Unit-II

Hazard and Vulnerability Profile of India

Vulnerability Profile of India

India is highly prone to a variety of disasters. This is due to factors like its unique geography, climate, and social conditions.

Here's a breakdown of India's vulnerability:

- **Earthquakes:** About 59% of India's land is susceptible to earthquakes, with some areas facing very high risk.
- **Floods:** 12% of India, equivalent to 40 million hectares of land, is vulnerable to flooding and river erosion.
- **Cyclones and Tsunamis:** Nearly 5,700 kilometers out of India's 7,516 kilometer-long coastline is at risk from cyclones and tsunamis.
- **Droughts:** 68% of India's cultivable land is prone to droughts.
- **Landslides and Avalanches:** Hilly areas face risks of landslides and avalanches.
- **Chemical, Biological, Radiological and Nuclear (CBRN) Emergencies:** India is also vulnerable to these hazards, often related to industrial activity.

Factors Making Disasters Worse:

- **Population Growth and Changing Demographics:** More people are living in disaster-prone areas.
- **Unplanned Urbanization:** Cities are growing rapidly without proper disaster planning, leading to more people in harm's way.
- **Development in High-Risk Zones:** Construction continues in areas susceptible to hazards.
- **Environmental Degradation:** Deforestation, pollution, and climate change exacerbate disaster risk.
- **Climate Change:** This increases the frequency and intensity of extreme weather events like heat waves, floods, and droughts.
- **Geological Hazards:** Active fault lines and unstable terrain increase vulnerability to earthquakes and landslides.
- **Epidemics and Pandemics:** The spread of diseases poses additional risks and challenges.

Overall, India faces significant challenges in managing disaster risks. This puts the country's economy, population, and future development under threat.

Specific Vulnerabilities in India:

- **Coastal Vulnerability:** Eastern and western coastal states are highly exposed to cyclones.
- **Flood-Prone Areas:** 4 crore hectares (40 million hectares) of land face the risk of floods, particularly during monsoon seasons.

- **Drought Vulnerability:** A large portion (68%) of the country's agricultural land is vulnerable to drought, causing hardship for millions of people.
- **Seismic Zones:** 55% of India is situated in Seismic Zones III-V, which means they are vulnerable to earthquakes.
- **Landslide Risk:** The Himalayas and Western Ghats are prone to landslides due to their geological features and rainfall patterns.
- **Industrial and Chemical Disasters:** India has experienced major industrial accidents, with the 1984 Bhopal Gas Tragedy serving as a grim reminder of the potential dangers.

Poverty and Disaster Vulnerability:

Poverty is a major factor that increases vulnerability to disasters. Poor people are more likely to live in unsafe shelters and areas that are at higher risk. They also have fewer resources to cope with disasters.

NIDM Guidelines on Earthquake

The National Institute of Disaster Management (NIDM) in India issued detailed guidelines on earthquake preparedness in 2007. These guidelines advise both national and state governments on how to develop effective disaster management plans for earthquakes.

Six Pillars of Earthquake Management

The NIDM guidelines highlight six key areas for action:

1. **Earthquake Resistant Construction:** Designing and building new structures that can withstand earthquakes.
2. **Selective Seismic Strengthening and Seismic Retrofitting:** Identifying and upgrading existing critical buildings and infrastructure to improve their resistance to earthquakes.
3. **Regulation and Enforcement:** Developing, updating, and enforcing building codes and construction standards to ensure earthquake safety.
4. **Awareness and Preparedness:** Educating the public about earthquake risks and how to stay safe before, during, and after an earthquake.
5. **Capacity Development:** Investing in education, training, research and development, and documentation to enhance expertise in earthquake-resistant construction and disaster management.
6. **Emergency Response Capability Enhancement:** Strengthening emergency services and developing effective response mechanisms for a coordinated response to earthquake events.

Key Points from the Guidelines:

- **New Structures:** Over 95% of lives lost in earthquakes are due to building collapses. Emphasize constructing all new structures in earthquake-prone areas using proper earthquake-resistant techniques.
- **Existing Structures:** It's not possible to retrofit all buildings, so prioritize critical infrastructure and high-risk structures (hospitals, schools, lifelines). Conduct safety audits to identify those most in need of strengthening.

- **Updating Codes and Standards:** Regularly review and update building codes and standards based on international best practices to keep them aligned with advancements in earthquake-resistant design.
- **Comprehensive Awareness:** Create public awareness campaigns and educational materials about earthquake risks, safe practices, and roles of different stakeholders. Translate these materials into local languages for broader reach.
- **Focus on Capacity Building:** Develop high-quality education and training programs in earthquake engineering, architecture, and related fields. Support research and innovation.
- **Response Preparedness:** Ensure strong emergency response systems at the community level with effective communication, coordination, and quick access to resources.

