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1

DISASTER MANAGEMENT

1. ASIA WORST HIT BY DISASTERS IN 2023: WMO

CONTEXT: **In the year 2023, Asia faced the most disasters in the world as 79 events associated with extreme weather, climate, and water-related hazards, affecting over nine million people in the region and claiming over 2,000 lives, as per a new report by the World Meteorological Organization (WMO).**

Key-highlights of the Report (Climate Disaster Profile)

- **Report Title:** *State of the Climate in Asia 2023*
- Asia has warmed faster than the global average and the warming trend has nearly doubled since the 1961-1990 period.
- Key climate change indicators such as surface temperatures, glacier retreat and sea level rise will have major consequences for Asia, its economy and ecosystems.
- In India alone, severe heatwaves in April and June resulted in about 110 reported fatalities due to heatstroke.
- In August 2023, India experienced a record-high monthly mean temperature and exceptional rainfall deficit, which can be linked to **El Niño**
- Floods were the leading cause of death in reported events in 2023 by a substantial margin.

Disaster Management in India

- Disaster Risk Management implies **the systematic process of using administrative decisions, organisation, operational skills, and capacities to implement policies, strategies and coping capacities of the society** and communities to lessen the impact of natural hazards and related environmental and technological disasters.

- **Disaster risk reduction** aims to reduce disaster risks through systematic efforts to analyse and reduce the causal factors of disasters.
- **Pre-Disaster risk reduction includes-**Mitigation and Preparedness
- **Post-Disaster risk reduction includes-**Rescue, Relief and Recovery

Required Steps/Initiatives

- Increase the coverage of early warning systems
- Climate proofing infrastructure
- Invest in disaster risk reduction
- Building climate and disaster resilience at the sub-national level
- Integrating possible climate change impacts into the 2005 Disaster Management Actand other existing national frameworks and SOPs.

FACT BOX

Fact Box: Recent Initiatives

- **Working group on DRR**: The world's major economies—as part of the G20—now have a working group on **disaster risk reduction (DRR)** for the first time. It has five priority areas: early warning systems, climate resilient infrastructure, financing framework for disaster risk reduction, disaster response systems, and an ecosystem-based approach to risk reduction.
- **Early Warnings for All initiative**: It aims to ensure everyone on Earth is protected from hazardous weather, water, or climate events through life-saving early warning systems by the end of 2027.
- **Coalition for Disaster Resilient Infrastructure:** Launched in 2019, CDRI is now a global coalition of 39 countries and seven organisations.
- **Aapda Mitra Scheme**: Aapda Mitra is a centrally-sponsored scheme by the NDMA aiming to impart training to community volunteers in disaster response in the most affected districts identified across the country on the basis of past disasters.

PRACTICE QUESTION

Q. "Asia is officially the most 'disaster-prone' region in the world". In the light of this statement, discuss mitigation measures required to prevent or reduce actual damage from hazards.

2. DISASTERS PUT FOCUS ON CITIES' 'CARRYING CAPACITY'

CONTEXT: The Centre proposed before the Supreme Court forming a 13-member technical committee to evaluate the "carrying capacity" of 13 Himalayan States.

What is the need?

- Frequent landslips leading to deaths and destruction had led the Supreme Court to moot a re-evaluation of the load-carrying capacity of hill towns and cities.
- Significantly, these states have faced flash floods, landslides, and acute water shortages in the past, especially in popular tourist destinations.
- In March 2021, the National Green Tribunal had directed all state governments to undertake carrying capacity studies of ecologically sensitive areas.

Are hill stations not prepared?

- Master plans for most Indian cities — including hill stations —are not prepared based on their carrying capacity.
- Master plan finds mention in the **Urban and Regional Development Plans Formulation and Implementation (URDPFI)** guidelines notified by the **Ministry of Housing and Urban Affairs** in 2015.
- It should be an integral part of city and town planning, especially in hill states.

Why carrying capacity is out of focus?

- Although carrying capacity has been taught in planning schools, it has rarely been used by urban planners while planning for cities' development. It is due to:
  - **Economic Imperatives:** Tourism generates substantial revenue for these regions, making policymakers hesitant to limit tourist numbers or impose stringent regulations.
  - **Lack of Planning**: Hill stations often lack comprehensive development plans that consider environmental sustainability and carrying capacity. This lack of foresight exacerbates the problem.
  - **Lack of manpower:** There is an acute shortage of experienced urban planners in the states.
  - **Political Considerations**: Political interests and pressure from the tourism industry can sideline discussions about carrying capacity and environmental concerns.

Mitigating the Impact of Infrastructure Damage from a Landslide

- **Landslide Hazard Zonation** - It covers aspects of reliability and validation of landslide zoning maps in Indian scenario and proposes future plan of activities for landslide zoning.
- **Landslide Monitoring and Early Warning System**: For future prospects, technical recommendation for developing and implementing rainfall thresholds, Numerical Weather Prediction (NWP), Automatic Rain Gauges, Wireless Sensor Network (WSN), Micro-Electro Mechanical Sensors (MEMS) etc., have been included.
- **Awareness Programmes**: It aims towards a culture of awareness generation and preparedness so that people in the society become alert and aware in case of an emergency or take some preventive measures before the disaster strikes.
- **Capacity Building and Training of Stakeholders**: focuses on identifying targets group for training on landslide DRR and most importantly, strengthening the response framework through capacity building and training of vulnerable communities at grass root level.

FACT BOX

Fact Box: What is carrying capacity?

- The carrying capacity of an area can be defined as the "maximum number of population that can be supported by the environment of that area through optimum utilisation of the available resources".
- **Factors Influencing Carrying Capacity:**
  - Terrain
  - Water availability
  - Waste management
  - Resilience of local communities

PREVIOUS YEAR QUESTION

Q. Define the concept of carrying capacity of an ecosystem as relevant to an environment. Explain how understanding this concept is vital while planning for the sustainable development of a region. (2019)

Q. "There is need for re-evaluation of the load-carrying capacity of hill towns and cities." Comment

3. HUMAN INDUCED DISASTER MANAGEMENT

CONTEXT: Recently, the most discussed issue in the country is the accident at Balasore, Odisha involving three trains collided and de-railed from the track taking lives of up to 300 peoples, has highlighted the man-made disasters and its extent.

Man-made disaster in India:

- More than **6,000 natural** and **7,000 human-made disasters** took place between **1970 and 2021**.
- More than **one fourth (**02 per cent) of all people worldwide affected by **natural disasters live in India.**
- Natural disasters have killed **45, 91,768 Indians since 1900.**
- India ranks among the **top ten countries** in the world that is prone to disasters.

Human-made disasters comprises of;

- Fires and explosions,
- Aviation and space disasters,
- Shipping disasters,
- Rail disasters,
- Mining accidents,
- The collapse of buildings/bridges, and
- Miscellaneous causes (including terrorism).

Forms of man-made disasters in India:

Gas Leaks	Oil Spills	Nuclear disaster	Industrial Fires
The most serious gas leak occurred in Bhopal, India in 1984. Known as the Bhopal Gas Tragedy, it began with the leakage of **methyl isocyanide (MIC**), a colorless gas used in pesticides, from the Union Carbide of India Ltd. The gas formed a deadly cloud causing severe body irritation, coughing, lung swelling, bleeding, and even death from direct concentrated inhalation. It killed roughly 5,000 people, affected 50,000 more people, and left at least 1,000 blind.	Oil spills are some of the most familiar man-made disasters, devastating to people, the environment, animals and global socio-economics. 2010 saw the worst and largest oil spill: the Deepwater Horizon Oil Spill in the Gulf of Mexico. **Impacts:** The surrounding environments have been choked to death, and at least **3,500 volunteers** suffered liver and kidney damage from prolonged contact with the oil.	One of the most famous nuclear meltdowns occurred in Chernobyl, Ukraine in 1986. One of the reactors in the power plant exploded, resulting in more fallout than the Hiroshima and Nagasaki atomic bombs combined. While 350,000 people were evacuated from the surrounding area, nearly 500,000 workers laboured to end the meltdown, 31 of which died during the attempt.	The **Bombay High North oil platform** operated by state-owned Oil and Natural Gas Corporation (ONGC) was struck by a drifting ship named Samudra Suraksha. The collision caused a major oil spill which caused both the platform and the ship to catch fire.

Why man-made disasters are a cause of concern?

- **Increasing Number of Climate refugees:** More people are likely to migrate due to slow-onset processes of environmental degradation such as **inundation, desertification, soil erosion and changing coastlines** than sudden-onset events like storms and cyclones.

- **Economic Losses:** The economic losses due to man-made disaster can be massive and also can impact the surrounding environments too. Especially for a developing country like India, economic losses induced by disaster are very high.
- **Social Impacts:** People affected and after-effects of man-made disasters can impact society at large.
- **Psychological impacts:** The man-made disasters sometimes can cause a mental impact on people affected by it. This can create lack of trust.

Disaster Management in India:

- Disaster Management efforts are geared towards **disaster risk management.**
- Disaster Risk Management implies **the systematic process of using administrative decisions, organisation, operational skills, and capacities to implement policies, strategies and coping capacities of the society** and communities to lessen the impact of natural hazards and related environmental and technological disasters.
- **Disaster Risk Reduction (DRR):** Disaster risk reduction is the concept and practice of reducing disaster risks through systematic efforts to analyse and reduce the causal factors of disasters.
- **Pre-Disaster risk reduction includes-**
  - **Mitigation:** To eliminate or reduce the impacts and risks of hazards through proactive measures taken before an emergency or disaster occurs.
  - **Preparedness**: To take steps to prepare and reduce the effects of disasters.
- **Post-Disaster risk reduction includes-**
  - **Rescue**: Providing warning, evacuation, search, rescue, providing immediate assistance.
  - **Relief:** To respond to communities who become victims of disaster, providing relief measures such as food packets, water, medicines, temporary accommodation, relief camps etc.
  - **Recovery:** This stage emphasises upon recovery of victims of disaster, recovery of damaged infrastructure and repair of the damages caused.

PRACTICE QUESTION

Q. "There has been significant increase in the number of man-made disasters in industrialised countries". Comment

4. INCREASING FIRE INCIDENTS, A 'MAN-MADE' DISASTER

CONTEXT: **Fire safety is a critical issue in India, highlighted by recent tragic incidents such as the Delhi hospital and Rajkot gaming zone fires. These unfortunate incidents, which reveal patterns of negligence and regulatory failures, highlight the importance of stringent enforcement of safety laws and the need for proactive measures to protect human lives and property.**

Reasons Behind the Tragic Incidents

- **Regulatory Failures**: Both the Delhi hospital and the Rajkot gaming zone operated **without mandatory licences and safety measures,** reflecting a systemic failure in regulatory enforcement. These institutions bypassed essential safety norms, endangering lives.
- **Administrative Negligence**: There was a lack of oversight from the relevant authorities. In both cases, the institutions had not been inspected or held accountable for their non-compliance with safety standards, indicating a **severe lapse in administrative diligence.**

- **Greed and Mismanagement**: Business owners prioritizing profits over safety led to inadequate safety measures. The lack of firefighting equipment and trained personnel in both establishments exemplifies a blatant disregard for human life.
- **Inadequate Infrastructure**: Shortage of manpower and modern equipment in fire service departments hampers effective disaster response, contributing to higher casualties and damage during incidents.

India's Model Code for Fire Safety

- **National Building Code (NBC):** NBC is India's central standard for fire safety, published by the **Bureau of Indian Standards (BIS)** in 1970 and last updated in 2016. It provides detailed guidelines on construction, maintenance, and fire safety for buildings. Part 4 of the NBC specifically addresses fire safety, outlining measures to ensure the safety of occupants.
- **Mandatory Compliance:** State governments must incorporate the NBC's fire safety recommendations into their local building bylaws.

Key Fire Safety Provisions

- **Building Classification and Restrictions**: The NBC categorizes buildings into fire zones to prevent hazardous structures from coexisting with residential and institutional buildings.
  - Hotels are under Residential **'Group A'**
  - Hospitals are under Institutional **'Group C'**
  - Assembly buildings (marriage halls, night clubs, tents, multiplexes) are under **'Group D'.**
- **Construction Materials**: Non-combustible materials should be used in construction, especially for staircases and enclosures.
- **Electrical Safety**: Wiring should have flame-retardant properties, and separate shafts for different voltage levels are required. Emergency power systems should support critical safety features like exit signage and fire alarms.
- **Exit Access and Lighting**: Properly identified exits with adequate lighting are essential for safe evacuation.
- **Advanced Safety Technologies**: The use of automatic fire detection systems, sprinklers, fire barriers, and escape routes is recommended.

Where is the State?

