RUNGTA IAS
FOR THE IAS EDGE

RUNGTA INTERNATIONAL SKILLS UNIVERSITY

Current Affairs

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INDEX

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POLITY & GOVERNANCE

1.1. RIGHTS OF PERSONS WITH DISABILITIES (RPWD) ACT, 2016

Context:

Recently, on March 9, 2026, the Supreme Court of India observed that if the Bharatiya Nyaya Sanhita (BNS) distinguishes between "throwing" and "administering" acid, the Rights of Persons with Disabilities (RPwD) Act, 2016 must also be updated to reflect this distinction. A Bench led by Chief Justice Surya Kant emphasized that the law must foresee and cover all forms of offences—including forced ingestion of corrosive substances—to ensure survivors are not excluded from the protective umbrella of disability welfare schemes and medical benefits.

Salient Features of the RPwD Act, 2016

1. **Legislative Background**
   - The Act was enacted to give effect to the **United Nations Convention on the Rights of Persons with Disabilities (UNCRPD)**, which India ratified in 2007.
   - It replaced the erstwhile **Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995**.
2. **Expanded Definition of Disability**
   - The Act increased the number of recognized disability categories from **7 to 21**.
   - **Specified Disabilities include:** Blindness, Low-vision, Leprosy Cured persons, Hearing Impairment, Locomotor Disability, Dwarfism, Intellectual Disability, Mental Illness, Autism Spectrum Disorder, Cerebral Palsy, Muscular Dystrophy, Chronic Neurological conditions, Specific Learning Disabilities, Multiple Sclerosis, Speech and Language disability, Thalassemia, Haemophilia, Sickle Cell disease, Multiple Disabilities, Acid Attack victims, and Parkinson's disease.
   - The Central Government retains the power to add more types of disabilities to this list.
3. **Rights and Entitlements**
   - **Benchmark Disabilities:** Defined as persons with at least **40%** of a specified disability.
   - **Education:** Every child with a benchmark disability between **6 and 18 years** has the right to free education in a neighborhood school or special school of their choice.
   - **Employment Reservation:** The Act mandates a reservation of not less than **4%** in government establishments for persons with benchmark disabilities (an increase from 3% in the 1995 Act).
   - **Higher Education:** A minimum of **5%** reservation is provided in government and government-aided higher educational institutions.
4. **Accessibility Mandates**
   - The Act imposes a legal obligation on the "appropriate government" to ensure that all public buildings are made accessible within a prescribed timeframe.
   - It covers accessibility in the physical environment, transportation, and Information and Communication Technology (ICT) ecosystems.

5. **Institutional Framework**

- **Chief Commissioner and State Commissioners:** These offices act as regulatory bodies and grievance redressal agencies to monitor the implementation of the Act.
- **National and State Advisory Boards:** These serve as high-level policy-making bodies on disability matters.
- **District Level Committees:** Tasked with addressing local grievances and ensuring the delivery of services at the grassroots level.
- **Special Courts:** Designated in each district to ensure speedy trials for offenses committed against persons with disabilities.

1.2. VB-G RAM G ACT, 2025

Context:

The Union Rural Development Ministry is currently in the process of framing rules and "objective parameters" for the implementation of the **Viksit Bharat – Guarantee for Rozgar and Ajeevika Mission (Gramin)** or **VB-G RAM G Act, 2025**. This new legislation seeks to replace the Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MGNREGA).

1. **The VB-G RAM G Act, 2025: Key Provisions**

- **Employment Guarantee:** Increases guaranteed employment from **100 to 125 days** per rural household annually. Unemployment allowance after **15 days without work** remains.
- **Fund Sharing:** Scheme to function as a **Centrally Sponsored Scheme**.
  - **60:40** Centre–State ratio (general states)
  - **90:10** (North-Eastern & Himalayan states) States will continue paying **unemployment allowance and delay compensation**.
- **Excess Expenditure:** Centre will set **state-wise normative allocations**. Any expenditure beyond this will be **borne by the State government**.
- **Pause During Agricultural Season:** States may declare up to **60 days annually** when MGNREGA works are paused during **peak sowing/harvesting periods**.
- **Planning Framework: Gram Panchayats** prepare work plans focusing on
  1. Water security
  2. Rural infrastructure
  3. Livelihood infrastructure
  4. Climate/extreme weather mitigation

2. **Plans integrated with PM Gati Shakti National Master Plan.**

- **Implementation & Monitoring:** Creation of **National and State Steering Committees** for oversight, planning, and coordination.

- **Use of Technology:** Biometric authentication, **geospatial planning**, **mobile dashboards**, and **weekly public disclosure systems** for transparency.

3. **Implementing and Monitoring Authorities**

- The Act establishes a clear institutional framework to ensure coordinated, accountable, and transparent implementation of the Mission across national, State, district, block, and village levels.
- **Central and State Gramin Rozgar Guarantee Councils** provide policy guidance, review implementation, and strengthen accountability.
- **Panchayati Raj Institutions** lead planning and execution, with Gram Panchayats implementing at least half of the works in terms of cost.
- **District Programme Coordinators and Programme Officers** manage planning, compliance, payments, and social audits.
- **Gram Sabhas** play a strengthened role in conducting social audits and ensuring transparency through access to all records.

1.3. JAL JEEVAN MISSION (JJM)

Context:

Recently, the Union Cabinet approved a significant extension of the **Jal Jeevan Mission (JJM)** up to **December 2028**, accompanied by an additional financial boost of **₹1.51 trillion** to accelerate rural tap water coverage. This decision marks the transition into **JJM 2.0**, which focuses on structural reforms, digital monitoring, and addressing regional implementation gaps. Simultaneously, the government launched the **Jal Mahotsav 2026** (March 8–22) to mark the formal handover of water assets to Gram Panchayats and reinforce community ownership.

1. **Core Features of Jal Jeevan Mission (JJM)**

- **Launch and Objective:** Launched on August 15, 2019, the mission originally aimed to provide **Functional Household Tap Connections (FHTC)** to all rural households by 2024, ensuring a supply of **55 litres per capita per day (lpcd)** of potable water.
- **Nodal Ministry:** It is implemented by the **Department of Drinking Water and Sanitation** under the **Ministry of Jal Shakti**.
- **Nature of Scheme:** It is a **Centrally Sponsored Scheme** that follows a community-managed and decentralized approach.
- **Funding Pattern:**
  - **100%** for Union Territories without legislature.
  - **90:10** for North-Eastern and Himalayan States (e.g., Himachal Pradesh, Uttarakhand).
  - **50:50** for all other States.
- **Targeted Priorities:** The mission prioritizes water quality-affected habitations (arsenic / fluoride), Sansad Adarsh Gram Yojana (SAGY) villages, and Aspirational Districts.

2. **Recent Developments: JJM 2.0 and Extension**

- **Revised Timeline:** The mission has been extended to **December 2028** to ensure 100% saturation in difficult terrains.

- **JJM 2.0 Reforms:** The updated phase emphasizes **service delivery** over mere infrastructure creation, linking fund releases to actual water delivery and digital verification via the **Sujal Gaon ID module**.
- **Sustainability Measures:** Mandatory elements now include **Greywater Management** (reusing used water), rainwater harvesting, and groundwater recharge in convergence with MGNREGS.
- **Digital Monitoring:** Assets are geo-tagged, and the mission uses a real-time **IoT-enabled dashboard** for tracking water quality and quantity.

3. Implementation Status (As of March 2026)

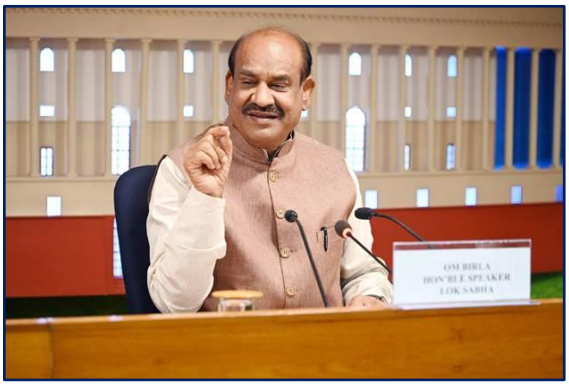
- **National Coverage:** India has crossed **81% rural tap water coverage**, increasing from just 16.7% (3.23 crore households) in 2019 to over **15.82 crore households** in March 2026.
- **100% Certified States/UTs:** Goa, Arunachal Pradesh, Haryana, Punjab, Himachal Pradesh, Mizoram, Gujarat, Telangana, and UTs like Puducherry and A&N Islands have reported full coverage.
- **Community Ownership:** Over **1.8 lakh villages** are now "Har Ghar Jal" certified, meaning every household and public institution (Schools/Anganwadis) has a functional tap.

4. Significant Impacts

- **Health:** According to the **World Health Organization (WHO)**, the mission has the potential to prevent **4 lakh diarrheal deaths** and save **14 million Disability Adjusted Life Years (DALYs)**.
- **Gender Empowerment: SBI Research** reports that the mission has freed roughly **9 crore women** from the daily drudgery of fetching water, translating to a saving of **5.5 crore hours daily**.
- **Child Health:** Research by Nobel Laureate **Michael Kremer** indicates that safe water access through JJM can reduce under-5 child mortality by nearly **30%**.

1.4. SPEAKER OF THE LOK SABHA

Context:



Recently, the Lok Sabha witnessed a high-stakes debate as the Opposition moved a resolution for the removal of Speaker **Om Birla** under **Article 94(c)** of the Constitution, alleging partisan conduct and procedural irregularities during the Budget Session. This development marks only the fourth time in independent India's history that such a motion has reached the floor of the House. Simultaneously, the Supreme Court has recently tightened its stance on the Speaker's role as a tribunal, warning that "indecision" in disqualification cases cannot be used as a shield to bypass the Anti-Defection Law.

1. Constitutional Provisions and Election

- **Constitutional Basis: Article 93** mandates the Lok Sabha to choose two members of the House to be Speaker and Deputy Speaker as soon as may be.

- **Election:** The Speaker is elected by a **simple majority** of the members present and voting. The date of the election is fixed by the **President**.
- **Tenure:** The Speaker holds office from the date of election until immediately before the first meeting of the next Lok Sabha. They do not vacate office upon the dissolution of the House (**Article 94**).
- **Resignation:** The Speaker submits their resignation in writing to the **Deputy Speaker** (and vice-versa).

2. Powers and Functions of the Speaker

- **Final Interpreter:** The Speaker is the final interpreter of the provisions of the Constitution of India, the Rules of Procedure and Conduct of Business of Lok Sabha, and parliamentary precedents within the House.
- **Money Bills:** Under **Article 110(3)**, the Speaker's decision on whether a bill is a Money Bill is final and cannot be questioned in any court, although the Supreme Court (Aadhaar Case) clarified that "colorable" exercises of this power are subject to judicial review.
- **Joint Sitting:** The Speaker presides over a joint sitting of both Houses of Parliament (**Article 108**).
- **Casting Vote:** The Speaker does not vote in the first instance but exercises a **casting vote** in case of a tie to resolve a deadlock (**Article 100**).

3. Administrative and Supervisory Powers

- **Head of Secretariat:** The Speaker is the ultimate head of the **Lok Sabha Secretariat** and exercises total control over the Parliament Estate, including security and infrastructure.
- **Committee Appointments:** The Speaker appoints the Chairpersons of all **Parliamentary Committees** of the Lok Sabha and supervises their functioning.
- **Ex-Officio Chairman:** The Speaker personally chairs three critical committees:
  - **Business Advisory Committee (BAC):** Regulates the House timetable and agenda.
  - **Rules Committee:** Considers matters of procedure and conduct of business.
  - **General Purposes Committee:** Deals with matters not falling under other committees.

4. Quasi-Judicial Role: The Tenth Schedule (Anti-Defection Law)

- **Adjudicating Authority:** The Speaker decides on the disqualification of members on grounds of defection.
- **Kihoto Hollohan Case (1992):** The Supreme Court ruled that while acting under the Tenth Schedule, the Speaker functions as a **Tribunal**. Therefore, their decisions are subject to **judicial review** on grounds of mala fides, perversity, or violation of constitutional mandate.
- **Keisham Meghachandra Singh Case (2020):** The Supreme Court recommended that Speakers should decide disqualification petitions within a **reasonable period**, suggesting a limit of **three months**.
- **Current Status:** In recent rulings (2025-26), the Court has emphasized that the Speaker cannot sit on petitions indefinitely, as this defeats the very purpose of the Anti-Defection Law.

5. Procedure for Removal

- **Article 94(c):** The Speaker can be removed by a resolution passed by a **majority of all the then members** of the Lok Sabha (known as an **Effective Majority**).
- **Notice Period:** At least **14 days' notice** must be given before moving such a resolution.
- **Admissibility:** At least **50 members** must support the leave to move the motion in the House.

- **Special Condition (Article 96):** When a resolution for removal is under consideration, the Speaker **cannot preside** over the sitting. However, they have the right to speak, participate in proceedings, and **vote in the first instance**, but they cannot vote in the case of a tie.

1.5. THE RIGHT TO DIE WITH DIGNITY

Context:

Recently, the Supreme Court of India delivered a historic judgment on March 11, 2026, permitting the withdrawal of life support for a 32-year-old man who had been in a **Persistent Vegetative State (PVS)** for nearly 13 years. In this ruling, the Court emphasized that the state's interest in preserving life must become **subservient to an individual's dignity** when medical interventions become futile and invasive.

Significantly, the Bench directed that the term "passive euthanasia" should be replaced with "**Withdrawing or Withholding of Medical Treatment**" to reflect a more compassionate and medically accurate approach. This marks the first time since the 2018 *Common Cause* judgment that the apex court has directly authorized the cessation of clinically assisted nutrition and hydration (CANH) in such a specific case.

1. Evolution of the Right to Die in India

The legal journey has shifted from total prohibition to a nuanced recognition of dignity:

- **P. Rathinam v. Union of India (1994):** The SC initially held that the "Right to Life" under Article 21 includes the "Right to Die," effectively striking down Section 309 of the IPC (Attempt to Suicide).
- **Gian Kaur v. State of Punjab (1996):** A Constitution Bench **overruled** Rathinam, stating that Article 21 is a "Right to Life" and does not include the "Right to Die." However, it hinted that a **dignified death** is part of a dignified life.
- **Aruna Shanbaug v. Union of India (2011):** The SC permitted **Passive Euthanasia** under strict judicial monitoring for the first time, distinguishing it from Active Euthanasia.
- **Common Cause v. Union of India (2018):** A 5-judge bench declared the **Right to Die with Dignity** as a Fundamental Right under Article 21. It legalized **Living Wills**.

2. Active vs. Passive Euthanasia

Feature	Active Euthanasia	Passive Euthanasia (Withdrawal of Treatment)
Action	A positive act to end life (e.g., lethal injection).	Withholding or withdrawing life-support.
Legal Status	**Illegal** in India (treated as murder/culpable homicide).	**Legal** in India under specific SC guidelines.
Outcome	Intentional termination of life.	Allowing the **natural course** of death to occur.

3. Advance Medical Directives (Living Wills)

A "Living Will" is a document where a person specifies in advance that they should not be kept on artificial life support if they reach a terminal or irreversible medical state.

- **Execution:** Can be signed in the presence of two witnesses and attested by a **Notary or Gazetted Officer** (simplified in 2023 from the earlier requirement of a Judicial Magistrate).
- **Revocation:** An individual has the right to withdraw or change the directive at any time while they are competent.
- **National Health Digital Record:** In 2023, the SC directed that these documents be integrated into digital health records for easy access by hospitals.

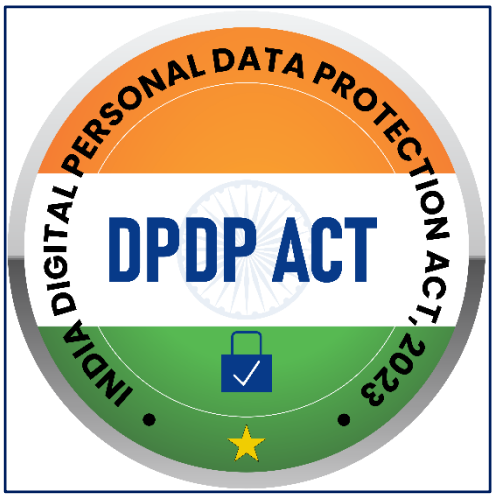
4. Procedural Safeguards

The procedure involves two tiers of medical experts to prevent misuse:

- **Primary Medical Board:** Consists of three doctors (including the treating physician and two specialists with 5 years of experience). They must give an opinion within **48 hours**.
- **Secondary Medical Board:** Consists of three experts (one nominated by the District Medical Officer). They also have a **48-hour** window to confirm the primary board's finding.
- **Communication:** The hospital must intimate the **Judicial Magistrate of First Class (JMFC)** about the decision before implementation.

1.6. DIGITAL PERSONAL DATA PROTECTION (DPDP) ACT

Context:



Recently, the Supreme Court of India issued a formal notice to the Union Government in response to a petition challenging the constitutional validity of certain provisions of the **Digital Personal Data Protection (DPDP) Act, 2023** and the **DPDP Rules, 2025**.

The court is specifically examining whether the Act's broad exemptions for state agencies and the amendment to Section 8(1)(j) of the **Right to Information (RTI) Act** create a "compensation vacuum" for citizens and unconstitutionally restrict the public's right to know.

1. Applicability and Scope

- **Digital Focus:** The Act applies to the processing of personal data that is collected in **digital form** or collected offline and later **digitized**.
- **Territorial Jurisdiction:** It applies to data processing within India. It also has **extraterritorial jurisdiction** if the processing is in connection with offering goods or services to Data Principals in India.
- **Exclusions:** It does not apply to personal data processed by an individual for **personal or domestic purposes** or data made publicly available by the Data Principal themselves.

2. Key Definitions

- **Data Principal:** The individual to whom the personal data relates. For children (under 18) or persons with disabilities, this includes their parents or lawful guardians.
- **Data Fiduciary:** The entity (individual, company, or State) that determines the **purpose and means** of data processing.
- **Data Processor:** Any entity that processes data on behalf of a Data Fiduciary.
- **Consent Manager:** A registered entity that provides a single, interoperable platform for individuals to manage, review, and withdraw their consent.

3. **Seven Core Principles of DPDP Act**

The Act is built on a "SARAL" (Simple, Accessible, Rational & Actionable Law) framework based on:

- **Consented & Lawful Use:** Data must be processed with explicit consent for lawful purposes.
- **Purpose Limitation:** Use of data is restricted only to the purpose specified at the time of consent.
- **Data Minimization:** Only the minimum necessary data should be collected.
- **Accuracy:** Ensuring data is correct and updated.
- **Storage Limitation:** Data should be deleted once the purpose is fulfilled.
- **Security Safeguards:** Reasonable measures to prevent data breaches.
- **Accountability:** Fiduciaries are responsible for compliance.

4. **Significant Data Fiduciaries (SDF)**

The Central Government can notify certain fiduciaries as **SDFs** based on factors like the volume of data processed and risk to national sovereignty. SDFs have additional obligations:

- Appointing a **Data Protection Officer (DPO)** based in India.
- Appointing an **independent data auditor**.
- Conducting **Data Protection Impact Assessments (DPIA)**.

5. **Rights and Duties of Data Principals**

- **Rights:** Right to access information, right to correction/erasure, right to grievance redressal, and the **Right to Nominate** (to exercise rights in case of death or incapacity).
- **Duties:** Data Principals must not furnish false information, suppress material facts, or file frivolous complaints. Violation of duties can lead to a penalty of up to **Rs 10,000**.

6. **The Data Protection Board of India (DPBI)**

- **Nature:** A quasi-judicial, digital-first body established to adjudicate breaches and complaints.
- **Powers:** It can summon witnesses, inspect documents, and impose financial penalties.
- **Appeals:** Decisions of the DPBI can be appealed before the **Telecom Disputes Settlement and Appellate Tribunal (TDSAT)**.

7. **Penalties and Exemptions**

- **Penalties:** Can range up to **Rs 250 crore** for failing to prevent a data breach. There is **no provision for criminal jail terms**; penalties are purely financial.
- **State Exemptions:** The Government can exempt its instrumentalities from the Act in the interest of **sovereignty, security of the state, or public order**.
- **RTI Amendment:** The Act amends Section 8(1)(j) of the RTI Act to prohibit the disclosure of all "personal information," removing the previous "public interest" exception.

1.7. FOREIGN CONTRIBUTION(REGULATION) ACT

Context:

The Union Government is likely to introduce the **Foreign Contribution (Regulation) Amendment Bill, 2026**, during the ongoing session of Parliament to streamline the management of foreign funds and assets created by NGOs.

1. **Key Proposed Legislative Changes**
   - **Designated Authority**: A new provision allows for the appointment of a "designated authority" to take over, manage, or dispose of assets created out of foreign funds by an NGO whose registration has been suspended, cancelled, or not renewed.
   - **Expansion of "Key Functionary"**: The definition of a "key functionary" of an NGO is being expanded beyond directors and office bearers to include partners, trustees, and the **Karta** of a Hindu Undivided Family.
   - **Reduction in Penalties**: The Bill proposes to reduce the maximum imprisonment for FCRA-related offences from **five years to one year**.
   - **Liability**: Key functionaries will now be held directly liable for offences committed under the Act.
   - **Investigation Approval**: Law enforcement agencies or State governments must seek **prior approval** from the Central Government before initiating investigations into FCRA-related complaints (Amendment to Section 43).
   - **Fund Utilization Timelines**: The Bill proposes fixed timelines for the utilization of foreign funds received under the "prior permission" category.
2. **Understanding FCRA**
   - The FCRA, enacted in 1976 during the Emergency, governs the acceptance and utilization of foreign contributions by individuals, associations, and organizations in India.
   - **Objective:** Safeguarding sovereignty and democracy; Ensures that foreign funds are not used to affect electoral politics, public opinion, or policymaking in ways that undermine **national interest.**
   - **Governing Institution: The Union Ministry of Home Affairs (MHA**) is the nodal ministry responsible for the registration, monitoring, and enforcement of the FCRA**.**
   - **FCRA, 2010 act:** It has been enacted by the Parliament **to consolidate the law to regulate the acceptance and utilization of foreign contribution** or foreign hospitality by certain individuals or associations or companies and to prohibit acceptance and utilization of foreign contribution or foreign hospitality for any activities detrimental to national interest and for matters connected therewith or incidental thereto.
   - **In terms of FCRA, 2010 "person" includes –**
     - an individual;
     - a Hindu undivided family;
     - an association;
     - a company registered under section 25 of the Companies Act,1956 (now Section 8 of Companies Act, 2013).
   - **Prohibitions: Certain entities are strictly prohibited from receiving foreign contributions, including:**
     - Candidates for election.
     - Members of any Legislature (MP/MLA).
     - Political parties or their office-bearers.
     - Judges and government servants.
     - Publishers/Editors of registered newspapers.
   - **Key Amendments (2020):**
     - **Aadhaar Requirement**: Made Aadhaar mandatory for all office-bearers of NGOs.

- **FCRA Account**: Required all foreign contributions to be received only in a designated "FCRA Account" opened in the **State Bank of India, New Delhi Main Branch**.
- **Administrative Expenses**: Capped the use of foreign funds for administrative purposes at **20%** (reduced from the earlier 50%).
- **Prohibition on Transfer**: Prohibited the transfer of foreign contributions to any other person or organization.

- **2022 Amendments:**
  - **Higher threshold for reporting foreign funds (from relatives):** Limit increased from ₹1 lakh → ₹10 lakh.
  - **Extended reporting time (foreign contribution from relatives):** Time increased from 30 days → 3 months.

1.8. BHARAT RATNA & PADMA AWARDS

Context:

In light of contemporary political discourse, there have been renewed public demands for the Bharat Ratna to be conferred upon prominent historical figures like Kanshi Ram. Furthermore, the 2026 award cycle has highlighted a significant shift towards recognizing "Unsung Heroes" and grassroots innovators, ensuring that India's highest civilian honors reflect diverse contributions from various strata of society.

Bharat Ratna: The Highest Civilian Honor

The Bharat Ratna is awarded in recognition of exceptional service or performance of the highest order in any field of human endeavor.

1. **Key Features and Evolution**

- **Inception:** Instituted in 1954, it was initially restricted to Art, Literature, Science, and Public Service, but the criteria were expanded in 2011 to include "any field of human endeavor."
- **Recommendations:** Unlike the Padma Awards, recommendations for the Bharat Ratna are made by the **Prime Minister** directly to the **President of India**. No formal committee is involved.
- **Cap on Awards:** The number of Bharat Ratna awards is generally restricted to a maximum of **three** in any particular year.
- **Benefits:** The award includes a *Sanad* (certificate) signed by the President and a medallion. It does not carry any monetary grant, but recipients receive several perquisites like "State Guest" status and a place in the Table of Precedence (7A).

2. **Constitutional Status**

- In the **Balaji Raghavan v. Union of India (1996)** case, the Supreme Court upheld the constitutional validity of these awards.
- The Court ruled that they are **"National Honours"** and not "titles" within the meaning of **Article 18(1)**.

- **Mandatory Restriction:** Recipients cannot use the award as a prefix or suffix to their names. Violation of this rule can lead to the forfeiture of the award.

The Padma Awards

The Padma Awards are the second, third, and fourth highest civilian honors in the country, announced annually on the eve of Republic Day.

1. **Hierarchy and Criteria**
   - **Padma Vibhushan:** For exceptional and distinguished service.
   - **Padma Bhushan:** For distinguished service of high order.
   - **Padma Shri:** For distinguished service in any field.
2. **Selection Process**
   - **Padma Awards Committee:** Formed every year by the Prime Minister, headed by the **Cabinet Secretary**.
   - **Nominations:** The process is open to the public, including **self-nomination**.
   - **Eligibility:** All persons without distinction of race, occupation, position, or sex are eligible. However, **Government servants** (including those in PSUs), except doctors and scientists, are **not eligible** for these awards while in service.
3. **Highlights of 2026 Awards**
   - **Total Count:** A total of 131 awards were approved (5 Padma Vibhushan, 13 Padma Bhushan, 113 Padma Shri).
   - **Diversity:** The 2026 list includes 19 women, 6 foreigners/NRIs, and 16 posthumous awardees.
   - **Prominent Names:**
     - **Padma Vibhushan:** Dharmendra Singh Deol (Art), V.S. Achuthanandhan (Posthumous - Public Affairs).
     - **Padma Bhushan:** Alka Yagnik (Art), Mammootty (Art), Uday Kotak (Trade & Industry).
     - **Padma Shri:** Rohit Sharma (Sports), Harmanpreet Kaur (Sports), and several "Unsung Heroes" like Anke Gowda (Social Work).

1.9. GUILLOTINE IN PARLIAMENTARY PROCEDURE

Context:

Lok Sabha Speaker is expected to apply the **guillotine** to fast-track the passage of the outstanding Demands for Grants for the Union Budget 2026-27. This procedural move follows a period of frequent disruptions in the House, which limited the time available for detailed discussions on various ministerial expenditures. By invoking this measure, the remaining budgetary demands will be put to a vote simultaneously to ensure the Finance Bill is passed within the constitutional deadline.

1. **What is the Guillotine?**

   In legislative parlance, to "guillotine" means to bunch together and fast-track the passage of financial business or clauses of a bill. It is a procedural tool used primarily in the **Lok Sabha** during the Budget Session to ensure that the government meets its financial deadlines.

2. The Budgetary Process and Guillotine

The application of the guillotine is the final stage of the discussion on the **Demands for Grants**:

- **Presentation & Recess:** After the Budget is presented, the House goes into a recess for about three weeks. During this time, **Departmentally Related Standing Committees (DRSCs)** examine the Demands for Grants of various ministries.
- **Discussion:** When the House reassembles, the **Business Advisory Committee (BAC)** schedules discussions for specific ministries (usually high-stakes ones like Defence, Home, and External Affairs).
- **The Deadline:** On the last day allotted for the discussion on Demands for Grants, the Speaker puts all the remaining undiscussed demands to vote, whether they have been debated or not. This specific act is called "applying the guillotine."

3. Classification as a Closure Motion

The guillotine is one of the four types of **Closure Motions** used to cut short the debate on a matter before the House:

- **Simple Closure:** A member moves that the matter has been sufficiently discussed and should be put to vote.
- **Closure by Compartments:** Clauses of a bill are grouped into parts; the debate occurs on the whole part, and the entire group is put to vote.
- **Kangaroo Closure:** Only important clauses are taken up for debate, and the intervening clauses are skipped and taken as passed.
- **Guillotine Closure:** Undiscussed clauses of a bill or resolution are put to vote along with the discussed ones due to a lack of time.

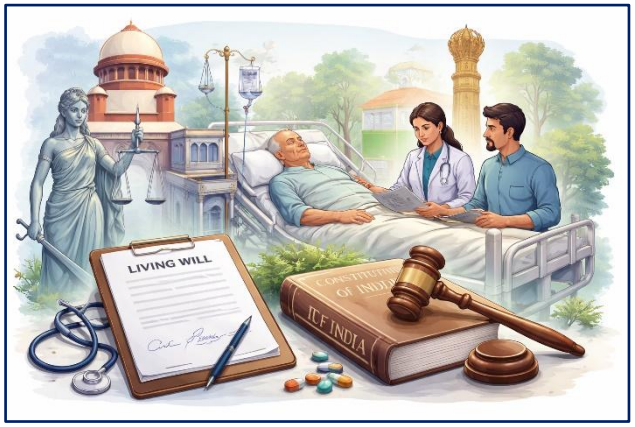
4. Constitutional and Functional Necessity

- **Article 113:** Mandates that any expenditure from the Consolidated Fund of India (other than charged expenditure) must be submitted to the Lok Sabha in the form of Demands for Grants.
- **Financial Year Deadlines:** The government must have the Appropriation Bill and Finance Bill passed before the new financial year begins on April 1st to ensure it has the legal authority to spend money.

1.10. RIGHT TO DIE AND EUTHANASIA

Context:

In a landmark development, the Supreme Court in **Harish Rana v. Union of India** permitted the first-ever practical application of its passive euthanasia guidelines.



About Euthanasia

Derived from Greek words Eu (Good) and Thanatos (Death), it literally means "Good Death" or "Mercy Killing." It refers to the practice of intentionally ending a life to relieve pain and suffering.

Classification based on Consent:

- **Voluntary:** With the patient's explicit consent.
- **Non-voluntary:** Patient is unable to consent (e.g., coma), and the decision is made by family/guardians.
- **Involuntary:** Against the patient's will (Equivalent to murder; globally illegal).

Active vs. Passive Euthanasia

Feature	Active Euthanasia	Passive Euthanasia
Definition	Deliberate action to cause death	Withdrawal or withholding of life support
Nature	Direct intervention	Allowing natural death
Legal status in India	Illegal	Permitted (Under strict SC guidelines).
Example	Injecting lethal drug	Removing ventilator or feeding tube
SC 2026 Clarification	The term "Euthanasia" should now strictly refer to **Active Euthanasia**	Now officially termed **"Withdrawing or Withholding of Medical Treatment"**

Legal and Constitutional Provisions on Euthanasia

- **Article 21:** The "Right to Life" is a fundamental right. The SC has interpreted this to mean a **"Right to a Dignified Life,"** which inherently includes a **"Right to a Dignified Death."**
- **Article 226:** High Courts have the power to issue writs; often the first point of appeal for families seeking euthanasia for incompetent patients.
- **Bharatiya Nyaya Sanhita (BNS), 2023:** Active euthanasia attracts criminal liability under **Section 100** (Culpable Homicide) or **Section 101** (Murder).

Evolution of Judicial Proceedings on Euthanasia

The legal journey has shifted from "Sanctity of Life" to "Quality of Life":

1. **Maruti Shripati Dubal (1987):** Bombay HC held that "Right to Life" includes "Right to Die" (decriminalized suicide).
2. **Gian Kaur v. State of Punjab (1996):** SC reversed the above, stating Article 21 is about protection of life, not its extinction.
3. **Aruna Shanbaug v. Union of India (2011):** First-time recognition of **Passive Euthanasia** under "exceptional circumstances" with High Court approval.
4. **Common Cause v. Union of India (2018):** SC declared the **Right to Die with Dignity** as a Fundamental Right. It legalized **"Living Wills"** (Advance Medical Directives).
5. **Harish Rana Case (2026):** Confirmed that **CANH** (Clinically Assisted Nutrition and Hydration) qualifies as medical treatment and can be withdrawn if it offers no therapeutic benefit.

Arguments For and Against Euthanasia

The "Pro-Choice" Perspective

- **Fundamental Right to Dignity:** Under **Article 21**, the "Right to Life" is not merely animal existence; it includes the **Right to Die with Dignity** when life becomes an agonizing burden.
- **Bodily Autonomy:** An individual has the ultimate sovereignty over their own body, including the choice to refuse medical intervention (Living Wills).
- **Relief from Futile Suffering:** Modern medicine can keep a body "alive" (biologically) long after the person has "died" (mentally/socially). Euthanasia ends "meaningless" pain.

- **Economic & Resource Logic:** In a country like India with a high patient-to-bed ratio, utilizing intensive care resources for "terminally ill/brain-dead" patients limits access for those with a high chance of recovery.
- **Compassion over Cruelty:** Prolonging the life of a patient in a Persistent Vegetative State (PVS) via invasive tubes is increasingly viewed by the SC as "cruelty" rather than "care."

The "Pro-Life" Perspective

- **The "Slippery Slope" Risk:** There is a grave danger of misuse by relatives to inherit property early or by the state to "clear" the burden of elderly/disabled populations.
- **Sanctity of Life:** Many religious and ethical frameworks believe life is a gift/sacred; its end should be natural, and humans should not "play God."
- **Medical Ethics:** It contradicts the **Hippocratic Oath** ("First, do no harm"). It may damage the trust between a doctor and a patient.
- **Palliative Care Gap:** Critics argue the "demand" for euthanasia arises from a lack of quality pain management. If **Palliative Care** is robust, the desire to die often disappears.
- **Potential for Recovery:** Medical science is constantly evolving. A "terminal" condition today might have a cure tomorrow, and euthanasia is irreversible.

Way Forward

To move toward a more humane and efficient end-of-life framework, the following steps are essential:

- **Enact a Comprehensive "End-of-Life Care Act":** The Supreme Court has specifically urged the Union Government to create a legislative bridge. This would provide permanent clarity, replacing the current "interim" judicial guidelines with a robust parliamentary law.
- **Universalize Palliative Care:** The "Right to Die with Dignity" is inseparable from the **Right to Quality Palliative Care**. Palliative care must be integrated into the **Ayushman Bharat (PM-JAY)** scheme and medical curricula to ensure that the transition to natural death is painless and managed with medical expertise.
- **Digitization via ABHA:** Living Wills should be seamlessly linked to the **Ayushman Bharat Digital Health Account (ABHA)**. This ensures that in emergencies, doctors can instantly access a patient's "Advance Medical Directive" without the family needing to produce physical documents.
- **Standardize Medical Protocols:** As established in the *Harish Rana* case, there is a need for standardized protocols for withdrawing **Clinically Assisted Nutrition and Hydration (CANH)**. This prevents doctors from being accused of "starvation" or "active killing" while performing their duty of care.
- **Public Awareness Campaigns:** The concept of "Living Wills" remains largely urban and niche. A national awareness campaign is needed to normalize advance care planning, ensuring citizens exercise their autonomy while they are mentally competent.

Conclusion

India's legal shift from "sanctity of life" to "quality of life" ensures constitutional empathy. Future legislation must now bridge the gap between judicial guidelines and clinical practice to institutionalize dignity.

