Monthly Editorial Consolidation

APRIL 2025

Content

Judicial Independence and Accountability

This editorial is based on "[Upendra Baxi writes: What does justice mean in Justice Varma case](#)" which was published in The Indian Express on 31/03/2025. The article highlights that a recent judicial inquiry has sparked renewed debate on the balance between independence and accountability within the higher judiciary.

Tag: GS Paper-2, Judiciary, Fundamental Rights, Judicial Review, Separation of Powers, Judgments & Cases.

The **Indian judiciary** faces renewed scrutiny amidst concerns over internal integrity and institutional transparency. A recent inquiry has prompted broader public engagement with the complex interplay between **judicial independence and accountability**. In this context, long-standing challenges, ranging from procedural opacity and case backlogs to the pressing need for inclusive reforms, have resurfaced, inviting thoughtful reflection on how to strengthen the judiciary's credibility and effectiveness in a constitutional democracy.

What Ensures Judicial Independence and Accountability in the Indian Constitution?
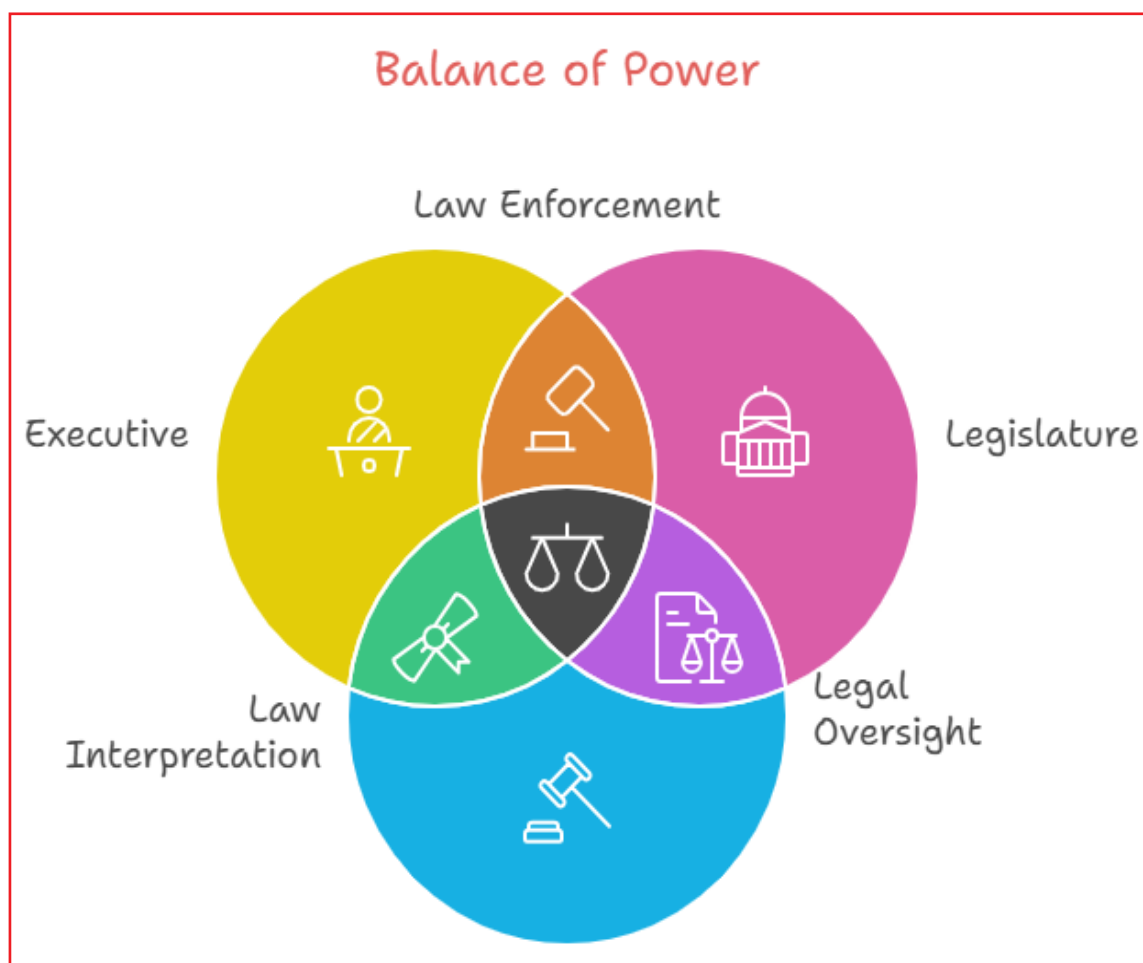
- 💡 **Judiciary as a Separate Organ**: The Constitution provides for a **separation of powers** among legislature, executive, and judiciary.

- ✘ This ensures **functional autonomy** and prevents undue influence among the three organs of governance.
- 💡 **Security of Tenure**: Judges of the **Supreme Court** and **High Courts** enjoy **security of tenure** under **Articles 124 and 217** respectively.
  - ✘ This protects judges from **arbitrary dismissal** and promotes **impartial decision-making**.
- 💡 **Fixed Service Conditions**: **Article 125 and Article 221** ensure **non-variable salaries** and service conditions **of Supreme Court and High Court judges**, safeguarding independence.
  - ✘ All **expenses of the Supreme Court are charged on the Consolidated Fund of India**, protecting its financial autonomy from executive control.
  - ✘ The **salaries and expenses of High Court judges are charged on the state's Consolidated Fund**.
    - 📎 While their **pensions are drawn from the Consolidated Fund of India**, making them non-votable but open to discussion.
- 💡 **Removal Only by Impeachment**: **Articles 124(4) and 217(1)(b)** permit **removal only via parliamentary impeachment**, not executive whim.
  - ✘ This high threshold maintains **judicial integrity** and guards against politically motivated actions.
- 💡 **Power of Judicial Review**: Under **Articles 32 and 226,** courts enjoy **judicial review powers** to protect rights and uphold the Constitution.
  - ✘ This empowers courts to act as **guardians of fundamental rights** and **constitutional supremacy**.
- 💡 **No Discussion in Legislature**: **Article 121** restricts **Parliament** from **discussing judicial conduct** except during impeachment proceedings.
  - ✘ This provision ensures that judges are insulated from legislative pressures.
- 💡 **Contempt Powers**: **Article 129 and 215** empower courts to **punish for contempt**, ensuring compliance with their authority.
  - ✘ This helps preserve the dignity and enforceability of judicial decisions.

- 💡 **Post-Retirement Restrictions**: **Article 124(7)** prevents Supreme Court judges from **pleading before any court**, avoiding future conflicts.
  - ✘ It aims to eliminate potential **conflicts of interest** and promotes ethical post-retirement conduct.
- 💡 **Collegium System Evolution**: Though not in the Constitution, the **collegium system** emerged through judicial interpretation for appointments.
  - ✘ It was institutionalized via key Supreme Court judgments to protect **appointment autonomy**.
- 💡 **In-House Mechanisms for Accountability**: Supreme Court guidelines and resolutions have framed **internal processes** for examining judicial conduct.
  - ✘ These mechanisms aim to maintain internal discipline and uphold ethical standards.
- 💡 **Basic Structure Doctrine**: The judiciary has held that **independence of judiciary** is part of the **Constitution's basic structure**.
  - ✘ Thus, any law undermining this principle can be struck down as unconstitutional.
- 💡 **Code of Ethics**: While not constitutional, the **Restatement of Values of Judicial Life** guides judges' conduct and ethical obligations.
  - ✘ It promotes standards of **judicial propriety and transparency** in personal and professional conduct.
- 💡 **Right to Fair Trial**: Article 21 ensures judicial processes respect the **right to life and liberty**, upholding due process and impartiality.

What Are the Major Challenges Currently Facing the Indian Judiciary?

- 💡 **Challenges in Judicial Appointments::** Judicial appointments in India face issues of **opacity, delay, and nepotism**, with the **collegium system** lacking **transparency** and clear criteria.
  - ✘ The striking down of the **National Judicial Appointment Commission (NJAC)** blocked a more accountable mechanism.
  - ✘ While the **'Uncle judge syndrome'** highlights favoritism, undermining **meritocracy** and public confidence in judicial elevation.

National Deficits

Judiciary

Judge vacancy

No court works with a full complement of judges except the High Court of Sikkim and the district courts in Chandigarh.

SC/ST/OBC

At the district court level **no state/UT could fully meet** all its Scheduled Castes, Scheduled Tribes and Other Backward Classes quotas. Data on SC/ST/OBC judges is not available for High Courts.

Case Clearance Rate

Among the 18 large and mid-sized states, **only Kerala could achieve case clearance rates of 100 per cent** and more at both High Court and subordinate court levels.

- 💡 **Pendency of Cases**: As of February 2025, India faces a judicial crisis with 80,982 **cases pending** in the Supreme Court alone.
  - ✦ This backlog **delays resolution and erodes public confidence**, reinforcing the adage that **justice delayed is justice denied**.
- 💡 **Delay Across Tiers**: In India, the **average case takes 3 to 5 years to conclude**, with some dragging on for decades.
  - ✦ Extended litigation burdens litigants financially and emotionally.
- 💡 **Judicial Vacancies Persist**: In November 2024, the government informed the **Rajya Sabha** that over 5,600 judicial vacancies exist across all levels, from lower courts to the Supreme Court.
  - ✦ These vacancies severely affect court productivity and increase the case backlog.
- 💡 **Infrastructure and Technological Gaps**: A recent report by the **Ministry of Law and Justice** highlighted major infrastructure gaps in district courts, hampering the efficient delivery of justice.
  - ✦ The report found that **only 45% of judicial officers** had electronic display facilities, with **20% still awaiting installation**, highlighting poor IT infrastructure in district courts.
  - ✦ This hinders the operational capability of the judiciary, especially in remote areas.
- 💡 **Lack of Diversity**: Women form **only 9.3% of Supreme Court** and **13.4% of High Court judges**, reflecting imbalance.
  - ✦ **Gender disparity** affects sensitivity in adjudicating women-centric and gender-based issues.
  - ✦ Also, marginalized communities remain **grossly under-represented**, affecting trust and justice perception.
    - 📎 Under-representation curtails inclusivity and democratic legitimacy.

- **Judicial Overreach Concern**: Judicial overreach refers to courts exceeding their mandate by intervening in executive or legislative functions.
    - As seen in the **Anoop Baranwal case**, where the court framed rules for election commissioner appointments.
        - Such interventions raise questions about the limits of judicial powers.
- **Executive Interference**: Cases like **Justice Muralidhar's transfer** raise alarms about **executive influence in judicial matters**.
    - Frequent transfers without explanation fuel speculation and distrust.
- **Corruption Allegations**: Corruption allegations in the judiciary have drawn national attention, including a case involving the alleged recovery of cash from a judge's residence, prompting an **in-house inquiry** by the Supreme Court.
    - Another instance involved allegations of **irregular land allotments** linked to a sitting High Court judge.
- **Undertrial Overpopulation**: According to the **Prison Statistics India 2022** report, **75.8% of prisoners are undertrials**, reflecting how justice is disproportionately delayed for the **marginalized and poor**.
- **Access to Justice Barriers**: High litigation costs, **language issues**, and **legal complexity** prevent inclusive access to judicial recourse.
    - Many citizens remain unaware or unable to navigate the legal system.
- **Legal Aid Underutilized**: Despite over 80% of India's population being eligible, **only 15 million people have availed legal aid** since **National Legal Services Authority's (NALSA) inception in 1995**, highlighting its significant underutilization.
    - Awareness and quality of legal aid remain major concerns.

What Significant Steps Have Been Undertaken to Reform the Judicial System in India?

- **Mission for Justice Delivery**: The **National Mission for Justice Delivery**, launched in 2011, seeks **delay reduction and systemic accountability**.
- **Judicial Infrastructure Boost**: Through the **Centrally Sponsored Scheme**, ₹9,755 crore has been released for **court buildings and amenities**.
- **E-Courts Project Expansion**: Launched in 2007 under the **National eGovernance Plan**, the **e-Courts Project** aims to digitize the Indian judiciary, with **Phase II concluding in 2023** and **Phase III focused on "access and inclusion."**
    - As of December 2024, under the **WAN Project**, **99.5% of court** complexes are connected, enabling video conferencing in 3,240 courts and 1,272 jails nationwide.
- **e-Sewa Kendras Operational**: To bridge the digital divide, **1,394 e-Sewa Kendras in District Courts** and **36 in High Courts** provide **e-Courts services** to lawyers and litigants, especially in remote or under-resourced areas.
- **Fast Track Courts Established**: As of January 2025, **754 Fast Track Special Courts**, including **404 exclusive POCSO Courts**, are operational in **30 States/UTs**, having disposed of **over 3.06 lakh cases**.
- **ADR Mechanisms Strengthened**: **Mediation Act 2023** provides a legal framework for pre-litigation dispute resolution via mediation.
    - The **3rd National Lok Adalat 2024** resolved **over 1.14 crore cases**, marking a significant step in **reducing court pendency**.
- **Gender sensitization training**: Judiciary-led training to **remove subconscious bias** on **gender, caste, and disability** is underway.
    - The **Handbook on Combating Gender Stereotypes** guides judges to avoid biased language and promote **gender-sensitive judicial reasoning**.

Bangalore Principles of Judicial Conduct
💡 **Independence:** Judges must remain free from external influence to uphold the rule of law impartially.
💡 **Impartiality:** Decisions should be made without bias, favoritism, or prejudice under all circumstances.
💡 **Integrity:** Judges must maintain high moral standards in personal and professional conduct.
💡 **Propriety:** Behaviour must inspire public confidence in the judiciary's impartiality and integrity.
💡 **Equality:** All individuals must be treated equally before the courts.
💡 **Competence and Diligence:** Judges must stay updated and perform duties efficiently and responsibly.

Bangalore Principles of Judicial Conduct

Competence and Diligence

Independence

Equality

Impartiality

Propriety

Integrity
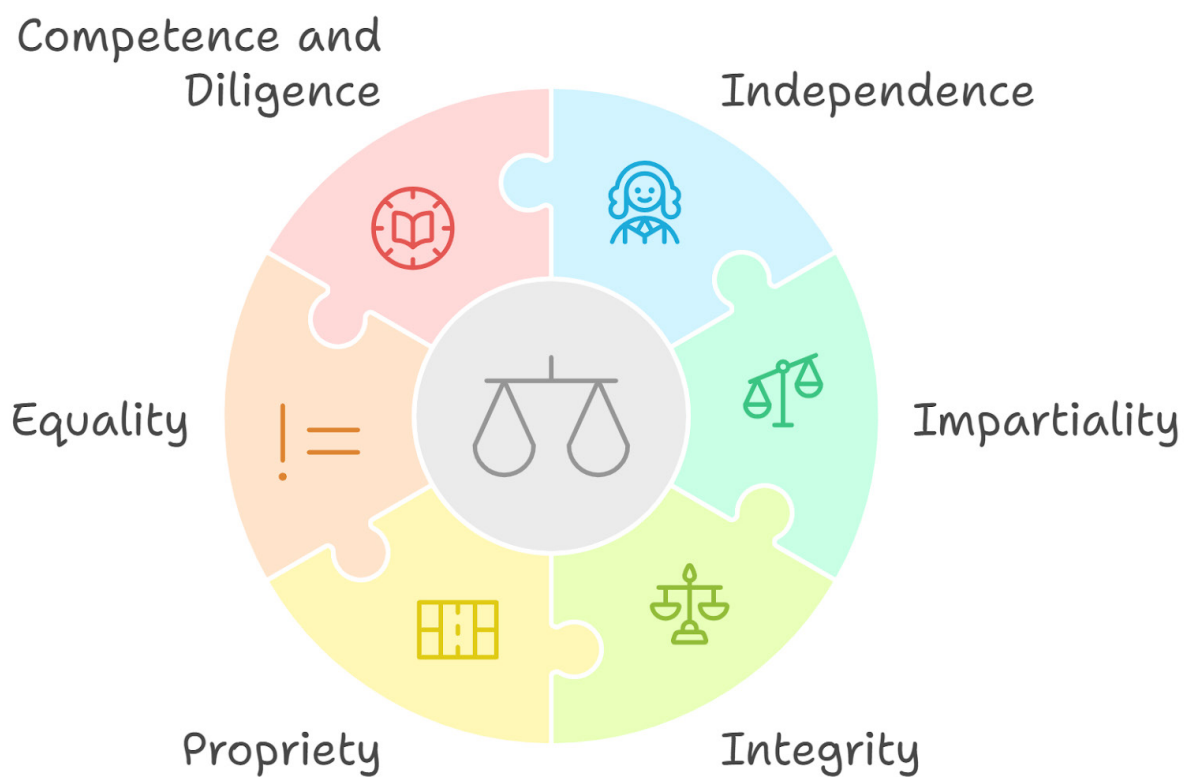
How Can India's Judiciary Be Strengthened for Better Efficiency?

💡 **Reform Judicial Appointments and Promote Diversity:** Revamp the **collegium system** by introducing a **Judicial Appointments Commission** ensuring **transparency, accountability, and broader representation** across social, regional, and gender lines.

   📌 Include the creation of an **All India Judicial Service (AIJS)** for **merit-based, uniform recruitment** at the subordinate level.

- **Address Vacancies and Enhance Performance Monitoring:** Mandate **time-bound appointments** and **increase sanctioned judicial strength** at all levels.
  - ✦ Introduce **performance appraisal systems** that balance judicial independence with timely and quality adjudication.
- **Upgrade Digital and Physical Infrastructure:** Expand the **e-Courts and FASTER systems**, and improve **AI-based case tracking** to boost efficiency.
  - ✦ Simultaneously, invest in **modern courtrooms**, basic amenities, and dedicated facilities across all court levels.
- **Strengthen Alternative Dispute Resolution (ADR) and Legal Aid:** Promote **pre-litigation mediation, Lok Adalats**, and **awareness campaigns** to reduce court burdens.
  - ✦ Expand **legal aid access**, especially for undertrials and marginalized litigants.
- **Ensure Timely Justice for Undertrials and Vulnerable Groups:** Prioritize **bail hearings**, introduce **fast-track mechanisms**, and improve legal support for **disadvantaged prisoners**, who form the bulk of undertrial populations.
- **Improve Judicial Accountability and Complaint Redressal:** Reform the **in-house judicial inquiry mechanism** and establish **independent judicial complaints commissions** to transparently handle misconduct allegations.
- **Institutionalize Continuous Learning and Compassion Training:** Introduce **mandatory Continuing Professional Development (CPD) modules of Singapore** based on global models and conduct **empathy and human rights** training for judges to promote people-centric justice.
- **Enhance Transparency and Public Engagement:** Encourage **live-streaming of proceedings**, issue **multilingual judgments**, and launch **legal literacy programmes** to build public trust and accessibility.

Conclusion:

Judicial reform in India must move beyond episodic outrage and address deep-rooted structural issues. Ensuring **transparency, timely justice, and merit-based appointments** is crucial to uphold both public confidence and constitutional values.

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India-China Relations: Crossroads & the Road Ahead

This editorial is based on "China-India ties across the past and into the future" which was published in The Hindu on 02/04/2025. The article underscores that India-China relations, rooted in a shared historical legacy and shaped by evolving strategic dynamics, have navigated a complex balance of cooperation and contention over the past 75 years.

Tag: GS Paper-2, India and its Neighbourhood, Important International Institutions, Groupings & Agreements Involving India and/or Affecting India's Interests, International Treaties & Agreements, Effect of Policies & Politics of Countries on India's Interests.

Marking **75 years** of diplomatic ties, **India-China relations** stand as one of the world's most significant bilateral engagements- **complex, consequential, and deeply rooted** in civilisational depth. Despite recurring **strategic divergences**, the two nations continue to engage across trade, multilateralism, and cultural exchange. Echoing its vision, China called for an **"elephant-dragon duet"**- a symbolic call for **peaceful, cooperative coexistence** between the two Asian giants. As rising powers, India and China must now navigate this relationship through dialogue, mutual respect, and strategic balance.

How Have India and China's Relations Evolved Over Time?

- **Diplomatic Foundations:** India and China established **diplomatic relations in 1950**, grounded in the **Panchsheel Agreement of 1954**.
  - ✦ The agreement emphasized **peaceful coexistence and non-interference**, becoming a bedrock for their bilateral engagement.
- **Strategic Leadership and High-Level Guidance:** Over the decades, leadership meetings provided **strategic direction** to bilateral relations during critical phases.
  - ✦ On the sidelines of the **2024 BRICS Kazan summit** India and China signaled a renewed chapter in **mutual cooperation**.

- 💡 **Economic Engagement and Trade Partnership:** China remains India's one of the **largest trading partners**, with bilateral trade reaching **USD 118.4 billion in 2023-24**.
  - ✦ Despite tensions, India continues to import **telecom, Active Pharmaceutical Ingredient (API), and electronic components**, reinforcing economic interdependence.
  - ✦ The trade relationship, though **asymmetrical**, reflects deep integration in **manufacturing supply chains and industrial inputs**.
  - ✦ India also exports **iron ore, organic chemicals, and raw materials**, indicating a **resource-driven export structure**.
- 💡 **Investment and Supply Chain Linkages:** Chinese investment plays a pivotal role in India's **unicorn ecosystem and high-tech industries**.
  - ✦ In 2020, **18 Indian unicorns** had received over **USD 3.5 billion** in Chinese investments, reflecting capital linkages.
- 💡 **Cultural and Civilisational Exchanges:** Historical figures like **Xuanzang and Monk Bodhidharma** exemplify deep cultural ties and shared civilisational ethos.
  - ✦ In April 2025, **Visva-Bharati University hosted** a seminar marking 100 years since **Tagore's visit to China**.
  - ✦ Ongoing **academic collaborations and language learning programs** have further institutionalised soft power exchange.
  - ✦ China's interest in **Ayurveda, Yoga, and Indian classical arts** highlights growing cultural receptivity and mutual curiosity.
  - ✦ **People-to-people linkages** have been revitalized through the recent resumption of direct flights and visa facilitation, boosting educational and tourism exchanges.
- 💡 **Defence and Strategic Dialogue:** Regular **Corps Commander-level meetings** and the **Working Mechanism for Consultation and Coordination** continue.
  - ✦ The **33rd Working Mechanism for Consultation & Coordination on India-China Border Affairs (WMCC)** meeting, held in March 2025, saw India and China agree to prepare for the upcoming Special Representatives' meeting and enhance border management measures.

- 💡 **Multilateral Cooperation:** India and China actively engage in multilateral fora such as **BRICS, SCO, G-20, and Asian Infrastructure Investment Bank (AIIB)**.
  - ✦ In 2024, both nations endorsed **Global South solidarity** and promoted multipolarity within the SCO framework.
- 💡 **Infrastructure and Connectivity:** India has not joined China's **Belt and Road Initiative**, citing **sovereignty concerns over China Pakistan Economic Corridor (CPEC)** in PoK.
  - ✦ India promotes alternatives like the **India-Middle East-Europe Corridor** and **SAGAR strategy** to assert regional connectivity leadership.
- 💡 **Water Cooperation and Hydrological Data Sharing:** China has resumed the **sharing of hydrological data** on the **Brahmaputra and Sutlej** rivers post-2024 dialogue.
  - ✦ The absence of a **water-sharing treaty** remains a concern, but current mechanisms ensure early warning systems.
- 💡 **Border Management and Confidence Building:** Mutual troop withdrawals and establishment of **no-patrol zones** in **Gogra, Galwan, and Pangong Tso** aim at stability.
  - ✦ Depsang and Demchok witnessed breakthroughs in **2024**, marking progress since the 2020 standoff.
- 💡 **Other Areas of Cooperation:** India and China cooperate in **climate diplomacy, disaster relief, and global health governance** through G-20 and BRICS.
  - ✦ Joint efforts in **UN peacekeeping**, **pandemic response mechanisms**, and **development finance** signify broader strategic convergence.
  - ✦ China supports India's initiatives like **ISA (International Solar Alliance)**, and both countries have **shared stakes in energy transition**.
  - ✦ Cooperation in **multilateral banking institutions** like the **AIIB, and New Development Bank (NDB)** reflects their regional leadership roles.

What are Major Challenges in the India-China Relations?

- 💡 **Persistent Border Disputes:** The **3,488-km-long LAC** remains undefined, with frequent incursions and infrastructure buildups on both sides.

  China occupies **38,000 sq km of Aksai Chin** and claims **90,000 sq km of Arunachal Pradesh** as South Tibet.

  - ✦ India perceives China's **dual-use village construction** along the border as a strategy of **salami-slicing territorial control** (gradual, covert encroachment of territory without open conflict).
  - ✦ The absence of **mutually agreed maps** on LAC sectors has compounded verification and patrol coordination challenges.
  - ✦ Remaining friction points at **Depsang and Charding-Ninglung Nala** are still under negotiation.
- 💡 **Galwan Incident and Trust Deficit:** The **Galwan clash in 2020**, resulting in 20 Indian soldier deaths, triggered a strategic rupture.

- ✦ Despite multiple disengagements, **trust levels remain low**, hindering normalization of relations.
- 💡 **Economic Imbalances and Trade Deficit:** India's trade deficit with China touched **USD 85 billion in 2023-24**, up from **USD 83.2 billion** in 2022-23.
  - ✦ Chinese dominance in **critical imports** like APIs, electronics, and solar panels affects India's trade leverage.
  - ✦ This structural imbalance reflects India's **low-value exports versus high-value Chinese imports**, perpetuating dependency.
  - ✦ India's anti-dumping efforts are often undermined by **Chinese rerouting through ASEAN partners** under existing FTAs.

India-China Stand-offs

Relevant India-China Treaties and Agreements
- 1914 Simla Convention (McMahon Line)
- 1993 Agreement on Peace and Tranquility on the Line of Actual Control
- 1996 Agreement on Confidence Building Measures in the Military field
- 2005 Agreement on Settlement of the Boundary Question
- 2012 Agreement on Working Mechanism for Consultation & Coordination
- 2013 Border Defence Cooperation Agreement

Relevant India-Bhutan Treaties and Agreements
- 1949 India-Bhutan Friendship Treaty
- 2007 India-Bhutan Friendship Treaty (Rev.)

Relevant India-China Treaties and Agreements
- 1890 Anglo-China Agreement on Sikkim and Tibet
- 1914 Simla Convention
- 1954 Panchsheel Treaty
- 1993 Agreement on Peace and Tranquility on the Line of Actual Control
- 1996 Agreement on Confidence Building Measures in the Military field
- 2005 Agreement on Settlement of the Boundary Question
- 2012 Agreement on Working Mechanism for Consultation & Coordination
- 2013 Border Defence Cooperation Agreement

Relevant China-Bhutan Treaties and Agreements
- 1988 Guiding Principles on the Boundary Issues
- 1998 Agreement on Maintenance of Peace & Tranquility

| 1962: Aksai Chin | 2013: Daulat Beg Oldi, Ladakh sector | 2014: Chumar, Ladakh sector | 2016: Demchok, Ladakh sector |

2016: Tawang district, Arunachal Pradesh

2016: Anjaw district, Arunachal Pradesh

2017: Doklam (called Donglang by China), at the tri-junction of Bhutan, India, and China

India — China (Tibet) — New Delhi — Bhutan — McMahon Line

GATEWAY HOUSE
INDIAN COUNCIL ON GLOBAL RELATIONS
भारतीय वैश्विक सम्बंध परिषद्

Infographic by Sameer Patil and Kartik Jaishankar

- 💡 **Strategic Nexus with Pakistan:** China's **CPEC runs through PoK**, violating Indian sovereignty and deepening the **China-Pakistan strategic nexus**.
  - ✦ China's **military and nuclear cooperation** with Pakistan adds to India's strategic insecurity.
- 💡 **Technological Dependence:** India's smartphone market is dominated by **Chinese firms with around 75% market share**.
  - ✦ Despite bans, many Indian Electric Vehicles **and telecom sectors** remain reliant on Chinese tech and batteries.

- India's ambitions for **semiconductor self-sufficiency** face hurdles due to lack of **technical know-how and ecosystem depth**.
  - The absence of a **robust regulatory framework for digital hardware imports** makes critical infrastructure vulnerable to disruption.
- **Cyber Threats and Digital Surveillance:** China-linked **ChamelGang and other threat actors** have targeted India's healthcare and power grid networks.
  - India banned **over 300 Chinese apps** and excluded firms like Huawei from 5G trials for security concerns.
- **Water and Environmental Concerns:** China's upstream control of rivers like **Brahmaputra and Sutlej** threatens India's **water security**.
  - China's mega-dam plans at **Medog and earlier Zangmu Dam** lack consultation with downstream India.
- **Maritime and Regional Influence:** China's presence in **Sri Lanka, Maldives, and Myanmar** under the **Maritime Silk Road** and **String of Pearls** strategy challenges India.
- **Global Forums and Diplomatic Obstruction:** China consistently blocks India's **Nuclear Suppliers Group (NSG) membership** and **UNSC** permanent seat bid.
- It shields **Pakistan-based terrorists** in UNSC sanctions committees, frustrating India's global ambitions.

What Are the Latest Developments in India-China Relations?

- **Diplomatic Reset in 2025:** India and China marked **75 years of diplomatic ties** with events and bilateral dialogues.
  - A breakthrough agreement on **Depsang and Demchok troop withdrawals** was reached in **late 2024**.
- **Resumption of Dialogue Mechanisms:** The **23rd Special Representatives' meeting** and **Vice Minister-Foreign Secretary Meeting** were held in Beijing in 2025.
  - India and China reached a consensus on border issues and agreed to enhance **practical cooperation**.

- **High-Level Engagements:** Modi and Xi met on the sidelines of **BRICS Kazan summit** in **October 2024**.
  - This was their **first formal meeting in five years**, signaling willingness to reset ties.
- **Hydrological Data and Pilgrimage:** Agreement reached to resume **data-sharing on rivers** and restart **Kailash Mansarovar Yatra** by summer 2025.
  - These steps indicate trust-building and confidence restoration measures post-crisis.

How Can India and China Strengthen Their Bilateral Relationship?

- **Deepen Strategic Dialogue:** Both sides must maintain momentum through **SR-level and WMCC talks** to resolve remaining friction points.
  - As India recently emphasized, the events of 2020 are not the way to resolve bilateral issues, and the path ahead lies in full **disengagement, de-escalation, and restoration** of peace along the LAC.
  - Sustained engagement through **SCO and BRICS platforms** will reinforce multilateral trust and conflict avoidance.
- **Balance Economic Interdependence:** India should diversify supply chains via the **China+1 strategy** while retaining beneficial FDI inflows.
  - The **2023-24 Economic Survey** suggested leveraging **Chinese investments to boost Indian exports** to the West.
- **Strengthen Border Infrastructure:** Accelerate construction of **strategic roads, ALGs, and surveillance assets** along LAC to match Chinese deployments.
  - The procurement of **31 Predator drones in 2024** was aimed at bolstering mountain reconnaissance capacity.
- **Promote Maritime Deterrence:** Enhance India's presence in the **Indian Ocean Region** through **QUAD cooperation** and **Sagarmala initiatives**.
  - Recent deployments in **Andaman-Nicobar** and coordination with ASEAN help counter China's naval outreach.

- **Lead Regional Development:** Strengthen initiatives like **PM-DevINE**, **BIMSTEC**, and South Asia Sub Regional Economic Cooperation **(SASEC)** to build goodwill in the South Asian periphery.
  - ✦ New infrastructure in **Nepal, Bhutan, and Sri Lanka** helps counter China's BRI outreach in the region.
- **Institutionalize Crisis Management:** Develop hotlines between **military commands and diplomatic channels** to de-escalate future incidents quickly.
  - ✦ Joint training or simulation protocols could be explored to build **LAC-level crisis mitigation tools**.
- **Recalibrate Technology Policy:** Build indigenous capacity in **semiconductors, APIs, and solar equipment** under PLI and **Digital India**.
  - ✦ The **IN-SPACe** and **India Semiconductor Mission** are vital to reduce Chinese tech dependency.
- **Cultivate Strategic Autonomy:** Balance US and QUAD ties with **non-alignment principles**, while maintaining core interests with China.
  - ✦ A **multipolar Asia** needs India to act as a **civilisational balancer**, not a proxy within geopolitical blocs.

Conclusion

As India and China step into the next phase of their **diplomatic journey, sustained dialogue, strategic maturity, and cooperative multilateralism** will be essential. By aligning shared interests with global responsibilities, both nations can shape a stable, multipolar Asia and contribute meaningfully to a more equitable international order.

■■■

Bridging India'S Formalisation Gap

This editorial is based on "Extend the scope of formalisation in the informal sector" which was published in The Hindu Business Line on 31/03/2025. The article brings into picture the dominance of India's informal sector, which employs 93% of the workforce, and highlights its recent growth.

Tag: GS Paper-3, Employment, Government Policies & Interventions, Inclusive Growth, Management of Social Sector/Services, Growth & Development

India's informal sector remains the **backbone of employment,** encompassing **93% of the workforce** through unincorporated private enterprises. Recent **Annual Survey of Unincorporated Sector Enterprises data** reveals impressive growth in 2023-24, with a **12.84% increase in establishments,** 10.01% rise in workforce, and 16.52% growth in GVA. India needs to work harder in this regard to accelerate the formalisation of its economy, ensuring sustainable growth and better protections for millions of workers.

What is the Current Status of Formalisation of the Indian Economy?

- **About**: **Formalisation of the economy** refers to the process of bringing informal economic activities, enterprises, and workers under the regulatory framework of the government.
  - ✦ This includes ensuring compliance with **taxation, labor laws, social security benefits, and other legal provisions.**
  - ✦ In recent years, India has witnessed a **gradual but uneven trend** towards formalisation across sectors.
- **Macroeconomic Indicators of Formalisation**
  - ✦ **Formal Share of GDP**: According to Citi Research (2024), the formal sector's share in India's GDP has increased to **56%**, a jump of over **25 percentage points in the last four decades**, driven by GST, digital payments, and corporate growth.
  - ✦ **Widening Tax Base**:
    - 🖉 The number of individual taxpayers increased from **51 million in 2013** to **90 million in 2022**.
    - 🖉 Around **4.4 million new taxpayers** are being added annually.
    - 🖉 Formal sector workers contribute significantly more — top 2% of earners pay **>40% of total income tax**.
- **Labour Market Formalisation:**
  - ✦ **EPFO Registrations**:
    - 🖉 Over **6.91 crore members** joined EPFO between Sept 2017 and July 2024.

