

#RiseWithRICE

RICE IAS

EXPECTED

MAINS TOPIC

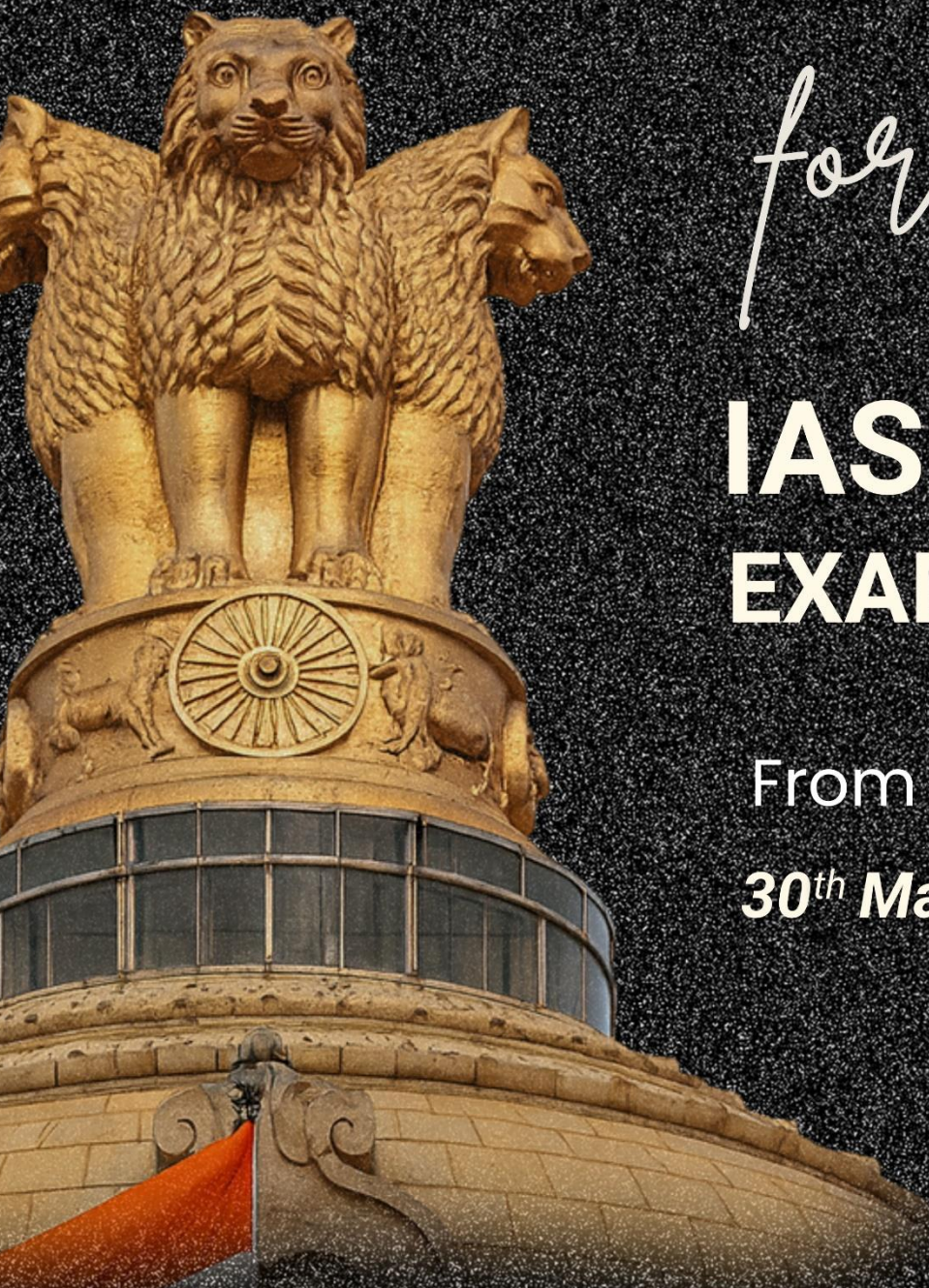
DEEP ANALYSIS

for

**IAS MAINS
EXAMINATION**

From

30th Mar *to* *04th April 2026*



INDEX

1. GENERAL STUDIES 2	01
1.1. POLITY & GOVERNANCE	01
1.1.1. A Comprehensive Framework for Crowd Management and Safety in India	01
1.1.2. Anti-Corruption Framework in India	05
2. GENERAL STUDIES 3	10
2.1. ECONOMY	10
2.1.1. Supply Chain Resilience	10
2.2. INTERNAL SECURITY	13
2.2.1. Naxalism in India	13
2.3. SCIENCE & TECHNOLOGY	18
2.3.1. Artemis II Mission	18
2.4. DISASTER MANAGEMENT	22
2.4.1. Disaster Management in India	22

Scan to know more about our courses...



IAS 2-Year GS PCM



IAS 10-Month GS PCM



Degree + IAS



Prelims Test Series

1.1. POLITY & GOVERNANCE

1.1.1. A COMPREHENSIVE FRAMEWORK FOR CROWD MANAGEMENT AND SAFETY IN INDIA

Context:

India continues to witness recurring stampedes, highlighting persistent gaps in scientific crowd management despite past experiences. Recent incidents from religious gatherings in Bihar to large public celebrations in Bengaluru (2025) and mass events in Tamil Nadu demonstrate how inadequate planning and sudden crowd surges can turn hazardous. Such occurrences reflect a pattern of preventable tragedies followed by reactive responses.



Legal and Constitutional Status of Stampedes in India

1. Constitutional Framework

- **Article 21 (Right to Life):** Stampedes violate the right to life and safety; State failure may attract constitutional liability.
- **DPSPs (Article 38):** Obligates the State to ensure public welfare and safety in mass gatherings, though non-justiciable.

2. Statutory and Legal Provisions

- **Disaster Management Act, 2005:** Treats stampedes as disasters and mandates preparedness, mitigation, and response mechanisms.
- **Indian Penal Code (IPC):**
 - Section 304A: Death due to negligence
 - Sections 336–338: Acts endangering life or causing injury
- **Police Acts & Local Laws:** Empower authorities to regulate assemblies and maintain public order.

3. Judicial Perspective

- Courts hold the State accountable for lapses in crowd safety during public events.
- The **Supreme Court of India** mandates risk anticipation and preventive planning as legal duties.
- Directions include compensation to victims and fixing responsibility on officials and organisers.

Understanding Crowd Dynamics and Causes

Crowd dynamics and stampede causes are interconnected, where structural gaps, human behaviour, and administrative failures together shape real-time risks.

1. Nature of Crowds in India

- **Emotionally Charged Crowds:** Religious or celebrity-driven gatherings reduce risk perception and increase panic under congestion.
- **Spontaneous/Semi-Planned Gatherings:** Poor anticipation of turnout leads to overcrowding and unsafe density levels.
- **Digital Mobilisation:** Social media triggers sudden large gatherings, creating unpredictability and administrative unpreparedness.
- **Combined Effect:** High density, emotional vulnerability, and unpredictability increase disaster risk.

2. Scientific Basis of Crowd Behaviour

- **Density Threshold + Infrastructure Gaps:** Beyond 5 persons/m², movement stops; poor exits and narrow paths convert crowding into crushing pressure.
- **Loss of Individual Identity + Human Factors:** Dense crowds reduce self-awareness; rumours and misinformation trigger panic-driven behaviour.
- **Trigger Events + Administrative Failure:** Minor incidents escalate quickly due to lack of monitoring, regulation, and clear communication.
- **Systemic Interaction:** Structural, behavioural, and governance failures together produce dangerous crowd conditions.

3. Integrated Causes of Stampedes

- **Structural Constraints:** Narrow exits and poor design increase density beyond safe limits.
- **Administrative Failures:** Weak coordination and inadequate personnel allow uncontrolled crowd buildup.
- **Human Behaviour:** Panic, misinformation, and preferential access create sudden surges and instability.
- **Information Gaps:** Lack of real-time monitoring and poor estimation delay timely intervention.

