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An Institute for Civil Services

IAS MAINS 2022

MAINS SAMPOORNA

**CONTEMPORARY
ISSUES *of*
DISASTER
MANAGEMENT**



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Urban Fire Risk

Context

- Recently released 'Indian Risk Survey report' ranks fire outbreak as the third biggest risk to businesses and human lives.
- 20 Indian cities witnessed 80% of building fire deaths.

■ Fire incidents take place due to:

- non-compliant construction
- lack of precautionary maintenance (non-upkeep of extinguishers, fire doors, fire exits and their markings and assembly areas)
- gross overlook of safety procedures such as evacuation drills
- lack of recording of significant consideration for better response towards flammable materials, and their use in cladding and partitions walls
- There are many offices/high rise buildings/mandi and religious places having firefighting equipment's installed but hardly any person has the knowledge of using them.
- Lack of maintenance makes the equipment's dysfunctional.

■ Other factors which act as catalyst:

- dense habitation with virtual no room for quick evacuation
- non-compliant use of properties
- local traffic congestions, on-street parking that constricts fire tender movement or delays their access to the affected area
- lacunas in governance structure; understaffing and fund crunch etc.

■ How 'unplanned urbanization' is a reason behind fire incidents?

- There has been a steep rise in the constructions of buildings in India, especially high rise buildings.
- Absence of in-build fire safety measures in metro cities
- Poorly stored goods, even though they are not flammable, may help to spread fire and hinder fire fighters gain access to the seat of the fire or reduce the effectiveness of sprinkler systems

■ How to prevent fire accidents?

- **Organizing firefighting workshop** once in six months in localities/mohallas/schools with the involvement of local councillor/elected representatives is one way to achieve awareness.
- **Analyzing critical areas periodically:** The schools where mid-day meals are cooked are potential fire hazards. Fire service departments should visit above mentioned installations periodically (once in six months) and take appropriate actions against erring establishments.
- **Maintaining the guidelines** under **National Building Code of India**.
- **Organized and robust set-up:** The fire services need to be organized properly with adequate infrastructure and equipment for keeping pace with advancement of technology and economic growth.
- **Proper checks:** Proper check on safety standards on movement of fire hazard materials.

Droughts in India

Context:

As June ends, the monsoon, it turns out, is deficient by 40 per cent. Despite the forecast of its revival in July, it is a concern for India's rainfed areas that account for significant foodgrain production and also host the largest number of farmers in the country.

Drought

- The Indian Meteorological Department (IMD) defines a drought year as one in which the overall rainfall deficiency is more than 10 per cent of the long period average and more than 20 per cent of the agricultural area is affected.

Classification of droughts:

Droughts in India can be classified into four categories:

- **Meteorological drought:** A situation of below average rainfall in the specific period.
- **Hydrological drought:** Associated with reduction in water sources; Surface water and ground water.
- **Agricultural drought:** A situation of drought arises due to poor crop selection, leading to decline in crop yield.
- **Ecological drought:** Decline in ecological productivity due to shortage of water.

■ Major driving factors of the droughts in India:

In general factors contributing to the drought like situation in India are:

Meteorological droughts	Hydrological drought	Agricultural droughts
<ul style="list-style-type: none"> ◦ Deficit monsoon and below average rainfall ◦ Delay in monsoon and early retreat of monsoon ◦ Breaks in monsoon 	<ul style="list-style-type: none"> ◦ Large scale deforestation ◦ Ecologically hazardous mining ◦ Exploitation of ground water 	<ul style="list-style-type: none"> ◦ Change in cropping pattern ◦ Use of HYV seeds
<p>Depletion of green cover is also a major factor. Rainwater falling over barren land is washed away into rivulets and thereon, into the sea. Underground reserves, hence, fail to get recharged and agricultural and hydrological drought follows.</p>		

Apart, from general factors there are some regional factors which are responsible for droughts in various regions.