- In FY 2022–23 alone, **1.38 crore new members** were added; July 2024 alone saw **20 lakh new members**.
- Increasing female participation and youth entry into the organised sector indicate a broadening base.
  - ✦ **Manufacturing Sector Shift**:
    - Formal employment in manufacturing nearly **doubled** from 2005 (47 million) to 2019 (88 million).
    - **~90% of manufacturing GVA** is now formal; however, **~70% of employment in manufacturing** remains informal (India KLEMS data, 2018–19).
  - ✦ **Informal Sector Still Dominates Employment**:
    - As per **ASUSE 2023-24**, the informal non-agricultural sector employed **~120 million workers**, with **only 0.3%** of hired-worker establishments under EPFO/ESIC.
- **Employment per enterprise has declined**, indicating fragmentation despite sectoral growth.
- **Sectoral Nuances**

Sector	Formalisation Trend
Manufacturing	Large firms highly formalised; smaller units (₹70% of jobs) remain informal
Construction	Post-Covid job growth driven by self-employment in this sector – mostly informal
Trade & Services	High concentration of own-account enterprises; limited formalisation
Digital & Financial Services	Rapid formalisation via fintech, GST, UPI, and e-invoicing

- **Drivers of Formalisation**
  - ✦ **Policy & Regulatory Interventions**:
    - **Goods and Services Tax** **(GST)**: Encourages registration and documentation.
    - EPFO & ESIC coverage expansion
    - **Aatmanirbhar Bharat Rozgar Yojana,** **PMRPY**: Incentivised formal job creation.
    - **Labour Codes**: Raise thresholds for applicability, easing compliance.
  - ✦ **Technological & Financial Infrastructure**:
    - **UPI and JAM trinity** (Jan Dhan, Aadhaar, Mobile) have digitised payments and welfare delivery.

What are the Key Issues Hindering Formalisation of the Indian Economy?

- 💡 **Dominance of Micro and Small Enterprises with Low Incentive to Formalise:** India's informal economy is dominated by micro-units, many of which **operate at subsistence levels** and **see little value in formalisation** due to **compliance costs and fear of taxation.**
  - ✦ The perceived complexity of **registration, record-keeping, and formal reporting** creates a disincentive for these enterprises to transition.
    - 🖉 Formalisation is also seen as **increasing visibility without assured access to credit or benefits.**
  - ✦ According to ASUSE 2022–23, **63.2%** of establishments were **not registered under any authority**, and **only 0.3%** of hired-worker establishments were covered under **EPFO/ESIC**.

- 💡 **Rigid Labour Laws and Threshold Effects:** Despite recent labour code reforms, fear of increased compliance, especially for units crossing **employee thresholds (10 or 20 workers)**, discourages hiring and formal registration.
  - ✦ Even the new labour codes, though progressive, **are yet to be fully implemented across states, causing uncertainty.**
    - 🖉 The link between crossing thresholds and losing regulatory flexibility leads many firms to remain small and informal. These **"threshold effects"** act as a **structural barrier to scalability and formalisation.**
  - ✦ Enterprises employing **10+ workers** form just ~**7%** of informal manufacturing establishments **(2015-16)**, showing deliberate size-capping.
    - 🖉 The **Occupational Safety Code (2020)** raises these limits, **but rollout remains incomplete.**

- 💡 **Inadequate Access to Enabling Infrastructure in Informal Sectors:** Lack of basic infrastructure such as electricity, digital connectivity, and finance impedes the transition of informal enterprises, especially in rural areas, **to formal operations.**

- ✦ Without **high-speed internet, digital skills, and reliable utilities, informal businesses** cannot leverage formal systems like **GST, Udyam, or EPFO effectively.**
  - 🖉 This restricts productivity, market access, and inclusion in formal value chains. The digital divide thus reinforces informality.
- ✦ The Centre has itself highlighted **rural underemployment and infrastructure bottlenecks** in **tier-2 and tier-3 cities** hindering formal job creation.

- 💡 **Exclusionary Design of Formal Employment Schemes:** Current **employment-linked incentive (ELI) schemes often require EPFO track records or formal registration,** which informal employers lack.
  - ✦ This eligibility barrier prevents a vast segment of enterprises from accessing incentives meant to encourage formal hiring.
  - ✦ Instead of incentivising formalisation, these schemes risk reinforcing duality by benefiting only existing formal firms.
  - ✦ Recent data shows only **0.3% of HWEs** are covered under **EPFO**, making most ineligible for **Scheme B & C** under ELI. Yet these enterprises employ millions without formal protection.

- 💡 **Gendered Barriers in Labour Formalisation:** Women face dual challenges in accessing formal jobs — limited skilling in emerging tech areas and exclusion from enterprise ownership.
  - ✦ Though self-employment among women has risen **post-Covid,** it is mostly informal and home-based.
  - ✦ ASUSE 2023–24 showed **28.12% female workforce share**. Yet, only a **small fraction** of these are informal jobs- with **EPFO reporting a rise but not a majority**.
    - 🖉 Within Asia-pacific, India had the widest gender gap in internet usage in recent years, a gender gap of 40.4% with **only 15% of women.**

- 💡 **Misalignment Between Economic Growth and Employment Formalisation:** India's GDP is increasingly formalising, but j**ob creation remains informal-heavy.**

- High growth sectors like **fintech and digital services offer formal jobs**, but **construction, trade, and manufacturing (major employers)** still depend on informal labour.
  - This divergence creates a situation where the economy formalises without the labour force benefiting fully.
- **Citi Research (2024)** notes **GDP formalisation at 56%**, but labour market formalisation at just **15%**.
  - Post-pandemic, **54 million new jobs** were created, mostly **self-employment**- not formal wage work.

What Measures can India Adopt to Enhance Formalisation of Economy?

- 💡 **Rationalise Compliance Framework for Micro Enterprises:** To incentivise transition, India must implement **differentiated regulatory thresholds** for **micro and small enterprises,** ensuring that **formalisation does not impose punitive compliance burdens.**
  - A simplified **single-window digital interface for registration, tax filing, and labour compliance** can ease procedural entry into the formal net.
  - Integrating **Udyam, GSTN, and EPFO** portals under a unified backend can reduce duplication. This will encourage voluntary registration.
- 💡 **Expand Scope and Targeting of ELI Schemes:** Existing Employment-Linked Incentive (ELI) schemes should be restructured to include **informal sector employers** who meet productivity and job creation benchmarks, even without prior EPFO track record.
  - A graded incentive model linked to progressive hiring and formalisation can ensure scalability.
    - Scheme B & C under ELI must broaden their eligibility beyond formal establishments.
  - **Linking ELI with Udyam and skill certification platforms** can enable more enterprises to qualify. This fosters **inclusive employment generation**.

- 💡 **Localised Cluster-Based Formalisation Strategy:** Adopt a **cluster-based approach** to formalisation by mapping informal enterprise hubs in trade, textiles, and food processing, and offering region-specific packages including **infrastructure, credit, skilling**, and market linkage.
  - District-level economic profiling should guide cluster interventions through schemes like **PM Vishwakarma** and SFURTI.
  - Convergence of **Skill India**, **One District One Product** (ODOP) and **Digital India** missions can create formal value chains from the ground up.
    - This builds **local economic ecosystems** with embedded formality.
- 💡 **Gender-Sensitive Formalisation Pathways:** Design formalisation strategies specifically for **female-led enterprises and self-employed women**, including tailored credit products, home-based digital skilling, and simplified onboarding processes.
  - Strengthening convergence between **DAY-NULM, PM SVANidhi,** and **FutureSkills Prime** can build digital capacity among urban poor women.
  - Creating **women-centric industrial parks** with social infrastructure like crèches and transport access can support sustained formal employment.
    - A **gender-smart formalisation lens** is vital to make economic inclusion equitable.
- 💡 **Incentivise Digital and Financial Traceability:** Encourage informal enterprises to adopt **digital payments, invoicing, and financial bookkeeping** through targeted incentives like GST rebates, subsidised POS machines, and interest subvention for compliant behaviour.
  - Linking such digital traceability with easier access to **MSME credit schemes** like **CGTMSE and Mudra** can accelerate formalisation organically.
  - Use of **AI-driven risk profiling** by banks and fintechs can reward digitally visible enterprises with better financial products, closing the gap between informality and formal credit access.

- 💡 **Strengthen Last-Mile Infrastructure for Formalisation:** Invest in **rural and peri-urban digital infrastructure**, electricity access, and common service centres to enable informal enterprises to onboard onto formal platforms.
  - ✦ The expansion of <u>National Broadband Mission 2.0</u>, convergence with **Digital Saksharta Abhiyan**, and use of **SHGs as digital enablers** can drive bottom-up inclusion.
  - ✦ Enabling **tele-law, e-payments, and Udyam registration** at the panchayat level brings government services closer to informal actors. **Infrastructure must be seen as a gateway to formality, not just connectivity.**

- 💡 **Formalisation Through Public Procurement Reform:** Mandate that a portion of **government procurement** be reserved for **registered informal enterprises transitioning into formal status**, especially in local construction, manufacturing, and services.
  - ✦ Introduce preferential access to <u>GeM (Government e-Marketplace)</u> for enterprises that complete formal onboarding and fulfil basic quality norms.
  - ✦ Linking formalisation with access to a **stable demand pipeline** will incentivise businesses to comply voluntarily. Public spending must act as a tool for **formality-led capacity building**.

- 💡 **Leverage Labour Codes to Encourage Scalable Formalisation:** Implement the **new labour codes uniformly across states with supportive guidelines** that allow enterprises to grow beyond size thresholds without fear of regulatory harassment.
  - ✦ Clear, digital-first enforcement mechanisms must **replace inspector raj**.
  - ✦ Labour flexibility should be balanced with access to **social security for workers**, such as **ESIC coverage** for gig and platform workers.

- 💡 **Foster Digital Aggregation Platforms for Informal Workers:** Build sector-specific **digital aggregation platforms** for informal workers — like artisans, gig workers, and construction labour — to onboard into formal structures.

- ✦ These platforms should offer modules for **skill certification, wage payments, social security**, and employer linkages. Integration with **eShram, Skill India, and EPFO Lite** models can make these platforms effective.
  - 🖉 This **decentralised digitisation** approach ensures workers **don't need to be tied to one employer for formality.**

Conclusion:

While India has made significant strides in economic formalisation through **digital payments, GST, and social security expansion,** a large portion of the workforce remains in the informal sector. A balanced approach—**simplifying compliance, leveraging technology, and ensuring social protection**—can drive sustainable and inclusive growth. Strengthening last-mile connectivity and financial incentives will be key to integrating millions of workers and enterprises into the **formal economy.**

■ ■ ■

Plastic Waste to Wealth Revolution

This editorial is based on "<u>Scientifically Speaking: How bacteria might help solve our plastic problem</u>" which was published in The Hindu on 07/05/2024. The article brings into the picture the environmental threat of plastics and highlights a breakthrough where scientists engineered E. coli to produce a strong, biodegradable alternative—an innovation India must adopt.

Tag: GS Paper - 3, Conservation, Environmental Pollution & Degradation, Government Policies & Interventions

<u>Plastics</u> have revolutionized modern life but now pose a **severe environmental challenge, persisting in our ecosystems for centuries** and contributing to climate change. Scientists at Korea's Advanced Institute of Science and Technology have engineered **E. coli bacteria to produce a promising <u>biodegradable plastic</u> alternative** that combines **nylon's strength with the breakdown potential of polyesters**. India needs to work hard to adopt and develop such innovative solutions to address its growing **plastic waste crisis.**

What are the Key Emerging Advancements in Plastic Recycling?

- 💡 **Bioengineered Microbial Plastics:** Using synthetic biology, scientists are engineering microbes like *E. coli* to produce biodegradable plastics from renewable plant-based sources like glucose.
  - ✈ These **"bio-plastics"** (e.g., **Kerala's eco-friendly water bottles made from potato starch based material**) are designed for easier **natural decomposition,** potentially replacing petroleum-based plastics. It marks a shift from linear production to circular, biologically integrated economies.
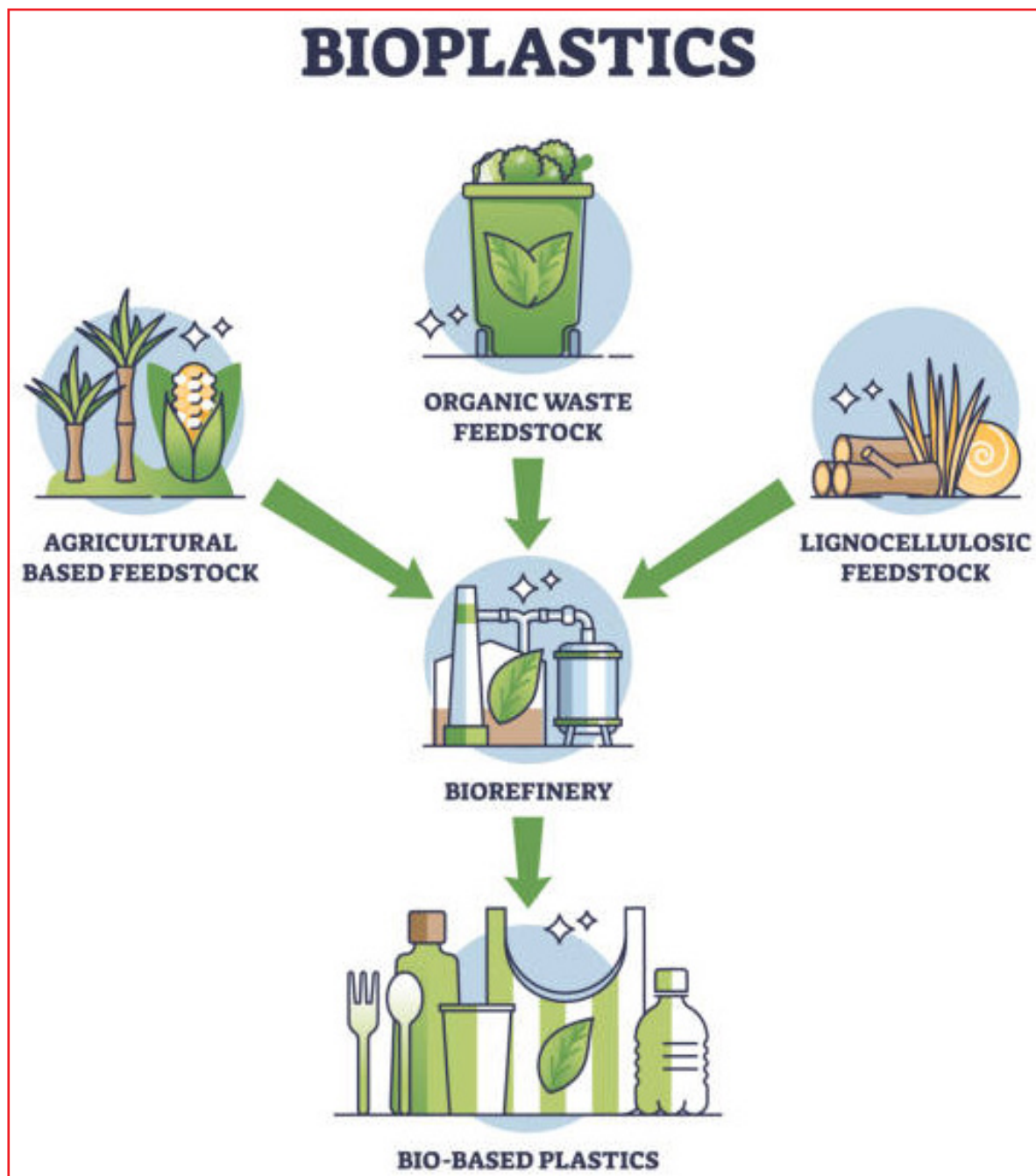
BIOPLASTICS

ORGANIC WASTE FEEDSTOCK

AGRICULTURAL BASED FEEDSTOCK

LIGNOCELLULOSIC FEEDSTOCK

BIOREFINERY

BIO-BASED PLASTICS

- ✦ In 2025, **Korea's KAIST** researchers developed microbial plastic with amino acids, combining nylon's strength with biodegradability.
- ✦ Also, researchers in Japan have designed a revolutionary biodegradable plastic that dissolves in seawater.
  - 🔗 The material of this plastic is also strong and can be adjusted to fit various uses such as packaging materials to medical devices

Evolution of Plastic Waste Management in India

2016
Introduction of Plastic Waste Management Rules

2018
Amendment phasing out non-recyclable plastics

2022
Mandatory recycling and reuse targets

2021
Ban on specific single-use plastics

2024
Expanded definitions and certification requirements

- 💡 **Fair Trade Plastic Recycling (Socially Inclusive Models):** Innovative models like **Plastics For Change** promote ethical recycling by integrating informal workers into formal systems with fair pay and traceable supply chains.
  - ✦ These models address both environmental concerns and social equity by formalizing and upgrading the informal sector.
  - ✦ Plastics For Change diverts plastic from oceans/landfills and supports **waste-picker livelihoods**, promoting circular economy and **SDG 12 (Responsible Consumption).**
- 💡 **Chemical Recycling (Advanced Depolymerization):** Unlike mechanical recycling, which downcycles plastics, chemical recycling **breaks polymers back into monomers for reuse in high-quality applications.**
  - ✦ This allows even low-grade or contaminated plastics to be recycled effectively, closing the loop.
  - ✦ Companies like **Pyrowave and Carbios** are leading this globally.
- 💡 **AI-Driven Waste Sorting Systems:** Using artificial intelligence and machine learning, automated sorting systems can identify and segregate different types of plastics with high precision.
  - ✦ This reduces contamination and improves the efficiency of recycling processes, especially in urban MRFs.
  - ✦ **Recykal and NEPRA in India are pioneering smart sorting systems;** global players like **AMP Robotics** are deploying **AI for real-time segregation.**
- 💡 **Plastic-to-Fuel (Pyrolysis Technology):** Pyrolysis converts plastic waste into fuel oils or industrial chemicals under high heat and absence of oxygen.
  - ✦ Though **still debated environmentally,** it offers a way to handle non-recyclable plastic in waste-to-energy schemes.

- India's **GAIL** and IIT Delhi have piloted pyrolysis units. IIT Delhi has also successfully produced **diesel from single-use plastic**

💡 **Deposit Refund Systems (DRS) for Packaging Waste:** DRS incentivizes consumers to return used plastic containers **(bottles, milk pouches)** in exchange for refunds or discounts.

- It helps recover high-quality recyclable plastics and encourages behavior change at the consumer level.
- **Germany**'s system recovers **98%** of plastic bottles using this approach.

💡 **Plastic Roads and Infrastructure:** Plastic waste is **repurposed as a binder in bitumen mix to construct roads,** providing durability and reuse in civil infrastructure.

- This reduces waste load and enhances road quality, especially in high-rainfall regions.
- More than **3 lakh kilometres of roads in India** have been converted into plastic tar roads, including the roads at the border.

What are the Key Issues Associated with Plastic Management in India?

💡 **Ineffective Waste Collection and Underreported Data:** Despite claims of high waste collection coverage, **a large volume of plastic remains uncollected**, especially in rural and peri-urban areas.

- This results in **open dumping and mismanagement** which severely undermines formal management systems.
- **India's official waste collection is cited at 95%**, but researches suggest actual collection is around **81%**.
  - The discrepancy between official and actual collection rates creates a policy-blind spot.

💡 **Open Burning and Toxic Pollution:** The widespread practice of open burning of plastic waste contributes significantly to **air pollution and public health hazards.**

- It releases **highly toxic chemicals such as dioxins and furans**, worsening India's already critical air quality scenario.

- This is especially prevalent in urban slums and rural areas due to lack of safe disposal alternatives.
  - India burns **5.8 million tonnes** of plastic waste and releases another 3.5 million tonnes into the environment each year, highlighting the gravity of the issue.

💡 **Dominance of Single-Use Plastics Despite Ban:** Regulatory efforts like the **2022 ban on select single-use plastics** have had minimal success due to poor enforcement and cheap availability.

- These plastics **still dominate daily consumption patterns,** from packaging to cutlery. Without viable and affordable alternatives, compliance remains weak.
- For instance, **43%** of India's plastic waste is still composed of single-use items, and these continue to be sold widely despite the **2022 ban.**

Weak Enforcement of EPR and Policy Frameworks: India's Extended Producer Responsibility (EPR) regime lacks effective monitoring and accountability.

- **Smaller manufacturers often escape compliance**, and the absence of centralized tracking results in fragmented execution.
- Regulations like **Plastic Waste Management Rules** (2016, 2021, 2024) exist more on paper than practice.
- Despite mandatory EPR, **only 60% of plastic waste is recycled (largely by informal sectors),** and **multi-layered plastics** (MLPs) remain hard to regulate

💡 **Lack of Infrastructure for Segregation and Processing:** India's municipal solid waste infrastructure is underprepared to handle complex plastic types, **especially non-recyclables.**

- Absence of **source segregation and inadequate MRFs (Material Recovery Facilities)** lead to dumping or incineration. Investment in waste processing tech is minimal.
- For instance, **77%** of urban waste is dumped untreated into landfills; sanitary landfills are outnumbered **10:1** by uncontrolled dump sites (Nature, 2024).

- 💡 **Environmental and Health Hazards from Microplastics:** Plastic waste is now breaking down into microplastics and entering **food, water, and soil systems**, posing a new-age health crisis.
  - ✦ **Agricultural and water systems are increasingly contaminated**, with long-term implications on food security and human health.
  - ✦ For instance, **Microplastics are found in 83% of Indian tap water samples,** and studies confirm their presence in **agricultural soils via wastewater sludge**.
    - 🔗 The impact of **microplastic on marine biota is an issue of concern** as it leads to the entanglement and ingestion which can be lethal to marine life.
- 💡 **Challenges in Adoption of Sustainable Alternatives:** Eco-friendly alternatives like **biodegradable plastics, plant-based packaging, jute bags and cloth bags** are often expensive, unavailable, or lack scalability.
  - ✦ Small businesses and vendors struggle to transition due to cost constraints. Additionally, there is inadequate R&D investment in **developing cost-effective, durable, and scalable substitutes** for conventional plastics.
  - ✦ Due to lack of availability of cheap alternatives, e-commerce plastic packaging market size still stands at $23-34 billion as of 2023.
    - 🔗 Food delivery sector is another big contributor, **generating approximately 3,50,000 tonnes of single-use plastic waste** annually.

What Measures can India Adopt for Enhanced Plastic Management?

- 💡 **Decentralized Waste Management through Urban Local Bodies:** Empowering ULBs with technical training and financial resources can help implement ward-level waste segregation, collection, and processing.
  - ✦ This decentralization enables area-specific innovations and enhances accountability. It can be operationalized via convergence with the **15th Finance Commission Grants** and **Swachh Bharat Mission**-Urban 2.0.

- 🔗 Strengthening the **capacity of municipal staff and promoting citizen participation** will ensure local ownership.
- 💡 **Enforceable and Digitally Tracked Extended Producer Responsibility:** Strengthening EPR with digital platforms to **trace plastic use, recovery, and recycling** can ensure producers are held accountable.
  - ✦ A centralized tracking mechanism using QR codes or blockchain-based traceability systems should be deployed.
  - ✦ Integration with **Digital India** and the **National Dashboard for EPR Compliance** can create transparency and ease audits. Third-party audits and penalties for non-compliance can reinforce enforcement.
- 💡 **Formalization of Informal Waste Sector:** Recognizing and integrating waste pickers into formal recycling chains through cooperatives or SHGs will improve collection efficiency and livelihoods.
  - ✦ Formalization should include access to social security **(Indore Model)**, training, and safety gear. Linking this effort with **Deendayal Antyodaya Yojana – National Urban Livelihoods Mission (DAY-NULM)** can ensure dignity and upward mobility.
  - ✦ Local governance bodies can help identify and register workers.
- 💡 **Strict Enforcement of Ban with Parallel Eco-Alternative Ecosystem:** Policy bans on single-use plastics must be accompanied by incentivizing the production and distribution of affordable biodegradable alternatives.
  - ✦ The government should provide MSMEs with R&D and marketing support to scale eco-friendly packaging.
  - ✦ Linking **Start-Up India**, **MSME Ministry**, and **KVIC** can create a full value chain for green alternatives. This dual-track approach ensures both restriction and substitution.
- 💡 **Incentivized Source Segregation at Household Level:** Households should be rewarded through rebates, discounts, or utility bill credits for consistent waste segregation.

- Urban bodies can **develop reward-linked dashboards for compliant societies.**
- Integrating **Behavioral Insights Unit (NITI Aayog)** and **SBM-Urban 2.0** nudging campaigns can drive adoption. Tech-based gamification of segregation practices can build a culture of responsible waste behavior.

💡 **Strengthening Infrastructure for Material Recovery Facilities (MRFs):** Establishing zonal-level MRFs equipped with automated segregation technology can vastly improve recycling efficiency.

- These facilities should be built on public-private partnership models and tied into smart city projects.
- **Smart Cities Mission** and **AMRUT 2.0** can co-fund such infrastructure. Training ULBs in operating these efficiently is crucial for long-term sustainability.

💡 **Localized Plastic Action Plans at District Level:** Each district should develop its own Plastic Waste Management Action Plan tailored to its volume, geography, and infrastructure.

- These plans must be made mandatory under **District Environment Plans (DEPs)** overseen by State Pollution Control Boards.
- Integrating them with **State Action Plans on Climate Change (SAPCCs)** will align plastic management with broader sustainability goals.

💡 **Circular Economy Innovation Hubs:** Establish innovation clusters focused on circular economy solutions, with support for startups, research institutions, and recyclers. These hubs can drive R&D on **biodegradable materials, upcycling technologies, and scalable recycling models.**

- Ministries like **MoEFCC**, **DST**, and **MSME** can co-create these under the **Mission LiFE framework.** Local industrial associations can help pilot and scale emerging solutions.

Conclusion:

Innovative plastic recycling technologies are crucial for tackling **India's mounting plastic waste crisis while fostering a circular economy.** Solutions like **bioengineered** plastics, AI-driven waste sorting, and advanced chemical recycling align with SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action) by promoting sustainable waste management.

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Future Of India'S Service Economy

This editorial is based on "Riding the new wave in services, industry" which was published in The Hindu on 28/03/2025. The article brings into picture the transformative role of Global Capability Centers (GCCs) in India's service industry, highlighting their $65 billion revenue and 1.9 million workforce while stressing the need to address regional concentration, fiscal sustainability, and AI's impact.

> **Tag:** GS Paper-3, Planning, Employment, Inclusive Growth

India stands at a strategic crossroads with **Global Capability Centers (GCCs)** transforming its **service industry landscape**. With approximately **1,700 GCCs** employing **1.9 million Indians and generating $65 billion in revenue**, India hosts nearly half of all GCCs worldwide. While manufacturing sectors increasingly rely on specialized global networks, **service industries are consolidating operations through these fully-owned entities**. India's technical talent pool provides significant competitive advantages, though policymakers must address regional concentration, fiscal sustainability, and AI's impact to maximize this opportunity.

What are the Key Growth Drivers of India's Service Sector?

💡 **Rise of Global Capability Centers (GCCs) and High-End Outsourcing:** India has emerged as the **top destination for Global Capability Centers (GCCs)**, attracting MNCs seeking operational control and cost efficiency.

- The **shift from third-party outsourcing to in-house GCCs** has accelerated post-pandemic, driven by demands for data security, analytics, and IP-sensitive services.

- Cities like **Bengaluru, Hyderabad, and Pune** have become global hubs for financial, tech, and healthcare GCCs.
  - As of 2025, India hosts **1,700 GCCs**, employing **1.9 million people**, contributing **$65 billion** to revenue **(Indus Valley Report 2025)**.

- 💡 **Expanding Digital Infrastructure and AI-Powered Innovation:** The central government's aggressive push toward **AI, cloud computing, and digital public infrastructure** has supercharged India's digital services landscape.
  - From **fintech to healthcare,** sectors are being reshaped through AI-led automation and data analytics.
  - The **National Data Governance Framework** and **AI Centres of Excellence** are enhancing innovation capacity.
    - The government has committed **INR 5 billion** to AI Centres of Excellence **(Union Budget 2024-25).**

- 💡 **Rising Foreign Direct Investment and Policy Liberalisation:** Liberalised FDI norms, rising investor confidence, and structural policy changes have made India a **magnet for capital in services** like insurance, telecom, and financial services.
  - The raising of FDI caps and streamlined procedures have made entry easier for global players, while regulatory sandboxes are fostering fintech growth.
  - **Services received $7.22 billion FDI between April–Dec 2024**, out of India's total **$40.67 billion FDI inflow** (DPIIT).
    - The FDI cap in **insurance** was raised from 74% to 100% in **Union Budget 2025-26.**

- 💡 **Strong Performance in High-Value Service Exports:** India is now the **7th largest global services exporter**, with strengths in IT, consulting, and financial services.
  - The growing demand for **digital transformation worldwide** has helped Indian firms expand in areas like **cloud, cybersecurity, and enterprise solutions**. India's diversified service export base makes it resilient to sector-specific shocks.
  - India's share in global services exports has more than doubled, reaching around **4.3% in 2023**.

- India ranks **2nd in the world in telecommunication**, computer, and information services exports, 6th in personal, cultural and recreational services exports and 8th in other business services exports.

- 💡 **Government-Led Skill Development and STEM Education Push:** The government has aligned national skilling efforts with the needs of the service sector. Schemes like **Skill India**, PMKVY, and **National Education Policy (NEP) 2020** promote future-ready talent.
  - Integration of the private sector with skills via GCCs enhances workforce employability.
  - India produces **over 1.5 million engineers** annually, a key source for IT and fintech talent.

- 💡 **Tier 2 and Tier 3 City Expansion:** With high saturation in **metros, firms** are expanding into **outskirts, smaller cities for cost benefits and new market access.**
  - Government projects like **BharatNet and Digital India** have enabled backend operations and digital services to move into underserved regions.
    - This also supports inclusive growth and reduces migration pressure on metros.
  - For instance, India's **logistics and warehousing sector** is expanding rapidly, with Tier 2 and 3 cities emerging as key hubs in the country.

- 💡 **Surge in Domestic Demand Across Rural India:** Rising incomes, urbanisation, and aspirations have expanded the domestic market for services from health and education to entertainment and financial services.
  - Even **rural India has seen a significant increase in service consumption,** showing a clear structural shift. This deepening of domestic demand makes India less export-dependent in services.
  - The urban-rural gap in **Monthly Per Capita Consumption Expenditure** has narrowed to **71% in 2022-23 from 84% in 2011-12,** largely driven by increased spending on services.
    - Sectors like **entertainment**, **healthcare and digital education** are seeing massive rural growth.

Service Sector Growth
Growth Rate of GVA at Basic Prices

Year	Growth Rate
2019-20	6.3%
2020-21	-7.8%
2021-22	8.4%
2022-23	9.1%
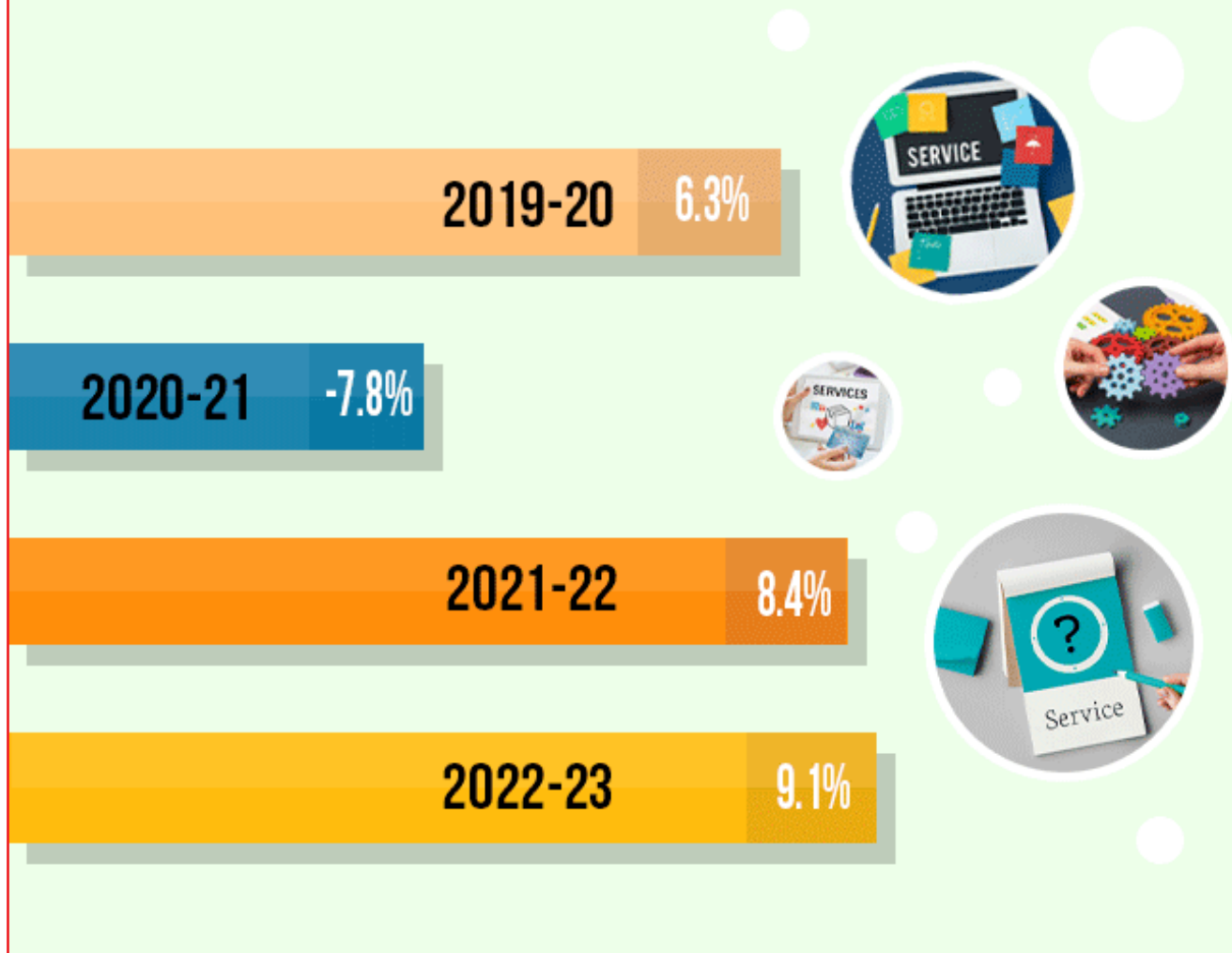
What are the Key Issues Associated with India's Service Sector?