NDMA Guidelines on Urban Flooding in India

The National Disaster Management Authority (NDMA) has also issued specific guidelines for managing urban flooding. Urban flooding is different from flooding in rural areas. Due to urban development, there are more paved surfaces (which can't absorb water) and changes in drainage patterns, leading to faster and more intense floods.

Urban Flood Risk in India

Urban flooding is increasing in India. Major cities like Hyderabad, Ahmedabad, Delhi, Chennai, Mumbai, Surat, Kolkata, and Guwahati have experienced serious flooding in recent years. Heavy monsoons, storm surges, and the effects of climate change all contribute to the problem.

NDMA Key Recommendations:

- **Hydro-meteorological Network:** Establish a comprehensive, real-time system to monitor rainfall and provide early flood warnings in all urban areas. Expand the use of Doppler Weather Radars.
- **Stormwater Drainage Assessment:** Conduct a detailed inventory of existing drainage systems to understand their capacity and limitations.
- **Watershed-Based Planning:** Plan and design drainage systems based on natural watershed boundaries.
- **Unblocked Bridges and Structures:** Ensure that roads, rails, and other structures don't obstruct water flow, which can cause flooding upstream.
- **Rainwater Harvesting in All Buildings:** Make rainwater harvesting mandatory in urban buildings to help recharge groundwater and reduce runoff.
- **Preserve Green Spaces:** Reserve low-lying areas for parks and open spaces to allow for water absorption and reduce human impacts in flood-prone zones.
- **Regular Maintenance:** Clear drains of silt and debris before the monsoon season to maintain flow and prevent blockages.
- **Treat Urban Flooding Separately:** Develop specific policies and plans to manage urban flooding distinct from those for riverine floods in rural areas.

- **Future Projections:** Account for future climate change impacts, changes in rainfall, and urbanization in flood hazard assessments and mitigation planning.

National Policy on Disaster Management 2009

Overview

India enacted the Disaster Management Act in 2009, aiming to improve its approach to managing disasters. The Act outlines responsibilities, risk reduction strategies, financing mechanisms, and establishes a framework for both national and state-level disaster management. It addresses a wide range of hazards, including:

- **Earthquakes**
- **Floods**
- **Cyclones**
- **Landslides**

Chapter 1: Preamble - Disaster Risks in India

This chapter highlights the diverse disaster risks faced by India due to its geography, climate, and socio-economic conditions. It acknowledges the need for a paradigm shift in disaster management.

Chapter 2: Approach and Objectives

Vision: To build a disaster-resilient India.

Approach:

- **Community-based Disaster Management:** Emphasize local-level preparedness and response.
- **Capacity Development:** Build skills and knowledge in disaster management at all levels.
- **Consolidation of Best Practices:** Learn from past initiatives and adopt effective strategies.
- **Collaboration:** Work with agencies at the national and international levels to enhance preparedness.

Objectives:

- **Promote a Culture of Prevention:** Increase awareness and understanding of disaster risk reduction at all levels.
- **Embrace Mitigation Measures:** Implement technology-driven and environmentally sustainable practices, as well as utilize traditional wisdom for mitigation.
- **Mainstream Disaster Management in Development:** Integrate disaster risk considerations into development planning.
- **Strengthen Institutional and Legal Frameworks:** Develop effective policies and regulations for disaster management.
- **Monitor Disaster Risks:** Create efficient mechanisms for identifying, assessing, and tracking disaster risks.

- **Modernize Warning Systems:** Implement accurate and timely forecasting systems with responsive and reliable communication.
- **Efficient Response and Relief:** Ensure effective response to disasters with a focus on supporting vulnerable populations.
- **Resilient Reconstruction:** Rebuild in a way that creates safer and more resilient structures and communities.
- **Engage with Media:** Foster proactive partnerships with media to communicate effectively about disasters.

Chapter 3: Institutional and Legal Arrangements

This chapter sets up a robust institutional structure to manage disasters at different levels:

- **National Disaster Management Authority (NDMA):** The apex body for disaster management policy, planning, and coordination.
- **National Executive Committee (NEC):** Supports NDMA in implementing the National Disaster Management Plan.
- **State Disaster Management Authority (SDMA):** Similar to NDMA, but at the state level.
- **District Disaster Management Authority (DDMA):** Responsible for disaster management at the district level.
- **Local Authorities:** Municipalities and other local bodies are involved in community-level disaster preparedness.
- **National Institute of Disaster Management (NIDM):** Provides training, research, and documentation for disaster management.
- **National Disaster Response Force (NDRF):** A specialized force trained to respond to major disasters.

The chapter also discusses the role of existing institutional mechanisms, including central ministries, armed forces, police, fire services, civil defense, and international cooperation.