■ Causes of drought in Maharashtra:

- **Deficit rainfall in the SW monsoon:** As, Maharashtra is under the influence of southwest monsoon, which showers first at the western boundary and then reaches to the lee ward side of the Western Ghats, with very little moisture with it. Any deficit rainfall in the SW monsoon will result in drought like situation in the central and eastern part of Maharashtra.
- **Absence of Perennial river source** except Godavari, thus resulting into water deficit condition in the central and eastern region.
- **Instances of 'Man-Made drought':** Poor crop selection, insufficient methods of irrigation and imbalanced use of ground and stored water, resulting to manmade drought.
- **Single crop dependency:** Sugarcane is the only crop constituting one of the largest share in the agricultural productivity of Maharashtra.

■ **Causes of drought in Gujarat:**

- **Scanty rainfall** with wide aberrations in its distribution contributing to chronic drought situation.
- **Disappearance of forest cover** and erosion of top soil.
- **Over exploitation** of ground water.
- **Exploitation of major source:** The more permanent and hence reliable sources of water are - **Narmada and Tapi**. But water from the **Narmada Valley Project** goes to industries and cities instead of farm lands.

■ **Causes of drought in Bundelkhand:**

- Rainfall much below average. It leads to agricultural drought in the same year because the region depends on monsoons for agricultural production.
- If the meteorological drought continues for the second consecutive year, then the hydrological drought—below average water availability—occurs.

■ **Indicators of droughts**

- Natural phenomena such as flowering of bamboo, intense flowering of the Moringa tree, and the multiplying of the rodent population are indicators of drought.

■ **Required measures**

- **Conserving the rainwater** along with **water shed management** in the water deficit areas.
- **Fastening up the river interlinkage projects** to minimize the impact
- **Sustainable development** is a broad and complex subject but has no alternative, especially when we look at challenges and miseries of Bundelkhand.
- **Water management** at all levels—household, farm, landscape and ecosystem and as well as village, taluka and district levels—need to be undertaken as a mission for socio-economic uplift and to remove disparities.
- There has to be **strong political and administrative will**—whether mooted by public opinion, awareness or academic movements. Prime goal needs to be one.

Global assessment report on drought, 2021

Context:

The UN Office for Disaster Risk Reduction (UNDRR) has released a report titled “**Global Assessment Report (GAR) on Drought 2021**”

■ **Key Findings of the report:**

- The effect of severe droughts on India’s GDP is estimated at 2-5%.
- The Deccan region of India is more prone to drought in all over India.
 - Significant drought conditions are found once in every three years in the Deccan plateau, leading to large-scale migration and desertification.
- Over dependence on groundwater resources and inefficient water-retaining infrastructure.

■ **Suggestions and recommendations for mitigation:**

- Establishment of National Drought Management Policy Commission

- Defining the goals and objectives of risk based national drought management policy
- Stakeholders participation and resolving the conflict between key water intensive sectors
- Data Inventory and financial resources and broadly identify the groups and risks.
- Preparation of National drought management policy considering three-tier governance structure.
- Identifying research needs and filling the institutional gaps
- Integrate science and policy aspects of drought management
- Public awareness
- Development of educational programmes for every age and stakeholders
- Evaluation and revision of policy and plans at a regular interval

Tropical Cyclones In India

Context

India is one of those countries that are highly prone to natural calamities, including, floods, drought, earthquakes, cyclones and landslides. In the past many years, cyclones have been a part of the country, the southern part of the country to be precise

■ Tropical Cyclone

- The storms that originate over a warm tropical ocean are termed as tropical cyclones.
- Low atmospheric pressure, high winds and heavy rainfall are characteristics of these types of cyclones.
- The principal cause of destruction in major cyclones is the **extent of storm surges**, which in turn, is the result of several factors such as the cyclone's intensity, high tides and topography.
- **Occurrence:** Cyclones generally occur in the month of May-June and October-November, with a primary peak in November and secondary peak in May.
- **More prone:** Although cyclones affect the entire coast of India, the East Coast is more prone compared to the West Coast.
 - More cyclones occur in the **Bay of Bengal** than the **Arabian Sea** and the ratio is approximately **4:1**.