💡 **Skill Mismatch and Workforce Readiness Gap:** India's services sector increasingly demands **high-end skills in AI, data science, fintech, and cybersecurity,** but the workforce supply remains uneven and undertrained.

- ✈ While we produce graduates in large numbers, **industry-academia alignment is still weak,** leading to underemployment and poor job readiness.
- ✈ The rising need for niche expertise outpaces current skilling efforts, especially in Tier 2/3 cities.
  - 🔗 For instance, **India's job crisis** deepens as **only 42.6% of graduates are employable,** sparking concerns over the growing skill gap

- 💡 **Urban Infrastructure Bottlenecks in Service Hubs:** Major service-sector cities face acute infrastructure stress — **from traffic congestion to water shortages and rising real estate costs.**
  - ✦ These inefficiencies increase **business costs, lower productivity, and reduce quality of life for skilled workers**, making retention harder. Over-dependence on a few urban clusters is unsustainable for long-term service sector growth.
  - ✦ For instance, Bengaluru, which tops India's office space demand as absorption grows **30% in 2024** and faces critical issues like <u>urban flooding,</u> water and power shortage.

- 💡 **Regional Imbalance in Services Growth:** The bulk of high-value service sector activity is concentrated in a few prosperous states like **Maharashtra, Karnataka, and Tamil Nadu.**
  - ✦ States with large labour pools — **like Bihar, MP, and Odisha —** remain underdeveloped in services **due to poor connectivity, education gaps, and lack of investment ecosystems.**
    - 📎 This reinforces spatial inequality and limits national job creation potential.
  - ✦ In FY23, **Karnataka and Maharashtra together contributed over 25% of India's total service sector** Gross State Value Added (GSVA), while **19 states collectively accounted for just 25%** of the sector's GSVA.

- 💡 **High Export Dependence and Geopolitical Exposure:** India's services exports are heavily reliant on markets like the **US and EU**, making the **sector vulnerable to global shocks, protectionism, and visa restrictions.**
  - ✦ Changes in **outsourcing trends, recessionary cycles, or trade tensions** (like **recent tariff issues with the United States**) directly impact revenue, employment, and investor confidence. Diversification into new markets remains slow.
  - ✦ For instance, around **70% of India's IT services exports go to the US, highlighting significant dependence.**
    - 📎 Also, the **U.S. tech sector** is currently grappling with widespread layoffs, significantly affecting Indian workers.

- 💡 **Underutilisation of Emerging Technologies in MSMEs:** While large service firms are rapidly adopting AI, automation, and cloud platforms, **MSMEs lag behind** due to cost barriers, lack of awareness, and limited digital infrastructure.
  - ✦ This deepens the productivity gap and creates a dual-speed services economy. Unlocking tech adoption in small firms is crucial for inclusive growth.
  - ✦ According to the 'SME Digital Insights' study, **only 50% of Indian MSMEs are prioritizing cloud adoption** for business expansion in FY2024.
  - ✦ Also, **only 6% of MSMEs actively leverage e-commerce platforms** for sales, underscoring the sector's limited digital adoption.

- 💡 **Fragmented Public-Private Collaboration in Infra Development:** The pace of public infrastructure expansion (**digital and physical)** often lags behind the needs of the private services sector.
  - ✦ While some partnerships exist, **coordination remains ad hoc**. This limits ecosystem development in education, healthtech, legal tech, and logistics services.
  - ✦ For instance, **Mumbai Coastal Road Project**, aimed at reducing traffic congestion and improving coastal access, **has faced delays and cost overruns due to land acquisition issues** and regulatory hurdles.

What Measures can India Adopt to Enhance its Service Sector?

- 💡 **Foster Tier-2 and Tier-3 Service Ecosystems:** India must decentralise its service-sector growth beyond metro cities by developing infrastructure, skill clusters, and digital connectivity in Tier-2 and Tier-3 cities.
  - ✦ This requires convergence between **smart city initiatives**, <u>BharatNet</u>**,** and the <u>National Logistics Policy</u> to create enabling conditions for GCCs and high-skill services.
  - ✦ Strategic incentives must attract private investment in education-tech, health-tech, and consulting services in these regions.

- 💡 **Strengthen Public-Private Skilling Partnerships:** A national framework to align **vocational education under NEP 2020** with **Skill India's modular training programs** can bridge the service sector's skill gap. Industry participation in curriculum design and delivery can make training demand-driven, future-ready, and employment-linked.
  - ✦ Focus should be on AI, fintech, digital design, legal-tech, and health-tech to meet evolving service sector demands.
- 💡 **Regulatory Sandboxes and Unified Compliance Platforms:** Service-oriented start-ups in fintech, ed-tech, gig economy, and telemedicine need a **light-touch regulatory approach** to grow without friction.
  - ✦ India should institutionalise **regulatory sandboxes** across key services **(SEBI, RBI, IRDAI**, etc.) and develop a **pan-India single-window compliance portal** to eliminate inter-state policy fragmentation, encouraging innovation and operational scalability.
- 💡 **Promote Service Export Diversification with Strategic Market Access:** To reduce overdependence on traditional export destinations, India must proactively **target emerging markets** in Africa, Latin America, and Southeast Asia for IT, financial, and education services.
  - ✦ Linking the **Champion Services Sector Scheme** with **India's FTAs** and trade diplomacy strategy can provide tailored support for digital trade expansion and cross-border service delivery.
- 💡 **AI and Digital Public Infrastructure for Sectoral Transformation:** India must integrate **AI Centres of Excellence**, **ONDC (Open Network for Digital Commerce),** and **Digital Health Mission** to boost productivity in retail, logistics, healthcare, and financial services.
  - ✦ These platforms must be scaled across states with real-time data-sharing frameworks and robust cybersecurity systems, ensuring that smaller players can leverage DPI for scale and reach.
- 💡 **MSME Integration into High-Value Service Chains:** Special incentives and subsidised access to cloud platforms, automation tools, and cybersecurity infrastructure can help **digitally onboard MSMEs** into global and domestic value chains.

- ✦ Converging the **Digital MSME Scheme** with **Startup India** seed support and cluster-based incubation can reduce the digital divide within the services sector and build resilience among smaller players.
- 💡 **Institutionalise a National Services Competitiveness Council:** A dedicated inter-ministerial body can act as a **think-tank and monitoring agency** for India's service sector, ensuring data-driven policy responsiveness, regulatory coordination, and strategic interventions.
  - ✦ This council should involve stakeholders from the private sector, academia, and states to monitor trends, address disruptions, and align policy goals with real-time sectoral dynamics.

Conclusion:

India's service sector stands at a pivotal moment, driven by the **rapid rise of Global Capability Centers (GCCs)**, digital infrastructure expansion, and increasing foreign investment. Policymakers must foster inclusive growth by decentralizing service hubs, enhancing skilling initiatives, and promoting MSME digital adoption. A forward-looking strategy **leveraging AI, regulatory reforms, and diversified exports** will ensure sustained growth and global leadership in services.

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Reviving Regionalism Through BIMSTEC

This editorial is based on "At BIMSTEC summit, an opportunity for India to strengthen its Act East Policy" which was published in The Indian Express on 07/04/2025. The article highlights India's renewed engagement with Southeast Asia at the Bangkok Summit has revitalised BIMSTEC as a strategic platform to advance regional cooperation, connectivity, and India's Indo-Pacific vision.

Tag: GS Paper - 2, India and its Neighbourhood, Important International Institutions, Groupings & Agreements Involving India and/or Affecting India's Interests, International Treaties & Agreements, Effect of Policies & Politics of Countries on India's Interests.

BIMSTEC

Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation

Members: 7
Significance: Hosts 22% of the world population, accounts for 3.8 trillion of GDP

Formation: 6th June 1997 (Bangkok Declaration)
Secretariat: Dhaka, Bangladesh

BHUTAN
- India is Bhutan's largest trade partner
- Mutually Beneficial Hydropower Cooperation: Mangdechhu, Kholongchhu, Chukha hydropower Projects
- India's grant assistance to Gyalsung Project
- Integration of Bhutan's DrukRen with India's National Knowledge Network

NEPAL
- Shares border with 5 Indian states (Uttarakhand, Uttar Pradesh, West Bengal, Sikkim and Bihar)
- Bharat Gaurav Tourist Train connecting India's Ayodhya and Nepal's Janakpur
- Major Issues: Territorial Disputes (Kalapani, Limpiyadhura and Lipulekh)
- Military Exercise: Surya Kiran (Army)

MYANMAR
- Only Southeast Asian country that shares a land border with north-eastern India
- The 2021 coup returned Myanmar to military rule
- India's Development Assistance: India-Myanmar-Thailand Trilateral Highway, Kaladan Multi-Modal Transit Transport (KMMTT), Sittwe port
- Major Issue: Rohingya Crisis

SRI LANKA
- India is Sri Lanka's third largest export destination
- India is the first country to officially back Sri Lanka's debt restructuring programme at IMF
- Major Issue: Fishermen crossing maritime boundary
- Important Exercises: Mitra Shakti (Army), SLINEX (Naval)

BANGLADESH
- Shares the longest border of over 4,096 km with India
- Largest trading partner in South Asia
- Water Sharing Agreements: Kushiyara river (2022), Ganga Water Treaty (1996)
- Major Issues: Teesta River Water Dispute
- Military Exercises: SAMPRITI-X (Military Training), Bongosagar (Naval)

THAILAND
- Thai language is written in script derived from Southern Indian Pallava alphabet
- Hinduism, Buddhism – both religions of Indian origin being popular in Thailand
- Convergence of India's 'Act East' policy with Thailand's 'Act West' policy
- Military Exercises: MAITREE (Army), SIAM BHARAT (Air Force), Indo-Thai CORPAT (Naval)

India's renewed outreach at the **6th BIMSTEC Summit** in Bangkok has revitalised **regional cooperation** and reinforced its **Indo-Pacific vision**. With Thailand's visa waiver and deepening defence ties, India showcased its commitment to regionalism amid shifting geopolitics. **BIMSTEC** emerges as a vital platform to institutionalise connectivity, counter political volatility, and promote collective resilience. This aligns with **India's Act East** and **Neighbourhood First policies**, offering strategic depth and recalibrated engagement with Southeast Asia in an era of stalled multilateralism.

What is BIMSTEC?

- 💡 **Regional Cooperation Platform:** The **Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)** is a regional grouping for fostering cooperation between **South and Southeast Asian countries** across multiple sectors.
  - ✦ It includes seven nations: **Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand from the Bay of Bengal region**.

- 💡 **Formation and Evolution:** Founded in 1997 as BIST-EC, it was renamed BIMST-EC after **Myanmar** joined the same year.
  - ✦ **Nepal and Bhutan** joined in 2004, completing the current membership; it became BIMSTEC formally.

- 💡 **Institutional Foundation:** The **Colombo Summit of 2022** adopted the **BIMSTEC Charter**, establishing it as a legal, institutionalised regional body.
  - ✦ The Charter outlines objectives, principles, and operational structures; it came into force after all members ratified it.

- 💡 **Secretariat and Structure:** The **BIMSTEC Secretariat** was established in 2014 in **Dhaka**.
  - ✦ It coordinates sectoral work and facilitates **inter-governmental cooperation** among members in priority areas.

- 💡 **Expansion of Sectors:** BIMSTEC started with six areas of cooperation; over time, it expanded to 14 key priority sectors.
  - ✦ Each member state leads specific sectors, with India heading **Security, Counterterrorism, Disaster Management, and Energy**.

- 💡 **Strategic Connectivity Bridge:** The grouping functions as a bridge between **SAARC** and **ASEAN**, bypassing SAARC's limitations caused by Indo-Pak tensions.
  - ✦ It aligns with India's Act East and Neighbourhood First policies, pushing regionalism through connectivity and collaboration.

What is the Significance of BIMSTEC for India and the Indo-Pacific?

- 💡 **Strategic Relevance in Indo-Pacific:** BIMSTEC connects two geostrategic subregions, giving India a central role in **Indo-Pacific regionalism**.

- ✦ The **Bay of Bengal** is crucial to **maritime trade routes** and **regional connectivity** in the Indo-Pacific theatre.

- 💡 **Counterweight to SAARC's Limitations:** BIMSTEC provides an **alternative to SAARC**, which remains paralyzed due to India-Pakistan hostilities.
  - ✦ India has used BIMSTEC post-**2016 Uri attack** to enhance engagement, evident in the **BRICS-BIMSTEC outreach**.

- 💡 **Trade and Economic Value:** BIMSTEC countries represent **22% of the global population** with a combined GDP of $5.2 trillion (2023).
  - ✦ The **Framework Agreement on the BIMSTEC Free Trade Area**, though unimplemented since 2004, could significantly boost intra-regional trade beyond the current sub-10%.

- 💡 **India's Sectoral Leadership:** India leads four crucial sectors: Security, Counterterrorism, Energy, and Disaster Management within BIMSTEC.
  - ✦ This allows India to institutionalise regional public goods and shape strategic discourse across multiple domains.

- 💡 **Connectivity and Integration Goals:** The **BIMSTEC Master Plan on Transport Connectivity** is a blueprint for improving regional logistics and movement.
  - ✦ It includes **264 projects** across maritime, road, rail, and aviation sectors, helping regional trade corridors flourish.

- 💡 **Link to East and Southeast Asia:** Projects like the **Kaladan Multimodal Transit** and **India-Myanmar-Thailand Highway** are India's gateway to ASEAN.
  - ✦ These routes strengthen India's economic and **people-to-people ties** with Thailand, Myanmar, and beyond.

- 💡 **BIMSTEC and India's Diplomacy:** India's use of BIMSTEC reflects its multi-alignment in the **Indo-Pacific with QUAD, Indian Ocean Rim Association (IORA), and ASEAN**.
  - ✦ MoUs with IORA and **The United Nations Office on Drugs and Crime (UNODC)** signed at the 6th Summit expand India's diplomatic and functional footprint.

- 💡 **Focus on Inclusive Growth:** Through BIMSTEC, India can advance **inclusive development** aligned with SDGs and regional welfare imperatives.

✦ Sectors like public health, climate resilience, and blue economy offer opportunities for targeted, people-centric diplomacy.

Why Has India Increasingly Shifted Its Focus From SAARC to BIMSTEC?		
Criteria	**BIMSTEC**	**SAARC**
Member Countries	BIMSTEC = SAARC – (Pakistan, Afghanistan, Maldives) + (Myanmar, Thailand)	Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.
Strategic Focus	Indo-Pacific bridge, connectivity, maritime	South Asian identity, socio-economic issues
Functionality	Active institutional reforms, vision documents	Dormant due to political stalemates
India's Role	Leading sectoral efforts (security, energy)	Hindered by bilateral tensions with Pakistan
Key Bottleneck	Funding, FTA delay, institutional weakness	Indo-Pak rivalry blocks implementation
Recent Progress	Bangkok Vision 2030, Maritime Transport Pact	Last summit in 2014, no recent outcomes

💡 **BIMSTEC Offers A Smoother And Obstruction-Free Platform:** India prefers BIMSTEC as it excludes Pakistan, ensuring fewer political hurdles and enabling **functional cooperation** in connectivity and regional projects.

💡 **BIMSTEC Aligns With India's Strategic And Leadership Goals:** With cordial ties among members and India leading key sectors, BIMSTEC supports **India's Act East Policy** and regional agenda-setting more effectively than SAARC.

What are the Major Outcomes of 6th BIMSTEC Summit?

💡 **Adoption of Bangkok Vision 2030:** The Bangkok Vision 2030 is BIMSTEC's new strategic blueprint, anchored in the **UN SDGs** and **Thailand's Bio-Circular-Green (BCG) economy model**.

✦ It focuses on shaping a **Prosperous, Resilient, and Open BIMSTEC** for the region's 1.7 billion people.

💡 **Introduction of PRO BIMSTEC:** PRO BIMSTEC is a thematic framework with three pillars: **Prosperity, Resilience, and Openness.**

✦ It promotes trade and investment, strengthens agriculture and health systems, and advances **sustainable tourism**.

💡 **Maritime Transport Cooperation Agreement:** Members signed the **Agreement on Maritime Transport Cooperation** to enhance cargo and passenger movement.

✦ It supports **maritime safety, regional logistics**, and **blue economy** development in the Bay of Bengal.

💡 **Institutional Strengthening Measures:** The **Rules of Procedure for BIMSTEC** mechanisms were adopted, enhancing transparency and institutional efficiency.

✦ These rules ensure procedural clarity for summits, ministerial meetings, and working groups.

💡 **External Collaborations Enhanced:** MoUs were signed with IORA and UNODC to broaden international collaboration and thematic convergence.

✦ IORA partnership supports maritime connectivity; UNODC engagement targets crime prevention and governance.

💡 **Strategic Guidance from EPG Report:** The **Eminent Persons Group (EPG) Report** on BIMSTEC's future direction was finalised after year-long consultations.

✦ It recommends prioritisation of sectors, **institutional rationalisation**, and performance-based implementation metrics.

- **Bilateral Diplomacy at Margins:** The Indian Prime Minister held talks with Myanmar's military leadership and Bangladesh's senior political figure during the summit.
  - ✦ These talks focused on earthquake aid, border security, and recalibration of bilateral ties post-political transitions.

What Key Challenges Undermine the Effectiveness of the BIMSTEC Grouping?

- **FTA Implementation Delay:** The BIMSTEC Free Trade Area, initiated in 2004, remains unimplemented after two decades of negotiations.
  - ✦ This delays **trade liberalisation**, undermining economic integration and investor confidence within the bloc.
- **Underfunded Secretariat:** The Secretariat in Dhaka suffers from **staffing shortages**, limited mandate, and poor financial autonomy.
  - ✦ This restricts its operational effectiveness, particularly in programme coordination and monitoring.
- **Connectivity Project Delays:** Transport connectivity plans like the **BIMSTEC Master Plan for Transport Connectivity** face implementation delays and cost overruns.
  - ✦ Lack of funding and coordination across ministries and countries hampers infrastructure delivery.
- **Political Instability in Region:** Myanmar's civil conflict and regime change in Bangladesh threaten **regional harmony and collaborative planning**.
  - ✦ Such instability disrupts consensus-building and slows down progress on common regional goals.
- **Lack of Financial Mechanism:** Absence of a dedicated BIMSTEC fund means projects depend on voluntary national contributions.
  - ✦ This results in inconsistent financing and gaps in implementing multi-country initiatives.
- **Consensus Decision-Making Hurdle:** The consensus-based model, while inclusive, leads to frequent policy paralysis on sensitive subjects.
  - ✦ **Security, counterterrorism, and migration cooperation** suffer due to divergent political interests.

What Strategic Steps Can Strengthen BIMSTEC's Role and Relevance in the Region?

- **Enhance Institutional Capacity:** The Secretariat should be strengthened with technical experts, adequate funding, and a broader functional mandate.
  - ✦ It must lead cross-sectoral integration and performance tracking of BIMSTEC programmes.
- **Create BIMSTEC Development Fund:** A dedicated funding mechanism is essential for financing connectivity, climate resilience, and digital public goods.
  - ✦ Member-state contributions and donor partnerships could sustain long-term cooperation.
- **Fast-track FTA and Trade Cooperation:** Set timelines for BIMSTEC FTA implementation covering goods, services, and investment.
  - ✦ This will boost intra-regional trade and reduce dependence on global north economies.
- **Accelerate Connectivity Masterplan:** Prioritise key infrastructure nodes under the BIMSTEC Master Plan on Transport Connectivity.
  - ✦ Regular updates and cross-border facilitation can address coordination failures.
- **Broaden Sectoral Depth:** New cooperation areas like **digital economy**, **green technology**, **and public health** must be institutionalised.
  - ✦ Post-Covid resilience requires **regional preparedness in health and disaster systems**.
- **Promote Stakeholder Engagement:** Track 1.5 and 2.0 diplomacy should bring in **academia, civil society, and business networks**.
  - ✦ This ensures inclusive ownership and bottom-up feedback for policy design.
- **Balance Leadership and Consensus:** India must lead without dominating, fostering equitable cooperation and trust among smaller members.
  - ✦ Leadership should focus on capacity sharing, humanitarian aid, and regional stability.

Conclusion

BIMSTEC must evolve from **vision to verifiable action**. Institutional reforms, trade frameworks, and inclusive

engagement are pivotal to its credibility. With consistent leadership, shared financing, and resilient diplomacy, the group can transition from aspirational dialogue to a functional pillar of **Indo-Pacific integration, enabling stability, prosperity, and regional cohesion**.

■■■

Optimizing India'S Healthcare System

This editorial is based on "Bridging gaps, building resilience" which was published in The Hindu on 07/04/2025. The article brings into picture the dual burden of diseases and healthcare disparities in India, highlighting how inadequate funding and high out-of-pocket expenses push millions into poverty. Despite schemes like Ayushman Bharat, access remains inequitable.

Tag: GS Paper-2, Health, Government Policies & Interventions, GS Paper-3, Government Budgeting, Planning

India's healthcare system faces a dual burden of persistent infectious diseases and rising non-communicable conditions, with challenges including rural-urban infrastructure disparities and insufficient public health funding. Despite progress through initiatives like Ayushman Bharat and digital health platforms, inequitable access remains a concern. **High out-of-pocket spending** pushes **55 million Indians** into poverty annually, highlighting the urgent need for increased investment in preventive care and universal coverage.

What are the Key Recent Developments in India's Healthcare Infrastructure and Resilience?

- 💡 **Infrastructure:**
  - ✦ **Expansion of Health and Wellness Centers:** The Indian government is expanding primary healthcare services through the establishment of **Ayushman Arogya Mandir.**
    - 🖇 This expansion addresses critical gaps in rural healthcare infrastructure by offering services like **early disease detection, maternal and child health, and non-communicable** disease management.

- 🖇 As of February 2025, over **1.7 lakh Ayushman Arogya Mandir** have been operationalized across India, aiming to cater to the population in underserved rural areas.
- ✦ **Investment in Advanced Medical Technology and AI Integration:** India's healthcare infrastructure has increasingly integrated **cutting-edge medical technologies and artificial intelligence (AI)** to improve diagnostics, treatment outcomes, and patient care.
  - 🖇 This includes AI-powered medical devices, robotic surgery tools, and predictive analytics in hospitals to better manage patient flows and resource allocation.
  - 🖇 For instance, **Apollo Hospitals** bets on AI to tackle staff workload, while **DNA Wellness** has announced an investment of Rs. 200 crore to set up **100 cervical cancer screening labs** across India.
- ✦ **Expansion of Medical Colleges:** To tackle the growing healthcare demands in India, the government has accelerated the establishment of new **AIIMS** and medical colleges.
  - 🖇 The move aims to address the shortage of healthcare professionals, particularly in rural areas, and improve the availability of specialized medical care.
  - 🖇 For instance, according to a 2021 report by the government, **22 AIIMS** are in different phases of development across the country,

- 💡 **Resilience:**
  - ✦ **Telemedicine and Digital Health Solutions:** India has significantly improved its healthcare resilience through the **adoption of digital health solutions**, especially **telemedicine**.
    - 🖇 The **Ayushman Bharat Digital Mission** (ABDM) has created **73 crore Health Accounts** (ABHA), enabling a seamless, digital exchange of health records across institutions
    - 🖇 As of 6th April, 2025, **e-Sanjeevani** has served **over 36 crore patients** through teleconsultations since its launch in 2020.
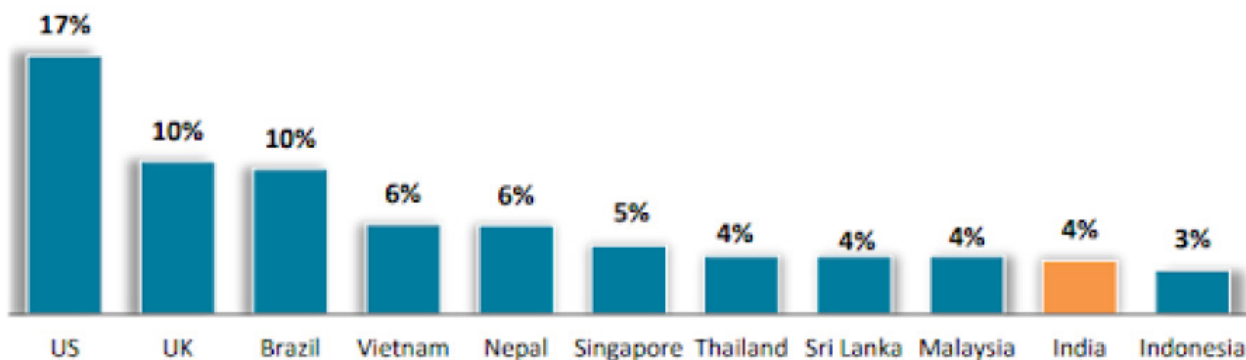
- The **telemedicine market** in India is expected to reach **US$ 5.4 billion** by FY25, reflecting the growing importance of digital solutions in healthcare resilience.

✦ **Pharmaceutical Industry Growth:** India's pharmaceutical sector has emerged as a major pillar of healthcare resilience, playing a crucial role in the global supply of vaccines and essential medicines.

- The country's ability to **produce and distribute COVID-19 vaccines at an unprecedented scale**, alongside its leadership in vaccine exports, has significantly boosted its health resilience.

- For instance, India has administered over **220 crore COVID-19 vaccine doses**, with **30 crore doses exported**.

✦ **Investment in Mental Health Services and Tele Mental Health:** In recognition of the growing mental health crisis, India has prioritized **tele-mental health services**, particularly through the **National Tele Mental Health Programme (Tele MANAS)**, which offers remote access to psychological services.

- This initiative has **expanded mental health resilience** by ensuring that citizens across the country, especially in remote areas, have access to mental health care.

- As on **1st April 2025, 36 States/ UTs have already set up 53 Tele MANAS Cells** to provide mental health support nationwide.

What are the Key Issues Associated with India's Healthcare System?

💡 **Inequitable Access to Healthcare Service:** India grapples with significant disparity in healthcare access between urban and rural areas.

Healthcare expenditure as % of GDP

US	UK	Brazil	Vietnam	Nepal	Singapore	Thailand	Sri Lanka	Malaysia	India	Indonesia
17%	10%	10%	6%	6%	5%	4%	4%	4%	4%	3%

✦ Despite numerous government initiatives, **rural India continues to face severe shortages in both healthcare infrastructure and medical professionals,** leading to unequal health outcomes.

✦ The concentration of healthcare resources in urban areas exacerbates these disparities.

✦ Approximately **70% of India's population** lives in rural areas, but only **35-40% of healthcare infrastructure** is located there.

- Moreover, rural areas have only **1.7 nurses per 1,000 people**, far below the global standard of **3-4 per 1,000.**

💡 **High Out-of-Pocket Expenditure:** India's healthcare system still remains heavily dependent on **out-of-pocket expenditure,** which pushes millions of Indians into poverty every year.

✦ While government schemes like **Ayushman Bharat** aim to reduce the financial burden on families, the **overall reliance on private healthcare facilities** continues to escalate.

✦ As per **National Health Accounts Estimates for India** (2019-20), out-of-pocket spending on healthcare accounted for **47.1%** of total health expenditure.

  🖉 It's estimated that **55 million Indians** fall below the poverty line every year due to healthcare costs.

💡 **Fragmentation of Healthcare Delivery:** India's healthcare system remains fragmented, with a stark divide between public and private healthcare sectors.

  ✦ The private sector provides a majority of secondary, tertiary, and quaternary care institutions with major concentration in metros, tier-I and tier-II cities, while **public healthcare** still struggles with a **1.9% of GDP expenditure**.

  ✦ This fragmentation leads to inconsistent healthcare quality, where public health services are often underfunded and overwhelmed.

💡 **Rising Burden of Non-Communicable Diseases (NCDs):** India is facing a **dual burden of diseases, with an increasing prevalence of non-communicable diseases (NCDs)** like diabetes, hypertension, and cardiovascular diseases, alongside traditional infectious diseases.

  ✦ The rising prevalence of NCDs is attributed to **sedentary lifestyles, poor diet, and tobacco use** (as cited in Economic Survey 2023-24 as well), further straining an already burdened healthcare system.

  ✦ An estimated **5-6 million Indians** lose their lives annually due to NCDs. **22% of Indians aged 30+ are at risk of dying** from an NCD before the age 70.

💡 **Inefficiencies in Healthcare Management and Governance:** India's healthcare management system is often criticized for **inefficiencies and lack of coordination between central and state governments.**

  ✦ Despite policy frameworks like the **National Health Policy 2017**, implementation challenges persist, particularly in terms of **governance, data collection, and quality assurance.**

✦ These issues impede the overall effectiveness of health programs, resulting in fragmented services and delayed responses to emerging health crises.

✦ For instance, the **PM-JAY** scheme has covered **over 55 Crore individuals**, but issues in **fraud detection** and **service delivery quality** continue to undermine its effectiveness.

  🖉 Recent, **CAG report on the Ayushman Bharat scheme** reveals irregularities, including invalid mobile numbers and potential fraud.

💡 **Challenges in Universal Health Coverage:** Despite significant strides in improving healthcare access, India still faces challenges in achieving **Universal Health Coverage (UHC)**.

  ✦ Large swathes of the population, particularly in rural and economically disadvantaged areas, remain outside the formal health insurance system.

  ✦ While **Ayushman Bharat** has made considerable progress, systemic barriers and lack of awareness about available schemes continue to hinder UHC.

  ✦ **Over 73 crore Ayushman Bharat Health Accounts** have been created, but the **coverage of health insurance** remains limited, with only **33.33% share of the total health premiums** underwritten by health insurance in FY24.

💡 **Neglect of Environmental Health and One Health Approach:** Environmental factors like **air and water pollution are increasingly recognized as major health risks**, yet efforts to mitigate these risks remain inadequate.

  ✦ Poor air quality in major cities contributes to respiratory diseases and cardiovascular conditions, **severely impacting public health.**

  🖉 The lack of effective environmental health policies exacerbates this issue, especially in urban centers with high pollution levels.

  🖉 **Air pollution** was responsible for **1.6 million deaths** in India in 2019. In major cities like **Delhi**, air quality often worsens to hazardous levels.

✦ Also, given India's vulnerability to <u>zoonotic diseases</u> like Nipah, avian influenza, and increasing <u>antimicrobial resistance (AMR)</u>, the absence of an integrated framework is a critical gap.
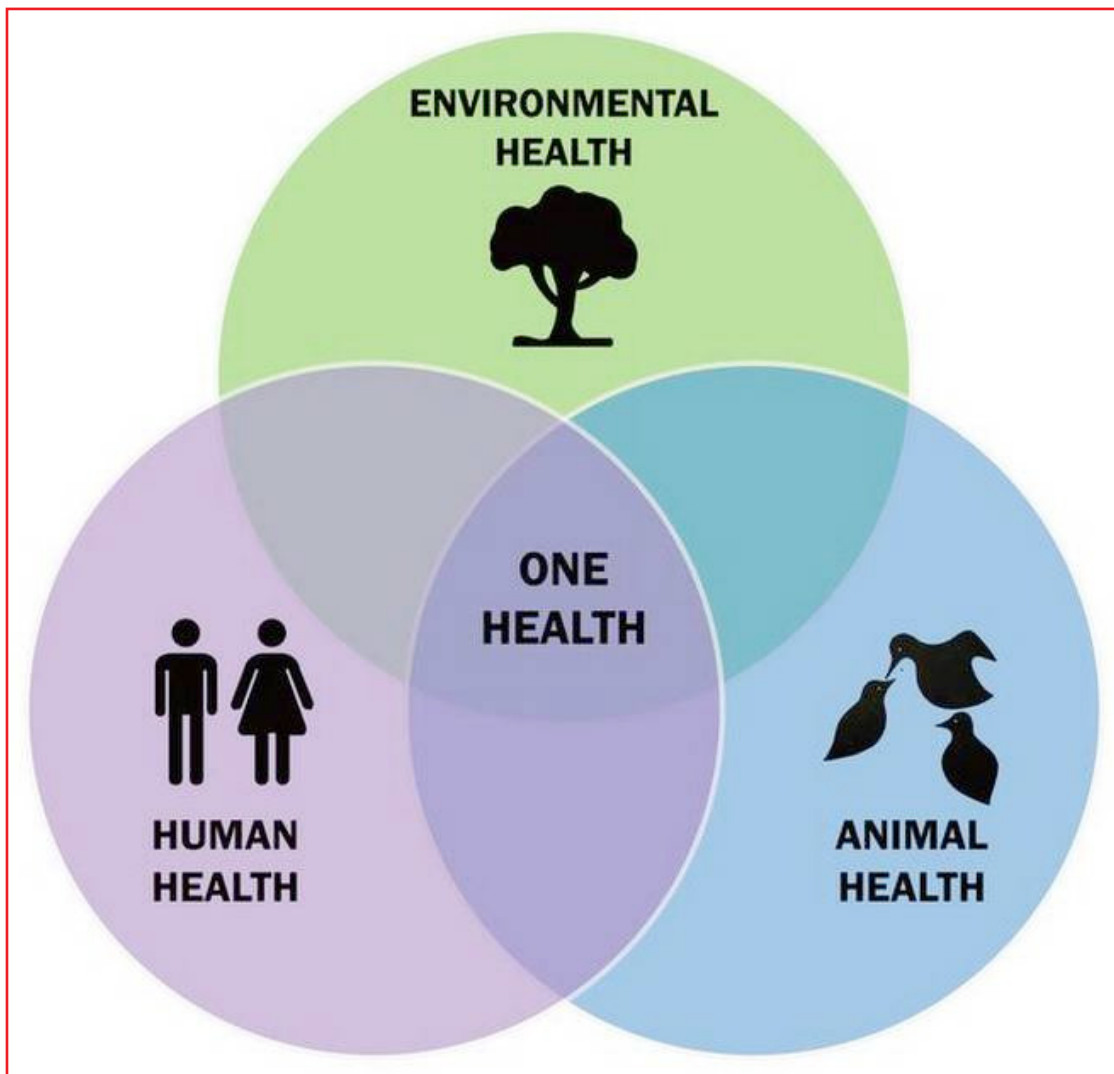
What Lessons India Can Learn from Other Countries in Terms of Healthcare?