Challenges in Crowd Management in India

1. Lack of Institutionalisation

Crowd management is not recognised as a formal discipline in governance or policing, leading to the absence of standard protocols. Training remains largely experience-based rather than grounded in scientific principles and data-driven methods.

2. Inadequate Infrastructure

Many religious and public spaces lack capacity planning, resulting in overcrowding beyond safe limits. The absence of separate entry-exit routes and poor spatial design restrict smooth movement and emergency evacuation.

3. Weak Inter-Agency Coordination

Police, local administration, and event organisers often function in silos, leading to fragmented decision-making. The absence of a unified command system delays timely response during emergencies.

4. VIP Culture and Resource Diversion

Security arrangements for high-profile events divert police personnel away from general crowd management duties. This results in inadequate on-ground presence in high-footfall areas, increasing vulnerability to mishaps.

5. Digital Mobilisation without Regulation

Social media enables rapid and large-scale mobilisation of crowds without prior intimation to authorities. This unpredictability makes it difficult to estimate turnout and plan adequate arrangements.

6. Limited Use of Technology

There is minimal deployment of advanced tools such as CCTV analytics, drones, and AI-based crowd monitoring systems. The lack of predictive technologies limits the ability to anticipate crowd surges and prevent risks proactively.

7. Behavioural and Cultural Factors

Strong faith-driven participation often leads to overcrowding, especially during religious events. Resistance to regulation and reluctance to follow instructions further complicate effective crowd control.

Government Schemes and Policy Initiatives

1. Safe City Project (Ministry of Home Affairs)

- **Governance Link:** Part of the **Nirbhaya Fund** initiative.
- **Tech-Integration:** Uses **Integrated Command and Control Centres (ICCC)** to monitor high-footfall areas in 8 mega-cities.

2. Aapda Mitra Scheme (NDMA)

- **Community Resilience:** Trains local volunteers as "First Responders."
- **The "Golden Hour":** In crowd disasters, medical help often can't reach the center of a crush. Aapda Mitras are trained to provide **on-spot basic life support** (CPR, trauma care) within the first few critical minutes.

3. PRASHAD & Swadesh Darshan 2.0 (Ministry of Tourism)

- **Infrastructure Focus:** Specifically addresses the "Religious Crowd" dynamic.
- **Standardization:** Funds the creation of **"Tourist Facilitation Centres"** and **Queue Management Systems** at pilgrimage sites (e.g., Varanasi, Kedarnath).

4. Amrit Bharat Station Scheme (Ministry of Railways)

- **Bottleneck Removal:** Focuses on the "Station Redevelopment" of 1,300+ stations.

- **Specific Fixes:** Widening of Foot Over Bridges (FOBs), dedicated entry/exit segregation, and multi-modal integration to ensure "smooth dispersal" of passengers.

Global Best Practices in Crowd Management

Countries with advanced systems integrate science, technology, and governance to minimise risks in mass gatherings.

1. United Kingdom – Scientific Planning and Simulation

- The UK uses advanced crowd modelling tools (e.g., for events like the Glastonbury Festival) to predict movement and congestion points.
- Authorities conduct scenario-based simulations to prepare for emergencies such as evacuations or sudden surges.

2. Japan – Infrastructure Design

- Japan's metro stations and event venues are designed with **segregated entry-exit routes** and clearly marked pathways.
- Use of barriers, queue systems, and signage ensures smooth flow and quick evacuation during peak hours or disasters.

3. Singapore – Real-Time Monitoring

- Singapore deploys **AI-enabled CCTV systems** to monitor crowd density in real time, especially during festivals.
- Drones and integrated command centres help authorities take immediate action when thresholds are breached.

4. Saudi Arabia – Behavioural Interventions (Hajj Management)

- During the Hajj pilgrimage, authorities use **nudging techniques** like colour-coded routes and visual cues to guide pilgrims.
- Structured scheduling and awareness campaigns reinforce discipline and reduce panic behaviour.

5. Germany – Legal and Regulatory Frameworks

- Germany enforces **strict safety regulations**, including mandatory risk assessments and crowd capacity limits.
- Event organisers are held legally accountable, ensuring compliance with safety norms and preventive measures.

Way Forward: Building a Robust Crowd Management Framework

1. Institutionalising Crowd Science

Introduce crowd management as a formal subject in police and administrative training, supported by dedicated research centres for data-driven solutions.

2. Capacity Building and Training

Train police, organisers, and volunteers in crowd psychology, emergency response, and communication to handle panic and ensure orderly movement.

3. Infrastructure and Venue Design

Redesign high-footfall spaces with multiple entry-exit points, barriers, and evacuation routes based on scientific capacity norms.

4. Leveraging Technology

Deploy AI-based monitoring, CCTV, GPS tracking, and predictive analytics for real-time crowd assessment and early risk detection.

5. Strengthening Governance and Coordination

Establish a Unified Command System with clearly defined roles for police, administration, and organisers to ensure quick and coordinated response.

6. Regulatory Framework and Accountability

Ensure strict permissions based on capacity assessment and enforce penalties for overcrowding, safety violations, and unauthorized access.

7. Public Awareness, Digital Monitoring, and Resource Optimisation

Promote safe crowd behaviour through awareness campaigns, monitor social media for crowd prediction, and rationalise security deployment to avoid personnel diversion.

Conclusion

Stampedes in India reflect systemic gaps rather than isolated failures, underscoring the need for a paradigm shift in crowd governance. A future-ready approach must integrate crowd science, smart technologies, and institutional coordination into a proactive framework. Leveraging data, behavioural insights, and resilient infrastructure can transform mass gatherings into safe and well-managed events. Ultimately, ensuring crowd safety is central to inclusive development and reflects the State's commitment to human dignity and life.

Q. Recurring stampedes in India highlight gaps in governance, institutional capacity, and regulatory enforcement in managing large gatherings. Examine the constitutional and administrative challenges in crowd management, and suggest governance reforms to ensure accountability, coordination, and public safety. 15 Marks

1.1.2. ANTI-CORRUPTION FRAMEWORK IN INDIA

Context

Corruption is often described as a "hydra-headed monster" that undermines the rule of law and erodes public trust. In the context of recent developments, including the **Jan Vishwas (Amendment) Bill, 2026** and the focus on **risk-based digital integrity**, the anti-corruption landscape is shifting from mere "policing" to "systemic prevention."



India's Anti-Corruption Institutional Architecture

India's Three-Tiered architecture operates as a **Triad of Oversight, Investigation and Prosecution:**

1. Tier 1: Oversight (The Ombudsman - Lokpal)

- **Legal Basis:** *Lokpal and Lokayuktas Act, 2013.*
- **Role:** Acts as the supreme "receiving station" for complaints against high-level functionaries (PM, Ministers, Group A-D officers).
- Transitioning to full operationalization of its own **Inquiry and Prosecution Wings** (as noted by a March 2026 Parliamentary Committee report) to reduce dependence on the CBI.

2. Tier 2: Vigilance (The Advisor - CVC)

- **Legal Basis:** *CVC Act, 2003* (Statutory).
- **Role:** The "Conscience Keeper" of the government. It supervises the vigilance administration of central departments and PSUs.
- **Control over CBI:** Exercises superintendence over the CBI for investigations specifically under the *Prevention of Corruption Act (PCA), 1988.*

3. Tier 3: Investigation (The Enforcement - CBI & ED)

- **CBI (DSPE Act, 1946):** The primary investigator for "Crimes of Corruption."
- **Enforcement Directorate (ED):** Focuses on "Proceeds of Corruption" under the **PMLA, 2002.**
- A shift toward **Asset Restitution** (returning stolen money to victims/the state), with the ED reporting over \$5.6 billion in restituted assets by early 2026.