- According to the **XII Schedule** of the Constitution under **Article 243(W),** the fire services in India are under the purview of the **state** and are listed as a **municipal function.**
- The **'Model Building Bye Laws 2016'**, issued by the **Ministry of Housing and Urban Affairs**, guide states and Union Territories in framing their building bylaws. These laws include norms for fire protection and safety.
- Additionally, the **National Disaster Management Authority (NDMA)** provides guidelines for fire safety in homes, schools, and hospitals.

FACT BOX

- According to NCRB's latest **Accidental Deaths and Suicides in India (ADSI) report**, as many as 7,435 people were killed in over 7,500 fire accidents in 2022.
- No lessons learnt from the **1997 Uphaar Cinema** tragedy or the **Kumbakonam fire** that killed 90 schoolchildren in 2004.
- The Centre earmarked Rs 5,000cr from 2021-22 to 2025-26, under **National Disaster Response Fund** to "strengthen fire services at state level".

5. CYCLONES AND TROPICAL STORMS

CONTEXT: Recent surges in the frequency and scale of cyclones has increased the risk of destructions from cyclones and its increasing frequency in Arabian sea points towards the relation and impact of climate change with occurrence of Cyclones.

Threats posed by Cyclones:

- Cyclones poses a huge challenge in terms of the destructions they cause to lives/livelihood, properties and to the biodiversity itself. Since the last decade or so the occurrence of cyclones have increased and thus increased the resultant risk and challenges to manage the disasters caused by cyclones.
- **Vulnerability of India:** The Indian subcontinent is one of the worst affected regions in the world. The subcontinent with a long coastline of 8041 kilometer's is exposed to nearly 10 per cent of the world's tropical cyclones. Of these, the majority of them have their initial genesis over the Bay of Bengal and strike the East coast of India.
  - On an average, five to six tropical cyclones form every year, of which two or three could be severe.
  - More cyclones occur in the Bay of Bengal than the Arabian Sea and the ratio is approximately 4:1.
  - Cyclones occur frequently on both the coasts (the West coast - Arabian Sea; and the East coast - Bay of Bengal).
- **Threats:** The disaster potential is particularly high during landfall in the North Indian Ocean (Bay of Bengal and the Arabian Sea) due to the accompanying destructive wind, storm surges and torrential rainfall.
  - Of these, storm surges cause the most damage as sea water inundates low lying areas of coastal regions and causes heavy floods, erodes beaches and embankments, destroys vegetation and reduces soil fertility.
  - Cyclones are characterized by their devastating potential to damage structures, viz. houses; lifeline infrastructure-power and communication towers; hospitals; food storage facilities; roads, bridges and culverts; crops etc. The most fatalities come from storm surges and the torrential rain flooding the lowland areas of coastal territories.

Mitigation and Preparedness Measures Against Cyclones

- **Mapping Hazards:** Cyclone hazard maps show the risk levels in different areas, indicating how often and how severe cyclones can be.
- **Regulating Land Use:** Implement policies to control land use and enforce building codes.
- Designate vulnerable areas for parks, grazing, or flood diversion instead of human settlements.
- **Engineered Structures:** Construct buildings on stilts or earthen mounds. Ensure buildings are wind and water-resistant. Protect food supply storage buildings from wind and water damage.
- **Cyclone Shelters:** Build shelters in cyclone-prone areas for protection. Cyclone shelters are expensive, so funding often comes from the government or donors. Use geographical mapping to find the best locations for shelters.
- **Flood Management:** Build barriers along rivers and coasts to prevent flooding. Control water flow by creating storage areas, small dams, and drainage systems.
- **Plantation of Mangroves:** Plant mangroves to protect coastal areas from storm surges and winds. Community participation in mangrove planting can be organized by local authorities, NGOs, or the community itself. Mangroves also help control erosion and conserve the coastline.
- **Public Awareness Generation:** Educate the public to save lives by disseminating information about cyclone risks.
- **Early Warning System:** Enhance early warning systems for rapid and efficient responses.

- **Community Participation:** Engage local communities in developing mitigation measures, as they know their area's strengths and weaknesses.

Government Initiatives for Cyclone Preparedness

- **National Cyclone Risk Mitigation Project:** This project aims to protect vulnerable communities from cyclones and other natural disasters through structural and non-structural measures. Managed by the National Disaster Management Authority (NDMA) since 2006.
- **Integrated Coastal Zone Management (ICZM) Project:** Improves the livelihood of coastal communities and conserves coastal ecosystems. Identifies infrastructure needs and livelihood improvements in coastal districts.
- **Coastal Regulation Zones (CRZ):** Declared under the Environment Protection Act of 1986, CRZs protect coastal areas influenced by tides. Regulate activities within 500 meters of the high tide line (HTL) and between the low tide line (LTL) and HTL.
- **Color Coding of Cyclones:** The India Meteorological Department (IMD) issues weather warnings using four colors: Green, Yellow, Orange, and Red to alert people about natural hazards.

Challenges Associated with Cyclone Preparedness

- **Limited Lead Time:** Despite advancements, the precise impact of cyclones can only be determined within 36-60 hours, posing challenges for effective preparedness and evacuation.
- **Vulnerable Coastal Infrastructure:** Coastal regions are geographically vulnerable and often lack the infrastructure to withstand strong winds, storm surges, and heavy rainfall.
- **Lack of Effective Communication Networks:** Efficient communication is crucial but often hampered by weak signals, power outages, and damaged networks during cyclones.
- **Evacuation Challenges:** Evacuating coastal communities quickly can be difficult due to reluctance to leave homes, transportation issues, and limited shelter capacity.
- **Different Livelihood Patterns:** Coastal communities depend on fishing and marine activities, making them resistant to evacuation warnings that disrupt their economic activities.
- **Inadequate Funding and Resources:** Effective cyclone preparedness requires financial resources, trained personnel, and necessary equipment, which are often limited in vulnerable regions.

FACT BOX

What are Cyclones?

Cyclones, also known as tropical storms, are large-scale air masses that rotate around a strong center of low atmospheric pressure. They form over warm ocean waters near the equator. These storms are characterized by high winds, heavy rainfall, and thunderstorms. Cyclones are classified into different categories based on wind speed, such as tropical depressions, tropical storms, and severe cyclones.

- **Eye:** The calm center of the storm.
- **Eyewall:** The area surrounding the eye with the most intense weather.
- **Rainbands**: Bands of clouds and precipitation spiraling out from the center.

Formation Mechanism:

- **Warm Ocean Water:** The primary energy source for cyclones is the warm ocean water (at least 26.5°C or 80°F).
- **Moist Air**: Warm water heats the air above it, causing the air to rise and create an area of low pressure.
- **Coriolis Effect**: The rotation of the Earth causes the rising air to spin, leading to the cyclonic rotation.
- **High Humidity:** The air must be moist to provide the latent heat necessary for the storm to grow.
- **Low Vertical Wind Shear**: Low wind variation with height helps maintain the storm's structure.

Detailed Mechanisms of Cyclone Intensification

- As moist air rises and cools, water vapor condenses into clouds, releasing latent heat. This heat warms the surrounding air, causing it to rise further and strengthen the cyclone.
- The rising warm air creates lower pressure at the surface, drawing in more warm, moist air from the ocean. This continuous supply of energy fuels the cyclone, making it grow stronger.
- At the top of the cyclone, air flows outward, allowing warmer, moist air to rise from below. This outflow is crucial for maintaining the cyclone's strength.
- As the cyclone intensifies, the eye forms at the center. The eye is characterized by calm weather and clear skies, surrounded by the eyewall, where the most severe weather occurs.

6. FLOODS AND LANDSLIDES

CONTEXT: In the recent past India witnessed numerous natural disasters like land subsidence in Joshimath, floods in Assam, Chennai, Bihar etc and the most importantly the collapse of tunnel in the Silkyara-Dandalgaon tunnel in Uttarkashi.

Vulnerability of Indian Regions:

- **Northeast India:** Vulnerable to floods due to heavy monsoon rains and the presence of large rivers like Brahmaputra, which often overflow their banks.
- **Northern Plains:** Flood-prone due to the extensive river systems like Ganga and Yamuna, which can overflow during monsoons or due to snowmelt from the Himalayas.
- **Western Ghats:** Characterized by steep slopes and heavy rainfall during the monsoon, making the region prone to landslides.
- **Himalayan Region:** Vulnerable to both floods and landslides due to its complex geological structure, high precipitation, and melting glaciers.
- **Impact:** Loss of Lives and Injuries, Damage to Property and Infrastructure, Displacement and Humanitarian Issues, Economic Impact (crop damage, loss of livestock, tourism & supply-chain disruption, damaged infrastructure and reduced consumer spending), Health Risks

India's Mechanism to Deal with Such Events:

India employs a robust framework to handle infrastructure emergencies:

- **National Disaster Response Force (NDRF): Specialized** teams trained for rapid response and rescue operations during disasters, including tunnel collapses.
- **Disaster Management Authorities:** State and national authorities coordinate efforts for disaster **preparedness, response, and recovery.**
- **Legislation and Regulations:** Stringent safety standards and building codes govern infrastructure projects to mitigate risks and ensure structural integrity.
- **Technological Advancements:** Continued investment in advanced technologies and expertise to improve monitoring, maintenance, and emergency response capabilities.
- **Data and Mapping Initiatives:**
  - **Landslide Atlas of India:** Detailed documentation of landslide-prone areas and damage assessment prepared by the National Remote Sensing Centre (NRSC).
  - **Resilience Building:** Developing resilience against natural and human-induced hazards through effective monitoring and data collection networks.
  - **Technology Integration:** Using web-based sensors (like rain gauges and InSAR) for real-time monitoring, particularly in densely populated and built-up areas.
  - **Early Warning Systems (EWS):** Utilizing AI and Machine Learning to predict and alert communities about impending landslides and floods, enabling timely preventive measures.

Steps Taken for Flood Management:

- **National Guidelines:** NDMA has released national flood management guidelines to standardize approaches.
- **IN-FLOWS Systems:** Installed in Chennai and Mumbai for effective flood control.
- **National River Interlinking Project:** Launched to manage floods and prevent droughts by linking rivers.
- **Flood Management and Border Area Development Program (FMBAP):** Aimed at controlling floods in border regions, particularly in Bihar.

NITI Aayog's Recommendations:

- **Priority to Non-Structural Measures:** Emphasizes flood forecasting, floodplain zoning, and flood-proofing as cost-effective methods.
- **Better Dam Management:** Advocates for creating flood cushions in existing dams to handle peak flood periods.
- **Use of Advanced Technology:** Recommends employing AI, satellites, remote sensing, and GIS for enhanced flood forecasting and warning systems.
- **Creation of a National Water Model:** Proposed to predict precipitation and support flood forecasting efforts.

Preventive Measures:

- **Regular Maintenance:** Implement a strict maintenance schedule, including frequent inspections of structural integrity, drainage systems, and ventilation. This ensures early detection and prompt rectification of any issues.
- **Monitoring Technologies:** Employ advanced sensors and monitoring technologies to continuously assess the health of the tunnel structure. This helps in identifying potential weaknesses or abnormalities before they escalate.
- **Risk Assessment and Preparedness:** Conduct periodic third-party risk assessments that consider geological, environmental, and usage factors. Develop comprehensive contingency plans and emergency protocols to address structural concerns swiftly and effectively.
- **Training and Awareness:** Provide specialized training for personnel involved in tunnel management and emergency response procedures. Public awareness campaigns should educate users and local residents about safety measures and reporting procedures in case of emergencies.
- **Technology Integration:** Explore innovative technologies such as Artificial Intelligence, drones, or robotics for more efficient inspections, maintenance, and early detection of potential issues. These technologies can enhance the overall safety and reliability of tunnel infrastructure.

Case Study 1: Joshimath Land Subsidence

Joshimath, nestled in the Himalayan state of Uttarakhand, has recently faced severe land subsidence, sparking panic and protests among its local population.

This town, strategically located and serving as a crucial transit point for tourists visiting religious sites like Badrinath and Hemkund Sahib, has been declared a landslide-subsidence zone.

Geographical Vulnerabilities:

- Situated in a high-risk seismic Zone-V, Joshimath is intersected by swiftly flowing streams from Vishnuprayag, where the Alaknanda and Dhauliganga rivers converge.
- The area's geological composition, including scattered rocks covered with ancient landslide debris, exacerbates its susceptibility to subsidence.
- The presence of highly weathered gneissic rocks, with low cohesive properties and high pore pressure during monsoons, further contributes to the instability.

Causes of Land Subsidence:

- Historically, Joshimath lies on a sedimentary deposit rather than solid bedrock, a condition exacerbated by undercutting from the powerful currents of nearby rivers.
- Additionally, extensive construction activities, including infrastructure development and hydroelectric projects, have significantly disturbed the natural slopes over the past few decades.