💡 **Thailand: Universal Health Coverage (UHC)**

  ✦ Thailand's UHC provides near-universal health access through an efficient public insurance model, **minimizing financial barriers.**

    🖉 India can adopt a similar system to offer **universal health coverage** that ensures affordable care for all, especially in rural areas

💡 **Cuba: Primary Healthcare Focus**

  ✦ Cuba emphasizes **preventive care** and strong **primary healthcare systems**, with doctors placed in communities for early detection.

    🖉 India could replicate this by enhancing **Primary Health Centers (PHCs)** and **preventive services** to tackle health issues before they escalate.

- 💡 **Germany: Health Insurance Expansion**
  - ✦ Germany's **dual public-private insurance** system provides **universal coverage**, balancing public access with private choice.
    - 🔗 India can adopt a **hybrid system** to ensure broader coverage while maintaining quality care
- 💡 **Estonia: Digital Health Integration**
  - ✦ Estonia's **digital health system** provides universal **electronic health records** for seamless healthcare delivery.
    - 🔗 India can scale its **digital health platforms** to integrate **electronic health records** across all services.
- 💡 **Sweden: Healthcare Financing**
  - ✦ Sweden uses **progressive taxation** to fund healthcare, ensuring it's free at the point of service.
    - 🔗 India can think of similar **progressive tax system** to reduce out-of-pocket spending and increase **public healthcare funding (though healthcare cess is already there)**
- 💡 **Ethiopia: Community Health Workers**
  - ✦ Ethiopia uses **community health workers** to deliver care in remote areas, improving access.
    - 🔗 India can expand and secure the role of **community health workers** like ASHA by providing them a social safety net.

What Measures India Can Adopt to Enhance its Healthcare System

- 💡 **Strengthening Rural Healthcare Infrastructure with Telemedicine Integration:** To bridge the urban-rural healthcare divide, India must significantly enhance rural healthcare infrastructure by **expanding Ayushman Arogya Mandir and integrating them with telemedicine platforms.**
  - ✦ Telemedicine should be further leveraged to provide **specialist consultations in remote areas, reducing the reliance on urban centers.**
  - ✦ This combination can improve **accessibility, reduce the burden on tertiary hospitals, and ensure primary care** in underserved regions.
- 💡 **Public-Private Partnerships (PPPs) for Expanding Healthcare Coverage:** India should expand the use of **Public-Private Partnerships (PPPs)** to enhance both infrastructure and healthcare delivery.
  - ✦ The government can collaborate with private healthcare providers to set up more medical facilities in underserved regions and offer affordable care through insurance schemes like **Ayushman Bharat**.
  - ✦ By aligning the goals of public and private stakeholders, India can increase capacity, streamline services, and enhance accessibility while **maintaining quality standards across the system.**
- 💡 **Revamping Primary Healthcare with a Focus on Preventive Care:** India should prioritize preventive healthcare at the **Primary Healthcare Centers (PHCs)** level to reduce the burden of non-communicable diseases (NCDs).
  - ✦ This can be done through **enhanced screening programs, health education, and early detection of diseases** like diabetes and hypertension.
  - ✦ By implementing early interventions and ensuring **consistent follow-ups, the pressure on secondary and tertiary healthcare facilities** can be reduced, improving the overall efficiency and cost-effectiveness of the system.
- 💡 **Integrating Mental Health into the Primary Healthcare System:** Mental health services must be integrated into the mainstream healthcare system by offering training to primary healthcare providers.
  - ✦ This integration would ensure that mental health support is easily accessible across all regions, especially in underserved areas.

- By mainstreaming **mental health care through public health programs and including it as part of routine medical check-ups**, India can address the rising mental health burden more effectively and reduce stigma.

💡 **Streamlining Health Insurance Schemes for Universal Coverage:** To move towards **Universal Health Coverage (UHC)**, India must streamline its health insurance schemes by expanding coverage to **include outpatient care.**

- Simplifying the claims process and ensuring quicker reimbursement timelines would make these schemes more accessible to vulnerable populations.

- **Coordination between national and state health insurance schemes,** along with improved awareness and outreach, would help ensure that the majority of the population benefits from comprehensive coverage.

💡 **Fostering Digital Health Innovations and Data Integration:** India should accelerate the **integration of digital health solutions**, such as **electronic health records (EHRs), Ayushman Bharat Digital Mission (ABDM)**, and **telemedicine platforms**, to create a seamless and interoperable health data ecosystem.

- This would enable better management of health data, improve service delivery, and ensure that patients receive coordinated care across different healthcare providers.

- Implementing **AI-based diagnostic tools** and remote patient monitoring systems will further enhance healthcare quality, particularly in resource-poor settings.

💡 **Implementing a National Health Workforce Strategy:** India needs to implement a **national health workforce strategy** that includes comprehensive workforce planning, skill development programs, and retention strategies.

- This should be linked with **incentives for professionals to work in underserved areas and incentives for further education.**

- Streamlining the regulatory frameworks for training and certification of healthcare workers can ensure that the workforce is adequately equipped to meet the country's diverse healthcare needs.

💡 **Increasing Health Financing and Allocating More to Public Health:** India should increase public healthcare spending to **2.5% of GDP** as recommended by the **15th Finance Commission** and ensure that the funds are allocated effectively.

- This can include enhanced financing for **primary healthcare**, investment in **preventive healthcare** programs, and upgrading the **national healthcare infrastructure**.

💡 **Addressing Environmental Health and Strengthening the One Health approach:** Environmental health, particularly air pollution, should be prioritized as a key public health issue. India can adopt **stringent pollution control policies**, incentivize green technologies, and invest in **air quality monitoring systems**.

- Linking these efforts with healthcare programs focusing on respiratory diseases will help mitigate the health effects of air pollution.

- **Strengthening the One Health approach** is essential for early disease detection, preventing outbreaks, and ensuring a **holistic public health response in a world marked by climate change and global mobility.**

Conclusion:

India's healthcare system is evolving, but persistent gaps in access, affordability, and infrastructure remain. Strengthening **primary care, leveraging digital health, and reducing out-of-pocket expenditure** are vital for building a resilient, inclusive system. Aligning with **SDG 3 (Good Health and Well-being),** India must prioritize universal health coverage through targeted investment, robust governance, and equitable service delivery.

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Reforming Agri-Marketing Amid Trade Uncertainty

This editorial is based on "The trade trap for Indian farmers" which was published in The Hindu Business Line on 07/04/2025. The article brings into picture the rising risks faced by India's smallholder farmers amid global trade shifts, highlighting the gap between the country's global ambitions and domestic agricultural distress
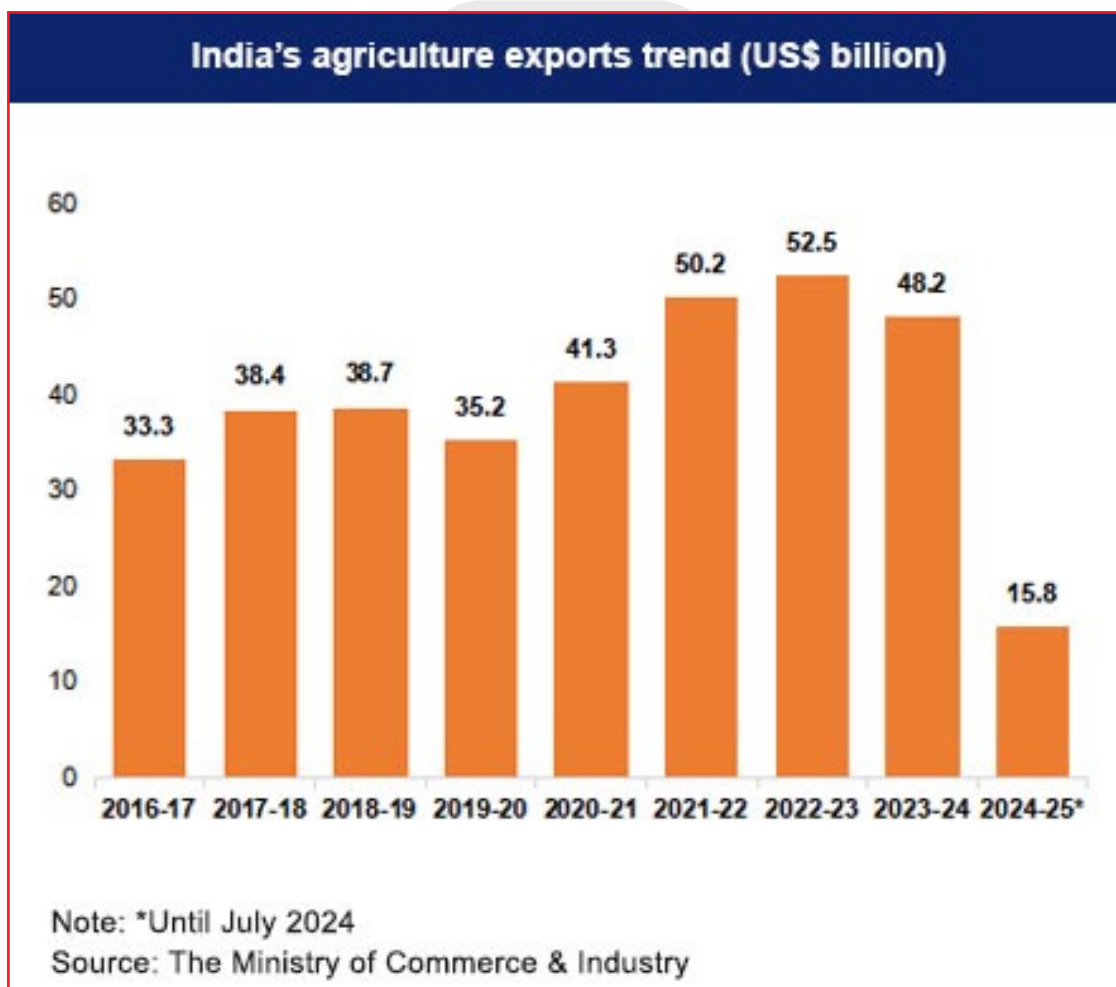
Tag: GS Paper-3, Direct & Indirect Farm Subsidies, Public Distribution System (PDS), Buffer Stocks & Food Security, Agricultural Marketing

The global agricultural trade is undergoing dramatic shifts due to **trade wars, retaliatory tariffs, and new trade conditions**, putting **India's 100+ million smallholder farmers at risk**. While India navigates US reciprocal tariffs and complex FTA negotiations **with the EU** and others, it faces the dual challenge of **protecting vulnerable farmers while pursuing strategic international partnerships**. India must transform its approach by **treating agriculture as an enterprise as well rather than just welfare**, developing state-level agricultural visions, and equipping farmers to meet international standards.

What are the Implications of Global Trade Shifts on the Indian Agricultural Sector?

- 💡 **Increased Protectionism and Trade Barriers:** The rising global trend of protectionism, particularly by major economies like the U.S. and the EU, poses significant challenges to **India's agricultural exports.**
  - ✦ With tariffs and non-tariff barriers being raised, India's agricultural products, such as **rice, shrimp, and spices**, face rising costs and reduced competitiveness.
  - ✦ For example, the **U.S. imposed a 27% reciprocal tariff on Indian shrimp exports**, severely impacting the livelihoods of coastal farmers.
    - 📎 India's agriculture and allies **grew 20.79% in 2021-22**, but declined by **8% in 2023–24 and 2024-25.**

India's agriculture exports trend (US$ billion)

Year	US$ billion
2016-17	33.3
2017-18	38.4
2018-19	38.7
2019-20	35.2
2020-21	41.3
2021-22	50.2
2022-23	52.5
2023-24	48.2
2024-25*	15.8

Note: *Until July 2024
Source: The Ministry of Commerce & Industry

- **Lagging Behind Value-Added and Processed Agricultural Exports:** Global demand is increasingly shifting towards **high-value processed food products**, and India's agricultural export strategy is yet to adapt to this trend.
  - ✦ India still lacks the **infrastructure and technological capacity to fully capitalize on processed food exports** compared to competitors like the EU and the U.S.
  - ✦ While the total value of agricultural exports rose from around US$5 billion to over US$37 billion over the past two decades, **the share of value-added products has declined—from over 21% in 2001 to about 13% in 2020–21,** shrinking at an average annual rate of −1.2%
    - ⬭ The **Agriculture Export Policy (AEP) of 2018** has laid out a roadmap for expanding **high-value processed food exports, but its implementation has been slow.**

- **Dependency on Developed Economies for Agricultural Inputs:** Global shifts in trade also expose India's growing dependency on external markets for **critical agricultural inputs, such as fertilizers and machinery.**
  - ✦ The **Ukraine Conflict** and supply chain disruptions highlighted India's reliance on imports for raw materials, leading to skyrocketing prices.
    - ⬭ For instance, the **2022 palm oil export ban by Indonesia led to a 27% increase in edible oil prices in India**, affecting consumers and farmers alike.

- **Disrupted Domestic Agricultural Markets from Free Trade Agreements:** The **negotiation of Free Trade Agreements (FTAs) with countries like New Zealand** and the EU poses a double-edged sword for Indian agriculture.
  - ✦ On one hand, FTAs promise better access to new markets, but on the other hand, **they expose domestic farmers to cheaper imports that could undermine local production.**
  - ✦ The proposed FTA with New Zealand, for example, **could flood India with low-cost dairy products**, harming the livelihoods of the **100 million dairy farmers in India.**

- **Technological Advancements and Innovation in Agriculture:** The global shift towards technological innovation in agriculture offers India both challenges and opportunities.
  - ✦ While **agricultural start-ups in India are driving innovation in precision farming,** irrigation technologies, and post-harvest processing, India's farmers still face a technology gap that limits their **competitiveness.**
    - ⬭ Start-ups, for example, Waycool is **India's fastest-growing agricultural start-up and food distribution company.**

- **Climate Change and Global Supply Chain Risks:** Climate change is a major disruptor of global agricultural trade patterns, affecting **India's agricultural productivity and its ability to meet global demand.**
  - ✦ **Erratic monsoons, changing temperatures, and shifting crop patterns** undermine India's agricultural supply chain, which is already under pressure from global trade shifts.
  - ✦ **India's agricultural imports have increased 50.56% in 2021-22,** partly due to local supply shortages caused by climate-related factors.
    - ⬭ The global shift towards sustainability in trade regulations, such as those **in the EU's green conditionalities**, could further strain Indian farmers who are ill-equipped to meet these new requirements.

- **Increased Competition in Global Agricultural Markets:** As the share of the Global South in agricultural trade increases, India faces heightened competition in traditional markets, especially from emerging economies like **China and Brazil.**
  - ✦ While India's share in world exports of rice has increased from nearly 36% in 2022 to nearly 46% in 2023, it faces intense competition in products like pulses and wheat, where countries like **Russia and Canada** are key players.

What are the Structural Issues Associated with Indian Agricultural Marketing?

- **Fragmented and Inefficient Supply Chain:** Fragmentation of supply chain leads to inefficiency, high wastage, and increased costs.

MINIMUM SUPPORT PRICE (MSP)

The rate at which the govt. purchases crops from farmers; based on a calculation of at least 1.5x the cost of production incurred by the farmers

RECOMMENDED BY

Commission for Agricultural Costs & Prices (CACP) (recommends MSPs for 22 mandated crops and Fair and Remunerative Price for Sugarcane)

22 MANDATED CROPS

(14 Kharif, 6 Rabi and 2 Other Commercial crops)

7 CEREALS Paddy, Wheat, Barley, Jowar, Bajra, Maize And Ragi

5 PULSES Gram, Arhar/tur, Moong, Urad And Lentil

7 OILSEEDS Groundnut, Rapeseed/mustard, Soyabean, Sunflower, Sesamum, Safflower And Niger Seed

RAW COTTON   RAW JUTE   COPRA

MSP is the price at which the govt. is supposed to procure the mandated crops from farmers if the market price falls below it

FACTORS FOR RECOMMENDING MSP

- ▷ Cost of cultivation
- ▷ Demand-Supply situation for the crop
- ▷ Market price trends
- ▷ Inter-crop price parity
- ▷ Implications for consumers (inflation)
- ▷ Environment (soil and water use)
- ▷ Terms of trade b/w agri and non-agri sectors (ratio of farm inputs and outputs)

Considers both A2+FL and C2 costs

Actual expenses on seeds, fertilisers, irrigation and the like

Unpaid family labour

A2 + FL

C2

Rentals or interest foregone on owned land and fixed capital assets

MSP has no statutory backing — a farmer cannot demand MSP as a matter of right

Drishti IAS

- The lack of integrated supply chain infrastructure results in **delays, spoilage,** and the inability to match demand with supply in real-time.
- As a result, a significant portion of produce, **especially perishables like fruits and vegetables, is wasted.**
  - In India, **40% of the food wasted is equivalent to nearly 92,000 crore/year.** This is equivalent to nearly 1% of the GDP which is depleted in the form of food wastage in India.
- **Unorganized Agricultural Markets:** India's agricultural markets remain largely unorganized, with an **overwhelming presence of middlemen** who **manipulate pricing and reduce farmers' incomes.**
  - These middlemen often act as **barriers to farmers accessing fair prices for their produce,** leaving them at the mercy of market dynamics that they cannot control.
  - The government's recent push for **Agricultural Produce Market Committees (APMC) reforms** has faced resistance, as it aims to reduce this middleman influence and **enable direct farmer-to-consumer transactions.**
    - According to an RBI paper, **farmers receive 31%–43% of the consumer rupee in the domestic market.**
- **Inadequate Infrastructure for Agricultural Storage and Processing:** Poor infrastructure for storage and processing remains a major bottleneck in India's agricultural marketing system.
  - With inadequate cold storage facilities and limited processing units, a significant amount of agricultural produce is **sold at suboptimal prices.**
  - As per **National Centre for Cold Chain Development (NCCD),** India requires **35-40 million metric tons of cold storage** but only has about 32 million metric tons of such storage space.
    - The lack of infrastructure also **reduces the ability to add value through processing,** limiting India's ability to compete in global markets.

- **Fluctuations in Government Policies and MSP:** Frequent changes in government policies regarding **MSP (Minimum Support Price)** and **export bans** create instability in agricultural marketing and disrupt market dynamics.
  - In recent years, **sudden export restrictions on crops like onions and non-basmati rice (though lifted recently)** have led to market confusion and led to losses for farmers.
    - These sudden policy shifts **contribute to market volatility and discourage long-term investment** in agriculture.
- **Market Monopolies and Oligopolistic Behavior:** In certain agricultural sectors, the presence of market monopolies or oligopolistic behavior by large corporate players severely limits competition and affects fair pricing.
  - In sectors such as **seeds, fertilizers, and even dairy,** large companies control a significant portion of the market, **often dictating prices and margins.**
  - Despite the rise of **e-commerce and digital platforms globally,** Indian farmers still lack access to modern marketing channels that could help them tap into wider consumer bases (**e-NAM** is progessing slowly).
    - For instance, together marginal-small dairy farmers contribute only **60%** of India's milk, down from **90% pre-deregulation.**
- **Inadequate Credit and Financing Options:** Agricultural marketing is severely hampered by **limited access to credit and financing options for farmers,** particularly smallholder farmers who lack assets and collateral.
  - This **lack of financing options prevents farmers from investing in better tools,** machinery, or storage facilities to enhance their productivity and marketability.
  - **Marginal farmers also account for about 71% of all non-institutional borrowers.** This lack of capital or informal channel exacerbates the challenges faced by farmers in improving their marketing capacities.

What Measures India Can Adopt for Enhancing Agricultural Marketing and Navigating Global Trade Complexities?

- 💡 **Strengthening Agricultural Infrastructure:** To improve the agricultural marketing system, India must **invest heavily in developing efficient cold storage, transportation, and processing facilities**.
  - ✦ Establishing a robust and modernized infrastructure network would help **reduce post-harvest losses**, improve product quality, and enable better price realization for farmers.
  - ✦ This can be achieved by **leveraging both government and private sector investments in cold chain logistics** and food processing units, ensuring access to these facilities for smallholder farmers and agricultural cooperatives.

- 💡 **Promotion of Digital Platforms for Market Linkages:** Encouraging the widespread adoption of digital platforms like **e-NAM (National Agriculture Market)** and **integrating these platforms with regional mandis** can help streamline agricultural marketing.
  - ✦ Providing farmers with real-time market prices, access to a wider range of buyers, and **opportunities to directly connect with consumers** can improve transparency and eliminate middlemen.
  - ✦ Expanding the scope of these digital initiatives and offering digital literacy programs will empower farmers, enabling them to make informed decisions and increase profitability.

- 💡 **Diversifying Agricultural Exports and Strengthening Value Chains:** India must focus on diversifying its agricultural export basket, moving beyond traditional commodities like rice and spices to include **high-value processed foods, organic products, and other niche crops.**
  - ✦ By fostering stronger linkages between **farmers, exporters, and food processors,** India can add value at various stages of the supply chain.
  - ✦ This can be facilitated through initiatives such as the **Agriculture Export Policy (AEP) and the Production-Linked Incentive (PLI) Scheme,** which together can support product innovation and help meet global market standards, enhancing competitiveness in international markets.

- 💡 **Reforming Agricultural Markets and Reducing Middlemen Influence:** India should come up with a reformed version of **Agricultural Produce Market Committee (APMC) reforms** and encourage the establishment of private and contract farming markets.
  - ✦ By reducing the dominance of intermediaries, farmers can access better prices and improve income stability.
  - ✦ Encouraging states to implement **model APMC reforms** and creating more **farmer producer organizations (FPOs)** will allow farmers to aggregate their produce, improving bargaining power and enabling direct transactions with larger buyers or exporters.

- 💡 **Incentivizing Sustainable Practices and Compliance with Global Standards:** To align with global sustainability trends, India must incentivize farmers to adopt environmentally friendly and sustainable agricultural practices.
  - ✦ This includes promoting **organic farming, reducing pesticide use, and enhancing water conservation techniques**.
  - ✦ By linking these practices to financial incentives such as subsidies or export benefits under the AEP, India can not only ensure compliance with global environmental standards but **also create niche markets for sustainable and organic products,** strengthening India's position in international trade.

- 💡 **Financial Support and Credit Access for Farmers:** Improving farmers' access to affordable and timely credit through formal financial institutions is critical for enhancing agricultural marketing.
  - ✦ The government should expand the **reach of schemes like Kisan Credit Cards (KCC)** and introduce more **robust credit guarantee schemes** to ensure farmers have the necessary capital for investments in technology, infrastructure, and market access.

- ✦ **Pairing these efforts with financial literacy programs** can empower farmers to utilize credit more effectively, ensuring they can invest in improving production and marketing capabilities.

- 💡 **Leveraging Public-Private Partnerships (PPP) for Agribusiness Development:** Encouraging public-private partnerships (PPP) in the agriculture sector can help create a more efficient and resilient agricultural marketing ecosystem.
  - ✦ By collaborating with **private players in logistics, processing, and retail**, the government can enhance market access, improve supply chain efficiency, and facilitate technology transfer.
  - ✦ This partnership approach should be focused on creating infrastructure, developing **value-added products, and expanding market reach**, particularly in export-oriented segments.

Conclusion:

To navigate global trade complexities, India must balance **welfare-driven to an enterprise-oriented agricultural model.** Strengthening infrastructure, diversifying exports, and aligning with global standards are crucial for resilience and competitiveness. **Empowering farmers through credit access, digital platforms, and FPOs** will enhance their market presence. A **holistic, farmer-centric strategy** is essential to protect livelihoods while seizing global trade opportunities.

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Reimagining India'S Neighbourhood Policy

This editorial is based on "Why PM's neighbourhood engagements are significant" which was published in Hindustan Times on 03/04/2025. The article brings into picture the evolving role of India as the regional anchor, leading with initiatives like 'Operation Brahma' amid multiple neighbourhood crises, from Myanmar to Sri Lanka.

Tag: GS Paper - 2, International Treaties & Agreements, Important International Institutions, Effect of Policies & Politics of Countries on India's Interests, Groupings & Agreements Involving India and/or Affecting India's Interests

India's neighbourhood region faces multiple crises: **Myanmar's earthquake** and civil war, **Bangladesh's political upheaval,** Nepal's democratic challenges, and **Sri Lanka's fragile recovery**. As BIMSTEC leaders meet in Thailand, India has demonstrated leadership through **"Operation Brahma" in Myanmar,** showcasing its growing capacity to assist neighbors during emergencies. With its geographical centrality and economic resources, India serves as the fulcrum of regional cooperation.

How India's Neighbourhood Policy Evolved Over Time?

- 💡 **Early Years (1947-1960s): Focus on Integration and Stability**
  - ✦ **Post-Independence Idealism:** In the immediate aftermath of independence, India's foreign policy was largely focused on **fostering peace and stability in the region.**
    - 🔖 India's priorities were centered around **integrating princely states,** establishing the legitimacy of the Indian republic, and securing its borders.
  - ✦ **Neighbourhood Relations:** In this period, India assumed a leadership role in the region, primarily focusing on establishing friendly relations with neighbouring countries.
    - 🔖 It viewed its immediate neighbours like **China, Nepal, Bhutan, Sri Lanka, and Afghanistan** as integral to its security and stability.
    - 🔖 However, the absence of a clear strategic vision for managing neighbourhood relations became evident during events like the **Kashmir issue with Pakistan and China's assertion in Tibet.**
- 💡 **Cold War Period and Non-Alignment (1960s-1980s)**
  - ✦ **The Cold War Influence**: During the **Cold War**, India's Neighbourhood Policy was heavily influenced by its stance of **non-alignment.**

Neighbouring Countries of India

- India sought to maintain **cordial relationships with both Western and Eastern blocs** while being wary of foreign powers influencing its immediate neighbourhood.
- **Sino-Indian Tensions:** The **1962 Sino-Indian War** and the ensuing territorial disputes with China were pivotal moments that forced India to reconsider its approach towards its borders and its neighbourhood.
  - The unresolved issues with China, particularly over **Tibet and Aksai Chin, became central to India's security policy.**

- **Pakistan and the Bangladesh Liberation War:** The **1971 India-Pakistan war,** which resulted in the creation of Bangladesh, marked a high point in India's regional diplomacy.
- **Strategic Hesitation:** India's response to the instability in Sri Lanka, the Maldives, and Nepal was marked by **hesitation**.
  - While India did intervene militarily in **Sri Lanka in the late 1980s,** its policy was still shaped by non-alignment and cautious engagement with its neighbours.

💡 **Post-Cold War and Liberalization Era (1990s)**

- **Shift in Focus with Economic Liberalization:** The 1990s marked a shift in India's approach to its neighbourhood, influenced by economic liberalization and the end of the Cold War.
  - **India sought to integrate itself into the global economy** while also focusing on the economic development of its neighbours.
- **Look East Policy: In the early 1990s, India began its "Look East" policy,** which initially focused on enhancing economic and strategic relations with **Southeast Asia**, but gradually extended to its immediate neighbourhood.
  - India looked to its eastern and northern neighbours to enhance trade, security, and regional integration.
- **Increasing Tensions with Pakistan:** The 1990s were also marked by escalating tensions with Pakistan, especially after the **nuclear tests in 1998**.
  - India's approach towards Pakistan became more cautious, focusing on securing its borders.

💡 **Neighbourhood First Policy (2000s - Present)**

- **The Birth of Neighbourhood First (2008):** India's "Neighbourhood First" policy formally emerged in 2008, underlining the importance of **strengthening relationships with its immediate neighbours.**
  - This policy emphasized **greater economic, diplomatic, and strategic cooperation w**ith countries such as **Afghanistan, Bangladesh, Nepal, Bhutan, Sri Lanka, and the Maldives.**

- **Regional Connectivity and Cooperation:** A significant shift was the emphasis on regional connectivity, through initiatives like the **BBIN (Bangladesh, Bhutan, India, Nepal) Motor Vehicle Agreement** and enhancing infrastructure connectivity in the northeast.

💡 **Recent Trends and Adjustments (2020-Present)**

- **Turbulence in Neighbourhood Politics:** Recent years have seen significant shifts in India's neighbourhood, including **political upheavals in countries like Nepal, Bangladesh, and Sri Lanka.**
  - The **political turmoil in Bangladesh in 2024,** the rise of anti-India sentiment in the Maldives (though under control now), and the **internal strife in Myanmar** have necessitated India to recalibrate its strategy.
- **China's Growing Influence**: India has had to contend with China's growing economic and military influence in its neighbourhood, **particularly through projects under the Belt and Road Initiative (BRI).**
  - This has pushed India to enhance its strategic presence through initiatives like the **Diamond of the Necklace.**
- **Increased Focus on Regional Cooperation:** India's role in multilateral institutions like **BIMSTEC, the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation**, and the **South Asian Association for Regional Cooperation (SAARC)** has gained prominence.

What are the Implications of Instability in Neighbourhood for India?

💡 **Security Threats and Military Tensions:** The instability in India's neighbourhood exacerbates security concerns, especially with **unresolved territorial disputes and growing proxy warfare.**

- For instance, the prolonged conflict in Jammu and Kashmir, **fueled by terrorism emanating from Pakistan,** remains a significant challenge to India's security.

- ✦ Additionally, **China's increasing presence in the Indian Ocean** and support to Pakistan complicates India's security landscape.
- ✦ In 2024, <u>Chief of Defence Staff (CDS)</u> General Anil Chauhan highlighted the escalating threats on both the western and northern borders, underlining that instability in neighbouring countries directly impacts India's national security.

💡 **Economic Disruptions and Trade Barriers:** Instability in the region significantly hampers India's economic ties with its neighbours, particularly in trade and connectivity.

- ✦ The sudden regime change in Bangladesh in August 2024, severely affected bilateral trade and infrastructure projects, which had previously been growing under the **"Golden Chapter"** of India-Bangladesh relations.
  - 🔗 <u>India's exports to Bangladesh</u> **fell by 13.3% between April and October 2023,** with disruptions at key land ports like **Benapole-Petrapole,** which handles about 30% of bilateral trade.

💡 **Compromised Regional Connectivity Projects:** Instability in Myanmar and Bangladesh severely impacts India's regional connectivity projects that are critical for the **"Act East Policy."**

- ✦ <u>India's Kaladan Multi-Modal Transit Transport Project (KMMTTP)</u>, aimed at providing the Northeast with a direct route to the Bay of Bengal, has faced persistent delays due to security issues in Myanmar, particularly the **Arakan Army's control over border areas.**
- ✦ Despite India's investment, key projects like the **Paletwa-Zorinpui highway remain incomplete,** further delaying the project's operational efficiency.
- ✦ Additionally, the ongoing unrest has disrupted crucial bilateral initiatives like the <u>India-Myanmar-Thailand (IMT-TH) Highway</u>, with only 70% of the work completed, significantly impacting regional connectivity and trade integration.

💡 **Diplomatic Setbacks and Geopolitical Isolation:** Instability in the neighbourhood, **particularly regime changes and internal political turmoil,** complicates India's diplomatic relations.

- ✦ In the Maldives, the **"India Out" campaign** successfully brought to power a government that seeks to dilute India's influence, forcing India to recalibrate its approach to regional diplomacy.
- ✦ These changes, **coupled with growing Chinese influence in the region,** undermine India's regional leadership ambitions and weaken its diplomatic standing.

💡 **Humanitarian and Refugee Crisis Management:** The instability in neighbouring countries like **Myanmar and Bangladesh** often results in significant humanitarian challenges for India.

- ✦ The **Rohingya refugee crisis**, continues to strain resources, and has led to an increase in cross-border migration pressures.
- ✦ **India's northeastern states**, particularly **Mizoram and Manipur**, have seen rising tensions due to the influx of refugees and insurgent activities along the borders.
- ✦ Furthermore, **India's limited role in international humanitarian frameworks** exacerbates the strain on its border states, as **they grapple with the socio-economic burden of refugee influxes.**

💡 **Halt in Resource Sharing Agreements:** Neighbourhood instability has heightened challenges for India in managing transboundary resources.

- ✦ For instance, the **Indus Waters Treaty,** despite its historical resolution, remains strained due to political tensions with Pakistan, **especially regarding the management of shared river resources.**
- ✦ **China's plan to build the world's largest dam on the Brahmaputra River** in Tibet, has raised concerns in India and Bangladesh about **potential downstream impacts** on water flow, agriculture, and regional stability

💡 **Increased Strategic Competition with China:** Instability in the neighbourhood, coupled with China's increasing influence, presents significant strategic competition for India.

- ✦ Chinese investments in **Pakistan (Gwadar Port), Sri Lanka (Hambantota Port), and**

Bangladesh (Mongla and Chittagong), as well as its growing military presence in the Indian Ocean, complicate India's regional security calculus.

  - This competition escalates India's security concerns, especially as **China's Belt and Road Initiative (BRI) gains traction in South Asia**.

  - It underscores the growing strategic rivalry, forcing India to recalibrate its own regional security and diplomatic policies.