India's Anti-Corruption Legislative Provision

1. Prevention of Corruption Act (PCA), 1988

- **The Core Mandate:** Defines "Undue Advantage" and criminalizes both the taking and giving of bribes.
- **Section 17A (Protective Shield):** Requires prior government sanction before investigating a public servant for decisions taken in official capacity.
- **Section 7 (Supply-Side):** Since 2018, bribe-giving is a standalone offence, making the private sector equally liable.
- **Commercial Organizations:** If a person associated with a commercial entity gives a bribe, the organization is liable unless it proves it had "adequate procedures" to prevent it.

2. Jan Vishwas (Amendment) Act, 2026

- **The Decriminalization Shift:** In April 2026, this Act decriminalized minor procedural lapses across 79 laws.
- **Strategic Intent:** It separates "technical non-compliance" from "criminal intent." By removing the threat of imprisonment for minor errors, it prevents lower-level officials from using these laws as tools for extortion.
- **Benefit:** Allows the CBI and Lokpal to focus exclusively on high-value, systemic corruption cases.

3. Prevention of Money Laundering Act (PMLA), 2002

- **Asset Recovery:** Focuses on "Proceeds of Crime." It allows the Enforcement Directorate (ED) to attach properties derived from corruption.
- **Asset Restitution:** A major policy shift in 2026 toward returning attached funds to public sector banks and legitimate victims rather than just keeping them in state custody.
- **Burden of Proof:** Under PMLA, the accused must often prove that the property in question is not the result of a crime.

4. Benami Transactions (Prohibition) Act, 1988

- **Target:** Prohibits transactions where property is held by one person but paid for by another (fictitious names).
- Now being linked with **Digital Land Records** and Aadhaar to automatically flag "mismatched" high-value properties.

5. Whistleblowers Protection Act, 2014

- **Identity Shield:** Provides a mechanism for the confidential disclosure of corruption or power abuse.
- **Current Status:** While enacted, it faces criticism for lacking a dedicated "physical protection" unit for informers, a gap currently filled by high court-mandated police protection.

Challenges Facing India's Anti-Corruption Framework

1. Legal & Procedural Hurdles

- **The "Sanction Shield" (Section 17A):** Mandates prior government approval before investigating public servants. Critics argue this acts as a "protection wall," causing significant delays and allowing evidence to be tampered with.
- **Low Conviction Rates:** Despite high-profile arrests, the judicial process remains slow. Proving "criminal intent" in complex financial webs remains a high evidentiary bar.
- **Decriminalization Dilemma:** While the **Jan Vishwas Act 2026** reduces harassment for minor errors, there is concern that sophisticated offenders might exploit these "civil penalty" routes to avoid criminal scrutiny.

2. Structural & Federal Friction

- **General Consent Issues:** Several states have withdrawn "General Consent" for the CBI. This forces the agency to seek case-specific permission, hindering "suo motu" action and inter-state investigations.
- **Institutional Overlap:** Multiple agencies (CBI, ED, CVC, Lokpal) often investigate the same set of facts, leading to "**Jurisdictional Conflict**" and duplication of effort.
- **Caged Parrot Syndrome:** Concerns persist regarding the functional autonomy of investigative agencies, particularly during election cycles.

3. Operational Gaps

- **Human Resource Crunch:** Chronic vacancies in the CVC and state Lokayuktas lead to a massive pendency of cases.

- **Whistleblower Vulnerability:** The 2014 Act lacks a robust **Witness Protection Program**, deterring "insiders" from reporting high-level grafts due to fear of administrative retaliation.

4. Emerging Challenges

- **Cyber-Corruption:** The rise of deepfakes and sophisticated encryption makes tracking "quid pro quo" harder for traditional agencies.
- **Supply-Side Complexity:** While the law now targets bribe-givers, tracking "indirect benefits" (e.g., job offers to kin, offshore shell investments) remains a major investigative challenge.

Way Forward

1. Institutional & Structural Reforms

- **Full Operationalization of Lokpal Wings:** As highlighted in early 2026 reports, the Lokpal must urgently move beyond its dependency on the CBI by fully staffing its own **Inquiry and Prosecution Wings**.
- **Constitutional Status:** Experts suggest granting **Constitutional Status** to the Lokpal and CVC (similar to the ECI) to insulate them from executive interference and "General Consent" disputes with states.
- **Specialized Anti-Corruption Courts:** Establishing dedicated courts in major hubs (starting with Delhi, as requested in 2026) to ensure trials under the PCA are completed within the statutory **one-year timeline**.

2. Technological Integration

- **Risk-Based AI Monitoring:** Moving from a rules-based to a **risk-based approach**. Using Machine Learning to scan public procurement data for "red flags" (e.g., bid-rigging or inflated contract modifications) before the fraud occurs.
- **Interoperable Data Systems:** Creating a secure, real-time data-sharing bridge between the **CVC, ED, and RBI** to track the "Money Trail" of corruption across digital and crypto-assets.

3. Legislative & Policy Refinement

- **Review of Section 17A:** Amending the "Sanction Shield" to include a "**Deemed Sanction**" clause—if the government doesn't respond within 60 days, permission to investigate should be considered granted.
- **Comprehensive Witness Protection:** Upgrading the Whistleblowers Act to include a dedicated **Witness Protection Unit**, ensuring physical and career security for "insiders" who expose systemic graft.
- **Asset Restitution:** Standardizing the **ED model** of returning attached assets to victims/banks, ensuring that the "Proceeds of Crime" are used to repair the economic damage caused.

4. Global Cooperation

- **Active GlobE Network Participation:** Leveraging India's 2026 role in the **GlobE Network Steering Committee** to secure real-time, encrypted intelligence exchange for tracking fugitive economic offenders and offshore shell companies.

Conclusion

Effective anti-corruption in 2026 requires transitioning from **punitive policing** to **systemic prevention**. Integrating **AI-driven transparency**, **institutional autonomy**, and **Jan Vishwas-led decriminalization** is vital to fostering a resilient, trust-based integrity ecosystem.

Q. Discuss the structure and functioning of anti-corruption bodies in India. Highlight the key challenges affecting their effectiveness and suggest reforms. 15 Marks

Scan to know more about our courses...



IAS 2-Year GS PCM



IAS 10-Month GS PCM



Degree + IAS



Prelims Test Series

2.1. ECONOMY

2.1.1. SUPPLY CHAIN RESILIENCE

Context:

In the traditional economic sense, a supply chain is a linear network of organizations, people and resources involved in moving a product from supplier to customer. However, **Supply Chain Resilience (SCR)** is the **adaptive capacity** of an ecosystem to anticipate, resist and recover from unexpected disruptions whether they are geopolitical (wars, sanctions), environmental (climate change), or systemic (pandemics).



Why Supply Chain Resilience is Critical for India

The global shift from "**Efficiency-First**" (Just-in-Time) to "**Resilience-First**" (Just-in-Case) is driven by India's need to decouple its growth from external shocks.

1. Shielding from "Imported Inflation"

- **The Energy-Inflation Link:** 85% crude dependency means a \$10/barrel price hike drains **\$13–14 billion** in forex and spikes the **CPI** by 30–40 bps.
- **The Fiscal Burden:** Supply shocks in natural gas (e.g., Russia-Ukraine) inflate the **fertilizer subsidy bill**, straining the fiscal deficit and threatening food security for the common man.

2. Transitioning to "Deep Manufacturing"

- **The "Midstream" Gap:** Reliance on a single source (China) for **70% of APIs** and critical semiconductors creates a "choke-point" for our \$300 billion electronics and pharma targets.

3. Safeguarding "Strategic Autonomy"

- **Weaponization of Markets:** Over-dependence on specific geographies for critical inputs (e.g., Lithium for EVs) allows foreign powers to use supply disruptions as diplomatic leverage.
- **The "China Plus One" Edge:** A resilient, predictable supply chain is India's primary USP to attract MNCs looking to diversify their manufacturing base away from China.

4. Powering the "Green Transition"

India's **Net Zero 2070** goal necessitates a massive shift to EVs and Renewables.

- **The Mineral Challenge:** To avoid replacing "Oil Dependency" with "**Mineral Dependency**" (Lithium, Cobalt, REEs), India must secure resilient supply chains through KABIL and circular economy (recycling) initiatives.