1.11. NCERT TEXTBOOK BAN

Context:

In any democracy, the judiciary must maintain a careful balance between **independence** and **accountability**. In India, the judiciary has traditionally protected its **authority and institutional dignity** through powers such as **contempt of court**. However, scholars like Max Boot, in ***Out of Order: Arrogance, Corruption, and Incompetence on the Bench (1998)***, argue that meaningful reform in the judiciary is possible only when the public is aware of its **shortcomings and failures**.

This issue came to the forefront in **February 2026**, when the Supreme Court of India intervened in a **NCERT social science textbook** and imposed a ban. This rare instance of the judiciary acting as a **censor** has raised critical questions about **judicial transparency**, **accountability**, and **freedom of expression** in a democratic system.

The Subject of Controversy: What the NCERT Textbook Actually Contained

- The **Class 8 Social Science textbook** *Exploring Society: India and Beyond*, published by the **National Council of Educational Research and Training (NCERT)**, included a chapter titled **"The Role of the Judiciary in Our Society"**.
- The purpose of this chapter was simple and important: to help school students understand how the **Indian judiciary** works, its strengths, and the real challenges it faces. The content was written in a factual, educational, and neutral way — not to attack the judiciary, but to teach young citizens about its role in democracy.

A. Key Content That Sparked the Controversy

The passages that drew the Supreme Court's attention included the following factual and well-researched points:

- **Data on Judicial Delay** The chapter presented real statistics showing the huge number of **pending cases** in Indian courts.
  - Total national pendency: **over 4.76 crore cases** (as per recent National Judicial Data Grid figures).
  - Supreme Court pendency: **over 92,000 cases** at the end of 2025. It explained the famous principle: **"Justice delayed is justice denied"** — showing how long waits affect ordinary people's access to justice.
- **References to Judicial Corruption:** The **NCERT Social Science textbook** openly (but factually) mentioned that **corruption exists** in some parts of the judiciary — both at **lower courts** and **higher courts**. It did not name individuals or make wild accusations; it simply acknowledged this as a known challenge that needs to be addressed.
- **Bangalore Principles of Judicial Conduct (2002):** The chapter referred to these internationally accepted ethical standards for judges. These principles (adopted by many countries, including India) outline values such as **integrity**, **impartiality**, **independence**, **propriety**, **equality**, and **competence** that every judge must follow in their personal and professional life.
- **Accountability Mechanisms** It explained how the judiciary holds its own members accountable:

- The **Supreme Court's in-house procedure** — an internal mechanism created by the Court itself to handle complaints against judges (without public trials).
- The **constitutional process** for removal of judges (impeachment) under **Article 124** (for Supreme Court judges) and **Article 217** (for High Court judges).

These points were presented as part of civic education — teaching students that no institution is perfect, and that **transparency** and **accountability** are essential in a democracy.

B. The Supreme Court's Three-Pronged Ruling

A **three-judge Bench** led by the **Chief Justice of India** responded strongly to the chapter. The Supreme Court's order had three main parts:

1. **Complete Blanket Ban:** The entire textbook was prohibited — no more distribution, teaching, or use in schools. All physical copies were to be seized, and digital versions removed immediately.
2. **Observation on "Underlying Agenda":** The Bench stated that the content appeared to have an **"underlying agenda"** to **undermine the institutional authority** of the judiciary and **demean its dignity**. The Court felt the references were selective and one-sided.
3. **Administrative Punishment**: The Court directed that the **academics, experts, and NCERT officials** responsible for writing or approving those passages should be **"disassociated"** (**effectively blacklisted**) from all future projects funded by the government or public universities — a serious penalty imposed without giving them any opportunity to explain or defend themselves.

Arguments in Favor of the Court's Action

While heavily criticized, the Court's intervention is often justified through the lens of **Institutional Preservation**:

- **Maintaining Public Faith:** The judiciary's power is derived from public trust. If school children are taught a cynical view of the courts, the long-term legitimacy of the rule of law may be compromised.
- **Ensuring "Balanced" Education:** The Court argued the text was **selective**, ignoring transformative reforms like **e-Courts**, **Legal Aid**, and the **National Judicial Data Grid (NJDG)**.
- **Article 129 (Power to Punish for Contempt):** The Supreme Court is a "**Court of Record**" with inherent powers to prevent the lowering of its authority in the eyes of the public.
- **Preventing Misinformation:** Proponents argue that academic freedom does not include the right to present incomplete facts that could "incite" a lack of confidence in the Constitution's third pillar.

Key Concerns Raised by the NCERT Textbook Ban

The Supreme Court's order banning the NCERT textbook raises serious questions about compliance with the Indian Constitution and established legal principles. The key concerns are:

1. **Violation of Freedom of Speech and Expression: Article 19(1)(a)** guarantees the **right to freedom of speech and expression**, including the **right to publish educational material**.
   - Restrictions are allowed **only** by a **law** enacted by the State and only on grounds listed in **Article 19(2)** (e.g., contempt of court, public order).
   - A **judicial order** does **not** qualify as "**law**" under Article 19(2), as clearly held by the Supreme Court in **Naresh Shridhar Mirajkar v. State of Maharashtra (1966)**.

2. **Contempt Threshold Not Satisfied:** Under **Section 2(c)** of the **Contempt of Courts Act, 1971**, criminal contempt requires material that:
   - Scandalises or lowers the authority of the court, or
   - Prejudices/interferes with judicial proceedings, or
   - Obstructs the administration of justice.
   - The textbook's general, factual references to delays and corruption (without naming individuals or using abusive language) do not meet this high threshold. The Court did not examine whether there was **malicious intent** or **actual harm** caused.
3. **Breach of Natural Justice and Due Process**: The order directed that the authors and NCERT officials be **"disassociated"** (blacklisted) from future government and university projects — a severe punitive measure imposed:
   - Without issuing any notice
   - Without giving an opportunity to be heard
   - Without allowing any defence or explanation.
   - This violates core principles of **natural justice** (**audi alteram partem**) and the guarantees of **equality** (**Article 14**) and **life and personal liberty** (Article 21).
4. **Paradox of Judicial Review and Absence of Remedy**: Constitutional courts are the final guardians of **fundamental rights** and exercise **judicial review** to strike down actions that violate **Part III of the Constitution**. When the courts themselves restrict free speech through bans:
   - Citizens are left **without effective remedy**, as there is no higher authority to challenge the judiciary.
   - This creates a **dangerous situation** where the protector of rights becomes the source of their infringement, undermining public confidence in the **rule of law**.

Implications for Indian Democracy

- **Erosion of Public Trust**: Suppressing discussion signals that the judiciary is above scrutiny, damaging its moral authority.
- **Chilling Effect on Free Speech and Education**: Authors, publishers, and teachers may avoid any critical content, weakening democratic values in young citizens.
- **Threat to Separation of Powers**: When one organ silences debate about itself, accountability weakens across all institutions.
- **Long-term Damage**: Students lose the chance to learn balanced civic education, harming the future of informed citizenship.

Global Best Practices: Transparency Through Acknowledgment, Not Suppression

In contrast to the Indian approach, advanced democracies often address judicial credibility concerns through openness:

- In **Kenya**, Chief Justice Willy Mutunga (2011–2013) established judicial ombudspersons, court users' committees, and performance management systems. By acknowledging issues openly, public trust rose from **27% in 2009** to **61% in 2013** — and reforms continued thereafter.
- In the **United States** and **United Kingdom**, media, academia, and citizens freely discuss judicial performance. Courts lead transparency efforts rather than banning criticism.

India's own judiciary has repeatedly acknowledged problems:

- In ***K. Veeraswami vs Union of India*** **(1991),** the **Supreme Court** held that High Court and Supreme Court judges are "**public servants**" under the **Prevention of Corruption Act**.
  - It stressed that "**society's demand for honesty in a judge is exacting and absolute**," and even one dishonest judge "**jeopardises the integrity of the entire judicial system.**"
  - Further, the **Supreme Court** itself has repeatedly warned about "**bad apples**", **delays,** and **the need for in-house mechanisms** — yet banned a book that merely echoed these concerns.

  To reform governance in both the judiciary and higher education, we must move from a culture of **suppression** to one of **transparency and empowerment**.

Way Forward: Strategic Roadmap for Institutional Reform

1. **Formalizing Accountability**
   - **Judicial Transparency:** Revive the **National Judicial Appointments Commission (NJAC)** or pass the **Judicial Standards and Accountability Bill** to handle complaints via a clear, statutory process.
   - **Performance-Based Autonomy:** Link college independence to **NIRF** rankings and **NBA** accreditation. Colleges that prove quality should automatically receive **academic and financial freedom**.
2. **Prioritizing Structural Fixes over Bans**
   - **Filling Vacancies:** Address the **30% vacancy** in High Courts and faculty shortages in colleges. Solving the **root cause** of delay is more effective than censoring its mention in textbooks.
   - **Decoupling Administration:** Universities should shift from "bureaucratic overseers" to **academic mentors**, outsourcing high-volume administrative tasks (like conducting mass exams) to specialized bodies.
3. **Adopting Institutional Restraint**
   - **The "Last Resort" Principle:** Powers of **Contempt** or **Blanket Bans** should be used only when absolutely necessary, not as a tool to silence criticism.
   - **The Scrutiny Principle:** Adhere to **Lord Atkin's** view that institutions are not "**cloistered virtues**." They must be robust enough to withstand public scrutiny to foster genuine growth.
4. **Modernizing the Curriculum (NCERT Model)**
   - **Problem-Solution Pedagogy:** Move away from **"sanitizing"** challenges. Textbooks should honestly present **systemic hurdles** (e.g., pendency, archaic affiliation) alongside **modern solutions** (e.g., AI-led courts, Lok Adalats, and Autonomous Colleges).
5. **Promote Media and Academic Freedom**
   - To resolve the tension between protecting judicial dignity and preserving democratic values, India must actively **promote media freedom** and **academic freedom** — allowing open, responsible debate about institutional strengths and shortcomings. The approach should follow the principle illustrated by **Max Boot**'s work and Kenya's judicial reform success: **"acknowledge, address, reform"**.

Conclusion

The **NCERT** textbook ban is not merely about one book — it is a litmus test for Indian democracy in 2026. While protecting judicial dignity is essential, **true dignity flows from transparency, not**

silence. As the authors **Kaleeswaram Raj and Thulasi K. Raj** rightly conclude, "**The first step in fighting systemic problems is acknowledging them**."

A judiciary that continuously reforms itself, educates citizens about its challenges, and remains open to dissent will remain the strongest pillar of our Constitution. Only through openness and accountability can public trust be rebuilt and democracy truly strengthened.

This balanced approach — respecting the institution while safeguarding fundamental rights — is the way forward for a mature democracy.

1.12. JUDICIAL RECUSAL AND CONFLICT OF INTEREST

Context:

- The integrity of the Indian Judiciary is anchored in the principle of **impartiality**. Recently, **Chief Justice of India (CJI) Surya Kant** recused/stepped aside himself from hearing petitions challenging the **Chief Election Commissioner and Other Election Commissioners (Appointment, Conditions of Service and Term of Office) Act, 2023**.
- This legislation notably removed the CJI from the selection panel for appointing **Election Commissioners**, replacing the office with a **Union Cabinet Minister**. The CJI stepped aside citing a potential **conflict of interest**, directing that the case be heard by a bench excluding judges in the **line of succession** for the **office of the CJI**.
- This development has reignited a critical debate on judicial ethics, the **Doctrine of Necessity** and the urgent **need for a clear legal framework** on **judicial recusal** in India.

What is Judicial Recusal and Its Legal Foundations?

Judicial recusal simply means a judge removes himself or herself from a case to avoid any chance of bias. It comes from an ancient **rule of natural justice**: **nemo judex in causa sua** – **no one shall be a judge in their own cause.**

Indian courts have developed clear but flexible rules over time:

- In **Manak Lal v. Dr. Prem Chand (1957)**, the Court said that even a small financial interest is enough for automatic disqualification.
- In **Ranjit Thakur v. Union of India (1987)**, the Supreme Court moved to a practical test: there must be a **real likelihood of bias** or **reasonable apprehension of bias** in the mind of a fair person. A very small or imaginary fear is not enough.

Key point: The decision to recuse is left completely to the **judge's own conscience**. No lawyer or party can force a judge to step aside. India still has **no statute** that lists exact rules for recusal. In contrast, the United States has **Section 455 of Title 28**, which clearly says a judge must disqualify himself if his impartiality "**might reasonably be questioned**".

Key Precedents and the Doctrine of Necessity

- A significant tension exists between the ethics of recusal and the **Doctrine of Necessity**, which states that a judge must hear a case if no other competent forum is available, regardless of potential bias.
- The most relevant earlier case is the challenge to the **National Judicial Appointments Commission (NJAC) Act, 2014** in ***Supreme Court Advocates-on-Record Association v. Union***

***of India* (2015).** A **five-judge Constitution Bench** heard the matter. Lawyers asked **Justice J.S. Khehar** to recuse because he would one day become **Chief Justice** and would have an interest in whether the **Collegium system** or the NJAC continued.

Justice Khehar refused to step aside. He gave **two strong reasons**:

1. Every judge on the bench faced the same possible conflict because all of them would be part of the Collegium if the petitioners won.
2. The **doctrine of necessity** applied. This doctrine says that when no other court of equal power exists, the judges must hear the case even if there is a technical conflict. Otherwise, justice would be denied.
    - He added that stepping aside would set a "**wrong precedent**". **Justice Kurian Joseph**, in his separate opinion, said that when a judge recuses, he or she should clearly explain the reasons as part of the constitutional duty of transparency under the oath of office.
    - In contrast, in the **present CEC case**, **two Chief Justices** have chosen to recuse even though the same logic of the NJAC case could have been used. This shows that the Court is treating the matter differently.

Critical Issues and Challenges in the Current Recusal

The recusal has raised several practical and constitutional questions:

- **Conflict that affects everyone**: Under the **seniority rule fixed by the Second Judges Case,** every Supreme Court judge can become Chief Justice one day. So the conflict is not personal to one judge but common to the entire institution.
- **Pre-emptive direction by the Chief Justice**: By ordering that future benches must exclude judges in the line of succession, the **Chief Justice** has decided the issue of bias for judges who have not even heard the case. Recusal is supposed to be an individual decision of conscience, not a command from the **Master of the Roster**.
- **Uncertain future**: The line of succession can change because of resignation, death or ill health. A judge who is told today that he or she is "**outside the line**" might still become Chief Justice tomorrow.
- **Master of the Roster power**: Even after recusing, the **Chief Justice** keeps the **power to choose** which bench will hear the case. This raises the same conflict-of-interest doubt that the recusal was meant to remove.
- **Lack of a clear law**: Unlike the **United States**, India has no statute that lists **objective grounds** for recusal. Everything depends on the personal sense of the judge.

Past examples illustrate the application:

- **Recusal occurred**: Justices Indira Banerjee and Aniruddha Bose recused from West Bengal-related cases in 2021 due to perceived links.
- **Recusal refused**: Justice M.R. Shah declined to recuse in the Sanjiv Bhatt case (2023), holding that public demand alone is insufficient. Justice Arun Mishra also refused recusal in a review of his own judgment.
- **Vague apprehension rejected**: In **State of Punjab v. Davinder Pal Singh Bhullar (2011)**, the Court ruled that mere suspicion or emotional distrust cannot justify recusal.

Impact on the Judiciary and Public Trust

The way recusal is handled has direct consequences for the health of a democracy:

- **Erosion of Institutional Authority:** Frequent or unexplained recusals can give the impression that the judiciary is avoiding "politically sensitive" cases.
- **Bench Hunting:** Without clear rules, lawyers might pressure certain judges to recuse themselves simply to get a bench they perceive as more favorable to their cause.
- **Transparency Deficit:** When oral remarks suggest bias but the written order is silent, it creates a gap in the public record, affecting the transparency of the judicial process.

Global Best Practices

Country	Mechanism
United States	**Section 455 of Title 28** provides a statutory standard requiring judges to disqualify themselves where their impartiality might be reasonably questioned.
United Kingdom	Uses the **"Fair-Minded and Informed Observer"** test; if such an observer perceives a real possibility of bias, recusal is mandatory.
Germany	Parties have a statutory right to challenge a judge for **"fear of bias,"** and the decision is often made by the rest of the bench, not the judge alone.

Way Forward: Strengthening the Judicial Recusal Framework

To strengthen the system, India needs the following practical steps:

- **Enact a Judicial Recusal Law or Guidelines**: Enact a short, clear **Judicial Recusal Act** or issue **binding guidelines** by the **Supreme Court** itself. The law should list **objective grounds** such as financial interest, family links and prior association, while keeping the "reasonable apprehension of bias" test.
- **Mandatory Recording of Reasons**: Make it compulsory for a judge to give **brief recorded reasons** for recusal or for refusing to recuse. This will increase **transparency** without forcing every reason into open court.
- **Application of Doctrine of Necessity**: Respect the **doctrine of necessity** in genuine institutional conflicts, but combine it with an **open acknowledgment** of the conflict so that the public understands the decision.
- **Internal Advisory Committee**: Consider creating a small **internal committee** of senior judges (not including the **Chief Justice** in that case) to give **non-binding advice** on recusal in sensitive matters.
- **Regular Ethics Training**: Train judges regularly on **ethics** and **conflict-of-interest** issues.
- **Separation of Powers in Roster**: Ensure that the **Master of the Roster** power is exercised only after the **recusal issue** is settled, so that the appearance of conflict is completely removed

Conclusion

The principle that **"Justice must not only be done but also be seen to be done"** remains the foundation of judicial legitimacy. While recent recusals show high **personal ethics**, they highlight a **structural vacuum** that requires moving beyond subjective **individual conscience**. Only a **principled, transparent framework** can protect the **Supreme Court's integrity** and ensure the long-term stability of India's **democratic processes**.

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INTERNATIONAL RELATIONS

2.1. INDIA'S NEIGHBOURHOOD POLICY

Concept and Core Philosophy

The Neighbourhood First Policy (NFP) is the cornerstone of India's foreign policy, viewing India's prosperity as intrinsically linked to the stability and growth of its neighbors.

- **Principles (The 5S Framework):** Samman (Respect), Samvad (Dialogue), Shanti (Peace), Samriddhi (Prosperity), and Sanskriti (Culture).
- **Approach:** Shift from "Big Brother" dominance to a **non-reciprocal, consultative, and outcome-oriented** partnership (inspired by the Gujral Doctrine).
- **Institutional Frameworks:** Focus on sub-regional groupings like **BBIN** (Bangladesh, Bhutan, India, Nepal) and **BIMSTEC**, often as a functional alternative to the stalled SAARC

Scope of Neighborhood

1. **Immediate Neighborhood**
    - **Land Neighbors:** Afghanistan, Pakistan, China, Nepal, Bhutan, Bangladesh, and Myanmar.
    - **Maritime Neighbors:** Sri Lanka and Maldives.
2. **Extended Neighborhood**
    - **Act East Link:** Thailand, Laos, Vietnam, Cambodia, Malaysia, Singapore, Indonesia, and the Philippines (via **BIMSTEC** and **ASEAN**).
    - **Connect Central Asia:** Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.
    - **West Asia/Middle East:** UAE, Saudi Arabia, Oman, Qatar, and Iran (crucial for energy security and the **IMEC** corridor).
3. **Strategic Space (IOR & SAGAR)**

    Focuses on the island nations and littoral states of the **Indian Ocean Region** where India acts as a "Net Security Provider."
    - **Island Nations:** Mauritius, Seychelles, Comoros, Madagascar, and Reunion Island (French territory).
    - **Littoral States:** Mozambique, Tanzania, Kenya, and South Africa (Western IOR).

Objectives of India's Neighbourhood First Policy

- **Regional Stability:** Preventing the spillover of cross-border terrorism and radicalization from **Afghanistan, Pakistan,** and **Myanmar** to ensure domestic security.
- **Strategic Autonomy:** Countering China's "String of Pearls" and BRI footprint in **Sri Lanka, Maldives,** and **Nepal** to maintain regional leadership.
- **Economic Integration:** Boosting physical and digital connectivity via BBIN and energy grids in **Bangladesh, Bhutan,** and **Nepal** for shared prosperity.

- **Net Security Provider:** Leading maritime security and HADR (Disaster Relief) missions in **Mauritius, Seychelles,** and **Maldives** under the **SAGAR** vision.
- **Civilizational Soft Power:** Utilizing shared religious and linguistic heritage to bridge trust deficits with **Nepal, Bhutan, Bangladesh,** and **Sri Lanka.**

Key Pillars of India's Neighbourhood First Policy

1. **Connectivity: Physical & Digital**
   - **Infrastructure:** Focus on "Multimodal Transit" such as the **Kaladan Project** (Myanmar) and **Agartala-Akhaura Rail** (Bangladesh) to integrate the North-East.
   - **Digital:** Exporting the **"India Stack"** (UPI, RuPay) to countries like **Bhutan, Nepal,** and **Sri Lanka** to create a regional digital economy.
2. **Economic Integration & Energy Security**
   - **Trade Concessions:** Non-reciprocal trade benefits (under the **Gujral Doctrine**) for smaller neighbors to facilitate duty-free access to Indian markets.
   - **Energy Grids:** Landmark projects like the **India-Nepal-Bangladesh** tripartite power trade (2024–2026) allowing for a regional electricity market.
3. **Strategic & Maritime Security**
   - **Net Security Provider:** Leading maritime patrolling and anti-piracy efforts under the **SAGAR** (Security and Growth for All in the Region) vision.
   - **Strategic Balancing:** Proactively countering external influences (specifically China's **BRI**) through faster project execution and currency swap agreements with **Maldives** and **Sri Lanka**.
4. **Humanitarian & First Responder Role**
   - **Disaster Relief:** India's role as the first to arrive during crises, such as the **Nepal Earthquake** or the **Sri Lankan Economic Crisis** ($4 billion assistance).
   - **Health Diplomacy:** Leveraging initiatives like **Vaccine Maitri** to provide critical medical aid during pandemics/outbreaks.
5. **Civilizational & Cultural Connect (Soft Power)**
   - **Shared Heritage:** Promoting the **Buddhist Circuit** (Nepal/Bhutan) and **Ramayana Circuit** (Sri Lanka) to bridge the trust deficit through "Sanskriti."
   - **People-to-People:** Expanding scholarships and ITEC programs for students and professionals across the subcontinent.

Recent Developments

Several critical shifts are redefining regional diplomacy:

- **Political Transitions:** Following the recent elections in **Bangladesh** and **Nepal**, India is pivoting from "Palace Diplomacy" (focusing on specific leaders) to "People Diplomacy," engaging with new youth-led movements and diverse political stakeholders.
- **West Asia Spillover:** Today's editorials highlight how escalating tensions in West Asia are forcing India to secure its maritime neighborhood to protect energy corridors and the **IMEC** (India-Middle East-Europe Economic Corridor).
- **Climate & Health Diplomacy:** A move toward "Low-Intensity Security" through Joint Disaster Relief (HADR) and sharing digital governance tools (Open-source platforms) to build long-term institutional dependency.

Key Challenges to India's Neighbourhood First

- **Energy Insecurity:** Heightened volatility in the **Strait of Hormuz** (mostly shut as of today) has caused oil prices to surge over **$100/barrel**, straining the economies of India and its neighbors (Bangladesh, Sri Lanka), who now look to India for energy bailouts.
- **Diaspora Vulnerability:** The conflict directly threatens nearly **25 million South Asians** (including 10 million Indians) living in the Gulf. Recent missile shrapnel deaths in **Abu Dhabi** and evacuations highlight the massive humanitarian risk.
- **Maritime "Net Security" Test:** Increased attacks on commercial tankers in the **Indian Ocean** (e.g., near UAE's Fujairah) challenge India's image as a "Net Security Provider." The Indian Navy is currently forced to divert resources for warship escorts (**OP Sankalp**).
- **Diplomatic Balancing (Trust Deficit):** Neighbors like **Bangladesh, Maldives, and Sri Lanka** have taken more vocal stances on the conflict. India's initial perceived alignment with Western/Israeli positions creates a "credibility gap" within its own neighborhood.
- **Connectivity Disruptions:** The conflict has halted progress on the **IMEC (India-Middle East-Europe Corridor)**, forcing India to double down on the **INSTC (via Iran/Chabahar)**, which is itself complicated by ongoing strikes.
- **The China Squeeze:** While India is distracted by West Asian maritime security, China continues to offer faster, non-political infrastructure funding, appealing to neighbors facing fuel-driven economic crises.
- **Af-Pak Radicalization:** Today's news of **Pakistan's airstrikes on Afghanistan** (hospital in Kabul) highlights the persistent threat of regional radicalization and cross-border "open war" that destabilizes India's western flank.

Way Forward

- **Pivot to "People Diplomacy":** Moving away from "Palace Diplomacy" (reliance on specific leaders) to engage with youth-led movements and civil society, as seen in the recent **Bangladesh and Nepal** transitions.
- **Out-Implement, Don't Out-Argue:** Prioritizing the rapid completion of existing **Lines of Credit (LoC)** projects (e.g., Kaladan, Agartala-Akhaura) to match the execution speed of China's BRI.
- **Exporting India Stack (DPI):** Scaling the integration of **Digital Public Infrastructure** (UPI, RuPay, ONDC) across the neighborhood to create a shared, India-centric regional digital economy.
- **"First Responder" Institutionalization:** Creating a permanent **Regional Disaster & Health Task Force** to provide predictable aid during climate crises or energy shocks caused by the West Asia war..
- **Decoupling Domestic Rhetoric:** Ensuring that internal political narratives (e.g., migration or CAA) do not "poison the well" of bilateral trust with key partners like **Bangladesh**.
- **Maritime Collective Security:** Strengthening the **Columbo Security Conclave** and **SAGAR** to address the new maritime threats in the Arabian Sea arising from the West Asia conflict.

Conclusion

India must evolve into a **"Strategic Anchor,"** leveraging Digital Public Infrastructure and asymmetric concessions to foster a resilient, integrated subcontinent that withstands external shocks while securing its status as a **Net Security Provider.**

2.2. GULF COOPERATION COUNCIL (GCC)

Context:

Recently, India co-sponsored a significant United Nations Security Council (UNSC) resolution on **March 11, 2026**, which condemned "egregious" attacks against GCC member nations and Jordan, while simultaneously demanding an immediate cessation of hostilities and threats to international navigation in the **Strait of Hormuz**.

This diplomatic move follows the formal launch of negotiations for a comprehensive **India-GCC Free Trade Agreement (FTA)** in February 2026, aimed at deepening economic integration and securing energy supply chains amidst rising regional instability.

1. **Overview and Establishment**
   - **What it is:** A regional, intergovernmental, political, and economic union.
   - **Established:** May 25, 1981, through the Charter of the Cooperation Council.
   - **Headquarters:** Riyadh, Saudi Arabia.
   - **Genesis:** Formed in the aftermath of the **Iranian Revolution (1979)** and the **Iran-Iraq War** to ensure collective security and economic stability among Arab monarchies.
2. **Member States**

   The GCC consists of six Arab nations bordering the Persian Gulf:

   1. **Saudi Arabia** (Absolute Monarchy)
   2. **United Arab Emirates (UAE)** (Federal Monarchy)
   3. **Qatar** (Constitutional Monarchy)
   4. **Kuwait** (Constitutional Monarchy)
   5. **Oman** (Absolute Monarchy)
   6. **Bahrain** (Constitutional Monarchy)

   Note: Iraq and Iran are **not** members of the GCC, despite bordering the Persian Gulf.

3. **Organizational Structure**
   - **Supreme Council:** The highest authority, consisting of the Heads of State. The presidency rotates **annually in alphabetical order**.
   - **Ministerial Council:** Comprises Foreign Ministers; they meet every three months to formulate policies and coordinate implementation.
   - **Secretariat General:** The administrative arm based in Riyadh, headed by a Secretary-General (currently Jasem Mohamed Albudaiwi).
4. **Economic and Strategic Significance**
   - **Energy Powerhouse:** GCC countries collectively control nearly **33% of the world's proven oil reserves** and 20% of global natural gas reserves.
   - **Economic Integration:** The bloc established a **Customs Union** in 2003 and a **Common Market** in 2008, allowing for the free movement of capital and labor among citizens.
   - **Security:** The **Peninsula Shield Force** serves as the joint military intervention arm of the GCC.

5. **India-GCC Relations (2025-26 Data)**

- **Trade:** The GCC is India's **largest trading partner bloc**. Bilateral trade reached approximately **$178.56 billion** in FY 2024-25.
- **Energy Security:** India imports roughly **35% of its oil** and **70% of its gas** requirements from the GCC region.
- **Remittances & Diaspora:** Nearly **10 million Indians** live in GCC countries, contributing the largest share of India's inward foreign remittances (approx. 30%).
- **FTA Negotiations (2026):** India and GCC signed the **Terms of Reference (ToR)** in February 2026 to conclude a broad-based FTA covering goods, services, and digital trade.

2.3. BRICS

Context:

Recently, India assumed the **BRICS Presidency for 2026**, positioning itself to host the 18th BRICS Summit later this year. India is currently facilitating high-level diplomatic negotiations through the "Sherpa channel" to forge a consensus among members regarding the ongoing volatility in West Asia. This presidency follows the historic expansion of the bloc and comes at a time when the grouping, now often referred to as **BRICS+**, represents over 40% of the world's population and approximately 30% of the global GDP.

1. **Key Pillars and Institutional Framework**

- **The Three Pillars of Cooperation:** BRICS operations are structured around three main areas:
  - **Political and Security:** Aimed at reforming the global governance architecture, including the UN Security Council and the WTO.
  - **Economic and Financial:** Focused on intra-BRICS trade, de-dollarization (using national currencies), and infrastructure funding.
  - **Cultural and People-to-People Exchanges:** Enhancing ties through forums, youth summits, and academic cooperation.
- **New Development Bank (NDB):** Headquartered in **Shanghai**, it was established in 2014 to mobilize resources for infrastructure and sustainable development. Unlike the World Bank, the NDB provides **equal voting rights** to its founding members, and its membership is open to any member of the United Nations (e.g., Bangladesh and Uruguay have joined).
- **Contingent Reserve Arrangement (CRA):** Created to provide a liquidity cushion for member countries during short-term balance of payments pressures, acting as a regional alternative to the IMF.

2. **Membership Evolution: From BRICS to BRICS+**

The grouping has evolved through several distinct phases of expansion:

- **2006–2011:** Formation of BRIC (Brazil, Russia, India, China) and the subsequent inclusion of South Africa.
- **2024 Expansion:** Full membership was granted to **Egypt, Ethiopia, Iran, and the United Arab Emirates**. Saudi Arabia has also been invited and participates in activities, though its formalization status is often monitored.

- **2025 Addition: Indonesia** was officially admitted as the 10th full member in early 2025, further strengthening the group's presence in Southeast Asia.
- **Partner Country Category:** A new "Partner Country" tier was established at the Kazan Summit (2024), including nations like Malaysia, Thailand, Vietnam, and Nigeria, to allow for cooperation without full membership obligations.

2.4. KURDISTAN REGION

Context:

The **Kurdistan Free Life Party (PJAK)**, an armed Kurdish group in Iran, has asserted its independence from foreign influence despite regional tensions. The group seeks a "Democratic Republic of Iran" to ensure the rights of all ethnic minorities.

This highlights the ongoing "Kurdish Question" in West Asia, where an ethnic group of nearly 35–40 million people remains without a sovereign state, spread across four primary nations.

1. **Who are the Kurds?**
   - **Ethnic Identity:** The Kurds are an Indo-European ethnic group, mostly Sunnis, who speak the Kurdish language.
   - **Population:** They are the **fourth-largest ethnic group** in West Asia but have never obtained a **permanent nation-state.**
   - **Capital city of Kurdistan: Erbil City**
   - **The Region (Kurdistan):** A roughly defined geo-cultural region spanning:
     - **Turkey:** (Northern Kurdistan) - Home to the largest Kurdish population.
     - **Iran:** (Eastern Kurdistan / Rojhelat) - Home to PJAK.
     - **Iraq:** (Southern Kurdistan) - The only region with a semi-autonomous government (KRG).
     - **Syria:** (Western Kurdistan / Rojava) - Gained prominence during the fight against ISIS.
2. **Geographical Features:**
   - **Mountains:** Zagros Mountains dominate the landscape, providing natural borders with Iran and Turkey.
   - **Rivers:** The Tigris and Greater Zab Rivers flow through the region, supporting agriculture and settlements.
3. **Key Organizations Mentioned**
   - **PJAK (Kurdistan Free Life Party):** An armed group fighting for Kurdish autonomy within a democratic Iran.

- **PKK (Kurdistan Workers' Party):** A militant political organization based in Turkey and Iraq. It is listed as a terrorist organization by Turkey, the US, and the EU. PJAK is often seen as the Iranian wing/affiliate of the PKK.

2.5. DIEGO GARCIA

Context:

Recently, the United Kingdom and the United States have faced heightened security concerns regarding the **Diego Garcia** military base following reports of unsuccessful missile strikes targeted at the facility amidst escalating regional tensions in the Middle East.

1. **Geographical Location**
   - **Archipelago:** It is the largest landmass in the **Chagos Archipelago**, which consists of 58 individual tropical islands.
   - **Coordinates:** Situated approximately **7° South of the Equator** in the central Indian Ocean.
   - **Proximity:** It lies about 1,800 km southwest of India (Kanyakumari) and roughly 1,200 km south of the Maldives.
   - **Physical Feature:** It is a **horseshoe-shaped coral atoll** with a large, deep natural lagoon that provides excellent anchorage for naval vessels.
2. **Historical Background and Sovereignty Dispute**
   - **Colonial Era:** Originally explored by the Portuguese, the islands were later settled by the French and eventually ceded to the **United Kingdom** under the **Treaty of Paris (1814)**.
   - **Separation from Mauritius:** In 1965, three years before Mauritius gained independence, the UK detached the Chagos Archipelago from Mauritius to create the **British Indian Ocean Territory (BIOT)**.
   - **Expulsion of Inhabitants:** Between 1967 and 1973, the UK forcibly evicted the indigenous **Chagossian population** (also known as Îlois) to Seychelles and Mauritius to facilitate the construction of the US military base.
3. **The 2025 Sovereignty Deal**
   - **Recognition of Sovereignty:** Under the landmark treaty signed in May 2025, the UK acknowledged Mauritius as the sovereign authority over the entire Chagos Archipelago.
   - **Lease Agreement:** A critical caveat of the deal is that **Diego Garcia** remains under the administrative control of the UK for an initial period of **99 years** to ensure the continued operation of the joint military base.
   - **Resettlement:** The treaty allows Mauritius to implement a resettlement program on the "outer islands" of the archipelago, though resettlement on Diego Garcia itself remains restricted due to military requirements.
4. **Strategic and Military Significance**
   - **Power Projection:** Often called an "unsinkable aircraft carrier," the base allows the US to project power across the **Indo-Pacific**, Middle East, and East Africa.

- **Operational History:** It served as a vital launchpad for operations during the **Gulf War (1991)**, the war in **Afghanistan (2001)**, and the **Iraq War (2003)**.
- **Facilities:** It hosts a 3,700-meter runway capable of supporting long-range bombers (like B-52s and B-2 Stealth bombers) and a deep-water port for nuclear-powered submarines and aircraft carriers.