Chapter 4: Financial Arrangements

This chapter outlines funding mechanisms for disaster management:

- **Integrate DM in Development Budgets:** Allocate funds for disaster risk reduction in regular development plans.
- **National Disaster Response and Mitigation Funds:** Establish dedicated funds at the national level to support response and mitigation activities.
- **Funding at State and District Levels:** Ensure financial provisions for disaster management at all levels.

Remaining Chapters:

The subsequent chapters focus on specific aspects of disaster management:

- **Chapter 5:** Disaster Prevention, Mitigation, and Preparedness.

- **Chapter 6:** Techno-Legal Regime
- **Chapter 7:** Response
- **Chapter 8:** Relief and Rehabilitation
- **Chapter 9:** Reconstruction and Recovery
- **Chapter 10:** Capacity Development
- **Chapter 11:** Knowledge Management
- **Chapter 12:** Research and Development
- **Chapter 13:** National Roadmap

NDMA Guidelines on Cyclones

Classification:

- **Extra-Tropical Cyclones:** Occur in temperate zones and higher latitudes.
- **Tropical Cyclones:** Form over warm tropical waters, typically between the Tropics of Capricorn and Cancer.

The Indian Meteorological Department (IMD) classifies cyclones based on wind speed, ranging from Low Pressure to Super Cyclone, with each category having different levels of potential damage.

Formation and Life Cycle of Cyclones:

1. **Formation and Initial Development:** Warm sea water, atmospheric instability, and specific wind conditions lead to the formation of cyclonic storms.
2. **Mature Tropical Cyclones:** Intense thunderstorms, strong winds, and the development of a calm "eye" characterize a mature cyclone.
3. **Modification and Decay:** As a cyclone moves over land or cooler water, its energy source weakens, leading to its eventual decay.

Recovery After Cyclone:

Even after a cyclone has passed, safety hazards remain. Residents should only return home when authorities give the "All Clear" signal and check for:

- Safe roads and power lines
- Availability of transportation and clean drinking water
- Functioning sewage systems
- Epidemic risks
- Safety of their neighbors

Emergency Kit: It's essential to have a well-stocked emergency kit ready, including basic supplies like food, water, a first aid kit, important documents, tools, and a way to get information.

Disaster Management Structures in Odisha and Gujarat

These documents outline the disaster management frameworks for the states of Odisha and Gujarat in India, focusing on the organizational structures and key responsibilities.

Network of Odisha State Disaster Management Authority (OSDMA)

OSDMA functions as a multi-level network connecting various stakeholders to effectively prepare for and respond to disasters:

State Level:

- **State Level Natural Calamity Committee:** The highest decision-making body chaired by the Chief Minister.
- **Governing Body of OSDMA:** Oversees OSDMA operations, chaired by the Chief Secretary.
- **Revenue and Disaster Management Department:** The lead government department responsible for disaster management.
- **State Emergency Operation Centre:** Coordinates emergency response operations.

District Level:

- **OSDMA (District Level):** Responsible for planning, preparedness, and prevention at the district level.
- **District Collector:** Leads disaster management activities in the district.
- **District Emergency Operation Center:** Coordinates local response efforts.

Block and Panchayat Levels:

- **Block Development Officer:** Responsible for disaster preparedness in a block.
- **Panchayat Samiti and Gram Panchayat:** Involved in community-level preparedness.

Other Stakeholders:

- **Scientific & knowledge institutions:** Provide technical support and research.
- **Red Cross/UN Agencies/NGOs:** Offer assistance and collaboration.
- **Fire Stations:** Key responders in emergency situations.

Cyclone/Flood Shelter Committees: At the gram panchayat, block, and district levels, these committees manage and maintain shelters, ensuring their readiness. Each committee includes task force members trained in search and rescue and first aid.

Odisha State Disaster Management Authority (OSDMA): Roles and Functions

- **History:** Established in response to a devastating super cyclone in 1999.
- **Key Purpose:** Coordinate responses to disasters, build capacity, and ensure preparedness for various hazards.
- **Responsibilities:**
    - Carry out mitigation activities, such as mock drills and evacuation.
    - Lead reconstruction efforts and coordinate with other departments.

- Work with aid agencies, UN, and other national and international organizations.
- Prepare guidelines and conduct preparedness drills.
- Address a wide range of hazards, including natural disasters and other emergencies.

Programs:

- Focus on capacity building for architects, engineers, and other professionals.
- Development of early warning systems (cyclone and tsunami sirens).
- Training specialized canine units for rescue operations.

Disaster Response: OSDMA has a strong record of responding to various disasters, including cyclones (Phailin, Hudhud, Titli, Fani, Amphan), floods, and earthquakes. The authority has undertaken large-scale evacuations, provided relief, and assisted with reconstruction.