- 💡 **Threat to South Asian Regionalism and Cooperation:** The instability and rising tensions in India's neighbourhood pose a threat to regional cooperation frameworks like **SAARC and BIMSTEC, where India has been a key player.**

  - ✦ **SAARC, in particular, has been paralysed by tensions** between India and Pakistan, while BIMSTEC's potential is constrained by Myanmar's internal strife and the shifting political landscape in Bangladesh.

  - ✦ **India's leadership in these regional platforms has been challenged by the lack of cohesive action** among member states, exacerbated by political volatility.

    - These stalled initiatives undermine India's efforts to strengthen regional integration and economic cooperation in South Asia.

What Measures India Can Adopt to Enhance its Active Engagement in the Neighbourhood?

- 💡 **Strengthen Regional Connectivity and Infrastructure Development:** India should prioritize the **enhancement of cross-border connectivity** through the development of transportation and energy infrastructure.

  - ✦ This includes expanding **road, rail, and port linkages** between India and its neighbours, especially through initiatives like the **BBIN Motor Vehicle Agreement and the Kaladan Multi-Modal Transit Transport Project**.

  - ✦ A **"whole-of-government"** approach, involving ministries like External Affairs, and Home Affairs, is crucial to ensure the timely implementation of such projects.

  - This will not **only boost trade and economic integration but also foster people-to-people connectivity,** reinforcing India's role as a regional leader.

- 💡 **Strategic Diplomatic Engagement and Conflict Resolution Mechanisms:** India needs to create a more robust and consistent diplomatic outreach mechanism that transcends political regimes in its neighbouring countries.

  - ✦ This includes **enhancing multilateral diplomacy through platforms like BIMSTEC and SAARC**, while also focusing on bilateral dialogues to resolve contentious issues.

  - ✦ By facilitating **open channels of communication,** India can mitigate tensions and proactively address cross-border issues such as terrorism, migration, and regional security.

  - ✦ India must also **strengthen regional peace initiatives by fostering collaborative conflict-resolution frameworks** that promote stability and trust-building.

- 💡 **Comprehensive Security and Defence Cooperation Framework:** India should focus on building stronger security partnerships with its neighbours, emphasizing **intelligence-sharing (**considering the interest is secured**), counter-terrorism cooperation, and maritime security.**

  - ✦ Joint military exercises, as seen with countries like **Nepal, Maldives, and Myanmar**, should be expanded to address common security concerns in the region.

  - ✦ Additionally, **India can enhance maritime domain awareness through shared resources** and coordinated efforts to safeguard the Indian Ocean.

    - Strengthening **regional security architecture, underpinned by collaborative defence agreements,** will help India bolster its position as a key security provider in the region.

- 💡 **Revitalize Economic and Trade Diplomacy:** To counter China's growing economic influence in South Asia, India should focus on a more aggressive economic diplomacy that includes **offering trade incentives, investment opportunities, and soft loans to neighbouring countries**.

- ✦ Strengthening India's role as a trade partner through platforms like the **India-Mekong Cooperation** will promote regional economic integration.
- ✦ India should also **focus on enhancing digital and financial connectivity (UPI)**, ensuring that its neighbours have access to India's technological and economic potential, which would reduce their dependency on external powers.
- 💡 **Fostering Cultural and People-to-People Ties:** India must expand its cultural diplomacy to deepen ties with its neighbours, **leveraging its civilizational links to build goodwill.**
  - ✦ This includes promoting **educational exchanges, tourism, and people-to-people initiatives** that facilitate mutual understanding and cooperation.
  - ✦ By prioritizing soft power tools such as **media cooperation, cultural festivals, and academic exchanges,** India can counterbalance negative perceptions and ensure long-term, sustainable engagement with its neighbours.
    - 📎 A pr**oactive approach to promoting mutual cultural appreciation** will lay the foundation for enduring bilateral relations.
- 💡 **Regional Climate and Environmental Cooperation:** Given the shared environmental challenges in South Asia, such as **flooding, water management, and climate change,** India should spearhead collaborative regional environmental efforts.
  - ✦ This includes establishing a regional framework for **disaster management, climate change mitigation, and sustainable development.**
  - ✦ India's leadership in **implementing green technologies and sharing climate-resilient infrastructure solutions** with its neighbours will foster deeper cooperation in addressing common environmental issues.
- 💡 **Engage in Multi-Dimensional Crisis Management Mechanisms:** India must enhance its crisis management capabilities by establishing **rapid response teams and crisis management centers in key neighbouring countries.**
  - ✦ This would ensure that India can respond quickly to regional challenges such as natural disasters, political upheavals, and security threats.

✦ India should also work towards creating regional crisis management frameworks in collaboration with **SAARC, BIMSTEC, and ASEAN** to better manage collective security challenges.

Conclusion:

India's neighbourhood remains a **dynamic theatre of both opportunities and turbulence**. Guided by the vision of **SAGAR (Security and Growth for All in the Region)**, **India's neighbourhood-first approach must now evolve into a neighbourhood-smart policy**. Much of India's neighbourhood lies within the **strategic arc defined by the Rimland Theory, which posits that "who controls the Rimland, rules Eurasia, who rules Eurasia controls the destinies of the world".** This underlines the vital stakes for India—not just in fostering regional resilience, but also in asserting itself as **Vishwa Mitra** in an increasingly multipolar world.

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Role Of Women in India'S Growth Story

This editorial is based on "Closing the gender gap: India still has miles to go in growth story" which was published in The Business Standard on 10/05/2025. The article brings into focus the sharp rise in women's workforce participation to 41.7%, yet highlights persistent gender gaps in unpaid domestic work, political representation, and societal attitudes that hinder their full economic potential.

Tag: GS Paper-2, Issues Related to Women, GS-Paper 3, Inclusive Growth

While India has seen a significant rise in **female labor force participation from 23.2% to 41.7% over 6 years**, it still lags behind the male rate of **77.2% and global average of 50%.** Women continue to **shoulder dispro-portionate unpaid domestic work**, creating a dual burden despite increasing workforce participation. Though female entrepreneurship and financial inclusion are growing, **political representation remains low with just 13.6% women in the 18th Lok Sabha.** India must urgently address structural inequalities, safety concerns, and societal perceptions to unlock women's full economic potential and accelerate national growth.

What are the Key Factors Driving Women's Active Participation in India's Economic Transformation?

💡 **Educational Advancements and STEM Inclusion:** The rising educational attainment among women has been pivotal in expanding their presence across skilled sectors.

✦ **Women are increasingly entering STEM fields, defying traditional stereotypes** and gaining access to high-paying, innovation-driven jobs.

📎 This has created a **virtuous cycle of aspirations, skill-building, and workforce readiness.**

✦ Access to digital education platforms and scholarships has democratized opportunities across rural and urban areas.

✦ For instance, **Female enrolment in higher education rose to 2.07 crore in 2021-22, making up nearly 50% of total enrolment.**

📎 Women constitute 42.57% of STEM students (**AISHE, 2022**).

💡 **Policy Push for Women-Led Development:** A deliberate shift from women's welfare to **women-led development** is reflected in policies across **ministries**.

✦ Initiatives are designed **not just to include women, but to enable them as leaders, entrepreneurs, and decision-makers.** These policies are increasingly intersectional, targeting rural, tribal, and underrepresented communities. Inter-ministerial coordination has begun to tackle systemic challenges more cohesively.

✦ For instance, 10 crore women connected to 9 million SHGs under National Rural Livelihood Mission. 84% of Stand-Up India loans go to women (PIB, 2024).

📎 Under **Pradhan Mantri Awas Yojana-G,** it has been decided that the allotment of a house shall be made in the name of the woman or jointly in the name of the husband and wife.

💡 **Rise of Women Entrepreneurship and Start-up Culture:** Women are transforming from **job-seekers to job-creators,** actively shaping India's start-up ecosystem.

- Digital platforms, financial inclusion, and mentorship have enabled women to scale up their ventures.
- Visibility of women entrepreneurs is challenging gender norms and inspiring others. The **ecosystem is now more gender-aware**, promoting inclusive innovation.
- For instance, **Falguni Nayar's Nykaa, Shradha Sharma's YourStory, and Upasana Taku's MobiKwik reflect this trend.**
  - Over 10% of SIDBI fund is now earmarked for women-led start-ups (SIDBI, 2024).
- **Financial and Digital Inclusion:** Access to formal banking and digital financial tools has significantly empowered women economically.
  - With financial control, women are more confident to make business and household decisions. The **rise of digital banking, Aadhaar-linked services, and mobile wallets** has reduced dependency and improved economic agency. Fintech has become a gateway to broader participation in the economy.
  - For instance, 39.2% of bank accounts and 39.7% of deposits are now held by women (MoSPI, 2024). The number of female-owned demat accounts tripled between 2021 and 2024.
  - **Also, Economic inclusion** is now seen as a community effort. Bank Sakhis model processed transactions worth $40 million (2020)
- **Legal and Institutional Reforms:** Robust legal backing has improved workplace safety, encouraged workforce retention, and addressed gender-based violence.
  - **Fast-track courts, one-stop centres, and workplace laws** give women institutional assurance. Protection against sexual harassment and stronger maternity benefits reduce dropouts.
  - These measures are vital for long-term gender parity in labour force participation
  - For instance, **750 Fast Track Courts, 802 One Stop Centres functional; more than 14,000 Women Help Desks in Police Stations (Ministry of WCD, 2024).**

- **Technological Penetration and Remote Work Opportunities:** Digital transformation has enabled remote work, allowing women to balance professional roles with domestic responsibilities.
  - The **gig economy and platform-based jobs** have opened new avenues in flexible employment. This helps overcome traditional mobility and time-related constraints.
  - Women now access national and global labour markets from their homes.
  - For instance, **Common Service Centres are run by 67,000 women entrepreneurs.**
- **Changing Social Norms and Role Models:** Increased visibility of successful women in diverse fields is reshaping societal attitudes.
  - From **defence forces to boardrooms**, women leaders inspire younger generations and normalize ambition.
  - For instance, **15% of Indian pilots are women—3x the global average. In 2023, Commander Prerna Deosthalee became the first woman officer of the Indian Navy to command the Indian Naval Warship.**
    - **Justice BV Nagaratna** is likely to become India's first woman Chief Justice.

What are the Key Issues Hindering Women Empowerment in India?

- **Persistently Low Female Labour Force Participation:** Despite recent improvements, India's FLFPR remains lower than the global average of **50%**.
  - **Societal norms, lack of flexible jobs, and care responsibilities** restrict women's active economic engagement.
  - Many women **drop out post-marriage or childbirth,** and **re-entry remains difficult** due to the absence of enabling work environments.
  - **For instance, Female LFPR rose from 23.3% (2017-18) to 41.7% (2023-24),** but still trails behind men at **77.2%** and below the global female average of **50%** (MoSPI, 2024; World Bank).
- **Unpaid Care Work and Domestic Burden:** Women disproportionately shoulder unpaid domestic work, which remains invisible in official economic metrics.

Empowering Women in India

- Vigyan Jyoti Programme
- Beti Bachao Beti Padhao
- Gender Budget Since 2005
- Mahila Shakti Kendra
- Sukanya Samriddhi Yojna
- National Creche Scheme
- Homes Registered in Women's Names under the Pradhan Mantri Awas Yojana
- Pradhan Mantri Matru Vandna Yojna
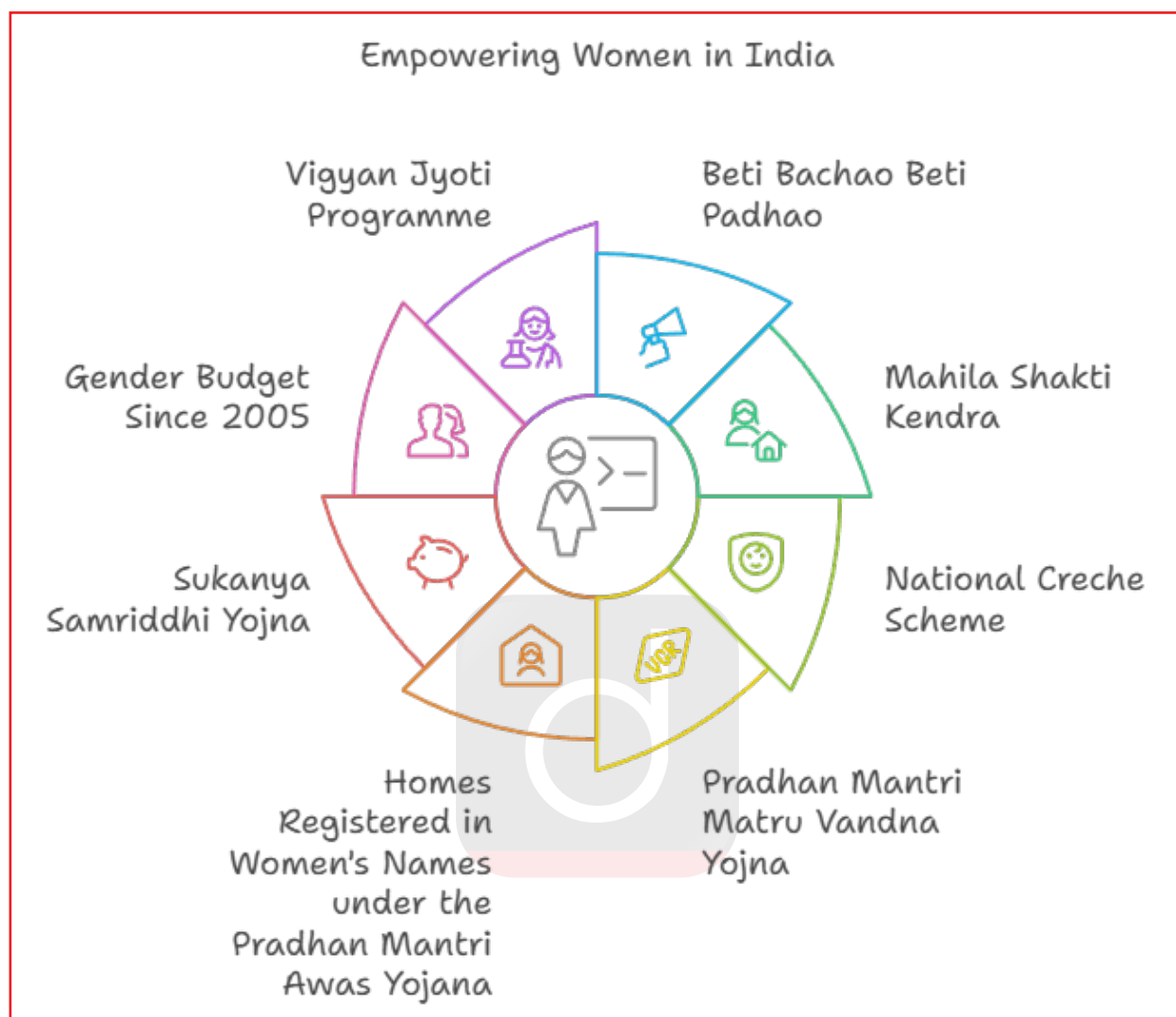
- ✦ This dual burden limits time for education, skilling, or formal employment. **Household responsibilities are still seen as a woman's duty,** reinforcing gender roles.
- ✦ Men's participation in domestic duties remains abysmally low, indicating slow social change.
- ✦ For instance, Time Use Survey shows **women spend 236 mins/day on unpaid domestic services, vs 24 mins/day by men.**
- 💡 **Gender Pay Gap and Informalisation:** Even when women work, they face pay disparities, especially in informal and rural sectors.
  - ✦ Many are engaged in low-paying, insecure, informal jobs without social security. The wage gap discourages long-term workforce retention and reduces incentives for women to upskill.
  - ✦ For instance, **men earn 29.4% more than women in urban areas,** while they earn 51.3% more in rural areas**. Around 81% of women work in informal sectors (NSSO, 2023).**
- 💡 **Gender-Based Violence and Safety Concerns:** Safety fears in public and private spaces severely restrict women's mobility, employment, and education opportunities.
  - ✦ **Gender-based violence** (GBV) leads to psychological and economic disempowerment.

- ✦ Lack of swift justice, poor implementation of laws, and under-reporting further worsen the situation.
- ✦ For instance, **India records 51 cases of crime against women every hour; over 4.4 lakh cases in 2022: NCRB report.**
  - ⌕ The **NFHS-5 (2019-2021)** survey reports that **29.3%** of married women aged 18-49 have experienced spousal violence

- 💡 **Underrepresentation in Political and Leadership Roles:** Despite numerical gains at grassroots levels, women remain underrepresented in decision-making at higher echelons.
  - ✦ The **lack of women in Parliament (implementation of women reservation bill is pending until next delimitation exercise)** and **corporate boards** reduce gender-responsive policy-making. **Reservation in panchayats has not yet translated to proportionate power** at national or state levels.
  - ✦ For instance, **only 13.6% of 18th Lok Sabha members are women. Also,** women account for only **17.6% of directorships** of the Nifty-500 companies.
    - ⌕ Women do not **only face the persistence of the glass ceiling** (invisible barriers preventing women from rising to top leadership) but also **instances of the glass cliff,** where they are more likely to be **appointed to leadership roles during times of crisis,** making success harder to achieve.

- 💡 **Digital Divide and Tech-Access Inequality:** While digital literacy is rising, women's access to digital tools, especially in rural India, is limited.
  - ✦ Gendered access to phones, internet, and digital finance particularly in rural areas prevents them from leveraging digital platforms for education, jobs, or entrepreneurship.
  - ✦ This reinforces the cycle of exclusion. For instance, **only 33% of rural women use the internet vs 57% of men.** Female ownership of mobile phones is still **~54% (NFHS-5, 2021).**

- 💡 **Poor Workplace Infrastructure and Support:** Lack of **gender-sensitive infrastructure (e.g., sanitation, crèches, transport)** discourages women from joining or staying in the workforce.
  - ✦ Without enough maternity benefits, paid leave, or flexible work hours, women find it difficult to balance work and life. Many drop out due to caregiving roles.
  - ✦ For instance, **1 in 4 working women had to choose between childcare and career due to poor flexible policies.**
    - ⌕ Also, **37% of organisations in India still do not provide maternity leave** benefits and only **17.5% provide childcare facilities.**

What Measures can India Adopt to Further Mainstream Women in Economic Growth?

- 💡 **Integrate Skilling with Local Economic Ecosystems:** Align women's skilling programs under **Skill India, PMKVY**, and **SANKALP** with local economic demands and emerging sectors like **green jobs, healthcare, and digital services**.
  - ✦ Training should be demand-driven and supported by post-training linkages like placement cells, SHG federations **(e.g., Kerala's Kudumbashree),** and entrepreneurship hubs.
  - ✦ Embed **vocational education in secondary schools** for early exposure. Create district-level Gender-Smart Skill Plans under **District Skill Committees**.
    - ⌕ This approach ensures skilling leads to **real, sustainable economic opportunities.**

- 💡 **Scale Women's Enterprise through Converged Finance Models:** Link **MUDRA** loans, **Stand-Up India**, and **Women Entrepreneurship Fund** under a converged credit access model to support nano and micro-enterprises.
  - ✦ **Handhold women entrepreneurs with business development services**, digital onboarding, and market linkages via platforms like **GeM**.
  - ✦ **SHGs can be transformed into incubators** for local women-led businesses.

- Introduce **joint liability and peer mentorship models to reduce credit risk.** This will mainstream entrepreneurship as a viable livelihood option for women.

- **Institutionalise Childcare and Care Economy Support:** Develop a **National Crèche Grid** under **Samarthya** and **ICDS**, integrating **Anganwadis and workplace-based crèches to support working mothers.**
  - Encourage **PPP models to create employer-sponsored childcare facilities.**
  - Recognise and professionalise care workers through formal skilling and wage mechanisms.
  - Expand paid maternity leave to the informal sector through a **portable care benefit framework**.
    - This will **redistribute care work and enable women's retention in the workforce.**

- **Mainstream Women in Infrastructure and Digital Ecosystem Projects:** Mandate gender-responsive budgeting in infrastructure creation—sanitation, transport, water, housing—to improve public infrastructure usability for women.
  - Embed **Digital Saksharta** and **PMGDISHA** into national infrastructure and rural internet projects to boost women's digital empowerment.
  - Involve women in planning and monitoring infrastructure projects through **community participation platforms**.
    - Gender audits and mobility mapping should be institutionalised in **Smart City and AMRUT projects**. This will make infrastructure more inclusive and empowering.

- **Promote Formalisation and Social Security for Women in Informal Sector:** Create a **Gender-Smart Udyam Registration Drive** to bring women-led informal enterprises under the formal framework.
  - Extend **e-SHRAM**, **ESIC**, and **NPS** coverage with simplified documentation and mobile-enabled enrolment.
  - Promote women-specific clusters under **One District One Product (ODOP)** for aggregating value and formalising supply chains.

- This enhances visibility, protection, and productivity of informal women workers.

- **Strengthen Women's Representation in Governance and Decision-Making:** Mandate gender quotas across government boards, local planning committees, MSME promotion councils, and cooperative societies.
  - Link **panchayat incentives** to inclusion of women in economic and planning roles.
  - Institutionalise capacity building on gender budgeting and **planning at all tiers of governance.** Women in leadership drive more gender-sensitive policies and resource allocations.

- **Expand Gender-Sensitive Work Norms in the Private Sector:** Mandate paternity leave and gender audit disclosures under **Corporate Social Responsibility (CSR)** and ESG frameworks.
  - Incentivise private firms to create **returnship programs** and re-skilling options for women post-career break.
  - Introduce a **Gender Equity Index** for companies, linked to public procurement preferences. Encourage adoption of **flexi-time, work-from-home**, and **on-site childcare** facilities across sectors.
    - These norms can help **mainstream gender-inclusive HR practices beyond tokenism.**

- **Develop a Unified Women's Digital Identity and Benefits Platform:** Create a **Women's Digital Empowerment Stack**—an **Aadhaar-linked, API-enabled platform** integrating access to welfare, credit, skilling, and insurance.
  - Use this stack to track progress, reduce leakages, and provide custom advisories. Embed this into **Aspirational Blocks Programme** and **Digital India** initiatives.
  - Partner with fintechs for doorstep delivery of services via women-led CSCs.

- **Decentralise Planning through Gender-Focused Local Development Plans:** Institutionalise **Gender Action Plans** at Gram Panchayat, block, and district levels, integrating inputs from Mahila Sabhas and SHG networks.

✦ These plans should be co-created with women and embedded in annual development planning cycles and financing.

✦ Use data from **MoSPI's Time Use Surveys**, **NFHS**, and **SECC** to identify priority gaps. **Decentralised, data-driven gender planning** ensures context-specific and effective interventions.

Conclusion:

As the famous Sanskrit saying goes: "राष्ट्रस्य श्रवः नारी अस्ति, नारी राष्ट्रस्य अक्षि अस्ति"- *"Woman is the ear through which the nation hears, the eye through which it sees."* To truly harness India's demographic dividend, women's empowerment **must shift from aspiration to implementation.** Advancing women's equality could lead to a $28 trillion increase in global GDP, with India potentially seeing a **$770 billion boost by 2025**. A gender-equal economy accelerates not just inclusive growth but national development. These efforts align directly with **SDG 5 (Gender Equality) and SDG 8 (Decent Work and Economic Growth).**

■■■

Shaping India'S Startup Growth

This editorial is based on "Why Indian startup ecosystem needs a deep-tech compass" which was published in Hindustan Times on 08/04/2025. The article emphasises that India's startup ecosystem, while achieving remarkable growth, must shift focus from short-term ventures to high-impact sectors like deep-tech to ensure long-term economic sustainability, global competitiveness, and homegrown innovation.

Tag: GS Paper - 3, Employment, Growth & Development, IT & Computers, Mobilization of Resources.

India's startup ecosystem has experienced rapid growth, positioning itself as the **third-largest** in the world.

With over **1.57 lakh** recognized (by **the Department for Promotion of Industry and Internal Trade (DPIIT)**) startups and an increasing number of **unicorns**, India is emerging as a **global leader in innovation**. Government-backed initiatives, coupled with sector-specific policies and growing investor confidence, are driving this transformation. However, challenges like capital access, regulatory complexity, and scaling remain, demanding continuous reforms and strategic investments to sustain growth and create long-term value.

What is the Status of Startups in India?

💡 **Startup:** A startup refers to a **newly formed business** aiming for rapid scaling through **innovation and technology**.

✦ These businesses are generally aimed at addressing market gaps with disruptive products or services.

💡 **Funding Landscape:** In the first quarter of 2025, Indian startups raised **$2.5 billion**, showing an **8.7% increase** compared to last year.

✦ This surge demonstrates the growing investor confidence and vibrant startup sector in India.

💡 **IPO Surge:** India's startup sector is witnessing an **Initial Public Offering (IPO)** boom, with **23 startups** preparing for public listings in 2025.

✦ This surge reflects a **broader investor interest** in Indian-origin innovations and market-driven solutions.

💡 **Unicorn Growth:** India is home to more than **100 unicorns**, startups valued at over $1 billion.

✦ These unicorns span diverse sectors such as **fintech**, health-tech, edtech, and **e-commerce**, proving the vast potential of the startup ecosystem.

💡 **Regional Growth and Inclusivity:** Tier-2 and Tier-3 **cities** are now becoming key players, contributing to **51% of the startups**.

✦ These cities are focusing on solutions in **agriculture, healthcare, and education,** addressing regional challenges.

Types of Startups (Based on Valuation)

Type	Valuation Range	Description
Seed Stage	Less than $10 million	Newly founded startups, often in pre-revenue phase, supported by seed funding or incubators.
Minicorns	$10 million to less than $100 million	Early-growth stage startups showing potential to scale and attract larger investments.
Soonicorns	$100 million to less than $1billion	Rapidly growing startups expected to reach unicorn status soon.
Unicorns	$1 billion or more	Privately-held startups with a valuation of $1 billion or more.
Decacorns	$10 billion or more	Startups valued at or above $10 billion, indicating significant market impact.

How Have Key Initiatives and Their Achievements Strengthened India's Startup Ecosystem?

- **Startup India Initiative:** Launched in 2016, the **Startup India initiative** aims to build a strong ecosystem for **innovation and entrepreneurship**.
  - By simplifying compliance and offering **tax benefits**, over **1.57 lakh startups** have benefited, increasing their access to resources.
- **Fund of Funds for Startups (FFS):** The **FFS**, with **₹10,000 crore** allocated for early-stage funding, has been a cornerstone in promoting startup growth.
  - By 2024, this fund enabled investments of **₹21,276 crore** across **1,173 startups**, significantly boosting their financial capacity.
- **Startup India Seed Fund Scheme (SISFS):** The **SISFS**, launched in 2021, supports startups through critical stages like **proof of concept** (feasibility test to validate an idea's potential) **and prototype development** (early version of product for testing design functionality).
  - By 2024, **₹467.75 crore** had been allocated, supporting **2,622 startups** and driving their growth.
- **Credit Guarantee Scheme for Startups (CGSS):** **CGSS** facilitates access to **collateral-free loans**, helping startups secure funding without the burden of assets.
  - As of January 2025, the scheme has guaranteed **₹604.16 crore for 209 startups**, with ₹27.04 crore allocated to **women-led ventures**.
- **Support for Women Entrepreneurs:** The government has prioritized women entrepreneurs, with **73,151 startups** having at least one woman director by 2024.
  - Women-led startups have received ₹3,107.11 crore in investments through **Alternative Investment Funds (AIFs)**.
- **Sector-Specific Policies:** Targeted policies for sectors like biotechnology, agriculture, and renewable energy have been pivotal in fostering sectoral growth.
  - These policies have attracted investments, particularly in **deep-tech**, where India is emerging as a global leader.
- **Capacity Building Programs:** The **Women Entrepreneurship Platform (WEP)** and **Atal Innovation Mission (AIM)** play vital roles in supporting startups.
  - The WEP aggregates policies and awards, while AIM has established **10,000 Atal Tinkering Labs** to promote entrepreneurship from a young age.
- **States' Startup Ranking:** Since 2018, the DPIIT, under the **Ministry of Commerce** and Industry has been carrying out the **States' Start-up Ranking** exercise.

✦ This plays a vital role in improving the business environment for startups across the country.
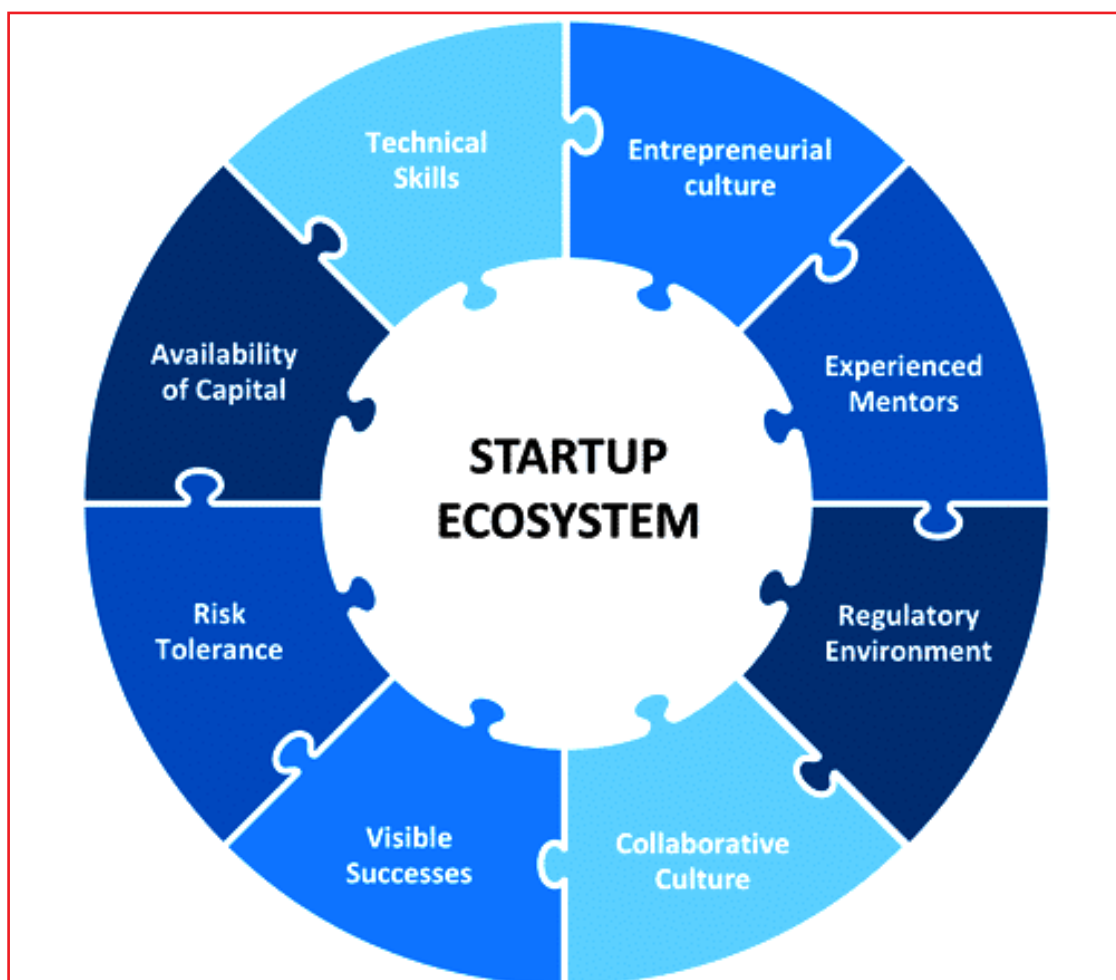
What Are the Challenges to the Startup Ecosystem in India?

💡 **Access to Capital:** Many startups, particularly in **Tier-2 and Tier-3 cities**, face challenges in securing adequate capital.

✦ In 2024, funding dropped significantly in these cities, with a decline from ₹2,202 crore in July 2024 to ₹202 crore in November 2024, highlighting a **funding disparity**.

💡 **Regulatory Hurdles:** India's **regulatory landscape** creates significant challenges for startups.

✦ For example, the ongoing debate over categorizing app-based cab services like Ola and Uber under the **Motor Vehicles Act** adds uncertainty to operations.

💡 **Compliance Burdens:** The new **Digital Personal Data Protection Act, 2024**, increases the compliance burden for startups.

✦ While essential for **data security**, it places additional pressure on startups that are already struggling with operational efficiency.

💡 **Scaling Issues:** Scaling remains a significant barrier for many startups, with around **90%** failing within five years.

✦ Issues such as market entry challenges and operational inefficiencies contribute to this high failure rate, preventing long-term growth.

- **Competition and Market Saturation:** Startups in certain sectors, especially edtech, are facing intense competition.
  - ✦ The saturation of these markets, combined with unsustainable cash burn, leads to limited profitability and struggles for startups to sustain growth.
- **Brain Drain and Intellectual Property:** India faces a significant challenge of **brain drain**, where innovations are sold to foreign companies at undervalued prices.
  - ✦ This leads to the **loss of intellectual capital** and undermines the long-term competitiveness of India's startup ecosystem.
- **Sustainability of Innovation:** Startups often focus on short-term gains, leading to unsustainable models.
  - ✦ In sectors like edtech, this has resulted in a **post-pandemic downturn**, highlighting the need for sustainable growth models that prioritize long-term value creation.
- **Infrastructure Challenges:** Despite the growth in **Tier-2 and Tier-3 cities**, poor infrastructure continues to be a barrier. '
  - ✦ Inadequate connectivity and limited access to resources restrict the scalability of startups, making it difficult to compete globally.

How Can India Transform into a Global Leader in Innovation and Startups?

- **Strengthening Deep-Tech Ecosystem:** India needs to focus on nurturing **deep-tech industries** such as **AI**, **robotics**, and **semiconductors.**
  - ✦ **Early-stage funding** must be encouraged to foster innovation in these critical sectors and position India as a global leader in technology.
- **Policy Reforms and Support:** The government must continue implementing and enhancing policy reforms like **abolishing angel tax**.
  - ✦ Expanding safe harbour rules and offering additional incentives for R&D in high-tech sectors will ensure the **growth and global competitiveness** of Indian startups.