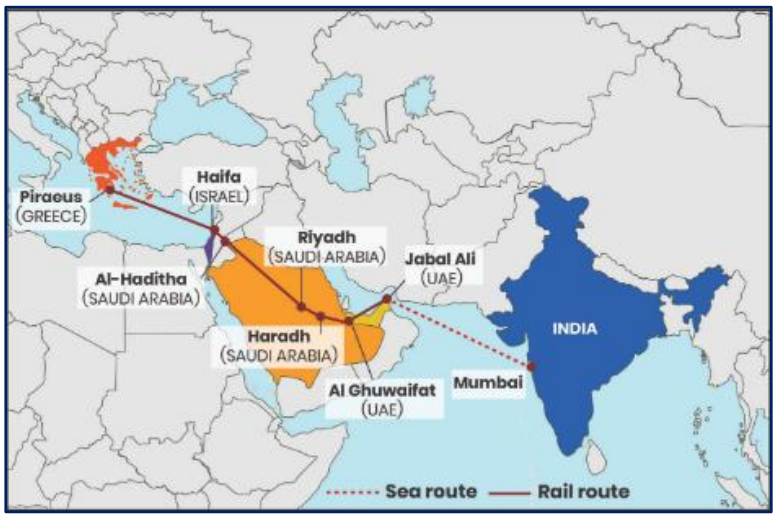
5. **International Legal Perspective**

- **ICJ Advisory Opinion (2019):** The International Court of Justice ruled that the decolonization of Mauritius was not lawfully completed and that the UK is under an obligation to end its administration of the Chagos Archipelago.
- **UN General Assembly (2019):** Passed a resolution demanding the UK withdraw its colonial administration, affirming the ICJ's stance.
- **ITLOS Ruling (2021):** The International Tribunal for the Law of the Sea also upheld Mauritius' claim to the archipelago.

2.6. INDIA'S WEST ASIA POLICY

Context:

West Asia (Middle East) is one of the **most strategically important regions for India's foreign policy** due to its significance for energy security, trade, diaspora, and geopolitical stability. India considers West Asia as its **"extended neighbourhood"** and has gradually shifted from a passive diplomatic approach to **active strategic engagement** in the region.



About West Asia

West Asia refers to the region located between **Europe, Africa, and South Asia**, often overlapping with what is called the **Middle East**. It includes countries of the **Arab world, Israel, Iran, and Turkey**.

Key Elements of India's West Asia Policy

1. **The "De-Hyphenation" Strategy**

   India has successfully separated its bilateral ties with traditional rivals. It maintains a **"Special Strategic Partnership"** with **Israel** (focusing on defense and high-tech) while simultaneously engaging with the **Iranian Interim Leadership Council** for strategic connectivity. This allows India to pursue national interests without being forced to choose sides in regional sectarian or political conflicts.

2. **Energy Security 2.0: Transition & Buffering**

   While the Gulf still provides ~55% of India's crude, the agenda has shifted toward:

- **Strategic Reserves:** Speeding up the expansion of **Strategic Petroleum Reserves (SPR)** to create a 90-day supply buffer against shocks like the current Strait of Hormuz instability.
- **Green Energy:** Investing in **Green Hydrogen** and solar projects with the UAE and Saudi Arabia to ensure long-term energy synergy beyond fossil fuels.

3. **"Net Security Provider" in Maritime Lanes**

   With the 2026 conflict threatening the Strait of Hormuz and the Red Sea, India has institutionalized **Operation Sankalp**. The Indian Navy now acts as a stabilizer, providing permanent maritime escorts for merchant vessels to protect trade routes and counter piracy or kinetic threats from non-state actors.

4. **Connectivity: The "Two-Gateway" Approach**

   India is aggressively pursuing two distinct corridors to reduce dependency on traditional routes:

   - **IMEC (India-Middle East-Europe Economic Corridor):** Using the Gulf (UAE/Saudi) and Israel as a bridge to Europe.
   - **INSTC & Chabahar:** Developing Iran's **Chabahar Port** as a vital gateway to Central Asia and Russia, ensuring India's land-link despite the blockade of overland routes through Pakistan.

5. **Diaspora Welfare & "Remittance Diplomacy"**

   Protecting the **9 million+ Indians** in the Gulf is a top-tier security priority. The agenda includes:

   - **Crisis Response:** Maintaining active evacuation protocols (like the 2026 Ministerial Committee led by the Home Minister).
   - **Economic Protection:** Signing **Migration and Mobility Partnerships** to ensure job security and social protection for Indian workers during regional economic shifts.

6. **Multilateralism & "Minilateralism"**

   India leverages new, flexible groupings to embed itself into the regional architecture:

   - **I2U2 (India, Israel, UAE, USA):** Focusing on joint projects in food security, water, and space.
   - **BRICS+ Engagement:** Utilizing the inclusion of Saudi Arabia, Iran, and the UAE into BRICS to coordinate on global financial architectures and "Rupee-Trade" settlements.

Advantages of India's West Asia Policy

1. **Energy Resilience & Price Stability**

   By cultivating deep ties with major producers like Saudi Arabia and the UAE, India secures **preferential energy access**. These partnerships also facilitate the development of **Strategic Petroleum Reserves (SPR)** within India, funded partly by Gulf investments.

2. **Strategic "Bridging" Capability**

   India is one of the very few nations that can talk to **Israel, Iran, and the Arab states** simultaneously. This "strategic autonomy" allows India to:

   - Act as a neutral mediator in regional crises.
   - Protect its interests without being dragged into sectarian conflicts.
   - Maintain defense ties with Israel while securing connectivity via Iran's **Chabahar Port**.

3. **Economic Windfall: Remittances & Investment**

   - **Remittances:** The 9 million-strong diaspora sends back over **$120 billion** annually (2025-26 estimates), providing a massive cushion for India's Current Account Deficit (CAD).
   - **Sovereign Wealth Funds:** India has become a primary destination for massive investments from the UAE's ADIA and Saudi Arabia's PIF in infrastructure, green energy, and digital startups.

4. **Countering China's "String of Pearls"**

   A proactive West Asia policy prevents the region from becoming a Chinese lake. By leading initiatives like the **IMEC (India-Middle East-Europe Economic Corridor)**, India offers a transparent, debt-free alternative to China's Belt and Road Initiative (BRI), ensuring the western flank of the Indian Ocean remains open and balanced.

5. **Enhanced Maritime Security**

   Through **Operation Sankalp** and joint naval drills, India has gained "docking rights" and logistical access in places like **Duqm (Oman)**. This extends the Indian Navy's reach, allowing it to protect vital sea lanes of communication (SLOCs) from piracy and drone threats in the North Arabian Sea.

6. **Food and Tech Security (Minilateralism)**

   Through the **I2U2 Group**, India leverages:

   - **Israeli Technology:** For arid-land farming and water recycling.
   - **UAE Capital:** To build "Food Parks" in India.
   - **Result:** This ensures a steady food supply chain for the Middle East while boosting Indian farmers' income and technological prowess.

Challenges of India's West Asia Policy

1. **The "Chokepoint" Paralysis:** Over **40-50% of India's crude oil** and nearly **90% of its LPG** imports pass through the **Strait of Hormuz**. With the current naval blockade and Iranian threats to close the waterway, India faces an existential energy threat.
2. **Connectivity Under Fire (IMEC vs. Reality):** The **India-Middle East-Europe Economic Corridor (IMEC)** is currently inoperable due to active conflict in Israel and the UAE. Failure of IMEC forces reliance on the **Suez Canal** (Houthi threat) or the costly **Cape of Good Hope** route.
3. **The Diaspora Dilemma**

   With nearly **10 million Indians** living in the Gulf, any major regional war is a logistical nightmare.

   - **Evacuation:** While over 52,000 Indians were evacuated in early March, a total regional war would require a rescue operation exceeding the scale of *Operation Rahat*.
   - **Economic Shock:** A decline in production in the Gulf directly hits the **$120 billion+** annual remittance flow, threatening India's foreign exchange stability.

4. **Imported Inflation and Fiscal Strain:** The spike in Brent crude (hitting **$100-$120/barrel**) is driving "cost-push inflation" in India.

   - **Fertilizer Crisis:** India imports 40% of its Urea and NPK inputs from the Gulf. Disruptions are currently inflating the government's subsidy burden and threatening domestic food security.
   - **Currency Pressure:** Increased import bills are putting the Rupee under depreciation pressure (forecasted to hit **₹92-95/$** if tensions persist).

5. **China's "Mediation" Diplomacy:** China is increasingly positioning itself as the regional "peacebroker" (e.g., the Saudi-Iran deal). As Beijing expands its **Belt and Road Initiative (BRI)** into Gulf ports like Gwadar and Jebel Ali.
6. **De-hyphenation Stress:** Balancing a defense pact with **Israel** while engaging **Iran's Interim Council** (for Chabahar) is increasingly difficult. India faces rising domestic criticism and friction with the US-led axis over its strategic autonomy.

Way Forward

1. **Strengthening Strategic Petroleum Reserves (SPR):** India must accelerate the Phase II expansion of its SPR (Strategic Petroleum Reserves) to build a **90-day buffer**. Inviting investments from Saudi Aramco and UAE's ADNOC into these reserves will tie their commercial interests to India's energy security, ensuring supply even during regional volatility.
2. **Operationalizing the "Trans-Continental" Backup:** Given the current paralysis of IMEC, India should prioritize the **International North-South Transport Corridor (INSTC)** via **Chabahar Port**. Strengthening this "middle corridor" provides a vital hedge against chokepoints in the Red Sea and ensures uninterrupted trade with Russia and Central Asia.
3. **Institutionalizing "Rupee-Trade" Hubs:** To counter currency pressure (₹92-95/$) and potential sanctions, India must institutionalize **Local Currency Settlement (LCS)** systems.
4. **Transitioning to Energy 2.0 (Green Hydrogen):** India should pivot from being a "buyer" of oil to a **"partner" in Green Hydrogen**. By co-developing renewable energy infrastructure in the Gulf, India can leverage West Asia's low-cost solar energy to meet its "Net-Zero" goals while reducing the fiscal strain of fossil fuel imports.
5. **Multi-Lateral "Security Architecture":** Utilizing the **I2U2** and **BRICS+** platforms, India can advocate for a "Code of Conduct" in the North Arabian Sea, positioning itself as a net security provider and a stabilizing force between the US-Israel axis and Iran.

Conclusion

India must transition from a "buyer-seller" to a **"strategic stakeholder,"** leveraging **IMEC** and **Green Hydrogen** to anchor its extended neighborhood, ensuring regional stability while securing long-term **energy and maritime sovereignty.**

2.7. STRAIT OF HORMUZ CRISIS: GLOBAL OIL DISRUPTION & ENERGY GEOPOLITICS

Context:

In simple words, a narrow sea passage called the **Strait of Hormuz** is like the main pipe that carries almost one-fifth of the world's traded oil. After the recent **US-Israel military action** against **Iran**, Iran blocked ships through this strait of Hormuz. This sudden stop has caused **oil prices to jump above $110 per barrel**, created chaos in energy markets, and forced big countries like **India**, the **USA**, and **Russia** to change their plans quickly.

Significance of the Strait of Hormuz as a Global Energy Chokepoint

The **Strait of Hormuz** is a narrow waterway located **between Iran (north) and Oman and the UAE (south)**. It connects the **Persian Gulf** (home to huge oil producers like Saudi Arabia, UAE, Iraq, Kuwait, and Iran) to the **Gulf of Oman** and the open **Arabian Sea** (leading to the Indian Ocean).

- Narrowest point: Only **21–33 km** wide (about the width of a small city).
- **Daily transit (pre-closure, 2024–2025 data)**: Around **20–21 million barrels per day** of crude oil and products — roughly **20–25%** of global seaborne oil trade and about **20%** of total world oil consumption.

- Also carries ~**20%** of global **LNG** (liquefied natural gas).
- **80–90%** goes to Asia (**China, India, Japan, South Korea**).
- Alternatives (pipelines like **Saudi Arabia's East-West pipeline**) can handle only **3.5–7 million barrels per day** max, far less than needed.

Why it matters: It's a global "chokepoint." Any block here creates instant supply shortages, panic buying, and price spikes worldwide. Right now, with the closure, hundreds of tankers are waiting, and Gulf exports are shifting to limited pipelines or getting stuck.

Energy Production and Consumption Dynamics in the World

Oil and **natural gas** together supply **slightly more than half** of the world's total energy (IEA 2024 data), while the remaining portion comes from **coal**, **renewables**, **nuclear**, and other sources.

- **Main uses**:
  - Fuel for **transport** (cars, trucks, airplanes, ships)
  - Generation of **electricity**
  - Production of **cooking gas** (LPG)
  - Essential raw materials for **industries** (plastics, chemicals, fertilizers)
- **Production and Consumption Pattern**
  - **Major producers**: Concentrated in **West Asia** (Persian Gulf region), especially **Saudi Arabia**, **UAE**, **Iran**, **Iraq**, and **Kuwait** — the world's leading exporters of crude oil and natural gas.
  - **Major consumers**: Rapidly growing economies in **East Asia** and **South Asia**, particularly **China**, **India**, and **Japan**.
  - **Limited domestic reserves**: These Asian countries have very little oil of their own (although **China** is a significant **producer of natural gas**).
- **Heavy Reliance on Imports**
  - **China**, **India**, and **Japan** depend heavily on **imported crude oil** and **natural gas** to support their expanding economies and populations.
  - A large share of these imports especially from the Persian Gulf passes through the narrow **Strait of Hormuz**, making this chokepoint critical for global energy security.

Thus, there is a clear mismatch of **huge production in West Asia** and **massive demand in Asia** creating strong dependence on safe passage through the Strait of Hormuz.

Major Players in Global Oil

Only a **few regions and countries dominate global oil reserves and production**:

1. **OPEC (Organization of the Petroleum Exporting Countries)**

   (Role: coordinates production levels to influence global oil prices and ensure supply stability)

   - It consists of around **12–13 major oil-producing countries**.
   - **Leading members:** Saudi Arabia (dominant leader), UAE, Iran, Iraq, Kuwait, etc.
   - OPEC countries together hold **over 70% of global oil reserves**
   - They regulate the market through **output cuts or increases** to maintain **price stability**.
   - **West Asia (Persian Gulf Countries)**
     - The **key producers** include **Saudi Arabia, UAE, Iran, Iraq, and Kuwait**.
     - This region holds a **major share of global oil reserves** and controls **large export flows through the Strait of Hormuz**.

- Most of these countries are part of **OPEC**, which gives the region strong influence over global oil supply.

3. Other Strategic Players

- **Venezuela and Iran together hold a massive share of global reserves (~39%)**
- **For example**, Venezuela alone has around **17% of global oil reserves**
- However, their **current production remains limited** due to: **Sanctions** and **Infrastructure constraints**

Shifting Power Dynamics among United States, Russia, and India

1. America's Central Role in Energy Geopolitics

The **United States** is both a **major producer and consumer** of energy:

- Its economy is dominated by **high-energy sectors** (transport, industry, manufacturing), leading to **very high per capita energy use**.
- US per capita energy consumption is roughly **10 times higher than India's** and about **2.4 times higher than China's** because of this, **securing reliable energy supplies** has long been a core driver of **US foreign policy**.

A. Historical Shift in West Asian Oil Control

From the **1950s onward**, control over **West Asian oil** shifted:

- Initially dominated by **large American and European oil companies**.
- Gradually transferred to **state-owned national oil companies** in the producing countries.

By the **1970s**, sharp **oil price spikes** occurred as **Arab members** gained more influence in **OPEC (Organization of the Petroleum Exporting Countries)**, using oil as a political and economic weapon.

B. US Strategic Responses

The United States countered these shifts with a **two pronged strategy**:

1. Boosting Domestic Production

- Heavily expanded **shale oil** extraction (oil trapped in **hard shale rock**, extracted using modern technology called fracking and horizontal drilling), especially from the **mid 2000s onward**.
- As a result, the US became the **world's largest oil producer**, reducing dependence on imports.

2. Shaping Global Oil Geopolitics

Through **military and political interventions**, including:

- **Gulf War (1990–1991)**
- **Iraq War (2003–2011)**
- **Recent actions in Venezuela (2026)**
- **Ongoing US–Israel conflict with Iran**

These moves aimed to secure **energy routes**, influence **regional regimes**, and maintain **access to Gulf oil**.

C. "Future Oil" Calculus

- Countries like **Iran and Venezuela together hold a large share of global proven oil reserves (~39%)**, making them crucial for future **energy supply**,

- For the U.S., **access to these reserves is important for long-term strategic and economic planning**. However, the **Strait of Hormuz closure has disrupted these plans in the short term**.
- At the same time, it has **benefited Russia**, as reduced **West Asian** supply has increased reliance on **Russian oil**, making it a **key stabiliser of global energy prices**.

2. Russia's Rise as a Beneficiary

- After the **2022 Russia-Ukraine war**, Russia faced Western sanctions, becoming isolated in Europe and struggling to export oil freely.
- Now, with **West Asian** production and exports hit hard, **Russian oil** is suddenly essential.
- Outside **West Asia**, Russia is the only major country with a large **tradable oil surplus** (ready for export).

A. Russian Oil and India's Role

Oil markets are tightly linked — small changes in one area can create massive ripples worldwide.

India's Position

- India ranks as the world's **second-largest importer** of crude oil and **third-largest consumer**.
- Disruptions raise prices for fuel, transport, food, and everyday goods in India.
- India's buying decisions also influence global oil prices significantly.

B. Europe's Energy Shift

- European nations have limited domestic reserves and historically relied on Russian imports for winter heating.
- Post-2022 sanctions forced Europe to pivot toward West Asian sources.

C. India's Pivot to Russian Oil

- To secure affordable supplies, India increased purchases of discounted **Russian crude**.
- **Share of Russian oil in India's imports jumped dramatically**: from **2.5% in 2021 to 39% in 2023** (peaking around **36–44% in 2023–2024**; recent data shows decline to **~33% in 2025** overall, with monthly lows around 27% due to sanctions pressure, but still significant).
- India refines **imported crude** into products like **petrol**, **diesel**, **LPG**, and **petrochemicals**.
- With large refining capacity, India (and China) export some refined products.
- Indian refiners earned strong profits from processing cheap Russian crude and selling outputs.

Western Response to the Strait of Hormuz Crisis

- Despite public criticism, Western leaders quietly supported this shift because India's diversion to sanctioned Russian oil helped stabilize global prices from 2022 onward.
- **Current Strain:** With the **Strait of Hormuz** closed and oil prices surpassing **$110 per barrel,** the US now urgently wants increased purchases of stranded **sanctioned Russian oil** to ease market pressure.

India's Multi-Pronged Response to the Energy Crisis

1. Government Regulation under Essential Commodities Act (ECA), 1955

- The government invoked the **Essential Commodities Act, 1955** through the **Natural Gas (Supply Regulation) Order, 2026** to manage the crisis.
- A **priority-based allocation system** has been introduced:

- **Top priority:** PNG (households), CNG (transport), LPG production
- **Reduced supply:**
  - Fertilizer sector (~70%)
  - Other industries (~80%)
  - To prevent **hoarding and panic buying**, a **25-day gap between LPG bookings** has been enforced.

2. Diversification of Energy Imports

- India is reducing dependence on **vulnerable routes like the Strait of Hormuz**.
- It has expanded imports from **alternative suppliers** such as: **Algeria, Norway, Canada, Australia**
- Supplies are being routed through **longer but safer routes** like the **Cape of Good Hope** to ensure continuity.

3. Increased Dependence on Russian Oil

- India has **stepped up oil imports from Russia** to compensate for supply disruptions from West Asia. This has been made possible by a **temporary easing of Western sanctions**, helping India maintain a steady energy supply.

4. Enhancing Domestic Energy Production

- The government has directed refineries to **increase domestic production**, especially **LPG**.
- As a result LPG output has increased by **~10% in the short term**
- The additional supply is being **prioritised for households** to meet essential needs.

Way Forward: Building Resilience Against Future Energy Shocks

1. For India: Strengthening Energy Security

- India should **diversify its import basket** by sourcing oil from multiple regions such as **Russia, West Asia, the United States, and Africa** to reduce overdependence on any single route.
- It must **expand Strategic Petroleum Reserves (SPR)** from the current limited capacity (around 2 weeks) towards **90 days of reserve cover**, in line with global best practices.
- There is a need to **accelerate the transition to renewable energy** (solar, wind) and promote **electric vehicles (EVs)** to reduce long-term dependence on fossil fuels.
- India should also **strengthen its refining capacity and flexibility** to process diverse crude types efficiently and maintain export competitiveness.

2. For the United States and Russia: Stabilising Global Supply

- The **United States** should prioritise **diplomatic efforts to ensure the reopening and security of critical chokepoints like the Strait of Hormuz**, while also **boosting domestic shale oil production** to ease global supply pressures.
- **Russia**, as a major surplus producer, can play a constructive role by **offering stable, long-term supply contracts**, especially to energy-importing countries like India, thereby contributing to market stability.

3. For the Global Community: Ensuring Systemic Stability

- Countries should **invest in alternative energy transport routes**, such as pipelines and new LNG terminals, to reduce dependence on vulnerable chokepoints.

- Greater **coordination among oil-producing nations**, including through platforms like **OPEC+**, is necessary to manage supply and avoid extreme price volatility.
- There must be a **faster transition towards renewable energy**, as global agencies like the **International Energy Agency (IEA)** highlight its potential to meet a large share of future energy demand.
- Finally, nations should emphasise **diplomacy and conflict resolution** to ensure stable trade flows.

Conclusion

The **Strait of Hormuz crisis highlights the deep interlinkage between energy security and geopolitics**, where disruptions in a single chokepoint can trigger global economic and strategic shifts. Going forward, a balanced approach combining **diversification, domestic resilience, clean energy transition, and international cooperation** will be essential to ensure a stable and secure energy future.

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3.1. OPEN MARKET OPERATIONS (OMO)

Context:

Recently, the Reserve Bank of India (RBI) announced a substantial liquidity injection plan involving the purchase of Government of India securities worth **₹1 lakh crore** through Open Market Operations (OMO). This decision, involves two separate auction tranches of ₹50,000 crore each, scheduled for **March 9 and March 13, 2026**. The move is strategically timed to counteract expected liquidity tightening in the banking system due to significant cash outflows from mid-month **advance tax payments** and Goods and Services Tax (GST) collections.

1. **What is OMO?**

   Open Market Operations are one of the **quantitative (general)** monetary policy tools used by the central bank (RBI) to regulate the money supply in the economy. It involves the **outright purchase or sale** of government securities (G-Secs) and Treasury Bills in the open market.

2. **Mechanism of OMO**

   The RBI manages liquidity by interacting with the secondary market:

   - **OMO Purchase (Liquidity Injection):** When the RBI buys G-Secs from the market, it pays the commercial banks/financial institutions in cash. This increases the **reserves of the banks**, leading to a higher money supply and potentially lower interest rates.
   - **OMO Sale (Liquidity Absorption):** When the RBI sells G-Secs, it takes cash out of the banking system. This reduces the **loanable funds** available with banks, thereby decreasing the money supply and controlling inflationary pressures.

3. **Impact on Bond Yields**

   There is an **inverse relationship** between the price of a bond and its yield:

   - During an **OMO Purchase**, the demand for bonds increases, which pushes the bond prices up. As bond prices rise, the **bond yield falls**.
   - During an **OMO Sale**, the supply of bonds in the market increases, causing bond prices to fall and **bond yields to rise**.

4. **Comparison with Other Tools**

Feature	OMO	Repo Rate (LAF)
Duration	Generally for **durable** or long-term liquidity.	Used for **short-term** (overnight to 14 days) liquidity.
Nature	Outright buying and selling; ownership changes.	Repurchase agreement; securities act as collateral.
Flexibility	RBI can choose specific securities to buy/sell.	Uniformly applicable to all eligible participants.

5. **Key Participants and Platform**
    - **Platform:** OMOs are conducted electronically on the **E-Kuber system**, which is the Core Banking Solution (CBS) platform of the RBI.
    - **Participants:** Commercial banks, primary dealers, and other designated financial institutions.

3.2. INDIA'S LPG DEPENDENCE AND RECENT CRISIS

Context:

Recently, India has been grappling with a nationwide **LPG supply crisis** primarily triggered by the escalating **Iran-Israel conflict** in West Asia, which has disrupted maritime traffic through the **Strait of Hormuz**. On March 11, 2026, the Government of India invoked the **Essential Commodities Act** to prioritize LPG supply for domestic households over commercial and industrial consumers. Furthermore, Union Ministers have confirmed that domestic LPG production has been ramped up by **25%** as an emergency measure to mitigate the shortfall caused by the effective halt of shipments from key suppliers like Qatar and Saudi Arabia.

1. **Basics of LPG (Liquefied Petroleum Gas)**
    - **Composition:** LPG is a flammable mixture of hydrocarbon gases, primarily consisting of **Propane (C_3H_8)** and **Butane (C_4H_{10})**. It may also contain small amounts of propylene and butylene.
    - **Properties:** It is **colorless and odorless** in its natural state; however, a powerful odorant called **Ethyl Mercaptan** is added to help detect leaks.
        - LPG is **heavier than air**, meaning it tends to settle in low-lying areas (like basements) if a leak occurs, posing an explosion risk.
        - It has a **high calorific value**, making it highly efficient for cooking.
    - **Production:** It is obtained as a by-product during **Petroleum Refining** (crude oil processing) and from **Natural Gas** fractionation.
    - **Storage:** It is stored as a liquid under moderate pressure to reduce its volume (approx. 250 times), allowing for easier transportation in cylinders.
2. **India's LPG Dependence**
    - **Import Reliance:** India is the world's third-largest consumer of LPG. Approximately **60-65%** of India's total LPG requirement is met through imports.
    - **Regional Concentration:** Nearly **90% of India's LPG imports** originate from the West Asian region (Middle East), specifically from Saudi Arabia, UAE, Qatar, and Kuwait.
    - **Vulnerability (Strait of Hormuz):** A significant portion of these imports passes through the Strait of Hormuz. Any regional instability here directly threatens India's energy security, as seen in the 2026 crisis.
    - **Storage Capacity:** India's strategic LPG storage capacity is relatively low compared to crude oil, typically lasting for only about **10-15 days** of national consumption.
3. **The 2026 LPG Crisis & Government Response**
    - **Cause:** Maritime disruptions in the Persian Gulf due to regional warfare have blocked the primary supply route for Indian gas tankers.

- **Emergency Measures:**
  - **Essential Commodities Act (ECA):** Invoked to prevent hoarding and ensure that available stocks are diverted strictly to "Domestic Use" (households).
  - **Production Hike:** Refineries have been ordered to maximize LPG output and divert chemical streams (like propane/butane used in plastics) into the fuel pool.
  - **Refill Restrictions:** The minimum gap between booking two domestic refills has been temporarily increased (from 21 to 25 days) to manage inventory.
  - **DAC Expansion:** The **Delivery Authentication Code (DAC)** system (OTP-based delivery) is being scaled to 90% coverage to prevent black marketing.

4. Major Government Schemes

- **Pradhan Mantri Ujjwala Yojana (PMUY):** Launched in 2016 to provide clean cooking fuel to BPL households. By 2026, **Ujjwala 3.0** is active, focusing on migrant families and providing additional subsidies (currently ₹300 per cylinder for up to 12 refills).
- **PAHAL (DBTL):** The world's largest cash transfer program, ensuring LPG subsidies are credited directly to the beneficiary's bank account via **Direct Benefit Transfer**.

3.3. ECONOMIC STABILISATION FUND (ESF)

Context:

Recently, the Union Finance Minister announced the creation of a **₹1 lakh crore Economic Stabilisation Fund** (ESF) as part of the second batch of supplementary demands for grants in the Lok Sabha. This move comes in response to intensifying global headwinds, particularly the volatility in energy prices and supply chain disruptions caused by the ongoing West Asia conflict.

The fund is designed to provide the Indian government with the necessary **fiscal headroom** to absorb external macroeconomic shocks without compromising the fiscal deficit target, which remains at **4.4% of GDP** for the financial year 2025-26.

1. Core Concept of the Economic Stabilisation Fund

An Economic Stabilisation Fund is a dedicated financial reserve established by a government to protect the domestic economy from external shocks and revenue volatility. Unlike developmental funds, its primary purpose is **stabilisation** rather than long-term infrastructure investment.

- **Buffer Mechanism:** It acts as a "rainy-day fund" that accumulates surpluses during periods of high growth or stable prices and is deployed during economic downturns or price spikes.
- **Counter-Cyclical Fiscal Policy:** By providing a cushion, the government can avoid drastic cuts in social spending or capital expenditure when revenue is hit by global crises.
- **Targeting Volatility:** In the Indian context, the fund is specifically aimed at mitigating the impact of high crude oil prices (which recently touched $100/barrel) and ensuring the stability of the rupee.

2. Key Features and Significance

1. **Fiscal Headroom:** The fund allows the government to meet additional spending requirements (such as fuel or fertilizer subsidies) without breaching the **Fiscal Responsibility and Budget Management (FRBM)** targets.

2. **Absorption of External Shocks:** It targets "black swan" events, such as the disruption of the **Strait of Hormuz**, which is critical for India's LPG and crude oil imports.
3. **Inflation Control:** By absorbing the cost of global price hikes, the fund helps prevent the pass-through of high energy costs to the domestic consumer, thereby anchoring inflation expectations.
4. **Sovereign Resilience:** It functions similarly to a Sovereign Wealth Fund (SWF) but with a specific mandate for macroeconomic stability rather than purely commercial returns.

3. Comparison: ESF vs. NIIF

Feature	Economic Stabilisation Fund (ESF)	National Investment & Infrastructure Fund (NIIF)
Primary Goal	Macroeconomic stability and shock absorption.	Catalyzing investment in infrastructure.
Nature	Counter-cyclical and precautionary.	Pro-growth and developmental.
Usage	Deployed during crises (e.g., oil price spikes).	Invested in greenfield and brownfield projects.
Funding	Budgetary allocations / Supplementary grants.	Anchored by Govt (49%) + International Investors.

3.4. PUBLIC INSURANCE REGISTRY (PIR)

Context:

Recently, the Insurance Regulatory and Development Authority of India (IRDAI) proposed the establishment of a **Public Insurance Registry (PIR)** to consolidate insurance data across all stakeholders and modernize the information architecture of the Indian insurance sector.

This move, discussed during a high-level stakeholder meeting in New Delhi, aims to create a unified, consent-driven digital infrastructure that tracks the entire lifecycle of an insurance policy from issuance to dispute resolution.

1. Key Features and Details of Public Insurance Registry (PIR)

- **Definition and Governance:** The PIR is envisioned as a structured, interoperable information infrastructure governed by the **IRDAI** to act as a centralized database for the insurance industry.
- **Consent-Driven Framework:** It is designed to be a legally compliant, digital platform where data sharing is based strictly on the **explicit consent** of the policyholder, ensuring privacy and security.
- **Comprehensive Lifecycle Coverage:** The registry will host data covering every stage of an insurance policy, including its issuance, premium payments, claims processing, grievance redressal, and final dispute resolution.
- **Integration with Bima Sugam:** The PIR will work in tandem with **Bima Sugam** (an e-marketplace) to enable seamless access to insurance policies and enhance the overall customer experience by providing a single source of truth for policy data.
- **Interoperability:** The system is built to be interoperable across various insurance entities, including life, general, and health insurers, ensuring that data can be seamlessly exchanged between authorized stakeholders.

2. **Objectives and Significance**

- **Reducing Information Asymmetry:** By consolidating data in one place, the PIR aims to provide a transparent view of the insurance landscape to both regulators and consumers.
- **Fraud Detection and Mitigation:** A centralized registry allows for better cross-verification of claims and policyholder history, making it significantly easier to identify and prevent fraudulent activities.
- **Data-Driven Oversight:** The IRDAI will be able to perform more effective regulatory oversight using real-time, high-quality data to monitor the solvency and conduct of insurance companies.
- **Enhancing "Insurance for All by 2047":** It aligns with the national goal of achieving universal insurance coverage by reducing administrative friction and lowering costs for both insurers and the insured.

3. **Institutional & Statutory Facts**

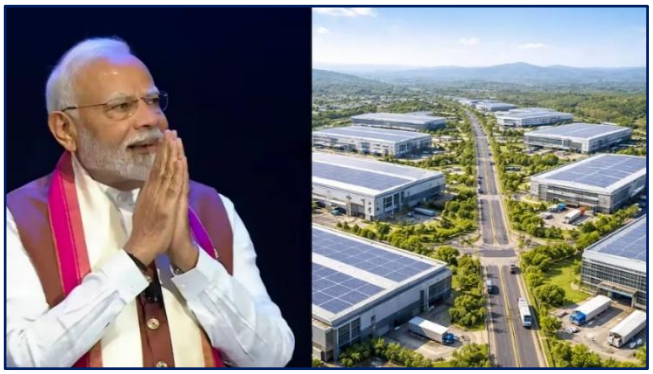
- **Malhotra Committee (1994):** The foundational committee that recommended the opening of the insurance sector and the creation of IRDAI.
- **Statutory Status:** IRDAI was established under the **IRDAI Act, 1999**. It is a 10-member body (1 Chairman, 5 full-time, 4 part-time members) appointed by the Government of India.
- **FDI Limit:** The Foreign Direct Investment limit in the insurance sector has been hiked to **74%**, while it is **100%** for insurance intermediaries (brokers).

4. **Critical Economic Terms**

- **Insurance Penetration:** The ratio of premium underwritten in a year to the **GDP**. (India: approx. **3.8% to 4%**).
- **Insurance Density:** The ratio of premium to the **total population** (measured in USD per capita).

3.5. BHARAT AUDYOGIK VIKAS YOJANA (BHAVYA)

Context:



Recently, the Union Cabinet chaired by the Prime Minister has approved the **Bharat Audyogik Vikas Yojana (BHAVYA)**. This flagship scheme, with a significant financial outlay of **₹33,660 crore**, aims to transform India's manufacturing landscape by developing 100 high-end "plug-and-play" industrial parks across the country. The move is seen as a strategic step to counter "premature de-industrialization" and achieve the goal of a *Viksit Bharat* by enhancing domestic manufacturing capabilities and generating approximately 15 lakh direct jobs.

1. **Overview and Objectives**

The Bharat Audyogik Vikas Yojana (BHAVYA) is a central sector initiative designed to provide world-class, investment-ready infrastructure.

- **Goal:** To build **100 industrial parks** that allow companies to move from "intent to production" with minimal delay.

- **Primary Target:** Boosting the manufacturing sector's contribution to the GDP and creating large-scale employment.
- **Focus Areas:** Ease of Doing Business (EoDB), deregulation, and streamlined single-window clearances.

2. Infrastructure and Funding Model

The scheme introduces a robust financial support mechanism to ensure the quality of these industrial ecosystems:

- **Grant Support:** The Central Government will provide a grant of up to **₹1 crore per acre** for core infrastructure development.
- **External Connectivity:** The Centre will fund up to **25% of the cost** for external infrastructure (roads, rail links, etc.) to ensure seamless multimodal connectivity.
- **Scale of Parks:** General Regions: Minimum area of **100 acres** (scaling up to 1,000 acres).
  - North-Eastern and Hilly States: Minimum area of **25 acres** to suit the local terrain.

3. Key Features of BHAVYA

- **Plug-and-Play Facilities:** These parks will offer ready-to-use factory sheds, testing laboratories, and pre-approved environmental and building clearances.
- **Challenge Mode Selection:** Projects will be selected through a competitive "Challenge Mode" among states to ensure only high-quality, reform-oriented proposals receive funding.
- **PM GatiShakti Alignment:** The parks are designed based on the **National Master Plan (NMP)** for multimodal connectivity, ensuring efficient logistics and "no-dig" underground utility corridors.
- **Social Infrastructure:** Unlike traditional industrial zones, BHAVYA includes provisions for **worker housing**, health centers, and basic amenities within the park to support the workforce.

4. Implementation Agency

The **National Industrial Corridor Development Corporation (NICDC)**, under the Department for Promotion of Industry and Internal Trade (**DPIIT**), will be the lead agency for executing the scheme in partnership with State Governments and the private sector.

3.6. NATIONAL AGRI-PHOTOVOLTAICS MISSION (AGRIPV)

Context:

A proposal for a **National Agri-photovoltaics Mission** has been introduced to achieve a target of 10 GW capacity, aiming to resolve the "food vs. energy" land-use conflict as India strives for 300 GW of solar power by 2030.