Gujarat State Disaster Management Authority (GSDMA)

Organizational Structure:

- **Chief Minister:** Serves as the Chairperson.
- **Two Ministers:** Appointed from the Council of Ministers.
- **Key Secretaries:** Including Revenue, Relief, Home, and other relevant departments.
- **CEO & ACEO-Admin:** Lead the day-to-day administration.
- **Director (Admin) & Director (Finance):** Manage administrative and financial aspects.
- **Various Support Staff:** Including assistant directors, managers, and a record keeper.

Vision and Objectives:

- **Vision:** Go beyond post-disaster reconstruction and create a resilient Gujarat that can withstand and manage future disasters while improving the standard of living.
- **Objectives:**
    - Focus on social and economic rehabilitation, including housing, infrastructure, and livelihood restoration.
    - Develop long-term disaster preparedness strategies, research risks, and identify mitigation measures.
    - Secure funding for rehabilitation and ensure efficient utilization.
    - Act as a nodal agency for coordination and support to disaster victims.
    - Arrange financial assistance and raise funds through bonds, investments, and other permissible methods.

Guidelines on Information & Communication Systems

1. **Introduction**:
    - Paradigm shift in Disaster Management (DM) at the global level.
    - Natural hazard profile in India and special features of ICT (Information & Communication Technology):
        - ICT for flood management - special features: warning, forecast.
        - ICT for cyclone management - special features: warning, forecast.
        - ICT for earthquake management - special features: warning, forecast.
        - ICT for landslide management - special features: warning, forecast.
2. **Requirements of ICT Network During Various Phases of Disaster Continuum**:
    - ICT for mitigation phase.
    - ICT for preparedness phase.
    - ICT for response phase.
    - ICT for recovery phase.
    - GIS platform for holistic DM.
    - Action points.
3. **Existing Communications Base and ICT Support - Situation Analysis**:
    - Existing telecommunication networks of various service providers and government agencies.
    - National Emergency Communication Plan, Ministry of Home Affairs.
    - Disaster Management Support Network of ISRO.
    - Cyclone forecasting and warning network.
    - Flood forecasting and warning network.
    - Drought forecasting and warning network.
    - Tsunami forecasting and warning network.
4. **Need for GIS-Based National Disaster Management Information System (NDMIS)**:
    - GIS database.
    - Development of vulnerability analysis and risk assessment tools.
    - Participatory agencies and nodes in NDMIS.
5. **Establishment of National Disaster Communication Network (NDCN)**:
    - Technology issues.

- Network management segment.
- Connectivity from national to state headquarters.
- Connectivity from state headquarters to district headquarters.
- Connectivity from district headquarters to sub-divisions and blocks.
- Forecasting and early warnings.

6. **Emergency Operations Centers: Connectivity, Database & Applications Development**:
    - Flow of information for Emergency Operations Centers (EOCs) at different levels.
    - Command and control.
    - Application and database at national, state, and district emergency operation centers.
    - Action points.
7. **Facilities Provided at Emergency Operation Centers**:
    - Facilities at National Emergency Operation Center (NEOC) and State Emergency Operation Center (SEOC).
    - District Emergency Operation Centers (DEOCs).
    - Incident Commander at affected sites.
    - Mini mobile communication packs at district headquarters.
8. **Technological Challenges for Implementation of NDCN**:
    - Language barriers.
    - Creation of call centers and websites.
    - Logistic support and maintenance.
    - Action points.
9. **Technology, Emergency Trends & R&D Requirements**:
    - Satellite phones.
    - Single channel per carrier.
    - Convergence of voice, video, and data services.
    - Signal transmission and mobile communication technologies.
    - Cellular service with telematics.

Role of UNDRR (United Nations Disaster Risk Reduction)

The **United Nations Office for Disaster Risk Reduction (UNDRR)**, formerly known as the International Strategy for Disaster Reduction (ISDR), plays a crucial role in global efforts to reduce the impact of disasters.

Key Functions:

- **Global Framework:** UNDRR provides a framework for nations and organizations to work together in reducing social vulnerability and the risks associated with natural hazards, technological disasters, and environmental events.
- **Building on Past Experience:** UNDRR builds upon the lessons learned during the International Decade for Natural Disaster Reduction (1990-1999) and key agreements like the Yokohama Strategy and the Sendai Framework.
- **Shifting Focus to Risk Reduction:** While disaster management focuses on responding to events *after* they happen, UNDRR emphasizes proactively reducing risks *before* disasters occur. This involves understanding the causes of disasters and implementing measures to prevent or minimize their impacts.

UNDRR Purposes

UNDRR aims to:

- **Integrate Risk Management:** Help governments, communities, and other entities in disaster-prone areas incorporate disaster risk management into their development plans and policies.
- **Build Resilient Communities:** Work towards enabling communities to become more resistant to disasters, thus saving lives, protecting livelihoods, and safeguarding social, environmental, and economic assets.