- **Developing Tier-2 and Tier-3 Cities:** Decentralizing the startup ecosystem by developing **Tier-2 and Tier-3 cities** as innovation hubs is essential.
  - ✦ Improving infrastructure, providing lower land rates, and establishing **innovation hubs** will enable regional startups to thrive.
- **Strengthening Intellectual Property Protection:** IP protection must be strengthened to encourage innovation-driven growth.
  - ✦ **Fast-track patent examinations** and increasing awareness of **intellectual property rights** will ensure that startups' innovations remain globally competitive.
- **Collaboration with Academia:** Collaboration between **academia and startups** is essential for fostering deep-tech innovation.
  - ✦ Universities can act as incubators, driving research partnerships and helping startups develop cutting-edge technologies that solve global challenges.
- **Inclusive Growth Through Localized Solutions:** Startups must leverage their presence in Tier-2 and Tier-3 cities to address local challenges.
  - ✦ Developing **solutions in agriculture, healthcare, and education** will contribute to the inclusive growth of India's startup ecosystem.
- **Government Procurement and Market Opportunities:** Introducing policies for **government procurement from startups**, similar to the US, will open significant market opportunities.
  - ✦ Mandating a percentage of government contracts for startups will ensure long-term growth and sustainability.

Conclusion

India's startup ecosystem is poised for further growth with the **right policy reforms** and a focus on deep-tech industries. By **addressing challenges and nurturing innovation**, India can continue to lead globally, ensuring a future of **sustainable, inclusive economic development** driven by entrepreneurial success.

■■■

India in the Era Of Rising Space Weaponization

This editorial is based on "[India has an admirable record as a global space power. But it needs to do more to close gap with China](#)" which was published in The Indian Express on 11/04/2025. The article brings into picture the strategic transformation of India's space program— from peaceful exploration to a pressing need for military preparedness. With rising global counter-space threats, it underscores the urgency for India to strengthen its defense space architecture and safeguard its orbital assets.

Tag: GS Paper-3, Space Technology, Achievements of Indians in Science & Technology

India's evolution as a **space power reflects the global shift from exploration to expansion.** While achieving impressive technological milestones including satellite launches, lunar missions, and anti-satellite capabilities, India now faces a critical juncture. As **CDS General Anil Chauhan** emphasized recently, **"warfare increasingly depends on space dominance"**. With adversaries rapidly developing counter-space capabilities, **India must accelerate its military space program** to protect its strategic interests in this new frontier of national security.

How Space is Becoming the New Frontier of Warfare?

- 💡 **Militarization of Space by Global Powers:** Space is no longer a passive domain of exploration; **major powers are actively developing offensive and defensive space capabilities.**
  - ✦ The **formation of dedicated space forces (e.g., U.S. Space Force)** marks a shift toward treating space as a potential **combat zone.** Countries now see space assets as strategic multipliers in terrestrial conflicts.
  - ✦ For instance, in the **US more than 60% of the Space Force budget, about $19.2 billion worth,** is aimed at research, development, testing and evaluation.
    - 📎 **China's PLA Strategic Support Force** has integrated space operations into military doctrine.

- 💡 **Satellite Targeting and Anti-Satellite (ASAT) Weapons:** The weaponization of space is evident in the **testing of anti-satellite weapons.** Destroying enemy satellites can cripple navigation, communication, and surveillance during wars. This adds a **new vulnerability in the modern battlefield.**
  - ✦ **India's 2019 "Mission Shakti"** demonstrated **ASAT capability.** In 2021, Russia's ASAT test created over **1,500 trackable pieces of debris,** threatening orbital safety.

- 💡 **Cyber Warfare in Space Systems:** Satellites are vulnerable **not only to kinetic strikes but also to cyberattacks** that can disrupt command and control.
  - ✦ Cyberattacks on space assets can disable early warning systems or manipulate data. **It offers low-cost, deniable avenues of warfare.**
  - ✦ **In 2022, the KA-SAT cyberattack during the Russia-Ukraine war** disrupted Viasat satellite services.

- 💡 **Dual-use Satellites and Espionage:** Satellites increasingly have **dual-use purposes, serving both civilian and military needs**, making them tools for peacetime surveillance and wartime targeting. Nations use earth observation satellites for military intelligence under the guise of civilian use.
  - ✦ **For instance, China's Yaogan satellite series is known for military surveillance** despite being officially labeled **"remote sensing."**
  - ✦ After the collapse of the Soviet Union, National Reconnaissance Office systems became ever more integrated into U.S. military capabilities, playing a critical role in the Gulf War.

- 💡 **Private Sector Involvement in Military Conflicts:** Private players like **SpaceX and Planet Labs** are actively shaping modern conflicts by providing real-time intelligence and internet services.
  - ✦ This blurs lines between civilian and military actors, creating new legal and strategic dilemmas.
  - ✦ During the **Ukraine war**, **Starlink enabled uninterrupted communication for Ukrainian forces.** Planet Labs provided commercial satellite images to track Russian troop movements.

- In 2022, **Germany's Enercon reported a "major disruption" to satellite communications across Europe**, which impacted the remote monitoring and control of around **5,800 wind turbines in Central Europe.**
- **Space Debris as a Strategic Concern:** With increasing militarization, intentional or accidental creation of space debris can be used to deny orbital access — a form of passive-aggressive warfare. The resulting **Kessler Syndrome** can paralyze space infrastructure.
  - As of 2024, there are approximately 36,500 pieces of space debris larger than 10 cm orbiting Earth, according to the European Space Agency (ESA).
    - China's **2007 ASAT test alone generated ~3,000 pieces of debris** still tracked today.
- **Lack of Regulatory Framework for Space Conflicts:** There is no robust global treaty to regulate military behavior in outer space beyond the **1967 Outer Space Treaty.**
  - The absence of binding enforcement mechanisms allows unchecked militarization.
  - The **Outer Space Treaty bans weapons of mass destruction in outer space in space but not conventional weapons.**
    - The **UN's Open-Ended Working Group (OEWG) on Space Threats has seen limited consensus** due to geopolitical rivalry.

What are the Key Issues Associated with Rising Weaponisation of Space for India?

- **Strategic Vulnerability and Deterrence Gap:** The militarisation of space by rivals like **China increases India's strategic exposure**, as it lacks a matching offensive or defensive space force.
  - This **asymmetry threatens deterrence stability, especially in the event of cross-domain conflicts.**
  - India's space assets are crucial for **communication, surveillance, and targeting;** their loss would cripple conventional operations.

- For instance, China is believed to have at least one, and as many as three, direct-ascent ASAT (anti-satellite) systems, or DA-ASAT, while India has only **one (Mission Shakti, 2019)**.
  - China's PLA has integrated space capabilities via its **Strategic Support Force,** giving it a **joint warfare edge.**
- **Arms Race and Escalation Dynamics:** Weaponisation accelerates an arms race in space, prompting adversarial capabilities that increase the **risk of miscalculation and crisis instability.**
  - India may be **compelled to allocate disproportionate resources** to keep pace, straining conventional and nuclear postures.
  - Escalation in one domain (like cyber or terrestrial) could quickly spill into space. For instance, China's **hypersonic glide vehicle (2021)** used space for trajectory masking—blurring the line between missile and space threats.
- **Economic and Commercial Disruption:** The space arms race threatens India's fast-growing commercial space economy, particularly its satellite launch and data services sectors.
  - Weaponisation raises **insurance costs, deters foreign collaboration, and jeopardizes satellite constellations**.
  - Any debris-generating conflict or accident would disproportionately affect India's value-sensitive missions. It could also divert ISRO's civilian focus toward defense requirements.
  - For instance, India's space economy is projected to reach **$13 billion by 2025**, with the space **tech sector growing 235% in two years. Any disruption in this can hinder India's economic progress.**
- **Environmental and Orbital Debris Threat:** The militarisation of space increases the risk of collisions, debris generation, and long-term orbital instability, affecting India's access to key orbital slots.
  - Unlike **terrestrial pollution**, space debris is near-permanent and can trigger cascading. India, with over **29 operational satellites in LEO (as of January 2024)**, is highly vulnerable

to even minor debris incidents. Its ability to **launch sustainable and safe missions is now in question.**

  - According to a recent report, the **ISRO had to carry out 23 collision avoidance manoeuvres (CAM) in 2023** to save its satellites from harm by space debris, highlighting the criticality of the issue.

- **Technological Lag and Capability Gaps:** India lags behind in developing cutting-edge counter-space systems such as **space-based lasers, jamming-resistant satellites, or AI-powered SSA.**

  - This gap reduces India's ability to deter adversaries and protect its orbital assets proactively.

  - **Indigenous R&D is underfunded compared to peer rivals**, and **DRDO/ISRO's defense-civil synergy is still evolving.** Dependence on foreign components also raises cyber-vulnerability.

  - **Isro's current annual budget of approximately $1.6 billion** is significantly smaller compared to other major space agencies.

    - **NASA** operates with a budget exceeding **$25 billion,** and **China's CNSA gets over $18 billion.**

Recent Advancements in India's Space Based Military Capacities

- Dual-Use Private Sector Integration
- Mission Shakti
- EMISAT and RISAT Series
- Defence Space Agency
- NETRA Project
- GSAT-7 Series Satellites

Do You Know?

What are the Key Major Space Conventions & Treaties?

- **Outer Space Treaty (1967):** Prohibits the placement of nuclear weapons in space and declares outer space free for exploration by all.

- **Rescue Agreement (1968):** Mandates that astronauts in distress must be safely returned and provides for the return of space objects to their owners.

- 💡 **Liability Convention (1972):** It provides that a launching State shall be absolutely liable to pay compensation for damage caused by its space objects on the surface of the Earth or to aircraft, and liable for damage due to its faults in space.
- 💡 **Moon Agreement (1984):** Declares the Moon and other celestial bodies as the "common heritage of mankind" and restricts their exploitation (not widely ratified).
- 💡 **UN COPOUS (Committee on the Peaceful Uses of Outer Space):** Not a treaty, but a UN body responsible for promoting international cooperation in peaceful space exploration.
- 💡 **Artemis Accords (2020):** A U.S.-led framework for responsible lunar exploration, emphasizing transparency, peaceful use, interoperability, and resource sharing.

What Measures can India Adopt to Enhance its Space Capabilities and Warfare Resilience?

- 💡 **Establish a Dedicated Space Command:** India should institutionalize a full-fledged **Space Command** under its **Integrated Defence** structure to centralize space-based surveillance, early warning, and offensive capabilities.
  - ✦ This will **streamline tri-service coordination, doctrine development, and asset deployment in real-time during conflicts**.
  - ✦ It also helps separate space warfare from purely scientific missions.
  - ✦ Operational control must include both **ground-based and orbital counter-space tools.** It should be fully interoperable with cyber and missile commands.
- 💡 **Boost Indigenous Counter-Space Tech:** India must urgently invest in scalable **counter-space capabilities** like **co-orbital ASAT systems**, electronic warfare, directed-energy weapons, and satellite jammers.
  - ✦ Focus should be on **modular, cost-effective, and reusable platforms** with dual-use utility. Collaborating with DRDO, startups, and academia under a mission-mode program can bridge tech gaps quickly.
    - 🔗 These tools must be **integrated into a layered deterrence framework**, not just reactive defense.
- 💡 **Enhance Space Situational Awareness (SSA):** A robust, real-time **SSA network** is essential for monitoring adversary activities, tracking debris, and ensuring satellite safety.
  - ✦ India must **develop both ground-based radar arrays and space-based optical** tracking systems.
  - ✦ This system should feed into an integrated threat-alert grid accessible to defense, ISRO, and commercial operators.
    - 🔗 **Establishing regional SSA cooperation** with friendly nations can expand coverage.
- 💡 **Formulate a National Space Doctrine:** India must craft a clear, **publicly articulated space security doctrine** to define **red lines, deterrence posture, escalation thresholds, and rules of engagement,** this can supplement **India Space Policy 2023.**
  - ✦ This will guide capability development, R&D investments, and military-industrial alignment.
  - ✦ It also signals strategic intent to allies and adversaries, deterring miscalculation. This doctrine must align with nuclear and cyber doctrines, ensuring cross-domain synergy.
    - 🔗 A **strong policy basis legitimizes funding and institutional reforms.**
- 💡 **Foster Civil-Military-Private Integration in Space Tech:** India should institutionalize **civil-military-private synergy** by creating defense-focused verticals within **ISRO and IN-SPACe** that collaborate with startups and academia.
  - ✦ **Military users must be involved early in mission planning and design.** Private players should be **incentivized to develop dual-use platforms** and launch services under secure protocols.
  - ✦ A **dedicated space innovation fund, tech transfer schemes,** and defense procurement incentives can catalyze rapid capability growth.

- **Lead Global Norms and Consensus-Building in Space Security:** India must actively engage in shaping **global norms and rules of the road** to prevent arms race dynamics and move towards constructive use of space assets while **safeguarding its interests.**
    - ✦ **Championing responsible ASAT testing, debris mitigation norms, and space traffic management** will boost its credibility.
    - ✦ This also **positions India as a balancer in US-China rivalry** and opens strategic collaboration with middle powers.
        - 🖉 Diplomatic leadership in space security will enhance resilience without relying purely on hard power.
- **Invest in Space-Based Cybersecurity and Quantum Communications:** With increasing satellite dependence, India must treat **space cybersecurity** as a core area of defense.
    - ✦ Securing **ground stations, satellite links, and inter-satellite communication** against **cyber sabotage** is essential.
    - ✦ **Indigenous quantum communication experiments** should be fast-tracked to achieve unbreakable encryption.
    - ✦ **Cyber-resilient command and control systems** must be developed with zero-trust architecture.
        - 🖉 **Joint DRDO-ISRO cyber cells** should be created with real-time threat monitoring capabilities.

Conclusion:

With space emerging as the **next battlefield of geopolitics, India must transition from being a passive observer to an assertive space power.** Strengthening **homegrown counter-space tech, establishing a dedicated Space Command,** and shaping global space governance building upon the **United Nations Committee on the Peaceful Uses of Outer Space** are vital. As the risks of an orbital arms race grow, **India's strategic autonomy hinges on securing the final frontier.**

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Reforming India'S Logistics Sector

This editorial is based on "Road map for efficiency: India must rethink its transport strategy" which was published in The Business Standard on 15/04/2025. The article brings into spotlight the need for integrated transport planning in India to reduce high logistics costs and shift freight movement from roads to more efficient modes like rail.

Tag: GS Paper-3, Infrastructure, Industrial Growth,Industrial Policy,GS Paper-2, Government Policies & Interventions

India is moving toward an integrated transport planning mechanism to **break down silos between different modes of transportation.** Currently, **road transport dominates freight movement (70%),** while **railways lags behind (below 30%)** due to high tariffs from cross-subsidization. Multimodal transportation initiatives like the **Dedicated Freight Corridors** are beginning to show promise in enhancing efficiency. Successful implementation will require both interministerial cooperation and effective coordination with states to unlock economic growth potential.

What are the Key Growth Drivers of India's Logistical Sector?

- **Government-led Policy and Regulatory Reforms:** The logistics sector's expansion is significantly driven by landmark policy interventions such as the **National Logistics Policy (NLP)** and **PM Gati Shakti.**
    - ✦ These aim to address fragmentation in infrastructure planning and reduce logistics costs by integrating multiple transport modes.
    - ✦ **GST** has streamlined interstate movement, eliminating bottlenecks and making India a single national market.
    - ✦ According to the **Economic Survey 2023-24,** logistics costs dropped by 0.8–0.9% of GDP between FY14 and FY22.
        - 🖉 Over **614 entities have registered on ULIP (Unified Logistics Interface Platform).**

- 💡 **Rapid Infrastructure Expansion and Multimodal Connectivity:** Massive investment in physical infrastructure is unlocking value in the logistics space through **dedicated freight corridors (DFCs)**, **multi-modal logistics parks**, and **port connectivity upgrades**.
  - ✦ These projects promote efficient movement of goods, reduce turnaround time, and lower freight costs. This is complemented by the **Sagarmala**, **Bharatmala**, and **NIP (National Infrastructure Pipeline)** frameworks.
  - ✦ For instance, **35 multi-modal parks are being developed with an outlay of ₹50,000 crore**.
- 💡 **Digital Transformation and Tech Adoption:** Digitisation is accelerating logistics growth by enhancing visibility, cutting delays, and automating supply chains.
  - ✦ Tools like **RFID**, **GPS tracking, blockchain, digital twins**, and government portals like **ICEGATE and E-Logs** are transforming traditional systems.
  - ✦ These innovations reduce transaction costs, improve cargo predictability, and support real-time logistics management.
  - ✦ For instance, India rose **6 places to 38th in the World Bank's Logistics Performance Index (2023).**
- 💡 **Manufacturing-led Demand via Make in India and PLI Schemes:** India's aspiration to become a **global manufacturing hub** is creating new demand for modern, agile logistics networks.
  - ✦ The **Production Linked Incentive (PLI)** schemes are drawing foreign and domestic investments, requiring seamless end-to-end supply chain services. Sectors like electronics, pharma, and textiles are particularly logistics-intensive.
  - ✦ For instance, India's manufacturing contributed **15.3% to GDP in FY22** and is projected to expand rapidly with global shifts like **China+1.**
    - 🖉 Recent data projects India's GDP to hit **$6 trillion by FY30** and $26 trillion by FY48 — logistics will be a key enabler.
- 💡 **Booming E-commerce and Last-Mile Delivery Ecosystems:** The exponential rise of e-commerce platforms has redefined logistics demand, particularly in **Tier II and III cities.**

- ✦ **Fast delivery, returns logistics, and warehousing** are now integral to customer satisfaction, propelling investment in **hyperlocal logistics, micro-warehousing**, and tech-enabled tracking.
  - 🖉 This is also giving rise to **reverse logistics** and demand for real-time supply chain responsiveness.
- ✦ For instance, The Indian e-commerce market is expected to reach $200 billion by 2026. The **logistics sector is projected to grow to $591 billion by FY27**, up from $435 billion in FY22 (EY).
- 💡 **Skilling, Formalisation, and Employment Opportunities:** A structured shift from informal to formal logistics has catalysed skilling, job creation, and better workforce productivity.
  - ✦ Government-backed **Employee-Linked Incentive (ELI)** schemes and focus on **training for logistics and warehousing jobs** are transforming this traditionally unorganised sector. It also contributes to India's demographic dividend.
  - ✦ The sector currently employs 22 million people and is expected to create 10 million more jobs by 2027.
    - 🖉 **Organised players, who hold 5.5–6% of the logistics market in FY22,** are projected to grow at 32% CAGR till FY27.
- 💡 **Sustainability and ESG-led Supply Chain Transition:** Growing environmental consciousness and **global ESG norms** are reshaping Indian logistics, prompting a shift toward **electric fleets, coastal shipping, energy-efficient ports**, and carbon-tracked supply chains.
  - ✦ India is aligning with global benchmarks like the **Carbon Intensity Rating** and **EEXI** for sustainable shipping. This also helps attract ESG-sensitive capital.
    - 🖉 Freight villages and coastal shipping corridors (like **Sagar Sethu portal**) are being expanded to cut emissions and logistics costs.

What are the Key Issues Associated with India's Logistical Sector?

- 💡 **High Logistics Cost as a Share of GDP:** India's logistics cost **remains significantly higher than global benchmarks**, impacting the competitiveness of exports and domestic production.
  - ✦ The fragmented supply chain, over-reliance on roads, and lack of modal integration inflate costs.
  - ✦ **This affects MSMEs the most**, reducing their margins and limiting global competitiveness.
  - ✦ For instance, India's logistics cost is estimated at **14–18% of GDP (Economic Survey 2022-23)** while global benchmarks stand at around 8%.

Logistics Cost as a Percentage of GDP

- India — 14
- BRICS — 11
- Europe — 10
- China — 9
- US — 8
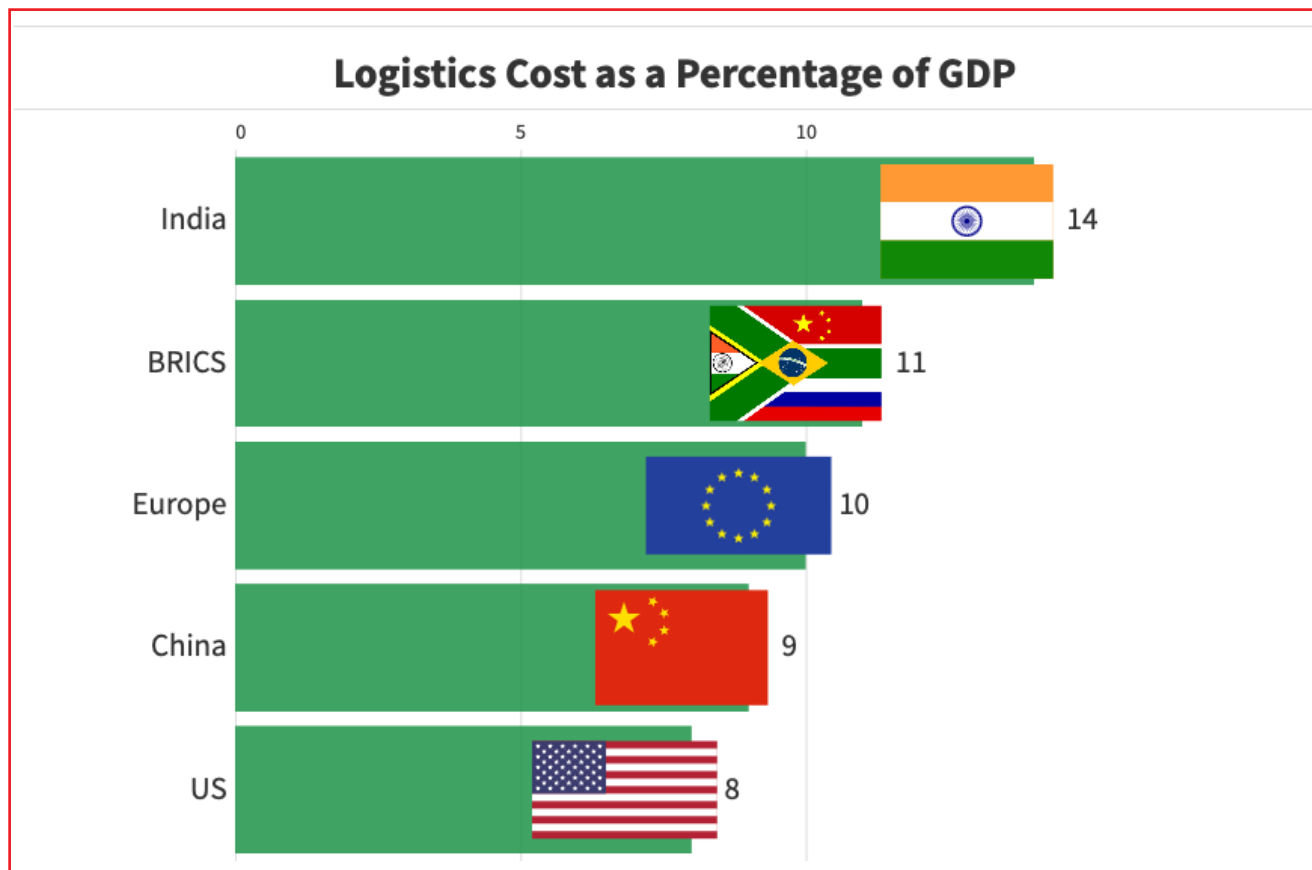
- 💡 **Modal Imbalance in Freight Movement:** India's freight movement is heavily skewed toward **roadways, undermining cost-efficiency and environmental sustainability.**
  - ✦ Multimodal logistics are still underdeveloped, with limited connectivity between rail, ports, and inland waterways. This limits economies of scale and causes congestion on highways.
  - ✦ For instance, **Roads handle 66% of freight,** while railways contribute 31%, and shipping just 3% (EY report).
    - 🖉 **Inland waterways, despite being 60% cheaper than road**, are underutilised due to infrastructure gaps.
- 💡 **Infrastructure Deficits and Project Execution Delay:** Despite policy push, infrastructure development is hampered by land acquisition issues, environmental clearance delays, and bureaucratic hurdles.
  - ✦ These delays cause cost overruns and limit private sector participation. Many logistics parks, DFCs, and port connectivity projects face slow execution.
  - ✦ For instance, **only 1,724 km of DFC completed against longer-term targets**; many Multi-Modal Logistics Parks are under initial stages.

✦ Though the average turnaround time for the Major Ports has reduced significantly, it is still high - **48 hours (2023-24).**

💡 **Regulatory Fragmentation and Compliance Complexity:** The logistics ecosystem is governed by multiple ministries and departments, resulting in regulatory overlap and inefficiencies.

   ✦ **Inter-state differences in rules, permits, and taxes** delay goods movement and increase transaction costs. Despite the launch of **PM Gati Shakti,** centre-state coordination remains patchy.

   ✦ Enterprises have to comply with several hundred acts and rules, depending on the size and geographical footprint of the business. These include the **Carriage by Road Act, 2007 & Carriage by Road Rules, 2011** and the **Warehousing (Development and Regulation) Act, 2007.**

      🔗 Furthermore, some types of logistics companies also need to balance additional compliances contained in the **Foreign Trade (Development & Regulation) Act, 1992 and Foreign Trade (Regulation) Rules, 1993.**

   ✦ According to industry estimates, **compliance burden contributes to 20–25% of logistics delays in India.**

💡 **Digital Divide and Low Tech Penetration:** Digital transformation in logistics is advancing, but unevenly — small players lack access to or knowledge of tech tools like RFID, IoT, blockchain, and predictive analytics.

   ✦ This creates inefficiencies, especially in warehousing, cargo tracking, and delivery routing. The benefits of ULIP and E-Logs remain concentrated among organised players.

   ✦ For instance**, only 5.5–6% of the logistics market was held by organised, tech-driven players as of FY22 (EY).**

💡 **Skilling and Human Resource Challenges:** India's logistics workforce lacks structured training in handling modern supply chain technologies, multimodal transport coordination, and ESG compliance.

✦ **Over 90% of the logistics industry is unorganized, leading to low productivity,** unsafe work conditions, and limited career mobility. The absence of large-scale, formal skilling programs adds to inefficiencies.

✦ Recent data highlight that **4.3 million additional workers will be required between 2024 and 2030 in this sector,** with concentrated demand in states like **West Bengal, Tamil Nadu and Maharashtra.**

💡 **Sustainability and Environmental Concerns:** India's logistics sector is predominantly carbon-intensive, dominated by **diesel-based trucking, limited electrification, and inadequate green corridors.**

   ✦ While ESG focus is rising, compliance remains weak, particularly among smaller operators. Coastal shipping and inland waterways — greener modes — remain underexploited.

   ✦ For instance, the transportation and logistics sector accounts for approximately **14% of India's total CO$_2$ emissions.**

      🔗 Despite policies like NLP Marine and Energy Efficiency Index adoption, the modal shift to sustainable transport is sluggish.

What Measures can India Adopt to Enhance the Efficiency of the Logistical Sector?

💡 **Operationalising Integrated Multimodal Transport Infrastructure:** India must accelerate the implementation of **PM Gati Shakti** in tandem with the **National Logistics Policy (NLP)** to break departmental silos and synchronise investments across roads, railways, ports, and air freight.

   ✦ By **mapping logistics corridors through the National Master Plan**, the government can enable seamless end-to-end cargo movement. Strengthening first- and last-mile connectivity will ensure full utilisation of dedicated freight and coastal corridors.

   ✦ Building upon the recommendations of the **Bibek Debroy Committee,** there is a need for converging multi-departmental actions into an integrated logistics policy.

Key Government Initiatives in Indian Logistics Sector

Unified Logistics Interface Platform
- Real-Time Data
- Transparency

E-Way Bill System
- Digital Permit
- Interstate Transportation

PM Gati Shakti
- Digital Platform
- Infrastructure Coordination

National Logistics Policy
- Cost Reduction
- Performance Improvement

Government Initiatives in Logistics

Bharatmala Pariyojana
- Road Connectivity
- Freight Corridors

Dedicated Freight Corridors
- Eastern DFC
- Western DFC

Sagarmala Programme
- Port Connectivity
- Coastal Shipping

Multi-Modal Logistics Parks
- Warehousing
- Cold Chain

ICEGATE & E-Logs Portals
- EXIM Operations
- Turnaround Time Reduction

- Creation of an integrated digital platform to facilitate a paperless environment across the logistics value chain and setting up a mechanism for periodic diagnostics and benchmarking of sectoral outputs.

💡 **Promoting Cluster-Based Development of Logistics Hubs:** Developing **multi-modal logistics parks (MMLPs)** near **industrial corridors and SEZs** will create efficient cargo aggregation and distribution systems.

- These hubs should provide unified services like warehousing, cold storage, and customs clearance under one roof.
- Co-locating them with **freight villages and EXIM zones** can generate economies of scale. The government can prioritise strategic nodes through **Public-Private Partnerships (PPP).**

💡 **Strengthening Digital Logistics Infrastructure:** India must push for **full-scale digitisation** of logistics operations through platforms like **ULIP**, **ICEGATE**, and **E-Logs**, ensuring universal adoption by small and medium logistics operators.

- Real-time cargo visibility, digital document exchange, and process automation should be scaled through incentives and mandatory standards.
- A unified logistics data exchange architecture can help de-risk supply chains. Enhancing cybersecurity and data privacy measures will build trust among stakeholders. This will also enable predictive analytics and AI-based logistics planning.

💡 **Enhancing Rail and Waterway Utilisation for Long-Haul Freight:** Policy incentives should be introduced to **shift bulk cargo** from road to **railways and inland waterways**, especially for sectors like cement, steel, coal, and fertilisers.

- Electrification of short rail links and expansion of inland water terminals can enhance modal share.
- Linking **Sagarmala and Bharatmala** schemes to logistics planning will unlock underused maritime and road infrastructure.

💡 **Creating a National Logistics Workforce Development Mission:** A dedicated skilling mission under **Skill India** and **Logistics Sector Skill Council** should be launched to build capacity in warehouse operations, multimodal handling, and digital tools.

- Modular training tied to certification and employability incentives can raise sectoral productivity.
- Special emphasis should be given to upskilling informal workers in emerging technologies and ESG compliance.

💡 **Formalising the Unorganised Logistics Sector:** India should simplify compliance procedures and create an enabling environment for **small fleet operators, local warehousing agents, and truckers** to register, upgrade, and formalise their operations.

- A unified logistics registration portal, low-cost finance, and simplified GST filings can ease this transition.
- Logistics providers can leverage the ONDC platform to streamline operations, optimize routes, and consolidate shipments from various sellers.

💡 **Leveraging Geospatial Intelligence and AI for Logistics Optimisation:** Integrating **GIS and AI-based analytics** with the Gati Shakti masterplan can enable real-time monitoring of traffic patterns, infrastructure usage, and freight flow bottlenecks.

- Such insights can inform smarter logistics network design, investment prioritisation, and congestion management.
- Predictive analytics can also help preempt supply chain disruptions. Collaboration between **ISRO, NIC, and MoRTH** can support deployment.

Conclusion:

India's logistics sector is undergoing a transformative shift through **integrated transport planning, digital innovation, and infrastructure modernisation.** Bridging modal imbalances and ensuring centre-state coordination will be key to realising cost efficiency and global competitiveness. This aligns with **SDG 9 (Industry, Innovation and Infrastructure) and SDG 11 (Sustainable Cities and Communities)** by fostering resilient infrastructure and sustainable urban logistics.

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Reorienting Indian Education System

This editorial is based on "Education in India: Why NEP has so far failed to move the needle" which was published in Hindustan Times on 15/03/2024. The article brings into focus the deep crisis in India's education system that despite NEP 2020, both public and private sectors struggle with poor outcomes and systemic inefficiencies.

Tag: GS Paper - 2, Education, Welfare Schemes, Issues Related to Children, Human Resource, Skill Development, Government Policies & Interventions

India's education system faces a crisis with alarming statistics: **75% of Class 3 students are unable to read Grade 2 texts**. Despite the **New Education Policy of 2020,** improvements remain marginal. The **government school system continues to be hampered by systemic inefficiencies, inadequate resources,** and poor learning

outcomes. Meanwhile, the **private education sector operates under regulatory constraints** that often lead to questionable practices rather than quality improvements. India must urgently address these fundamental structural challenges to transform its education landscape and secure its future human capital.

What are the Key Developments in India's Education System?

- 💡 **Growth of Digital and Online Education:** India's education system has rapidly **embraced digital learning, especially after the pandemic.**
  - ✦ The move towards **online platforms and blended learning models** has democratized access to education, particularly for students in remote areas.
  - ✦ The rise of edtech companies and government initiatives like **PM eVidya** have significantly expanded educational reach.
    - 📎 As of FY22, the **Indian edtech market saw an investment of US\$ 3.94 billion,** and the online education sector is expected to grow by **US\$ 2.28 billion between 2021-2025, with a CAGR of 20%.**

- 💡 **Integration of Vocational Education and Skills Development:** The National Education Policy (NEP) 2020 places **significant emphasis on skill development and vocational education** to address India's employment challenges.
  - ✦ By integrating **skill-based learning into mainstream education**, India aims to align its youth with industry needs.
  - ✦ Moreover, the **Skill India Mission** has trained millions, with the **Union Budget 2025-26 allocating Rs. 500 crore to a Centre of Excellence in AI for Education,** promoting advanced tech skills.

- 💡 **Policy Support for Private Investment and FDI:** The Indian government has actively **encouraged private investment in education,** which has significantly strengthened the sector's infrastructure and innovation.
  - ✦ The allowance of **100% FDI in the education secto**r has attracted international players, promoting a competitive landscape.