1. Understanding Agri-photovoltaics (AgriPV)

AgriPV (also known as *Agrisolar* or *Dual-use Solar*) is the simultaneous use of **land for both solar energy generation** and agricultural production.

Key Technical Features

- **Elevated Mounting:** Panels are fixed **2–3 meters high** (standard elevation at least 2.1m) to allow movement of laborers and farm machinery (like tractors) beneath them.

- **Optimal Tilting:** Panels are often tilted at an angle (approx. 30°) or use **manual/automated tracking** to balance light for crops with energy capture.
- **Bifacial Panels:** Modern systems use panels that capture sunlight from both sides, often installed vertically to save space.

2. **Synergies and Benefits**
   - **Micro-climate Control:** Partial shading reduces **evapotranspiration**, helping soil retain moisture longer (reducing irrigation needs by up to 29%).
   - **Yield Protection:** Protects sensitive crops from heat stress, hail, and extreme weather.
   - **Water Conservation:** Systems can incorporate **rainwater harvesting**, capturing up to 80% of rain falling on panels for irrigation/cleaning.
   - **Economic Stability:** Provides a secondary, stable revenue stream for farmers (lease rent or selling surplus power to the grid).
3. **Institutional & Policy Framework**
   - **PM-KUSUM Scheme:** The primary anchor.
     - **Component A:** Decentralized ground-mounted plants (500 kW to 2 MW) on barren/fertile land.
     - **Component B & C:** Standalone solar pumps and solarization of existing pumps.
   - **Nodal Agencies:** Ministry of New and Renewable Energy (**MNRE**) and the National Solar Energy Federation of India (**NSEFI**).
   - **India Agrivoltaics Alliance (IAA):** An initiative to integrate solar infrastructure with agricultural spaces.
4. **Challenges and Regulatory Barriers**
   - **High CAPEX:** Installation costs are roughly **11% higher** than traditional ground-mounted solar due to specialized elevated structures.
   - **Technical Suitability:** Not all crops are "shade-tolerant." Success depends on matching specific crops (e.g., leafy greens, tomatoes, onions) with panel density.
   - **Policy Gaps:**
     - **Land Use Classification:** Ambiguity in laws regarding whether AgriPV land is "agricultural" or "industrial," affecting tax and subsidies.
     - **Yield Thresholds:** Unlike Japan (which mandates 80% yield maintenance), India lacks standardized minimum agricultural yield thresholds.
   - **Grid Limitations:** Rural areas often face intermittent grid connectivity, hindering the sale of surplus power back to **DISCOMs**.
5. **Global Best Practices for Comparison**
   - **Germany (DIN SPEC 91434):** Requires at least **66% of original yield** to be maintained; only 15% of arable land can be used for infrastructure.
   - **Japan:** Requires specific panel heights and periodic reviews every 3 years to ensure agricultural productivity isn't compromised.

6. Crops for Agri-photovoltaics (AgriPV) in India

Crop Category	Suitable Crops	Reason for Suitability
Leafy Vegetables	Spinach (Palak), Lettuce, Fenugreek (Methi)	These are naturally **shade-tolerant** and require less direct intense sunlight to prevent wilting.
Root/Tuber Crops	Potato, Onion, Radish, Ginger, Turmeric	Shading keeps the soil cooler, which is beneficial for the growth of underground bulbs and tubers.
Fruit Vegetables	Tomato, Chilli, Brinjal (Eggplant)	These show resilience under partial shade, though yields must be monitored against light-saturation points.
Fodder Crops	Alfalfa, Napier Grass	High biomass production is possible with reduced water evaporation under panels.
Aromatic/Medicinal	Aloe Vera, Lemongrass, Mint	Many medicinal plants prefer the diffused light and stable micro-climate provided by solar structures.

3.7. WOMEN FARMERS IN INDIA

Context:

As the United Nations has declared **2026 as the International Year of the Woman Farmer**. , the focus is on transforming these laborers into empowered entrepreneurs.

The Reality of Women in Agriculture

- **Workforce Participation:** Over **80%** of economically active women in rural India are employed in agriculture.
- **Labor Contribution:** Women perform approximately **70%** of all agricultural activities (sowing, weeding, harvesting, and post-harvest management).
- **Ownership Gap:** Despite their labor, only about **13.9%** of operational landholdings are held by women (Agriculture Census).
- **Productivity Potential:** According to the FAO, if women had the same access to productive resources as men, they could increase yields on their farms by **20–30%**.
- **FLFPR Trend:** The **Economic Survey 2025-26** indicates a rise in Female Labour Force Participation Rate (FLFPR) to **42%**, largely driven by the rural agricultural sector.

The Importance of Women Farmers in India

1. Nutritional Security & SDG 2 (Zero Hunger)

- Women prioritize "Nutrition-Sensitive Agriculture." Unlike commercial cash-cropping, women-led farms often focus on diverse food crops that directly impact the health of rural households.

  Example: The **"Nutri-Garden" (Poshan Vatika)** initiative under the POSHAN Abhiyaan, where women grow green leafy vegetables and fruits to combat stunting and anemia in their families.

2. **Conservation of Biodiversity & Indigenous Knowledge**
    - Women act as the primary "Seed Keepers" of India. They possess specialized knowledge for selecting, treating, and storing traditional seeds that are often more resilient than high-yield varieties.
      Example: Rahibai Popere (the "Seed Mother" of India), who was awarded the Padma Shri for conserving hundreds of native secondary landraces and promoting traditional seed banks.
3. **Leadership in "Natural Farming" (BPKP)**
    - Women are the natural pioneers of **Bhartiya Prakritik Krishi Paddhati**. Their traditional role in livestock management makes them experts in using organic inputs like Jeevamrut and Ghanajeevamrut.
      Example: In **Andhra Pradesh**, the Community-Managed Natural Farming (APCNF) model has succeeded largely due to the participation of over **6 million women** who transitioned away from expensive chemical fertilizers.
4. **Pillars of the Rural Post-Harvest Economy**
    - Women bridge the gap between the farm and the market by leading "Value Addition" activities, which prevents post-harvest losses and increases farm income.
      Example: Women-led FPOs (Farmer Producer Organizations) in states like Madhya Pradesh and Maharashtra that process raw millets into "Ready-to-Eat" snacks, significantly increasing the profit margin compared to selling raw grain.
5. **Resilience Against "Male Out-Migration"**
    - As rural men migrate to urban centers for work, women have stepped up as the de facto managers of the entire farm ecosystem, ensuring national food production remains stable.
      Example: In the **Himalayan and Bihar regions**, where male migration is highest, women have taken over "ploughing to peak-harvest" duties, preventing the "fallow land" crisis.
6. **Technology Pioneers & Digital Inclusion**
    - Women are breaking the "technological glass ceiling" in agriculture, proving that gender is not a barrier to adopting high-tech precision farming tools.
      Example: The **Namo Drone Didi Scheme**, where thousands of women in Self-Help Groups (SHGs) are being trained to operate drones for precision spraying of pesticides and fertilizers, transforming them into "Agri-Technicians."

Critical Challenges for Women Farmers

1. **Land Ownership & Legal Invisibility:** Patrilineal inheritance ensures men hold the majority of titles; women own **<14%** of operational land. This lack of "Farmer" status creates a **"recognition gap,"** relegating them to "agricultural laborers" despite performing the bulk of the work.
2. **Credit & Insurance Exclusion:** Banks mandate land as collateral, creating a **"Collateral Barrier."** This denies women access to institutional credit and central safety nets like **PM Fasal Bima Yojana**, pushing them toward exploitative informal moneylenders.
3. **Technological & Drudgery Bias:** Most farm machinery is designed for the male physique (**"Gender-neutrality gap"**). Lack of ergonomic, woman-friendly tools leads to high physical drudgery and chronic health issues, limiting productivity and mechanization.
4. **Structural Wage Disparity:** A persistent **Gender Pay Gap** exists in the unorganized sector. According to **PLFS 2025-26**, women earn only **70-80%** of male wages for identical labor, despite often working longer hours.

5. **Digital Divide & Info-Asymmetry:** Limited access to smartphones and the internet creates a **"Knowledge Gap."** Women are often excluded from **e-NAM** price discovery and "Lab-to-Land" extension services, which remain predominantly male-centric.
6. **"Time Poverty" (The Dual Burden):** Rural women face a **"Double Day"**—balancing intensive farm labor with nearly **360 minutes/day** of unpaid care work. This "Time Poverty" restricts their ability to attend training, engage in leadership, or access distant markets.

Key Government Initiatives for Women Farmers

1. **Namo Drone Didi:** Empowering Women SHGs through **80% drone subsidies** (up to ₹8 lakh) to transition from manual labor to high-tech **Agri-Entrepreneurs**.
2. **Lakhpati Didi Mission:** Aiming to elevate **6 crore rural women** to an annual income of **₹1 Lakh** by 2029 through diversified SHG-led livelihoods.
3. **Krishi Sakhi Program (KSCP):** Training women as **certified para-extension workers** (56-day module) to earn ₹60,000–80,000 annually by bridging the "Lab-to-Land" gap.
4. **Mahila Kisan Sashaktikaran Pariyojana (MKSP):** A DAY-NRLM sub-component empowering **3.5 crore women** in **climate-resilient natural farming** via community resource centers.
5. **Womaniya on GeM:** Facilitating direct market linkage for **2 lakh women-led MSEs** to secure government procurement orders worth over **₹80,000 crore**.
6. **Gender Budgeting & Earmarking:** Mandating **30% fund allocation** in agriculture schemes (RKVY/MIDH) and providing **3% interest subvention** via the Agriculture Infrastructure Fund.

Way Forward

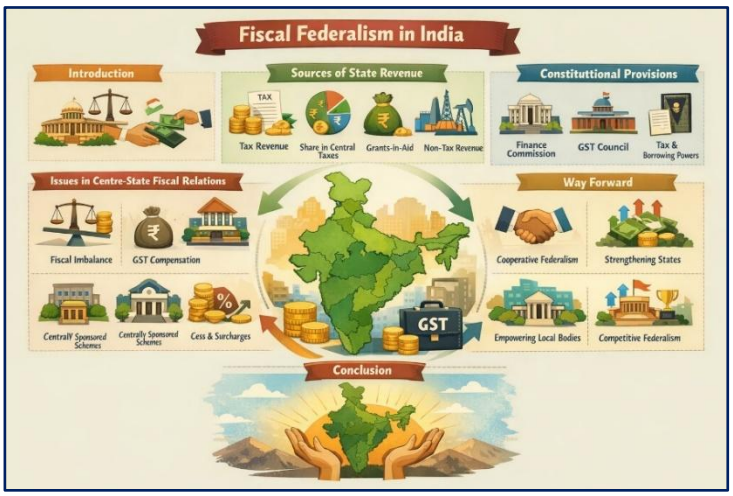
1. **Recognise Women as Farmers:** Revive the spirit of the **2011 Women Farmers' Entitlement Bill (proposed by MS Swaminathan)** to create a legal framework that recognizes a "farmer" based on cultivation, not just land ownership.
2. **Strengthen Land Rights:** States should incentivize the registration of agricultural land in women's names through **Stamp Duty waivers** (e.g., as seen in UP and Haryana) and promote **Joint Titling**.
3. **Improve Access to Credit and Resources:** Scaling "Livelihood Finance" through **Joint Liability Groups (JLGs)** to provide collateral-free institutional credit.
4. **Promote Women-Centric Farmer Institutions:** Strengthening **Women-only FPOs (Farmer Producer Organizations)** to eliminate middlemen and improve bargaining power in platforms like **e-NAM**.
5. **Improve Technology and Extension Services:** R&D by institutes like **ICAR (Central Institute for Women in Agriculture)** must prioritize the "feminization of tools"—creating lightweight, adjustable machinery (power tillers, weeders) suited for the female physique to reduce drudgery.
6. **Nutrition-Sensitive Agriculture:** Leveraging women's expertise in **Shree Anna (Millets)** to lead India's nutritional security and climate adaptation strategy.

Conclusion

Empowering women farmers via land rights and **Agri-Tech** is vital for **Viksit Bharat @2047**. As 2026 honors their leadership, integrating them into the digital value chain ensures a climate-resilient, food-secure future.

3.8. FISCAL FEDERALISM IN INDIA

Context:



- **Definition:** Fiscal Federalism is the study of how revenues and expenditures are allocated across different layers of the government.
- **Nature:** India follows a **Quasi-Federal** fiscal structure. While the Centre has more elastic revenue sources (Income Tax, Corp Tax), the States bear the majority of "ground-level" expenditures (Health, Education, Agriculture).
- **Musgrave's Three Functions:** It aims to achieve **Allocation** (public goods), **Distribution** (equity), and **Stabilization** (macroeconomic health).

Constitutional Provisions on Fiscal Federalism

The legal framework is primarily contained in **Part XII** (Articles 268-293).

1. **Division of Taxing Powers (The Foundation)**
   - **Article 246 (Seventh Schedule): Union List (List I):** Centre has exclusive power over Income Tax (except agriculture), Customs, Corporate Tax, and Central Excise (on tobacco, petroleum, etc.).
     - **State List (List II):** States have exclusive power over Land Revenue, State Excise (on alcohol), Stamp Duty, and Agricultural Income Tax.
     - **Concurrent List (List III):** Minimal taxation powers; mostly regulatory.
   - **Article 246A (101st Amendment):** The "Special Provision" that bypasses the Seventh Schedule to allow both Centre and States to levy **GST** on the same transaction.
2. **Revenue Distribution (The Mechanism)**
   - **Article 268:** Duties levied by the Union but **collected and appropriated by the States** (e.g., Stamp duties).
   - **Article 269:** Taxes levied and collected by the Union but **assigned to the States** (e.g., taxes on inter-state trade, though largely subsumed by IGST).
   - **Article 270 (The Divisible Pool):** Mandatory sharing of "Net Proceeds" of all Union taxes (except cesses and surcharges) between the Centre and States.
     - *Current Status:* The **16th Finance Commission** has maintained the vertical devolution at **41%** for 2026-31.
   - **Article 271:** Power of the Union to levy **Cesses and Surcharges**. These are **not part of the divisible pool**, meaning the Centre keeps 100% of this revenue. This remains a major point of friction.
3. **Grants-in-Aid (The Gap Filler)**
   - **Article 275 (Statutory Grants):** Mandatory grants given to specific states based on the Finance Commission's recommendations. Charged on the **Consolidated Fund of India**.
   - **Article 282 (Discretionary Grants):** Allows the Centre or States to make grants for any "public purpose." Most **Centrally Sponsored Schemes (CSS)** are funded under this article.

- **N.B**: The 16th FC has signaled a shift toward **performance-linked grants** (e.g., 20% of local body grants are now performance-tied).

4. **Institutional Pillars**

- **Article 280 (Finance Commission):** A quasi-judicial body appointed every 5 years to recommend the formula for horizontal and vertical tax devolution.
- **Article 279A (GST Council):** A constitutional body for joint decision-making. Decisions require a **75% majority**, where the Centre has **1/3rd voting power** and States have **2/3rd**.

5. **Financial Management & Borrowing**

- **Article 292:** Union's power to borrow upon the security of the Consolidated Fund of India (within limits set by Parliament).
- **Article 293:** States' power to borrow.
  - **Constraint:** A State **cannot** borrow without the Centre's consent if it has any outstanding loan due to the Union (Art. 293(3)).
  - *Recent Conflict:* The Centre has used this to include **Off-Budget Borrowings** in the state's debt ceiling, a move challenged by states like Kerala.

Sources of State Revenue

1. **State's Own Tax Revenue (SOTR)**

This is the most critical component for a state's fiscal autonomy.

- **State GST (SGST):** The single largest source. It is the state's share of the Goods and Services Tax levied on intra-state supply.
- **State Excise Duty:** Primarily levied on the manufacture of **alcohol for human consumption** and narcotics. (A major "sin tax" revenue source).
- **VAT on Petroleum:** Since petrol, diesel, and aviation turbine fuel are outside GST, states levy a Value Added Tax (VAT) on them.
- **Stamp Duty & Registration Fees:** Levied on the transfer of property and legal documents.
- **Taxes on Vehicles:** One-time or annual life taxes on motor vehicles.
- **Land Revenue:** Tax on agricultural land (historically significant, now a smaller share).
- **Electricity Duty:** Tax on the consumption or sale of electricity.

2. **State's Own Non-Tax Revenue (SONTR)**

Often underutilized, this includes:

- **User Charges:** Fees for social and economic services (e.g., irrigation charges, tuition fees in govt colleges, health hospital fees).
- **Interest Receipts:** Interest earned on loans provided by the State to PSUs or local bodies.
- **Dividends & Profits:** Income from State Public Sector Undertakings (SPSUs).
- **Mining Royalty:** Fees paid by mining companies for extracting minerals (crucial for states like Odisha, Jharkhand, and Chhattisgarh).
- **Lottery Proceeds:** Significant for states like Kerala and Sikkim.

3. **Transfers from the Centre**

- **Tax Devolution (Art. 270):** States receive **41%** of the "Divisible Pool" of central taxes (Income Tax, Corp Tax, CGST, etc.).
- **Grants-in-Aid (Art. 275): Revenue Deficit Grants:** Given to states facing a fiscal gap after devolution.

- **Local Body Grants:** For Panchayats and Urban Local Bodies (RLBs/ULBs).
- **Centrally Sponsored Schemes (CSS):** Funds transferred for specific schemes (e.g., Jal Jeevan Mission, PM-Kisan) under **Article 282**.

Issues In Center-state Fiscal Relations

I. **Vertical Fiscal Imbalance:** The Centre collects roughly **60%** of total revenue but the States perform **60%** of total public expenditure. This creates a dependency of States on the Union.

II. **Growth of Cesses and Surcharges:** Under Article 271, the Centre levies cesses (e.g., Health & Education Cess) which are **not shared** with states. This has effectively reduced the "divisible pool."

Note: The **16th FC** recently proposed a **"Grand Bargain"** where States might accept a lower devolution percentage if Cesses are merged into the shared pool.

III. **Erosion of Autonomy (GST):** The "One Nation, One Tax" regime has taken away the States' power to vary tax rates on most goods, making them "pensioners of the Centre."

IV. **Borrowing Constraints (Article 293):** The Centre imposes a **Net Borrowing Ceiling (NBC)**. States like Kerala have challenged this in the Supreme Court, arguing it infringes on their constitutional right to manage their own finances.

V. **Centrally Sponsored Schemes (CSS):** States argue that CSS (like MGNREGA or Ayushman Bharat) are "one-size-fits-all" and force states to spend their limited resources on Central priorities, often with a 60:40 or 90:10 funding pattern.

Way Forward: Strengthening Fiscal Federalism

1. **Cess Neutralization:** Implement a **"Grand Bargain"** by merging major cesses into the divisible pool. This ensures transparency and prevents the "shrinking" of the states' share of Gross Tax Revenue.
2. **GST 2.0 Reform:** Move toward a **simplified two-slab structure** (e.g., 5% and 18%) and establish a clear roadmap for including **Petroleum and Electricity** under GST to reduce cascading costs and broaden the revenue base.
3. **Revenue Floor Guarantee:** To mitigate the "North-South" divide created by efficiency-linked criteria (like GDP contribution), the Centre should guarantee that no state's absolute revenue falls below its previous levels during the transition.
4. **Local Body Empowerment:** Shift focus from "Grant-Dependency" to **"Fiscal Autonomy"** for Panchayats and ULBs. States must mandate the implementation of **State Finance Commission (SFC)** reports to improve local property tax collection.
5. **Flexi-CSS Model:** Replace rigid **Centrally Sponsored Schemes** with "Outcome-based Tied Grants." This allows states the flexibility to customize scheme implementation based on local geographical and demographic needs.
6. **Institutional Consensus:** Revitalize the **Inter-State Council (Art. 263)** to resolve disputes over **Net Borrowing Ceilings (NBC)** and off-budget liabilities, shifting the resolution of fiscal friction from the Judiciary to collaborative Executive dialogue.

Conclusion

India's fiscal architecture must evolve from "Centralized Coordination" to **"Equitable Partnership."** Leveraging the 16th Finance Commission's efficiency-linked criteria while absorbing cesses into the divisible pool will ensure a fiscally resilient, **Viksit Bharat @ 2047**.

3.9. REVISION OF INDIA'S GDP SERIES: KEY HIGHLIGHTS AND IMPLICATIONS

Context:

India periodically revises its **National Accounts Statistics (NAS)** to better capture the evolving structure of the economy. In **2026**, the **Ministry of Statistics and Programme Implementation (MoSPI)** released a **new GDP series with 2022–23 as the base year**, replacing the earlier **2011–12 base year series introduced in 2015**.

Concept of GDP and Related Measures

1. **Gross Domestic Product (GDP): Gross Domestic Product (GDP)** refers to the **total monetary value of all final goods and services produced within a country's borders during a specific period**, usually a **financial year**. It is the most widely used indicator to measure the **size and performance of an economy**.
   - **Importance of GDP:** GDP is widely used to:
     - **Measure the size of an economy** and overall economic activity.
     - **Track economic growth or contraction** over time.
     - **Compare economic performance across countries.**
     - **Assess changes in living standards** and general economic welfare.

   An **increase in GDP** generally indicates **economic expansion**, while a **decline in GDP** may signal **economic slowdown or contraction**.
2. **GDP at Market Price (GDP-MP) and Factor Cost (GDP-FC):**
   - **GDP at Market Price (GDP-MP):** Value of output measured at **prices paid by consumers**, including **indirect taxes and excluding subsidies**.
   - **GDP at Factor Cost (GDP-FC):** Measures income earned by **factors of production (land, labour, capital, entrepreneurship)**.
   - **Relationship:**
     GDP at MP = GDP at FC + Indirect Taxes − Subsidies.
   - **GVA at Basic Prices** is currently used to derive **GDP at Market Prices** in India's national accounts.
3. **Nominal GDP and Real GDP**
   - **Nominal GDP: Nominal GDP** refers to GDP measured at **current market prices**.
     - **Key characteristics include:**
     - It is calculated using **prevailing prices in the current year**.
     - It **includes the effects of inflation or price changes**.
     - It reflects the **actual monetary value of goods and services produced**.
   - **Real GDP: Real GDP** refers to GDP measured at **constant prices using a base year**.
     - **Key characteristics include:**
     - It **removes the impact of inflation or price fluctuations**.
     - It reflects the **actual change in production levels**.
     - It provides a **more accurate measure of economic growth over time**.

   Therefore, **Real GDP is considered a better indicator of economic performance** when comparing growth across different years.

4. **Gross Value Added (GVA): Gross Value Added (GVA)** measures the **value created by different sectors of the economy** during the production process. It is calculated using the formula: **GVA = Value of Output − Value of Intermediate Inputs**

   Thus, **GVA represents the net value added by producers** after deducting the cost of inputs used in production.

   - **Relationship Between GDP and GVA** GDP is derived from GVA through the following relationship: **GDP = GVA + Taxes on Products − Subsidies on Products.**
   - Hence:
     - **GVA reflects sector-wise production performance** in the economy.
     - **GDP represents the total economic output**, including the effect of **government taxes and subsidies on products**.

5. **Base Year and Rebasing**

   - **Base Year:** The **Base Year** is the **reference year whose prices are used to calculate Real GDP** and measure economic growth over time.
   - For India's latest GDP series:
     - **Current Base Year: 2022–23**
     - **Previous Base Year: 2011–12**
   - **Rebasing: Rebasing** refers to the **process of updating the base year using improved data sources, updated methodologies, and revised statistical techniques**.
     - This process helps capture:
       - **Changes in production patterns**
       - **Technological advancements**
       - **Shifts in consumption behaviour**

   Periodic rebasing ensures a **more accurate and realistic measurement of economic activity**.

   Methodology for Estimating GDP in India

   India compiles its GDP estimates in accordance with the **United Nations System of National Accounts (SNA 2008)** and plans to transition towards **SNA 2025 standards** in future revisions.

   Additionally, as a subscriber to the **International Monetary Fund's Special Data Dissemination Standard (SDDS)**, India follows **globally accepted norms of statistical transparency, consistency, and data quality**.

A. Approaches to GDP Calculation

GDP can be estimated using **three standard approaches**, each capturing a different dimension of economic activity.

1. **Production Approach (Output Method)**

   This approach measures the **value added by different sectors of the economy**.

   Major sectors include:

   - **Agriculture and allied activities**
   - **Industry (manufacturing, mining, construction, etc.)**
   - **Services sector**

   The total **value added across these sectors** forms the basis for estimating GDP.

2. **Expenditure Approach**

   This approach measures GDP by **summing total expenditure on final goods and services** in the economy.

It includes:

- **Private Final Consumption Expenditure (PFCE)**
- **Government Final Consumption Expenditure (GFCE)**
- **Gross Capital Formation (Investment)**
- **Net Exports (Exports − Imports)**

Thus, **GDP = Consumption + Government Spending + Investment + Net Exports**

3. Income Approach

The income approach measures GDP by **summing all incomes generated from production activities**.

These incomes include:

- **Wages and salaries**
- **Profits of firms**
- **Rent earned from property**
- **Interest earned on capital**

The revised GDP series attempts to **better reconcile these three approaches using improved datasets and statistical techniques**.

B. Quarterly GDP Estimation

In addition to annual estimates, **Quarterly GDP estimates** are prepared by the **National Statistical Office (NSO)**.

These estimates are calculated using the **Benchmark–Indicator Method (Proportional Denton method)**, which is widely used internationally.

- **Process:**
  - **Annual GDP estimates serve as the benchmark reference point.**
  - **High-frequency indicators**, such as **monthly or quarterly economic data**, are used to track short-term movements in economic activity.
  - These indicators are then **applied to the benchmark estimates to derive quarterly GDP figures**.

This methodology follows internationally accepted standards, including:

- **UN System of National Accounts (SNA 2008)**
- **IMF Quarterly National Accounts Manual (2017)**.

Key Highlights of the Revised GDP Series

- **Revised Base Year (2022–23):** The **base year for the National Accounts Statistics has been revised to 2022–23**, replacing the earlier **2011–12 base year**. The year **FY 2022–23** was selected because it represents the **latest relatively stable or "normal" economic period after the disruptions caused by the COVID-19 pandemic (2019–2021).**
- **Incorporation of High-Frequency Data:** The revised GDP series incorporates **high-frequency and administrative datasets** to improve the **accuracy and coverage of economic activity**. These include **GST collections**, the **e-Vahan vehicle registration portal**, and the **Public Financial Management System (PFMS)**.

- **Shift from Single Deflation to Double Deflation:** The new methodology introduces **Double Deflation**, particularly in **manufacturing and agriculture**, where **both input prices and output prices are adjusted for inflation**.
    - This replaces the earlier **Single Deflation method (a technique where only the output price is adjusted for inflation while the cost of intermediate inputs is not separately deflated).**
- **Adoption of the Supply and Use Tables (SUT) Framework:** The **Supply and Use Tables (SUT) framework** has been aligned with the **National Accounts system**. This helps **reduce inconsistencies between production-based and expenditure-based GDP estimates** and improves the **overall coherence of national accounts data**.
- **Enhanced Estimation of Private Final Consumption Expenditure (PFCE):** Estimation of **PFCE** has been strengthened by combining **direct production-based estimates**, **administrative datasets**, and the **commodity flow approach**, resulting in a **more accurate measurement of household consumption patterns**.
- **Adjustments in Government Sector Accounting:** Government sector estimates now incorporate the effects of both the **National Pension System (NPS)** and the **Old Pension Scheme (OPS)**, allowing for **better accounting of government expenditure and pension liabilities**.
- **Enhanced Domestic Sector:** Inclusion of **hired domestic workers** and activities related to the **digital, platform, and gig economy** in the revised GDP estimates.
- **Improved Measurement of Informal Sector**: Use of data from the **Annual Survey of Unincorporated Sector Enterprises (ASUSE)** and the **Periodic Labour Force Survey (PLFS)** to **improve the measurement of the household and informal sectors**.

Implications of the Revised GDP (Base Year 2022–23)

- **Reduction in Nominal GDP:** The revised statistical framework has **lowered India's nominal GDP by around 3–4%** for **FY 2025–26 and the preceding three years**, reflecting adjustments in estimation methods and datasets.
- **Pressure on Fiscal Deficit Targets:** Since the **fiscal deficit is calculated as a percentage of nominal GDP**, a **smaller GDP base increases the deficit ratio**.
    - The **FY 2025–26 fiscal deficit target**, earlier estimated at **4.4%**, rises to **about 4.5% under the new series**.
    - Achieving the **4.3% fiscal deficit target for FY 2026–27** would now require **nominal GDP growth of around 13–14%**, which is significantly higher than the **10% growth assumption in the Union Budget 2026–27**, potentially necessitating **adjustments in government borrowing strategies**.
- **Increase in Debt-to-GDP Ratio:** A **lower estimated GDP size** leads to a **higher debt-to-GDP ratio**. The **Centre's debt ratio** is projected to increase from **56.2% to about 58.1% in FY 2025–26** under the revised series.

Conclusion

The shift to the **2022-23 base year** is a landmark move toward statistical accuracy. While the reduction in absolute GDP size presents fiscal challenges, it provides a more grounded and **"honest"** baseline for India's growth story. By integrating modern data sources like GST and gig-work metrics, the new series ensures that India's economic measurements are fit for the 21st century.

3.10. SUSTAINABLE ENERGY FOR INDIA

Context:

Sustainable energy refers to **energy that meets present needs without compromising the ability of future generations to meet their needs**, ensuring **energy security, environmental protection and economic growth**.

Core Principles of Sustainable Energy

(a) Environmental Sustainability: Energy production should **minimize environmental damage and carbon emissions.**

(b) Economic Sustainability: Energy systems must be **cost-effective and support economic development**.

(c) Social Equity: Energy should be **accessible and affordable for all sections of society**.

(d) Energy Security: Ensuring **continuous and reliable energy supply** for economic growth.

Why Sustainable Energy is Crucial for India

1. **Economic Resilience (The "Import Bill" Crisis)**
   - **Fiscal Stability:** India spends over **$160 billion annually** on crude oil imports. This drain on foreign exchange reserves directly impacts the value of the Rupee.
   - **Inflation Control:** High oil prices lead to **"imported inflation,"** raising transport costs for food and essential goods. Sustainable energy (Solar/Wind) has **zero fuel cost**, stabilizing long-term energy prices.
2. **Energy Security & Geopolitical Autonomy**
   - **The "Hormuz" Risk:** 60% of India's oil comes from the Middle East. Any conflict in the Persian Gulf can cripple the Indian economy in days.
   - **Strategic Autonomy:** By generating power domestically via Renewables and **Green Hydrogen**, India reduces its "Energy Dependency" and can maintain a neutral foreign policy without fear of energy blackmail.
3. **Environmental & Health Mandates**
   - **Air Quality:** 14 of the world's 20 most polluted cities are in India. Moving away from coal-fired plants reduces PM2.5 levels, saving billions in healthcare costs.
   - **Climate Leadership:** As the world's 3rd largest CO_2 emitter, meeting **Net Zero 2070** targets is essential for India's global standing and to avoid "Carbon Border Taxes" imposed by the EU/USA.
4. **The "Demographic Dividend" & Job Creation**
   - **Green Jobs:** The renewable sector is more labor-intensive than fossil fuels. India's RE sector could create **3.4 million jobs** by 2030 in manufacturing, installation, and maintenance.
   - **Rural Electrification:** Decentralized solar (PM-KUSUM) empowers farmers to become "Urjadatas" (energy providers), increasing rural incomes.

Major Sources of Sustainable Energy in India

1. **Solar Energy (The Dominant Lead)**

   Solar power is the "anchor" of India's green transition. India has surpassed Japan to become the **world's 3rd largest solar producer**.

- **Current Capacity:** ~143.6 GW.
- **Ground-Mounted:** ~109.5 GW, dominated by massive parks like **Khavda** (Gujarat), which is becoming the world's largest renewable energy zone.
- **Rooftop Solar:** Reached **~25 GW**, accelerated by the PM Surya Ghar Yojana aiming to solarize 1 crore homes.
- **Floating Solar:** Increasing deployment in reservoirs (e.g., Omkareshwar Dam) to save land and reduce water evaporation.

2. **Green Hydrogen (The Decarbonizer)**
   - **Production Status:** Costs have dropped below **$4/kg.**
   - **Strategic Hubs:** Three dedicated ports are now "Green Hydrogen Hubs": **Kandla (Gujarat), Tuticorin (Tamil Nadu), and Paradip (Odisha)**.
   - India is integrating Green Hydrogen into "hard-to-abate" sectors like Steel and Fertilizer to reduce dependence on imported LNG.
3. **Wind Energy (Onshore & Offshore)**
   - **Current Capacity:** ~54 GW (Onshore).
   - **Offshore Leap:** Following the VGF (Viability Gap Funding) scheme, the first 1 GW offshore tenders off the coasts of **Gujarat and Tamil Nadu** are now in the execution phase.
   - **Hybridization:** Most new projects are now "Solar-Wind Hybrids" (3.5 GW currently) to ensure a more stable, round-the-clock power supply to the grid.
4. **Nuclear Energy (The "Base Load" Pillar)**

   Under the **SHANTI Act of 2025**, India has opened the nuclear sector to limited private participation to reach **100 GW by 2047**.
   - **Current Capacity:** ~8.8 GW.
   - **Bharat Small Reactors (BSRs):** 220 MW indigenous reactors are being deployed as "captive power plants" for heavy industries.
   - **SMR-55:** India's first dedicated 55 MWe Small Modular Reactor is now under construction, specifically designed for decentralized industrial use.
5. **Bio-Energy & Circular Economy**
   - **Ethanol Blending:** Having achieved **20% blending (E20)** in 2025, India is now testing E100 (pure ethanol) vehicles in select cities.
   - **CBG (Compressed Biogas):** Utilizing agricultural waste (parali) to produce gas, effectively reducing the LPG import bill and urban pollution.

Major Government Policies & Initiatives

1. **PM Surya Ghar: Muft Bijli Yojana (2024–2027):** Decentralized solar adoption through rooftop installations.
2. **National Green Hydrogen Mission (NGHM):** Production of **5 MMT (Million Metric Tonne)** of Green Hydrogen per annum by 2030.
3. **SHANTI Act, 2025 (Sustainable Harnessing of Nuclear Energy):** Ending the state monopoly by allowing **limited private participation** and accelerating the deployment of **Small Modular Reactors (SMRs)** for industrial captive power.

4. **PM-KUSUM:** De-dieseling the farm sector by providing solar pumps and allowing farmers to become **"Urjadatas"** (selling surplus solar power back to the grid).
5. **PM E-DRIVE Scheme (2024–2028):** Accelerate the transition to **Electric Mobility**. Support for e-2Ws, e-3Ws, e-trucks, and e-ambulances, while establishing a pan-India public charging network (EVPCS).
6. **National Policy on Biofuels (Amended 2022):** Achieve **20% Ethanol Blending (E20)** by ESY 2025-26. Using surplus food grains and agricultural residue for fuel.

Challenges in Achieving Sustainable Energy

1. **Storage Infrastructure Gap:** India lacks sufficient **Battery (BESS)** and **Pumped Hydro** capacity to store surplus midday solar power for nighttime use.
2. **Critical Mineral Dependency:** India relies heavily on imports for Lithium, Cobalt, and Rare Earths required to manufacture EV batteries and solar panels.
3. **High Capital Cost:** Renewable projects require massive upfront investment, and high interest rates in India increase the overall "Levelized Cost of Electricity."
4. **Land Acquisition Conflicts:** Solar/Wind farms require vast areas, leading to competition with agriculture and threats to biodiversity (e.g., the Great Indian Bustard).
5. **Transmission Bottlenecks:** Most green energy is produced in a few states (Rajasthan/Gujarat), but the **Green Energy Corridor** lacks the capacity to evacuate all of it to the rest of India.
6. **DISCOM Financial Health:** State-owned distribution companies are in deep debt, making them hesitant to sign long-term Power Purchase Agreements (PPAs) for green energy.
7. **Technological Import Reliance:** Despite "Make in India," a significant portion of high-efficiency solar cells and electrolyzers for hydrogen are still imported.