UNDRR Activities:

- **Raise Awareness:** Work through a global network of partners (international organizations, experts, scientists, government officials, and civil society) to raise public awareness about disaster risk reduction.
- **Promote Commitment:** Encourage governments and authorities to prioritize disaster risk reduction and commit resources to it.
- **Facilitate Partnerships:** Build and support collaborations across sectors (interdisciplinary and intersectoral) to enhance understanding and action.
- **Implement Sendai Framework:** Play a central role in guiding and supporting the implementation of the Sendai Framework for Disaster Risk Reduction (SFDRR), a global blueprint for reducing disaster risk.

UNDRR Global Assessment Report (GAR)

UNDRR publishes the Global Assessment Report (GAR) every two years to provide a global overview of efforts to reduce disaster risk.

Key Findings of GAR 2019:

- **Multiple Intertwined Threats:** The report highlighted various hazards threatening lives and property, including pollution, disease outbreaks, earthquakes, droughts, and climate change.
- **Urgent Action Needed:** Failure to address these interconnected risks could slow down or even reverse progress towards achieving the Sustainable Development Goals (SDGs).

- **Return on Investment:** The report estimated that an annual investment of $6 billion in disaster risk reduction strategies could yield benefits of up to $360 billion annually.
- **Capacity Gaps:** Countries with less capacity (financial resources, technology, governance structures) to prepare, respond, and recover from disasters experience higher losses relative to their GDP (Gross Domestic Product).
- **Shifting Focus to Systems Thinking:** The GAR 2019 emphasized understanding risk from a *systemic* perspective. This means recognizing how various risks interact and influence each other, leading to a more comprehensive approach to risk governance.

UNDRR and India

India faces a high level of disaster risk. Between 1998 and 2017, India's economic losses due to disasters reached approximately $80 billion, placing it among the top 5 countries with the highest absolute economic losses from disasters.

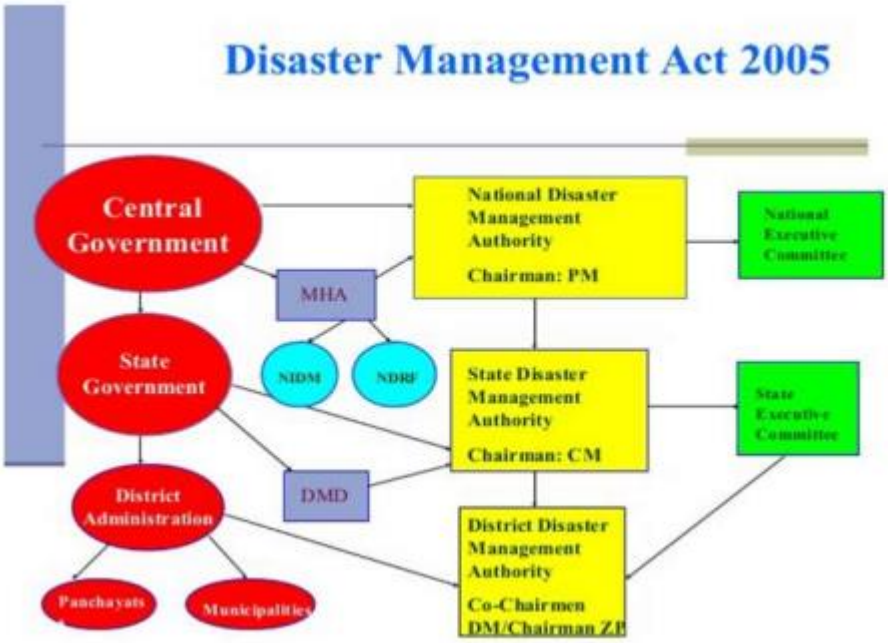
In 2019, the Indian government launched a UN-backed initiative with the aim of leveraging the private sector to strengthen the country's disaster resilience and reduce economic losses. India also joined the UNISDR Private Sector Alliance for Disaster Resilient Societies (ARISE), a network that encourages private sector involvement in implementing the Sendai Framework.

Disaster Management Framework in India: Organizations and Policies at the National and State Levels

National Disaster Management Authority of India (NDMA)

- **Established:** 2005, under the Disaster Management Act.
- **Objective:** To build a safer and more disaster-resilient India through a proactive, technology-driven, and sustainable development strategy.
- **Structure:**
    - Chairperson: The Prime Minister of India.
    - Vice-Chairperson: Holds the status of a Cabinet Minister.
    - Members: Eight members with the status of Ministers of State.
    - Secretariat: Headed by a Secretary, managing various aspects of disaster management.
- **Ministry:** Operates under the Ministry of Home Affairs.
- **Key Responsibilities:**
    - Develop policies and guidelines for disaster management.
    - Coordinate disaster response at the national level.
    - Provide technical and financial assistance to states.
    - Promote capacity building and training in disaster management.
    - Approve state disaster management plans.