- ✦ The education market in India is projected to reach **US\$ 225 billion by FY25**, and **foreign direct investment (FDI) inflow in education** between April 2000 and September 2024 stands at **Rs. 83,550 crore.**

- 💡 **Expansion of Higher Education Institutions:** India has significantly expanded its **higher education sector** in recent years, with **an increase in both the number of universities and students enrolled.**
  - ✦ In FY25, **India had 52,538 colleges and 1,362 universities,** showing a **10% increase over the past five years**.
  - ✦ The **Gross Enrollment Ratio (GER)** in higher education has also risen to **28.4%,** reflecting growing opportunities in the sector.

- 💡 **Rise of Regional Language Education:** The NEP 2020's push for multilingualism and regional language education has been a transformative stride in India's educational landscape.
  - ✦ **Encouraging the use of regional languages as a medium of instruction,** the policy addresses regional disparities and strengthens cultural identity.
  - ✦ The government has **allocated Rs. 500 crore under the PM Vidya initiative to develop multilingual resources** and digital learning tools in multiple regional languages, helping bridge the gap between urban and rural students.

- 💡 **Increased Focus on Research and Innovation:** India is gradually transitioning towards a r**esearch-driven education model** with an emphasis on innovation and industry collaboration.
  - ✦ The government's push fo**r research in higher education institutions** has been supported by initiatives like the **Atal Innovation Mission (AIM)** and funding through the **Research and Innovation in Higher Education (RISE) program**.
  - ✦ **Anusandhan National Research Foundation (ANRF)** has been established to promote research and development and foster a culture of research and innovation

- 💡 **Investment in STEM Education:** STEM (Science, Technology, Engineering, and Mathematics) education is gaining momentum in India, with a growing number of initiatives focusing on skill development and creating a talent pool for future industries.

✦ Initiatives like the **Atal Tinkering Labs (ATL),
sponsored by NITI Aayog,** have already
established over 8,000 labs across India,
aiming to foster creativity and innovation.

✦ Moreover, **the Indian edtech market, particularly in STEM education,** saw substantial investments in FY22, with a total of US$ 3.94
billion.

What are the Key Issues Impeding the Effectiveness of Educational Reforms in India?

💡 **Infrastructure Deficits in Rural and Remote Areas:**
Despite significant policy push for inclusive
education, **a vast gap remains in infrastructure
between urban and rural schools.**

✦ Rural schools, especially in remote areas,
often **lack basic amenities like clean water,
electricity, and functioning toilets**.

✦ The government's efforts, such as the **Samagra
Shiksha Abhiyan,** have made progress, but th**e
infrastructure in over 400,000 under-
resourced schools still languishes**.

📎 A 2023 report stated that **only 47% of
schools in India have access to drinking
water**, and **only 53% have separate toilets
for girls.**

💡 **Teacher Shortage and Quality of Educators:** One of
the most critical issues hindering effective
educational reforms in India is the **shortage of
qualified teachers, particularly in rural and
disadvantaged areas.**

✦ From 2021-22 to 2023-24, there has been a
substantial reduction in sanctioned teaching
positions across India, decreasing by nearly
6%.

✦ Over **4,500 secondary school teachers** lack
proper education, **with less than 25% receiving
job training**, and there is an acute shortage of
subject-specialist teachers in STEM fields.

💡 **Inadequate Funding and Resource Allocation:**
While India's education sector has seen increasing
investments, the **level of funding remains
inadequate** to implement the sweeping changes
promised by the National Education Policy (NEP)
2020.

✦ India is spending on education around 4% of
GDP as a public expenditure and **just 2.5% of
GDP as private expenditure.**

✦ This funding gap affects **everything from
teacher salaries to infrastructure development** and digital learning tools.

💡 **Socio-Economic Disparities in Access to Education:**
Economic and social inequalities continue to be a
barrier to achieving inclusive education.

✦ Children from economically disadvantaged
backgrounds**, especially those in rural and
tribal areas,** often lack access to quality
education.

✦ For instance, tribal students in **Eklavya Model
Residential Schools (EMRS)** schools are
struggling with language barriers as teachers
instruct in Hindi instead of English or Telugu.,
underscoring the persistent educational
divide.

💡 **Rote Learning and Slow Curriculum Transition:**
India's education system continues to focus
excessively on **rote memorization,** which
undermines critical thinking and problem-solving
skills.

✦ Despite the NEP 2020's push for **competency-
based learning, schools and universities are
slow to transition** from traditional examination
systems.

✦ Recent surveys indicate that **75% of Class 3
students cannot read basic Grade 2-level text**,
showing that the focus remains on
memorization rather than comprehension and
application of knowledge.

💡 **Digital Divide and Technological Barriers:** Although
the shift towards digital education has been
accelerated by the pandemic, a significant digital
divide continues to impede effective educational
reform.

✦ **Rural areas, in particular, lack reliable internet
connectivity,** making online learning
inaccessible.

✦ While initiatives like **PM eVidya and the Skill
India Digital platform** have attempted to
bridge the gap, **only 47% of students in rural
areas have access to high-speed internet.**

- 💡 **Political and Bureaucratic Resistance to Reform:** Despite strong political will at the central level, many educational reforms in India face resistance at the **state and local levels due to bureaucratic red tape.**
    - ✦ States and local authorities often resist reforms that they perceive as threatening to their power or that require additional resources. For instance, the **consolidation of schools**, a key component of the NEP 2020, **has seen low progress due to resistance from many state governments.**
- 💡 **Gender-Based Barriers in Education:** Although gender inclusivity is a key focus of the Indian education system, gender-based barriers still impede the effectiveness of educational reforms.
    - ✦ **Girls, particularly in rural areas**, continue to face higher dropout rates due to early marriage, family responsibilities, and safety concerns.
    - ✦ The ASER report found that while girls' enrollment increased in the last decade, the dropout rate for girls remains significantly higher than for boys, particularly in secondary education.
        - 🔖 The survey of <u>United Nations Children's Fund (UNICEF)</u> in India states that in India, **33% of girls drop out of school due to domestic work.**

Government's Key Initiatives Related to Education

NEP 2020
A reform aligning education with modern needs.

PM SHRI Schools
Upgrading schools as NEP model institutions.

Samagra Shiksha
Ensuring equitable quality education for all.

PRERNA Program
Blending heritage with innovation in learning.

ULLAS (NILP)
Literacy program for adult empowerment.

NIPUN Bharat
Aiming for foundational literacy by Grade 3.

Vidyanjali
Community-driven program enhancing school education.

DIKSHA Platform
Tech hub for teacher training and resources.

SWAYAM Plus
Courses boosting employability and learning credits.

NISHTHA
Upskilling school teachers nationwide.

PM-Vidyalaxmi
Education loans for meritorious students.

What can India Learn from Other Countries in terms of Education Reforms?

- 💡 **Teacher Autonomy and Professional Development (Finland)**: In Finland, teachers are **highly respected professionals who are given significant autonomy in the classroom.**
  - ✦ They have the freedom to design their curriculum and teaching methods based on student needs. India can learn from this by offering more autonomy to teachers and investing in continuous professional development.
- 💡 **Project-Based Learning (Singapore)**: Singapore's education system integrates project-based learning (PBL) across subjects, focusing on real-world challenges.
  - ✦ Students work on long-term projects that require critical thinking, creativity, and collaboration. India can adopt PBL to move beyond rote learning and enhance **students' problem-solving skills and creativity.**
- 💡 **Digital Learning Infrastructure (Estonia)**: Estonia has integrated digital tools and platforms in its education system, allowing for personalized learning experiences.
  - ✦ **All Estonian schools were provided with the Internet in 2001** already and Estonia continues upgrading the digital infrastructure of schools.
  - ✦ India can accelerate its digital transformation by ensuring equitable access to technology and incorporating online learning tools into the mainstream education system.
- 💡 **Dual Education System (Germany)**: Germany's dual system combines classroom education with hands-on training in industries.
  - ✦ It allows students to gain work experience while studying, improving their employability.
  - ✦ **India can adapt this model by integrating more vocational training programs** and apprenticeships, bridging the gap between education and industry needs.
- 💡 **Student-Centered Learning (South Korea)**: South Korea's education system focuses heavily on student-centered learning, where the needs and interests of the students guide their learning process.
  - ✦ India can incorporate more flexible and personalized learning paths to cater to diverse student strengths and interests, rather than following a one-size-fits-all model.

What Measures can be Adopted to Strengthen the Effectiveness of India's Education System?

- 💡 **Enhanced Teacher Training and Professional Development:** To elevate the quality of education, there must be a **systematic overhaul of teacher training programs**, e**nsuring that educators are equipped with modern pedagogical skills.**
  - ✦ Continuous **professional development, including exposure to new teaching methods, technology integration, and subject expertise,** should be made a mandatory component of the teacher career progression.
- 💡 **Infrastructure Development in Rural and Remote Areas:** A key measure to improve the educational landscape is **substantial investment in upgrading infrastructure in rural and underdeveloped regions.**
  - ✦ This involves providing basic facilities like **clean water, electricity, functioning toilets, and digital learning resources in schools.**
  - ✦ Additionally, creating student-friendly environments, such as safe playgrounds and proper classrooms, will enhance the learning experience and reduce dropout rates.
- 💡 **Bridging the Digital Divide:** To ensure equitable access to education, bridging the digital divide is essential.
  - ✦ This requires **expanding broadband connectivity to rural and underserved areas,** coupled with providing affordable digital devices to students from economically weaker backgrounds.

- Furthermore, **enhancing digital literacy among both students and teachers will enable effective usage of e-learning platforms**, fostering an inclusive and technologically advanced education system.
- 💡 **Integration of Vocational and Skill-Based Education:** The future of education should be **geared towards developing practical skills** that align with industry needs (Finland Model).
  - ✦ **Incorporating vocational training and skill-based learning** into the mainstream curriculum will equip students with competencies that increase their employability.
  - ✦ **Collaborations with industries to design relevant curricula,** internships, and apprenticeship programs will ensure that students are workforce-ready upon graduation.
    - 🖉 This approach will not only reduce unemployment but also foster an entrepreneurial mindset among the youth.
- 💡 **Strengthening Public-Private Partnerships:** To address gaps in funding, infrastructure, and innovation, fostering **effective public-private partnerships (PPPs) in education is crucial**.
  - ✦ These partnerships **can help create high-quality educational content,** improve school infrastructure, and introduce modern teaching methodologies.
  - ✦ The government **should incentivize private entities to invest in education through clear regulatory frameworks**, ensuring that profit motives do not compromise educational standards.
  - ✦ Engaging community participation in the development of government schools and **tied corporate social responsibility (CSR) programmes.**
- 💡 **Revision of Curriculum to Encourage Critical Thinking:** The traditional rote-learning system needs a paradigm shift towards competency-based education.
  - ✦ **Updating and revising the curriculum** to focus on critical thinking, problem-solving, creativity, and interdisciplinary learning will better prepare students for the challenges of the modern world.

- ✦ The **curriculum should be flexible and adaptive,** allowing students to engage in practical applications of theoretical knowledge.
- 💡 **Improvement in Educational Governance and Accountability:** Strengthening the governance structures within educational institutions is crucial for ensuring effective implementation of reforms.
  - ✦ **Clear guidelines, transparent processes, and decentralized decision-making** can lead to more localized accountability.
  - ✦ Regular audits, performance assessments, and feedback mechanisms will help identify gaps and improve the quality of education.
- 💡 **Reforming the Examination and Assessment System:** The existing examination system needs to be overhauled to reduce the undue pressure on students.
  - ✦ **A shift from high-stakes exams to continuous, formative assessments (PARAKH under NEP 2020)** that focus on practical skills and project-based learning will better reflect a student's abilities.
  - ✦ Introducing multiple assessment methods, including peer reviews and self-assessment, will encourage holistic development.

Conclusion:

India's education system stands at a pivotal crossroads, where digital strides and policy reforms show promise, but deep-rooted challenges persist. From **inequity and infrastructure gaps to teacher shortages and rote learning,** systemic transformation is imperative. Harnessing innovation, inclusivity, and skill-based learning can shape a **resilient, future-ready Bharat.** A spirit of **"नवोन्मेष" (Navonmesh – innovation and renewal)** must guide the journey ahead.

■■■

Securing the Future for Indian Tribes

This editorial is based on "Call for permanent settlement for tribals" which was published in The Hindu on 17/04/2025. The article brings into picture the prolonged

plight of 50,000 displaced Gond tribals, highlighting their lack of recognition and rights in new regions. It underscores the urgent need for inclusive policies to protect and rehabilitate tribal communities across India.

> **Tag:** GS Paper - 2, Issues Related to SCs & STs, Government Policies & Interventions

In 2005, the Indian government's **"strategic hamleting" initiative to combat Maoist insurgency** led to the displacement of approximately **50,000 Gond tribes from Chhattisgarh to neighboring states.** Nearly two decades later, these communities remain in administrative limbo—**denied tribal status in their adopted regions while facing barriers to returning to ancestral lands.** Across India, tribal communities continue to endure **land dispossession, cultural erosion, poor access to services, and bureaucratic apathy**. There is an urgent need for comprehensive frameworks to safeguard indigenous rights, ensure effective rehabilitation, and enable their **meaningful integration into the national mainstream.**

What is the Role of Tribals in Shaping India's Socio-cultural and Developmental Fabric?

- 💡 **Cultural Preservation and Rich Heritage:** Tribal communities have **played a pivotal role in preserving India's rich cultural diversity**, contributing significantly to the country's folklore, traditions, and artistic expressions.
  - ✦ Their deep connection to nature and unique customs serve as a vital counterbalance to the homogenizing forces of modernization.
  - ✦ For instance, the **Gond and Bhil tribes are famous for their vibrant art,** which is now gaining global recognition.
    - 🔗 The **Warli tribe, known for their distinct folk art**, also contributes to the cultural fabric of India, with their intricate wall paintings depicting daily life and nature.
- 💡 **Environmental Stewardship and Biodiversity Conservation:** Tribal communities, especially in forested regions, have been at the **forefront of environmental stewardship,** protecting biodiversity through traditional knowledge systems.

  - ✦ Their **sustainable practices in resource management** have ensured the survival of crucial ecosystems.
  - ✦ The tribals' role as the guardians of forests can be seen in regions like **Bastar (Chhattisgarh),** where local tribal communities have actively opposed deforestation for mining.
  - ✦ Also, the **Dongria Kondh tribe in Odisha** is renowned for their efforts in protecting the **Niyamgiri hills,** fighting against the **bauxite mining project that threatened their sacred lands.**
- 💡 **Contribution to India's Agricultural Landscape:** Tribal communities have significantly contributed to the evolution of India's agricultural practices, **often being the first adopters of organic farming methods.**
  - ✦ Their **deep-rooted knowledge of the land, crops, and natural fertilizers** has informed sustainable agricultural practices, which have proven to be resilient in harsh conditions.
  - ✦ For instance, **the Munda tribe, in Jharkhand**, is another example, known for their traditional agricultural practices, such as **mixed cropping,** which ensures soil fertility and sustainability.
- 💡 **Economic Contribution through Tribal Entrepreneurship:** Tribal populations are increasingly contributing to India's economy, particularly through **entrepreneurship and local industries such as handicrafts, textiles, and herbal medicines.**
  - ✦ The government's initiatives like **TRIFED (Tribal Cooperative Marketing Development Federation of India)** have facilitated market access for tribal products.
    - 🔗 This has not only provided economic sustenance for tribal communities but also introduced their indigenous products to global markets.
- 💡 **Contributing to National Security and Development:** Tribal communities have played a crucial role in national security and regional development, particularly in areas affected by insurgencies.

Major Tribes in India

Swangal, Gujjars, Lahaulas, Khas, Pangwala, Lamba, Gaddis

Gond, Birjia, Asur, Savar, Parhaiya, Chero, Birhor, Santhals, Baiga

Balti, Garra, Sippi, Bakarwal, Mon, Gaddi, Purigpa, Beda

Pawai, Chakma, Raba, Hajong, Lakher, Garos, Jaintias Khasis

Bhotias, Buksa, Jaunsari, Khas, Raji, Tharu

Singpho, Monpa, Abor, Sherdukpen, Galo, Apatanis, Mishmi

Sahariya, Parahiya, Bhotia, Buksa, Jaunsari, Kol, Raji, Tharu

Bhutia, Khas, Lepchas, Limboo, Tamang

Bhils, Damaria, Dhanka, Meenas (Minas), Patelia, Sahariya

Nagas, Angami, Sema, Garo, Kuki, Kachari, Mikir, Rengma

Khasis, Chakma, Dimasa, Gangte, Garos, Hajong, Chutiya

Thadou, Aimol, Maram, Paite, Chiru, Purum, Kuki, Monsang, Angami

Patelia, Bhil, Dhodia, Bamcha, Barda, Paradhi, Charan, Gamta

Bhil, Bhutia, Chaimal, Chakma, Halam, Khasia, Lushai, Mizel, Namte

Kharia, Bhils, Murias, Birhors, Baigas, Katkari, Kol, Bharia, Khond, Gonds

Bru (Reang) Dimasa, Raba, Chakma, Lakher, Khasi, Synteng, Kuki, Pawai

Asur, Khond, Hajong, Ho, Parhaiya, Rabha, Santhals, Savar

Gonds, Birhors, Savar, Mundas, Santhals, Khaira, Bhumji

Nagasia, Biar, Khond, Agariya, Bhattra, Mawasi, Bhaina

Warlis, Khond, Bhaina, Katkari, Bhunjia, Rathawa, Dhodia

Gadaba, Ghara, Kharia, Khond, Matya, Oraons, Rajuar, Santhals

Chenchus

Varli, Dubia, Siddi, Dhodia, Naikda

Andh and Sadhu Andh, Bhil, Bhaghata, Dhulia, Rona, Kolam, Gond, Thoti, Goundu, Kammara, Savaras, Dabba Yerukula, Sugalis, Nakkala, Pardhan, Gadabas, Chenchus, Kattunayakan, Jatapus, Manna Dhora

Oraons, Onges, Sentinelese

Gond, Patelia, Barda, Yerava, Bhil, Koraga, Adiyan, Iruliga

Jarawa

Malai aarayan, Arandan, Uralis, Kurumbas, Eranvallan

Adiyan, Aranadan, Eravallan, Irular, Kadar, Kanikar, Kotas, Todas

Nicobarese, Shompens

- STs constitute **8.6% of the population of India** (Census 2011). Draft National Tribal Policy, 2006 records **698 STs** in India.
- **Particularly Vulnerable Tribal Groups (PVTGs)** are more vulnerable among the tribal groups. Among the 75 listed PVTGs, the highest number is found in Odisha.
- **Bhil is the largest tribal group** (38% of the total scheduled tribal population of India) followed by the Gonds.
- **Madhya Pradesh has the highest tribal population** in India (Census 2011).
- The **Santhal are the oldest tribes** in India. The Santhal system of governance, known as **Manjhi-Paragana**, can be compared to local self-governance.
- According to the Scheduled Castes and Scheduled Tribes list (modification orders), 1956, the inhabitants of **Lakshadweep** who and both of whose parents were born in these islands are treated as STs.
- **Article 342** of the Constitution prescribes procedure to be followed for specification of STs.
- **Article 275** provides for the **grant of special funds** by the Union Government to the State Government for promoting the welfare of Scheduled Tribes and providing them with a better administration.

Drishti IAS

- ✦ For example, the **re-enlisted dislocated tribals from Chhattisgarh** have been instrumental in counter-insurgency operations, providing valuable local knowledge and support to security forces.
- ✦ These tribals, who were initially displaced during the **"Strategic Hamlet" program,** now serve as crucial allies in the fight against Maoist insurgents in the region.
- 💡 **Tribal Populations in Promoting National Identity and Diversity:** Tribal communities, with their distinct customs, languages, and traditions, are vital in promoting India's pluralistic national identity.

✦ Their **festivals, rituals, and arts contribute to the cultural richness** of the nation. The celebration of **"Janjatiya Gaurav Divas" on November 15,** to honor the contributions of tribal freedom fighters, exemplifies the growing recognition of tribals' historical role in India's fight for independence.

✦ The government's recent focus on celebrating tribal heritage through the creation of **Tribal Freedom Fighters' Museums** across India is another example of their contributions to national identity and cultural preservation.

What are the Major Challenges Confronting Tribal Communities in India?

💡 **Land Alienation and Displacement:** Land alienation remains one of the most significant issues faced by tribal communities in India**, with increasing industrialization, urbanization, and development projects** leading to the loss of ancestral lands.

  ✦ For instance**, in Chhattisgarh and Odisha, tribals have faced large-scale displacement due to mining**, resulting in a breakdown of community structures and economic instability.

    ✐ Also**, The Koya tribes of Thottipampu** have slowly lost their lands to non-tribal moneylenders and landlords, reducing their status to that of laborers in their own fields.

💡 **Lack of Education and Skill Development:** Despite various government initiatives, access to quality education and skill development for tribal communities remains inadequate, **perpetuating a cycle of poverty and social exclusion.**

  ✦ The rise of initiatives like **Eklavya Model Residential Schools (EMRS)** is encouraging, but a large proportion of tribal youth still lack the skills to compete in the modern job market.

    ✐ Also, recent government data shows **EMRS struggling to meet the 5% PVTG quota, with rising dropouts.**

💡 **Health Disparities and Malnutrition:** Tribal communities experience poor health outcomes, exacerbated by **inadequate access to healthcare, lack of sanitation, and a high burden of malnutrition.**

  ✦ A recent study revealed that **Anaemia among tribal women aged 15-49 years rose from 59.9% to 64.6%.**

    ✐ Also, it has been reported that about **40% of under 5 tribal children are stunted**, and 16% of them are severely stunted.

💡 **Economic Exploitation and Poverty:** Tribal communities face economic exploitation, with many relying on subsistence farming or manual labor in hazardous and poorly paid sectors.

  ✦ Despite their significant contribution to the country's economy through resources like **forest products, tribals often receive minimal compensation for their labor.**

  ✦ The Government's efforts to promote tribal entrepreneurship through schemes like **TRIFED have had limited success** due to a lack of market access and resources.

    ✐ The **increased exploitation of tribal labor in mining and construction industries in states like Jharkhand** has contributed to the persistence of poverty.

💡 **Cultural Erosion and Identity Crisis:** Tribal communities in India face the erosion of their cultural identity due to the **increasing influence of mainstream culture and urbanization.**

  ✦ The **Warli tribe in Maharashtra is an example of this phenomenon**, where the younger generation is increasingly moving away from traditional art forms in favor of more modern professions.

    ✐ This shift jeopardizes the continuity of tribal traditions, folklore, and customs.

💡 **Environmental Degradation and Resource Scarcity:** Environmental degradation, driven by deforestation, mining, and industrial activities, poses a significant threat to tribal communities, **whose livelihoods are intricately linked to the natural environment**.

  ✦ Above **50% of the tribal population live in forests (GoI, TRIFED, 2019)**, and derive their livelihoods from land and forest resources, yet the availability of resources like mahua and tendu leaves is declining annually.

- In regions like **Bastar (Chhattisgarh)**, deforestation for mining and industrial purposes has led to a depletion of forest resources, directly impacting tribal income from non-timber forest products.
- 💡 **Weak Implementation of Forest Rights Act (FRA):** The Forest Rights Act (FRA) 2006 was a landmark piece of legislation aimed at recognizing the rights of tribal communities over forest lands they have traditionally inhabited.
  - However, **its implementation remains weak,** with many tribal groups still struggling to get their claims recognized.
  - For instance, over **40% of tribal claims under the [Forest Rights Act (FRA)](#)** have been rejected by the Gujarat government.
    - Critics argue that **excessive reliance on satellite imagery**, without abiding by the list of evidence provided in the FRA, had led to **'wrongful denials of rightful claims'.**

What are the Key Government Initiatives Related to Tribal Welfare?

- 💡 **Legal Anchors**: The **Forest Rights Act (FRA), 2006** and **PESA, 1996** have laid the groundwork for community empowerment by granting ownership over resources and strengthening self-governance.
  - The evolution from the Tribal Sub-Plan to the **Development Action Plan for Scheduled Tribes (DAPST)** shows a deepening fiscal and strategic commitment.
- 💡 **Key Flagship Initiatives:**
  - **Dharti Aaba Janjatiya Gram Utkarsh Abhiyan**
    - Covers 63,000 tribal villages with an investment of ₹79,150 crore.
    - Integrates 25 interventions across 17 ministries.
    - Focuses on infrastructure, health, education, and livelihoods.

- [PM-JANMAN (Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan)](#)
  - Targets **PVTGs** with focused support for electrification, water access, education, and healthcare.
  - Operationalizes mobile medical units and builds Van Dhan Kendras to stimulate tribal entrepreneurship.
- **Eklavya Model Residential Schools (EMRS)**
  - Envisions parity with Navodaya Vidyalayas, blending quality education with cultural preservation.
- 💡 **Health and Nutrition: Holistic Interventions**
  - **Sickle Cell Anaemia Elimination Mission (2023)**: Aims for universal screening and treatment across vulnerable tribal belts.
  - **Swasthya Portal**: Digitally tracks tribal health outcomes, aiding data-driven policymaking.
  - **[Mission Indradhanush](#) & Nikshay Mitra**: Ensure immunization and TB care in hard-to-reach tribal areas.
- 💡 **Socio-Economic Empowerment: Self-Reliance as a Goal**
  - **Van Dhan Vikas Yojana & MSP for MFP**: Create value chains for forest produce, ensuring market access and fair income.
  - **NSTFDC, TRIFED, Aadi Mahotsav**: Promote tribal entrepreneurship, artisanry, and cultural exports.

What Measures can India Adopt to Mainstream and Empower Tribal Communities?

- 💡 **Enhancing Access to Quality Education and Vocational Training:** To empower tribal communities, it is crucial to expand access to quality education tailored to their cultural context.
  - This includes **strengthening the Eklavya Model Residential Schools (EMRS),** ensuring they provide **not just academic education but also vocational training aligned with the local economic landscape.**

- Additionally, integrating tribal languages and cultural practices into curricula will help preserve their heritage while ensuring students remain competitive in the modern job market.

- **Implementing Robust Land Reforms and Forest Rights:** The Forest Rights Act (FRA) 2006 must be fully implemented to recognize the land and forest rights of tribal communities. **Supreme Court's** guidelines in **T.N. Godavarman Case** should be implemented in letter & spirit

  - A **nationwide drive to ensure that tribal claims to forest land are legally recognized** will prevent displacement and provide them with the security to continue their traditional practices.

  - Also, there is a need to ensure **effective participation of women in FRA processes** and decision-making, recognizing their close relationship with forests **(Xaxa Committee)**

- **Promoting Economic Self-Sufficiency through Tribal Entrepreneurship:** Tribal entrepreneurship should be **promoted through targeted financial support, including soft loans, grants, and capacity-building initiatives.**

  - The government can create a **robust infrastructure for tribal businesses by connecting them to broader markets** through **digital platforms and cooperatives,** particularly for handicrafts, organic produce, and sustainable forest-based products.

  - **Particularly Vulnerable Tribal Groups (PVTGs),** as recommended by the **Dhebar Commission,** should be given special focus.

- **Strengthening Tribal Governance and Political Representation:** Empowering tribal communities through better political representation is vital.

  - This includes ensuring that tribal areas are governed by tribal leaders with a deep understanding of local needs, values, and governance systems.

  - Strengthening **decentralized governance bodies like Panchayats (under the Panchayats Extension to Scheduled Areas Act, 1996)** and providing more autonomy to tribal councils can ensure more locally-driven decision-making.

- This approach would help address tribal issues more efficiently, from resource management to welfare schemes.

- **Fostering Inclusive Healthcare Systems:** To tackle the severe healthcare disparities faced by tribal populations, India must adopt an **inclusive healthcare model that incorporates tribal health needs into the national healthcare framework.**

  - This includes improving access to healthcare facilities in tribal areas, training healthcare providers in culturally sensitive practices, and addressing health issues specific to tribals, such as sickle cell anemia and malnutrition.

  - Telemedicine services can be used to **connect remote tribal areas with specialists in urban centers (with the help of BharatNET),** and mobile healthcare units can help deliver essential services.

- **Promoting Cultural Preservation and National Integration:** While mainstreaming tribal communities, it is essential to preserve their cultural identity and heritage.

  - **Establishing institutions dedicated to preserving tribal arts, languages, and traditions** will ensure that tribal cultures are not lost to globalization.

  - The government can facilitate the inclusion of tribal cultural festivals, art forms, and practices in national celebrations and tourism, promoting a deeper understanding of their contributions to India's cultural fabric.

- **Addressing Climate Change and Environmental Protection:** It is crucial for India to adopt climate-resilient strategies that **specifically cater to the needs of tribals, including promoting sustainable agriculture,** forest management, and water conservation practices.

  - **Offering tribals a direct role in environmental conservation,** backed by financial incentives, can help them protect their natural resources while securing their livelihoods.

  - Collaborative efforts with NGOs and international organizations focused on climate change could provide tribals with the tools and knowledge to mitigate environmental challenges.

- 💡 **Legal Protections Against Exploitation and Discrimination:** There is a need to amend PESA to strengthen the requirement of prior informed consent for projects in Scheduled Areas as recommended by **Xaxa Committee**
  - ✦ This **involves implementing strict laws against land grabs,** ensuring timely compensation for displacement, and protecting tribals from exploitation in mining, agriculture, and other sectors.
    - 📎 Along with effective implementation of the Forest Rights Act (FRA), 2006, and PESA, 1996, with **penalties for officials who delay their execution.**
  - ✦ There is also a need to **strengthen the role of Tribal Advisory Councils** and ensure their active involvement in governance
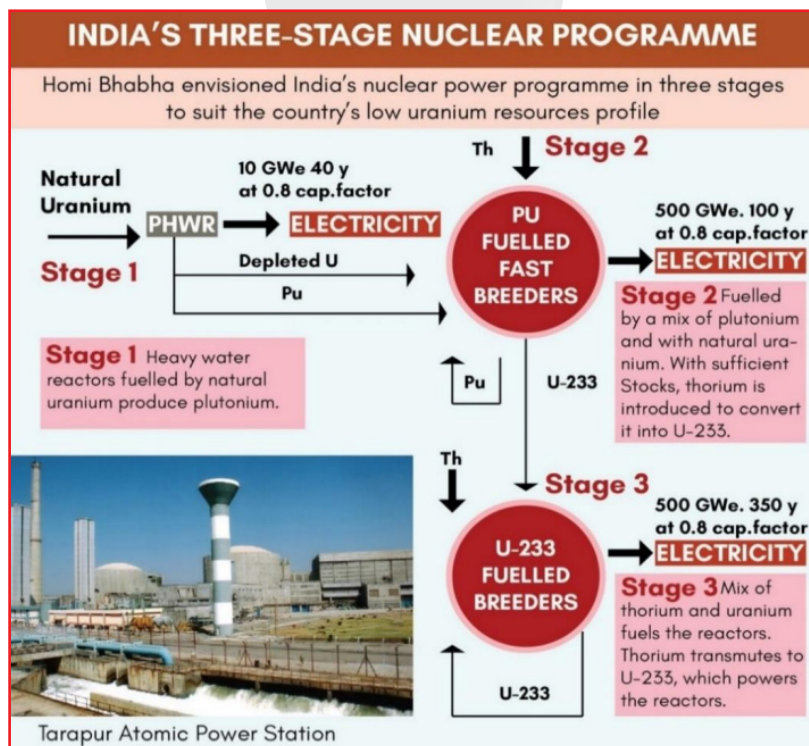
Conclusion:

India's tribal communities are integral to its socio-cultural mosaic and ecological balance, yet they face persistent marginalization and neglect. To truly empower them, India must uphold **SDG 1 (No Poverty), SDG 4 (Quality Education), SDG 10 (Reduced Inequalities), and SDG 15 (Life on Land) through inclusive development, education, and land rights.** A rights-based, culturally sensitive, and participatory approach is vital for sustainable tribal upliftment.

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India'S Nuclear Energy Roadmap

This editorial is based on "[India's long pursuit of nuclear power](#)" which was published in Hindustan Times on 15/04/2025. The article brings into picture the gap between India's nuclear energy ambitions and actual progress, highlighting the need for private participation and innovation to achieve the 100,000 MW target by 2047.

Tag: GS Paper - 1, Mineral & Energy Resources, GS Paper - 3, Nuclear Technology

INDIA'S THREE-STAGE NUCLEAR PROGRAMME

Homi Bhabha envisioned India's nuclear power programme in three stages to suit the country's low uranium resources profile

Stage 1
Natural Uranium → PHWR → ELECTRICITY (10 GWe 40 y at 0.8 cap.factor)
Depleted U / Pu

Stage 1 Heavy water reactors fuelled by natural uranium produce plutonium.

Stage 2
Th → PU FUELLED FAST BREEDERS → ELECTRICITY (500 GWe. 100 y at 0.8 cap.factor)
Pu / U-233

Stage 2 Fuelled by a mix of plutonium and with natural uranium. With sufficient Stocks, thorium is introduced to convert it into U-233.

