**RECURRING LIGHTNING DISASTERS IN BIHAR - GEOGRAPHY**

**NEWS:** 80 people were killed in 72 hours due to thunderstorms and lightning across Bihar.

**WHAT'S IN THE NEWS?**

**1. Historical Pattern of Disasters:**

- Bihar has witnessed a **recurring pattern of fatal natural disasters**, particularly **lightning events** during pre-monsoon and monsoon months.
- For instance, **over 90 deaths were recorded in June 2020** due to a lightning strike event, highlighting the **intensity and regularity** of such occurrences.

**2. Pre-Monsoon Vulnerability:**

- Lightning events are **frequent between April and June**, coinciding with pre-monsoon and early monsoon thunderstorms.
- These are often accompanied by **squall winds**, increasing the potential for destruction and loss of life.

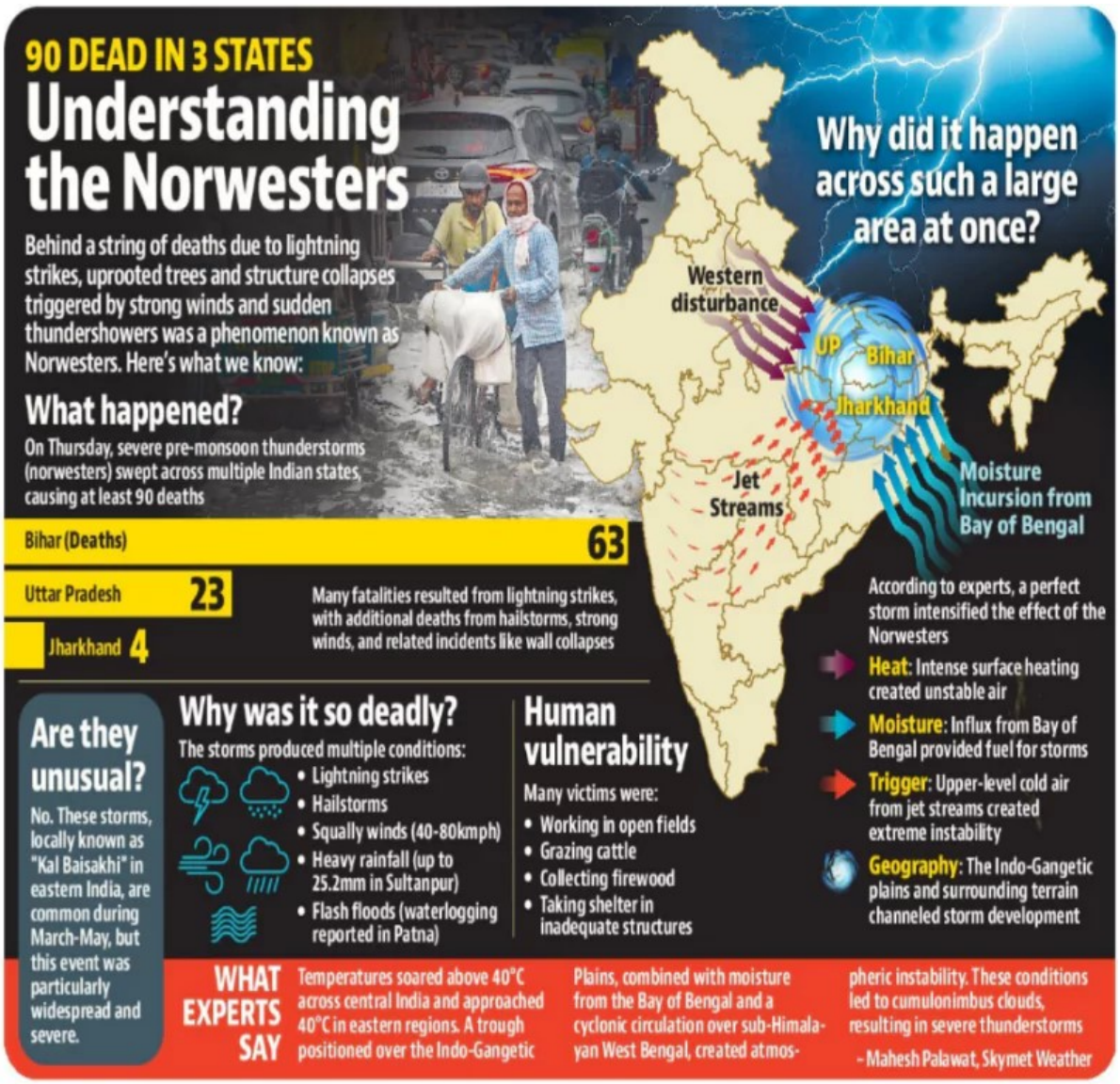
**3. NCRB Data on Lightning Fatalities:**

- According to the **National Crime Records Bureau (NCRB)**:
    - **Lightning accounts for 39%** of all deaths from natural disasters in India.
    - **Bihar ranks second** in the country in terms of lightning-related deaths.
    - The state reports **around 250 deaths annually** due to natural disasters—many of them due to lightning.

**Understanding Lightning**

**1. What is Lightning?**

- Lightning is a **natural electrical discharge** that occurs during thunderstorms.
- It is caused by **charge imbalances** between clouds or between a cloud and the ground.




**2. Formation Mechanism:**

- When **positively and negatively charged particles** in the atmosphere build up sufficient difference, the resulting **discharge** produces a **bright flash** and thunder due to rapidly expanding air.

**3. Types of Lightning:**

- **Cloud-to-Ground:** Most dangerous and causes human fatalities.
- **Cloud-to-Cloud:** Between two separate clouds.
- **Intra-Cloud:** Occurs within the same cloud.