Way Forward

1. **Integrated Storage Policy:** Accelerate the deployment of **Pumped Hydro Storage** and **Battery Energy Storage Systems (BESS)** to manage the intermittency of solar and wind power.
2. **Mineral Security Partnerships:** Secure long-term supplies of Lithium and Cobalt through the **KABIL** (Khanij Bidesh India Ltd) joint venture and the "Mineral Security Partnership" to reduce import reliance.
3. **Green Hydrogen Scaling:** Transition from pilot projects to industrial-scale production to decarbonize heavy industries like steel, cement, and refineries.
4. **Grid Modernization:** Complete the **Green Energy Corridor** and implement "Smart Grids" that can automatically balance fluctuating renewable inputs..
5. **Incentivizing Domestic Manufacturing:** Use the **PLI (Production Linked Incentive) Scheme** to move beyond assembly and start manufacturing high-efficiency solar cells and electrolyzers in India.
6. **Agricultural Synergy:** Expand **PM-KUSUM** and **Agrivoltaics** to ensure energy production doesn't compete with food security for land use.

Conclusion

India must transition from **energy dependency to energy sovereignty** by integrating Green Hydrogen, SMRs, and DAC, ensuring a resilient, Net-Zero future that decouples economic growth from geopolitical oil shocks.

3.11. CORPORATE SOCIAL RESPONSIBILITY (CSR) IN INDIA

Context:

Corporate Social Responsibility (CSR) refers to the idea that businesses should balance their profit-making activities with activities that benefit society. In India, CSR is not just a philanthropic act but a **legal mandate** under the Companies Act, 2013.

Statutory Framework: Section 135 of Companies Act, 2013

India was the first country in the world to make CSR mandatory for certain classes of companies.

- **Threshold for Applicability:** A company must spend on CSR if it meets any of these criteria in the preceding financial year:
  - **Net Worth:** ₹500 crore or more.
  - **Turnover:** ₹1,000 crore or more.
  - **Net Profit:** ₹5 crore or more.
- **Spending Requirement:** Eligible companies must spend at least **2% of their average net profits** made during the three immediately preceding financial years.
- **Governance:** Companies must constitute a **CSR Committee** of the Board (with at least one independent director) to formulate and monitor the CSR policy.

Key Areas of Corporate Social Responsibility (CSR) Activity

The diverse activities listed under **Schedule VII** of the Companies Act, 2013, can be strategically grouped into these **6 key pillars:**

1. **Human Capital & Social Welfare**
   - **Health & Nutrition:** Eradicating hunger, poverty, and malnutrition; promoting preventive healthcare and sanitation (including contribution to the *Swachh Bharat Kosh*).
   - **Vulnerable Groups:** Setting up old age homes, day care centers, and hostels for women/orphans; measures for reducing inequalities faced by SCs, STs, OBCs, and minorities.
2. **Education & Skill Empowerment**
   - **Education:** Promoting literacy and special education.
   - **Livelihood:** Employment-enhancing vocational skills, especially among children, women and the differently-abled to ensure economic self-reliance.
3. **Environmental Stewardship & Sustainability**
   - **Ecological Balance:** Protection of flora and fauna, animal welfare and agroforestry.
   - **Resource Conservation:** Maintaining the quality of soil, air and water (including contributions to the *Clean Ganga Fund*).
4. **Heritage, Culture & National Identity**
   - **Cultural Preservation:** Protection and restoration of historical buildings, sites and works of art.
   - **Promotion of Arts:** Development of traditional handicrafts and setting up public libraries.
5. **Research, Innovation & Sports**
   - **R&D:** Contributions to public-funded universities, IITs and national laboratories (DRDO, ICAR, CSIR) for research in science, technology and medicine.

- **Sports:** Training to promote rural, nationally recognized, Paralympic and Olympic sports.

6. **National Resilience & Relief Funds**
   - **Armed Forces:** Measures for the benefit of veterans, war widows and their dependents (including CAPF and CPMF families).
   - **Disaster Management:** Relief, rehabilitation, and reconstruction activities; contributions to the **PM CARES Fund** or the PM National Relief Fund.

Significance of Corporate Social Responsibility (CSR) in India

1. **Supplementing State Capacity**

   CSR acts as a vital bridge between public policy and private efficiency. It allows corporate capital, technology, and managerial expertise to reach developmental sectors (like health and education) that the state alone may struggle to fully fund or implement.

2. **Localization of SDGs**

   CSR activities are a primary vehicle for achieving the **UN Sustainable Development Goals (SDGs)** at the grassroots level. By investing in local sanitation, gender equality, and renewable energy, companies localize global targets into tangible Indian outcomes.

3. **Promoting Ethical Corporate Governance**

   The mandate pushes companies beyond a "profit-only" motive toward a **"Triple Bottom Line"** approach (People, Planet, Profit). It fosters transparency, accountability and a culture of social responsibility within the Indian corporate ecosystem.

4. **Human Capital Development**

   Through massive investments in vocational training and skill development, CSR helps address India's **"Skill Gap."** This creates a more employable workforce, directly supporting national initiatives like *Skill India* and *Atmanirbhar Bharat*.

5. **Strengthening Social Infrastructure**

   CSR funding has led to the creation of durable community assets such as schools, clinics and solar-powered irrigation particularly in rural areas, improving the overall quality of life and social stability.

6. **Environmental Stewardship**

   By mandating spending on ecological balance and resource conservation, CSR encourages industries to mitigate their carbon footprints. It promotes green technologies and helps India meet its **Nationally Determined Contributions (NDCs)** under the Paris Agreement.

Challenges of Corporate Social Responsibility (CSR) in India

1. **Geographic & Regional Imbalance**

   There is a severe concentration of CSR funds in industrialized states like **Maharashtra, Gujarat, and Karnataka**, while developmentally backward regions (including the North-East and several **Aspirational Districts**) remain neglected. This defeats the goal of "inclusive growth."

2. **Sectoral Skewness**

   Corporate spending is heavily tilted toward **Education and Healthcare** (the "easy" sectors), while critical areas under Schedule VII such as the protection of national heritage, promotion of rural sports, and slum area development receive negligible funding.

3. **Issues with Implementing Agencies (NGOs)**

   Many companies lack the internal expertise to execute projects and rely on NGOs. However, many local NGOs lack **professionalism, transparency, and the capacity** to handle large-scale corporate funds or provide the rigorous "Impact Assessment" now required by law.

4. **"Greenwashing" & Superficial Compliance**

   Some companies treat CSR as a mere **compliance burden** or a PR exercise ("Greenwashing"). Instead of long-term sustainable transformation, they focus on "cheque book philanthropy" or one-off events that provide visibility without substantial social impact.

5. **Lack of Community Participation**

   CSR projects are often designed using a **"Top-Down" approach** by corporate boards without adequately consulting the local communities. This leads to a lack of "local ownership," where the assets created (like toilets or libraries) often fall into disuse due to a lack of community involvement.

Way Forward

1. **Focus on Aspirational Districts**

   To correct the **geographic imbalance**, the government and corporates should prioritize projects in the **112 Aspirational Districts**. Incentivizing spending in North-Eastern and tribal states through tax benefits or "CSR credits" can ensure more inclusive regional development.

2. **Transition from "Outlays" to "Outcomes"**

   Companies must move beyond merely reporting "money spent" to measuring **"social impact."** Mandatory **Third-Party Impact Assessments** and Social Audits should be standardized to ensure that assets created (like schools or clinics) are functional and delivering long-term benefits.

3. **Promoting "Collective CSR"**

   Encouraging a **Consortium Model** where multiple companies pool their 2% funds for large-scale, high-impact infrastructure projects (e.g., massive water desalination plants or regional waste management units). This prevents "fragmented spending" on small, ineffective programs.

4. **Convergence with Government Schemes**

   CSR initiatives should be strategically aligned with flagship national missions like **Gati Shakti (Infrastructure)**, **Poshan 2.0 (Nutrition)**, and the **Lighthouse Tourism** initiative. This creates a "Multiplier Effect," where private funds complement the scale of government machinery.

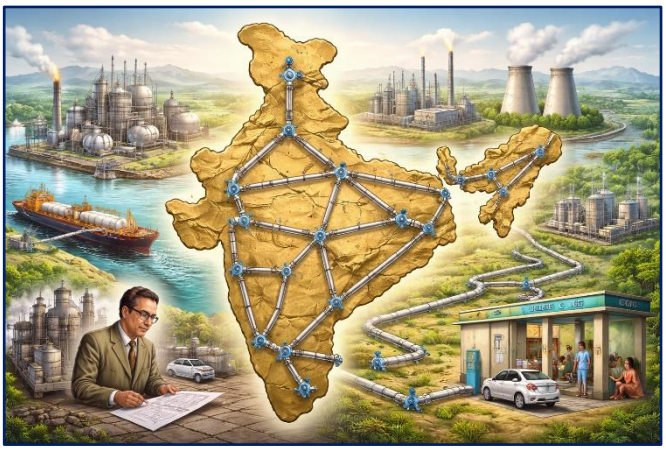
5. **Strengthening NGO Capacity & Transparency**

   The government should develop a **National CSR Exchange Portal**—a digital marketplace that connects verified, high-performing NGOs with corporate donors. This would reduce "middleman" issues, improve transparency, and help smaller NGOs in rural areas access professional funding.

Conclusion

Corporate Social Responsibility (CSR) funds bridge the gap between profit and purpose. By investing in sustainable development, businesses drive measurable social impact, enhance brand reputation, and ensure long-term ethical growth.

3.12. NATIONAL GAS GRID



Context:

West Asia conflict involving the **U.S., Israel, and Iran** effectively closed the **Strait of Hormuz**, disrupting 90% of India's LPG imports. Consequently, the government issued the **Natural Gas (Supply Regulation) Order, 2026**, prioritizing **PNG** and **fertilizers** to mitigate the severe national energy shortage.

Background of National Gas Grid (NGG)

1. **Early Conceptual Origins (1950s–1970s)**

   The idea of a **National Gas Grid** in India dates back to **1955**, when Syed Husain Zaheer proposed a **nationwide gas pipeline network** based on **coal gasification**.

   - He envisioned a **"Town Gas Supply Scheme"**:
     - Gas produced from coal
     - Transported through pipelines to cities and industries

2. **Vision & Goals**

   - **"One Nation, One Gas Grid":** Integrating regional networks into a single national unit for equitable gas distribution.
   - **Objective:** Increase the share of natural gas in the energy mix from **~6.7% to 15% by 2030**.

3. **Regulatory Framework**

   - **PNGRB Act, 2006:** Established the statutory board to regulate the downstream sector (transport, storage, and distribution).
   - **Common Carrier Principle:** Mandates "open access" to pipelines, preventing infrastructure monopolies.
   - **Unified Tariff (2023):** Replaced multiple additive fees with a single "One Nation, One Tariff" model, drastically lowering costs for consumers far from gas sources (e.g., NE India).

4. **Structural Evolution**

   - **Initial Phase:** Centered on the **HBJ (Hazira-Vijaipur-Jagdishpur)** pipeline, primarily serving Northern India's fertilizer and power sectors.
   - **Regional Integration:**
     - **South:** Connection via the **Kochi-Mangaluru** pipeline.
     - **East: Pradhan Mantri Urja Ganga (JHBDPL)** connecting Bihar, Jharkhand, West Bengal, and Odisha.
     - **Northeast: Indradhanush Gas Grid (IGGL)** linking all eight NE states to the national network.

Need for the National Gas Grid

1. **Transition to a Gas-Based Economy**

   - **Target Alignment:** Essential to increase natural gas share in the energy mix from **~6.7% to 15% by 2030**.
   - **Bridge Fuel:** Necessary to move away from "dirtier" fossil fuels (coal/oil) toward **Net Zero 2070** goals.

2. **Ending "Energy Poverty" (Regional Balance)**
   - **Geographical Equity:** Connects the "gas-starved" Eastern and North-Eastern regions to the supply-rich Western and Southern coasts.
   - **Uniform Growth:** Ensures that industrial development is not restricted to coastal states with LNG terminals.
3. **Strategic Energy Security**
   - **Import Diversification:** Allows India to move gas from any port (West or East coast) to any inland demand center, crucial during maritime disruptions (e.g., **2026 West Asia crisis**).
   - **Strategic Storage:** Required to link future **strategic gas reserves** to industrial and domestic hubs.
4. **Industrial & Agricultural Productivity**
   - **Fertilizer Subsidy Control:** Reliable gas supply to urea plants via the grid reduces the high cost of production and the government's subsidy burden.
   - **Industrial Feedstock:** Vital for "Hard-to-Abate" sectors like Steel and Cement that require high-heat energy.
5. **Clean Urban Mobility & Cooking**
   - **Pollution Control:** Necessary to expand **City Gas Distribution (CGD)** networks, reducing urban smog by replacing diesel/petrol with CNG.
   - **LPG Substitution:** Reduces the logistics and foreign exchange drain associated with importing and transporting LPG cylinders.
6. **Future-Proofing (Hydrogen & Biogas)**
   - **Blending Hub:** The grid is the only viable infrastructure for the large-scale transport of **Green Hydrogen** and **Compressed Biogas (CBG)** from rural production centers to urban markets.

Significance of the National Gas Grid

1. **Energy Security & Stability**
   - **Buffer Against Volatility:** Reduces reliance on a single fuel source (like coal or oil).
   - **Supply Resilience:** Enables rapid diversion of gas to deficit regions during geopolitical crises (e.g., the **2026 West Asia supply crunch**).
2. **Economic Growth**
   - **Industrial Competitiveness:** Provides reliable, cheaper fuel to fertilizer, steel, and glass industries.
   - **Cost Reduction:** The **Unified Tariff** makes gas affordable for industries far from coastal LNG terminals.
3. **Environmental Impact**
   - **"Bridge Fuel":** Emits **40% less CO_2** than coal and nearly zero Particulate Matter (PM), aiding India's **Net Zero 2070** goal.
   - **Decarbonization:** Facilitates the transition of heavy transport (trucks/buses) from diesel to **CNG**.
4. **Social & Infrastructure Benefits**
   - **Consumer Convenience:** Direct-to-kitchen **PNG** eliminates the logistics and safety risks of LPG cylinders.

- **Regional Development:** Connects under-developed regions (East and Northeast India) to the mainstream industrial economy.

5. **Strategic Integration**
   - **Multi-fuel Synergy:** Essential for injecting **Compressed Biogas (CBG)** and **Green Hydrogen** into existing pipelines, future-proofing India's energy infrastructure.

Challenges to the National Gas Grid

1. **High Import Dependency**
   - India imports nearly **50% of its natural gas** as LNG. Global price volatility (spiked by the **2026 West Asia crisis**) makes gas expensive compared to domestic coal, leading to underutilization of gas-based power plants.
2. **Exclusion from GST**
   - Natural Gas remains outside the **Goods and Services Tax (GST)**. This leads to a cascading effect of taxes (VAT and Central Excise) across state borders, increasing the final cost for industries by **10-15%** compared to other fuels.
3. **Land Acquisition & RoW Issues**
   - Securing the **Right of Way (RoW)** for laying pipelines is a major bottleneck. Legal disputes and compensation delays in densely populated states (like West Bengal and Kerala) often lead to significant project cost overruns.
4. **Underutilized "Stranded" Assets**
   - Approximately **14.3 GW of gas-based power capacity** remains "stranded" or underutilized because the high cost of imported gas makes the electricity produced commercially unviable for Discoms.
5. **Last-Mile Connectivity**
   - While the "trunk" pipelines (main arteries) are expanding, the **City Gas Distribution (CGD)** networks face "last-mile" hurdles in old, congested cities, delaying the transition of households to PNG.
6. **Technical & Safety Risks**
   - Integrating **Green Hydrogen** and **Compressed Biogas (CBG)** into existing steel pipelines poses technical challenges like "hydrogen embrittlement" (weakening of metal), requiring expensive infrastructure upgrades.

Government Initiatives

1. **Infrastructure Projects**
   - **Pradhan Mantri Urja Ganga (PMUG):** Connecting the "gas-starved" East (UP, Bihar, Jharkhand, WB, Odisha). It revitalizes defunct fertilizer plants and supports the **Matix Fertilizer** plant in West Bengal.
   - **North East Gas Grid (NEGG):** Implemented by **IGGL**, this 1,656 km pipeline aims for full commissioning by **March 31, 2026**, linking all eight North-Eastern states to the national grid.
2. **Pricing & Tariff Reforms**
   - **Unified Pipeline Tariff (2023-2026):** A "One Nation, One Grid, One Tariff" model. It eliminates multiple transit fees, ensuring that a consumer in a remote area (like Agartala) pays a transport rate similar to one near a coastal terminal (like Dahej).

- **Kirit Parikh Committee Implementation:** Moving toward a market-linked pricing regime with a "floor" and "ceiling" price for domestic gas to protect both producers and consumers.

3. **Bio-Fuel Integration**
   - **SATAT Initiative:** Promoting **Compressed Biogas (CBG)**. As of **2026**, the government has mandated a **CBG Blending Obligation (CBO)** for all City Gas Distribution (CGD) entities to reduce LNG imports.
   - **National Green Hydrogen Mission:** Upgrading the grid to be "hydrogen-ready" for blending green hydrogen into existing natural gas pipelines.
4. **Expanding Access**
   - **City Gas Distribution (CGD) Bidding:** The **12th CGD Bidding Round (2024-25)** has brought nearly **100% of India's map** under authorized gas coverage.
   - **PM Ujjwala Yojana 2.0:** While focused on LPG, it acts as a precursor to PNG by building the "clean cooking" habit in rural India, with over **10.4 crore beneficiaries** by early 2026.

Way Forward

1. **Fiscal Integration (GST):** Include natural gas under the **GST regime** to eliminate the cascading effect of varied state taxes (VAT/Entry tax). This will reduce industrial fuel costs by **10–15%** and create a truly unified national market.
2. **Creation of Strategic Gas Reserves:** Establish **Strategic Natural Gas Reserves** (similar to Strategic Petroleum Reserves) in salt caverns or depleted wells. This is critical to buffer against 30–60 day supply shocks caused by maritime chokepoints (e.g., **2026 Strait of Hormuz crisis**).
3. **Infrastructure "Teeth" (Legal Reform):** Enact a **"National Transmission Corridor Act"** to grant gas pipelines the same legal status as Highways or Railways. This would streamline **Right of Way (RoW)**, reduce land acquisition litigation, and prevent "project-stretch" in states like West Bengal.
4. **Independent Transmission System Operator (TSO):** Establish an **Independent TSO** to manage the grid. This ensures "neutral" third-party access to pipelines, separating the *transport* of gas from the *marketing* of gas, which encourages private investment and prevents monopolies.
5. **Future-Proofing with "Green Blending":** Mandate and subsidize the blending of **Compressed Biogas (CBG)** and **Green Hydrogen** into the existing grid. This reduces LNG import dependency and leverages the National Gas Grid as a "decarbonization highway."
6. **Demand Aggregation & Digital Twins:** Deploy **Real-time Data Monitoring (under the 2026 Information Order)** and "Digital Twins" of the grid. This allows for predictive maintenance and "Demand Aggregation" to negotiate better long-term LNG contracts with non-Gulf suppliers like the U.S. and Australia.

Conclusion

The National Gas Grid is the strategic backbone of India's **Net Zero 2070** journey, evolving into a multi-fuel "Energy Highway" that seamlessly integrates natural gas, green hydrogen, and biogas.

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4.1. GLOBAL WARMING ACCELERATION & AEROSOLS

Context:

Recently, a study published in *Geophysical Research Letters* (March 2026) by researchers from the University of Potsdam confirmed that global warming has entered a phase of **significant acceleration since 2015**. By stripping away natural "noise" such as volcanic eruptions and solar cycles, the study revealed that the warming rate has jumped from 0.2°C per decade to approximately **0.35°C per decade**, largely attributed to the "unmasking" effect of reduced aerosol pollution.

1. **The Warming Trend: From Steady to Accelerated**
   - **The Baseline:** From the 1970s until 2015, the Earth warmed at a relatively steady rate of **0.2°C per decade**.
   - **The Shift:** Since 2015, the rate has increased by nearly **75%**, reaching an estimated **0.35°C per decade**.
   - **Statistical Significance:** Researchers used "piecewise linear models" to identify 2015 as a "changepoint," confirming with **98% confidence** that this is not a result of natural variability (like El Niño) but a structural shift in the climate system.
2. **The Role of Aerosols: The "Double-Edged Sword"**

   Aerosols are minute solid particles or liquid droplets suspended in the atmosphere. They influence the climate in two primary ways:

Feature	Cooling Aerosols (Reflective)	Warming Aerosols (Absorptive)
Examples	**Sulphates**, Nitrates, Sea salt, Mineral dust.	**Black Carbon (Soot)**, Brown Carbon.
Mechanism	Reflect incoming solar radiation back into space (**Increase Albedo**).	Absorb solar energy and radiate heat; decrease albedo when settling on ice.
Source	Volcanic eruptions, Coal/Fossil fuel combustion.	Biomass burning, Diesel engines, Cookstoves.
Cloud Impact	Act as Cloud Condensation Nuclei (CCN), making clouds brighter and longer-lasting (Cooling).	Can dissipate clouds by heating the surrounding air.

3. **The "Aerosol Unmasking" Effect**
   - **The "Faustian Bargain":** For decades, sulphate pollution from industrial activities acted as a "parasol," masking roughly **0.4°C to 0.5°C** of the warming caused by Greenhouse Gases (GHGs).
   - **Cleaning the Air:** As nations (notably China and India) implement stricter air quality standards and shift away from coal, the concentration of these reflective aerosols drops.

- **Consequence:** Removing the "cooling mask" allows the full force of accumulated GHGs to be felt, leading to a sudden spike in temperatures.

4. **Implications for the Paris Agreement**
   - **1.5°C Threshold:** The Paris Agreement aims to limit warming to 1.5°C above pre-industrial levels.
   - **Revised Timeline:** At the current accelerated rate, the 1.5°C limit is projected to be breached **by 2030**, much earlier than previous IPCC estimates of the mid-2030s.
   - **Net-Zero Urgency:** The findings suggest that "Net-Zero" targets for 2050 or 2070 may need to be advanced to prevent irreversible tipping points.

4.2. SAND MINING

Context:

Recently, the Supreme Court of India intervened to protect the National Chambal Sanctuary from **illegal sand mining**. The Court directed a **three-member committee** to monitor and control illegal mining activities in the river system.

The action followed a report submitted by the **National Green Tribunal (NGT)** highlighting that **unchecked sand extraction in the Chambal River basin is damaging the habitat of several endangered aquatic and riverbank species.**

1. **About National Chambal Sanctuary**
   - **Location:** The sanctuary is located along the **Chambal River** and spreads across **three states:**
     - Madhya Pradesh
     - Rajasthan
     - Uttar Pradesh
   - **Type: Riverine wildlife sanctuary**
   - **Major Species Protected:** The sanctuary is famous for protecting:
     - Gharial
     - Gangetic Dolphin
     - Indian Skimmer
     - Mugger Crocodile
     - Several migratory birds and turtles.
2. **Sand Mining: Legal and Regulatory Framework**
   - **Classification:** Under the **Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act)**, sand is classified as a **"Minor Mineral."**
   - **Regulatory Authority:** The administrative and legislative power to frame rules for "Minor Minerals" entirely belongs to the **State Governments** (not the Central Government).
     - State governments have the power to grant leases and prevent illegal mining.
   - **National Guidelines:** The **Sustainable Sand Mining Management Guidelines (2016)** and the **Enforcement & Monitoring Guidelines (2020)** issued by the Ministry of Environment,

Forest and Climate Change (MoEFCC) emphasize the use of **drones and night-vision surveillance** to track illegal activities.

- Further, Ministry of Mines, through Indian Bureau of Mines, has developed the Mining Surveillance System (MSS), in coordination with Bhaskaracharya Institute for Space Applications and Geo-informatics (BISAG), Gandhinagar and Ministry of Electronics and Information Technology (MEITY), to use space technology for curbing illegal mining activity in the country.

3. **Ecological and Hydrological Impacts of sand mining**
   - **River Morphometry:** Excessive mining causes **riverbed incision** (deepening), which can lower the water table of the surrounding floodplains, affecting agriculture and drinking water.
   - **Groundwater Depletion:** Sand acts as a "sponge" that recharges groundwater. Removing it leads to faster runoff and reduced seepage.
   - **Coastal Erosion:** Sand mining in estuarine and coastal areas destroys natural barriers against **storm surges** and leads to **saline water intrusion** into freshwater aquifers.
   - **Biodiversity Loss:** It destroys the breeding grounds of sensitive species like the **Gharial** (Critically Endangered) and various species of river turtles.
4. **Alternatives to Natural Sand**
   - **M-Sand (Manufactured Sand):** Produced by crushing hard granite rocks. It is ecologically superior as it reduces the load on riverbeds.
   - **Industrial By-products:** Use of **Fly Ash** (from thermal plants) and **Copper Slag** as partial replacements in construction.

4.3. TROPICAL FOREST FOREVER FACILITY (TFFF)

Context:

- **Recently**, the **Tropical Forest Forever Facility (TFFF)** has come into the spotlight as several tropical nations gathered in Brazil to finalize its launch for **COP30**. This new $125 billion global fund is unique because it moves away from traditional "charity" or "carbon credits." Instead, it treats standing forests like a **financial asset**, offering countries a fixed annual payment for every hectare of tropical forest they keep intact.
- This development is significant as it provides a steady income to developing countries—including potential benefits for India's own tropical regions—provided they keep their deforestation rates near zero.

1. **What is the TFFF?**
   - **Nature:** A permanent, multi-billion dollar **trust fund** designed to incentivize the conservation of tropical forests.
   - **Proponent:** It was spearheaded by **Brazil** at COP28 and has now gained support from over 60 nations.

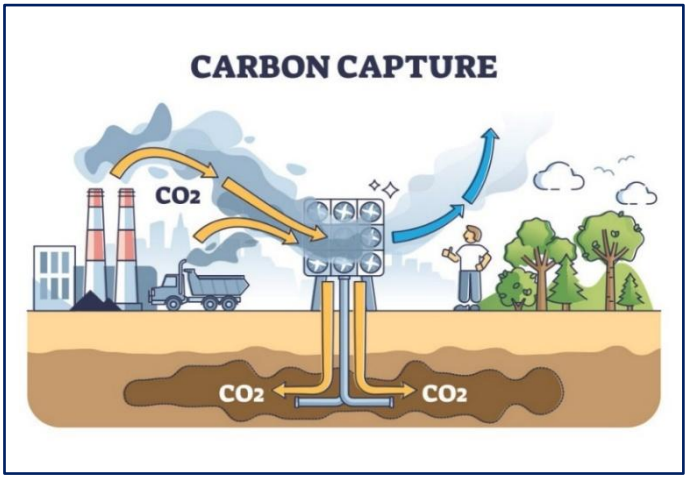
- **Shift in Approach:** Unlike the REDD+ mechanism (which pays for *reducing* deforestation), the TFFF pays for *preserving* what already exists. It rewards "standing forests."

2. **How the Money Works (The $125 Billion Model)**
   - **The Corpus:** The fund aims to raise **$125 billion** through a mix of investments from wealthy countries and private institutional investors.
   - **Investment Returns:** This money is invested in safe global financial markets. The **interest/profit** earned from these investments is then distributed to tropical countries.
   - **Fixed Payment:** A country receives a specific dollar amount (e.g., $4 per hectare) every year, as long as its forest cover remains protected.
3. **Who is Eligible?**
   - **The Tropical Belt:** Up to **74 developing countries** located between the Tropics of Cancer and Capricorn are eligible.
   - **Low Deforestation Rule:** To receive payments, a country must keep its annual deforestation rate below a strict threshold (currently proposed at **0.5%**).
   - **Strict Monitoring:** Forest cover is verified annually using **high-resolution satellite imagery** to ensure no "factual mistakes" or false claims are made regarding forest loss.
4. **Key Social Safeguard: The 20% Rule**
   - **Indigenous Focus:** A mandatory **20% of the payout** must be given to **Indigenous Peoples and Local Communities (IPLCs)**.
   - **Reasoning:** These communities are the frontline protectors of the forest, and the TFFF ensures they are financially compensated for their stewardship.
5. **India's Role and Benefit**
   - **Observer Status:** India currently acts as an **Observer**, helping shape the rules of the facility.
   - **Potential:** If India joins as a member, its vast tropical stretches in the **Western Ghats**, **Northeast**, and **Andaman Islands** could generate significant annual revenue for the government and local tribal communities.

4.4. INDIA'S CARBON STRATEGY: CCUS VS. NATURE-BASED CREDITS

Context:

The **Union Budget 2026** announced a massive **₹20,000 crore outlay** for a carbon credit programme. While there has been public debate regarding whether this fund is for farmers or industry, technical documents from the **Department of Science and Technology (DST)** clarify that this specific allocation is dedicated to **Carbon Capture, Utilization, and Storage (CCUS)** technologies for heavy industries.



1. **The CCUS Programme for "Hard-to-Abate" Sectors**

   The DST's "R&D Roadmap for CCUS" (released in December 2025) serves as the technical basis for the ₹20,000 crore budgetary provision.

- **Objective:** Large-scale deployment of CCUS technologies over five years to capture CO2 from factory flue gases for industrial use or underground storage.
- **Target Sectors:** The roadmap explicitly identifies "hard-to-abate" industries where emissions are concentrated and technically challenging to eliminate via renewable energy alone:
  - Power
  - Steel and Cement
  - Refineries and Chemicals
- **Significance:** These sectors are responsible for approximately **one-quarter of India's total emissions**.

2. CCUS vs. Carbon Dioxide Removal (CDR)

The DST roadmap draws a clear technical distinction between preventing new industrial emissions and removing existing atmospheric CO2.

- **CCUS (Industrial Focus):** Targets point-source capture from smokestacks; it is biologically mediated and suited for concentrated emissions.
- **CDR (Nature-Based Focus):** Involves drawing down existing atmospheric CO2 through agricultural and forestry practices.
- **Exclusion of Agriculture from CCUS:** Agriculture is excluded from CCUS strategies because its emissions (primarily methane and nitrous oxide) are **diffuse** and not suited to point-source capture technology.

3. Key Aspects of CCUS Technology

- Capture Methods:
- **Post-combustion:** Removes CO2 from flue gases after burning fossil fuels.
- **Pre-combustion:** Converts fuel into a CO2-hydrogen mix; CO2 is extracted before combustion.
- **Oxy-fuel combustion:** Burns fuel in pure oxygen to produce high-concentration CO2 and steam.
- **Advanced Technologies:** Includes membrane-based capture, cryogenic separation, and modular systems like **CycloneCC.**
- Carbon Clean's CycloneCC is a revolutionary, modular industrial carbon capture technology with a footprint 10x smaller than conventional systems.

4. The "Farmer Carbon Credit" Narrative

While the ₹20,000 crore fund is industrial, a parallel narrative exists regarding a domestic carbon market for agriculture.

- **Key Mechanisms:** Agriculture contributes to carbon sequestration through:
  - **Soil Carbon Sequestration:** Enhancing soil organic carbon.
  - **Biochar and Agroforestry:** Utilizing trees and charcoal to lock away carbon.
- **Current Status:** These are currently part of the **evolving voluntary carbon market** in India, driven by private sector initiatives and some state-level pilot programmes rather than this specific Budget 2026 outlay.

4.5. ETHYL CHLOROFORMATE

Context:

India recently opened an **anti-dumping investigation** into ethyl chloroformate imports from China after a domestic producer alleged the chemical, used in pharmaceutical and agrochemical manufacturing, was being sold at unfairly low prices.

1. **Key Aspects of Anti-Dumping Investigations**
   - Anti-dumping investigations are trade remedies initiated by governments to protect domestic industries from unfair competition, where foreign firms sell goods below their home market price or production cost.
   - In India, the **Directorate General of Trade Remedies (DGTR)** investigates these cases.
   - The **World Trade Organization (WTO)** permits **anti-dumping measures** as a tool for ensuring fair competition, which is typically imposed for five years.
2. **About Ethyl Chloroformate**

   Ethyl chloroformate is an organic chemical intermediate widely used in pharmaceutical and agrochemical manufacturing
   - **Appearance**: It is a **colorless to light yellow** liquid.
   - **Odor**: It possesses a **pungent, irritating** odor.
   - **Volatility**: It is a **highly flammable** liquid and vapor.
   - Solubility: It decomposes in water to form toxic and corrosive fumes, including Hydrogen Chloride.
   - Uses: In Pharmaceuticals, Pesicides
3. **Health Hazards and Safety**
   - **Toxicity**: It is **fatal if swallowed** or inhaled.
   - **Corrosivity**: Causes **severe skin burns** and eye damage.
   - **Respiratory Impact**: Inhalation leads to severe irritation of the respiratory tract and can cause pulmonary edema.
   - **Environmental Impact**: It is **toxic to aquatic life** with long-lasting effects

4.6. WORLD FROG DAY

Context:

World Frog Day **(March 20)** highlights the ecological importance of frogs, the most numerous group of amphibians. Despite their vital role, they are currently the **most threatened vertebrate group** globally, according to the IUCN.

1. **Ecological Significance of Frogs**
   - **Interface Species:** They bridge the gap between **freshwater** and **terrestrial** ecosystems.

- **Biomass Conversion:** They play a critical role in converting **insect biomass** (by eating insects) into **vertebrate biomass** (by being eaten by birds, reptiles, and mammals).
- **Pest Control:** They act as natural biological controllers of agricultural pests.
- **Ecosystem Indicators:** Their permeable skin makes them highly sensitive to environmental changes (pollution, climate), acting as "ecological sentinels."

2. Major Threats to Amphibians

- **Chytridiomycosis:** A devastating fungal disease caused by:
  1. *Batrachochytrium dendrobatidis* (in frogs).
  2. *Bactrachochytrium salamandrivorans* (in salamanders).
     - **Mechanism:** It attacks the skin, disrupting respiration and electrolyte balance.
     - **Origin:** Asia (spread globally via the pet trade and frog leg exports).
- **Climate Change (39%):** Now the leading driver of extinction. It causes a "seasonal mismatch" (e.g., false monsoon cues followed by droughts).
- **Habitat Loss (37%):** Significant threat due to land-use changes.

3. The Indian Scenario

- **Diversity:** India is home to over **450 amphibian species**.
- **Conservation Status:** Roughly **1/4th** are 'Threatened'.
  - **1/5th** are 'Data Deficient' (lack of long-term monitoring).
- **Legal Protection:** Out of 157 threatened species, only **six** are protected under the **Wildlife Protection Act, 1972**.
- **Regional Trends:** Mass mortality due to fungi is lower in India compared to the Americas/Australia, likely because the fungi originated in Asia.

4. Key Conservation Initiatives in India

- **Jorepokhri Salamander Sanctuary (WB):** Created in 1985 for the Himalayan Salamander.
- **Dissection Ban:** In 2011, the **UGC** banned the dissection of frogs for educational purposes.
- **Breeding Programmes: Padmaja Naidu Himalayan Zoological Park (Darjeeling):** Conservation breeding for the Himalayan Salamander.
  - **Tillari Conservation Reserve (Maharashtra):** Long-term monitoring of stream frogs.
- **Citizen Science Projects: Mapping Malabar Tree Toad Project** (Western Ghats).
  - **Amphibian Recovery Project** (Munnar, Kerala).
  - **Naturalist:** A portal for citizens to share photographs and recordings of frogs.

