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DISASTER MANAGEMENT

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DISASTER MANAGEMENT

1. UTTARKASHI TUNNEL COLLAPSE

- **Background:** In November 2023, a tragic incident unfolded in the Uttarkashi district of Uttarakhand, India, as a portion of the Silkyara Bend - Barkot tunnel, under construction, collapsed, trapping 41 workers inside.
- **Under-Construction Uttarakhand Tunnel Collapsed**
  - The tunnel is located on the **Yamunotri National Highway** near **Silkyara** and was being constructed under the **Chardham Highway Project**.
  - Accident spot was located near **Main Central Thrust of the Himalayas and** this area is extremely sensitive to earthquakes and frictional shear rocks are present in this area.
  - Experts raised questions on **geological and geotechnical surveys for the project** and said that mainly two types of incidents occur during tunnel construction in Uttarakhand —
    - Sudden release of large amounts of water
    - Unexpected encounter of sheared rocks (worn by rubbing against each other).
- **Rescue Mission: Operation Zindagi was a massive rescue operation launched by the state government to save 41 workers** in the **Silkyara Bend - Barkot tunnel collapse** in Uttarakhand, India.

Silkyara Bend-Barkot Tunnel in Uttarakhand

- **Silkyara Tunnel:** It is a **4.5 Km long two-lane Bi-Directional tunnel** with an escape passage on Dharasu –Yamunotri.
- **Significance:**
  - This tunnel will provide **all-weather connectivity to Yamunotri**, encouraging regional socio-economic development, trade, and tourism within the country.
  - It will **reduce the travel distance** from Dharasu to Yamunotri by about 20 km and **travel time by about an hour.**

- **Causes of Tunnel Collapse:** Fractured or Fragile Rock, Water Seepage, Landslide-Prone Himalayan Rock, Lack of Geological Studies, Shear Zone Neglect, No Escape Tunnel Design
- **Initiatives for Safe Tunnel Construction in India**
  - **Tunnel Zone Department:** Creation of a dedicated department in the Ministry of Road Transport and Highways (MoRTH) for tunnel construction.

- **Indian Standard Codes:** Issuance of Indian Standard Codes (IS 15026 and IS 4756) providing guidelines for tunnel design.
- **IRC Codes for Tunnels:** Implementation of Indian Road Congress (IRC) codes to ensure tunnels meet international standards.

2. ODISHA DISASTER

Preface

The Balasore Train Tragedy, considered one of the deadliest train accidents globally, unfolded in Odisha. This catastrophic event involved three trains and resulted in the tragic loss of more than 250 lives.

- **Reasons Behind the Tragedy:** Train collisions, a recurring nightmare in the realm of rail disasters, are often attributed to the critical factor of loco pilots disregarding signals.
- **Disaster Management and Response:**
  - **Odisha Disaster Rapid Action Force (ODRAF):** ODRAF emerged as the frontline responder, showcasing the result of years of investment in capacity building and advanced equipment procurement for disaster management.
  - **Government's Preparedness:** The Odisha government's proactive approach and preparedness played a crucial role in mitigating the impact of the disaster.
  - **Professionalism in Rescue Operation:** The prompt and professional response of ODRAF and the fire brigade team proved instrumental in saving numerous lives.
  - **Medical Aid and Categorization:** The injured passengers received timely medical aid, and the district collector of Balasore, Dattatreya B. Shinde, led a team of doctors to assess injuries.
    - Categorization of injuries into critical, severe, and minor facilitated efficient medical attention.
- **The Aftermath: Triple Train Accident at Bahanaga:** The efficiency demonstrated in the Balasore tragedy echoed in Odisha's response to another disaster – the triple train accident at Bahanaga. The state's disaster management prowess, coupled with swift action and strategic medical intervention, played a pivotal role in minimizing casualties and aiding recovery.