Case Study 2: Uttarkashi Tunnel Collapse

The Silkyara-Barkot tunnel is part of the Char Dham all-weather road project, aimed at improving connectivity to important religious sites in Uttarakhand. Constructed by Navayuga Engineering Company under NHIDCL, it plays a crucial role in enhancing infrastructure in the region.

7. EARTHQUAKES

CONTEXT: Recent incidents of Earthquakes in states like Assam, Himachal and Ladakh (2022) led the need felt to frame a more robust and effective strategy to mitigate the loss and prevent the loss of lives and livelihood.

How prone is India to earthquakes?

- India is located in a seismically active region. India is divided into four seismic zones based on the potential for earthquake activity in each region.
- According to the Ministry of Earth Sciences, 59 per cent of India's land mass is prone to earthquakes.
  - **Zone V** is seismically the most active region, while **Zone II** is the least.
  - Around **11 per cent of the country's area falls in Zone V, 18 per cent in Zone IV and 30 per cent in Zone III and the remaining in Zone II.**
- The zones are used to guide building codes and construction practices.

Is India ready?

- India is well-prepared to deal with the fallout of large-scale earthquakes as it has a dedicated, well-equipped and trained force in the form of the National Disaster Response Force (NDRF).
- **BhuDEV:** Recently, Indian Institute of Technology (IIT) Roorkee and the Government of Uttarakhand, introduced BhuDEV, the cutting-edge Earthquake Early Warning App to ensure the safety and resilience of Uttarakhand's residents in the face of seismic threats.
- **Mobile Apps:** 'India Quake' for real-time earthquake information and 'Sagar Vani' for ocean-related alerts.
- **Google announced an Android Earthquake Alerts System** to provide early warning alerts to users about earthquakes in their area.

FACT BOX

Earthquake Management

- **Earthquake Preparedness & Response**: The first priority in Earthquake response is to minimize loss of lives, by undertaking effective search and rescue operations and the evacuation of affected people. Specific response during Earthquake hazards include:
  - Rescuing victims from rubble
  - Special care in case of fire
  - Evacuation of at risk people in safe locations
  - Rendering first aid
  - Positioning of ambulances

- **Earthquake Recovery:** The planning for earthquake recovery ideally begins immediately after the earthquake event. Key components of Post-Earthquake Recovery include:
  - Managing post disaster funds
  - Monitoring and management of recovery process
  - Transitional shelter programs
  - Environmental and social assessment
  - Decision pertaining to relocation or rebuilding
  - Debris management
  - Focus on vulnerable segments (Women, Children, Elderly, differently abled etc.)
  - Proper seismic assessment
  - Decisions pertaining to Land Tenure and regularization of slums
  - Income support/ Livelihood recovery programs

Agencies Responsible

- **India Meteorological Department (IMD)** monitors earthquakes and form a real time seismic monitoring network and disseminate information to agencies involved in earthquake tracking, research, mitigation and response.
- **Geological Survey of India** in coordination with IMD is responsible for **hazard zonation and micro seismic zonation of vulnerable areas**.
- The National Disaster Management Authority, National Institute of Disaster Management and other Science and Technology departments and institutions have been entrusted with the task of **Earthquake hazard risk and vulnerability assessment**.
- **BMTPC (Building Materials & Technology Promotion Council)** in coordination with the **Bureau of Indian Standards (BIS)** and other institutions formulate and update the National Building Code and other standards. The state departments are required to act accordingly and ensure measures to understand and mitigate seismic risk.
- **Ministry of Home Affair**s is identified as the nodal agency for coordinating Earthquake Response and central assistance, while the **State Disaster Management Authorities**, Revenue Department and Commissioner for Relief along with the Panchayats and Urban Level Bodies are responsible for the organization

8. FOREST FIRES

CONTEXT: **Several incidents of forest fires in Uttarakhand, Himachal and Odisha along with similar incidents being reported from across the world has pointed to the general interlinkage with fire related incidents to climate change and an environmental concern and also the need to prepare comprehensive strategy to tackle the challenge and also developing the strategy to mitigate the losses.**

Government Measures

- **Forest Fire Alert System (FFAS):** Developed by the Forest Survey of India (FSI) to monitor wildfires in real-time.
- **MODIS Sensors:** These sensors collect real-time forest information, which is then sent to FSI and local authorities.
- **National Master Plan for Forest Fire Control:** A coordinated fire-management program by the government.
- **Forest Control Manuals:** Create manuals for early fire detection, reporting, and control.

- **Comprehensive Forest Fire Policy:** Develop a cohesive policy incorporating climate change aspects.
- **Indigenous Knowledge:** Utilize local and tribal knowledge for wildfire management.
- **Infrastructure Creation:** Build watchtowers, hire seasonal fire watchers, and improve firefighter staffing.
- **Development of Technology:** Adopt modern firefighting techniques like radio-acoustic sound systems and Doppler radar. Develop a National Fire Danger Rating System (NFDRS) and Fire Forecasting System.
- **Bambi Bucket**, also known as a **helicopter bucket or helibucket**, is a specialized container suspended by a cable beneath a helicopter. It can be filled by lowering it into a river or pond, then flown over a fire and discharged from above by opening a valve at the bottom of the bucket.

Management or Prevention of Forest Fire (Methods Identified by MoEFCC)

- **Early Detection**: Construction of watch towers for early detection and deployment of fire watchers.
- **Community Involvement**: Engaging local communities in fire prevention and control efforts.
- **Creation of Fire Lines:** Establishing and maintaining fire lines to prevent the spread of fires.

Types of Fire Lines Recognized by National Disaster Management Authority (NDMA):

- **Kachha Fire Lines:** These are covered fire lines where undergrowth and shrubs are cleared while retaining trees to reduce fuel load.
- **Pucca Fire Lines**: Open fire lines created by clear-cutting areas to separate forest compartments or blocks and control potential fire spread.
- **Other methods:** Controlled burning, fire terracing, counter fire, rock walls, and others.

FACT BOX

Frequency and Causes of Forest Fires in India

- **Forest Fire Season Duration:** November to June.
- **Contributing Factors:** Factors such as temperatures, precipitation, vegetation, and moisture contribute to the scale and frequency of these fires.
- **Factors contributing to the spread of forest fires**: fuel load, oxygen, and temperature.
- **Humans' role:** Deliberate fires by locals (to promote growth of quality grass), carelessness, farming-related activities, agriculture and unchecked land-use patterns, concealing illegal tree cutting, or facilitating poaching and natural factors.
- Friction between electricity cables and dry leaves, as well as lightning strikes, are additional triggers for wildfires.
- **Extent of Vulnerability:** As per Forest Survey of India (FSI) reports, nearly 36 per cent of India's forests are prone to frequent fires.
- **Seasonal Variation:** Higher incidences of forest fires are typically reported in March, April, and May due to the abundance of dry biomass after winter and during the summer season.
- **Regional Vulnerability:** Specific forest types, such as dry deciduous forests, are more prone to severe fires compared to evergreen, semi-evergreen, and montane temperate forests.
  - Approximately 4% of the country's forest cover is classified as extremely prone to fire, while 6% is considered very highly fire-prone, according to the India State of Forest Report (ISFR) in 2019.

9. HEATWAVES

CONTEXT: **Anthropogenic climate change is turning ambient heat into an inevitable environmental hazard. India is poised to encounter an increased number of heat-wave days than usual from April to June and this expansion of the realm of extreme heat is potentially the gravest consequence of climate change for India.**

Government Initiatives and Plans

- **National Disaster Management Act, 2005, and Policy, 2009**: These do not list heat waves as a natural calamity, despite them being the third biggest natural cause of deaths in India.
- **India Meteorological Department (IMD):** IMD issues color-coded impact-based heat wave warnings through mass media to alert the public.
- **National Disaster Management Authority (NDMA):** Works with IMD and local authorities in 23 states prone to high temperatures to support heat action plans.
- **Ministry of Health and Family Welfare** conducts public awareness campaigns on the health impacts of climate change, specifically focusing on heat waves. It implements the National Programme on Climate Change and Human Health to educate the public and health professionals.
- **Public Awareness and Education**: Various ministries and departments, including Health and Environment, conduct workshops, exhibitions, and campaigns to raise public awareness about heat wave risks and mitigation strategies.
- **Technological Interventions:** Water Technology Initiative (WTI) focuses on research-led solutions such as river bank filtration, rainwater harvesting, and sustainable agricultural practices (e.g., drip irrigation) that indirectly help in managing heat impacts by conserving water resources.

FACT BOX

What is a Heat Wave?

- A heat wave is a period of extremely high temperatures that can be dangerous to human health. It's defined by temperature thresholds which can vary based on the region:
- **Qualitative Definition**: A condition where air temperature becomes dangerously high for humans when exposed.
- **Quantitative Definition**: Heatwaves are determined based on temperature thresholds:
  - **In Plains**: When maximum temperature reaches 40°C or higher.
  - **In Hilly regions**: When maximum temperature reaches 30°C or higher.
  - **For Coastal areas**: When the maximum temperature departure is 37°C or more than normal.
- **Severity Levels:**
  - **Heatwave**: Temperature is 4.5°C to 6.4°C above normal.
  - **Severe Heatwave**: Temperature rises more than 6.4°C above normal.

PREVIOUS YEAR QUESTION

Q. Discuss the consequences of climate change on the food security in tropical countries. (UPSC 2023)

PRACTICE QUESTION

Q. Heatwave is the gravest consequence of climate change for India. Discuss the impact of heatwave as a disaster. (250 words)

10. COLD WAVES AND MANAGEMENT

CONTEXT: January 2024 cold wave observed over North India resulted from the intrusion of cold and dry air from the Siberian high.

Government Responses and Measures

- **Disaster Management Act:** The Government of India has recognized cold waves as a disaster under the Disaster Management Act, 2005, with the Ministry of Agriculture as the nodal ministry for cold wave and frost management.
- **Cold Wave Action Plan (CWAP):** The National Disaster Management Authority (NDMA) has prepared guidelines for states to develop and implement Cold Wave Action Plans, focusing on:
  - Risk and vulnerability assessment.
  - Early warning systems and alert dissemination.
  - Inter-agency coordination.
  - Local-level preparedness.
  - Structural and non-structural measures.
  - Public awareness and community outreach.
  - Capacity building and training.
  - Research and development.
- **Relief Assistance:** Areas suffering crop loss of 33% or more due to cold wave or frost are eligible for assistance from the State Disaster Response Fund (SDRF) or the National Disaster Response Fund (NDRF).
  - The SDRF/NDRF also provides assistance for animal husbandry and poultry sectors affected by cold waves.
- **Preventive and Mitigation Measures:**
  - Using organic mulches for thermal insulation.
  - Running fans in orchards to mix warm and cold air.
  - Using heaters or creating smoke blankets to trap heat.
  - Sprinkler irrigation to release latent heat.
  - Cultivating cold-resistant plant varieties like: Potatoes: Varieties like **Kufri Surya and Kufri Jyoti, Cauliflowe**r: Varieties such as Pusa Snowball and Pusa Snowball K-1, Peas: Varieties like Arkel and Azad P-1, Mustard: Varieties such as Pusa Jaikisan and Varuna, Carrots: Varieties like Pusa Rudhira and Pusa Meghali, Radish: Varieties such as Pusa Chetki and Pusa Himani.
  - Applying growth regulators to enhance cold stress resistance.
  - Planting windbreaks and mixed cropping to protect crops.
- **Training and Capacity Building:** State governments must develop location-specific training plans for stakeholders, including government officials, media personnel, local authorities, and NGOs, to enhance preparedness and response to cold waves.

FACT BOX

What are Cold Waves?

- Cold waves are extreme weather events characterized by a significant drop in temperatures below normal levels, persisting for at least two consecutive days.
- India's core cold wave zone spans northern, central, and eastern regions, with occasional spells affecting western and southern areas as well.

Criteria for Cold Waves:

- **Temperature Thresholds:**
  - **Plains:** A cold wave is defined when minimum temperatures drop to 10°C or below. If temperatures plunge to 4°C or lower, it escalates to a severe cold wave.
  - **Hilly Regions**: Cold waves occur when minimum temperatures reach 0°C or lower.
  - **Coastal Areas**: Cold waves affect coastal regions when minimum temperatures fall to 15°C or below.
- **Negative Departure from Normal:** The severity of a cold wave is also determined by how much temperatures deviate from the average. A negative departure of 4.5 to 6.4°C constitutes a cold wave, while anything exceeding 6.4°C is classified as a severe cold wave.