**4. Impact of Lightning:**

- Causes:
    - **Fires and structural damage**
    - **Power outages**
    - **Deaths and injuries**, especially in rural or open areas

**5. Government's Classification:**

- **Lightning is not officially classified** as a natural disaster under the **Disaster Management Act, 2005**, which limits the scope of state support and compensation.

**Why is Bihar Highly Vulnerable to Lightning?**

**1. Climatic and Geographic Conditions:**

- **Humid subtropical climate** and **monsoonal rains** promote frequent thundercloud formation.
- The **flat Indo-Gangetic plains** and proximity to the **Himalayas** increase storm activity due to the clash between cold mountain winds and warm lowland air.
- **Moisture influx from the Bay of Bengal** further intensifies storm systems.

**2. Rural Exposure:**

- A large part of Bihar's population is **agriculture-based**, with people often working in **open fields** during thunderstorms.
- This significantly increases **exposure to lightning**.

**3. Lack of Infrastructure:**

- Many villages **lack tall buildings**, **lightning rods**, or **concrete shelters**.
- As a result, people have no place to take refuge during a storm.

**4. Low Public Awareness:**

- Despite the deployment of **early warning systems** and the dispatch of **12 crore SMS alerts**, awareness and response remain low.
- Many villagers **do not act on warnings** or are unaware of safety protocols.

**5. Moist Soil and Water Bodies:**

- Bihar has an **abundance of rivers and wetlands** (e.g., Ganga basin).
- Moist soil **enhances electrical conductivity**, increasing the risk of **ground strikes** during lightning.

**6. Role of Climate Change:**

- **Rising temperatures**, **changing rainfall patterns**, and **erratic wind flows** are contributing to a **rise in severe weather events**, including lightning.
- This trend is expected to **worsen with global warming**.

**NDMA Guidelines for Lightning and Storm Preparedness**

**1. Early Warning Systems:**

- **Accurate, timely alerts** in **local languages** are recommended via TV, radio, SMS, and mobile apps.
- Alerts should be **location-specific** and easily understandable.

**2. Public Communication – Do's & Don'ts:**

- The NDMA emphasizes **clear safety guidelines**, especially in rural regions.
- Example: Avoid open fields, trees, and metal objects during thunderstorms.

**3. Hazard Mapping and Prevention:**

- NDMA calls for **detailed hazard maps** to identify vulnerable areas.
- Such maps help in **early preventive action** and targeted awareness campaigns.

**4. Disaster-Resilient Infrastructure:**

- **Building codes** must incorporate lightning protection, especially in schools, hospitals, and community buildings.
- Installation of **lightning arrestors** is encouraged.

**5. Underground Cabling:**

- In dense urban and high-risk areas, **electrical and telecom cables** should be installed underground to reduce exposure.

**6. Community-Level Disaster Management:**

- **Local volunteer groups** and **panchayat-level disaster committees** are essential for **last-mile communication** and response.

**7. Hospital Preparedness:**

- Hospitals should have:
    - **Emergency kits**

- **Standard Operating Procedures (SOPs)**
- **Triage areas** for handling mass casualties from disasters like lightning or storms.

**Steps Taken to Prevent Lightning-Related Deaths in India**

**1. Advanced Early Warning Systems:**

- India is among the **top 5 countries** globally with the capability to **forecast lightning events 3 hours to 5 days in advance**.

**2. Lightning Detection Networks:**

- The **Indian Institute of Tropical Meteorology (IITM), Pune** has established a **network of 83 lightning sensors** nationwide to monitor and locate lightning activity with high accuracy.

**3. Damini App:**

- Developed to provide **real-time alerts** using GPS.
- Features:
  - Warns users when lightning is within **20–40 km**
  - Provides **40-minute advance alerts**
  - Shares **safety tips and advisories**

**4. State Lightning Action Plans:**

- Similar to Heat Action Plans, states are being encouraged to formulate **Lightning Action Plans** with **local strategies** for awareness, infrastructure, and quick response.

**5. Lightning Resilient India Campaign:**

- Led by the **Climate Resilient Observing-Systems Promotion Council (CROPC)**.
- Supported by:
  - **NDMA**
  - **India Meteorological Department (IMD)**
  - **Ministry of Earth Sciences**
  - **Indian Meteorological Society**
- Focus: **Community engagement**, awareness, and resilience building.

**6. Public Education and Awareness Campaigns:**

- **TV (Doordarshan)** and **Radio (All India Radio)** are used to promote behavioural changes:
    - Avoid using phones or umbrellas in storms.
    - Stay indoors or in concrete shelters.

**Way Forward**

**1. Official Recognition of Lightning as a Natural Disaster:**

- Including lightning under the **Disaster Management Act, 2005** will:
    - Unlock **better funding**
    - Improve **preparedness frameworks**
    - Ensure **efficient relief and rehabilitation**

**2. Strengthen Last-Mile Communication:**

- Leverage **panchayats**, **self-help groups**, and **local governance** to ensure **timely action** by farmers, fishermen, and outdoor workers.

**3. Lightning Atlas & Hotspot Mapping:**

- Developing a **Lightning Atlas** with **micro-level hotspot data** can:
    - Enable **targeted risk reduction**
    - Guide **resilient infrastructure planning**
    - Inform **educational campaigns** in high-risk zones

**Conclusion**

- Lightning, though natural, is **increasingly becoming a man-made disaster** due to inadequate preparation and awareness.
- With **climate change worsening weather extremes**, India must invest in:
    - **Stronger early warning systems**
    - **Community awareness**
    - **Resilient infrastructure**

- While lightning activity decreases post-monsoon, **long-term, climate-resilient planning** remains the need of the hour.

Source: https://www.newsonair.gov.in/bihar-on-orange-alert-as-lightning-hailstorm-thundering-heavy-rainfall-expected-over-next-5-days/