3. FIRE INCIDENT IN DELHI: MUKHARJEE NAGAR

- **Incident Overview:** A fire erupted in a five-storey building hosting classes for approximately 300-350 students in Mukherjee Nagar, Delhi.
- **Swift Emergency Response:** The district administration and police demonstrated swift responsiveness to the crisis, taking effective control of the situation.
  - The quick and coordinated efforts of the emergency responders played a crucial role in minimizing potential casualties.
- **Role of Delhi Disaster Management Authority (DDMA):** The DDMA, a dedicated body for disaster management in Delhi, actively assessed, planned, and implemented crucial aspects of disaster management.
  - Focus areas include prevention, mitigation, preparedness, and response to ensure comprehensive disaster management.
  - The DDMA operates with the objective of fostering seamless coordination between the Central and State Governments during disaster events.

- **DDMA Structure and Leadership:** The DDMA Secretariat, known as the Disaster Management Center, serves as the administrative hub for the Authority. Led by the Divisional Commissioner of Delhi, the nodal department for disaster management, who also acts as the Convenor of the DDMA Secretariat.
- **Prevention and Mitigation Initiatives:** The DDMA has been proactively working on strategies to prevent and mitigate disasters in Delhi, reflecting a commitment to community safety.
- Ongoing efforts encompass planning, training, and resource allocation to enhance the city's resilience in the face of potential disasters.
- **Delhi HC Order:** Immediate closure of all coaching centres that do not possess a No-objection Certificate (NOC) from the fire service department.

4. SURAT GAS LEAK

- **Incident Overview:** In January 2022, a chemical factory in Sachin, Surat, Gujarat, witnessed a tragic gas leak, resulting in 10 fatalities and numerous injuries. The leak originated from a tanker illegally disposing of chemical waste in the Sachin GIDC industrial area. Labourers, both inside a nearby textile mill and outdoors, were adversely affected as they inhaled the leaked gas, rendering them unconscious.
- **Chemical Identification:** The leaked substance was identified as sodium hydrosulphite.
- **Compensation and Accountability:** The Gujarat government provided ₹4 lakh (US$5,000) as ex gratia, while the textile mill owner contributed ₹2 lakh (US$2,500) to the families of the deceased.
- **Disaster Management Response:**
  - Swift response from the district administration and police ensured control over the situation.
  - The **National Green Tribunal (NGT)** issued notices to the Gujarat Pollution Control Board, initiating a comprehensive investigation.
  - NGT formed a nine-member committee for a thorough probe, with the final report accepted in March 2023.
  - The Disaster Management Authority of Gujarat actively oversees disaster prevention and mitigation initiatives in the state.

5. MORBI BRIDGE COLLAPSE (2022)

Preface: In a devastating incident, a bridge in Morbi, Gujarat, collapsed, resulting in a tragic loss of 141 lives and leaving numerous individuals injured. The disaster sent shockwaves through the community, prompting an urgent need for investigation, relief efforts, and a comprehensive disaster management response.

Causes of the Bridge Collapse

- **Structural Failure:** Preliminary investigations suggest potential structural weaknesses or failures in the bridge design, construction, or maintenance.
- **Material Defects:** Examination of construction materials used in the bridge may reveal defects or substandard quality contributing to the collapse.
- **Engineering Oversight:** Possible oversights in engineering assessments, including inadequate risk assessments and structural integrity checks.

Disaster Management Response

- **Immediate Emergency Response:**
  - **Rescue Operations:** Swift deployment of emergency services, including fire brigades, police, and medical teams, for immediate search and rescue operations.
  - **Evacuation:** Evacuation of the injured to nearby medical facilities and securing the disaster site to prevent further harm.
- **Casualty Management:**
  - **Medical Aid:** Mobilization of medical teams to provide on-site first aid and expedited transportation of the injured to hospitals.
  - **Casualty Identification:** Establishment of a system for identifying and documenting casualties to inform families promptly.
- **Government Intervention:**
  - **Declaration of Emergency:** Local authorities declare a state of emergency to facilitate resource mobilization and coordination.
  - **Government Support:** Deployment of government resources, including the National Disaster Response Force (NDRF), for a coordinated disaster response.

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

- **Preface:** 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.
- **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".
- **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.
- **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.

- **Measures to Mitigate the Impact: Landslide Hazard Zonation**, **Landslide Monitoring and Early Warning System**, **Awareness Programmes**, **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.

7. ROLE OF TECHNOLOGY IN DISASTER MANAGEMENT

The problem Statement

India is one of the most disaster-prone countries in the world. Several factors such as the location and geographic characteristics serve as catalysts for a number of natural hazards such as floods, cyclones, fire, droughts, landslides, earthquakes, and avalanches.
There are many applications that help in the provision of aid in times of calamities. All these technological benefits have had a significant impact on the management and eradication of disasters.