Disaster Management Act 2005: The Act provides the legal framework for disaster management in India and established the NDMA. It covers various aspects including planning, response, capacity building, and financing.



National Disaster Management Plan (NDMP)

- **Released:** 2016. The first comprehensive national plan for disaster management in India.
- **Alignment:** Aligns with the Sendai Framework for Disaster Risk Reduction (2015-2030).
- **Objectives:**
    - Make India disaster resilient and reduce disaster risks.
    - Significantly minimize losses (lives, livelihoods, assets, and environment).
    - Improve capacity to cope with disasters at all levels of administration and within communities.

State Disaster Management Authority (SDMA)

- **Established:** Under the Disaster Management Act 2005, in each state.
- **Structure:**
    - Chairperson: The Chief Minister of the state.
    - Members: No more than eight, appointed by the Chief Minister.
- **Key Responsibilities:**
    - Prepare the state disaster management plan, based on the NDMP.
    - Implement disaster management programs and policies at the state level.
    - Coordinate disaster response within the state.

Organizational Set-up at the State Level:

Disaster management at the state level involves various stakeholders:

1. **State Disaster Management Authority (SDMA):** Governing body chaired by the Chief Minister.
2. **Revenue Administration Disaster Management and Mitigation Department:** The lead department responsible for disaster management, headed by the State Relief Commissioner.
3. **District Administration:** District Collectors head the disaster management efforts in each district.
4. **Sub-Divisional Officers (RDOs):** Assist District Collectors.
5. **Local Bodies:** Municipalities, corporations, and panchayat unions play a role in community-level preparedness.
6. **Non-Governmental Organizations (NGOs):** Offer expertise, resources, and support.
7. **Public and Private Sector:** Involvement in infrastructure development, relief, and recovery.
8. **Community:** Active participation in disaster preparedness, response, and recovery.

Disaster Management Act (2005) of India:

Key Highlights

- **Passage and Enactment:** Passed by both houses of the Indian Parliament in November and December 2005 and received Presidential assent in January 2006.
- **Structure:** Comprises 11 chapters and 79 sections, creating a comprehensive framework.
- **Objective:** Establishes a legal and institutional structure for effective disaster management in India.

Institutional Framework

The Act establishes a multi-tiered institutional framework for disaster management, encompassing:

- **National Disaster Management Authority (NDMA):** The apex body at the national level, chaired by the Prime Minister, responsible for developing policies, coordinating response, and providing guidance.
- **State Disaster Management Authority (SDMA):** State-level authority chaired by the Chief Minister, responsible for developing state-specific plans, coordinating with the NDMA, and overseeing disaster management within the state.
- **District Disaster Management Authority (DDMA):** District-level authority with similar functions as SDMA but operating at the local level, ensuring coordination and preparedness within districts.

Mandates and Responsibilities: Each authority (NDMA, SDMA, DDMA) has specific responsibilities for planning, prevention, mitigation, preparedness, response, and recovery efforts at their respective

levels. They are equipped with the necessary financial and administrative powers to carry out their mandates effectively.

National Institute of Disaster Management (NIDM)

The Act mandates the creation of the NIDM, which plays a vital role in:

- **Capacity Building:** Providing training and enhancing knowledge about disaster management for various stakeholders.
- **Curriculum Development:** Creating and delivering training modules covering different aspects of disaster management.
- **Research and Documentation:** Conducting research on disaster management issues and creating resources and guidelines.
- **Human Resources:** Formulating and implementing human resource development plans related to disaster management.
- **Policy Assistance:** Providing expertise to the national government for disaster management policy formulation.
- **Support to States:** Offering assistance and guidance to state governments on disaster management, including training.

Financial Provisions

The Act establishes funding mechanisms to support disaster management activities:

- **National Disaster Response Fund (NDRF):** A central fund to provide financial support for immediate relief and response to disasters.
- **National Disaster Mitigation Fund (NDMF):** A fund focused on long-term mitigation projects to reduce disaster risks.
- **State-Level Funds:** The Act encourages state governments to establish similar funds to supplement national resources.
- **Allocation Mechanisms:** The Act outlines processes for allocation of funds from both national and state governments to specific disaster management initiatives.

Other Key Features

- **Guidelines:** The Act provides guidelines for:
    - Developing safe construction practices.
    - Setting minimum relief standards for disaster victims.
    - Establishing and managing a National Disaster Response Force (NDRF).
- **National Plan:** The Act mandates the development of a comprehensive National Plan for disaster management, which details strategies and actions to be taken at various levels.
- **Offences and Penalties:** The Act outlines specific offences, such as providing false information or obstructing disaster management efforts, and prescribes penalties for such violations.