11. DROUGHTS AND MANAGEMENT

CONTEXT: Drought conditions in parts of Maharashtra and Karnataka leading to severe water shortages such as Bangalore running out of water.

Government Measures to Combat Drought

The Government of India has implemented several measures to mitigate the impact of droughts:

- **Disaster Management Guidelines:** The Central Government supports State Governments technologically and financially in tackling droughts.
- **Irrigation and Watershed Programs:** Initiatives like Accelerated Irrigation Benefit Programs, Command Area Development Programs, and Watershed Management Programs aim to develop and manage natural resources.
- **Subsidies for Farmers:** Diesel subsidies and enhanced subsidies for agricultural commodities in drought-affected areas.
- **Fodder Development Programs:** Implementation of additional programs to support livestock.
- **Crop Contingency Plans:** Availability of seeds, potable water, and other necessary inputs during late monsoons, dry spells, and deficit rainfall.
- **Public Awareness:** SMS services, radio, and television programs to educate farmers.
- **Water Management:** Construction of dams, barrages, and canals for effective water management.

NDMA Guidelines for Drought Management (2010)

The National Disaster Management Authority (NDMA) issued comprehensive guidelines for managing droughts, including:

- **Drought Monitoring Cells (DMCs):** Establishment of DMCs at the state level with adequate staff under State Disaster Management Authorities (SDMAs).
- **Vulnerability Maps:** Preparation of state-level vulnerability maps by State Drought Monitoring Cells (SDMCs).
- **Control Room for Drought Management:** Strengthening the Drought Monitoring Cell in the Department of Agriculture & Cooperation (DAC).

- **Information and Communication Technology (ICT)**: Development of real-time drought-related information through ICT.
- **Watershed Development Approach:** Integration of ground-based information with space-based data for comprehensive drought reporting.
- **Automatic Weather Stations:** Setting up weather stations with moisture sensors to monitor soil moisture levels.
- **Drought Monitoring Webpage**: Creation of a dedicated webpage on drought monitoring and forecasting on the IMD's web portal.
- **Drought Management Information System:** Revamping and institutionalizing the system with the support of State DMCs.
- **Research and Development**: Large-scale research to develop drought-resistant crop varieties.
- **Cloud Seeding Policy:** Formulation of a national and state-level cloud seeding policy.
- **Micro Irrigation Systems**: Promotion of protective irrigation through micro irrigation systems.
- **Credit and Insurance:** Providing prompt credit, marketing, price support, and insurance products for drought-prone areas.

FACT BOX

Fact Box: Drought in Numbers 2022" Report

- The "**Drought in Numbers 2022" report, released** by the United Nations Convention to Combat Desertification at its 15th Conference of Parties (CoP15), highlighted the alarming increase in the frequency and duration of droughts globally.
- India is identified as one of the most severely affected countries, with nearly two-thirds of its land experiencing drought from 2020 to 2022. **The Global Drought Vulnerability Index further underscores India's vulnerability**, estimating that severe droughts reduced the country's GDP by 2 to 5 percent from 1998 to 2017.
- Moreover, India's drought-prone area has increased by 57% since 1997, affecting nearly 50 million people annually.

12. UTTARAKHAND TO STUDY RISK POSED BY 13 GLACIAL LAKES DURING MONSOON

CONTEXT: The Uttarakhand State Disaster Management Department (USDMA) is initiating a vulnerability study of 13 glacial lakes, including five in the "high-risk zone", to prevent potential calamities such as lake outbursts during the monsoon season.

Identifying High-Risk Glacial Lakes:

- **Satellite-Based Risk Assessment:** USDMA identified 13 new glacial lakes through satellite imaging in early 2023. Five lakes categorized as "high-risk" based on size, location, and potential impact. High-risk lakes located in Pithoragarh and Chamoli districts, known for their fragile ecological balance
- **Geographical Characteristics of High-Risk Lakes:** Located in Darma, Lasaryanghati, Kutiyangti Valley (Pithoragarh), and Dhauli Ganga basin (Chamoli). Lake sizes range from 0.02 sq. km to 0.5 sq. km, indicating significant water volume. Situated at elevations of 4,000 meters above sea level, making access and monitoring challenging
- **Climate Change and Glacier Dynamics:** Himalayan glaciers retreating at an average rate of 30-60 meters per decade. Rapid glacier melting leading to formation of new lakes and expansion of existing ones.

Comprehensive Study Approach:

- **Advanced Bathymetry Study:** Teams to employ state-of-the-art bathymetry techniques starting July 2023. Study aims to determine precise lake depths, volumes, and surrounding terrain characteristics. Data crucial for developing early warning systems and evacuation plans for downstream communities
- **Multi-Agency Collaboration for Risk Assessment:** USDMA collaborating with Indo-Tibetan Border Police for on-ground intelligence. Expert teams formed in March 2023 include specialists from five premier institutions:
  - Indian Institute of Remote Sensing
  - Geological Survey of India
  - National Institute of Hydrology, Roorkee
  - Centre for Development of Advanced Computing
  - Wadia Institute of Himalayan Geology
  - **Innovative Risk Mitigation Strategies:** Plans to implement controlled lake drainage by installing pipes in high-risk lakes. Technique aims to gradually reduce water pressure and minimize sudden outburst risks. Similar methods successfully employed in Nepal and Bhutan, reducing GLOF risks by up to 35%

Historical Context and Urgency:

- **Devastating GLOF Events in Uttarakhand:**
  - **Kedarnath valley GLOF in June 2013:** Over 6,000 fatalities and economic losses exceeding $3.8 billion.
  - **Rishiganga Valley GLOF in Chamoli (February 2021):** 72 lives lost and severe damage to infrastructure. These events highlight the catastrophic potential of GLOFs and the need for proactive management
- **Global Climate Change Context:** IPCC Sixth Assessment Report (2021) warns of increased GLOF risks in Hindu Kush Himalaya region. Projected temperature rise of 1.8-2.2°C in the region by 2050 could accelerate glacier retreat. Uttarakhand's initiative aligns with global efforts to adapt to and mitigate climate change impacts
- **Monsoon Preparedness and Long-term Planning:** Study timing coincides with monsoon onset, when GLOF risks typically peak. Part of Uttarakhand's broader climate adaptation strategy, including:
  - Development of climate-resilient infrastructure
  - Community-based early warning systems
  - Integration of traditional knowledge in disaster preparedness

FACT BOX

Formation of Glacial Lakes:

- Glacial lakes are primarily formed by the accumulation of meltwater in depressions created by glacier movement.
- ISRO categorizes glacial lakes into following types based on their formation mechanisms:
  - moraine-dammed
  - ice-dammed
  - erosion-based, and others
- **Glacial Lake outburst**
  - When the boundary around unstable glacial lake breaks, and huge amounts of water rush down the side of the mountains, which could cause flooding in the downstream areas.
  - This is called glacial lake outburst floods or GLOF.
  - **Factors causing GLOF:** earthquakes, extremely heavy rains, landslides and ice avalanches.

PRACTICE QUESTION

Q. Discuss the challenges posed by glacial lakes in the Himalayan region and evaluate the effectiveness of current mitigation strategies. Suggest innovative approaches to enhance disaster preparedness in vulnerable areas.

13. ISRO'S ROLE IN FLOOD MANAGEMENT

CONTEXT: The Indian Space Research Organisation (ISRO) has extended support to mitigate flood risks associated with the Mullaperiyar and Idukki dams in Kerala by providing space-based inputs related to high-resolution terrain data for the researchers to engage in flood modelling and assess probable inundation by identifying potential flood risks.

India's Vulnerability to Floods:

- India faces significant flood risks due to its geographic diversity, monsoon rains, and changing climate patterns.
- Over 40 million hectares of land are prone to flooding, affecting states like Assam, Bihar, Odisha, Uttar Pradesh, and West Bengal.
- **Causes:** Factors like deforestation, rapid urbanization, and poor agricultural practices exacerbate flood severity in certain regions.
  - Poor town planning, unauthorized and illegal construction, and inadequate urban infrastructure expose Indian cities to flooding.
- **Impact:** Loss of human lives, displacement, destruction of crops, and damage to property and other physical infrastructures.
- **Role of Satellite Technology:** Satellites, operated by agencies like the Indian Space Research Organisation (ISRO), are pivotal in managing and mitigating flood disasters across India.

ISRO's role in Disaster Management

ISRO plays a crucial role in disaster management through its satellite-based applications. These tools aid in monitoring, predicting, and mitigating various natural disasters across India.

- **Flood Management:** ISRO provides real-time flood mapping and inundation maps to agencies like **National Disaster Management Authority (NDMA)** and State Relief Commissioners. This helps in timely evacuation and relief operations during floods.
- **Glacial Lake Outburst Floods (GLOFs):** ISRO monitors glacial lakes using satellite data to assess potential risks of GLOFs. This helps in understanding and mitigating flood risks in the Himalayan region.
- **Terrain Mapping:** High-resolution terrain data from satellites assist in flood modelling and identifying vulnerable areas prone to inundation, such as around dams like Mullaperiyar and Idukki in Kerala.
- **Information Dissemination:** ISRO uses platforms like *Bhuvan* and **National Database for Emergency Management (NDEM)** to disseminate critical information to disaster management authorities. This includes flood maps, weather forecasts, and disaster impact assessments.
- **Telemedicine and Tele-education:** ISRO's satellites support telemedicine projects, connecting remote healthcare centers with urban hospitals for medical consultations. Similarly, tele-education initiatives like **EDUSAT** provide educational resources to rural areas.
- **Meteorological Services**: ISRO satellites contribute to weather forecasting and monitoring through collaboration with the **India Meteorological Department (IMD).** This aids in predicting cyclones and other severe weather events.

PRACTICE QUESTION

Q. India faces significant flood risks due to its geographic diversity. Discuss ISRO's role in disaster management through its satellite-based applications.

14. CROWD DISASTERS IN INDIA

CONTEXT: Stampedes during religious gatherings are tragically common in India, often due to poor crowd management and safety oversights. Recently, a stampede in Uttar Pradesh's Hathras district claimed the lives of at least 116 people, predominantly women, highlighting the urgent need for effective crowd control strategies.

What is a Stampede?

- A stampede is characterized by the chaotic movement of a crowd, resulting in injuries and fatalities. It typically occurs due to panic triggered by perceived danger, overcrowding, or the rush to achieve something desirable.
- **Causes of Stampedes**: Stampedes are primarily caused or exacerbated by panic and can be prevented through improved design and management of spaces where mass gatherings occur. Factors contributing to stampedes include:
  - Lack of adequate lighting
  - Uncontrolled flow of crowds
  - Structural failures like collapsed barriers or buildings
  - Blocked exits or evacuation routes
  - Inefficient design of infrastructure such as entrance doors
  - Fire hazards and other safety oversights
- **Reason behind casualties:**
  - **Traumatic asphyxia:** There is partial or complete cessation of respiration due to external compression of the thorax and/or upper abdomen.
  - **Myocardial infarction**: Heart attack, caused by decreased or complete cessation of blood flow to a portion of the heart
  - **Direct crushing** injury to internal organs, head injuries, and neck compression.

Preventive Measures

- Effective crowd management is crucial in mitigating stampede risks. Strategies include:
  - **Live Surveillance:** Monitoring crowd density, bottlenecks, and disturbances to anticipate and prevent incidents.
  - **Communication:** Coordination between organizers, local authorities, and law enforcement to manage crowd behavior and ensure timely interventions.

NDMA's guidelines for Crowd Management

- The National Disaster Management Authority (NDMA) has formulated guidelines for integrated crowd management, which are crucial for ensuring public safety during various types of events. Here are the simplified pillars and considerations as per NDMA's guidelines:
  - **Pillars of Integrated Crowd Management**:
  - **Capacity Planning**: Assessing the venue's capacity to accommodate the expected number of attendees. Ensuring adequate facilities like exits, seating arrangements, and emergency services.
  - **Risk Assessment**: Identifying potential hazards and risks associated with the event. Evaluating factors like crowd density, weather conditions, and infrastructure vulnerabilities.
  - **Preparedness Planning**: Developing detailed plans and procedures for managing crowds effectively.
  - **Incident Response**: Establishing protocols for responding to emergencies such as medical emergencies, fires, or crowd disturbances.

- **Capacity Building:** Training personnel involved in crowd management on safety protocols and crowd control techniques. Educating the public on safe behavior during events to prevent panic and stampedes.

- **Parameters for Planning and Management:**
  - **Type of Event:** Whether it's religious, educational, sports, entertainment, etc.
  - **Expected Crowd:** Considering demographics like age, gender, and economic backgrounds.
  - **Crowd Motives**: Understanding why attendees are coming (social, academic, religious, etc.).
  - **Venue:** Assessing location, layout (open or closed), accessibility, and infrastructure.
  - **Stakeholder**s: Involving NGOs, local authorities, and community members to enhance coordination and support.