■ Indian Mitigation measure:

- **National cyclone Risk management project (NCRMP)**
 - Phase-II of NCRMP, being implemented since January 2015 by the National Disaster Management Agency and state governments, covers all the west coast states--Gujarat, Maharashtra, Goa, Karnataka, Kerala--and the eastern state of West Bengal.
- Integrated coastal Zone management project
- Coastal regulation zone
- IMD's colour code of cyclone
- National disaster relief force
- National and state disaster relief fund
- ISRO has contributed significantly to **India's cyclone management system**. Space-based systems have become the primary tools for collecting data on cyclones and cloud bursts.

■ **Major deficiencies in India’s ‘usual approach’ to cyclone management**

- Over-emphasis on a total evacuee figure
- Inadequate focus on response aspects other than evacuation, such as
 - measures to minimise crop damage
 - assistance for quick harvest
 - adequate relief and timely distribution of post-cyclone assistance such as for damaged houses, etc

Impacts of cyclones	What should be done more?
<ul style="list-style-type: none"> ○ Heavy rainfall in the affected region ○ Flooding and flash flooding ○ Potential landslides ○ Mud slides ○ Destruction of forest and vegetation cover ○ Destruction of crops; leading to food insecurity ○ Loss of life and property life and property ○ Threat to the fisherman and fishing industry 	<ul style="list-style-type: none"> ○ There is need for adequate disaster mitigation infrastructure like shelters, all-weather roads and embankments in light of increasing cyclonic storms on the west coast. ○ Capacity building of state relief forces and state police forces ○ Vulnerability mapping ○ Satellite imaging and improvement of cyclone warning system ○ Cyclone sheltering: Construction of evacuation shelters in cyclone-prone districts. ○ Revamp disaster preparedness measures. ○ Democratisation of mitigation measures ○ Vegetation cover improvement: Reduce the vulnerability of the cyclone ○ Mangrove plantation: Serves as first line of defence in case of cyclone by reducing the speed of the storm.

Coastal vulnerability index

Context

Indian National Centre for Ocean Information Services (INCOIS) has carried out coastal vulnerability assessment for entire Indian coast.

■ **Parameters included under CVI**

- The CVI uses the relative risk that physical changes will occur as sea-level rises are quantified based on parameters like:
 - Tidal range
 - Wave height
 - Coastal slope
 - Coastal elevation
 - Shoreline change rate
 - Geomorphology
 - Historical rate of relative sea-level change

Coastlines in India

- Length of the coastline of India including the coastlines of Andaman and Nicobar Islands in the Bay of Bengal and Lakshadweep Islands in the Arabian Sea is 7517 km.
- Length of Coastline of the Indian mainland is 6100 km which is surrounded by the Arabian Sea in the west, Bay of Bengal in the east, and the Indian Ocean in the south.

■ What are the factors influencing the vulnerability in the coastal region?

- Significant increasing coastal population
- Increase in demand for coastal resources increases, leading to increase exposure to coastal hazards.
- Unplanned development near the coastal region
- Climate change and lack of regulation
- Conflict of human activities with the natural coastal ecosystems
- Urbanisation, tourism development, recreational activities, Port activities, shipping, and agriculture
- Saltwater intrusion, soil erosion and embankment collapse, degradation of coastal ecosystems

■ Significance and benefits of CVI:

- Delivers valuable information for coastal disaster management.
- Determination of coastal risks areas construct resilient coastal communities.
- Providing inputs to the city planners to develop coastal hazard resilient design
- Prediction of relative risks in the coastal region

■ What should be done to mitigate the challenges?