5. Mitigating "Climate-Induced" Volatility

- **Agri-Resilience:** Erratic monsoons and heatwaves frequently shock the supply of pulses and oilseeds. Building **climate-resilient supply chains** and strategic reserves is vital to preventing rural distress and food inflation.

Sector-wise Analysis of Supply Chain Risks

1. Energy Supply Chains: The "Import-Inflation" Trap

Energy is India's primary shock-transmission channel.

- **Import Reality:** India imports ~85% crude oil and ~50% natural gas. Price spikes in chokepoints like the **Strait of Hormuz** instantly inflate transport and manufacturing costs.
- **Strategic Gap:** Current **Strategic Petroleum Reserves (SPR)** cover only ~9.5 days of net imports—insufficient for prolonged geopolitical conflicts.
- **Macro-Impact:** A \$10/barrel hike typically increases **CPI inflation by 30–40 bps** and swells the Current Account Deficit (CAD).

2. Food & Fertilizer: The "Rural Distress" Link

Despite being a net exporter of food, India's production inputs are externally anchored.

- **The "P&K" Gap:** While Urea is largely domestic, India relies heavily on imports for **Phosphatic (P) and Potassic (K)** fertilizers from Morocco, Jordan, and Russia.
- **Edible Oil/Pulses:** India meets only **44% of edible oil demand** domestically. Supply shifts in Indonesia (Palm) or South America (Soybean) trigger immediate "Agri-inflation."
- **Fiscal Risk:** Global gas price hikes lead to a skyrocketing **Fertilizer Subsidy bill**, straining the fiscal deficit.

3. Manufacturing & Tech: The "Midstream" Gap

India dominates assembly ("Downstream") but lacks component depth ("Upstream").

- **Pharma (API Risk):** India relies on China for **65–70% of Active Pharmaceutical Ingredients**. Any disruption in China threatens India's "Pharmacy of the World" status.
- **Electronics/Semiconductors:** The **\$300bn electronics target** is vulnerable to the Taiwan-South Korea "Fab" concentration. Current value-addition remains low at 15–20%.
- **Capital Goods:** Dependence on imported high-end industrial machinery (Robotics/CNC) limits indigenous industrial competitiveness.

4. Critical Minerals & Future-Tech: "Green" Dependency

The transition to a "Green Economy" creates new structural risks.

- **Concentration Risk:** Minerals like **Lithium, Cobalt, and REEs** (essential for EVs/Defense) are globally concentrated, with China controlling **>60% of processing**.
- **Energy Security 2.0:** Moving to 500 GW of non-fossil capacity risks replacing **Middle East oil dependency** with **Chinese mineral dependency**.
- **Tech Chokepoints:** Quantum computing and AI chips are held by a few global players, exposing India to potential "Technology Denials."

Government Initiatives for Supply Chain Resilience

1. **Production Linked Incentive (PLI) Schemes:** Targeting 14 key sectors (e.g., ACC Batteries, Pharma), the scheme incentivizes incremental production to shift India from low-value assembly to high-value **component-level manufacturing**.
2. **PM Gati Shakti & National Logistics Policy (NLP):** A digital and physical integration of 16 ministries to reduce logistics costs from **14% to 8% of GDP**.

3. **National Green Hydrogen Mission:** Aiming for **5 MMT p.a. by 2030**, it seeks to decarbonize "hard-to-abate" sectors like Steel and Refineries, reducing long-term reliance on imported fossil fuels like Natural Gas.
4. **KABIL (Khanij Bidesh India Ltd):** A specialized Joint Venture to secure "**Energy Security 2.0**" by acquiring strategic overseas assets of critical minerals like Lithium and Cobalt for the EV and Defense sectors.
5. **India Semiconductor Mission (ISM):** A **\$10 billion** incentive framework to establish domestic "Fabs" and display ecosystems, breaking the "Silicon Dependency" on East Asia for digital sovereignty.
6. **Strategic Petroleum Reserves (SPR) – Phase II:** Expansion of storage at **Chandikhol and Padur** to increase India's fuel buffer, safeguarding the economy against maritime blockades or West Asian geopolitical shocks.

Global Trends

1. **"Friend-Shoring" & "Ally-Shoring":** Countries are shifting supply chains to "Trusted Partners" with shared values (e.g., US-India-EU) to prevent economic coercion by adversarial nations.
2. **The "China Plus One" Strategy:** MNCs are diversifying their manufacturing bases away from China to India, Vietnam, and Mexico to mitigate "Single-Source" risks. India, Vietnam, and Mexico
3. **Decoupling vs. De-risking:** Led by the EU and G7, there is a trend of "De-risking"—reducing critical dependencies on specific nations (like China for Rare Earths or Russia for Gas) without completely "Decoupling" or isolating from global trade.

Challenges in Building Supply Chain Resilience

1. **High Logistics Costs:** Despite **PM Gati Shakti**, India's logistics cost remains **13–14% of GDP**. This "internal tax" makes domestic intermediate goods more expensive than imported alternatives, hindering import substitution.
2. **Inverted Duty Structure:** In several sectors, **import duties on raw materials exceed those on finished goods**. This discourages domestic value-addition and incentivizes "assembly" over "production."
3. **MSME Technology Gap:** Most Indian MSMEs lack the **economies of scale and R&D** required to produce high-precision intermediates (e.g., specialized chemicals) that meet global "Six Sigma" quality standards.
4. **Critical Mineral "Blind Spot":** India has limited domestic reserves of **Lithium, Cobalt, and REEs**. Securing these from the "Lithium Triangle" or Australia involves intense geopolitical competition and high capital risk.
5. **Long Gestation Periods:** High-tech resilience, like the **India Semiconductor Mission**, requires decades of sustained investment in "water-power-talent" ecosystems. It is a long-term marathon, not a quick fix for immediate shocks.
6. **"Efficiency vs. Resilience" Trade-off:** Building buffers and localizing is **expensive**. Shifting from "Lowest-Cost" sources (China) to "Trusted-Sources" can lead to higher end-consumer prices and inflationary pressure.

Way Forward: Strategies for a Resilient India

1. **Deepening "Midstream" Manufacturing:** Pivot from final assembly to the domestic production of high-value intermediates (APIs, semiconductors, specialized chemicals) to eliminate **"up-stream chokepoints."**
2. **Accelerated "Resource Diplomacy":** Use **KABIL** to aggressively secure long-term "Off-take Agreements" for critical minerals (Lithium, Cobalt) in the Lithium Triangle and Africa, insulating the **Green Energy transition.**
3. **Reducing Logistical Friction:** Fully operationalize **PM Gati Shakti** and the **National Logistics Policy** to slash logistics costs to **8% of GDP**, making domestic components price-competitive against global imports.
4. **Institutionalizing Multi-Sectoral Buffers:** Expand Strategic Reserves beyond oil (SPR Phase II) to include **Edible Oils, Pulses, and Fertilizers**, acting as a shock absorber against maritime and price disruptions.
5. **Strengthening "Trust-Based" Networks:** Leverage mini-lateral frameworks like **SCRI** (Japan/Australia) and **iCET** (USA) to facilitate **"Friend-Shoring"** and secure access to sensitive high-end technologies.
6. **Mainstreaming the Circular Economy:** Promote **"Urban Mining"** to recover Rare Earth Elements from e-waste, reducing primary raw material import demand and enhancing environmental sustainability.

Conclusion

Future-proofing India's \$5 trillion trajectory requires transitioning from a "Global Price-Taker" to a "Strategic Value-Maker." By integrating **Aatmanirbharta** with **Trust-based Global Value Chains**, India can ensure a resilient, shock-proof, and sovereign economic era.