Notable Stampede Incidents

- **Moscow, Russia (1896):** Over 1,000 deaths due to a crowd surge over souvenir rumors.
- **Allahabad, India (1954):** Around 800 fatalities during the Kumbh Mela due to poor crowd control.
- **Lima, Peru (1963):** 326 deaths after tear gas use during a football match triggered panic.
- **Wai, India (2005):** Over 340 deaths during a temple pilgrimage due to slippery steps.

15. KAVACH ANTI-COLLISION SYSTEM

CONTEXT: A recent tragic incident in West Bengal highlighted the urgency of enhancing railway safety in India. A collision between a goods train and the Kanchanjunga Express resulted in 15 deaths and over 60 injuries, prompting renewed focus on safety measures like the Kavach anti-collision system.

Increasing Accidents:

- India's vast railway network, spanning over 100,000 km, faces significant challenges despite efforts to expand and upgrade.
- **Challenges for India:**
  - The railway system, vital for transporting 25 million daily passengers, operates on **mixed tracks where passenger and goods trains share space.**
  - Over-utilization leads to reduced maintenance windows, increasing risks like signal malfunctions and accidents.

Reasons Behind Rail Accidents in India

- **Derailments:** Occur when train carriages derail due to track defects, mechanical failures, or human error.
- **Collisions:** Involve two or more trains colliding due to signalling errors, miscommunication, or operational failures.
- **Explosions/Fires:** Result from incidents such as electrical faults, arson, or gas leaks on trains or at railway stations.
- **People Falling from Trains/Colliding with People on Tracks:** Include accidents where individuals fall from moving trains or are hit while crossing or walking along railway tracks.
- **Other Causes:** Encompass accidents not falling into the above categories, often due to unforeseen events like bridge collapses, landslides, or natural disasters. This category also includes accidents with unknown causes.

Top Technologies Ensuring Safety of Indian Railways

- **LHB Coaches:** Introduced in 1999, LHB (Linke Hofmann Busch) coaches replace older ICF coaches. They feature anti-telescopic designs that prevent secondary accidents in case of a collision. LHB coaches are safer and can operate at speeds exceeding 160 kmph.
- **Block Proving Axle Counter (BPAC):** BPAC is a train detection system that ensures only one train occupies a track section at a time. It uses sensors at axles to accurately detect train presence and direction, crucial for safe railway signaling.
- **Auxiliary Warning System (AWS):** AWS, or Automatic Train Protection, monitors train speeds according to signal indications. It restricts speeds to ensure safety: 15 kmph for red signals, 38 kmph for yellow, and up to 70 kmph for green or double yellow signals.
- **Self-Propelled Ultrasonic Rail Testing (SPURT):** SPURT cars use ultrasonic technology to detect internal rail flaws, conducting real-time testing twice yearly on busy routes like New Delhi – Howrah and New Delhi – Mumbai Central. This technology enhances track maintenance efficiency, covering up to 80-120 km of track per day.

What is Kavach Anti-Collision System?

- **Developed by:** Research Designs & Standards Organisation (RDSO)
- The Kavach automatic train protection (ATP) system is India's indigenous automatic train protection system.
- It is a technology with **Safety Integrity Level 4 (SIL-4) certification.**
- It aims to prevent collisions through features such as automatic brake application during emergencies, real-time communication, and warning systems for foggy conditions.
- **Key Features of Kavach:**
  - Uses RFID and radio frequency technologies along tracks and in locomotives.
  - Alerts operators to Signal Passed at Danger (SPAD) situations and potential collisions.
  - Enhances safety with direct locomotive-to-locomotive communication and automated responses to critical situations.
- **Implementation Status:** As of early 2024, Kavach covers 1,465 route kilometres and 139 locomotives, mainly in the South Central Railway network. Plans include expanding coverage on major corridors like Delhi-Mumbai and Delhi-Howrah, spanning approximately 3,000 route kilometres.
- **Other Safety Initiatives:**
  - India's rail modernization efforts also focus on upgrading signalling systems and enhancing safety measures nationwide.
  - Significant investments are directed towards improving infrastructure and operational efficiency to mitigate accidents and ensure passenger safety.

PRACTICE QUESTION

Q. India's vast railway network faces significant challenges despite efforts to expand and upgrade. Discuss measures to enhance railway safety.

16. DISASTER MANAGEMENT POLICIES AND INITIATIVE

India's Vision for Prevention, Mitigation, and Preparedness

India aims to develop a culture focused on prevention, mitigation, and preparedness to combat the damage caused by natural and man-made disasters. This goal involves the collective efforts of all government agencies, non-governmental organizations, and public participation. The approach is technology-driven, proactive, multi-hazard, and multi-sectoral, ensuring a safer, disaster-resilient, and dynamic India.

About NDMA

The Government of India has prioritized Disaster Management, setting up a High-Powered Committee in August 1999 and a national committee after the Gujarat earthquake. These bodies make recommendations on Disaster Management plans and effective mitigation mechanisms. The Tenth Five-Year Plan included a detailed chapter on Disaster Management, and the Twelfth Finance Commission reviewed financial arrangements for it.

On December 23, 2005, the Disaster Management Act was enacted, creating the National Disaster Management Authority (NDMA), headed by the Prime Minister. State Disaster Management Authorities (SDMAs) are led by respective Chief Ministers. These bodies spearhead and implement a holistic and integrated approach to Disaster Management in India.

NDMA Vision

"To build a safer and disaster-resilient India through a holistic, proactive, technology-driven, and sustainable development strategy involving all stakeholders, fostering a culture of prevention, preparedness, and mitigation."

Organization Structure

The NDMA, constituted under the Disaster Management Act 2005, is chaired by the Prime Minister and includes a Vice Chairman with the status of Cabinet Minister and eight members with the status of Ministers of State. NDMA is a lean, professional, IT-enabled, and knowledge-based organization. Specialists' skills and expertise are extensively used to address disaster-related issues. NDMA's functional and operational infrastructure is suitable for managing disasters, involving uncertainties and action plans.

The organization is based on a 'disaster divisions-cum-secretariat' system, with each member heading specific disaster and functional domains. Members also interact and coordinate with specified states and UTs.

The NDMA Secretariat, headed by a Secretary, provides secretarial support and continuity, dealing with mitigation, preparedness, plans, reconstruction, community awareness, and financial and administrative aspects. NDMA also has the National Disaster Management Operations Centre with state-of-the-art communication systems, and it focuses on capacity development, training, and knowledge management.

Functions and Responsibilities

NDMA, as the apex body, is responsible for laying down policies, plans, and guidelines for Disaster Management to ensure timely and effective responses to disasters. Its responsibilities include:

- Formulating disaster management policies
- Approving the National Plan and plans prepared by various ministries
- Setting guidelines for State Authorities and different ministries
- Coordinating the enforcement and implementation of disaster management policies and plans
- Recommending funds for mitigation
- Providing support to other countries affected by major disasters
- Taking necessary measures for disaster prevention, mitigation, preparedness, and capacity building
- Laying down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

NDMA Policy

The National Policy framework aligns with the vision of creating a safe and disaster-resilient India through a holistic, proactive, multi-disaster, and technology-driven strategy. This strategy promotes a culture of prevention, mitigation, and preparedness to ensure prompt and efficient responses during disasters. The entire process centers on the community and involves the collective efforts of government agencies and NGOs.

This policy framework conforms with international strategies, including the International Strategy for Disaster Reduction, the Rio Declaration, the Millennium Development Goals, and the Hyogo Framework 2005-2015. The key themes include:

- Community-based disaster management, including policy integration and execution
- Capacity development in all related areas
- Consolidation of past initiatives and best practices
- Cooperation with national, regional, and international agencies
- Compliance and coordination for multi-sectoral synergy.

Objectives Guiding Policy Formulation

- Promoting a culture of prevention and preparedness
- Encouraging state-of-the-art and environmentally sustainable mitigation measures
- Mainstreaming disaster management concerns into the development planning process
- Establishing a streamlined institutional and techno-legal framework
- Developing advanced forecasting and early warning systems with reliable communications and IT support
- Partnering with the media, NGOs, and the corporate sector for awareness generation and capacity development
- Ensuring efficient and humane response and relief, particularly for vulnerable sections of society
- Making reconstruction an opportunity to rebuild better and create disaster-resilient structures.

National Disaster Response Force (NDRF)

The Disaster Management Act of December 26, 2005, established the National Disaster Response Force (NDRF) for specialized response to natural and man-made disasters. The proactive availability and pre-positioning of the NDRF have significantly minimized damage from natural calamities.

Role of NDRF in Natural Disasters

NDRF carries out rescue and relief operations during natural disasters, having saved approximately 1.3 lakh lives in 73 operations. The NDRF can also respond to nuclear, biological, and chemical disasters.

Leadership of NDRF

The NDRF is led by a Director General (DG), typically an IPS officer, and operates under the National Disaster Management **Authority (NDMA). The Prime Minister chairs the NDMA.**

National Disaster Response Fund (NDRF)

The National Disaster Response Fund (NDRF), defined in Section 46 of the Disaster Management Act, 2005, is managed by the Central Government to cover emergency response, relief, and rehabilitation expenses due to disasters. It supplements the State Disaster Response Funds (SDRF) when state funds are insufficient for severe disasters.

Eligibility for NDRF Funds

Natural calamities like cyclones, droughts, earthquakes, fires, floods, tsunamis, hailstorms, landslides, avalanches, cloud bursts, pest attacks, cold waves, and frost, considered severe by the Government of India, qualify for NDRF assistance. The NDRF also covers man-made disasters such as terrorist attacks, chemical or biological disasters, and nuclear disasters.

States must submit a memorandum detailing sector-wise damage and funding needs to access NDRF funds. The Centre assesses the damage and grants additional funds to states. NDRF funds are intended for immediate relief, not for compensating property or crop losses. Preparedness, restoration, reconstruction, and mitigation activities are funded by other schemes like the National Disaster Mitigation Fund (NDMF), the National Cyclone Risk Mitigation Project (NCRMP), and the National Flood Management Programme (NFMP).

Sources of Financing NDRF

The NDRF is financed through a cess on certain items chargeable to excise and customs duty, approved annually through the Finance Bill. Additional funds are sourced from general budgetary resources. The National Executive Committee (NEC) of the National Disaster Management Authority decides on NDRF expenses. The Comptroller and Auditor General (CAG) audits NDRF accounts annually.

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2

INTERNAL SECURITY

1. URBAN NAXALISM

CONTEXT: **To prevent unlawful activities by individuals and organizations and to curb the threat of Naxalism and its supporters in urban areas, the Maharashtra government presented a bill named the "Maharashtra Special Public Safety Act 2024," the legal provisions of this bill are intended to curb the threat of Naxalism and its supporters in urban areas.**

About

- The **Maharashtra Special Public Safety Act 2024** aims to combat unlawful activities linked to Naxalism and its supporters in urban areas.
- It categorizes involvement in violence, promoting fear among the public, and encouraging disobedience to established laws as unlawful.
- **Need behind the bill:** The menace of Naxalism is not only limited to remote areas of the Naxal-affected states, but its presence is increasing in the urban areas also through the Naxal frontal organisations. The spread of active frontal organisations of Naxal groups gives constant and effective support in terms of logistics and safe refuge to their armed cadres.

The states of **Chhattisgarh, Telangana, Andhra Pradesh and Odisha** have enacted the **Public Security Acts** for more effective prevention of unlawful activities of such organisations and banned 48 frontal organisations.

Urban Naxalism in India

- Urban Naxalism has emerged as a contentious issue in India, blending socio-political ideology with security concerns. Originating from the Maoist insurgency in rural India, particularly the Naxalite movement, Urban Naxalism represents a shift towards urban centers where sympathizers and ideologues support or facilitate Maoist activities.

- Unlike their rural counterparts engaged in armed struggle, Urban Naxals operate covertly, using **intellectual and cultural platforms to propagate their ideology, recruit followers, and mobilize support.**
- They often exploit **democratic freedoms** such as **free speech and association** to further their cause, posing a challenge to law enforcement agencies.
- **Factors Driving Urban Naxalism:** Socio-Economic Disparities, Perceived Injustice, Intellectual and Ideological Influence
- **Challenges:**
  - **National Security Concerns**: Urban Naxalism is viewed by authorities as a threat to national security due to its potential to incite violence, undermine state authority, and destabilize governance.
  - **Freedom of Expression vs. Sedition**: The thin line between legitimate dissent and sedition is often debated, with arrests of activists and intellectuals accused of supporting Naxalism raising concerns about freedom of expression.
  - **Legal and Ethical Dilemmas**: Law enforcement faces challenges in balancing preventive actions with civil liberties, leading to criticism over the arbitrary use of anti-terror laws against dissenters.

