Reforming India's Disaster Strategy

This editorial is based on "[Bill to amend Disaster Management Act: a proposed solution involving the States](#)" which was published in The Hindu on 18/02/2025. The article brings into picture the growing tensions between the Centre and states over disaster relief funding, highlighting delays and inadequate allocations. It underscores the need for a transparent, equitable, and depoliticized disaster management framework to ensure timely recovery.

For Prelims: [National Disaster Response Force](#), [Disaster Management (Amendment) Bill, 2024](#) , [Cyclone Michaung](#), [Indian Meteorological Department](#), [Glacial Lake Outburst Floods](#), [Earthquake](#), [Antibiotic resistance](#), [Heatwave](#), [National Building Code (NBC), 2016](#), [MGNREGA](#), [Jal Shakti Abhiyan](#)

For Mains: Key Disaster Threats India is Facing, Key Structural Issues in India's Disaster Management Strategy.

[India's disaster relief](#) funding system has become a point of **contention between the Centre and states**, as seen in **Tamil Nadu's recent struggle for adequate [National Disaster Response Force](#) assistance post-cyclone.** While states face rising **climate-induced disasters, delays and insufficient allocations from the [SDRF](#) and NDRF** hinder timely recovery efforts. Legislative proposals like the **[Disaster Management (Amendment) Bill, 2024](#)** aim to enhance transparency and ensure proportional state representation in decision-making. As extreme weather events escalate, **India urgently needs a resilient and depoliticized disaster management system.**

What are the Key Disaster Threats India is Facing?

- **Increasing Frequency of Extreme Weather Events:** India is witnessing a surge in **climate-induced disasters** such as **cyclones, floods, and heatwaves**, driven by **rising global temperatures and erratic monsoon patterns**.
    - The **warming of the Indian Ocean** is intensifying cyclones, while **shifting monsoon trends** are causing unpredictable droughts and floods.
    - **[Cyclone Michaung](#) (2023)** caused **₹37,000 crore losses** in Tamil Nadu; **2023 floods** in Himachal Pradesh led to **₹10,000 crore damage**.
        - India reported 2,227 casualties due to extreme weather events in 2022 (IMD, 2024).
- **Urban Flooding Due to Poor Infrastructure:** Unplanned urbanization, clogged drainage systems, and disappearing wetlands have turned **seasonal rains into devastating [urban floods](#)**.
    - Cities like **Delhi, Chennai, and Bengaluru** face severe water logging due to **concretization and poor stormwater management**.
        - For instance, **Delhi recorded its highest single-day rainfall (153 mm) in 41 years in July 2023**, leading to **Yamuna flooding** and widespread traffic