Q. The West is fostering India as an alternative to reduce dependence on China's supply chain and as a strategic ally to counter China's political and economic dominance.' Explain this statement with examples. 10 Marks

2.2. INTERNAL SECURITY

2.2.1. NAXALISM IN INDIA

Context

The Union Home Minister has set a target of **March 31, 2026**, to completely eliminate Naxalism from India. According to MHA (2025), "Most Affected Districts" have declined from **36 in 2014 to just 3 in 2025** (Bijapur, Sukma, and Narayanpur in Chhattisgarh). Total affected districts dropped from 126 to 11.



What is Naxalism?

Naxalism, or **Left-Wing Extremism (LWE)**, is an armed insurgency inspired by **Maoist ideology** (specifically the "Protracted People's War").

- **Objective:** To overthrow the Indian State through armed rebellion and establish a "People's Government."
- **Methodology:** Guerrilla warfare, creation of "liberated zones," and mobilization of marginalized sections (tribals and landless laborers) against "class enemies" (landlords and the State).

Background of Naxalism in India

- **Naxalbari Uprising (1967):** It began in Naxalbari village, West Bengal, led by **Charu Majumdar, Kanu Sanyal, and Jangal Santhal**. It was a peasant revolt against exploitative landlords (*Jotedars*).
- **Ideological Split:** The movement led to a split in the CPI(M), forming the **CPI (Marxist-Leninist)** in 1969.
- **Formation of CPI (Maoist):** In 2004, the merger of the **People's War Group (PWG)** and the **Maoist Communist Centre of India (MCCI)** created the "CPI (Maoist)," which is currently the dominant insurgent group.

Phases of Naxalism in India

Phase I: The Naxalbari Period (1967 – 1975)

- **Focus:** Romanticized "Peasant Revolution."
- **Characteristics:** Started in Naxalbari (West Bengal). It was primarily an ideological movement against feudalism and land-lords (*Jotedars*).
- **Outcome:** Highly fragmented. It was largely suppressed by 1972 following **Operation Steeplechase** and the death of Charu Majumdar.

Phase II: Fragmentation & Survival (1975 – 2004)

- **Focus:** Regional Consolidation.
- **Characteristics:** The movement split into many factions. Two dominant groups emerged:
 - **People's War Group (PWG)** in Andhra Pradesh (Telangana region).
 - **Maoist Communist Centre (MCC)** in Bihar and Jharkhand.
- **Outcome:** Shifted its base from plains to deep **forested terrains**, focusing on tribal (Adivasi) mobilization against the State.

Phase III: Peak & The "Red Corridor" (2004 – 2014)

- **Focus:** Militarization and Expansion.
- **Characteristics:** In 2004, the PWG and MCC merged to form the **CPI (Maoist)**. This unified the movement under a single command.
- **The "Red Corridor":** Influenced a vast stretch from Nepal to Andhra Pradesh, affecting over 180 districts.
- **Outcome:** Escalation of violence, including the 2010 Dantewada ambush. The government declared it the "single biggest internal security challenge."

Phase IV: Decline & Consolidation (2014 – Present)

- **Focus:** Shrinking Footprint & Elimination.
- **Characteristics:** Implementation of the **SAMADHAN** strategy. A heavy focus on "Security-cum-Development."

- **Current Status:** As of **March 2026**, the movement is restricted to just a few pockets in South Chhattisgarh. The government is currently in the final stages of the mission to achieve a "Naxal-Free India" by the end of this year.

Causes of Naxalism in India

1. **Land Alienation:** Failure of "Land to the Tiller" reforms led to land concentration among elites, leaving tribals as exploited, landless laborers.
2. **The Mining-Development Paradox:** Massive displacement of Adivasis for mineral extraction without equitable compensation or rehabilitation fueled "anti-state" resentment.
3. **Forest Rights Violation:** Slow implementation of the **Forest Rights Act (2006)** and criminalization of traditional livelihoods (Minor Forest Produce) alienated forest-dwellers.
4. **Governance Deficit:** A "vacuum" of state services (schools, healthcare) allowed Maoists to establish parallel systems like **Jan Adalats** (People's Courts).
5. **Socio-Economic Neglect:** Acute poverty, malnutrition, and unemployment in the "Red Corridor" created a fertile recruiting ground for armed insurgency.
6. **Exploitation by Middlemen:** The predatory *Thekedar* (contractor) and moneylender system, including (bonded labor), forced many to seek "instant justice" from Naxals.
7. **Infrastructural Isolation:** Lack of roads and connectivity in regions like **Bastar** provided Naxals a strategic haven while keeping the State at a distance.

Government Initiatives to Combat Naxalism in India

The government follows a **Multi-Pronged Strategy**:

1. Security Measures

- **SAMADHAN Doctrine (2017):**
 - **S**- Smart Leadership
 - **A**- Aggressive Strategy
 - **M**- Motivation and Training
 - **A**- Actionable Intelligence
 - **D**- Dashboard-based KPIs
 - **H**- Harnessing Technology (Drones, GIS)
 - **A**- Action Plan for each Theatre
 - **N**- No Access to Financing (Financial Choking via NIA/ED)
- **Specialized Forces:** Deployment of **CoBRA** (Commando Battalion for Resolute Action) of the CRPF, along with state-specific units like **Greyhounds** (AP/Telangana) and the **District Reserve Guard (DRG)** in Chhattisgarh.
- **Security Related Expenditure (SRE) Scheme:** Provides 100% central reimbursement for operational expenses, insurance for SFs, and community policing.
- **Fortified Police Stations:** Over **656 Fortified Police Stations** have been constructed in LWE areas (as of Feb 2026) to withstand heavy insurgent attacks.
- **Choking Naxal Finance:** Dedicated verticals in the **NIA (National Investigation Agency)** and **ED (Enforcement Directorate)** to seize assets and disrupt the extortion networks.

2. Development-Led Initiatives

- **Special Central Assistance (SCA):** Funds provided to the "Most Affected Districts" to fill critical gaps in public infrastructure (e.g., small bridges, primary health centers).
- **Infrastructure Connectivity:**
 - **Roads:** Under the **Road Requirement Plan (RRP)** and **RCPLWE**, over 15,000 km of roads have been completed.
 - **Telecom:** The **LWE Mobile Tower Project** has commissioned over 9,200 towers (4G saturation) to eliminate "shadow zones."
- **Education & Skill Development:**
 - **Eklavya Model Residential Schools (EMRS):** 179 functional schools provide quality education to tribal students.
 - **ITI/SDC:** Setting up Industrial Training Institutes and Skill Development Centres in each affected district.
- **Financial Inclusion:** Opening of nearly 6,000 Post Offices and 1,800+ Bank branches/ATMs in formerly unbanked LWE zones.

3. Rights and Entitlements

- **Forest Rights Act (2006):** Prioritizing the settlement of individual and community forest rights to reduce tribal alienation.
- **Niyad Nellanar Scheme (Chhattisgarh):** A 2024-25 flagship initiative meaning "Your Good Village," aimed at providing 25+ essential government services to villages in the core Bastar region.

4. Surrender and Rehabilitation Policy

- **Financial Incentives:** Central government provides an immediate grant of **₹5 Lakh** for higher-ranked cadres and **₹2.5 Lakh** for others who surrender.
- **Mainstreaming:** Includes vocational training, monthly stipends for 3 years, and land/housing support to prevent re-entry into insurgency.

5. Public Perception Management

- **Civic Action Programme (CAP):** CAPFs conduct medical camps, distribute essential items, and organize sports (e.g., the **Bastar Olympics 2025-26**) to build trust with local populations.
- **Tribal Youth Exchange Programme:** Organized by NYKS to expose tribal youth to the developmental progress in other parts of India.

Challenges in Combating Naxalism

1. Geographical & Tactical Challenges

- **Difficult Terrain:** The core "liberated zones" (like **Abujmad** in Chhattisgarh) consist of 4,000 sq. km of unsurveyed, dense hilly forests, making aerial surveillance and troop movement difficult.
- **Asymmetric Warfare:** Naxals use "hit-and-run" guerrilla tactics and IEDs (Improvised Explosive Devices), which negate the numerical superiority of security forces.
- **Safe Havens at Inter-State Junctions:** Insurgents exploit the "tri-junctions" of state borders (e.g., Chhattisgarh-Odisha-Telangana) to escape from one state's jurisdiction into another.