FACT BOX

About Naxalism

- Naxalism originated in 1967 in Naxalbari, West Bengal, led by Charu Majumdar and Kanu Sanyal. Over time, it evolved into an armed Maoist movement aimed at overthrowing India's parliamentary system.
- The CPI (Maoist), formed in 2004, amalgamated several groups and operates primarily in central Indian states like **Jharkhand, Chhattisgarh, and Maharashtra.**
- **Spread in India:** Naxalism has spread widely, affecting states such as Jharkhand, West Bengal, Odisha, Bihar, Chhattisgarh, and Andhra Pradesh.
- **Causes:** Economic grievances and alleged governmental neglect contribute to local support for Naxal groups. Issues like lack of development, denial of tribal rights, and exploitation often fuel resentment and recruitment into these movements.
- **Impact:** Naxal activities include obstructing development projects, extorting locals, and running parallel judicial systems in areas inaccessible to regular governance.

PREVIOUS YEAR QUESTION

Q. Naxalism is a social, economic and development issues manifesting as a violent internal security threat. In this context, discuss the emerging issues and suggest a multilayered strategy to tackle the menace of Naxalism. (2022)

PRACTICE QUESTION

Q. "Economic inequalities and marginalized communities feeling neglected by mainstream development policies can fuel discontent and sympathy towards radical ideologies." Comment

2. THE SPREAD OF NAXALISM

CONTEXT: The Naxalite–Maoist insurgency in India is an ongoing conflict between Maoist groups known as Naxalites or Naxals and the Indian government.

Origin and Ideology:

- Naxalism represents both a socio-economic issue and a law and order problem.
- Naxals are far-**left radical communists** who support Maoist political sentiment and ideology.
- Their followers primarily include **Adivasis, Dalits, and the poorest of the poor**—often landless laborers working below India's mandated minimum wages.
- **Impacted region:** Naxalism is concentrated in Eastern India, particularly an area known as the **Red Corridor** spread across the states of Chhattisgarh, Odisha, Jharkhand, Bihar, and Andhra Pradesh.
- Some districts of Kerala, Telangana, Uttar Pradesh, etc. are also impacted by Naxalism.

Challenges and Criticisms:

- **Inefficient Service Delivery**: Naxal-affected areas remain deprived of basic services, justice delivery, and community participation among others.
- **Lack of coordination:** States have not done satisfactorily in joining hands. This lack of coordination between State police and Central forces results in security voids which are exploited by the Naxals.
- **Inability to maintain created infrastructure-** It hampers the trust of locals and disrupts channels of communication for security forces.
- **Inability to curb sources of financing for Naxals** – Demonetisation also proved to be insufficient.
- **Inadequate use of Technology**-The use of drones, ground sensors, smart guns, AI, etc. has been inadequate in Naxal areas.

FACT BOX

Government Response:

The Indian government has launched several operations to counter Naxalism:

- **Operation Prahar (Launched in 2017)**:
  - A collaborative mission involving the CRPF and Chattisgarh Police.
  - Focuses on removing extremists from their hideouts, particularly in the Bastar region of Chhattisgarh.
  - Reports indicate that over 79 Naxals have been neutralized in different encounters since the start of 2024.
  - Other notable operations include **Operation Green Hunt, Operation Hill Vijay, Operation Samadhan-Prahar, and Operation Thunder.**

PRACTICE QUESTION

Q. Discuss recent government interventions to counter the menance of Naxalism in India.

3. AFSPA EXTENSION

CONTEXT: The contentious Armed Forces Special Powers Act (AFSPA) continues to be a subject of debate and concern as the central government announces its extension in three districts and three police stations of Arunachal Pradesh for a further six months. This decision raises questions about the balance between security imperatives and the protection of civil liberties in the northeastern state.

Need of the Act in India's north-east

- Arunachal Pradesh, shares its borders with **China, Bhutan, and Myanmar**, making it strategically significant from a security standpoint.
- Over the years, the region has witnessed sporadic incidents of insurgency and militancy, prompting the deployment of security forces and the enactment of special legal provisions such as AFSPA.
- The extension of AFSPA in three districts—Tirap, Changlang, and Longding—and three police stations underscores the persistent security challenges facing certain pockets of Arunachal Pradesh.
- These areas have been identified as being **vulnerable to insurgent activities, cross-border infiltration,** and other **threats to public order and national security.**

Efficacy of such legal measures in addressing security challenges

- AFSPA is essential for dealing with insurgencies and protecting civilians from armed groups, critics view it as a draconian law that enables human rights abuses and undermines democratic principles.
- While security agencies emphasize the need for uninterrupted powers to combat insurgency and maintain stability, civil society organizations and human rights activists raise concerns about the potential for abuse of power and violations of fundamental rights.
- Reports of extrajudicial killings, arbitrary detention, and other human rights violations have fuelled calls for the repeal or reform of AFSPA.
- **SC on AFSPA:** The Supreme Court established legal principle "Accountability is a facet of the rule of law." It rules that the armed forces cannot escape investigation for excesses in the course of the discharge of their duty even in "disturbed areas".

Positives of AFSPA	Negatives of AFSPA
◦ It is necessary tool to tackle unconventional threats posed by insurgent groups operating in remote and inaccessible terrain. ◦ Withdrawal of AFSPA could embolden militant outfits and compromise the safety and security of both civilians and security personnel.	◦ It shields security personnel from accountability for excesses committed in the course of their duties. ◦ It leads to abuse of power and violations of fundamental rights.

FACT BOX

Fact Box: About AFSPA

- Under the **Armed Forces (Special Powers) Act**, an area is declared as **"disturbed"** for the convenience of security forces.
- An area or district is notified as a disturbed area under the AFSPA to facilitate the operations of the armed forces.
- The AFSPA gives armed forces personnel, operating in disturbed areas, sweeping powers to search, arrest and to open fire if they deem it necessary for "the maintenance of public order".

PREVIOUS YEAR QUESTION

Q. Human right activists constantly highlight the view that the Armed Forces (Special Powers) Act, 1958 (AFSPA) is a draconian act leading to cases of human rights abuses by the security forces. What sections of AFSPA are opposed by the activists? Critically evaluate the requirement with reference to the view held by the Apex Court. (2015)

PRACTICE QUESTION

Q. Do you think there is the need for a nuanced approach that balances security imperatives with respect for human rights and the rule of law.

4. INDIA'S FIRST NATIONAL SECURITY STRATEGY

CONTEXT: The National Security Council Secretariat (NSCS) is going to draft a comprehensive National Security Strategy in consultation with several Central ministries and departments.

- The final draft has been put forward for the Cabinet's approval.

About

- This is the first time that India will come out with a national security strategy.
- **Objective:** The document is aimed at putting together India's national security objectives and the ways to be adopted to achieve or realise them.
- The strategy may include other stakeholders to tackle the many **non-traditional threats** and vulnerabilities identified across domains such as **civil society organisations, academia, media, think tanks and other institutions.**

Why it's needed?

- Given the complex nature of the various traditional and non-traditional threats, especially when rising geopolitical tensions have given way to uncertainties; it was felt that there was an urgent need to draft a national security strategy.
- This would draw in from the **comprehensive national power** of the country.
- A National Security Strategy document outlines the country's security objectives and the ways to be adopted to achieve these.
- **Significance:** It would help in optimal utilisation of the military's resources for future wars and operations. Without such a well-defined strategy, military reforms would be like "putting the cart before the horse".

Importance in contemporary Period

- **Deterrence:** A well-defined strategy acts as a deterrent against potential adversaries. It sends a clear message that any hostile actions will be met with a strong and organized response, which can help prevent conflicts.
- **Resource Allocation:** A National Security Strategy helps in the efficient allocation of resources. It prioritizes various security needs, helping the government allocate budgetary resources to strengthen defense capabilities, intelligence agencies, and disaster management.
- **Counterterrorism:** Given India's vulnerability to terrorism, a National Security Strategy is essential for counterterrorism efforts. It outlines the measures to combat terrorism, including intelligence sharing, law enforcement, and border security.
- **Cybersecurity:** In the digital age, cybersecurity is a crucial aspect of national security. A strategy provides a framework for protecting critical infrastructure, sensitive information, and maintaining the integrity of cyberspace.
- **Disaster Management:** Natural disasters and pandemics can also pose significant threats to national security. A strategy includes measures for disaster preparedness, response, and recovery.
- **Economic Security:** National security is closely linked to economic security. A strategy considers economic stability and prosperity as vital components of security, addressing issues such as trade, energy security, and critical infrastructure protection.
- **Geopolitical Influence:** A well-crafted strategy can enhance India's influence and standing in the global geopolitical arena. It allows India to assert its interests effectively and contribute to regional and global security.

PRACTICE QUESTION

Q. By formulating and implementing an effective national security strategy, India can better protect its citizens and interests while contributing to regional and global stability. Comment

5. EXPANSION OF DEEP-VETTING FOR GOVERNMENT JOBS IN J&K

CONTEXT: The Union government has announced an expansion of the "deep-vetting" process for government job aspirants in Jammu and Kashmir. This new policy aims to ensure that no relatives of militants or stone-pelters get government jobs in the Union Territory. This move is expected to affect over 50,000 families and has been criticized by regional parties for potentially alienating Kashmiri youth.

The Need for New Rules

- The policy change comes in response to concerns about the **security implications of hiring individuals with potential ties to militancy.**
- The traditional process only verified the credentials of the job aspirant.
- However, the expanded vetting will include background checks on immediate and close relatives on both the maternal and paternal sides to identify any connections to militant activities or stone-pelting incidents.

Details of the New Rules

- **Expanded Background Checks**: Security agencies will perform thorough checks on the families of job aspirants, including immediate and close relatives.
- **Target Group**: The focus is on ensuring no relatives of militants or stone-pelters are employed in government positions.
- **Past Rehabilitation Policies:** This policy overturns previous government efforts to rehabilitate former militants, which included:
  - **Monetary Incentives**: Cash deposits and monthly stipends were provided to surrendered militants under policies from 1995, 2004, and 2010.
  - **Rehabilitation for Exfiltrated Individuals**: A policy for Kashmiris who had exfiltrated to Pakistan Occupied Kashmir for arms training allowed them to return and reintegrate.

Impact of the move

- The Government has a policy of zero tolerance against terrorism. The expanded vetting policy for government jobs in Jammu and Kashmir is a significant shift aimed at enhancing security.
- However, it has sparked a debate about its potential consequences on the region's youth and their integration into mainstream society.
- In Jammu & Kashmir, the increase in terror activities, is a major concern.

FACT BOX

Agencies Responsible for Fighting Terrorism in India

- **Central Reserve Police Force (CRPF):** This 165,000-strong force assists police in maintaining internal security and is particularly active in regions like Kashmir.
- **Indian Army:** Generally involved as a last resort in counterterrorism operations, except in Jammu and Kashmir, where they have a consistent presence.
- **Intelligence Agencies**
  - **Research and Analysis Wing (RAW):** India's external intelligence agency, responsible for gathering and analyzing intelligence on foreign threats.
  - **Intelligence Bureau (IB):** Operating under the Ministry of Home Affairs, the IB collects domestic intelligence and oversees the interagency counterterrorism center.

- **Joint Intelligence Committee**: Analyzes data from RAW, IB, and military intelligence agencies to provide a comprehensive view of terrorist threats.
- **Ministry of Home Affairs**: It oversees national police, paramilitary forces, and domestic intelligence gathering.
- **Ministry of External Affairs:** Manages diplomatic counterterrorism efforts, including briefing other nations on issues such as suspected terrorism sponsorship by Pakistan.

PREVIOUS YEAAR QUESTION

Q. Analyse the complexity and intensity of terrorism, its causes, linkages and obnoxious nexus. Also suggest measures required to be taken to eradicate the menace of terrorism. (2021)

Q. For effective border area management, discuss the steps required to be taken to deny local support to militants and also suggest ways to manage favourable perception among locals. (2020)

PRACTICE QUESTIONS

Q. Discuss the impact of the recent expansion of the "deep-vetting" process for government job aspirants in Jammu and Kashmir.

6. ARMY PRESENCE IN J&K

CONTEXT: The government is considering a plan to withdraw the Army from the interior of Kashmir in a phased manner and replace it with Central Reserve Police Force (CRPF) personnel.

Reason behind the move:

- **To show (prove) normalcy**: The idea behind the deliberations is to not just claim normalcy in Kashmir but also make it visible.
  - The government claims that terrorist violence incidents and killing of security personnel in J&K have reduced by almost 50 per cent since August 5, 2019, compared with the same period before it.