disruption.
- In 2022, Bengaluru suffered a loss of **Rs 2.25 billion** due to flooding.
- **Droughts and Water Scarcity Affecting Agriculture:** Erratic monsoons, rising temperatures, and groundwater depletion are making **droughts more frequent and severe**.
    - India's **over-reliance on monsoon-dependent farming** makes its food security highly vulnerable.
    - **Inefficient irrigation practices** and delays in implementing **climate-resilient agriculture** are compounding the crisis.
    - **Indian Meteorological Department declared 2023's August as the driest in 122 years**, severely impacting **Kharif crop yields.**
        - Also, according to a recent estimate by the World Wide Fund for Nature, 30 Indian towns would face a **"severe water risk" by 2050.**
- **Himalayan Glacial Melting and Flash Floods:** Rising global temperatures are **accelerating glacier retreat in the Himalayas**, increasing the risk of **Glacial Lake Outburst Floods (GLOFs)** and landslides.
    - Infrastructure projects like **hydropower dams and highways** in fragile Himalayan regions worsen the situation.
        - The absence of **early warning systems** and disaster-resilient infrastructure leads to significant human and economic losses.
    - In October 2023, a **Glacial Lake Outburst Flood (GLOF) from North Sikkim's South Lhonak Lake** burst, leading to widespread destruction.
- **Rising Sea Levels and Coastal Erosion:** India's **7,500 km coastline** is increasingly vulnerable to **rising sea levels, coastal erosion, and saline water intrusion**.
    - Unchecked **sand mining, port expansion, and mangrove destruction** are worsening the situation.
        - Despite **India's Climate Action Plan**, coastal resilience efforts remain slow.
    - According to a study by **National Centre for Coastal Research, (NCCR), about 33.6%** of the coast is eroding.
- **Earthquakes in High-Risk Zones:** India sits on multiple seismic zones, making **northern and northeastern states highly earthquake-prone**.
    - Poor enforcement of **building codes** and outdated infrastructure increase the disaster impact.
        - The **lack of retrofitting policies** for old buildings and critical infrastructure makes earthquake preparedness weak.
    - The **6.4 magnitude Assam earthquake (2021) caused widespread structural damage**.
        - Recent **tremors in Delhi-NCR**, with a potential epicenter near Dhaula Kuan, highlight growing seismic threats.
- **Industrial and Chemical Disasters:** Rapid industrial expansion without stringent **safety compliance** is increasing **chemical disasters and gas leaks**.
    - Poor regulatory oversight and outdated technology in hazardous industries amplify risks.
    - The **Vizag LG Polymers gas leak led to many casualties. Delhi's Mundka factory fire (2022)**, highlighting poor industrial safety standards.
- **Biological Disasters and Public Health Crises:** Pandemics, zoonotic diseases, and antimicrobial resistance pose **long-term disaster risks**.
    - Rising pollution, deforestation, and climate change are increasing the frequency of **vector-borne diseases**.
        - The **Covid-19 pandemic** exposed gaps in India's healthcare infrastructure, underscoring the need for **stronger disease surveillance**.
    - India has been **identified as a hotspot of emerging antibiotic resistance** owing to excessive use to antibiotics in both domestic animals and humans

What are the Key Structural Issues in India's Disaster Management Strategy?

- **Overcentralization and Delayed Fund Disbursal:** India's disaster management remains highly **centralized**, with states dependent on the **National Disaster Response Fund (NDRF)**, leading to delays and inefficiencies.

- States often struggle with **inadequate State Disaster Response Fund (SDRF) allocations**, limiting their capacity for **timely relief and rehabilitation**.
- Tamil Nadu has recently urged the Union government to release **₹6,675 crore under the National Disaster Response Fund (NDRF**) so that the State can carry out the relief and restoration work required after **Cyclone Fengal.**

- **Weak Local Governance and Implementation Gaps:** Despite the **Disaster Management Act, 2005**, local authorities remain **underfunded and lack decision-making power**, making disaster response slow and ineffective.
  - Many districts have **inactive or non-functional District Disaster Management Authorities (DDMAs)** due to lack of **trained personnel and technical capacity**.
    - Even **disaster-prone states** lack proper **risk assessment and preparedness plans** at the grassroots level.
  - During the **2023 Himachal Pradesh floods**, lack of district-level coordination led to **slow relief operations, delaying aid for thousands**.
- **Outdated Early Warning Systems and Poor Forecasting:** India's **early warning systems (EWS)** suffer from **technological gaps, poor last-mile connectivity, and inaccurate forecasting**, leading to **delayed evacuations and higher casualties**.
  - While **IMD issues warnings**, they are often **not specific or localized enough**, making it difficult for authorities to **take timely preventive measures**.
    - Many **rural and tribal communities** remain out of reach of **real-time alerts**, increasing their vulnerability.
    - **Infrastructural limitations**, such as **insufficient Doppler radar coverage**, further weaken prediction capabilities.
  - The **South Lhonak Lake GLOF in Sikkim (2023) had no proper early warning system**, leading to **many casualties and massive infrastructure loss**.
    - Also, an estimated **72% of districts in India** are exposed to extreme flood events but **only 25% of them have level flood forecasting stations**
- **Inadequate Urban Planning and Infrastructure Resilience:** Rapid, unplanned urbanization has made **cities highly vulnerable to flooding, earthquakes, and heatwaves**, with **weak building codes and poor drainage systems** worsening disasters.
  - **Retrofitting of old structures** remains neglected, increasing the risk of casualties during disasters like earthquakes.
    - Poor enforcement of the **National Building Code (NBC), 2016**, allows developers to ignore disaster-resistant construction standards.
  - A recent study **found that over 80% of Delhi's buildings are vulnerable to a major earthquake** due to poor adherence to NBC guidelines.
- **Insufficient Community Awareness and Preparedness:** Despite India's high disaster vulnerability, **public awareness about disaster preparedness remains low**, especially in rural and marginalized communities.
  - Lack of **disaster drills, education programs, and evacuation training** leads to high casualties and inefficient crisis response.
  - The **absence of inclusive disaster policies** means that **vulnerable groups—women, elderly, disabled people—are often left out of preparedness plans**.
- **Limited Use of Technology and Innovation:** India's disaster management relies heavily on **traditional response mechanisms**, with **slow adoption of AI, remote sensing, and GIS mapping** for disaster prediction and relief.
  - Blockchain and satellite imagery could enhance real-time damage assessment and faster fund disbursa**l**, but implementation remains limited.
  - Lack of **inter-agency data sharing and integration of smart technologies** weakens **decision-making and coordination**.
  - While countries like **Japan use AI-based tsunami prediction models,** India's coastal EWS still relies on conventional sensors.
- **Fragmented Disaster Health Management:** Disaster-hit areas often face **severe shortages of emergency medical facilities, trauma care centers, and trained healthcare professionals**, worsening post-disaster mortality.
  - Many state disaster plans **lack dedicated public health response strategies**, making them **reactive rather than preventive**.
  - **Heatwaves, pandemics, and chemical disasters** require specialized healthcare responses, but coordination between **NDMA and the Health Ministry remains weak**.