2. Intelligence & Operational Gaps

- **Human Intelligence (HUMINT) Deficit:** Local villagers often refuse to provide information due to fear of brutal retaliation by Naxal **Jan Adalats** (People's Courts).
- **Technology vs. Canopy:** Dense forest cover often renders high-end drones and satellite imagery less effective for real-time tracking of small guerrilla squads.
- **IED Proliferation:** The high cost of human life due to pressure-cooker bombs and sophisticated landmines remains the biggest hurdle for ground patrols.

3. Governance & Developmental Hurdles

- **The "Trust Deficit":** Decades of neglect and perceived state high-handedness make it difficult for administrative machinery to win "hearts and minds."
- **Delayed Infrastructure:** Road construction in Maoist strongholds is slow because contractors are targeted, and equipment is frequently burnt by insurgents.
- **Ineffective Local Bodies:** In many affected areas, the **PESA Act** and **5th Schedule** are not implemented in spirit, leaving a power vacuum that Naxals fill.

4. Ideological & Structural Challenges

- **Urban Naxalism/Overground Network:** The existence of support structures in cities—providing legal aid, recruitment, and propaganda—makes it a "invisible" multi-front war.
- **Extortion Economy:** Naxals run a multi-crore "taxation" racket, taxing mining companies, PWD contractors, and tendu leaf collectors, ensuring they remain well-funded despite demonetization or financial choking.
- **Radicalization of Youth:** Exploiting local grievances (like unemployment and displacement) to recruit the next generation of "People's Liberation Guerrilla Army" (PLGA) cadres.

5. Legal & Human Rights Constraints

- **Collateral Damage:** Any civilian casualty during an operation is used by Naxal propaganda to further alienate the masses from the State.
- **Legal Delays:** The slow judicial process in convicting high-ranking Maoist leaders often allows them to continue directing operations from behind bars or while on bail

Way Forward

1. Transition to "Governance-Led" Consolidation

- **From 'Clear-Hold' to 'Develop':** Shift focus from kinetic military operations to the "**Develop**" phase. Ensure that the administrative vacuum created by the retreat of Maoists is immediately filled by civilian officials and not just security camps.
- **Universal Service Delivery:** Scale up the **Niyad Nellanar (Your Good Village)** model across all former "Most Affected Districts" to ensure 100% saturation of health, education, and electricity.

2. Institutionalizing Tribal Rights

- **PESA & Forest Rights:** Ensure the **PESA Act (1996)** and **Forest Rights Act (2006)** are implemented in letter and spirit to empower Gram Sabhas. This addresses the root cause of "alienation" by giving tribals control over minor forest produce and local land decisions.
- **Land Record Digitization:** Accelerate the digitizing of land records in the Red Corridor to prevent future land-grabbing and exploitation by middlemen.

3. Strategic "Post-Insurgency" Security

- **De-mining Operations:** Launch a massive, tech-driven **joint de-mining exercise** (using NSG and CRPF) to clear the thousands of hidden IEDs that pose a long-term threat to civilian life and developmental activity.
- **Strengthening Local Police:** Gradually withdraw CAPF battalions as the threat recedes, handing over internal security to state police forces (like the **DRG** or **Greyhounds**) who have better local intelligence and language skills.

4. Countering "Urban Maoism" & Ideology

- **Narrative Building:** Use the success stories of surrendered cadres (acting as "Peace Ambassadors") and events like the **Bastar Olympics** to build a counter-narrative against the Maoist ideology of violence.
- **Financial Intelligence:** Continue using the **NIA** and **ED** to choke the remnants of the "extortion economy" and urban support networks that provide logistical cover.

5. Economic Diversification

- **Sustainable Livelihoods:** Promote minor forest produce-based industries, eco-tourism (e.g., in the Bastar circuit), and dairy cooperatives to provide stable income alternatives for the youth.
- **Infrastructure Sustainability:** Ensure the "3-C Connectivity" (Roads, Mobile, Banks) is maintained and protected from any residual extremist elements.

Conclusion

The March 2026 milestone marks the transition from armed conflict to **integrated development**. Future success lies in transforming the "Red Corridor" into a **vibrant socio-economic zone** through tribal empowerment.

Q. Naxalism is a social, economic and developmental issue manifesting as a violent internal security threat. In this context, discuss the emerging issues and a multilayered strategy to tackle the menace of Naxalism. 15 Marks

2.3. SCIENCE & TECHNOLOGY

2.3.1. ARTEMIS II MISSION

Context

Artemis II is the **first crewed mission** of NASA's Artemis program, marking the return of humans to the lunar vicinity after a gap of over **50 years** (since Apollo 17 in 1972).

About Artemis II Mission

- **Launch Date: April 1, 2026** (Successfully launched from Kennedy Space Center, Florida).
- **Nature of Mission: A crewed lunar flyby** (The crew does not land on the Moon).



- **Duration:** Approximately **10 days**.
- **Spacecraft:** **Orion** Multi-Purpose Crew Vehicle, powered by the **European Service Module (ESM)**.
- **Launch Vehicle:** **Space Launch System (SLS)**—the most powerful operational rocket in history, producing 8.8 million pounds of thrust.

The Historical "Firsts" of the Crew

The four-member crew represents a shift toward inclusivity and international cooperation in deep space:

- **Reid Wiseman (Commander):** NASA veteran.
- **Victor Glover (Pilot):** First **person of color** to leave Low Earth Orbit (LEO).
- **Christina Koch (Mission Specialist):** First **woman** to travel to the Moon's vicinity.
- **Jeremy Hansen (Mission Specialist):** First **non-American** (Canadian Space Agency) to fly to the Moon.

Mission	Status/Date	Spacecraft & Launcher	Key Objective
Artemis I	Completed (Nov-Dec 2022)	SLS Block 1 & Orion (Uncrewed)	System Validation: Tested the SLS rocket and Orion's heat shield during a high-speed re-entry from lunar orbit.
Artemis II	Ongoing (Launched April 1, 2026)	SLS Block 1 & Orion (Crewed)	Human Validation: 10-day lunar flyby to test Life Support Systems (ECLSS) and communication in deep space.
Artemis III	Scheduled (Mid-2027)	SLS, Orion & SpaceX Starship HLS	Crewed mission in Low Earth Orbit to test the Starship HLS and Blue Moon landers, and new Axiom space suits. (No lunar landing).
Artemis IV	Scheduled (Early 2028)	SLS Block 1B & Orion	First Lunar Landing of the program. Crew will land at the Lunar South Pole.
Artemis V	Scheduled (Late 2028)	SLS Block 1B & Blue Origin Lander	Second lunar landing; beginning of the Lunar Base Camp construction.

Key Objectives of the Artemis Program

Artemis II serves as a bridge between the uncrewed Artemis I and the landing mission, Artemis III.

- **Human-System Integration:** Validating the **Environmental Control and Life Support System (ECLSS)** in Orion to ensure it can regulate oxygen, remove CO₂, and maintain temperature for a four-person crew over 10 days.

- **Manual Maneuvering & Proximity Operations:** Performing a "**Prox Ops**" demonstration where the pilot manually maneuvers Orion near the ICPS (the rocket's upper stage) to test manual handling and docking sensors.
- **Deep Space Navigation & Communication:** Testing the high-speed **Optical (Laser) Communications** and the Deep Space Network to ensure continuous, high-bandwidth data and video links at 400,000 km from Earth.
- **Radiation & Environment Assessment:** Monitoring the crew's exposure to high-energy solar and cosmic radiation once they leave the protection of Earth's Van Allen belts, providing data for long-duration stays.
- **Re-entry and Recovery Validation:** Testing the high-speed re-entry (approx. 40,000 km/h) into Earth's atmosphere and the precision splashdown/recovery procedures in the Pacific Ocean with humans on board.