- Optimal utilization of technical resources; use of satellite imaging and early warning system
- Planned and hazard resilient developmental models for the coastal region
- Restricting the settlements nearby disaster prone areas
- Strengthening and capacity building of coastal guard forces and state police forces
- Environmental assessment for sea level rises and coastal boundary depletion in a regular interval.

Climate Vulnerability index

Context

Environmental think tank **Council on Energy, Environment and Water (CEEW)** has carried a first-of-its-kind district-level climate vulnerability assessment, or **Climate Vulnerability Index (CVI)**.

■ What is Climate Vulnerability Index?

- In the Index, CEEW has analyzed 640 districts in India to assess their vulnerability to extreme weather events such as cyclones, floods, heatwaves, droughts, etc.
- The CVI maps:
 - **Exposure** (that is whether the district is prone to extreme weather events)
 - **Sensitivity** (the likelihood of an impact on the district by the weather event)
 - **Adaptive capacity** (what the response or coping mechanism of the district is)

■ Major Key-highlights of the Index

- While 27 Indian states and union territories are vulnerable to extreme climate events, 463 districts out of 640 are vulnerable to extreme weather events.
- More than 80 per cent of Indians live in districts vulnerable to climate risks – that is 17 of 20 people in India are vulnerable to climate risks, out of which every five Indians live in extremely vulnerable areas
- More than 45 per cent of these districts have undergone “unsustainable landscape and infrastructure changes”.
- 183 hotspot districts are highly vulnerable to more than one extreme climate events
- 60% of Indian districts have medium to low adaptive capacity in handling extreme weather events
- North-eastern states are more vulnerable to floods
- South and central are most vulnerable to extreme droughts
- 59 and 41 per cent of the total districts in the eastern and western states, respectively, are highly vulnerable to extreme cyclones.

■ Significance of the index:

- It helps map critical vulnerabilities and plan strategies to enhance resilience and adapt by climate-proofing communities, economies and infrastructure.
- Instead of looking at climate extremes in isolation, the study looks at the combined risk of hydro-met disasters, which is floods, cyclones and droughts, and their impact.

■ Drawbacks:

- The study does not take into consideration other natural disasters such as earthquakes.

■ Why adaptation is crucial?

- **Gaps in Adaptation:** The report also highlights large gaps in the adaptation actions that are being taken and the efforts that are required. It says these gaps are a result of “lack of funding, political commitment, reliable information, and sense of urgency”.
- Adaptation is essential to reduce harm, but if it is to be effective, it must go hand in hand with ambitious reductions in greenhouse gas emissions because with increased warming, the effectiveness of many adaptation options declines.
- Feasible solutions already exist, but more support must reach vulnerable communities.
- The IPCC estimates that adaptation needs will reach \$127 billion and \$295 billion per year for developing countries alone by 2030 and 2050, respectively.
- Suggestions and recommendations:
- Countries should strive for net-zero emissions by 2050.
- Severe cuts are required in GHG emissions in this decade itself (2021-30).
- New coal plants and fossil fuel exploration and development should be ended.
- Governments, businesses and investors should work towards a low-carbon future.
- Cumulative emissions should be factored in while calculating net zero.
- Technology should be developed for bringing about negative emissions, which means, the planet should be cooled down. This can be done by:
 - sucking out or sequestering the carbon from the atmosphere
 - stopping the use of fossil fuels and stopping deforestation
- For staying below the 2°C target in this century, global emissions must peak sometime in the middle of this decade itself (by 2025).

Increasing Cloudburst events in India

Context

This year's monsoon season has seen a spate of cloudbursts over the Western Himalayas and the west coast, revealing the deadly, unpredictable face of monsoon rains.

■ What are cloudbursts?

- Cloudbursts are **short-duration, intense rainfall events** over a small area.
- According to the **India Meteorological Department (IMD)**, it is a weather phenomenon with unexpected precipitation exceeding 100mm/h over a geographical region of approximately 20-30 square km.