- Mobile hospitals and **telemedicine solutions** are underutilized in disaster-affected regions.
    - During the **2024 Odisha [heatwave](#),** over **26 lives were lost in 24 hours,** with many hospitals lacking adequate emergency cooling facilities.

What Measures to Strengthen India's Disaster Management System?

- **Decentralized Disaster Governance and Fund Allocation:** Empower **State and District Disaster Management Authorities (SDMAs & DDMAs)** with **autonomy in fund utilization** to ensure faster response.
    - Establish a **formula-based, impact-driven NDRF allocation** mechanism to avoid political interference and delays.
    - Strengthen **local governance frameworks** by integrating disaster risk reduction (DRR) into **[Panchayati Raj Institutions (PRIs)](#) and urban local bodies (ULBs)**.
    - Increase **flexibility in SDRF utilization** to allow states to respond to evolving disaster risks.
- **Strengthening Early Warning Systems and Real-Time Monitoring:** Upgrade **Doppler radar networks, satellite imaging, and AI-based predictive analytics** to enhance **localized and accurate forecasting**.
    - Implement **automated alert systems via SMS, social media, and mobile networks** for last-mile connectivity, especially in rural and tribal regions.
    - Develop a **multi-hazard early warning system (MHEWS)** covering floods, cyclones, earthquakes, and heatwaves in an integrated manner.
    - Promote **community-based early warning dissemination** through local volunteer networks.
- **Climate-Resilient Infrastructure and Urban Planning Reforms:** Implement **strict enforcement of the [National Building Code (NBC), 2016](#)**, ensuring all new constructions are **earthquake, flood, and cyclone-resistant**.
    - Promote **nature-based solutions** like **wetland restoration, mangrove plantations, and permeable urban surfaces** to mitigate urban flooding.
    - Mandate **risk-sensitive land-use planning** by integrating **disaster vulnerability assessments** into Smart City and AMRUT projects.
    - Encourage **disaster-resilient retrofitting of old buildings, bridges, and dams**, especially in seismic zones.
        - Introduce **green infrastructure incentives** to promote **sustainable urbanization**.
- **Enhancing Community Awareness and Disaster Preparedness:** Integrate **disaster risk education** into school and university curricula to foster **a culture of preparedness**.
    - Conduct **regular disaster drills, mock evacuations, and awareness campaigns** at community and workplace levels.
    - Strengthen **[Self Help Groups](#) (SHGs), local NGOs, and citizen response teams** to act as first responders in disaster-prone regions.
    - Use **vernacular media, traditional knowledge systems, and digital outreach** for more effective risk communication.
- **Leveraging Technology and Innovation for Disaster Management:** Expand the use of **AI, blockchain, and GIS-based decision support systems** for real-time disaster risk assessment.
    - Deploy **IoT-based smart sensors** in **dams, bridges, and landslide-prone areas** to detect early signs of failure.
        - Strengthen **drone-based disaster mapping and emergency supply delivery** for faster relief operations.
    - Develop **integrated disaster management mobile applications** that provide real-time alerts, evacuation routes, and emergency contacts.
- **Strengthening Healthcare and Post-Disaster Response Mechanisms:** Establish **mobile emergency hospitals and rapid medical response teams** in disaster hotspots.
    - Equip **primary health centers (PHCs) and district hospitals** with **heatwave, flood, and pandemic preparedness protocols**.
    - Train **paramedics, ASHA workers, and disaster volunteers** in mass casualty