Significance of the Artemis Program

1. **Transition to Sustainable Habitation:** Unlike the "flags and footprints" approach of Apollo, Artemis focuses on **long-term presence**. It prioritizes **In-Situ Resource Utilization (ISRU)**, specifically extracting water ice from the Lunar South Pole for life support and rocket fuel (LH₂/LOX).
2. **"Moon to Mars" Proving Ground:** The Moon serves as a critical testbed for deep-space technologies needed for Mars missions in the 2030s, including **nuclear thermal propulsion**, advanced radiation shielding, and closed-loop life support systems.
3. **Space Geopolitics & Rules-Based Order:** Through the **Artemis Accords** (which India signed), the mission establishes a U.S.-led international framework for transparent, peaceful exploration. This acts as a strategic counterweight to the China-Russia **International Lunar Research Station (ILRS)**.
4. **The Cislunar Economy:** Artemis is catalyzing a "**New Space**" economy by partnering with private entities (e.g., SpaceX, Blue Origin). This fosters commercial lunar mining, satellite refueling hubs, and the economic integration of Low Earth Orbit (LEO) with lunar space.
5. **Inclusivity & Science Diplomacy:** Artemis II breaks historical barriers by including the first woman, person of color, and non-U.S. citizen (Canadian) on a lunar mission. This reflects a shift from Cold War nationalistic competition to modern, inclusive **global science diplomacy**.
6. **Strategic Value for India:** India's participation aligns with **ISRO's Vision 2040** (landing an Indian on the Moon). It provides critical technical data for the **Gaganyaan** mission and the development of the **Bharatiya Antariksha Station**, while enhancing NASA-ISRO tech transfers.

Critical Challenges of the Artemis Program

- **Technical Reliability & Safety:** Artemis I revealed significant **heat shield charring** and erosion issues. Ensuring the Orion capsule can protect a human crew from re-entry temperatures of **2,760°C** remains a primary engineering hurdle.
- **Cost Sustainability:** Each SLS launch costs approximately **\$2 billion**, leading to a "fiscal sustainability" debate. Unlike private reusable rockets (like SpaceX Starship), the SLS is expendable, making long-term mission frequency economically taxing.

- **Deep-Space Radiation:** Beyond Earth's **Van Allen belts**, astronauts face high-energy Galactic Cosmic Rays (GCRs) and Solar Particle Events (SPEs). Developing lightweight yet effective shielding for multi-week missions is a persistent biological challenge.
- **Lunar Dust (Regolith) Toxicity:** Lunar dust is sharp, abrasive, and statically charged. It can cause "**Lunar Hay Fever**" in humans and mechanically degrade spacesuits, seals, and scientific instruments over long durations.
- **Geopolitical Fragmentation:** The emergence of two competing blocs—the **Artemis Accords** (led by the US/India) and the **ILRS** (led by China/Russia)—risks a "Cold War 2.0" in space, potentially leading to territorial disputes over "safety zones" and resource-rich sites.
- **Landing Complexity (South Pole):** The Lunar South Pole features extreme topography with deep craters and **Permanently Shadowed Regions (PSRs)**. Landing in these areas requires unprecedented precision and the ability to operate in near-total darkness and cryogenic temperatures.

Way Forward for the Artemis Program

- **Transition to Reusability:** To ensure fiscal sustainability, NASA and its partners must transition from the expendable SLS model to **fully reusable heavy-lift vehicles** (like SpaceX's Starship). This will significantly lower the cost per kilogram of payload to the lunar surface.
- **Strengthening Space Diplomacy:** With the rise of competing blocs (Artemis vs. ILRS), a **universal legal framework** under the UN Office for Outer Space Affairs (UNOOSA) is needed. This would prevent "resource colonization" and ensure "Safety Zones" are used for science, not territorial claims.
- **Developing In-Situ Resource Utilization (ISRU):** The focus must shift from "carrying supplies" to "living off the land." Perfecting technologies to extract **Oxygen and Hydrogen from Lunar Regolith** is the only way to make the Moon a viable "pit-stop" for Mars.
- **Public-Private Partnership (PPP) Models:** Expanding the role of private players—not just for transport but for lunar communication (e.g., Nokia's 4G lunar network) and mining—will drive innovation and reduce the burden on national exchequers.
- **India's Strategic Autonomy:** India should leverage the **Artemis Accords** to fast-track its "Vision 2040." This involves securing a seat for an **ISRO astronaut** on a future lunar mission and seeking tech-transfers for heavy-lift rocketry and human-rated life support systems.
- **Planetary Defense and Science:** Utilizing the Moon's "Far Side" (radio-quiet zone) for deep-space telescopes can revolutionize our understanding of the early universe, turning the Moon into a global hub for **High-Energy Astrophysics**.

Conclusion

Artemis represents a paradigm shift from exploration to sustainable habitation. For India, it catalyzes **Vision 2040**, fostering global cooperation and a cislunar economy while securing strategic leadership in deep-space governance.

Q. Examine how the Artemis Program, particularly Artemis II, reflects emerging trends in global space geopolitics and international cooperation. 15 Marks

2.4. DISASTER MANAGEMENT

2.4.1. DISASTER MANAGEMENT IN INDIA

Introduction

India has transitioned from a **reactive** to a **proactive, mitigation-centric** disaster management model. Guided by the **DM Act 2005** and the **Sendai Framework**, it integrates technology and institutional decentralization to build a **climate-resilient** nation against increasing geophysical and hydrological hazards.



Institutional and Legal Framework

1. Statutory Foundation: The DM Act, 2005

- **Mandate:** Defines "disaster" and provides for the setup of specialized bodies at National, State, and District levels.
- **Shift:** Officially moved India from a **relief-centric** (Post-disaster) to a **pro-active mitigation** (Pre-disaster) approach.

2. Three-Tier Institutional Structure

Level	Authority	Chairperson	Key Responsibility
National	NDMA	Prime Minister	Formulating national policies, plans, and guidelines.
State	SDMA	Chief Minister	Coordinating state-level implementation and funding.
District	DDMA	District Magistrate/ Collector	Frontline execution; preparing the District Disaster Management Plan.

3. Executive & Operational Arms

- **NEC (National Executive Committee):** Chaired by the **Union Home Secretary**; assists NDMA in monitoring policy implementation.
- **NDRF (National Disaster Response Force):** A specialized multi-disciplinary force for **proactive deployment** during emergencies.
- **NIDM (National Institute of Disaster Management):** The nodal agency for **capacity building**, research, and human resource development.

4. Financial Framework (16th Finance Commission Updates)

- **Risk Financing:** Creation of the **NDRM (National Disaster Risk Management Fund)**, split into:
 - **Response Fund (NDRF/SDRF):** For immediate relief.
 - **Mitigation Fund (NDMF/SDMF):** For long-term risk reduction (e.g., building embankments).
- **16th FC Shift:** Funding is now increasingly linked to a **Disaster Risk Index (DRI)** rather than just historical expenditure.

5. Nodal Ministries for Specific Hazards

- **Natural Disasters:** Ministry of Home Affairs (MHA).
- **Drought:** Ministry of Agriculture.
- **Chemical/Industrial:** Ministry of Environment (MoEFCC).
- **Biological:** Ministry of Health (MoHFW).
- **Rail Accidents:** Ministry of Railways.

The 16th Finance Commission (2026-31) & Risk Financing

1. The Shift to Risk-Based Allocation

- **Disaster Risk Index (DRI):** For the first time, funds are allocated based on a state-specific risk profile rather than just past spending.
- **The Formula:** Allocation now accounts for **Hazard** (frequency/intensity), **Exposure** (population/assets in danger), and **Vulnerability** (socio-economic capacity).
- **Objective:** To ensure that states with high climate vulnerability (e.g., Odisha, Himachal Pradesh) receive proportionate support compared to larger, less-exposed states.