■ Occurrence

- Generally cloudbursts are associated with **thunderstorms**. The air currents rushing upwards in a rainstorm hold up a large amount of water.
- Air current is air moving from an area of high pressure to an area of low pressure.
- If these currents suddenly cease, the entire amount of water descends on to a small area with catastrophic force all of a sudden and causes mass destruction.
- This is due to a rapid condensation of the clouds.

■ Himalayan vulnerability to natural disasters

- The geography of a placemakes it vulnerable to cloudbursts—which are a convective phenomenon producing sudden high-intensity rainfall over a small area.
- Due to its topography, geology, propensity for tectonic activity and ecological fragility, the Himalayan region becomes prone to rapidly changing weather at micro-levels.

■ How cloudburst is different from rainfall?

- A cloudburst is different from rain only in the amount of water that pours down on the earth.
- The India Meteorological Department (IMD) labels rainfall over 100 mm per hour as cloudburst.
- In simpler terms, if 10 centimetres rainfall is received at a station in one hour, the rain event is termed as cloudburst.
- Usually small areas – anywhere between 20-80 square kilometres are affected.

■ How anthropogenic factors are increasing the events?

In recent years, the following anthropogenic factors have been implicated in extreme weather events in the Himalayas-

- Population
- Deforestation
- Land-use change
- Emissions due to urbanization

■ How climate change is adding to the issue?

- As per the Intergovernmental Panel on Climate Change (IPCC), glaciers in the Himalayas are receding faster than in any other mountain range.
- Glacial lakes formed by melting glaciers are constrained by ice dams.
- Since the Indian summer monsoon coincides with the melting of glaciers, ice dams are weakened by the additional stress of the monsoons and are prone to bursting.

- A flash flood in Kargil in May 2016 was attributed to this.
- As temperatures increase the atmosphere can hold more and more moisture and this moisture comes down as a short very intense rainfall for a short duration probably half an hour or one hour resulting in flash floods in the mountainous areas and urban floods in the cities.

■ **Consequences of Cloudbursts:**

- Flash floods
- Landslides
- Mudflows
- Land caving

■ **Ways to minimize the vulnerability:**

- Regulation over construction activities near river banks
- Strengthening of embankments, barrages and dams to regulate the water flow.
- Reinvigorating the SDMA with adequate resources
- Localised planning taking into consideration the ecological fragile nature of the region and involving the local communities.
- Better forecasting and incorporation of advanced technology to monitor and predict extreme weather events and enabling early warning systems and preparedness.
- Adaptation of eco-friendly policies and eco-sensitive tourism for development of the region.

Landslide and Flash Flood

Context

Anthropological intervention along with climate change has worsened the climate vulnerabilities in the form of landslides and flash floods.

■ **Landslide:**

A landslide is defined as the movement of a mass of rock, debris, or earth down a slope. They are a type of mass wasting, which denotes any downward movement of soil and rock under the direct influence of gravity.

Causes of Land Slides	Impacts
<ul style="list-style-type: none"> ◦ Geological factor: refers to characteristics of the material. The earth or rock might be weak or fractured, or different layers may have different strengths and stiffness. ◦ Morphological factor: refers to the structure of the land. For example, slopes that lose their vegetation to fire or drought are more vulnerable to landslides. ◦ Human induced factor: Decline of forest cover for agricultural activity and construction activities along with mining, quarrying and road cutting ◦ Rainfall and snowfall ◦ Earthquakes and volcanic activities 	<ul style="list-style-type: none"> ◦ Short-term impact ◦ Loss of lives and properties ◦ Roadblocks and destruction of connectivity ◦ Diversion of river course ◦ Loss of natural beauty ◦ Long-term impact ◦ Permanent change in landscape ◦ Loss of cultivable land ◦ Environmental impact in terms of erosion of soil ◦ Relocation of population and establishments.