What is in the plan?

- The government is discussing a proposal to withdraw the Indian Army completely from the Valley hinterland.
- If approved, the Army will have presence only on the **Line of Control (LoC).**
- The idea is to have J&K Police along with the Central Reserve Police Force (CRPF) fill in for the Army when it is withdrawn.

The Strength (in numbers):

- The **Army** maintains strength of around 1.3 lakh personnel in the entire J&K of which around 80,000 are deployed on the border.
- About 40,000-45,000 personnel from the **Rashtriya Rifles** have the mantle of conducting counter-terror operations in Kashmir's hinterland.
- The **CRPF** is said to have a strength of close to 60,000 personnel in J&K, of which more than 45,000 are deployed in Kashmir Valley.
- **J&K Police** is 83,000 strong.
- Apart from this, a few companies from other **Central Armed Police Forces (CAPF)** remain deployed in the Valley. The figures for CAPFs fluctuate depending on the security situation in the Valley.

7. JOINT CULTURE IN ARMED FORCES

CONTEXT: **Chief of Defence Staff (CDS) Anil Chauhan has called on the Indian Army, Navy, and Air Force to embrace a joint culture as they progress towards forming integrated operational structures. This initiative, termed "Jointness 2.0" by the CDS, is the next step in enhancing collaboration among the three services.**

Evolution from Jointness 1.0 to Jointness 2.0

- Jointness 1.0 aimed at fostering better camaraderie and consensus among the services, with no major differences impeding cooperation.
- Now, with Jointness 2.0, the focus shifts to creating a more **integrated joint culture** while respecting the **unique strengths of each service.** The goal is to integrate the best aspects of each service, aiming for the highest common factor rather than the least common denominator.

Need in India:

- These reforms are important in the **Indian Defence ecosystem** due to new global challenges and the current flux in world order, which force nations to review their security strategies.
- The rapid advancement of technology is transforming the way future wars will be fought, making these reforms even more critical.
- Jointness for India is far more important now than in the past. This is because India aims to be a regional power by 2030 and one of the global powers by 2050.

Integrated Theatre Commands

Jointness and integration are prerequisites for creating **functional Integrated Theatre Commands.** These commands will:

- **Separate Functions**: Separate operational functions from administrative functions like Raise-Train-Sustain (RTS), allowing operational commanders to focus solely on security matters.
- **Enable Reforms**: Lead to reforms such as transitioning from single to multi-domain operations, integrating space and cyber domains with traditional ones, digitizing battlefield information, and shifting from net-centric to data-centric operations.

FACT BOX

About Joint Culture

- Jointness was a term coined by the US armed forces to describe inter service cooperation.
- It's a combination of at least two arms in the military coordinated towards one common goal.

PRACTICE QUESTION:

Q. "Jointness and integration are prerequisites for creating functional Integrated Theatre Commands" Comment

8. HUMAN TRAFFICKING IN INDIA

CONTEXT: **The National Investigation Agency (NIA) has arrested five individuals in connection with their alleged involvement in international human trafficking and cyber fraud activities. They were allegedly coerced into engaging in various illegal online activities, including credit card fraud, investments in cryptocurrency using fake applications, honey trapping, etc.,**

What is Human Trafficking?

- According to the United Nations Office on Drugs and Crime (UNODC), human trafficking involves the recruitment, transportation, transfer, harboring, or receipt of people through force, fraud, or deception to exploit them for profit.
- This exploitation includes sexual exploitation, forced labor, slavery, servitude, or the removal of organs.
- **Global Severity:** The UNODC's 2019 report reveals that 60% of trafficking occurs within a country. Key statistics include:
  - 90% of sexual trafficking victims are women and girls.
  - In South Asia, 85% of victims are exploited for forced labor.
  - Human trafficking is the third most challenging crime globally, following drugs and weapons in terms of turnover and human misery.

Causes of Human Trafficking

- **Poverty:** Trafficking thrives in areas with widespread poverty. Desperate parents might sell their children, believing it will lead to a better life for them.
- **Social Factors:** Young women are particularly vulnerable due to social and cultural devaluation, making them easy targets for traffickers.
- **Migration:** Individuals seeking better lives are often lured by traffickers with false promises. Once under the traffickers' control, coercive measures are used to exploit them.
- **Climate change**, including sudden-onset disasters such as floods and slow-onset events like drought, increased large-scale displacement and migration, further exacerbating vulnerabilities to human trafficking.
- **Other Factors:** Permeable borders, corrupt officials, involvement of international criminal groups, limited capacity or commitment of immigration and law enforcement officers.

Reason behind India's vulnerability to human trafficking

- **Border:** In India, West Bengal has long served as a major hub for both domestic and International human trafficking, largely due to the state's areas of poverty and its porous 2,216.7-kilometre border with Bangladesh. It also shares borders with Nepal and Bhutan.
- **Geographical proximity with opium growing regions:** India is placed between the two largest opium growing areas in the world.
  - To the west is the Golden Crescent (Afghanistan)
  - To the east is the Golden Triangle (Myanmar)

FACT BOX

Legal and Constitutional Frameworks to Counter Human Trafficking in India

- **Article 23**: Prohibits human trafficking and forced labor (begar).
- **Article 24**: Forbids the employment of children below 14 years in hazardous jobs like factories and mines.
- **Immoral Traffic Prevention Act, 1986**: This Act aims to implement the Trafficking Convention and prohibit immoral human trafficking. It establishes authorities at the central and state levels to combat trafficking, though it does not specify their roles, functions, or composition.
- **Criminal Law (Amendment) Act, 2013:** This amendment replaces Section 370 of the Indian Penal Code with **Sections 370 and 370A**, providing comprehensive measures to counter human trafficking.
- **Section 370 of the IPC** criminalises the **import, export, removal, buying, selling or disposal of any person as a slave or accepting, receiving or detaining against the person's will as a slave**. The **Bharatiya Nyaya Sanhita (BNS),** to replace IPC, has introduced beggary as a form of exploration for trafficking.
- However, conviction rate in human trafficking cases stood at 19. 4 per cent in 2022.

PYQ

Q. India's proximity to two of the world's biggest illicit opium-growing states has enhanced her internal security concerns. Explain the linkages between drug trafficking and other illicit activities such as gunrunning, money laundering and human trafficking. What countermeasures should be taken to prevent the same? (2018)

PRACTICE QUESTION

Q. Why India is vulnerable to human trafficking? Suggest countermeasures.

9. CATEGORISATION OF TERRORISM

CONTEXT: India has said that the tendency to categorise terrorism on the basis of motivations behind terrorist acts is "dangerous". India also asserted that all kinds of terror attacks, whether motivated by Islamophobia, anti-Sikh, anti-Buddhist or anti-Hindu prejudices, are condemnable.

About terrorism:

- Terrorism, by definition, is always a crime, but it can also be a strategy in a war. In the international community (including UN), terrorism has no legally binding, criminal law definition.
- For the sake of discussion, it can be described as; according to the FBI: "Terrorism is the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives."

Challenges in Combating Terrorism:

- **Terror Financing:** IMF and the World Bank estimate that criminals launder up to four trillion dollars annually, which is used to finance terrorism. Terrorists have also used charities and auxiliary remittance methods to conceal their financial movements.
- **Use of Emerging Technology by Terrorists**: New advancements in computing and communications, such as widespread internet access, end-to-end encryption, and virtual private network (VPN), have allowed more radicalised people around the world to carry out new kinds of operations, raising the threat.
- **Politicization of Terrorism Countermeasures:** To varying degrees, the five permanent members of the United Nations Security Council (P5) have used their veto power to block efforts to identify terrorists.
- **Terrorism through social networking**: Terrorist networks and their "ideological fellow-travelers" now have powerful tools at their disposal in the form of social media platforms.

Framework for Combating Terrorism in India:

- India recently hosted a special meeting of the UNSC'sCounter Terrorism Committee (CTC), with theme of 'Countering the use of new and emerging technologies for terrorist purposes'.
- India also hosted the meeting of "No Money For Terror", which was initiative of the French government, to specifically focus on cooperation between countries to choke terror funding.
- In August 2019, theUnlawful Activities Prevention Act of 1967 was revised to include the ability to label individuals as terrorists.
- National Investigation Agencyis the lead law enforcement investigative agency to combat terrorism.
  - The National Investigation Agency (NIA) Act of 2008 has been amended by the Indian Parliament to give NIA the ability to investigate terrorism cases overseas.

PRACTICE QUESTION

Q. "It is essential to re-energize the global counter-terrorism agenda". Comment

10. BLUE SCREEN OF DEATH (BSOD)

CONTEXT: A recent global outage, Blue Screen of Death (BSOD), severely impacted computer systems worldwide, disrupting operations in critical sectors such as aviation, banking, stock exchanges, payment systems, and emergency services. The root cause of this disruption was attributed to a technical issue with Crowd Strike Falcon, a cyber security platform that provides security solutions for Microsoft Windows devices. Blue Screen of Death (BSOD)

- The Blue Screen of Death (BSOD) is a **critical error screen** that appears on **Windows operating systems** when a severe issue causes the system to crash. It forces the computer to restart unexpectedly, potentially resulting in data loss.
- **Cause of the Outage:** The outage stemmed from a configuration change within CrowdStrike's Azure backend workloads, affecting the connectivity between storage and compute resources. This interruption subsequently caused failures in Microsoft 365 services that rely on these connections.

Vulnerabilities inherent in interconnected digital services

- The Microsoft outage highlights the vulnerabilities inherent in interconnected digital services.
- It underscores the critical need for robust cybersecurity measures and rapid response protocols to mitigate such disruptions in the future, ensuring the reliability and continuity of essential services globally.
- **Causes:** Interconnected digital services rely on complex networks and systems that facilitate seamless communication and data exchange. However, several factors contribute to vulnerabilities:
  - **Dependency on Technology:** Modern services heavily depend on technology infrastructure, software applications, and data sharing protocols.
  - **Cybersecurity Threats:** Increasingly sophisticated cyber threats such as malware, phishing, and ransomware exploit vulnerabilities in interconnected systems.
  - **Human Error:** Misconfigurations, lack of cybersecurity awareness, and unintentional actions by users can inadvertently expose vulnerabilities.
  - **Third-Party Dependencies:** Integration with third-party services and APIs introduces additional points of vulnerability if not properly secured.

Impacts:

- **Disruptions and Downtime:** Cyberattacks or technical failures can lead to widespread disruptions, causing downtime in critical services like banking, healthcare, and transportation.
- **Data Breaches:** Vulnerabilities can result in unauthorized access to sensitive data, leading to breaches that compromise privacy and trust.
- **Financial Losses:** Businesses may incur significant financial losses due to operational disruptions, legal liabilities, and recovery costs associated with cyber incidents.
- **Reputational Damage:** Public perception and trust in organizations can suffer following a cyber incident, affecting customer loyalty and investor confidence.
- **Regulatory Compliance Issues:** Non-compliance with data protection regulations and cybersecurity standards can result in legal penalties and regulatory scrutiny.

11. CYBERSECURITY AWARENESS

CONTEXT: The Indian Computer Emergency Response Team (CERT-In) has registered several cases of cybercrimes during the last three years.

What is Cyber-security?

- Cyber security is concerned with making cyberspace safe from threats, namely cyber-threats.

- The notion of "cyber-threats" implies the malicious use of information and communication technologies (ICT) either as a target or as a tool by a wide range of malevolent actors.

Challenges of Cyber Security:

- **Digital Data Threat**: Growing online transactions generate bigger incentives for cybercriminals. Besides, establishments looking to mine data—for instance, customer information, results of product surveys, and generic market information—create treasured intellectual property that is in itself an attractive target.
- **Supply Chain Inter-connection**: The supply chains are increasingly interconnected. Companies are urging vendors and customers to join their networks. This makes a company's security wall thin.
- **Hacking**: This action is penetrating into someone's system in unauthorized fashion to steal or destroy data, which has grown hundred folds in the past few years. The availability of information online makes it easier for even non-technical people to perform hacking.
- **State-sponsored cyber-attacks**: They are typically difficult to track or defend against due to their lack of physical components. Their anonymity allows them to hide in systems undetected until their attack is unleashed. Many of these attacks exploit "zero days" (vulnerabilities in software that companies have zero days to fix).
- **Sectors those are vulnerable:** The most targeted sectors- health care, education and research, communications and governments.