- **Powers:** The Act grants powers to:
    - The Central Government to requisition resources and issue directives for effective disaster management.
    - State Governments to make rules and regulations regarding disaster management within their states.

Chapter-wise Breakdown

Each chapter of the Disaster Management Act deals with specific areas, as outlined below:

- **Chapter I: Preliminary** - Covers basic definitions, title, and scope.
- **Chapter II: National Disaster Management Authority** - Establishes the NDMA, its powers and functions, its committees (National Executive Committee), and the creation of the National Plan.
- **Chapter III: State Disaster Management Authority** - Creates SDMA with similar structures and responsibilities as NDMA at the state level.
- **Chapter IV: District Disaster Management Authority** - Creates DDMA to function at the district level, mirroring the national and state level authorities.
- **Chapter V: Measures by the Government for Disaster Management** - Outlines actions to be taken by the Central and State Governments and their departments, emphasizing responsibilities, coordination, and departmental disaster management plans.
- **Chapter VI: Local Authorities** - Defines the functions and roles of local authorities in disaster preparedness and response.
- **Chapter VII: National Institute of Disaster Management** - Mandates the establishment of the NIDM, its roles, and staffing.
- **Chapter VIII: National Disaster Response Force** - Establishes the specialized force (NDRF) and defines its operation.
- **Chapter IX: Finance, Accounts and Audit** - Establishes disaster-related funds (NDRF, NDMF), guidelines for funding at the state level, and fund allocation procedures for various ministries and departments.
- **Chapter X: Offences and Penalties** - Outlines offenses related to obstructing disaster management, spreading misinformation, or misuse of funds. Prescribes penalties for such violations.
- **Chapter XI: Miscellaneous** - Covers general provisions regarding discrimination, requisitioning of resources, powers to amend rules, and communication strategies during emergencies.

Disaster Management in India: NDMA Guidelines and Andhra Pradesh Case Study

NDMA Guidelines on Floods

- **High Vulnerability:** India faces significant flood risks, with over 40 million hectares (mha) of land prone to flooding, leading to substantial loss of life and economic damage.
- **Increasing Trend:** Flood-related damage has worsened in recent decades due to factors like population growth, rapid urbanization, developmental activities in floodplains, and the effects of global warming.
- **Addressing the Challenge:** The NDMA guidelines provide a comprehensive framework for managing floods, covering everything from risk assessment and mitigation to preparedness, response, and recovery.

Key Elements of the Guidelines:

1. **Floods - Status and Context:** Assess the flood hazard in different regions, identifying vulnerable areas and understanding the factors contributing to flood risk.
2. **Institutional Framework and Financial Arrangements:** Define roles and responsibilities of different organizations, outline financing mechanisms (including insurance), and ensure sufficient resources for flood management.
3. **Flood Prevention, Preparedness, and Mitigation:** Develop strategies and implement both structural measures (e.g., embankments, dams) and non-structural measures (e.g., land-use planning, flood forecasting) for prevention, mitigation, and preparedness.
4. **Flood Forecasting and Warning in India:** Establish an accurate and reliable flood forecasting and early warning system by strengthening coordination between relevant agencies (Central Water Commission, India Meteorological Department, state governments) and leveraging international cooperation.
5. **Dams, Reservoirs, and Other Water Storages:** Manage dams, reservoirs, and other water storage structures effectively to regulate water flow, prevent floods, and ensure dam safety.
6. **Regulation and Enforcement:** Implement flood plain zoning regulations, building codes in flood-prone areas, and measures to conserve wetlands. Enforce these regulations strictly.
7. **Capacity Development:** Invest in education and training programs to build capacity for flood management professionals. Conduct research and development to enhance understanding of flood risks and mitigation techniques.
8. **Flood Response:** Strengthen emergency response capabilities, including search and rescue, relief efforts, medical support, and coordination through an Incident Command System. Engage the private sector in response activities.
9. **Preparation of Flood Management Plans:** Develop detailed flood management plans at all levels (national, state, district, and for specific nodal agencies).

NDMA Recommendations for Flood Management

The NDMA has issued specific recommendations, urging:

- **Scientific Analysis:** Hydrological and morphological studies to inform the design and construction of flood control structures (embankments, levees).
- **Remedial Measures:** Desilting/dredging of riverbeds where necessary to mitigate the effects of sedimentation and rise in river beds.