■ **Mitigation measures for landslides vulnerability:**

- Restriction on the construction and other developmental activities.
- Limiting agricultural to valley areas.
- Regulation over development of large settlements in high vulnerable zones.
- Promoting large scale afforestation programme
- Practice of Terrace farming

■ **Flash Floods:**

- These are sudden surges in water levels generally during or following an intense spell of rain.

Causes	Impact of flash flood
<ul style="list-style-type: none"> ◦ Heavy rainfall with severe thunderstorm ◦ Hurricane and tropical storm, ◦ Dams and levee Breaks ◦ Mudslides and debris flow <p>Other responsible factors:</p> <ul style="list-style-type: none"> ◦ Type and intensity of rainfall ◦ Location and distribution of rainfall ◦ Land use pattern and topography ◦ Vegetation types and growth ◦ Soil type ◦ Soil water 	<ul style="list-style-type: none"> ◦ Frequent inundation of agricultural land and human settlement has serious consequences on the national economy and society. ◦ Floods do not only destroy valuable crops every year but these also damage physical infrastructure such as roads, rails, bridges and human settlements. ◦ Millions of people are rendered homeless and are also washed down along with their cattle in the floods. ◦ Spread of diseases like cholera, gastro-enteritis, hepatitis and other water-borne diseases spread in the flood-affected areas. ◦ Floods also make a few positive contributions. Every year, floods deposit fertile silt over agricultural fields which are good for the crops.

■ **Mitigation measures to reduce the impact:**

- Instead of valleys, people should live in areas on slopes with firm ground for safety reasons.
- In areas where ground fissures have developed, appropriate steps should be taken to check the infiltration of rainwater and surface water.
- Banning "indiscriminate" and "unscientific" construction works.

Disaster Management and role of technology

Context

In the age of new and emerging technologies and contemporary events, there is a need to integrate the technical resources for better disaster management and mitigation measures.

■ **Application of technology in disaster management**

► **Role of GIS and remote sensing**

- This can be used to facilitate measurement, mapping, monitoring and modeling of variety of data types related to natural phenomenon.

- **Hazard Mapping** to show earthquake, landslides, floods or fire hazards. These maps could be created for cities and districts.
- **Tropical Cyclone Threat Maps** are used by meteorological departments to improve the quality of the tropical storm warning services and quickly communicate.
- **GIS** can also be used in carrying out search and rescue operations in a more effective manner by identifying areas that are disaster-prone and zoning them accordingly to risk magnitudes.
- **Aerial Remote Sensing** which is the process of recording information, such as photographs and images from sensors on aircrafts.
- **Satellite Remote Sensing** which consists of several satellite remote sensing systems which can be used to integrate natural hazard assessments into development planning studies.

■ **Role of Internet**

- Internet for real-time dissemination of weather observation.
- Forecasts, satellite and other data
- Growing age of technology is solely dependent on the internet service, a number of individuals and groups, including several national meteorological services

■ **Role of big data in disaster management:**

- Predictive policies
- Efficient allocation of resources
- Economic mitigation plans
- Social media also collects data and allows survivors to mark themselves safely in times of crisis, which is helpful for both emergency response teams and distressed friends and family
- A pilot project was carried out by Google in collaboration with the Central Water Commission to assess the flood situation in Patna

■ **Role of block chain technology:**

- Speeding up the decision making process
- Restricting the spread of misinformation during crisis
- Build transparency between government and locals.
- Optimal utilisation of resource; minimising the wastage

■ **Role of robotics:**

- In the mitigation and evacuation process specifically in difficult terrain and life-threatening operations.

Role of local self government in disaster management and mitigation:

Context

The local government bodies can act as catalysts to social mobilization process and tap the traditional wisdom of the local communities to complement the modern practices in disaster mitigation efforts.