Government Initiatives to Enhance Cybersecurity Awareness

- **Cyber Crime Coordination Centre:** The Indian Government has established the Indian Cyber Crime Coordination Centre (14C) to enhance the coordinated response of law enforcement agencies (LEAs) to cybercrimes.
- **Citizen Financial Cyber Fraud Reporting and Management System**: The Government launched the 'Citizen Financial Cyber Fraud Reporting and Management System' to facilitate the immediate reporting of financial frauds and prevent fund siphoning by fraudsters
- **Digital Personal Data Protection Act**: Protecting citizen rights: The Digital Personal Data Protection Act, 2023 upholds individuals' rights to safeguard their personal data, incorporating established principles for data protection.

MAINS PRACTICE QUESTION

Q. Indians are becoming 'Digital Nagriks', citizens integrating the internet into their daily lives. Discuss important government's initiatives to enhance Cybersecurity Awareness.

12. FIGHTING MILITANTS IN THE MOUNTAINS

CONTEXT: Since the abrogation of Article 370 in Jammu and Kashmir (J&K) in 2019, which ended the region's special status, there has been a resurgence of militancy in the Jammu region. This has raised concerns about regional stability and security. Reasons Behind the Resurgence

- **Post-Article 370 Developments:** The removal of Article 370 has led to increased militant activity as groups seek to destabilize the region in response to the political changes.
- **Strategic Shifts:** Militants are using old infiltration routes through **Kathua and Samba districts**, which were previously inactive. This shift reflects a strategic adaptation by militant groups.
- **Challenging Terrain:** The difficult mountainous terrain of Jammu, particularly the **Pir Panjal** and **Chenab valleys**, provides a strategic advantage to militants, making it hard for security forces to conduct effective operations.

Impact

- **Security Forces:** The increased militant activity has led to the death of several security personnel and has strained resources. Security forces are facing challenges in patrolling the vast and rugged terrain.
- **Local Communities:** Villagers are experiencing heightened fear and disruption. Economic conditions and local grievances, such as unemployment and perceived discrimination, are contributing to the challenges.
- **Terrorist Tactics:** Militants are employing sophisticated tactics, using advanced weaponry and mobile apps for navigation. They are also adapting their appearance to avoid detection, making them harder to differentiate from security forces.

Responses and Measures

- **Increased Security Measures:** The Army has reinforced its presence with more soldiers and increased patrols. They are also using drones for surveillance. Efforts are being made to detect and neutralize underground tunnels used by militants.
- **Political Solutions:** The government is being urged to find a political solution to address the underlying issues contributing to militancy.
- **Community Outreach:** Initiatives are being taken to improve relations with local communities, including mobile schools and medical patrols.

PREVIOUS YEAR QUESTION

Q. For effective border area management, discuss the steps required to be taken to deny local support to militants and also suggest ways to manage favourable perception among locals. (2020)

Q. Analyse internal security threats and transborder crimes along Myanmar, Bangladesh and Pakistan borders including Line of Control (LoC). Also, discuss the role played by various security forces in this regard. (2020)

Q. Border management is a complex task due to difficult terrain and hostile relations with some countries. Elucidate the challenges and strategies for effective border management. (2016)

PRACTICE QUESTION

Q. The abrogation of Article 370 in Jammu and Kashmir (J&K) in 2019 has led to a resurgence of militancy in the Jammu region. Analyze the reasons behind this resurgence, its impact on security forces and local communities, and discuss the measures taken to address the challenges.

13. CHALLENGES OF SECURITY FORCES GUARDING INDIAN BORDERS

CONTEXT: The Indian Defence forces for border security, LOCs, and other central security forces have several challenges in guarding the common people of the country.

- Our forces including the **BSF, ITBP, SSB, and Assam Rifles** lose more jawans every year than the Indian army does during peacetime.

Major problems:

- Unplanned expansion of the forces has made human resource management a stupendous problem.
- **The deployment statement of the CAPFs is very distressing**: About 95 percent of the force remains deployed throughout the year.

- **Growing hiatus between the officers and the men:** The kind of fellow feeling, the camaraderie is gradually fading.
- **Politicization:** It has eroded the chain of command.
- **Wastage of manpower**: When a State Government is given a CAPF, they like to retain it as long as they can do so due to which other states requiring them are starved of it.
- **Promotions:** In CAPF as well as in police, there are four levels of entry whereas in the army there are two levels of entry.

About Security forces:

Security force	Description
Central Armed Police Forces	◦ The **Ministry of Home Affairs** maintains seven CAPFs: ◦ The **Central Reserve Police Force (CRPF),** assists in internal security and counterinsurgency. ◦ The **Central Industrial Security Force (CISF),** protects vital installations (like airports) and public sector undertakings. ◦ The **National Security Guards (NSG),** is a special counterterrorism force. ◦ Four border guarding forces, which are the **Border Security Force** (BSF), **Indo-Tibetan Border Police (ITBP), Sashastra Seema Bal (SSB), and Assam Rifles (AR).**
	Major Functions of CAPFs: ◦ **Border Security:** Safeguard the security of the borders of India and promote a sense of security among the people living in border areas. ◦ Prevent trans-border crimes, smuggling, and unauthorized entry into or exit from the territory of India and prevent any other illegal activity. ◦ **Industrial Security:** Provide security to sensitive installations, and persons at a security risk. ◦ **Other Functions:** Counter Insurgency Operations, Anti Naxal Operations, Internal Security Duties, VIP Protection, Lead Intelligence Agency, Security To Diplomatic Missions Abroad, United Nations(UN) Peacekeeping Operations, Disaster Management, Civic Action Nodal Agency for UN Police Missions, etc.
Assam Rifles	◦ Assam Rifles is a **Central Paramilitary** Force under the **Central Armed Police Forces**. ◦ It came into being in 1835, as a militia called the **'Cachar Levy'**, to primarily protect **British Tea estates and their settlements against tribal raids.** ◦ Assam Rifles has two battalions stationed in Jammu and Kashmir and one National Disaster Relief Force battalion, which is playing its active role in case of natural calamities.
Indo-Tibetan Border Police (ITBP)	◦ Indo-Tibetan Border Police Force (ITBPF) is a Central Armed Police Force functioning under the Ministry of Home Affairs, Government of India. ◦ The ITBP was **raised on 24th October 1962 during the India-China War** and is a border-guarding police force specializing in high-altitude operations. ◦ Presently, ITBP is **deployed on border guarding duties from Karakoram Pass in Ladakh to Jachep La in Arunachal Pradesh covering 3488 km of the Indo-China Border.** ◦ The Force is also deployed for Anti-Naxal operations and other internal security duties.

Sashastra SeemaBal (SSB)	◎ SSB comes under the aegis of the **Ministry of Home Affairs** and is a part of the Central Armed Police Forces (CAPF). ◎ It was established as Special Service Bureau in May 1963, in the aftermath of the Chinese aggression in 1962. ◎ It was declared a lead intelligence agency for Indo-Nepal in June 2001 and assigned to the Indo-Nepal border. In 2004, **it was also assigned the Indo-Bhutan border.** ◎ In 2004, SSB received the **President's Colours** in recognition of its keystone role in national security, since its inception.
Border Security Force (BSF)	◎ BSF is a Border Guarding Force of India. **Established on December 1, 1965**, it is a paramilitary force charged with guarding India's land borders with Pakistan and Bangladesh. ◎ The BSF has an **air wing, a marine wing, an artillery regiment, and commando units.** ◎ It currently stands as the world's largest border-guarding force. BSF has been termed the **First Line of Defence** of Indian Territories.

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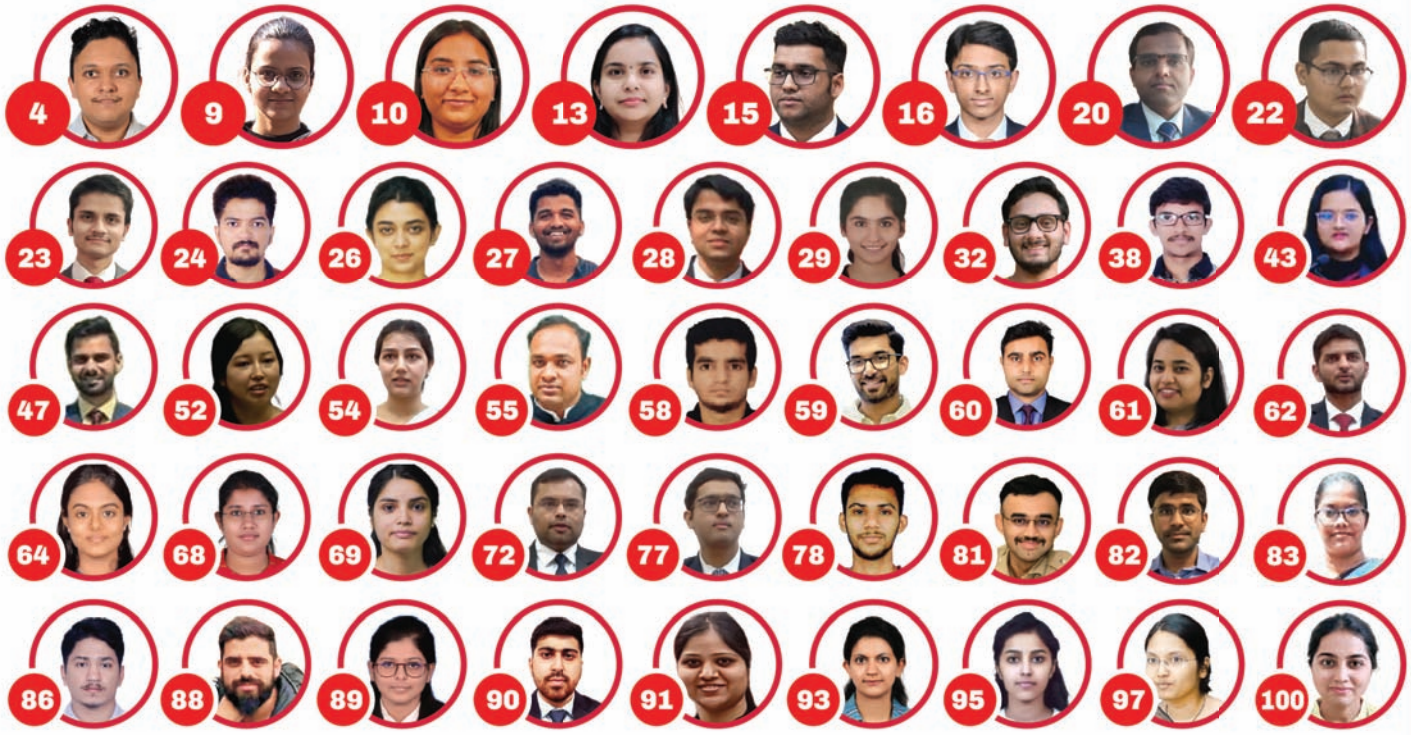

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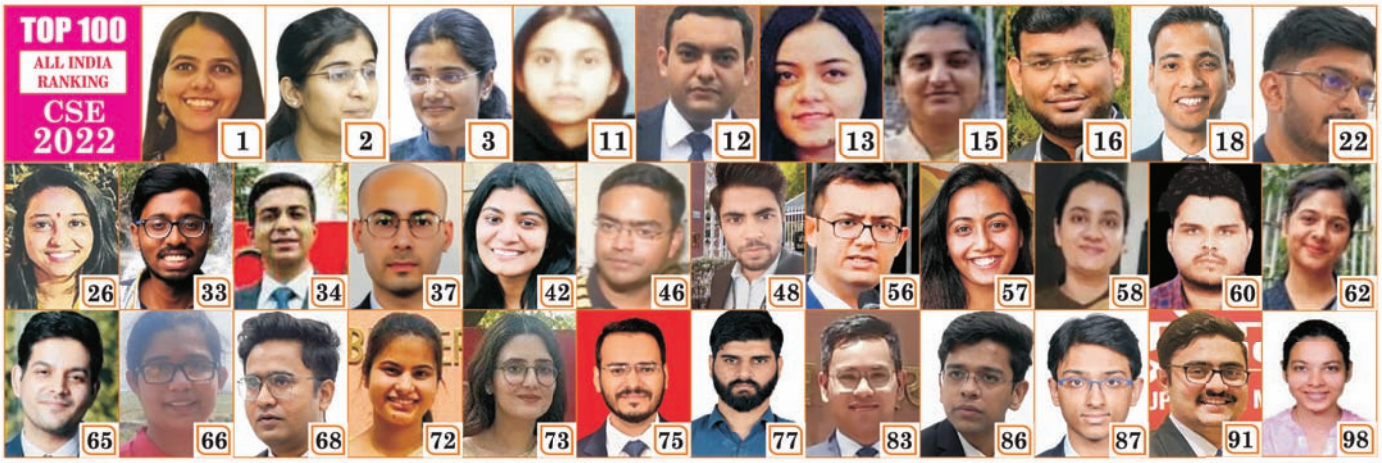

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