5. Important Biological Facts for Prelims

- **Metamorphosis:** The transition from aquatic **tadpoles** (algae eaters) to terrestrial **froglets/adults** (insect eaters).
- **Skin Functions:** In amphibians, the skin is an organ for **protection, respiration,** and **ion exchange** (electrolyte balance).
- **IUCN Assessment:** The 2023 Global Amphibian Assessment confirmed 37 species have gone extinct recently.

4.7. BUILDING INDIA'S CLIMATE RESILIENCE WITH WATER AT THE CORE

Context:

- During the **30th session of the United Nations Climate Change Conference** (**COP 30**) **COP30** held in **Belém**, global adaptation indicators under the **UAE Framework for Global Climate Resilience** placed **water, sanitation and hygiene (WASH)** systems at the **core** of **climate adaptation strategies**, marking a paradigm shift by establishing water as the central pillar of global climate adaptation.

How Climate Change Affects Water Systems

Climate change acts as a **"threat multiplier"** by disrupting the natural balance of the hydrological cycle.

- **Intensification of Extreme Events (Flood–Drought Paradox):** Rising temperatures intensify the water cycle; warmer air holds **about 7% more moisture per 1°C increase**, leading to short bursts of intense rainfall followed by prolonged dry spells.
  - This results in simultaneous **urban flooding and rural droughts**. Urban areas with heavy **concrete sealing** cannot absorb rainfall, worsening floods.
  - **Examples**: The **2023 North India floods** and recurring floods in **Chennai** illustrate how extreme rainfall combined with poor drainage causes disasters, while regions like **Marathwada in Maharashtra** frequently face crop failures due to delayed or failed Southwest Monsoons.
- **Himalayan Glacial Destabilisation ("Third Pole" Crisis):** The Himalayas—often called the **"Third Pole"**—feed major **perennial river systems** such as the **Ganga River**, **Brahmaputra River**, and the Indus.
  - **Climate warming** accelerates glacier melting. Initially this increases river flows and flood risks, but over time it depletes the natural **"water bank,"** threatening the perennial nature of these rivers. Retreating glaciers also form unstable lakes, increasing the risk of **Glacial Lake Outburst Floods (GLOFs)**.
  - **Example***:* The **2023 South Lhonak Lake outburst in Sikkim** damaged the **Teesta-III hydropower project**, highlighting risks to Himalayan infrastructure.
- **Coastal Vulnerability and Saline Intrusion:** Sea-level rise pushes saltwater into freshwater aquifers, a process known as **saline intrusion**, contaminating groundwater used for drinking and irrigation. It also increases soil salinity in delta regions, reducing agricultural productivity.
  - **Example***:* In the **Sundarbans**, rising sea levels and cyclones have forced farmers to shift from traditional rice cultivation to salt-tolerant crops or shrimp farming, which further degrades soil quality.
- **Agricultural Stress and the Water–Food–Climate Nexus:** Agriculture depends heavily on water and is both affected by and contributes to climate change. Traditional **flooded paddy cultivation contributes around 10–15% of global methane emissions**, while changing monsoon patterns disrupt crop cycles.
  - Over **50% of India's net sown area remains rain-fed**, making it highly vulnerable to shifts in the **onset, progress, and withdrawal of the monsoon**.

- **Example***:* The **2024 heatwaves followed by erratic rains in Punjab and Haryana** reduced wheat yields, affecting national food stocks and contributing to food inflation.

- **Water–Energy Feedback Loop:** Climate change increases dependence on **groundwater extraction when surface water fails**, requiring significant electricity for pumping.
  - This electricity often comes from **coal-based power plants**, creating a feedback loop where higher energy use increases greenhouse gas emissions and further intensifies climate change.
  - **Example***:* In states like **Tamil Nadu and Telangana**, groundwater levels have fallen to **300–500 metres**, leading to a sharp rise in agricultural electricity consumption and deepening the water-energy-climate cycle.

Belém Adaptation Indicators

The **59 Belém Adaptation Indicators**, adopted under the **UAE Framework for Global Climate Resilience** redefines **Water Security**, moving the focus away from simple "asset creation" toward the **functional reliability of systems** under intense climate stress. It is structurally divided into two primary strategic clusters:

- **Cluster 1 - Climate-Resilient WASH Systems:** Focuses on mitigating climate-induced water scarcity and building resilience to floods/droughts. The objective is **universal access to safe drinking water** by ensuring infrastructure can withstand extreme events without service disruption.
- **Cluster 2 - Proactive Risk Governance:** Focuses on institutional preparedness. It sets a **2027 deadline** for universal multi-hazard early warning systems and a **2030 deadline** for updated national vulnerability assessments.

Significance of Water-Centric Climate Resilience

Water is the **primary medium** through which the impacts of climate change are felt, acting as the "**connective tissue**" between environmental stability and human survival.

Urban water bodies—**lakes, wetlands,** and **tanks**—are not mere aesthetic features; they are **critical blue-green infrastructure** essential for **Regenerative Urbanism"** (letting **nature manage the water cycle** by soaking up, storing, and cleaning water where it falls, rather than simply draining it away.)

Defining Blue-Green Infrastructure (BGI): Unlike "Grey Infrastructure" (concrete drains and pipes), **BGI** is a strategically planned network of natural and semi-natural areas.

- **"Blue"** refers to water bodies like rivers, lakes, and wetlands.
- **"Green"** refers to land-based elements like parks, trees, and gardens.
- **The Primary Climate Messenger:** Climate change is experienced most viscerally through the hydrological cycle. It manifests as a "**trilemma**" of water extremes: **too much** (flash floods), **too little** (chronic droughts), or the **wrong kind** (salinity in coastal aquifers). Resilience, therefore, depends on systems that can manage these rapid transitions without service disruption.
- **Natural Flood Mitigation and Buffering:** Urban wetlands and lakes serve as "**natural sponges**" that absorb and detain excess stormwater during heavy rains. By reducing surface runoff, they protect low-lying neighborhoods from inundation.
  - **Data Point:** Historical loss of water bodies in **Chennai** and **Mumbai** has been directly linked to the increased frequency of catastrophic urban floods.
- **Groundwater Recharge and Aquifer Replenishment:** Water bodies act as critical "entry points" for rainwater to percolate into the ground. In cities where "concrete sealing" has blocked natural recharge, these zones are vital for replenishing drying aquifers.
  - **Data Point:** In **Bengaluru**, the water table has plummeted from **28m to over 300m** in just 20 years due to the disappearance of nearly **79% of its water bodies** between 1973 and 2016.

- **Micro-Climate Regulation and Heat Mitigation:** Through the process of **evapotranspiration,** water bodies moderate ambient temperatures. This is a primary defense against the **Urban Heat Island (UHI)** effect, where dense concrete cores become significantly hotter than surrounding areas.
  - **Validation:** Research shows that the loss of lakes in **Bengaluru** contributed to a **1.5°C rise** in local temperatures over two decades.
- **Water Purification and Ecological Filtration:** Wetlands act as the **"natural kidneys"** of an urban region, filtering pollutants, sediments, and excess nutrients from wastewater.
  - **Global Benchmark:** The **East Kolkata Wetlands (EKW)** naturally treat over **900 million litres** of wastewater daily, simultaneously supporting local fisheries and agricultural economies without expensive chemical plants.
- **Preservation of Biodiversity and Ecological Corridors:** Lakes and wetland fringes serve as **biodiversity hotspots** and **ecological corridors** within "**grey**" urban landscapes. They provide essential breeding grounds for amphibians, fish, and migratory birds, maintaining the urban food web and ecological balance.
  - **Case Study:** The **Neknampur Lake** in **Hyderabad** used "**floating treatment wetlands**" to restore habitats, successfully reviving local bird and amphibian populations.

Key Challenges Hindering Water-Centric Climate Resilience

India's urban population is projected to hit **675 million by 2035**. However, the **2023 Waterbody Census** reveals that only **2.9%** of India's **2.4 million water bodies** are in urban areas, many of which are "not in use" due to pollution and encroachment.

1. **Systemic Scarcity and Infrastructure Vulnerability:** Water scarcity in India is **unevenly distributed** and managed. Most water infrastructure is built for average weather, meaning it is rarely **"stress-tested"** for extreme climate events. When record floods or droughts hit, these rigid systems often fail.
   - **Core Issue:** The focus remains on expanding the number of connections rather than ensuring **diversification of sources** and system **redundancy** (backup capacity) for emergencies.
2. **Uncertain and Fragile Adaptation Finance:** While global targets aim for **$1.3 trillion annually by 2035**, actual funding remains unreliable. A major mindset barrier is that water projects are treated as **"sectoral costs"** (basic municipal expenses) instead of high-value **"climate investments."**
   - **Core Issue:** Without **predictable finance**, cities focus on "post-disaster recovery" (reactive) rather than "long-term resilience planning" (proactive).
3. **Anthropocentric vs. Eco-centric Conflicts:** Many "revival" projects prioritize **cosmetic beautification**—such as **granite jogging tracks**, **fences,** and **fountains**—over ecological restoration. These "hard" interventions often destroy the **hydrological functions** of the water body, like its ability to recharge groundwater or filter pollutants.
4. **Institutional Fragmentation and Silos:** Water governance is split across multiple agencies with **overlapping jurisdictions**. For example, **Revenue Departments** own the land, **Pollution Boards** monitor quality, and **Urban Local Bodies (ULBs)** manage supply.
   - **Core Issue:** This lack of coordination causes **"implementation paralysis,"** where one department's cleaning efforts are neutralized by another department's drainage or construction decisions.

5. **Digital Gaps and Fragmented Data:** India has massive amounts of hydrological data, but it is **fragmented and isolated** within different departments. There is very little **AI-driven, real-time integration** of weather and water data into local planning or budgeting.
    - **Core Issue:** Without **interoperable platforms**, city managers cannot perform real-time monitoring or use **climate-stress indicators** to make quick, data-backed decisions.

Global Best Practices

Case Study	Location	Key Innovation/Model
Jakkur Lake	Bengaluru	**Integrated Model:** Combines a sewage plant with a natural wetland to clean water.
East Kolkata Wetlands	West Bengal	**"Natural Kidneys":** Treats 900 million liters of wastewater daily while supporting local fisheries.
Neknampur Lake	Hyderabad	**Nature-based Solutions (NbS):** Used "Floating Treatment Wetlands" made of recycled materials.
Cheonggyecheon	Seoul, S. Korea	**Greenway Model:** Removed a highway to restore a buried stream; lowered local heat by 3-5°C.
Singapore/China		**Sponge City Model:** Utilizing naturalized rivers and floodplains (e.g., Bishan-Ang Mo Kio Park) to manage stormwater via infiltration and detention.

Major Government Initiatives for Water-Centric Resilience

- **Integrated Water Governance:** The **Ministry of Jal Shakti** was created to **integrate and streamline water-related departments**, enabling coordinated management of water resources.
- **Groundwater Management:** The **National Aquifer Mapping and Management Programme** focuses on **scientific mapping of aquifers and sustainable groundwater utilisation**.
- **Drinking Water Security:** The **Jal Jeevan Mission** aims to provide **functional household tap connections to rural households**, ensuring safe drinking water access.
- **River Rejuvenation:** The **National Mission for Clean Ganga** works towards **restoration, pollution control, and ecological conservation of the Ganga river basin**.

Way Forward: A Regenerative Roadmap for Water Resilience

1. **Policy Convergence & Institutional Integration:** Instead of reinvention, India must align existing missions like **Jal Jeevan**, **AMRUT 2.0**, and **Smart Cities** with the **Belém Indicators**.
    - **Institutional Strength:** Building on the **2019 consolidation** of water governance under the **Ministry of Jal Shakti**, India is well-positioned for integrated stewardship.
    - **Key Action:** Integrate **Climate Stress Metrics** into mission dashboards to track how infrastructure performs during extreme weather events.
2. **Integrated Hydrological Planning:** Cities must stop treating lakes as isolated "assets" or real estate spots. **Lake Management Plans (LMPs)** should be legally integrated into **City Master Plans**.
    - Utilize **National Aquifer Mapping and Management (NAQUIM) Programme 2.0** data to move from simple mapping to implementing **aquifer-level management plans** grounded in hydrogeological knowledge.
    - **Key Action:** Protect the entire **catchment area** and **feeder channels** (inlet/outlet drains) to ensure water actually reaches the urban basins.

3. **Adopting the "Sponge City" Framework:** Urban design should shift from "draining" water to "absorbing" it. Cities must be designed to act like a sponge—absorbing, storing, and purifying rainwater.
    - **Key Action:** Deploy **Nature-based Solutions (NbS)** like permeable pavements, bioswales, and rain gardens to reduce runoff and prevent urban flooding.
4. **Mainstreaming a Circular Water Economy**

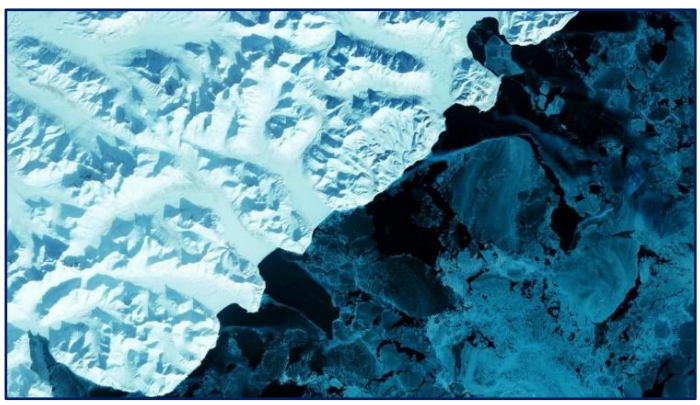
    Shift from a "linear" (use and throw) to a **"circular"** (reduce-recycle-reuse) model. Treated sewage must be viewed as a valuable resource for rejuvenating local water bodies.
    - **Key Action:** Mandate the reuse of treated wastewater for **industrial and cooling purposes** to reduce the extraction of fresh groundwater.
5. **Climate Stress-Testing of Infrastructure:** All water infrastructure—including dams, pipes, and drains—must be **"stress-tested"** for extreme scenarios.
    - **Key Action:** Ensure designs can handle **"1-in-100-year" flood events**, moving beyond historical average rainfall data to account for future climate volatility.
6. **Digital Public Infrastructure & AI Integration:** Leverage India's technology prowess to create **interoperable digital platforms** that connect sensors with decision-makers.
    - **Key Action:** Use **Artificial Intelligence (AI)** to link real-time **weather forecasts** directly to city water management systems for proactive disaster response.
7. **Community Stewardship & Protecting the "Commons":** Resilience is only successful if it is inclusive. Local governance should move toward a **stewardship model** that protects the rights of traditional users.
    - **Key Action:** Empower **Mohalla Samitis** and local NGOs (e.g., **PNLIT in Bengaluru**) to lead governance, ensuring that fisherfolk and farmers maintain access to water bodies as shared heritage.

Conclusion

Climate change is fundamentally a water challenge, as disruptions in the hydrological cycle intensify floods, droughts, and water insecurity. By shifting from simple asset creation to systemic resilience and aligning domestic missions with the **Belém indicators**, India can build a scalable model for the **Global South** while advancing the goals of **Water Vision 2047**.

4.8. UNDERSTANDING THE CREDIBILITY OF CLIMATE SCIENCE

Context:



- Climate science has been established on the foundation of **systematic observations, physical laws and independent verification**.
- Recent claims questioning the reality of global warming particularly regarding **ocean heat content** and **Earth's energy imbalance (EEI)** have necessitated a closer examination of how scientific credibility is ensured.

- It is demonstrated that climate science derives its strength not from isolated datasets, but from **convergence across multiple independent methods**, thereby ensuring **accuracy, reliability, and policy relevance**.

Background

Climate change refers to long-term shifts in temperature, precipitation, and other atmospheric conditions, primarily driven by **increased greenhouse gas concentrations** from human activities. The **Intergovernmental Panel on Climate Change (IPCC)**, established in **1988** by the **World Meteorological Organisation** and **UNEP**, synthesises global evidence in its **Assessment Reports** (**AR6 being the latest key milestone**).

- **IPCC AR6 Findings:**
  - **>90% of excess heat** is absorbed by oceans.
  - **Recent observations confirm acceleration**: **ocean heat content** reached record highs in 2025, with the **rate of warming** more than doubling since 2005 compared to earlier decades. These facts support international frameworks such as the **Paris Agreement** and inform **India's climate policy** under **Nationally Determined Contributions**.
  - **Earth's Energy Imbalance (EEI)** (difference between **incoming solar radiation** and **outgoing terrestrial radiation**) **increased** from ~0.57 W/m² (1971–2018) to ~0.79 W/m² (2006–2018).
  - **Global temperature rise** ≈ **1.1°C** above pre-industrial levels.

Key Scientific Concepts

- **Temperature (Intensive Property):** Independent of mass.
- **Thermal Energy (Extensive Property):** Depends on **mass + temperature**, used to measure **heat content**.

Core Issues Raised and Scientific Clarifications

Recent scrutiny has focused on three specific assertions regarding data handling. Each has been evaluated against established scientific practices, revealing that standard methods already incorporate and resolve the raised concerns.

1. **Claim on Temperature and Heat Measurement**

   Temperature measures **average kinetic energy** per molecule and does not depend on the mass of the material, making it an **intensive property**. Critics argue this prevents meaningful averaging for total ocean heat.

   - However, scientists calculate **thermal energy** (**an extensive quantity**) as the **product of temperature, mass, and specific heat capacity**. This **total kinetic energy** content rises measurably over time, confirming warming.
   - The same logic applies consistently to other metrics such as **average air temperature, atmospheric pressure or sea-level rise** without invalidating them. This distinction clarifies why direct temperature averages, when combined with volume and density data, yield reliable heat-content estimates.

2. **Uncertainties in Argo Floats Data and Ocean Monitoring**

   The **Argo programme** deploys thousands of **free-drifting profiling floats** that measure **temperature and salinity** up to **2,000 metres** depth across the global ocean. Concerns highlight data gaps leading to underreported uncertainties, including mesoscale aliasing and limited deep-ocean coverage.

Oceanographers address these through:

- Multiple independent calculation methods that produce consistent results.
- Validation against known measurement sites and sensitivity tests (removing subsets of data).
- **Cross-comparison with independent satellite systems**:
  - **Altimetry satellites** measure total sea-level rise.
  - **GRACE satellites** track added water mass via gravity changes.
  - The residual "steric" expansion (due to heat) matches Argo-derived heat content exactly.

This multi-method convergence demonstrates that uncertainties are neither ignored nor overstated; instead, they are quantified and minimised through rigorous robustness checks.

3. Claim on Circularity in CERES-Argo Cross-Calibration

CERES (**Clouds and the Earth's Radiant Energy System**), operated by NASA, consists of satellite instruments that measure **incoming solar radiation and outgoing shortwave (visible light)** and **longwave (heat) radiation** at the top of the atmosphere. Subtracting outgoing from incoming radiation gives the **net energy flux and thus Earth's energy imbalance**.

- CERES instruments achieve accuracy of **about 1% for shortwave** and **0.75% for longwave radiation,** implying an absolute uncertainty of roughly **2 W/m² in net flux**.
- The **EBAF** (**Energy Balanced and Filled**) product adjusts fluxes so the **global mean net flux (July 2005–June 2015)** aligns with **Argo's estimate of 0.71 W/m².**

  Critics label this "**circular**" because Argo informs calibration while CERES validates heat content. In reality:

- **Balancing** applies a constant offset to the long-term mean only.
- **Filling** separately patches data gaps caused by clouds.
- The warming **trend** derives from raw monthly differences in CERES data, which the constant adjustment does not alter.

For example, if EBAF adds **3.6 W/m² uniformly**, the difference between any two months **(e.g., 4 vs. 5 W/m² raw becomes 7.6 vs. 8.6 W/m² adjusted)** remains exactly **1 W/m².** Thus, evidence of an increasing energy imbalance comes from raw instrument readings, independent of Argo.

Additional Independent Lines of Evidence

Scientists estimate **Earth's energy imbalance** through several other approaches that align with **CERES-Argo** results:

- **Atmospheric reanalyses**.
- **Deep-ocean temperature** records from research vessels.
- **Physical climate models** informed by observed surface warming.

If the **imbalance** were zero, all these independent systems would need to be wrong for unrelated reasons — a highly improbable scenario. Credible studies perform such independent tests and falsification checks, which the recent paper did not adequately address.

Implications for Global and Indian Policy Frameworks

The credibility of climate science rests on **convergence of evidence** rather than any single dataset or journal prestige. This foundation supports evidence-based policymaking under the **United Nations Framework Convention on Climate Change**, the **Kyoto Protocol**, and the **Paris Agreement**.

For India, a highly vulnerable country with a long coastline and monsoon-dependent agriculture, reliable data justify:

- **Adaptation measures** such as coastal regulation and heat action plans.
- **Mitigation** through renewable energy targets (**500 GW non-fossil capacity by 2030**).
- Claims for **climate finance and loss-and-damage support** in global negotiations, guided by the principle of **common but differentiated responsibilities**.

Delaying action due to unresolved doubts risks exacerbating impacts on food security, biodiversity, and sustainable development goals.

Way Forward: Strengthening Credibility and Climate Action

1. **Strengthening Observation Systems**
   - Expand **Argo network to deeper oceans (below 2000 m)**
   - Ensure **continuity of satellite missions (CERES, GRACE)**
   - Reduce **data gaps and uncertainties**
2. **Promoting Data Transparency and Accessibility**
   - Ensure **open-access climate datasets**
   - Encourage **independent verification by global researchers**
   - Build **public trust through transparency**
3. **Enhancing Scientific Rigor and Peer Review**
   - Strengthen **peer-review mechanisms**
   - Encourage **replication studies and falsification tests**
   - Discourage **selective or biased interpretation of uncertainties**
4. **Improving Climate Literacy and Scientific Temper**
   - Integrate **climate science in education and UPSC curriculum**
   - Promote **evidence-based reasoning in public discourse**
   - Counter **misinformation with scientific clarity**
5. **Integrating Science into Governance**
   - Mainstream climate data into:
     - **Disaster management (NDMA frameworks)**
     - **Urban planning and coastal regulation**
   - Use **scientific evidence for policy formulation**
6. **Strengthening Global Cooperation**
   - Support **IPCC-led synthesis of evidence**
   - Promote **multilateral collaboration in climate research**
   - Align national policies with **global climate goals**

Conclusion

The credibility of climate science does not depend on silencing dissent but on the **requirement of independent proof**. For any new theory to "overturn" current climate science, it must not only point out a minor uncertainty but also explain why multiple independent systems—satellites, ocean floats, ice cores, and physical models—all show a consistent warming trend.

4.9. EARTHQUAKES

Context:

An **earthquake** is the sudden shaking of the Earth's surface caused by the **release of energy in the Earth's crust**, producing seismic waves. It usually occurs along **fault lines or tectonic plate boundaries**.

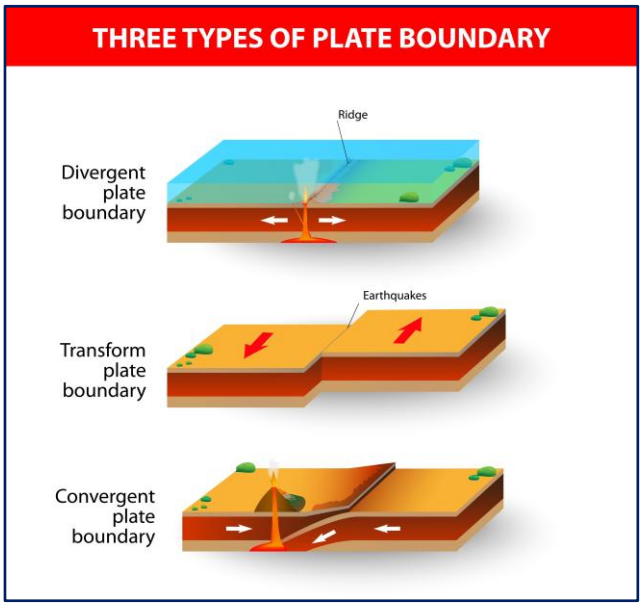
- Measured using **Richter Scale (magnitude)** and **Modified Mercalli Intensity (MMI) scale**.
- Most earthquakes occur along **plate boundaries** such as the Pacific Ring of Fire.
- India is highly vulnerable due to its location near the **collision zone of the Indian and Eurasian plates**.

Causes of Earthquakes

1. **Natural Causes**

   The Earth's lithosphere is broken into several tectonic plates that are constantly in motion due to convection currents in the mantle.

   - **Tectonic Movements:**
     - **Convergent Boundaries:** Plates collide (e.g., Indian Plate hitting the Eurasian Plate), creating the Himalayas and causing high-magnitude quakes.
     - **Divergent Boundaries:** Plates pull apart (e.g., Mid-Atlantic Ridge), allowing magma to rise and causing tremors.
     - **Transform Boundaries:** Plates slide past each other horizontally (e.g., San Andreas Fault), leading to a buildup and sudden release of friction.



   - **Volcanic Eruptions:** The violent movement of magma or the explosion of gases can trigger localized but intense seismic activity.
   - **Faulting and Folding:** Rocks under immense stress eventually fracture (faulting) or bend (folding). When the elastic limit is exceeded, the "Elastic Rebound Theory" explains the sudden snap that releases seismic energy.

2. **Anthropogenic (Human-Induced) Causes**

   Human activities can alter the stress distribution in the Earth's crust:

   - **Reservoir-Induced Seismicity (RIS):** The weight of water in massive reservoirs (like the **Koyna Dam** in Maharashtra) puts pressure on underlying rock layers and can lubricate existing faults.
   - **Mining and Quarrying:** Deep underground mining can cause "rock bursts" or the collapse of mine roofs, triggering tremors.

- **Nuclear Explosions:** Underground testing of nuclear devices releases a massive amount of energy that mimics a natural earthquake.

Types of Earthquakes

(1) Based on Origin

1. **Tectonic Earthquakes** – caused by plate movements (most common).
2. **Volcanic Earthquakes** – associated with volcanic eruptions.
3. **Collapse Earthquakes** – due to underground mine collapse.
4. **Explosion-induced Earthquakes** – due to nuclear or chemical blasts.

(2) Based on Depth

Type	Depth	Characteristics
Shallow Focus	0 – 70 km	**Most Destructive.** Energy has less distance to travel, hitting the surface with high intensity.
Intermediate Focus	70 – 300 km	Moderate impact; often occur at subduction zones.
Deep Focus	300 – 700 km	Also called **Plutonic** earthquakes. Usually felt over wide areas but cause less surface damage.

Impact of Earthquakes

1. Physical & Structural Impacts

- **Building Collapse:** The primary cause of fatalities.
  - Example: **2023 Turkey-Syria Earthquake** where "pancake collapses" of thousands of buildings led to over 50,000 deaths.
- **Infrastructure Destruction:** Damage to "lifeline" infrastructure like bridges, dams, and power grids.
  - Example: **1993 Latur Earthquake**, which decimated stone-masonry houses in rural Maharashtra.

2. Geological & Environmental Impacts

- **Surface Faulting:** Visible tearing of the Earth's crust.
- **Liquefaction:** Soft soil behaving like liquid, causing buildings to tilt.
  - Example: **2011 Niigata (Japan) Earthquake**, where entire apartment complexes tilted perfectly intact into the saturated soil.
- **Landslides/Avalanches:**
  - Example: **2015 Nepal Earthquake**, which triggered a massive avalanche at the Everest Base Camp and buried the village of Langtang.

3. Secondary Hazards (The "Follow-on" Disasters)

- **Tsunamis:** Displacement of the ocean floor.
  - Example: **2004 Indian Ocean Tsunami** (triggered by a Sumatra quake), affecting 14 countries including India's Andaman & Nicobar Islands.
- **Flash Floods:** Landslides blocking rivers to create "artificial lakes" that eventually burst.
  - Example: Frequent risks in the **Sikkim-Himalayan belt** following tremors.
- **Urban Fires:** Ruptured gas lines and electrical short circuits.
  - Example: **1923 Great Kanto Earthquake (Japan)**, where fire caused more deaths than the actual shaking.

4. **Socio-Economic Impacts**
    - **Economic Loss:** Massive drain on the national exchequer for reconstruction.
        - Example: The **2001 Bhuj Earthquake** caused an estimated loss of **$5 billion** and crippled the local handicraft and industrial sectors.
    - **Public Health Crisis:** Outbreak of waterborne diseases in relief camps and long-term PTSD.
    - **Digital/Communication Blackout:** Modern dependency on undersea cables and satellites makes communication fragile.

Earthquake Vulnerability in India

- India lies at the **convergent boundary of Indian and Eurasian plates**, making the Himalayan belt highly active.
- About **59% of India's landmass is prone to earthquakes of varying intensity**.
- **Population at Risk:** About **75% of India's population** lives in seismically active regions.
- **The "Seismic Gap":** Scientists are particularly concerned about the "Central Himalayan Gap"—a section of the Himalayas that hasn't seen a major earthquake in over 200 years, making it overdue for a "Great Earthquake" (M > 8.0).

Bureau of Indian Standards (BIS) divides India into **four seismic zones (II–V)** based on risk.

Approximate distribution:

- Zone V (Very High Risk): Himalayan region, Northeast India, Andaman & Nicobar
- Zone IV (High Risk): Delhi, Kashmir, Himachal Pradesh, Uttarakhand
- Zone III (Moderate Risk): parts of central India
- Zone II (Low Risk): stable peninsular regions

Mitigation Strategies

1. **Structural Mitigation (The "Engineering" Fix)**
    - **Seismic Retrofitting:** Strengthening older, vulnerable buildings (especially hospitals and schools) using steel bracing, base isolation, or jacketed columns.
    - **Base Isolation & Dampers:** Using flexible bearings or "shock absorbers" at the foundation to decouple the building from ground motion.
        - Example: The **Bhuj District Hospital** was rebuilt with base isolation after the 2001 quake.
    - **Strict Enforcement of Building Codes:** Ensuring all new constructions adhere to **IS 1893: 2016** (Seismic Design) and **IS 13920** (Ductile Detailing).
    - **Use of Lightweight Materials:** Promoting the use of hollow bricks or Bamboo-based reinforced structures in high-risk hilly terrains (Zone V).
2. **Non-Structural Mitigation (The "Policy" Fix)**
    - **Seismic Microzonation:** Dividing a city into small "micro-zones" based on soil type to determine which areas will shake more (e.g., Delhi and Bengaluru have completed this).
    - **Land Use Planning:** Prohibiting high-rise construction on "fault lines" or liquefaction-prone riverbeds through strict zoning laws.
    - **Early Warning Systems (EWS):** Installing sensors that detect **P-waves** (faster, less destructive) to provide a 10–60 second warning before **S-waves** (destructive) arrive.
        - Example: Uttarakhand's Earthquake Early Warning (EEW) app.
    - **Capacity Building:** Training "Aapda Mitras" (community volunteers) and conducting regular **Mega Mock Drills** (e.g., Annual 'Exercise Sahayta').

3. **Institutional & Global Frameworks**
    - **NDMA Guidelines:** A shift toward "Safe Construction Practices" and "Mandatory Technical Audits" for high-rise buildings.
    - **CDRI (Coalition for Disaster Resilient Infrastructure):** An Indian-led global initiative to ensure that new infrastructure (power, telecommunications) can withstand seismic shocks.
    - **Insurance Penetration:** Promoting "Catastrophe Insurance" to reduce the fiscal burden on the government post-disaster.

India's Preparedness on Earthquakes

1. **Institutional Framework**
    - **Disaster Management Act, 2005:** The bedrock of India's preparedness, establishing a three-tier structure: **NDMA** (National), **SDMAs** (State), and **DDMAs** (District).
    - **NDMA Guidelines (2026 Update):** The latest guidelines emphasize **"Building Back Better"** and shifting from generic risk assessment to **Probabilistic Seismic Hazard Assessment (PSHA)**.
    - **NDRF (National Disaster Response Force):** A specialized force with 16 battalions trained in collapsed structure search and rescue (CSSR).
2. **Technological & Monitoring Systems**
    - **National Seismological Network (NSN):** As of early 2026, the network has expanded to **169 stations** (up from 80 in 2014), providing real-time data to the National Center for Seismology.
    - **Earthquake Early Warning (EEW) Systems:** Operational in **Uttarakhand** (first of its kind in India).
        - Research is underway to expand this across the **Himalayan Arc** to provide a 10–60 second lead time before destructive S-waves hit densely populated plains.
    - **Sachet Portal (NDMA):** A pan-India integrated alert system that uses geo-intelligence to send real-time alerts to mobile phones in local languages.
3. **Community & Capacity Building**
    - **Aapda Mitra Scheme:** A central project that has trained over **1 lakh community volunteers** to be "first responders" before professional help arrives.
    - **School Safety Programs:** Conducted by NIDM (National Institute of Disaster Management) to ensure schools in high-risk zones have evacuation plans.
    - **Traditional Knowledge:** Integration of resilient traditional architecture like **Kath-Kuni** (Himachal) and **Dhajji-Dewari** (Kashmir) into modern building protocols.

Challenges in Earthquake Management

1. **Structural and Engineering Challenges**
    - **Enforcement Deficit:** ~80% of buildings in cities like Delhi/Guwahati violate **IS 1893** norms; prevalence of "non-engineered" structures built without expert supervision.
    - **Retrofitting Dilemma:** Over 12 crore buildings need strengthening. High costs, technical complexity, and **"occupancy disruption"** (e.g., inability to vacate hospitals/schools) hinder progress.
    - **Skill Shortage:** Acute lack of licensed structural engineers and masons skilled in **ductile detailing** and seismic-resistant masonry.

2. Institutional and Policy Challenges

- **The 2026 "Seismic Rollback":** The recent withdrawal of the **IS 1893: 2025** code (which proposed 'Zone VI') due to industry pushback.
  - **Reason:** Concerns over 20–50% spike in construction costs and the risk of **"stranded assets"** in infrastructure.
- **Top-Down Governance:** Over-centralization persists; **DDMAs** (Districts) lack independent budgets and technical staff to implement microzonation data.
- **Connectivity Gaps:** Despite 169 monitoring stations, India lacks **"last-mile connectivity"** for real-time Early Warning Systems (EWS) in the Indo-Gangetic plains.

3. Geographical and Socio-Economic Challenges

- **Himalayan Fragility:** Tectonic stress in the **"Central Himalayan Gap"** makes the region overdue for an M > 8.0 quake; compounded by unplanned hill urbanization.
- **Soil Amplification & Liquefaction:** Soft alluvial soil in the North Indian plains amplifies tremors and causes ground failure (liquefaction) far from the epicenter.
- **Rural-Urban Divide:** Rural reliance on **"Kutcha" masonry** leads to "pancake collapses," while urban density increases the risk of secondary hazards like fires.

Way Forward

- **Risk-Informed Governance:** Transition from the **2026 Seismic Rollback** to a phased implementation of **IS 1893:2025** standards, mandating "Seismic Compliance Certificates" for all lifeline infrastructure (Metros, Nuclear Plants, Hospitals) first.
- **National Retrofitting Mission:** Address the vulnerability of 12 crore existing structures through a dedicated mission providing **"Resilience Loans,"** tax rebates, and **Parametric Insurance** to ensure immediate liquidity post-event.
- **Decentralized Capacity Building:** Expand the **Aapda Mitra** program to every district and bridge the technical "Skill Gap" by certifying local masons in **ductile detailing** and resilient traditional styles like **Kath-Kuni**.
- **Mainstreaming DRI:** Utilize the **Coalition for Disaster Resilient Infrastructure (CDRI)** to "disaster-proof" the **National Infrastructure Pipeline (NIP)**, shifting the paradigm from "Reactive Relief" to **"Proactive Risk-Informed Development."**

Conclusion

Moving from a "Reactive Relief" to a **"Risk-Informed Development"** paradigm is vital. Integrating the **Sendai Framework** with cutting-edge **Early Warning Systems** and **CDRI** leadership will ensure India's $5 trillion economic vision remains resilient against seismic uncertainties.