- **Channel Improvement:** Undertake projects to improve river channel flow capacity to reduce flood risks.
- **Diversion Schemes:** Explore ways to divert excess water away from urban areas using channels.
- **Watershed Management:** Implement measures like afforestation, check dams, and detention basins in river catchments to prevent erosion and reduce runoff.
- **Anti-Erosion Measures:** Protect towns, cities, and infrastructure with anti-erosion structures (revetments, slope pitching).
- **Coastal Protection:** Design and build coastal protection works based on scientific understanding of sea behavior.
- **Flood Shelters:** Provide well-equipped flood shelters with basic amenities in vulnerable areas.
- **Real-time Data Sharing:** Improve real-time data sharing and communication between national and state agencies.
- **International Collaboration:** Strengthen cooperation with neighboring countries on data sharing and flood forecasting.
- **Public Awareness:** Develop public awareness campaigns to educate communities about flood risks, safety measures, and available resources.
- **Volunteer Involvement:** Encourage NGOs, volunteer groups, and youth organizations to provide assistance in disaster response.

Andhra Pradesh State Disaster Management Authority (APSDMA)

Andhra Pradesh, a state vulnerable to various disasters including cyclones and floods, has established a structured disaster management authority:

- **Leadership:**
    - Chairman: Chief Minister of Andhra Pradesh.
    - Chief Executive Officer: Chief Secretary of the state.
- **Membership:** Key ministers from relevant departments (Revenue, Relief, Home, Finance, Health, Irrigation, etc.) serve as members of the SDMA.
- **State Executive Committee:**
    - Chaired by the Chief Secretary.
    - Includes key departmental secretaries (Finance, Panchayat Raj, Irrigation, etc.) and the Commissioner for Disaster Management.
    - Responsible for carrying out the decisions of the State Government and the SDMA.
    - Meets at least once every three months or more often if required.
- **District Disaster Management Authority (DDMA):**
    - Formed in each district with the District Collector as the Chairman.

Focus on Technology: APSDMA utilizes modern technology for hazard monitoring, data analysis, communication, and response management.

Disaster Management: Andhra Pradesh Framework and UN's Role in Disaster Risk Reduction

These documents focus on the disaster management structure in the state of Andhra Pradesh and the broader global efforts in disaster risk reduction spearheaded by the United Nations.

Andhra Pradesh State Disaster Management Authority (APSDMA)

- **Structure:** APSDMA follows a hierarchical structure with clear lines of authority:
    1. **Chief Minister:** Chairperson of the APSDMA.
    2. **Minister for Disaster Management:** Vice-Chairperson.
    3. **Principal Secretary (Disaster Management):** Member-Convenor, responsible for day-to-day operations.
    4. **Director-General, APSDMA:** Member-Secretary, leading administrative functions.
    5. **Additional Director-Generals (Admin & Ops):** Managing administrative and operational aspects.
    6. **Joint Directors:** Providing sector-specific expertise.
    7. **Deputy Directors:** Supporting disaster management at the district level.
    8. **District Collectors:** Chairpersons of the District Disaster Management Authorities.
    9. **Tahsildars:** Heading Tahsil-level disaster management committees, engaging communities.

Role of UNDRR (United Nations Disaster Risk Reduction)

The United Nations plays a crucial role in global disaster risk reduction, operating mainly through the UNDRR, and has various responsibilities in supporting countries worldwide:

1. **Coordination:** Bringing together governments, NGOs, and international organizations for collaborative response and relief.
2. **Policy Framework:** Establishing global policies, frameworks (e.g., Sendai Framework), and standards for disaster risk reduction.
3. **Capacity Building:** Enhancing national and local capabilities for preparedness and response.
4. **Early Warning Systems:** Supporting the development of effective early warning systems to alert communities about impending hazards.
5. **Humanitarian Response:** Providing humanitarian assistance and aid during disasters.
6. **Recovery and Reconstruction:** Assisting nations with post-disaster recovery and rebuilding.
7. **Climate Change Adaptation:** Integrating disaster risk reduction into climate adaptation efforts, addressing shared challenges.

8. **Community Resilience:** Working at the grassroots level to build stronger and more resilient communities.

UNISDR - UN International Strategy for Disaster Reduction:

(UNISDR was the previous name of UNDRR. The key objectives of this strategy remain highly relevant.)

Priorities for Action (from the UNISDR Framework):

- **Prioritize Disaster Risk Reduction:** Make it a national and local priority with strong institutional structures to support it.
- **Risk Assessment and Early Warning:** Identify, assess, and monitor risks; invest in timely and accurate early warning systems.
- **Culture of Safety:** Foster a culture of safety and resilience by increasing awareness, knowledge, innovation, and education on disaster risk.
- **Address Underlying Factors:** Tackle root causes of vulnerability, such as poverty, poor infrastructure, and environmental degradation.
- **Strengthen Preparedness:** Improve preparedness for an effective and coordinated response at all levels of government.

Specific Roles of UNISDR (now UNDRR):

- Coordinate international efforts for disaster risk reduction.
- Provide technical assistance and support to countries.
- Facilitate the sharing of knowledge and best practices.
- Advocate for disaster risk reduction in global development agendas.
- Support countries in developing effective national and local disaster risk reduction strategies.