2. Structure of the Disaster Management Fund

Following the 15th FC's precedent, the 16 FC maintains the division of the **National Disaster Risk Management Fund (NDRMF)** and **State Disaster Risk Management Fund (SDRMF)** into two functional components:

1. **Response Fund (80%):**
 - **Response & Relief (70%):** For immediate post-disaster assistance.
 - **Recovery & Reconstruction (30%):** For building back after the event.
2. **Mitigation Fund (20%):** Reserved strictly for **pre-disaster** structural and non-structural measures (e.g., sea walls, early warning systems).

Major Disaster Profiles & Mitigation Strategies

A. Hydrological: Floods & Urban Flooding

- **Vulnerability:** 12% of India's landmass is flood-prone.
- **2026 Context:** Recent cloudbursts in Kolkata and flash floods in Uttarakhand (August 2025) highlight the increasing frequency of "Compound Disasters."
- **Mitigation:**
 - **Sponge City Concept:** Increasing permeable surfaces to absorb rainwater.
 - **Bhuvan Portal:** Using ISRO's satellite data for real-time inundation mapping.

B. Geophysical: Earthquakes & Landslides

- **Vulnerability:** 59% of land is prone to earthquakes (Zone V - Himalayan Belt).
- **Mitigation:**
 - **Seismic Micro-zonation:** Detailed mapping of urban areas (e.g., Delhi, Guwahati).
 - **Koti Banal Architecture:** Reviving indigenous earthquake-resistant building techniques in the Himalayas.

C. Climatological: Heatwaves & Lightning

- **The Challenge:** Lightning is now the leading cause of natural hazard fatalities in India (36% of deaths).
- **Mitigation:**
 - **Sachet Portal / CAP:** A Common Alert Protocol for geo-targeted SMS alerts.
 - **Heat Action Plans (HAPs):** Implementing "Cool Roof" policies and "Green Corridors" to tackle Urban Heat Islands.

Global Frameworks: Sendai to CDRI

1. Sendai Framework for DRR (2015–2030)

The cornerstone of global disaster policy, Sendai shifted the focus from **managing disasters** to **managing disaster risk**.

- **The 4 Priorities:**
 - Understanding disaster risk.
 - Strengthening disaster risk governance.
 - Investing in resilience (structural and non-structural).
 - Enhancing preparedness for effective response and **"Build Back Better"** in recovery.
- **The 7 Global Targets:** Aims for substantial reductions in global mortality, number of affected people, economic losses, and damage to critical infrastructure by 2030.

2. Sustainable Development Goals (SDG) Integration

Disaster resilience is embedded in the 2030 Agenda:

- **SDG 1 & 11:** Protecting the poor from climate-related extremes and making cities resilient.
- **SDG 13:** Urgent action to combat climate change and its impacts.

3. Paris Agreement (COP21)

Recognizes "Loss and Damage" associated with climate change. India's **National Action Plan on Climate Change (NAPCC)** aligns disaster mitigation with global carbon reduction and adaptation goals.

4. CDRI (Coalition for Disaster Resilient Infrastructure)

Launched by India at the UN Climate Action Summit (2019), this is a global partnership of governments and UN agencies.

- **Focus:** Ensuring that essential infrastructure (Power, Telecom, Transport, Health) can withstand climate shocks.
- **Flagship Initiative: IRIS (Infrastructure for Resilient Island States)**, focusing on the specific vulnerabilities of Small Island Developing States (SIDS).

Challenges in the Disaster Management in India

1. Institutional & Coordination Gaps

- **The "Last Mile" Deficit:** While the **NDMA** and **SDMAs** are well-funded, the **DDMAs** (District level) often lack dedicated staff and technical expertise to execute complex plans.

- **Data Silos:** Lack of real-time data sharing between central agencies (IMD, CWC, ISRO) and local first responders leads to delayed "Actionable Intelligence."

2. Financial Challenges (Post-16th FC)

- **Funding Paradox:** The **16th Finance Commission's** shift to a "total population" metric for risk exposure penalizes states like Odisha that have managed population growth but face high climate frequency.
- **Underutilization of Mitigation Funds:** States often prioritize **Response/Relief** over the **20% Mitigation Fund**, treating disaster management as an emergency expense rather than a long-term investment.

3. Emerging Climate Hazards

- **The "Silent Killers": Heatwaves and Lightning** now cause more annual deaths than cyclones, yet national classification and compensation mechanisms remain inconsistent.
- **Urban Flooding:** Rapid, unplanned urbanization and the destruction of "Sponge" ecosystems (wetlands) have turned cities like Bangalore and Chennai into high-risk zones.

4. Infrastructure & Technical Gaps

- **Standardization:** Lack of uniform **Building Bye-laws** and strict enforcement of **BIS Seismic Codes** makes urban infrastructure highly vulnerable to earthquakes.
- **Maintenance:** Ageing dams and embankments (e.g., Mullaperiyar concerns) pose a significant risk of **Dam Break Floods**.

5. Socio-Economic Constraints

- **Vulnerability of the Poor:** Disasters disproportionately impact marginalized communities living in "high-risk" zones (slums, floodplains) who lack the insurance or resources to "Build Back Better."
- **Erosion of Indigenous Knowledge:** Reliance on concrete-heavy engineering often ignores traditional, eco-sensitive resilience practices (e.g., Himalayan traditional architecture).

Way Forward

1. Mainstreaming DRR in Development

Mandate **Disaster Risk Audits** for all infrastructure (Highways, Smart Cities). Shift the focus from "Development at any cost" to "**Resilient Infrastructure**" (CDRI standards), ensuring schools, hospitals, and grids survive extreme climate shocks.

2. Strengthening Local Governance & Community Leadership

Empower **DDMAs** with technical expertise and financial autonomy. Scalable community initiatives like "**Aapda Mitra**" utilize local knowledge to manage the critical "**Golden Hour**" before professional help arrives.

3. Leveraging "Impact-Based" Early Warning Systems (EWS)

Transition from "Weather alerts" to "**Actionable Intelligence**" (e.g., Sachet Portal). Use AI, ML, and ISRO data to provide hyper-local, geo-targeted warnings that tell vulnerable populations exactly what to do, not just what is coming.

4. Nature-Based Solutions (NbS) & Blue-Green Infrastructure

Adopt "**Sponge City**" concepts by restoring wetlands and mangroves. Prioritize **Nature-Based Solutions** (bio-shields) over "Grey Infrastructure" (concrete walls) to provide cost-effective, sustainable protection against floods and cyclones.

5. Closing the Risk Financing Gap

Expand **Disaster Risk Insurance** for public and private assets to lower the fiscal burden on the state. Strictly utilize the **16th Finance Commission's Mitigation Fund (SDMF)** to break the cycle of "Disaster-Response-Repeat."

Conclusion

India's transition to a **risk-informed, technology-driven** disaster management model, supported by the **16th Finance Commission**, is vital for **sustainable development**. Success lies in bridging the "last-mile" gap through **community resilience**.

Scan to know more about our courses...



IAS 2-Year GS PCM



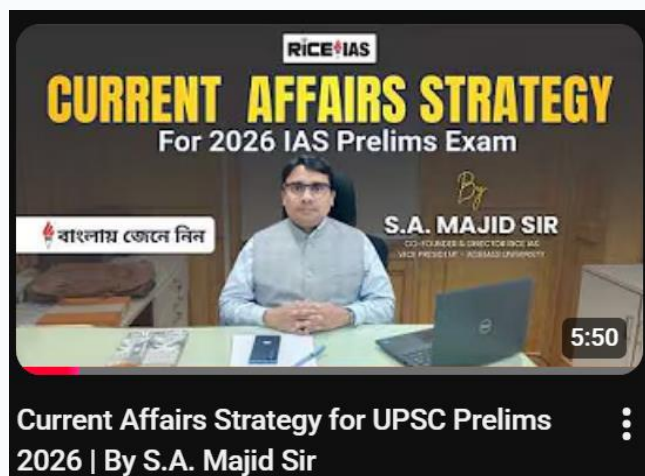
IAS 10-Month GS PCM



Degree + IAS



Prelims Test Series



[Click here to watch this video](#)