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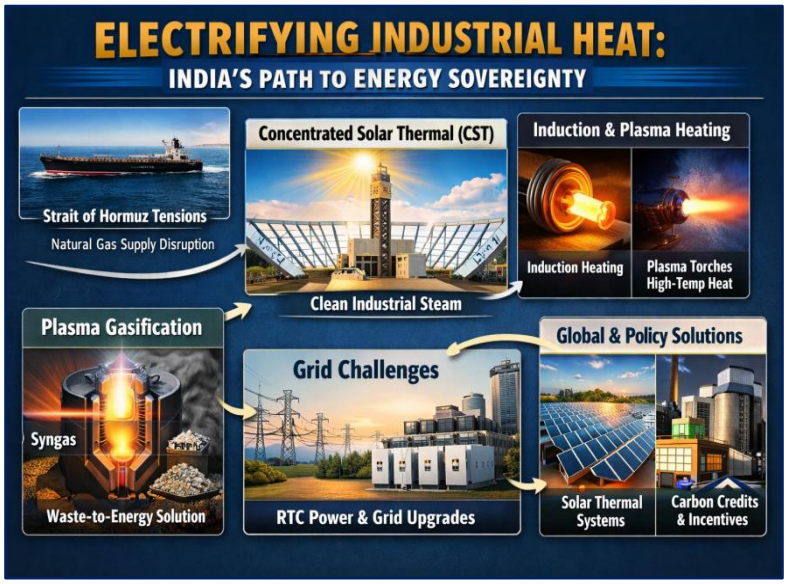
5.1. THE QUEST FOR THERMAL INDEPENDENCE

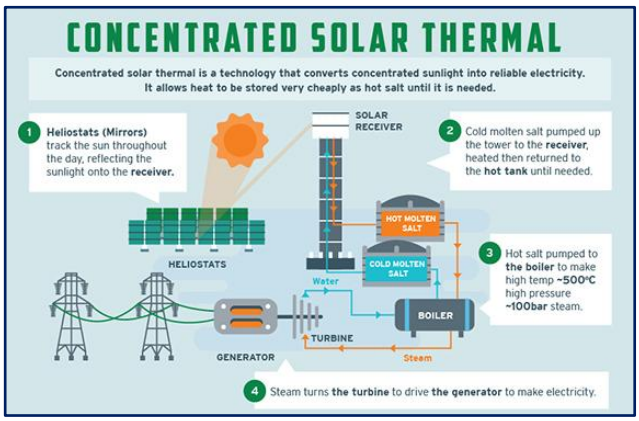
Context:



India is facing a "geopolitical ultimatum" due to the volatility in the **Strait of Hormuz** (a critical artery for India's natural gas imports). As the Ministry of Petroleum and Natural Gas slashes gas allocations to non-priority industrial sectors (like ceramics and textiles), India must transition from burning hydrocarbons to **Electrification of Industrial Heat** and **Concentrated Solar Thermal (CST)** to achieve "**sovereignty of heat.**"

1. **Key Technologies for Industrial Decarbonization**

   A. **Concentrated Solar Thermal (CST)**



   - **Mechanism:** Uses precisely controlled mirrors to concentrate sunlight onto a receiver to heat fluids (water or molten salt) up to **400 °C**.
   - **Utility:** Ideal for textile processes (scouring/bleaching) requiring steam between **100 °C and 180 °C**.
   - **Other Applications:** Primarily used for high-temperature industrial process heat (heating, cooling, drying) and utility-scale electricity generation via steam turbines.
   - **Advantage:** Unlike solar PV, CST systems can efficiently store heat in molten salt or other materials, enabling electricity production at night.
   - **India's Potential:** Estimated at **15 GW** by the MNRE.

   B. **Induction and Plasma Heating**

   - **Induction Heating:** Uses electromagnetic fields to generate heat directly inside the material (e.g., metal). Efficiency rates can exceed **90%** because there is no intermediary substance (like air or steam) to lose heat.
   - **How it Works:**
     - A high-frequency **Alternating Current (AC)** is passed through a copper coil.
     - This creates a rapidly fluctuating **magnetic field** around and inside the coil.
     - When a conductive workpiece (like a steel rod) is placed inside this field, **Eddy Currents** are induced within the material.
     - The material's internal resistance to these currents generates heat instantly (Joule heating).

- **Key Physics Concept: Skin Effect.** At high frequencies, the current tends to flow on the surface of the material. By adjusting the frequency, engineers can control whether they want to heat just the "skin" (surface hardening) or the entire core of the metal.
- **Industrial Use:** Melting metals, brazing, and surface hardening in automotive and aerospace manufacturing.
- **Plasma Torches:** Used in high-temperature industries. Instead of a solid workpiece, the induction coil surrounds a gas stream (e.g., argon, oxygen), creating a high-frequency electrodeless discharge that ionizes the gas into plasma.
- **How it Works:**
  - An electric arc is struck between two electrodes.
  - A gas (like Argon, Nitrogen, or even compressed air) is passed through this arc.
  - The intense energy strips electrons from the gas atoms, creating **Plasma**—a soup of ions and electrons.
  - This plasma "torch" can reach temperatures of **5,000°C to 10,000°C** or more.
- **Industrial Use:** Plasma cutting, specialized waste-to-energy (plasma gasification), and high-end metallurgy.
- Plasma gasification is a high-temperature waste treatment process that uses plasma torches (**about 3,000°C–10,000°C**) to break down waste into elemental components. It converts organic waste into **syngas (mainly carbon monoxide and hydrogen)** and transforms inorganic materials into **inert vitrified slag**, providing a sustainable alternative to landfills.

2. Infrastructure & Grid Challenges

The transition to electric heat poses significant engineering challenges for India's power sector:

- **Grid Collapse Risk:** Shifting the 25% of India's energy consumption currently served by gas pipes to electric wires could overwhelm the current grid.
- **Baseload Requirement:** Most factories operate 24/7, necessitating **Round-the-Clock (RTC)** renewable power, battery storage, and **Pumped Hydro Storage**.
- **Last-Mile Constraints:** Local grids in industrial clusters (like Ludhiana) have aging high-voltage substations. DISCOM reports suggest 25–33% of distribution transformers are already critically loaded during peak hours.

3. Global Policy Lessons & Hybrid Models

- **Oman (Project 'Miraah'):** One of the world's largest CST plants integrated with gas-fired operations. Solar generates steam during the day (reducing gas use by 80%), while gas boilers remain on standby for nighttime.
- **Spain (Solatom):** Use of **plug-and-play solar thermal units** (pre-assembled, containerized mirrors) that can be installed on factory roofs or parking lots.
- **Denmark:** Reformed energy markets to support **'Heat Purchase Agreements'**, where an external provider maintains the system and the factory pays a fixed rate for the heat.

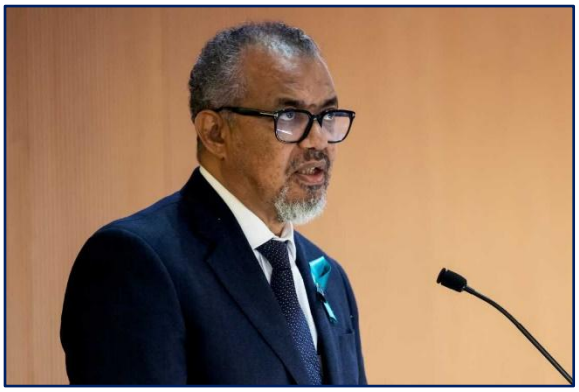
4. Policy Recommendations for India

- **National Thermal Policy:** Necessary to survive the LPG/Natural Gas crisis.
- **Incentive Parity:** Extend **Production-Linked Incentives (PLI)** to CST mirror manufacturers (currently focused on PV cells).

- **Carbon Market Reform:** Allow factories to sell "avoided emissions" through the **Carbon Credit Trading Scheme** to offset the high capital cost of electric/plasma kilns.

5.2. WHO PANDEMIC AGREEMENT

Context:



Recently, India joined a coalition of developing nations, known as the "Group for Equity," to demand a legally enforceable benefit-sharing system during the ongoing negotiations for the **Pathogen Access and Benefit-Sharing (PABS)** system in Geneva.

These crucial talks aim to finalize the "rule book" or the Annex of the **WHO Pandemic Agreement**, which was formally adopted by the World Health Assembly in May 2025.

Key Features of the Pandemic Agreement

The Pandemic Agreement is a historic, legally binding international treaty designed to prevent a repeat of the inequities witnessed during the COVID-19 pandemic.

- **Legal Basis:** It is negotiated under **Article 19** of the WHO Constitution. It is only the second such treaty in WHO history, following the 2003 Framework Convention on Tobacco Control (FCTC).
- **Pathogen Access and Benefit-Sharing (PABS) System:** This is the "soul" of the agreement. It mandates that countries rapidly share information on pathogens with pandemic potential. In exchange, manufacturers using this data must provide **20% of their real-time production** of pandemic products (10% as a donation and 10% at affordable prices) to the WHO for equitable distribution.
- **The "One Health" Approach:** The agreement recognizes that 75% of emerging infectious diseases are zoonotic. It promotes an integrated framework that links human, animal, and environmental health to detect spillovers early.
- **Sovereignty Safeguards:** Critically, the treaty explicitly states that it **cannot** empower the WHO to mandate national lockdowns, compulsory vaccinations, or travel bans. Each member state retains full sovereign rights over its domestic public health policies.
- **Institutional Framework:** * **Global Supply Chain and Logistics (GSCL) Network:** To ensure the fair movement of medical countermeasures.
    - **Coordinating Financial Mechanism:** To assist developing countries in building laboratory and surveillance capacities.

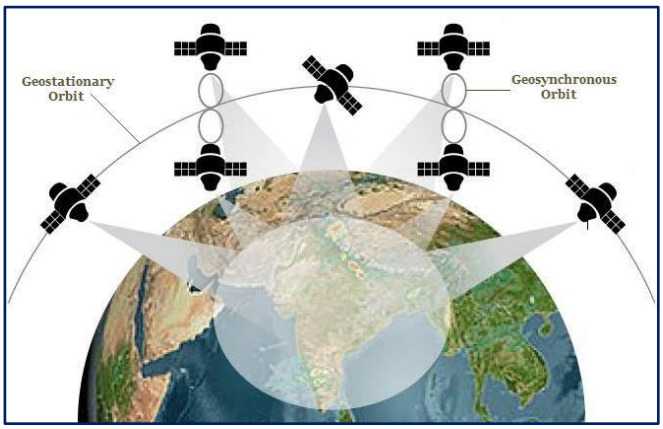
India's Stand and Concerns

India has emerged as a leading voice for the **Global South** in these negotiations, focusing on three primary pillars:

1. **Equity over Charity:** India opposes the "voluntary" nature of benefit-sharing, demanding that pharmaceutical companies be legally bound to share technology and products.
2. **Access to Raw Materials:** India has highlighted that sharing pathogen data is meaningless if developing nations cannot access the raw materials needed to manufacture vaccines locally.
3. **Traditional Medicine:** India successfully advocated for the inclusion of holistic health and traditional medicine systems within the broader pandemic preparedness framework.

5.3. NAVIC AND GLOBAL/REGIONAL SATELLITE NAVIGATION SYSTEMS

Context:



Recently, India's indigenous navigation system, **NavIC** (Navigation with Indian Constellation), faced a technical challenge following the failure of an atomic clock onboard the **IRNSS-1F** satellite in March 2026. This development is significant as it reduces the number of fully operational satellites providing precise Positioning, Navigation, and Timing (PNT) services. While the satellite remains in orbit for one-way messaging, the loss of its timing frequency highlights the critical need for India to accelerate the launch of its **second-generation NVS series** satellites to maintain a robust and independent regional navigation network.

1. NavIC: India's Indigenous Navigation System

NavIC, formerly known as the **Indian Regional Navigation Satellite System (IRNSS)**, is an independent regional system developed by **ISRO**.

- **Constellation Design:** It originally consisted of 7 satellites.
  - **3 satellites** are in **Geostationary Orbit (GEO)** (appearing fixed over the equator).
  - **4 satellites** are in **Geosynchronous Orbit (GSO)** (inclined at 29° to the equatorial plane).
- **Coverage Area: Primary Service Area:** Entire Indian landmass and an area extending up to **1,500 km** beyond its borders.
- **Services Provided:**
  1. **Standard Positioning Service (SPS):** Open for all civilian users (accuracy < 20 meters).
  2. **Restricted Service (RS):** An encrypted service for authorized users (military and strategic applications).
- **Frequency Bands:** Initially used **L5 and S bands**. The new NVS satellites have added the **L1 band**, which is common in civilian GPS, making NavIC compatible with most smartphones and wearable devices.

2. Global vs. Regional Systems

The world's navigation systems are categorized based on their coverage:

System Name	Country/Region	Type	Number of Satellites
GPS	USA	Global (GNSS)	24+ (MEO)
GLONASS	Russia	Global (GNSS)	24+ (MEO)
Galileo	European Union	Global (GNSS)	30 (MEO)
BeiDou	China	Global (GNSS)	35+ (MEO/GEO/GSO)
NavIC	India	**Regional**	7 (GEO/GSO)
QZSS	Japan	**Regional**	4 (GSO/GEO)

Note: Global systems primarily use **Medium Earth Orbit (MEO)** to ensure worldwide visibility, whereas regional systems like NavIC use higher orbits (**GEO/GSO**) to remain focused over a specific geography.

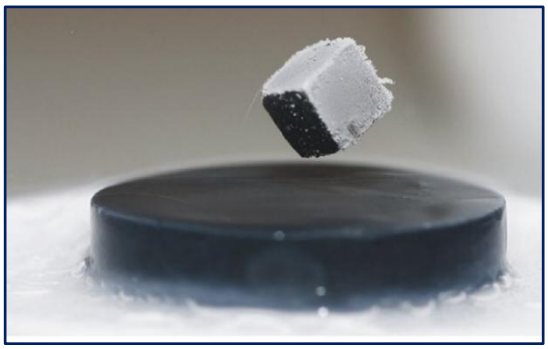
3. The Role of Atomic Clocks

Atomic clocks are the "heart" of navigation satellites. They measure time based on the vibrations of atoms (usually **Rubidium** or **Cesium**).

- **Principle:** Navigation works via **trilateration**. The satellite sends a signal with a timestamp; the receiver calculates distance based on the time delay.
- **Precision:** Even a nanosecond error can lead to a positioning error of several meters.
- **Indigenous Progress:** Earlier IRNSS satellites used imported rubidium clocks which faced frequent failures. ISRO has now developed **indigenous Space-qualified Rubidium Atomic Clocks**, first flown in the **NVS-01** satellite in 2023.

5.4. DISCOVERY OF ROOM-TEMPERATURE SUPERCONDUCTIVITY

Context:



Scientists have reportedly discovered a new material—a **lutetium-hydride compound doped with nitrogen**—that exhibits superconductivity at **room temperature (21°C)**, though it still requires high pressure (10 kilobars) to function. This discovery aims to overcome the "**temperature barrier**" that has historically limited the use of superconductors to extreme laboratory conditions.

1. What is a Superconductor?

A superconductor is a material that can conduct electricity or transport electrons from one atom to another with **zero resistance**.

- **Critical Temperature:** The specific temperature below which a material becomes superconducting.
- **Energy Efficiency:** Because there is no resistance, no energy is released as heat, making the transmission of electricity 100% efficient.

2. Key Physical Properties

- **The Meissner Effect:** This is the hallmark of superconductivity. When a material transitions to a superconducting state, it **expels all internal magnetic fields**. This allows for **quantum levitation** or magnetic levitation (Maglev).
    - This is the most important and defining property of superconductivity. When a material is cooled below a certain **critical temperature**, it enters the superconducting state and completely expels all internal magnetic fields. As a result, the material behaves as a perfect **diamagnet**.
    - In this process, magnetic field lines cannot penetrate the material and are forced to move around its surface. This leads to the phenomenon where the material can float above a magnet—known as **quantum levitation or magnetic levitation (Maglev)**.
    - In real-world applications, this effect is used in **Maglev trains**, enabling frictionless motion and very high speeds. It also plays a significant role in modern physics and advanced technologies.
- **Infinite Conductivity:** Current flowing through a closed loop of superconducting wire can persist indefinitely without a power source.
- **Exclusion of Magnetic Flux:** Superconductors are perfect diamagnets.

3. Materials

- Superconductivity is one of nature's most intriguing quantum phenomena. It was discovered more than 100 years ago in mercury cooled to the temperature of liquid helium (about -452°F, only a few degrees above absolute zero).
- Following the discovery of superconductivity in mercury, the phenomenon was also observed in other materials at very low temperatures..
- Superconductor material classes include **chemical elements** (e.g. mercury or lead), **alloys** (such as niobium–titanium, germanium–niobium, and niobium nitride), **ceramics** (YBCO and magnesium diboride), **superconducting pnictides** (like fluorine-doped LaOFeAs), single-layer materials such as **graphene and transition metal** dichalcogenides,[48] or **organic superconductors** (fullerenes and carbon nanotubes; though perhaps these examples should be included among the chemical elements, as they are composed entirely of carbon).

4. Applications

- **Medical Imaging**: Used in MRI (Magnetic Resonance Imaging) machines to create the powerful magnetic fields required for high-resolution body scans.
- **Transportation:** Maglev Trains use the Meissner effect for friction-less travel, reaching speeds of over 600 km/h.
- **Particle Accelerators:** Essential for the Large Hadron Collider (LHC) at CERN to steer subatomic particles.
- **Power Grids:** Superconducting cables could transmit power over long distances with zero line loss, solving the global energy wastage problem.
- **Quantum Computing:** Superconducting circuits act as "Qubits," the basic unit of information in quantum computers.

5.5. BIO-PHARMA SHAKTI

Context:

Recently, the Union Finance Minister, during the presentation of the **Union Budget 2026-27**, announced the launch of the **Biopharma SHAKTI** initiative to transform India into a global manufacturing hub for biopharmaceuticals. This move comes as a strategic response to India's shifting disease profile, where non-communicable diseases (NCDs) like cancer and diabetes now account for a significant portion of the national health burden.

1. What is Biopharma SHAKTI?

The **Biopharma SHAKTI** (Strategy for Healthcare Advancement through Knowledge, Technology and Innovation) is a flagship national initiative designed to bolster the domestic ecosystem for high-value biopharmaceutical products.

2. Key Features and Financial Outlay

- **Budgetary Allocation:** The government has proposed a total outlay of **₹10,000 crore** over a period of **five years**.

- **Targeted Goal:** The initiative aims to capture **5% of the global biopharmaceutical market share**, transitioning India from a "pharmacy of the world" (volume-based) to a global innovation hub (value-based).
- **Nodal Ministry:** It is steered by the **Department of Pharmaceuticals** under the Ministry of Chemicals and Fertilizers.

3. **Strategic Focus: Biologics and Biosimilars**

The scheme prioritizes the domestic production of complex medical products:

- **Biologics:** These are medicines derived from living organisms (cells, tissues, or microorganisms) rather than chemical synthesis. Examples include vaccines, gene therapies, and monoclonal antibodies.
- **Biosimilars:** These are "highly similar" versions of already approved biological medicines. They provide cost-effective alternatives to expensive branded biologics once patents expire.

4. **Institutional and Infrastructure Strengthening**

- **NIPER Network:** The plan includes the establishment of **three new National Institutes of Pharmaceutical Education and Research (NIPERs)** and the upgradation of seven existing ones to create a specialized workforce.
- **Clinical Trial Ecosystem:** The government intends to develop a network of over **1,000 accredited clinical trial sites** across India to facilitate faster and ethical human trials.
- **Regulatory Reform:** The **Central Drugs Standard Control Organisation (CDSCO)** will be strengthened with a dedicated **Scientific Review Cadre** and specialists to align Indian approval timelines with global standards.

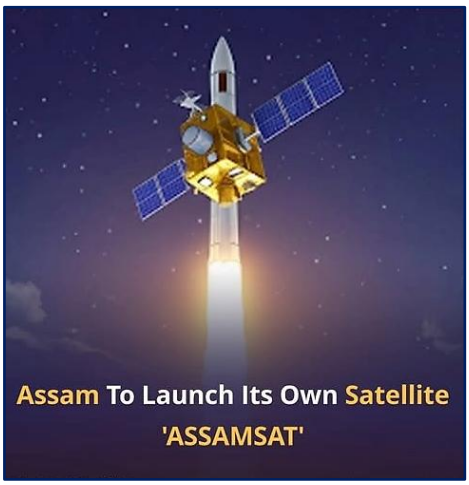
5. **Innovation and Startup Support**

The initiative focuses on providing **early-stage innovation funding** and structured equity support to help startups move from "concept to commercialization."

- It seeks to foster collaboration between academia, research institutions, and the private industry to reduce the gestation period for new drug development.

5.6. ASSAM'S SATELLITE INITIATIVE FOR FLOOD MONITORING

Context:



In a **first-of-its-kind** initiative by any Indian state, the Government of Assam has floated a tender to launch a constellation of **Earth-Observation (EO) Satellites**, named **AssamSAT**. This project aims to provide high-resolution, real-time data to tackle the state's chronic flood issues and enhance border security.

1. **Key Objectives of the Project**

- **Real-Time Flood Monitoring:** Tracking the Brahmaputra River's course and inundation levels during monsoons to improve disaster response.
- **Border & National Security:** Monitoring the **Siliguri Corridor** (Chicken's Neck) and porous international borders where traditional fencing is difficult.

- **Environmental Protection:** Detecting illegal logging, tracking drug trafficking routes, and preventing rhino poaching in **Kaziranga National Park**.
- **Resource Management:** Assessing crop health, forest cover, and urban planning across the state.

2. Technical Framework

- **Orbit:** The satellites will operate in **Low-Earth Orbit (LEO)**.
- **Constellation:** A network of at least **5 satellites** to ensure a high "revisit rate" (how often a satellite passes over the same spot).
- **Satellite Type:** Small satellites (Smallsats) or CubeSats, which are cost-effective and faster to deploy.

3. Science & Technology Linkages

A. Earth Observation Satellites (EOS)

- These are remote-sensing satellites designed for non-military uses such as environmental monitoring and meteorology.
- India's **RISAT** (Radar Imaging Satellite) and **Cartosat** series are the national equivalents used for similar purposes.

B. Low-Earth Orbit (LEO) vs. Geostationary Orbit (GEO) vs Geosynchronous

Feature	**Low-Earth Orbit (LEO)**	**Geosynchronous Orbit (GSO)**	**Geostationary Orbit (GEO)**
Altitude	**160 km to 2,000 km**	**35,786 km**	**35,786 km**
Orbital Period	Approx. **90 to 120 minutes**	**23 hrs, 56 mins, 4 secs** (1 Sidereal Day)	**23 hrs, 56 mins, 4 secs**
Speed	Very High (~27,000 km/h)	Matches Earth's rotation speed	Matches Earth's rotation speed
Position from Earth	Constantly moving/ sweeping across the sky.	Returns to the **same spot** at the same time daily.	Appears **fixed/stationary** in the sky.
Inclination	Can be any (often Polar or Sun-synchronous).	Can be **inclined** (tilted relative to the equator).	**Must be 0°** (Directly over the Equator).
Latency (Delay)	**Low** (Minimal delay in signal).	**High** (Noticeable signal delay).	**High** (Noticeable signal delay).
Resolution	**High Resolution** (closer to Earth).	Lower resolution compared to LEO.	Lower resolution compared to LEO.
Primary Use Cases	Spy satellites, Remote Sensing, International Space Station (ISS), Starlink.	Specialized telecommunications, regional monitoring.	**Satellite TV (DTH)**, Weather satellites (e.g., INSAT), Global Communication.

C. Synthetic Aperture Radar (SAR) Technology

- **Why it matters for Assam:** Traditional optical cameras cannot see through clouds. During the monsoon, Assam is mostly cloud-covered.

- **Mechanism:** SAR uses radar pulses to create 2D or 3D images of landscapes. It can "see" through **clouds, smoke, and darkness**, making it essential for flood monitoring.

4. **Strategic & Geographical Linkages**
   - **The Siliguri Corridor:** A narrow strip of land (~22km wide) in West Bengal that connects the North-Eastern states to the rest of India. It is a vital "choke point" for national security.
   - **Brahmaputra Hydrology:** The river is "braided," meaning it constantly changes its path. Satellite data helps in mapping these morphological changes which lead to sudden embankments breaches.

5.7. DISCOVERY OF 15 NEW MOONS

Context:

The Minor Planet Centre (MPC) recently announced the discovery of **15 new moons**: 4 orbiting **Jupiter** and 11 orbiting **Saturn**.

1. **The Minor Planet Centre (MPC)**
   - **Primary Role:** It serves as the world's single repository for all observations of **small bodies** in the solar system, including asteroids, comets, and the moons of outer planets.
   - **Location & Operation:** Located in Cambridge, Massachusetts, it operates at the **Smithsonian Astrophysical Observatory**.
   - **Institutional Affiliation:** It functions under the auspices of the **International Astronomical Union (IAU)**.
   - **Designation Process:** When a new object is discovered, the MPC verifies the observation, calculates the orbit, and assigns an **official designation** to ensure every minor planet has a unique identity.
2. **Near-Earth Objects (NEOs) & Planetary Defense**
   - **Monitoring:** One of the MPC's most critical tasks is tracking **Near-Earth Objects (NEOs)**—space rocks that could potentially threaten Earth.
   - **Collaboration:** It maintains a massive database with support from **NASA's Planetary Defense Coordination Office**.
   - **Predictive Science:** The data allows scientists to predict if and when a celestial rock might come dangerously close to our planet.
3. **Global Coordination**
   - **Communication:** The MPC facilitates global scientific communication by publishing **electronic circulars**.
   - **Alert System:** These circulars alert researchers to new discoveries or interesting celestial events, allowing observatories worldwide to coordinate efforts quickly.

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6.1. KEELADI EXCAVATION

Context:

The **Archaeological Survey of India (ASI)** has officially granted permission to the **Tamil Nadu State Department of Archaeology (TNSDA)** to begin excavations at eight historical sites across the state. This follows a period of administrative delays and is crucial because the primary excavation window in Tamil Nadu is limited (January to July) due to the monsoon cycle.

1. Key Excavation Sites and Locations

Archaeological Site	District	Significance / Note
Keeladi (and its clusters)	**Sivaganga**	Entering its **11th phase** of excavation; evidence of an urban civilization on the banks of the **Vaigai River.**
Pattanamarudhur	**Thoothukudi**	Coastal/Interior research potential.
Karivalamvanthanallur	**Tenkasi**	Expansion of the Sangam era footprint.
Manikollai	**Cuddalore**	Located in the northern coastal belt.
Adichanur	**Villupuram**	*Note: Not to be confused with Adichanallur in Thoothukudi.*
Vellalore	**Coimbatore**	Historic trade hub known for Roman coin finds.
Telunganur-Mangadu	**Salem**	Research into Iron Age/Megalithic cultures.
Nagapattinam	**Nagapattinam**	Significant for maritime history and Buddhist influence.

2. About Keeladi

- **Location:** Tamil Nadu, on the banks of the **Vaigai River**.
- **Period:** Carbon dating suggests **6th century BCE to 1st century CE**, roughly overlapping with **Sangam Age**.
- **Significance:** Confirms urban settlement and advanced culture in Tamilakam much earlier than previously thought.

3. Material Culture and Daily Life

- **Artifacts found:** Pottery, beads, iron tools, graffiti on pots, terracotta figurines.
- Indicates **trade, craft specialization, and literacy**—like other ancient Indian regions:
  - Similar to **Northern Iron Age settlements** (like **Ujjain, Mathura**) in use of iron tools.
  - Script resemblance to **Tamil-Brahmi**, which links to early **Indian scripts evolution**

4. Urbanization in Ancient India

- Traditionally, urbanization is associated with **Indus Valley Civilization (c. 3300–1300 BCE)**.

- Keeladi shows **continuity of urban settlements in South India** post-Harappan decline, implying:
  - Advanced urban planning (brick structures, street layouts)
  - Drainage and water management systems

5. **Trade and External Contacts**
   - **Beads, pottery styles, and semi-precious stones** suggest:
     - Internal trade within Tamilakam
     - Possibly maritime contacts (like **Roman trade with South India**, 1st century BCE onward)

6.2. SANGITA KALANIDHI AWARD

Context:

Recently, The Music Academy announced that during its **100th Conference and Concerts**, scheduled to begin in December this year in Chennai, the prestigious **Sangita Kalanidhi** will be conferred upon renowned veena player Jayanthi Kumaresh.

1. **Sangita Kalanidhi Award (2026)**
   - **Recipient: Jayanthi Kumaresh**, a renowned exponent of the **Saraswati Veena**.
   - **Significance:** She is the first veena artiste to be selected for this honor in **34 years**.
   - **Legacy:** Her selection coincides with the centenary year of her guru, the late **S. Balachander**.
   - **Background:** She belongs to the musically prominent **Lalgudi G. Jayaraman** family and has collaborated with global maestros like Zakir Hussain.
2. **Nritya Kalanidhi Award (2026)**
   - **Recipient: Narendra G.**, a distinguished **Bharatanatyam** dancer.
   - **Timing:** The award will be presented during the inauguration of the 20th Annual Dance Festival of the Academy.
3. **About Sangita Kalanidhi Award:**
   - It is considered the **highest award** in the field of Carnatic music.
   - The award is conferred by the **Madras Music Academy**.
   - Instituted in 1942, the Sangita Kalanidhi was earlier preceded by the practice of inviting a senior musician or expert to preside over the annual conference of The Music Academy.
   - From 1942 onward, the presiding musician began to be formally honoured with the title, accompanied by a gold medal and a birudu patra (citation).
4. **Madras Music Academy**
   - The Music Academy, Madras is a landmark institution in the history of the fine arts. It emerged as an offshoot of the **All India Congress Session held in Madras** in December 1927.
   - A music conference was held along with it and during the deliberations, the idea of a Music Academy emerged.

6.3. KAKORI MARTYRS

Context:

Recently, statues of the Kakori train action martyrs were allegedly demolished using a bulldozer during road construction work in Shahjahanpur, sparking outrage.

1. **Key Facts of the Incident**
   - **Date:** August 9, 1925.
   - **Location:** Kakori, a small village near **Lucknow**, Uttar Pradesh.
   - **Target:** The **8-Down Train** traveling from Saharanpur to Lucknow, which was carrying government treasury money.
   - **Organization Involved:** The **Hindustan Republican Association (HRA)**.
   - **Objective:** To secure funds for the HRA's revolutionary activities and to challenge the authority of the British Raj through a high-profile act of resistance.
2. **Important Personalities Involved**
   - **Ram Prasad Bismil:** The main mastermind and leader of the operation.
   - **Ashfaqullah Khan:** The first Muslim to be hanged in a conspiracy case against the British Raj.
   - **Chandrashekhar Azad:** Managed to escape the police net after the incident and later reorganized the HRA into the HSRA.
   - **Other key participants:** Thakur Roshan Singh, Rajendra Lahiri, Sachindra Bakshi, Keshab Chakravarty, Banwari Lal, Mukundi Lal, and Manmath Nath Gupta.
3. **Consequences and Legal Trial**
   - **The Kakori Conspiracy Case:** A long legal battle ensued. The British government arrested around 40 revolutionaries.
   - **Sentences:**
     - **Death Penalty (Hanging):** Ram Prasad Bismil, Ashfaqullah Khan, Thakur Roshan Singh, and Rajendra Lahiri.
     - **Deportation (Kala Pani):** Sachindra Sanyal and Jogesh Chandra Chatterjee.
4. **HRA vs. HSRA: Key Differences**

Feature	HRA (1924)	HSRA (1928)
Influential Text	*The Revolutionary* (Manifesto).	*The Philosophy of the Bomb* (by Bhagwati Charan Vohra).
Key Events	Armed struggle and dacoities for funds (e.g., **Kakori**).	Responsible for the **J.P. Saunders assassination** in 1928 to avenge Lala Lajpat Rai's death and **Central Assembly Bombing (1929):** To protest the Public Safety Bill and Trade Dispute Bill.
Key Leadership	Ramprasad Bismil, Jogesh Chandra Chatterjee, Sachin Sanyal.	Bhagat Singh, Chandrashekar Azad, Sukhdev, Rajguru.
Philosophy	Militant Nationalism.	Scientific Socialism and Internationalism.

UPSC Prelims Pointers:

- **Bandi Jiwan:** Written by **Sachindra Nath Sanyal**; it served as the "Bible" for HRA revolutionaries.
- **"To make the deaf hear":** The slogan used by **Bhagat Singh** and Batukeshwar Dutt during the Assembly Bombing to explain that their intent was not to kill, but to protest repressive laws.

6.4. INDIAN NATIONAL FLAG & SYMBOLS

Context:

Recent allegations against Hardik Pandya for alleged disrespect to the national flag have renewed focus on the Flag Code of India, 2002 and the Prevention of Insults to National Honour Act, 1971.

Legal Framework on National Symbols

1. **Prevention of Insults to National Honour Act, 1971**
   - **Scope:** Prohibits desecration of or insult to the country's national symbols, including the **National Flag**, the **Constitution**, and the **National Anthem**.
   - **Key Offenses:** Burning, defacing, trampling, or showing disrespect to the flag in public or within public view.
   - **Punishment:** Imprisonment for up to **3 years**, or a fine, or both.
2. **Flag Code of India, 2002**
   - **Key Provisions:**
     - **Universal Rights:** Since 2002, private citizens, educational institutions, and organizations can hoist the flag on all days (with dignity).
     - **Material:** Allows hand-spun, hand-woven, or machine-made flags (Cotton, Polyester, Wool, Silk, Khadi).
     - **Display Rules:** The flag must occupy the **position of honor** and be distinctly placed. It should never be dipped in salute to any person or thing.
     - **2022 Amendment:** Changed to allow the flag to be flown **day and night** if displayed in the open or on a house (previously only sunrise to sunset).
3. **Constitutional Provisions**
   - **Article 51A(a):** It is a **Fundamental Duty** of every citizen to abide by the Constitution and respect its ideals and institutions, the National Flag, and the National Anthem.
   - **Article 19(1)(a):** The Supreme Court (**Union of India v. Naveen Jindal, 2004**) ruled that flying the National Flag is a **Fundamental Right** as an expression of one's allegiance and pride.
4. **Emblems and Names (Prevention of Improper Use) Act, 1950**
   - **Scope:** Restricts the use of the national flag, coat-of-arms used by a government department, the official seal of the President or Governor, etc., for **commercial or professional purposes** without prior permission.

Judicial Interpretations:

- **Union of India v. Naveen Jindal (2004):** The Supreme Court declared that flying the National Flag with respect and dignity is a Fundamental Right under Article 19(1)(a).

Evolution of the Indian National Flag

- **1906/1907 (Calcutta Flag):** Early tricolour (green, yellow, red) designed by Sachindra Prasad Bose and Sukumar Mitra.
- **1907 (Bhikaji Cama):** Madame Cama became the first to hoist the Indian flag on foreign soil (Stuttgart, Germany).
- **1917 (Home Rule):** Annie Besant and Tilak used a flag with five red and four green horizontal stripes.
- **1921 (Pingali Venkayya):** Proposed a design with a charkha (spinning wheel), endorsed by Mahatma Gandhi.
- **1947 (Final Adoption):** The Constituent Assembly adopted the Saffron, White, and Green tricolour with the Ashoka Chakra (24 spokes) replacing the charkha.