management and psychological first aid.
  - Stockpile **emergency medical supplies, vaccines, and portable diagnostic tools** for quicker post-disaster interventions.
- **Institutional Reforms and Inter-Agency Coordination:** Enhance coordination between **IMD, ISRO, NDMA, and NDRF** through a unified **National Emergency Coordination Hub (NECH)**.
  - Train **bureaucrats, first responders, and law enforcement personnel** in modern disaster response protocols.
  - Promote **inter-ministerial collaboration** for synchronized climate adaptation and disaster risk reduction efforts.
    - Ensure **real-time intelligence sharing** among **scientific institutions, disaster response forces, and local governments**.
- **Strengthening Financial Resilience and Disaster Insurance Mechanisms:** Expand **state-level catastrophe risk insurance schemes** to cover **crop loss, property damage, and livelihood disruptions**.
  - Develop **parametric insurance models** to provide **automatic compensation** based on predefined disaster triggers.
  - Encourage **[corporate social responsibility](#) (CSR) funds** for disaster risk reduction projects.
  - Establish **a dedicated National Resilience Fund (NRF)** to support **climate adaptation and pre-disaster mitigation strategies**.
    - Incentivize **micro-insurance programs for vulnerable communities**, reducing post-disaster economic shocks.
- **Promoting Nature-Based Solutions and Ecosystem Restoration:** Implement **large-scale afforestation and wetland conservation projects** to enhance **natural flood control and climate resilience**.
  - Strengthen **coastal zone management** by restoring **mangroves, coral reefs, and sand dunes** to protect against storm surges and erosion.
  - Promote **sustainable agriculture and water conservation** to mitigate drought risks.
  - Integrate **disaster resilience into [MGNREGA](#) and [Jal Shakti Abhiyan](#)** for long-term ecological sustainability.
- **Ensuring Faster Rehabilitation and Livelihood Recovery:** Develop **pre-approved disaster recovery frameworks** to streamline post-disaster reconstruction efforts.
  - Strengthen **livelihood diversification programs** to help disaster-affected populations regain economic stability.
  - Implement **fast-track housing reconstruction schemes** with climate-resilient designs in disaster-prone areas.
  - Establish **psycho-social support programs** to help trauma-affected survivors recover faster.
    - Promote **local entrepreneurship and vocational training** to rebuild economies in disaster-hit regions.

Conclusion:

India's disaster management system must evolve into a decentralized, technology-driven, and climate-resilient framework to address escalating threats. Strengthening early warning systems, community preparedness, and sustainable infrastructure is crucial for reducing disaster impacts. The **Sendai Framework for Disaster Risk Reduction (2015-2030)** emphasizes a proactive approach, focusing on **risk mitigation, resilient recovery, and inclusive governance**.

__Drishti Mains Question:__

Climate change has intensified the frequency and severity of natural disasters in India. Analyze how climate resilience and disaster preparedness can be integrated into India's governance framework.

UPSC Civil Services Examination Previous Year Question (PYQ)

__Mains__

Q. Discuss the recent measures initiated in disaster management by the Government of India departing from the earlier reactive approach. (2020)

Q. Vulnerability is an essential element for defining disaster impacts and its threat to people. How and in what ways can vulnerability to disasters be characterized? Discuss different types of vulnerability with reference to disasters. (2019)

Q. Describe various measures taken in India for Disaster Risk Reduction (DRR) before and after signing 'Sendai Framework for DRR (2015-30)'. How is this framework different from 'Hyogo Framework for Action, 2005'? (2018)