- **Scope:** Technology can be used at every stage of the cycle: **Preparedness, Response, Recovery, Mitigation.**
- Role:
  - To evaluate disaster risks for preparedness, response and mitigation.
  - To communicate to all stakeholders including the people and to develop plans to mitigate contributors to the risks
  - To use technologies for risk-reduction, mitigation and response
  - To develop early warning systems and emergency communication systems
- **Spectrum of technology:** remote sensing, Geographical Information System, Global Positioning System (GPS), Satellite navigation system, Satellite communication, Amateur and community radio, television, augmented reality & virtual reality with GIS and real-time situational information
- **Example:**
  - **Using drone technology** for rescue operation, assessment of damage after an earthquake, Using GPS tracking systems on emergency vehicles
  - **Artificial Intelligence (AI)** is used for retrospective image recognition of satellite data to identify damaged infrastructure
  - **Unmanned Aerial Vehicles (UAVs),** or drones, can be used for high-resolution terrain mapping, assessing damage in real-time.
  - **Use of social media platforms** like Twitter or Facebook where citizens can post pictures from their phones about what happened (e.g., where they're located), how bad it is outside right now ("shelter-in-place" orders), etc.

8. PANDEMIC PREPAREDNESS FUND

The problem Statement

To counter financial obstacles, weak infrastructure, scarcity of healthcare, etc, the World Bank Board of Directors has approved setting up a **Financial Intermediary Fund (FIF)** for **Pandemic Prevention, Preparedness, and Response (PPR).**

- **Meaning:** Financial Intermediary Funds (FIFs) provide the global development community with independently governed multi-contributor collaboration platforms.

- **Need for a FIF**: Future pandemic threats are imminent—some estimates indicate a 47–57 percent chance of another global pandemic as deadly as COVID-19 in the next 25 years.
- **Role of a separate fund:** To focus and sustain much-needed high-level attention on strengthening health systems.
  - To provide long-term financing to low or middle-income countries to bridge the gaps that they face during a pandemic.
  - To help in building PPR capacity in zoonotic disease surveillance, emergency communication, management, laboratories, community engagement, critical health workforce, etc.

9. DISASTER INDUCED DISPLACEMENT

The problem Statement

- Disasters continue to displace more and people are living longer in relief camps. Archaeological evidence suggests that human settlement patterns have responded repeatedly to changes in the climate. As early as 1990, the **Intergovernmental Panel on Climate Change (IPCC)** noted that the greatest single impact of climate change might be on human migration.
- Millions of people are displaced by shoreline erosion, coastal flooding and agricultural disruption. Over the past 30 years, the number of people living in coastal areas at high risk of rising sea levels has increased from 160 million to 260 million, 90% of whom are from poor developing countries and small island states.
- **The number game:** The International Organisation on Migration (IOM) estimates that on a global scale, between 25 million and 1 billion people would be compelled to migrate from their homes because of climate change and environmental degradation by 2050.
- **Implications of such displacements**: Livelihood crisis, impacted education and health care system, increased pressure on urban infrastructure and services, Vulnerabilities of women and children, undermined economic growth and risk of conflict among migrants themselves, etc.
- **Policies in India:** Disaster induced displacement is currently looked after by the **National Disaster Management Authority (NDMA)** and their state level counterparts.
- **India's role in the current disorder:** India seeks to play a significant role in the international efforts for climate action, and its commitment can be reflected in it being party to the UNFCCC.
  - India's G20 presidency could provide a platform for the G20 countries to work together in addressing the growing concerns of human mobility
- Required Measures:
  - Government policies to help affected in getting access to financial grants, food aid, tools, shelter, schools or clinics.
  - Adaptation to climate change-driven extreme events by making a series of cost-benefit decisions.
  - The UN SDGs (Sustainable Development Goals) may be of greater help as they address both migration and climate change.