Symbolism & National Identity

1. **The Tricolour (Tiranga) – Core Symbolism**
   - **Saffron (Kesari):** Represents **strength and courage** of the country.
   - **White:** Represents **peace and truth** with the Dharma Chakra.
   - **Green:** Represents **fertility, growth, and auspiciousness** of the land.
   - **Ashoka Chakra:** The "Wheel of the Law of Dharma."
     - **24 Spokes:** Symbolize 24 hours of the day, representing **dynamism and progress** ("Movement is life, stagnation is death").
     - **Historical Link:** Derived from the **Sarnath Lion Capital** of Maurya Emperor Ashoka.
2. **Emotional & Psychological Connect**
   - **Unifying Force:** During the Freedom Struggle, the flag acted as a common identity transcending caste, religion, and linguistic barriers.
   - **National Pride:** It represents the sovereignty of the nation. In **Union of India v. Naveen Jindal (2004)**, the SC noted that flying the flag is an expression of "allegiance and pride."
   - **Sacrifice:** The flag is a silent reminder of the martyrs who fought for independence.
3. **National Identity & Secularism**
   - **Inclusive Design:** While early versions had religious connotations (red for Hindus, green for Muslims), the final 1947 design moved toward **secular values** (courage, peace, and growth).
   - **National Anthem vs. National Song: Jana Gana Mana:** Chosen as the Anthem because its lyrics reflect the geographical and cultural diversity of India, reinforcing a **secular national identity**.
     - **Vande Mataram:** Remains a "National Song" with equal status, symbolizing the **revolutionary spirit** and personification of India as a Motherland.
4. **Constitutional Patriotism**
   - **Beyond Symbols:** Identity is not just about the flag but about the **values** it represents: Justice, Liberty, Equality, and Fraternity.
   - **Duty-Bound:** Respecting these symbols is a Fundamental Duty (**Art 51A**), linking individual identity with the collective national conscience.

National Anthem vs. National Song

Feature	National Anthem (Jana Gana Mana)	National Song (Vande Mataram)
Author	**Rabindranath Tagore** (1911)	**Bankim Chandra Chattopadhyay** (1870s)
Source	Originally a Brahmo hymn in Bengali.	From the novel ***Anandamath*** (1882).
Adoption	Adopted by Constituent Assembly on **Jan 24, 1950**.	Adopted on **Jan 24, 1950** (Equal Status).
Symbolism	Represents **Secularism & Diversity** (Geographic/Cultural).	Symbol of **Anti-Colonial Resistance** & Revolutionary Zeal.
Language	Highly Sanskritised Bengali (Tatsama).	Mixture of **Sanskrit and Bengali**.
First Sung	1911 Calcutta Session of INC.	1896 Calcutta Session of INC (by Tagore).
Legal Status	Protected under **the Prevention of Insults to National Honour Act, 1971**.	Held to have **"Equal Status"** but no specific penal law for not singing.

Jana Gana Mana was chosen as the Anthem specifically because its lyrics are considered more **inclusive** and **secular**, reflecting the vast geography and various communities of India.

Key Challenges: National Symbols & Identity

- **Compulsory vs. Voluntary Patriotism:** The debate over whether patriotism should be a **spontaneous emotion** or a **state-mandated duty**, highlighted by the Bijoe Emmanuel (1986) case which allows for silent respect over forced singing.
- **Misuse & Commercialization:** Preventing the desecration of symbols through **improper disposal** (especially plastic flags) and their illegal use in **commercial branding or clothing** under the 1950 Act.
- **Inclusivity vs. Religious Imagery:** Navigating the friction between the **revolutionary symbolism** of Vande Mataram (personifying India as a deity) and the requirements of a **modern secular state**.
- **Dissent vs. National Honour:** Balancing the **Right to Protest** with strict penal provisions under the 1971 Act, ensuring that political expression does not cross the line into intentional insult or desecration.
- **Coercive vs. Constitutional Patriotism:** The challenge of shifting focus from **ritualistic nationalism** (symbols/anthems) toward **Constitutional Patriotism**—upholding core values like Justice, Liberty, and Equality for all citizens.

Way Forward

- **Promote Constitutional Patriotism:** Shift from "coercive nationalism" (enforced rituals) to a values-based identity rooted in **Justice, Liberty, Equality, and Fraternity**.
- **Awareness & Education:** Integrate the **Flag Code of India, 2002** into school curricula to ensure citizens understand the dignity of symbols through education rather than fear of legal penalties.
- **Sustainable Symbolism:** Strictly enforce the ban on **plastic flags** and promote the use of biodegradable or khadi materials to prevent the undignified littering of national symbols post-events.

- **Judicial Consistency:** Maintain the balance set in the ***Bijoe Emmanuel (1986)*** case—protecting the right to silent, respectful dissent while penalizing intentional desecration under the **1971 Act**.
- **Inclusivity in Celebrations:** Ensure national symbols remain **unifying tools** that represent India's diverse cultural fabric, preventing them from being used for majoritarian exclusion.

Conclusion

India must evolve from **ritualistic nationalism** to **Constitutional Patriotism**, balancing the sanctity of national symbols with **individual liberties**. Future progress lies in inclusive, voluntary respect that strengthens India's democratic fabric.

6.5. MAHAD SATYAGRAHA

What is Mahad Satyagraha?

It was a non-violent social movement launched on **March 20, 1927**, in Mahad (Maharashtra) led by **Dr. B.R. Ambedkar**. It aimed to assert the right of the Dalit community (then "untouchables") to access water from the **Chavdar Tank**, a public resource they were traditionally barred from using.

Background of the Mahad Satyagraha

- **The S.K. Bole Resolution (1923):** The Bombay Legislative Council passed a resolution allowing "untouchables" access to all public watering places, wells, and schools maintained by the government.
- **Local Defiance:** Despite the law and a 1924 Mahad Municipal Council order, the high-caste Hindu community resisted, often through violence and social boycotts.
- **Institutional Mobilization:** Under the banner of the **Bahishkrit Hitakarini Sabha**, Ambedkar turned a local grievance into a national civil rights issue.

Key Features of the Mahad Satyagraha

1. **Symbolic Defiance (March 20, 1927)**
    - **Direct Action:** Dr. Ambedkar led a procession of thousands to the **Chavdar Tank**. He was the first to drink water, followed by his supporters.
    - **Breaking the Taboo:** This act shattered the "pollution by touch" myth. It wasn't about thirst; it was a demonstration of **civil equality**.
2. **The "Manusmriti Dahan" (December 25, 1927)**
    - **Phase Two:** After orthodox groups "purified" the tank with cow urine, a second Satyagraha was organized.
    - **Radical Break:** Ambedkar and his followers **burned the Manusmriti**, the ancient text seen as the source of caste-based discrimination. This symbolized the rejection of the religious basis of untouchability.
3. **Inclusion of Women**
    - **Gender Equality:** For the first time in such a large-scale social movement, women participated actively.

- **Social Reform:** Ambedkar urged Dalit women to change their attire (e.g., wearing saris like other women) to shed the visual markers of "servitude" and reclaim their dignity.

4. **Non-Violent Approach**
   - **Strict Discipline:** Despite being attacked by orthodox mobs after the first march, Ambedkar ensured his followers did not retaliate with violence.
   - **Constitutional Method:** He maintained that the struggle was for the **legal enforcement** of a government resolution (the Bole Resolution).
5. **Secular and Rights-Based**
   - **Not a Religious Quest:** Unlike temple-entry movements, Mahad was about **Civic Rights**. It focused on access to a public utility (water), framing it as a natural right of every human being.
   - **"Manushki" (Humanity):** The core philosophy was centered on human dignity rather than seeking "purity" within the caste fold.
6. **Legal Victory (1937)**
   - **Rule of Law:** The struggle didn't end at the tank; it moved to the courts. After a decade-long battle, the **Bombay High Court** ruled in 1937 that Dalits had the legal right to use the water, affirming that "custom" cannot override "legal rights."

Significance of the Mahad Satyagraha

1. **The "First Rehearsal" of the Constitution**
   - **Rights over Charity:** It shifted the focus from seeking "mercy" or "reform" within the caste system to claiming **Fundamental Rights** as equal citizens.
   - **Article 17 Precursor:** The demand for the abolition of untouchability at Mahad directly informed the drafting of **Article 17** (Abolition of Untouchability) and **Article 15** (Non-discrimination) in the Indian Constitution.
2. **Transition to Mass Mobilization**
   - **Political Awakening:** It was the first time the "Depressed Classes" organized on such a massive scale (thousands of participants) to challenge the social order through **Direct Action**.
   - **Institutional Strength:** It established the **Bahishkrit Hitakarini Sabha** as a potent force for social change, moving beyond mere petitions to active Satyagraha.
3. **Intellectual & Symbolic Break**
   - **Rejection of Hierarchy:** The burning of the Manusmriti (Dec 1927) was a radical intellectual break from traditional social laws. It signaled that the movement would no longer accept religious justifications for inequality.
   - **Secularization of Rights:** By fighting for **water** (a civic utility) rather than just temple entry, Ambedkar framed the struggle as a **Secular Human Rights** issue rather than a purely religious one.
4. **Empowerment of Women**
   - **The "Mahad Speech":** Ambedkar's address to Dalit women during the Satyagraha is considered a milestone in **Indian Feminism**. He urged them to shed symbols of slavery and educate their children, recognizing women as the primary drivers of social reform.

Comparison: Mahad vs. Salt Satyagraha

Feature	Mahad Satyagraha (1927)	Salt Satyagraha (1930)
Primary Adversary	**Internal:** The "Feudal-Caste" oppression and the Brahmanical social order.	**External:** The "Colonial-Imperial" exploitation by the British Raj.
The "Resource"	**Water:** A natural, life-sustaining resource denied based on birth (Caste).	**Salt:** A daily essential taxed by the state to generate revenue (Colonial Law).
Core Philosophy	**Manushki (Humanism):** Focused on reclaiming human dignity and "social citizenship."	**Swaraj (Self-Rule):** Focused on political sovereignty and "national independence."
Legal Trigger	Defiance of the **1923 Bole Resolution** by local orthodox groups.	Defiance of the **1882 Salt Act** by the Indian National Congress.
Gender Inclusion	**Radical:** Women were encouraged to shed visual symbols of caste slavery (Ambedkar's 1927 speech).	**Massive:** Women joined the frontlines of the Civil Disobedience Movement.
Key Symbolic Act	Drinking water from **Chavdar Tank** and burning the **Manusmriti**.	Making salt at the **Dandi** coast.
Constitutional Legacy	Direct precursor to **Articles 15, 17, and 21**.	Foundation for the **Fundamental Rights** of Political Participation.

Conclusion

The Mahad Satyagraha remains the foundational blueprint for **Article 17**, evolving today into a "Digital Mahad" ensuring equitable access to **Digital Public Infrastructure** and data dignity for all citizens.

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7.1. 11th EDITION OF EXERCISE LAMITIYE-2026

Context:

The 11th edition of the joint military exercise between India and Seychelles is currently being conducted at the **Seychelles Defence Academy** from **March 9 to 20, 2026**. This edition is a major milestone as it is the **first-ever Tri-Service edition**, involving the Army, Navy, and Air Force from the Indian side.

1. **Core Characteristics of 'LAMITIYE'**
   - **Etymology:** The word 'LAMITIYE' translates to **"Friendship"** in the **Creole** language (the local language of Seychelles).
   - **Frequency:** It is a **biennial** training event (held every two years).
   - **History:** The exercise has been conducted in Seychelles since **2001**.
   - **Objective:** To enhance synergy and interoperability in **Sub-conventional Operations** in a **Semi-Urban environment** under the United Nations (UN) Charter for Peacekeeping Operations.
2. **Participants & Assets (2026 Edition)**
   - **Indian Army:** Personnel from the **ASSAM Regiment** (Southern Command).
   - **Indian Navy:** Deployment of the stealth frigate **INS Trikand**.
   - **Indian Air Force:** Deployment of a **C-130J Super Hercules** transport aircraft.
   - **Host Nation:** Seychelles Defence Forces (SDF).
3. **Key Operational Focus Areas**
   - **Tactical Drills:** Neutralization of threats in semi-urban settings, close-quarter battle (CQB), and room intervention drills.
   - **Specialized Scenarios:** Hijacked bus scenarios and hostage situation response tactics.
   - **Technology Showcase:** Exploitation of new-generation equipment, including discussions on **Artificial Intelligence (AI)** in disaster management and tactical combat.
   - **Maritime Component:** The Seychelles Coast Guard and Special Forces demonstrate **VBSS (Visit, Board, Search and Seizure)** procedures.
   - **HADR:** Sessions on Humanitarian Assistance and Disaster Relief, specifically the role of helicopters in casualty evacuation and reconnaissance.
4. **India's Major Military Exercises (2026)**

Exercise Name	Partner Nation(s)	Type	Edition / Venue (2026)	Strategic Significance & Key Focus
LAMITIYE-2026	**Seychelles**	**Tri-Service**	11th Edition / Seychelles	**First-ever Tri-Service edition.** Focuses on sub-conventional

		(Army, Navy, Air Force)	Defence Academy	operations, semi-urban warfare, and maritime security under India's **SAGAR** vision.
MILAN 2026	**Multilateral** (50+ Nations)	**Naval**	Visakhapatnam, India	India's largest multilateral naval exercise. Projects India as a **"Preferred Security Partner"** in the Indo-Pacific and enhances collective maritime domain awareness.
DHARMA GUARDIAN	**Japan**	**Army**	India (Foreign Training Nodes)	Strengthens the India-Japan **Special Strategic Partnership**. Focuses on urban combat and disaster relief (HADR) in the context of the **QUAD** framework.
DUSTLIK 2026	**Uzbekistan**	**Army**	Termez, Uzbekistan / India	Focuses on counter-terrorism in mountainous and rural terrains. Key to India's **"Connect Central Asia"** policy.
SAMPRITI 2026	**Bangladesh**	**Army**	Alternating (India/ Bangladesh)	Enhances synergy for UN Peacekeeping missions and border security. Central to the **"Neighbourhood First"** policy.

7.2. OPERATION SANKALP

Context:

Recently, the Indian Navy has successfully escorted three Indian-flagged merchant vessels—the LPG carriers **Shivalik** and **Nanda Devi**, and the crude oil tanker **Jag Laadki**—from the **Gulf of Oman** after they transited the volatile **Strait of Hormuz**. These warships are operating under **Operation Sankalp** to provide a "safe corridor" amidst the ongoing U.S.-Israel-Iran conflict which has effectively disrupted navigation in the Persian Gulf.

1. **Overview of the Mission**
   - **Launch Date:** Officially launched on **June 19, 2019**.
   - **Objective:** To ensure the **safe passage** of Indian-flagged merchant vessels transiting through the Gulf region (specifically the Strait of Hormuz) and to provide a sense of reassurance to the maritime community.
   - **Meaning:** "Sankalp" is a Sanskrit word meaning **"Commitment."**
   - **Agencies Involved:** It is an integrated effort involving the **Ministry of Defence**, **Ministry of External Affairs**, **Ministry of Shipping**, **Ministry of Petroleum and Natural Gas**, and the **Director General of Shipping**.

2. **Geographical and Strategic Focus**
    - **Key Chokepoints:** The operation focuses on the **Strait of Hormuz**, **Gulf of Oman**, and the **Persian Gulf**.
    - **Trade Significance:** Nearly **62% of India's oil imports** and a significant portion of its natural gas pass through the Strait of Hormuz.
    - **Extended Reach:** In response to the 2023-2024 Red Sea crisis, the Navy expanded the scope of Operation Sankalp to the **Central and North Arabian Sea** and the **Gulf of Aden** to counter Houthi drone threats and Somali piracy.
3. **Key Assets and Operations**
    - **Deployment:** The Navy maintains a continuous presence with at least one **Destroyer or Frigate** (e.g., INS Talwar, INS Chennai, INS Kolkata) and regular aerial surveillance using **P-8I Neptune** maritime patrol aircraft and **Sea Guardian drones**.
    - **The "First Responder" Role:** India has established itself as the **Preferred Security Partner** in the Indian Ocean Region (IOR), evidenced by successful rescue operations like those of **MV Ruen** and **MV Chem Pluto**.
    - **MARCOS Involvement:** Elite Marine Commandos (MARCOS) are frequently deployed for boarding operations and to neutralize pirate threats.
4. **Legal Framework**
    - **Maritime Anti-Piracy Act 2022:** This act provides the legal teeth to the Indian Navy to prosecute pirates apprehended during these operations, moving beyond mere "deterrence" to "legal accountability."

7.3. BORDER SECURITY AND DIPLOMACY ON THE INDIA-MYANMAR FRONTIER

Context:

The unfenced border between India and Myanmar has gained strategic attention following the arrest of seven foreign nationals (six Ukrainians and one U.S. citizen) in Mizoram. They were allegedly involved in training armed ethnic groups in Myanmar in weapons handling and drone operations.

1. **Geography of the India-Myanmar Border**
    - **Total Length:** Approximately **1,643 km**.
    - **Bordering States:** Four Indian states share a border with Myanmar:
        1. Arunachal Pradesh
        2. Nagaland
        3. Manipur
        4. Mizoram
    - **River:** The **Tiau River (or Tyao) and the Kaladan River** (known as Chhimtuipui in India) are the primary rivers forming part of the 1,643-km international border between India and Myanmar.

- **Fencing Status:** Currently, the border is largely unfenced. Out of the 1,643 km, only about **43.75 km** of fencing has been completed so far.

2. **The Free Movement Regime (FMR)**
   - **Definition:** A unique institutional arrangement between India and Myanmar that allowed tribes living along the border to travel into each other's territory **without a visa.**
   - **Historical Context:** People on both sides share deep ethnic, social, and cultural ties.
   - **Recent Changes:** In February 2024, the Union Home Ministry announced the **scrapping of the FMR** to check illegal migration and insurgent activities.
     - Prior to being scrapped, it was restricted to **10 km** from the border (reduced from the original **16 km**).
     - Movement is now regulated through designated gates requiring biometrics and gate passes.
3. **Security and Agencies Involved**
   - **National Investigation Agency (NIA):** The primary agency investigating the illegal crossing and the importation of drones from Europe to Myanmar via India.
   - **Assam Rifles:** (Note: While not explicitly named in the snippet, they are the primary "Border Guarding Force" for the Myanmar border).
   - **Security Challenges: EAGs (Ethnically Armed Groups):** Insurgent groups active in Myanmar that sometimes use Indian territory for transit or logistics.
     - **Counter-Drone Mechanism:** A joint mechanism with monthly reporting has been instituted to monitor the use of drones by insurgents.
     - **Trafficking and Migration:** The unfenced nature of the border facilitates illegal human trafficking and migration.
4. **Key Infrastructure and Technology**
   - **Smart Fencing:** The project includes the installation of gates that record **biometrics and photographs** of individuals crossing the border.
   - **Challenges in Construction:** The fencing project has faced resistance from local communities and coordination challenges with the Myanmar Army and security agencies.
   - **Functional Gates:** Out of 43 proposed entry/exit gates, the number has declined to 38, with only **20 currently functional**.

7.4. PROJECT NANHI KALI

Context:

Recently, **Project Nanhi Kali** was honoured with the **Sports for Social Good Award** at the **Sportstar Aces Awards 2026**, in recognition of its long-standing efforts to empower girls from underserved communities through sports.

1. **About the Project Nanhi Kali**
   - **Objective and Inception**: Launched in **1996**, the project focuses on empowering girls from underserved communities through a combination of **education and sport**.

- **Implementing Organization**: The programme is managed by the **K.C. Mahindra Education Trust**.
- **Geographical Reach**: It currently supports over 8.7 lakh girls across **15 States**, including Maharashtra, Gujarat, Karnataka, Andhra Pradesh, Punjab, Uttar Pradesh, Odisha, and West Bengal.
- **Target Demographic**: The initiative primarily supports girls studying in **government schools**.
- **Integration of Sport**:
  - In 2018, the project launched **'Sports for Life'** to promote fitness, leadership, and confidence among participants.
  - In FY25, approximately **94,000 girls** were engaged in the programme, including more than 18,000 participants in football.
- **Recent Honors**: The project received the **'Sports for Social Good'** award at the Sportstar Aces Awards 2026.

2. Related Industrial / Sporting Context

- **Indian Oil Corporation Limited (IOCL)**: Recognized as the **'Best PSU for Promotion of Sport'** at the same ceremony. This reaffirms its four-decade commitment to nurturing sporting talent in India's ecosystem.

7.5. ADDRESSING THE GROWING CHALLENGE OF CHILDHOOD OBESITY IN INDIA

Context:

- The **World Obesity Federation** recently released the **World Obesity Atlas 2026**, highlighting the **rapid rise of childhood obesity globally and in India**.
- The **World Obesity Atlas 2026** report indicates that **India has the second-highest number of children with high Body Mass Index (BMI)** after **China**.
- With millions of children already affected and projections indicating a sharp rise by 2040, **childhood obesity is emerging as a major public health concern** with long-term implications for **non-communicable diseases (NCDs), economic productivity, and demographic dividend**.

Understanding Childhood Obesity

A. Definition of Obesity

- According to the **World Health Organization**, **obesity** is defined as a **chronic, relapsing disease characterised by abnormal or excessive fat accumulation that poses a risk to health**.

B. Measurement: Body Mass Index (BMI)

- **BMI = Weight (kg) / Height² (m²)**
- It is widely used to classify **overweight and obesity** in both adults and children.

C. WHO Growth Reference for Children (5–19 years)

- **Overweight:** BMI greater than **1 standard deviation above the WHO median**
- **Obesity:** BMI greater than **2 standard deviations above the WHO median**

Thus, **childhood obesity refers to excessive body fat accumulation in children and adolescents that significantly increases health risks**.

World Obesity Atlas 2026: Key Findings

A. Global Scenario

- Prevalence of obesity among children **(5–19 years)** increased from **4% in 1975 to nearly 20% in 2022**.
- Majority of affected children reside in **middle-income countries**.
- **Ten countries alone account for over 200 million children with high BMI**, led by **China, India, and the United States**.
- **Childhood obesity often persists into adulthood**, increasing risk of **NCDs such as diabetes, cardiovascular diseases, and certain cancers**.

B. Indian Scenario

India is experiencing a **rapid nutritional transition.**

1. Current Statistics (2025)

- **14.9 million children (5–9 years)** are overweight or obese.
- **26.4 million children (10–19 years)** are overweight or obese.
- **41 million children** have **high BMI**.

2. Health Indicators

- **8.39 million children** have **BMI-attributed metabolic dysfunction-associated steatotic liver disease (MASLD)**.
- **2.98 million children** suffer from **BMI-related hypertension**.

3. Projections for 2040

- **20 million children likely to be obese**.
- **56 million children expected to be overweight**.
- **120 million school-going children may show early signs of chronic diseases**, including: **Hypertension**, **Cardiovascular diseases**, **Diabetes**

Global Shift in Child Nutrition: Rising Childhood Obesity Trends

According to a **2025 report by the UNICEF**, global child nutrition patterns are undergoing a major transformation. For the **first time, the proportion of children and adolescents affected by obesity has surpassed those who are underweight**.

A. Rising Prevalence of Overweight and Obesity in India (NFHS-3 to NFHS-5)

Data from the **National Family Health Survey** indicate a consistent increase in overweight and obesity across various age groups between **NFHS-3 (2005–06)** and **NFHS-5 (2019–21)**.

- **Children under five years:** prevalence increased from **1.5% to 3.4%**.
- **Adolescent girls:** rose from **2.4% to 5.4%**.
- **Adolescent boys:** increased from **1.7% to 6.6%**.
- **Adult women:** prevalence nearly doubled from **12.6% to 24.0%**.
- **Adult men:** rose from **9.3% to 22.9%**.

B. Key Findings of the UNICEF Report

- Among children and adolescents aged **5–19 years**, **obesity prevalence (9.4%) has slightly exceeded the share of underweight children (9.2%)**, reflecting a shift in malnutrition patterns.
- Since **2000**, obesity in this age group has **tripled**, rising from **3% to 9.4%**, while underweight prevalence has declined from **around 13% to 9.2%**.
- Globally, about **5% of children below five years** and **20% of children and adolescents aged 5–19** are affected by **overweight or obesity**.
- The **steepest rise in overweight prevalence is observed in low- and middle-income countries**, highlighting the rapid nutrition transition.
- In most regions of the world, **obesity rates have surpassed underweight levels**, except in **sub-Saharan Africa and South Asia**, where undernutrition still remains a major concern.

Factors Contributing to the Rise in Childhood Obesity

- **Shift Towards Unhealthy Diets:** Children increasingly consume **ultra-processed foods (UPFs)** that contain high amounts of **sugar, salt, unhealthy fats, and additives**. These foods are widely advertised, which strongly influences children's eating habits.
- **Economic Factors:** Ultra-processed foods are often **cheaper and more easily available than fresh and nutritious foods**. This price difference partly results from **agricultural subsidies for crops such as corn, soy, and wheat**, along with preservatives that increase shelf life.
- **Unhealthy Foods in School Meal Programmes:** The **2024 Global Survey of School Meal Programs** indicates that **about one in four school meal programmes globally include processed meat**, while many also provide **sweets, fried foods, and sugary drinks**, which can contribute to unhealthy diets.
- **Declining Physical Activity:** Physical activity among children has decreased due to **urbanisation, limited play areas, increased use of motorised transport, and higher screen time**, leading to more sedentary lifestyles.
- **Genetic Factors:** In some cases, obesity may be influenced by **genetic variations and metabolic conditions**, making certain individuals more prone to gaining excess weight.
- **Weak Policy Measures:** Many countries still lack strong regulations. Only a **small proportion of countries have mandatory front-of-pack nutrition labelling**, and **very few provide subsidies to promote healthy foods**, limiting effective control over unhealthy diets.

Impact of Increasing Childhood Obesity

Childhood obesity substantially increases the likelihood of **long-term health complications**, affecting metabolic, physical, and psychological well-being. Major health risks include:

- **Metabolic and Cardiovascular Disorders:** Childhood obesity increases the risk of **type-2 diabetes, hypertension, hyperglycaemia, high cholesterol, and cardiovascular diseases**, as excessive body fat disrupts normal metabolic functioning and elevates long-term disease susceptibility.
- **Liver-Related Complications:** Excess fat accumulation can lead to **Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD)**, a condition characterised by abnormal fat deposition in the liver, which may progress to serious liver damage if untreated.

- **Musculoskeletal Problems:** Increased body weight places excessive stress on bones and joints, often resulting in **joint disorders, skeletal strain, and reduced mobility**, which can limit physical activity and overall fitness.
- **Psychological and Social Consequences:** Children with obesity frequently experience **low self-esteem, anxiety, depression, and social stigma**, often aggravated by bullying and discrimination in schools and social settings.
- **Persistence into Adulthood:** Childhood obesity often continues into adulthood, significantly increasing the **lifetime risk of non-communicable diseases and chronic health conditions**.

Key Government Initiatives to Promote Healthy Nutrition and Prevent Obesity

- **POSHAN Abhiyaan:** Aims to improve **nutritional status of children, adolescent girls, and mothers** through better nutrition services and awareness.
- **Eat Right India Movement:** Promotes **safe, healthy, and sustainable diets** through consumer awareness campaigns, supply-side reforms, and initiatives in schools.
- **'Aaj Se Thoda Kam' Campaign:** A nationwide awareness programme that encourages people to **gradually reduce the intake of fat, sugar, and salt** in their daily diet.
- **RUCO (Repurpose Used Cooking Oil) Initiative:** Ensures that **used cooking oil is collected and converted into products such as biodiesel or soap**, preventing its reuse in food preparation.

Global Policy Measures

- **Frameworks of World Health Organization and UNICEF:** Recommend measures such as **healthy school food environments, taxes on sugary beverages, regulation of junk-food marketing, and national monitoring of childhood obesity trends**.

Way Forward to Address Childhood Obesity

- **Promoting Healthy Diets:** Improve access to **affordable and nutritious foods** through measures such as **food assistance programmes**, **vouchers, cash transfers**, and strengthening **local food systems**.
- **Strengthening Regulatory Measures:** Implement **stricter regulations** on **junk-food advertising, front-of-pack nutrition labelling, and taxation of ultra-processed foods** to discourage unhealthy consumption.
- **Encouraging Active Lifestyles:** Promote regular physical activity among children and adolescents through initiatives such as **Fit India Movement** and **Khelo India**, while integrating sports and fitness into daily routines.
- **Improving Physical Infrastructure for Children:** Ensure strict enforcement of **Right to Eductaion (RTE) norms** mandating playgrounds and sports facilities in schools and develop parks and open recreational spaces in residential areas to encourage outdoor activities.
- **Advancing Medical Interventions:** New **anti-obesity drugs** such as **semaglutide** and **tirzepatide** show promising results. While high costs currently limit access, the availability of affordable generic versions in the future may improve treatment options.
- **Enhancing Public Awareness:** Promote awareness among families and communities about balanced diets, the risks of excessive junk food consumption, and the importance of regular exercise.

Conclusion

Childhood obesity has emerged as a **significant public health challenge in India**, driven by changing dietary habits, sedentary lifestyles, and rapid socio-economic transitions. Addressing it through **preventive strategies such as healthy nutrition, regular physical activity, effective regulations, and public awareness** is essential to safeguard the health of future generations and sustain India's demographic dividend.

7.6. TUBERCULOSIS

Context:

India aimed to eliminate TB by **2025**, five years ahead of the Sustainable Development Goal (SDG 3.3) target of 2030. While India recorded the **fastest global decline** in TB incidence (21% reduction since 2015), it missed the 2025 elimination target.

- **Current Burden:** India still accounts for **25% of global TB cases** and **32% of global Multi-Drug Resistant TB (MDR-TB)** cases.
- **Latest Theme (World TB Day 2026):** "Yes! We Can End TB!"

Tuberculosis (TB): Clinical Overview

- **Pathogen:** Mycobacterium tuberculosis (Bacterium).
- **Transmission:** Airborne (droplets from coughing/sneezing).
- **Classification:**
  - **Pulmonary TB:** Affects lungs (most common and contagious).
  - **Extrapulmonary TB:** Affects lymph nodes, bones, kidneys, or the brain (Meningitis).
  - **Latent TB:** Infected but not ill; cannot spread the disease (25% of the global population has latent TB).

Key Government Initiatives for TB Elimination

1. **National Strategic Plan (NSP) 2017-2025:** A multi-pronged framework aiming to eliminate TB by **2025** (5 years ahead of the SDG 2030 target) through the pillars of **Detect, Treat, Prevent, and Build (DTPB)**.
2. **Nikshay Poshan Yojana (NPY):** A flagship **Direct Benefit Transfer (DBT)** scheme that provides **₹500–₹1,000 per month** to every notified TB patient for nutritional support throughout the duration of their treatment.
3. **Pradhan Mantri TB Mukt Bharat Abhiyaan:** A community-driven initiative that introduced **Nikshay Mitras**. It allows individuals, NGOs, and corporates to "adopt" TB patients and provide them with additional diagnostic, nutritional, and vocational support.
4. **Universal Drug Susceptibility Testing (U-DST):** A policy shift ensuring that every diagnosed TB patient is screened for drug resistance (using molecular tests like **CB-NAAT** or **TrueNat**) at the very start of treatment, rather than waiting for treatment failure.
5. **Introduction of BPaLM Regimen:** As of 2024-2025, India has rolled out the **BPaLM regimen** (Bedaquiline, Pretomanid, Linezolid, and Moxifloxacin), which reduces the treatment time for Multi-Drug Resistant TB (MDR-TB) from 20 months to just **6 months**.

6. **TB Mukt Panchayat Abhiyaan:** A decentralized "Jan Andolan" (People's Movement) that empowers **Panchayati Raj Institutions** to track cases, reduce stigma, and achieve "TB-Free" status at the village level through a certification and award system.

Major Challenges in TB Elimination

- **Drug Resistance (MDR/XDR-TB):** India has the world's highest burden of Multi-Drug Resistant TB. Treatment is long, expensive, and often has severe side effects, leading to **patient non-compliance.**
- **The "Social Determinants" Gap: Undernutrition** remains the leading risk factor, responsible for nearly 40% of TB cases. Coupled with overcrowded housing and poor ventilation in urban slums, these socio-economic factors sustain the transmission cycle despite medical interventions.
- **Private Sector Fragmentation:** A significant portion of patients first seek care from private practitioners. Gaps in **mandatory notification**, inconsistent treatment protocols, and delayed referrals to the government system often lead to "missing cases" and improper treatment.
- **Latent TB Pool:** An estimated **350–400 million Indians** have Latent TB Infection (LTBI). These individuals are not sick but carry the bacteria; without massive scaling of **TB Preventive Treatment (TPT)**, this pool remains a "ticking time bomb" for future active cases.
- **Stigma and Delayed Diagnosis:** Deep-rooted social stigma leads to the concealment of symptoms, particularly among women and marginalized groups. This results in **delayed diagnosis**, increased community transmission, and higher mortality rates before treatment even begins.

Global Achievements in TB Control: Comparative Analysis

Region/ Country	Key Achievement (2015–2024)	Primary Drivers & Strategies
African Region	**-46% Mortality** (Fastest global decline) & -28% Incidence.	→ **HIV-TB Integration:** 90% co-infected patients on Antiretroviral Therapy (ART). → **Fiscal Shift:** Transitioned from donor aid to national funding. → **Community Outreach:** Massive deployment of rural health workers.
European Region	**-39% Incidence** (Global leader in rate reduction).	→ **Digital Health:** Whole Genome Sequencing & video-based adherence tools. → **Modern Regimens:** All-oral 6-month treatments. → **Targeted Screening:** Focus on migrants, prisoners, and elderly.
China	**"Moderate-to-Low" Prevalence** status (WHO 2025).	→ **Zero-TB Communities:** Mass screening + preventive treatment (TPT). → **AI-Smart Screening:** 40% faster diagnosis using AI-chest X-rays. → **Governance:** Three-tier network linking CDC, hospitals, and clinics.

Way Forward for TB Elimination

- **Scaling TB Preventive Treatment (TPT):** Transition from just treating active cases to aggressively managing **Latent TB**. Expanding TPT to all household contacts of pulmonary TB patients is critical to exhausting the reservoir of future cases.
- **Integrating "One Health" Approach:** Addressing TB not just as a respiratory disease but as a **comorbidity-linked crisis**. This involves mandatory screening for Diabetes, HIV, and tobacco use, which significantly increase the risk of treatment failure.
- **Strengthening Nutritional Security:** Moving beyond the ₹1,000 DBT to direct **food fortification** and high-protein ration kits for vulnerable families. Addressing undernutrition is the most effective "social vaccine" against TB.
- **Private-Public Mix (PPM) Optimization:** Universalizing the **"Patient Provider Support Agencies" (PPSA)** model to ensure that every patient treated in the private sector is notified, tracked, and provided with free government-funded molecular diagnostics and drugs.
- **R&D for an Adult Vaccine:** Since the 100-year-old BCG vaccine loses efficacy in adults, India must fast-track indigenous clinical trials for candidates like **VPM1002** or **MTBVAC** to provide long-term community immunity.
- **Community-Led Advocacy (Jan Andolan):** Leveraging the **Panchayati Raj Institutions** and "Ni-kshay Mitras" to de-stigmatize the disease. Transforming TB elimination from a medical program into a social movement is the only way to reach the "missing millions."

Conclusion

To end TB by 2030, India must shift from a clinical approach to a **socio-technological movement**, leveraging **adult vaccines**, **AI-driven diagnostics**, and **nutritional sovereignty** to ensure a "TB-Mukt Bharat."

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