■ Major domain of participation

The role of local government in disaster management and mitigation can be classified into three domains:

- Pre disaster preparedness
- During disaster
- Post disaster mitigation

■ Pre disaster preparedness:

- Organizing awareness campaign and promoting community education on disaster preparedness.
- Articulation of community need for developing preparedness plan through community involvement and Panchayats ownership.
- Identifying the resource gaps both physical and manpower and replenish the same through capacity building.
- Establishing synergy with local agencies including Non-Governmental Organizations (NGOs)/ Community Based Organizations (CBOs).
- Dovetailing Risk Reduction into various development programs of national and state governments.
- Encouraging people to insure assets and livestock.
- Establishing convergence with local institutional structures created for implementing education, health, livelihood and social justice and so on.
- Activating the disaster Management Plans with the participation of the community.
- Formation of Task forces and their capacity building.

■ During the disaster:

- Arranging emergency communication through available resources.
- Evacuation to temporary shelter and running relief camps.
- Supplementing rescue and relief efforts in coordinating different agencies.
- Monitoring of Relief distribution.
- Safe disposal of carcass and arranging safe drinking water and sanitation.

■ Post disaster mitigation:

- Damage assessment particularly assisting in identifying victims for compensation and its distribution.
- Formulating rehabilitation and reconstruction plan of houses and other local infrastructures.
- Enforce minimum specification for safe reconstruction.
- Supervise and monitor long term reconstruction and mitigation projects. Mobilizing special funds to use disaster resistant construction technology in vulnerable areas.

■ Other roles played by the local government in managing the disaster:

- Managing the information and prediction of disasters.
- Collection and informing authentic information for better preparedness.
- Analysing the information
- Dissemination of information to the public
- Planning and capacity building.

■ What needs to be done?

- Democratic decentralisation of decision making and execution process

- Community involvement
- People participation
- Strengthening the financial capacity of the local government via better tax evolution and grants.
- Involving the volunteers from the local level on line with the ASHA volunteers.
- Peoples involvement in decision making process

War and Disaster management:

Context

Some disasters can result from multiple hazards, or more often to a complex situation, combining both natural and man made disasters, involving a break down of authority, looting, attacks and external aggression.

■ Major concerns surrounding these kinds of disasters are:

- **Extensive violence:** In case of external aggression and wars, the instances of excessive violence increases, providing a potential threat to the people and community of the nation.
- **Loss of life:** Existence of violence during the war, threatening the lives of the people.
- **Displacement of people:** People near the war zone get displaced for the safety and security of the life and family.
- **Severe damage of societies and economies**
- **Humanitarian crises:** Loss of life and violation of civil rights, resulting into humanitarian crises in the state.

■ What should be done?

- Enabling humanitarian assistance from various agencies and countries
- Increased security for Humanitarian relief workers.
- Protection of civilian life and rights
- Food security measures and assistance to the people in need.
- Strengthening Civil defence mechanism with proper capacity building and resource allocation.
- Building resilience and local capacity
- Supporting women's rights and gender justice
- Campaigning and influencing others
- Dialogues through diplomatic channels should be enhanced for any resolution.

Earthquake & its management

Context:

Whenever earthquake hits Delhi, there starts discussion on the **tectonic faults** that the city lies on. In this regard, it is essential to understand the major earthquake zone where does the national capital stand.

■ What causes Earthquake?

- The primary cause for an earthquake is the movement of rocks beneath the earth's surface.
- The movement is usually caused by the continuous movement of plates that make up Earth's crust.
- This movement exerts stress on rocks, causing the latter to respond by breaking along existing fractures called fault lines.
- The sudden release of energy during such breakup causes the tremors.