10. URBAN FLOOD MANAGEMENT (TO TACKLE FREQUENT FLOODS)

The problem Statement

- Urbanization in India has led to 31% of its total population residing in cities and urban areas contributing to 63% of the national GDP in 2011. In this context, resilience of cities depends

on effective functioning of complex infrastructure networks such as water, energy, sanitation, transport along with physical infrastructure such as housing, hospitals and educational institutions. The intensity of water related shocks and stresses faced by cities in India are beginning to pan out with increasing frequencies.

- The **Sixth Assessment Report (AR6)** by the **Intergovernmental Panel on Climate Change (IPCC)** highlights an increase in the frequency and magnitude of floods in India.
- **Reasons of increasing floods:** Callous urbanisation, Excessive mining, Rapid development, Unsustainable human activities
- Others:
  - wide variations in rainfall both in time and space with frequent departures from the normal pattern
  - inadequate carrying capacities of rivers, river bank erosion and silting of river beds
- **Issue in Urban areas:** Urban areas generate high volumes of polluted run-off, often resulting in the breakdown of the urban drainage system.
- **Challenges:**
  - Urbanisation is an inevitable process and urban areas will continue to grow
  - Cities were not planned keeping in mind stormwater management.
- **Impacts:** heavy human costs, impact on agriculture, threats to coastal cities, Economic loss
- **Urban infrastructure development missions:** Smart Cities Mission, the Swachh Bharat Mission and Atal Mission for Rejuvenation and Urban Transformation
- **Ways to manage flood:** Water-Sensitive Urban Design and Planning **(WSUDP) and a** green infrastructure **approach for stormwater management**
  - Prepare **drainage master plans** for cities and formulate a nodal authority for urban **stormwater management**

11. LIGHTNING DISASTERS IN INDIA

Problem Statement

- **Meaning:** Lightning disasters in India refer to the frequent occurrence of lightning strikes, leading to significant human casualties, injuries, and damage to property. Lightning is a natural atmospheric phenomenon, but its impact becomes a critical issue when it results in disasters affecting communities, especially in regions prone to thunderstorms.
- **Challenges:**
  - **Predictability:** Lightning events are challenging to predict accurately, making it difficult for communities to take preventive measures or evacuate areas at risk.
  - **Public Awareness:** Limited awareness and understanding of lightning risks contribute to inadequate safety measures, as people may not recognize the need to seek shelter during thunderstorms.

Disaster Management:

- **Early Warning Systems:** Implement and enhance early warning systems to provide timely alerts about impending thunderstorms, allowing communities to take preventive measures.
- **Public Awareness Campaigns:** Conduct extensive public awareness campaigns to educate communities about lightning risks, safety measures, and the importance of seeking shelter during thunderstorms.

- **Infrastructure Upgradation:** Invest in upgrading infrastructure resilience, especially in vulnerable regions, to minimize property damage and ensure community safety during lightning events.
- **Emergency Medical Services:** Strengthen emergency medical services to ensure rapid response and effective medical care for lightning strike victims.
- **Community Preparedness:** Facilitate community-level training and preparedness programs to empower individuals to respond effectively to lightning threats, including the establishment of community shelters.
- **Research and Technology:** Support research initiatives and technological advancements to improve lightning prediction accuracy and enhance disaster management strategies.

12. GLACIAL LAKE OUTBURST FLOOD (GLOF) DISASTERS IN INDIA

Problem Statement

- **Meaning:** Glacial Lake Outburst Floods (GLOFs) in India refer to the sudden release of water from glacial lakes, primarily caused by the drainage of glacier-dammed lakes due to various triggers. These floods pose a severe threat to mountainous regions and downstream communities.

Disaster Impact:

- **Flash Flooding:** GLOFs result in rapid and intense flash flooding downstream, endangering human lives, settlements, and infrastructure.
- **Infrastructure Damage:** The force of GLOFs can lead to the destruction of bridges, roads, hydropower installations, and other critical infrastructure.
- **Loss of Life and Livelihoods:** GLOFs can cause fatalities, displacement of communities, and loss of livelihoods, particularly in regions dependent on agriculture and tourism.
- **Ecological Impact:** These floods can result in the erosion of soil, loss of biodiversity, and damage to ecosystems in affected areas.

Challenges:

- **Remote and Inaccessible Terrain:** Many regions prone to GLOFs are situated in remote and challenging terrains, making it difficult to implement timely monitoring, early warning, and emergency response measures.
- **Climate Change Impact:** Climate change exacerbates the risk of GLOFs as rising temperatures contribute to glacier melting, altering the dynamics of glacial lakes.
- **Data Deficiency:** Limited availability of accurate and up-to-date data on glacial lakes and their stability hampers risk assessment and preparedness efforts.
- **Early Warning Systems:** Establishing effective early warning systems for GLOFs is complex due to the unpredictable nature of glacial lake outbursts and the lack of real-time monitoring infrastructure.

Disaster Management:

- **Risk Assessment and Mapping:** Conduct comprehensive risk assessments and mapping of glacial lakes to identify areas prone to GLOFs, enabling targeted disaster management strategies.

- **Monitoring and Early Warning Systems:** Implement advanced monitoring technologies such as satellite imagery and sensors to detect changes in glacial lakes and establish early warning systems for downstream communities.
- **Community Preparedness:** Conduct community-based awareness and preparedness programs to educate residents about GLOF risks, evacuation procedures, and safe practices.
- **Climate Change Mitigation:** Address climate change through mitigation measures to reduce glacier melting and prevent the formation of unstable glacial lakes.

13. CLIMATE CHANGE AND DISASTERS

Problem Statement: Disasters and Climate Change

- **Meaning:** Disasters exacerbated by climate change refer to the increasing frequency and intensity of natural disasters, such as hurricanes, floods, wildfires, and heatwaves, driven by changes in climate patterns. These events have widespread and severe consequences for ecosystems, communities, and economies.

Disaster Impact:

- **Rising Sea Levels:** Climate change contributes to rising sea levels, leading to coastal flooding, erosion, and salinization of freshwater sources.
- **Extreme Weather Events:** Increased frequency of extreme weather events, including hurricanes, cyclones, droughts, and heatwaves, results in extensive damage to infrastructure, agriculture, and human settlements.
- **Loss of Biodiversity:** Disruptions caused by climate-induced disasters contribute to habitat loss, ecosystem degradation, and the decline of plant and animal species.
- **Humanitarian Crises:** Climate-related disasters lead to displacement, food and water shortages, and humanitarian crises, particularly affecting vulnerable populations.
- **Economic Impacts:** The economic toll of climate-related disasters includes damage to property, reduced agricultural productivity, increased healthcare costs, and the burden of recovery and reconstruction.

Challenges:

- **Complexity and Interconnectedness:** Climate change exacerbates the complexity and interconnectedness of disaster risks, making it challenging to predict and respond effectively.
- **Resource Constraints:** Many regions face limitations in resources, both financial and technical, hindering their ability to implement robust climate change adaptation and disaster risk reduction measures.
- **Global Coordination:** Addressing climate-induced disasters requires global coordination, as the impact transcends national boundaries, necessitating collaborative efforts to mitigate and adapt to changing climatic conditions.
- **Vulnerability of Developing Nations:** Developing nations are often more vulnerable to the impacts of climate change and disasters due to socio-economic factors, limited infrastructure, and inadequate adaptive capacities.

14. NEW DELHI: GOOGLE LAUNCHES EARTHQUAKE ALERT SYSTEM IN INDIA FOR ANDROID SMARTPHONE USERS

- **Introduction:** Google introduces an Earthquake Alert System in India to provide early warnings through android smartphones.
- **Collaboration with Authorities:** Developed in consultation with the *National Disaster Management Authority (NDMA)* and the *National Seismology Center (NSC)* in India.
- **How the System Works:** Utilizes sensors in android smartphones equipped with tiny accelerometers that act as *mini seismometers*.
  - Detects and estimates earthquakes, especially during the initial stages.
- **Types of Alerts:**
  - Two types of alerts sent: *Be Aware and Take Action*.
  - *"Be Aware" alerts* for MMI 3 & 4 shaking during an earthquake of magnitude 4.5 or greater, providing on-screen alerts without sound.
  - *"Take Action" alerts* for MMI 5+ shaking during an earthquake of 4.5 magnitudes, bypassing notification settings and playing a loud sound.
- **Rollout in India:** The feature will be rolled out to *all Android 5+ users* in India. Alerts designed to be easy to read and available in *Indian languages* supported by Android.