■ Effects of Earth quake:

- Ground Shaking
- Differential ground settlement
- Land and mudslides
- Fires
- Ground lurching
- Avalanches
- Ground displacement
- Floods from dam and levee failures
- Structural collapse
- Tsunami

■ Earthquake management in India:

- **Early warning system** : India Quake – Developed by the National center for seismology, the mobile app disseminates real-time earthquake information.
- **Monitoring and enforcement of earthquake-resistant building codes and appropriate town planning.**
- **Proper earthquake response planning** :
 - **National Earthquake Risk Mitigation Project (NERMP)**
 - Necessary risk mitigation measures are put in place in the highly seismic zones.
- System of decentralized response:
 - In December 2005, the Disaster Management Act was enacted
 - The Disaster management act envisaged the creation of National Disaster Management Authority (NDMA), headed by the Prime Minister to implement activities of Disaster Management in India
 - State Disaster Management Authorities (SDMAs) headed by respective Chief Ministers to do the same at the state level.
- **Trained manpower to deal with the disaster:** The National Disaster Response Force (NDRF) strives to be the first responder at heritage sites, which are vulnerable to disasters such as earthquakes, floods, cyclones, and tsunami across India.
- **Building back better** : India is a signatory to the **Sendai Framework** for Disaster Risk Reduction

■ Challenges in Earthquake management in India:

- The Earthquake-prone zone mainly is a hilly and mountainous region. Retrofitting is difficult and costly in these regions
- There is a dearth of trained manpower in earthquake resistant design and building.
- There is no formal system of competency-based licensing of structural engineers.
- Safety requirements are not well monitored and enforcement of building codes is lacking.

- NDMA said that close to 4,000 multi-storied buildings in Ahmedabad won't survive a high magnitude earthquake due to a faulty design.
- The mobilization of funds during disasters is still not systemized. The national disaster relief Fund is not publicized enough.
- The awareness generation regime is not strong enough. The training of the local population after disaster activities has not been done effectively.

Budget Allocation on Disaster resilience

Context

Proper budget allocations for disasters have the potential to increase welfare by increasing national savings, reducing exposure to risk and promoting mitigation prior to a loss. Those ways can also contribute to aggregate fiscal stability over the long term.

■ Significance of Budget allocation for the Disaster Resilience Strategy

- **Building resilient information systems and records:** PFM (Public Financial Management) institutions can prepare information systems and digital
- **Planning and budgeting:** Ministries of finance can proactively assess risks and help ensure that funding mechanisms are available to address the foreseeable impacts of disaster events
- **Preparing procurement plans ahead of time:** Governments can prepare procurement plans during normal operating conditions to be ready when disasters hit.
- **To ensure transparency and accountability**
- **To ensure appropriate institutional arrangements in place**

■ Challenges and issues in the Budget allocation for the Disaster Resilience Strategy

- **Exclusion of relevant stakeholders:** Disaster risk reduction component is not being included in other departments like rural housing. Only these departments can prioritise houses for people, who seem to be the most vulnerable from disasters, such as those living in coastal regions.
- **Reduced allocation for welfare scheme:** MGNREGA scheme can provide relief to effected people as well as the disaster hit areas. However, it is also unfortunate that the allocation for **the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)** has been consistently reduced in the last few budgets.
- **Poor situation of urban employment programs:** Inadequate funds being earmarked for urban employment programmes. In the post disaster situation, there is always huge outflow of internal migrants. Urban employment programmes need to be encouraged in those disaster effected states.
- **Lack of resources:** DRR and climate change adaptation resources are not provided to the Panchayats, blocks and districts to plan and implement programmes in a localised manner.

■ Way forward:

- The state allocations for SDRF are not enough, so need to increase them.
- There is need to bring uniformity of compensation across the country.
- Allocation provided under National Coastal Mission and MoEFCC should be used to protect the livelihoods of fisherfolk and also the mangroves in the Sundarbans. The West Bengal government has already set up a mangrove resource centre to study and raise mangrove forests.

- Recently, PM Awas Yojana has got an allocation of Rs. 48,000 crore but this needs to be prioritized for ecologically sensitive zones by building disaster-resilient houses.
- More than 90 per cent of survey respondents wanted to work for more than 100 days under MGNREGA. There is an immediate need to increase number of working days.
- The wage rate had to be increased at least up to the local average agriculture labour wage.
- Vulnerable population groups such as women, children, uncared-for elderly people, those with disabilities and others should be the focus.