Stage 3
Th → U-233 FUELLED BREEDERS → ELECTRICITY (500 GWe. 350 y at 0.8 cap.factor)
U-233

Stage 3 Mix of thorium and uranium fuels the reactors. Thorium transmutes to U-233, which powers the reactors.
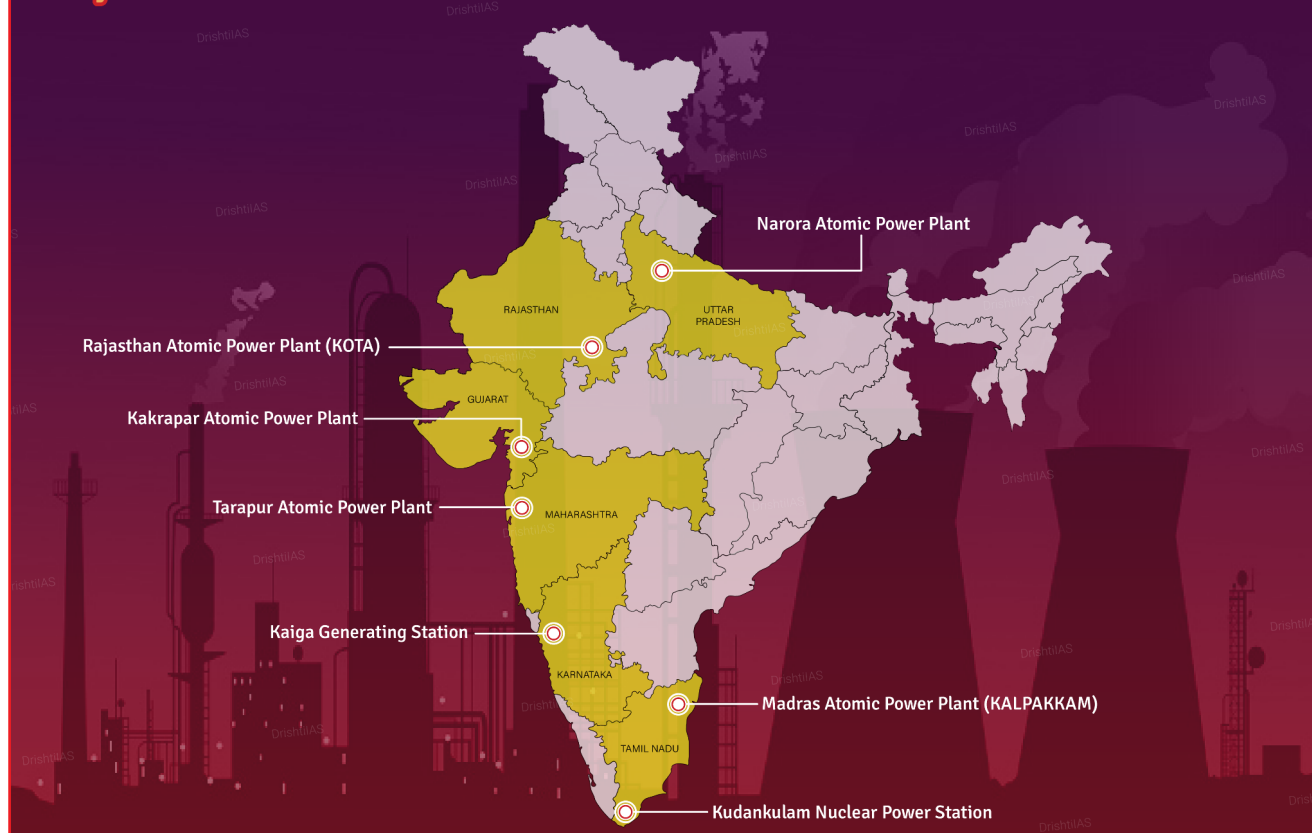
Tarapur Atomic Power Station

India's nuclear journey reflects both ambition and challenge, with the **recent FY26 Union Budget** targeting **100,000 MW of nuclear capacity by 2047**—crucial for both industrial growth and net-zero emissions by 2070. Despite **Homi Bhabha's visionary three-stage plan from 1954,** actual achievements have consistently fallen short of declared targets, with current capacity a**t only 8,180 MW.** India needs to intensify efforts in this regard through **greater private sector participation, technological innovation, and focused implementation** to meet its growing electricity demands and achieve energy security.

What is the Role of Nuclear Energy in Advancing India's Energy Transition and Driving Economic Growth?

- 💡 **Reducing Fossil Fuel Dependency and Achieving Net-Zero Goals:** Nuclear energy plays a pivotal role in India's strategy to reduce dependency on fossil fuels and meet its net-zero emissions target by 2070.

Operational Nuclear Power Plants in India

- Narora Atomic Power Plant
- Rajasthan Atomic Power Plant (KOTA)
- Kakrapar Atomic Power Plant
- Tarapur Atomic Power Plant
- Kaiga Generating Station
- Madras Atomic Power Plant (KALPAKKAM)
- Kudankulam Nuclear Power Station

FACTS

- ❍ Presently, India has 22 nuclear power reactors operating in 6 states, with an installed capacity of 6780 MegaWatt electric (MWe).
- ❍ Activities concerning the establishment and utilization of nuclear facilities and use of radioactive sources are **carried out in India in accordance with the Atomic Energy Act, 1962.**
- ❍ Atomic Energy Regulatory Board (AERB) **regulates nuclear & radiation facilities and activities.**
- ❍ **Newest & Largest Nuclear Power Plant:** Kudankulam Power Plant, Tamil Nadu.
- ❍ **First & Oldest Nuclear Power Plant:** Tarapur Power Plant, Maharashtra.

- With the ambitious target of **100,000 MW** of nuclear capacity by **2047**, nuclear power is poised to be a cornerstone in the country's clean energy transition.
- For instance, India's nuclear power capacity is set to grow from **8,180 MW** to **22,480 MW** by **2031-32**.

💡 **Catalyst for Energy Security and Stable Supply:** Nuclear energy is integral to ensuring **energy security** by providing a stable, uninterrupted power supply.

- Unlike renewable sources like **wind and solar,** which are intermittent, nuclear plants can operate **24/7**, ensuring a consistent energy output.
- As India's electricity demand grows at **6-8%** annually, nuclear power helps stabilize the grid. The government plans to add **18 reactors** by **2031-32**, underscoring nuclear energy's critical role in maintaining a **stable power supply** amid rising demand.

💡 **Economic Growth Through Industrial Decarbonization:** Nuclear energy contributes significantly to **economic growth** by enabling decarbonization in energy-intensive industries like **steel, aluminium, and cement.**

- By providing reliable **captive power** through technologies like **Bharat Small Reactors (BSRs)**, nuclear energy supports industrial sectors in meeting carbon reduction targets.
- The **private sector participation** in BSR projects further bolsters this, with the **government allocating ₹20,000 crore for Small Modular Reactors (SMRs)** to diversify and modernize energy infrastructure by **2033**.

💡 **Enhancing Technological Innovation and R&D:** Nuclear energy drives **technological innovation** and research, particularly through advancements in **Fast Breeder Reactors (FBRs)**.

- These technologies not only improve nuclear efficiency but also align with India's **long-term energy strategy** to reduce reliance on uranium.

- The **Prototype Fast Breeder Reactor (PFBR),** which reached **core loading** in **2024**, exemplifies India's progress toward developing **thorium-based nuclear power**.

💡 **Strategic International Partnerships and Energy Diplomacy:** Nuclear energy enhances India's **energy diplomacy** by fostering international collaborations.

- The **2005 US-India Civil Nuclear Agreement** opened access to **global uranium markets**, helping India secure uranium supplies crucial for its growing nuclear fleet.
- **India and France** have agreed to collaborate on developing next-generation nuclear reactors, including advanced modular reactors and small modular reactors

💡 **Job Creation and Skill Development:** Nuclear energy plays a significant role in **job creation** and **skill development**, which are crucial for India's **economic growth**.

- The expansion of nuclear power plants generates employment opportunities in **construction, operations, maintenance**, and technology development.
- Nuclear power creates about **25% more employment per unit of electricity** than wind power, while workers in the nuclear industry earn one third more than other renewable sectors. **(International Atomic Energy Agency)**
  - 📎 This aligns with India's broader goal of enhancing its **industrial workforce** to meet future energy demands.

💡 **Supporting Decentralized Energy Generation in Remote Areas:** Nuclear energy provides a viable solution for **decentralized power generation**, especially in **remote and off-grid areas**.

- Small Modular Reactors (SMRs) are ideal for such locations due to their **modular design**, which allows for factory-based manufacturing and shorter construction timelines.
- The **Bharat Small Reactors (BSRs)**, designed to be deployed near industrial clusters, will not only serve these areas but also promote **sustainable local energy economies**.

<table>
<tr><td colspan="1">**What is the Current Status of
Nuclear Energy Around the Globe?**</td></tr>
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💡 **About**: Nuclear energy, developed for power generation since the 1950s, currently contributes **around 9% of global electricity** and is the **second-largest source of low-carbon power**, supplying about a **quarter of the world's low-carbon electricity**. It is central to achieving clean energy goals and sustainable development.

💡 Key Stats:

✦ **440 operational reactors** globally, producing **2602 TWh** in 2023

✦ **14 countries** produce over **25% of their electricity from nuclear (France ~70%).**

✦ **Top producers**: USA (779.2 TWh), **China** (406.5 TWh), **France** (323.8 TWh).

✦ **Reactor construction in 2025**: **Lufeng 1** (China), **Leningrad 2-4** (Russia).

✦ **Shutdowns**: **Doel 1 (Belgium).**

✦ **Emerging nuclear nations: Bangladesh, Turkey** (first plants under construction).

What are the Key Issues Associated with India's Nuclear Power Sector?

💡 **Slow Pace of Project Implementation:** While India aims to ramp up its nuclear capacity significantly, projects have experienced significant delays.

✦ The **Prototype Fast Breeder Reactor (PFBR)**, which began construction in **2004**, only achieved **core loading** in **2024**, and **commercial operations** are still far off.

✦ This delay may hinder the timely realization of **India's nuclear goals**, such as the target of **100,000 MW** by **2047**, highlighting inefficiencies in project management.

💡 **Uranium Supply Constraints:** Despite advancements in nuclear technology, **uranium supply constraints** remain a critical challenge.

✦ India's uranium production is limited, contributing to only **1-2% of global production.**.

✦ The **2005 US-India Civil Nuclear Agreement** has alleviated some pressure by securing access to international uranium markets, but India still faces dependency on **external sources** for fuel, which can lead to geopolitical risks.

📎 Also, **reactors utilizing imported uranium must comply with IAEA safeguards** to guarantee that the material is used exclusively for peaceful purposes, which places an additional compliance burden on India.

💡 **Technological Bottlenecks in Thorium Utilization:** India's ambitious **three-stage nuclear program** hinges on **thorium-based reactors**, but progress in the **second and third stages** remains stunted.

✦ The **Fast Breeder Reactors (FBRs)**, essential for transitioning to thorium, have faced consistent **technological bottlenecks**.

✦ Meanwhile, India's **accelerator-driven subcritical system (ADSS)**, proposed in **2003**, has not yet materialized, delaying the shift to thorium.

💡 **Financial Constraints and Investment Challenges:** The **high capital costs** associated with nuclear power, combined with **financial constraints**, are hindering the sector's growth.

✦ Although the **Union Budget 2025-26** allocated **₹20,000 crore** for **Small Modular Reactors (SMRs)**, the nuclear sector still faces challenges in attracting sufficient investment.

✦ According to the **CEA (Central Electricity Authority)**, the capital cost of a PHW nuclear power plant in India is about **INR 117 million.**

📎 And funding is often insufficient to overcome cost overruns and delays in large-scale nuclear projects.

💡 **Safety Concerns and Public Perception:** Despite robust safety protocols, the **public perception of nuclear power** remains a significant barrier.

✦ Incidents like the **Fukushima disaster** have heightened **global concerns** about nuclear safety, contributing to resistance in some regions.

✦ While **radiation levels** in India's plants remain **well below global safety thresholds**, the public remains wary.

✦ For example, **Kudankulam's** radiation levels have dropped from **0.081 micro-sieverts in 2014** to **0.002 micro-sieverts**, but this has not entirely alleviated public apprehension over nuclear safety, **complicating land acquisition and community support.**

- **Environmental and Waste Management Issues:** Nuclear waste management continues to be a **challenging issue** for India's nuclear power sector.
  - ✦ While India has established systems for handling nuclear waste, including **on-site storage** followed by **long-term storage**, the lack of **centralized waste repositories** remains a concern.
  - ✦ India's nuclear plants store waste for **five to seven years** before transferring it to storage facilities, but the long-term management of **spent fuel** is still unresolved.

What Measures can India Adopt to Enhance the Effectiveness and Productivity of the Nuclear Energy Sector?

- **Fast-Tracking Project Approvals and Implementation:** India must **accelerate the approval process** for nuclear projects and streamline **regulatory clearances**.
  - ✦ By establishing a **single-window clearance system**, India can reduce delays and improve **project turnaround times**, ensuring that the **100,000 MW target** by **2047** is met without further setbacks.
  - ✦ Leveraging **public-private partnerships (PPP)** will inject **capital** and **innovation** into India's nuclear sector.
  - ✦ Encouraging **private sector investment** through **amendments to the Atomic Energy Act** will create a conducive environment for **faster reactor deployment**.
- **Enhancing Indigenous Technology and R&D:** Investing heavily in **indigenous nuclear technology** will reduce **reliance on foreign suppliers** and ensure **energy security**.
  - ✦ India's progress in **Small Modular Reactors (SMRs)** and **Fast Breeder Reactors (FBRs)** needs to be complemented with **focused R&D** efforts.
  - ✦ This will help overcome **technological bottlenecks** and ensure **self-reliance** in nuclear power.

- **Strengthening Uranium Exploration and Supply Chains:** To address the **uranium supply shortage**, India should ramp up **domestic uranium exploration** and expedite **mining projects**.
  - ✦ The **recent discovery in Jaduguda Mines** offers an opportunity to boost reserves for **nuclear reactors**.
  - ✦ By deepening ties with countries like the **US**, **Russia**, and **France**, India can secure **long-term supply contracts** and benefit from **shared research** on next-generation nuclear technologies.
    - 🔗 These partnerships will enable faster adoption of **Small Modular Reactors (SMRs)** and accelerate capacity building in the nuclear sector.
- **Focus on Skilled Workforce and Capacity Building:** Investing in **human capital** is crucial for enhancing the productivity of India's nuclear sector.
  - ✦ By expanding **nuclear education** and **training programs**, India can develop a **skilled workforce** capable of operating and maintaining advanced nuclear reactors.
  - ✦ Collaboration with global institutes and establishing **nuclear universities** will equip future generations with the expertise needed to manage the evolving demands of the **nuclear energy landscape**.
- **Optimizing Nuclear Waste Management Systems:** India should establish a **centralized nuclear waste management facility** to ensure **sustainable handling** of spent fuel.
  - ✦ While on-site storage and **long-term waste disposal** are being practiced, a comprehensive solution for **waste reuse and recycling** is crucial for sustainability.
  - ✦ Investments in **advanced reprocessing technologies** will reduce environmental risks and improve **public acceptance** of nuclear energy.

Conclusion:

Nuclear energy is pivotal to India's clean energy transition, energy security, and industrial decarbonization goals. To achieve the 100,000 MW target by 2047 and align with the **Paris Agreement and SDG 7 (Affordable**

and Clean Energy), India must overcome project delays and uranium constraints. **Strategic international partnerships and public trust** will be key to unlocking nuclear energy's full potential in India's growth story.

■ ■ ■

Balancing Constitutional Powers in A Democratic Setup

This editorial is based on "Tamil Nadu governor case: Judicial overreach, not constitutional interpretation" which was published in The Indian Express on 14/04/2025. The article highlights the evolving relationship between constitutional functionaries, specifically the President and the Governors, and the judiciary's role in delineating their responsibilities and timelines.

> **Tag:** GS Paper-2, Judiciary, Executive, State Legislature, Role of Governor, Parliament, Centre-State Relations, Judgments & Cases, Separation of Powers, Judicial Review, Separation of Powers, Judicial Review, Constitutional Amendments, Co-operative Federalism, Federalism

The recent Supreme Court judgment directing constitutional heads, the President and Governors to act on bills within a **"reasonable time"** has triggered a timely debate on the balance of powers. While hailed by many as a corrective against deliberate executive delays, the verdict also raises concerns about judicial overreach into the discretionary realm of constitutional functionaries. The *State of Tamil Nadu vs. Governor of Tamil Nadu* case has become a litmus test for cooperative federalism, the sanctity of legislative processes, and the limits of judicial activism.

What is the SC's Verdict on the President's and Governor's Role in State Bills?

- 💡 **Case Background:** The Tamil Nadu Governor withheld assent to 10 Bills, delaying action under **Article 200** (power of the Governor to assent to the bills of the State Legislature).

  - ✦ After the Governor withheld assent, the Tamil Nadu Legislative Assembly re-enacted the Bills and sent them back. Instead of granting assent or returning them with comments, the Governor referred them to the **President.**

  - ✦ The state government challenged the delay, citing constitutional violations and governance disruption.

- 💡 **SC's Verdict on Governors' Role in State Bills:** SC termed the Tamil Nadu Governor's referral of re-enacted Bills to the President as **"erroneous in law."**

  - ✦ The Court ruled that there is no concept of **"absolute veto"** or **"pocket veto"** under Article 200 and stated that governors cannot indefinitely delay action on bills.

    - 🖉 SC noted that **Governors are bound to follow the advice of the Council of Ministers.**

  - ✦ The **SC prescribed clear timelines for Governors** when dealing with Bills with **one month to withhold assent, three months if doing against State Cabinet advice,** and **one month for Bills re-presented after reconsideration.**

- 💡 **SC's Verdict on the President's Role in State Bills:**

  - ✦ The **SC noted that Article 201** provides **no specific timeline** for Presidential assent, and such delays can stall legislative processes**, leaving state Bills in "indefinite and uncertain abeyance."**

  - ✦ It emphasized that **inaction violates the constitutional principle of non-arbitrariness** in the exercise of power.

  - ✦ **Time Limit:** The SC held that the President cannot exercise an "absolute veto" by indefinitely delaying assent. A decision must be made **within three months,** and any delay must be reasoned and communicated to the State.

    - 🖉 Withholding assent must be based on sound and specific grounds, not done arbitrarily.

    - 🖉 If the **President fails to act** within the time limit, **States can file writ petitions** to compel a decision, **seeking a Writ of Mandamus** from the Court.

- Additionally, the **SC stated that under Article 143**, if a bill is reserved by the **Governor** on the grounds of unconstitutionality, the **President ought to seek the Supreme Court's opinion.**

💡 Although it is **not mandatory,** the reference to the SC in such cases carries high persuasive value.

- The SC clarified that **unlike the Governor, who must assent to a State Bill** if it is passed again after being returned. The **President is not constitutionally bound to do so under Article 201.**

💡 This is because Article 201 applies only in exceptional cases where state legislation has potential national implications.

- **References:** The SC referred to the 2016 Office Memorandums issued by the Ministry of Home Affairs, which prescribed a three-month timeline for decisions on state bills reserved for the President.
  - The Court invoked **recommendations of the Sarkaria Commission (1988) and Punchhi Commission (2010),** both of which **called for time-bound decisions on reserved Bills.**
  - **Punchhi Commission:** In respect of bills passed by the Legislative Assembly of a state, the **Governor should take the decision within six months whether** to grant assent or to reserve it for consideration of the President.

What are the Constitutional Provisions Related to State Bills?

💡 **Article 200:**
- When a Bill is passed by the Legislative Assembly (or both Houses if there is a Legislative Council) of a state, it must be sent to the **Governor** for approval.
  - The **Governor** has three options: **Assent** to the Bill (approve it); **Withhold assent** (reject it); **Reserve the Bill for the President's consideration** (send it to the President for a final decision).

- **If the Bill is not a Money Bill**, the Governor can **send the Bill back** to the Legislature with a message asking them to reconsider it, or to introduce any changes the Governor suggests.
  - After the Legislature reconsiders and passes the Bill again (with or without amendments), the Governor **must** give **assent** if the Bill is sent back to him again.
- **If the Bill could affect the powers of the High Court**, the Governor **must reserve it** for the President's consideration.

💡 **Article 201:**
- If the Governor sends a Bill to the **President**, the **President** has two options: **Assent** to the Bill (approve it) or **Withhold assent** (reject it).
- **If the Bill is not a Money Bill**, the President can **send the Bill back** to the Governor with a message asking the Legislature to reconsider it, just like the Governor did in **Article 200**.
- The Legislature must reconsider the Bill within **six months** from the date they receive the President's message.
- If the Legislature passes the Bill again (with or without changes), the Bill is sent back to the **President** for final approval.

What are the Implications of the SC's Ruling on the President and Governor's Role in State Bills?

Positive Implications:

💡 **Strengthening Accountability in Governance:**
- The SC's directive on Governors and the President to act on state bills within a reasonable time strengthens **democratic accountability**.
  - This ensures that **elected representatives** are not hindered by unnecessary delays, making the legislative process more efficient.
- The **Constitutional provisions**, especially **Articles 200 and 201**, provide a structure for executive decisions on bills, ensuring transparency in the working of constitutional functionaries.

- 💡 **Protection of Federal Structure:**
  - ✦ By ensuring that **Governors cannot withhold assent indefinitely**, the SC's ruling **reaffirms the federal balance**, reducing the potential for the **Centre to exert undue influence** over state legislative functions.
    - 🖉 This judgment could act as a **check on the misuse of gubernatorial powers for political purposes.**
  - ✦ **Article 200** demands that bills passed by **state legislatures are either assented to or reserved** for the President's consideration, safeguarding the autonomy of state legislatures.
- 💡 **Enhancing Legislative Independence:**
  - ✦ The ruling prevents **executive overreach (Governor)**, ensuring that bills **passed by state legislatures cannot be blocked** without justifiable cause.
    - 🖉 This upholds the **separation of powers**, a core principle of the Constitution **(declared basic structure in *Indira Gandhi vs Raj Narain Case, 1975*),** and ensures that the **executive branch does not unduly influence the legislature**.
  - ✦ The **Right to Legislate** is now more secured, empowering state governments to carry out their policy agenda without unnecessary interference from the Governor's office.
- 💡 **Judicial Oversight as a Safeguard:**
  - ✦ The **Supreme Court's intervention** ensures that **Governors and Presidents do not act arbitrarily,** providing judicial checks (writ of *Mandamus*) where needed.
    - 🖉 It clarifies the **timeliness of actions** by the executive and ensures **constitutional morality** is upheld.
  - ✦ The **ruling upholding Articles 200 and 201,** it **emphasizes that executives must act in line with democratic and federal principles,** with the **Supreme Court in *Rameshwar Prasad* (2006)** affirming that the Governor's power to withhold assent is subject to judicial review if exercised arbitrarily.

Negative Implications:

- 💡 **Judicial Overreach into Executive Functions:**
  - ✦ The SC's interference in prescribing timelines for Governors and the President may be perceived as **judicial overreach**, potentially infringing upon the **separation of powers**.
    - 🖉 By mandating action within a specified time, the Court could be perceived as **intruding into executive and constitutional functions** that were originally meant to be outside judicial control.
    - 🖉 In light of **Article 212**, **legislative proceedings are immune from judicial scrutiny**. As the **Governor's role in lawmaking** is part of this process, it is **similarly protected.** Hence, **judicial directions to the Governor** or President—**unlike in the case of the Speaker acting as a tribunal** in defection-related cases, where the SC refused to set a timeline citing its constitutional position—may **amount to judicial overreach.**
  - ✦ Critics argue that the **Governor's discretion**, particularly in cases involving contentious issues, **should not be subject to judicial timelines**, as it might distort the independence of the office.
- 💡 **Undermining Constitutional Office:**
  - ✦ The **two-judge bench of the Supreme Court** effectively **re-enacted the Constitution** by imposing conditions that the framers had deliberately avoided.
  - ✦ By invoking **Article 142**, the Court has subjected the roles of the **Governor** and **President to judicial scrutiny,** allowing for writs to be issued against the President, contrary to the original constitutional design.
  - ✦ This decision undermines the **independence** and **impartiality** of these constitutional offices, which were intended to function above political pressures.
  - ✦ The ruling introduces the risk of judicial intervention in the **Governor's** and **President's** discretionary powers, potentially eroding their autonomy and altering the **balance of powers** in the Constitution.

- **Diluting Separation of Power:**
  - The **Supreme Court's recent ruling** effectively **amends the Constitution** by imposing fixed timelines on the **Governor** and **President** regarding assent to bills. This alters the procedural framework of **Article 200** and **Article 201**, which traditionally allowed discretion to these constitutional offices.
  - By doing so, the Court has encroached upon the **Parliament's power** under **Article 368** to amend the Constitution, modifying the original procedures set by Parliament.
- **Opening a Pandora's Box:**
  - The Supreme Court's judgment has **introduced judicial oversight into legislative matters**, potentially leading to a flood of **similar cases involving center-state disputes and discretionary powers**, such as those in states like Kerala, West Bengal, Telangana, and Punjab, where Governors have delayed assent to Bills.
  - This could overburden an already **overloaded judiciary (+80000 pending cases in SC)**, diverting **attention from more urgent legal issues** and creating a precedent for further judicial intervention in legislative functions.

What Could Be the Structural Remedies Regarding the Governor's Role in State Bills?

- **Impeachment Process for Governors**: At present, Governors can only be removed by the **President**, which limits **state-level accountability**.
  - The **Punchhi Commission** suggested introducing an impeachment process *(mutatis mutandis)* at the state level to improve accountability.
  - Additionally, the **Supreme Court's ruling in** *BP Singhal vs Union of India (2010)* stressed that removal should be based on valid reasons, ensuring fairness in the process.
- **Revision to Article 163**: Article **163 grants Governors discretionary powers**, which could sometimes lead to political bias.
  - An amendment could **clarify that these powers should only be exercised in exceptional situations** that directly impact national interest or constitutional integrity, reducing the scope for misuse.

- **Periodic Review of Gubernatorial Conduct**: Establishing a **periodic review system** via **Judicial Commissions** could assess how Governors exercise their powers.
  - This would ensure their actions align with **constitutional principles**, minimize interference in state governance, and enhance **transparency**.
- **Clear Guidelines for Imposing President's Rule**: To avoid misuse, the Governor's discretion in recommending **President's Rule** should be **strictly guided** by objective criteria and subject to judicial review, as emphasized in the **S.R. Bommai case (1994)**.
  - The **Sarkaria Commission** recommended that this should be a **last resort**, invoked only after all other constitutional remedies have been exhausted.
- **Primacy of Advice of Council of Ministers:**
  - In *Shamsher Singh v. State of Punjab (1974) case*, the Supreme Court emphasized that the Governor must act on the advice of the Council of Ministers, except in situations where the Constitution explicitly requires the Governor to act in his discretion.
  - The same stance was reiterated in the current judgment, reinforcing that the Governor's actions should align with the advice of the elected government, ensuring democratic governance and accountability.

Conclusion

The Supreme Court's ruling on the **Governor's and President's role** in the assent process strengthens **democratic accountability** but raises concerns about **judicial overreach** and the **separation of powers**. While it enhances **legislative efficiency**, it is crucial to balance accountability with the **independence of constitutional offices**.

Future reforms should focus on introducing an **impeachment process for Governors**, clarifying the scope of **discretionary powers**, and establishing **review mechanisms** to ensure **transparency and constitutional balance.**

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Navigating the India-China Tightrope

This editorial is based on "India-China relations at 75: An uncertain thaw" which was published in Hindustan Times on 21/04/2025. The article brings into picture the persistent structural challenges in India-China ties, including the unresolved LAC dispute and strategic distrust. Despite 75 years of diplomatic relations, tensions remain amid evolving global dynamics.

Tag: GS Paper - 2,India and its Neighbourhood,Important International InstitutionsGroupings & Agreements Involving India and/or Affecting India's Interests, International Treaties & Agreements, Effect of Policies & Politics of Countries on India's Interests

Despite recent diplomatic warming, **India-China relations** remain fundamentally challenged by structural problems. The unresolved boundary dispute along the LAC, with incomplete **de-escalation following 2020 transgressions**, continues to be a flashpoint. China's concerns about India's growing partnership with the US, viewing it as abandoning **"strategic autonomy,"** further complicates bilateral ties. Even as both countries marked **75 years of diplomatic relations** in April 2025, these persistent issues ensure that **tensions will continue to define their relationship amid global uncertainties.**

What are the Key Areas of Positive Developments Between India and China?

- 💡 **Resumption of Diplomatic Dialogue:** Despite strained ties post-2020, both nations have revitalised dialogue mechanisms to manage tensions and prevent escalation.
  - ✦ The revival of structured talks like the **Special Representatives (SRs) mechanism** reflects mutual interest in restoring diplomatic normalcy.
    - 🖉 **The 23rd SRs meeting (Dec 2024) resumed after a 5-year gap**.
  - ✦ Constructive engagement now focuses on political perspectives rather than only military posturing.

- 💡 **Patrolling Agreement at LAC:** India and China reached a limited but crucial agreement on **regulated patrolling** at friction points along the LAC.
  - ✦ Though **full de-escalation is pending**, it marks a shift from confrontation to management. This step reflects a tactical thaw aiming at reducing risks of accidental conflict.
    - 🖉 In **October 2024,** both sides agreed on patrolling protocols at multiple flashpoints, breaking a **four-year standoff since Galwan (2020**).
    - 🖉 **Indian External Affairs Minister** reiterated recently that *"peace and tranquillity at the border is non-negotiable"* and that rebuilding ties post-2020 is in "mutual interest".

- 💡 **People-to-People Exchanges:** After years of disruption, both nations have worked to revive **cultural and interpersonal engagement** as a soft reset to strained relations.
  - ✦ **Visas, pilgrimage talks, and academic links** are being restored to rebuild societal-level trust.
  - ✦ For instance, **China issued over 85,000 visas to Indian citizens between Jan–April 2025**. Also, modalities for Kailash Mansarovar Yatra 2025 are being finalised.

- 💡 **Trade Continuity Despite Tensions:** While geopolitical friction persists, **bilateral trade remains resilient**, showing strong economic interdependence.
  - ✦ India has calibrated economic responses **post-Galwan without fully decoupling from China, indicating pragmatism.** Economic ties serve as a buffer to contain strategic competition.
  - ✦ For instance, In the **fiscal year 2024, bilateral trade between India and China reached US$118.4 billion**. China remains India's second-largest trading partner despite curbs on tech imports.

- 💡 **Climate and Global Development Issues:** Both nations align on the need for **climate justice**, **green financing**, and **South-South cooperation.**

✦ Shared concerns about **Western carbon tariffs** and inequities in global climate governance create a zone of policy convergence. This **enhances India's leadership with China in multilateral climate platforms.**

✦ For instance, India and China united against **EU Carbon Border Tax** at COP29, citing unfair competition and economic impact concerns.

What are the Key Areas of Contention Between India and China?

💡 **China's 'ICAD' Strategy (Illegal, Coercive, Aggressive, Deceptive):** Beijing's hybrid tactics—**cartographic aggression, hydro-politics, and infrastructure build-up**—reflect an **assertive ICAD doctrine** to alter facts on the ground. India perceives this as a deliberate challenge to territorial sovereignty.

✦ For instance, China has **rechristened 30 locations in Arunachal Pradesh with Chinese and Tibetan name**s as part of its continuing efforts to assert claims over the north-eastern Indian state.

🖉 Also, China plans a mega dam on **Yarlung-Tsangpo near Arunachal border.**

💡 **China-Pakistan Nexus and CPEC:** China's deepening strategic partnership with Pakistan, especially through **China Pakistan Economic Corridor (CPEC),** directly violates India's **sovereignty claims in PoK** and enhances two-front security concerns.

✦ The **CPEC passes through Gilgit-Baltistan**. Also, **China's presence in Gwadar port and weapon transfers to Pakistan** continue to alarm Indian security circles.

💡 **Trade Imbalance and Economic Dependence:** India faces a massive and widening **trade deficit** with China, creating economic vulnerability. Dependence on Chinese tech and hardware persists despite geopolitical risks.

✦ For instance, India posted a trade deficit of **$99.2 billion with China** in the **2024-25 fiscal year.**

💡 **Border Dispute and LAC Militarisation:** The unresolved boundary dispute remains the **central fault line**, with repeated violations of protocols along the LAC undermining trust.

- ✦ Despite disengagement in parts, full **de-escalation and de-induction** have not occurred. China's **grey-zone tactics have expanded the zone of friction.**
- 💡 **South Asia and Maritime Competition:** China's growing presence in **India's neighbourhood** through BRI projects and port infrastructure challenges India's regional primacy. This fuels direct competition in **South Asia and the IOR.**
  - ✦ China has invested in ports across **Sri Lanka, Pakistan, Maldives. For instance, Beijing's lease of Hambantota port** and **Maldives' military deal** signal growing proximity.
- 💡 **Perception of Strategic Alignments:** China views India's deepening ties with the **US and QUAD** as a shift away from **'strategic autonomy'.** It perceives **India's Indo-Pacific alignment as containment.**
  - ✦ Also, **India's signing of a labour mobility agreement with Taiwan in February 2024** drew attention from China, which views such engagements with sensitivity.

How does China Continue to Play a Significant Role in India's Supply Chains?

- 💡 **High-Tech Hardware and Electronics:** India remains heavily reliant on China for critical hardware inputs, especially in the **electronics and IT sectors,** undermining supply chain sovereignty. This **dependence constrains India's ability to decouple strategically from Beijing.**
  - ✦ For instance, **imports from China into India rose nearly 11%** to $46.6 billion **between April and August 2024,** driven primarily by **computers, telecom equipment, and components.**
- 💡 **Active Pharmaceutical Ingredients (APIs):** Despite being a pharma hub, India imports a majority of its **bulk drugs and intermediates** from China, making its health sector vulnerable to geopolitical disruption.
  - ✦ For instance, India, over years has been importing on an average, **68% of its entire supply of bulk drugs and drug intermediates annually from China.**

- 💡 **Renewable Energy Supply Chains:** India's green transition depends on **Chinese dominance in solar and battery manufacturing,** limiting its clean energy autonomy. This also impacts national climate targets.
  - ✦ For instance, **in 2023-24,** India imported **USD 7 billion** worth of **solar equipment,** with China supplying **62.6% of it.**
- 💡 **Heavy Machinery and Capital Goods:** India's infrastructure and manufacturing sectors still source key **capital goods and machinery** from China, slowing efforts under **'Make in India'.**
  - ✦ For instance, in the machinery sector, China accounts for $19 billion, which is **39.6% of India's imports in the sector.**

What Measures can India Adopt to Deepen the Strategic Engagement with China?

- 💡 **Establish a Permanent Border Stability and Confidence-Building Mechanism:** India should propose a **dedicated institutional mechanism** focused solely on managing border stability and fostering **military-to-military predictability.**
  - ✦ This can function parallel to the WMCC but with a permanent secretariat and expert working groups on **seasonal deconfliction, logistics coordination, and early warning systems.**
  - ✦ Such a proactive mechanism would ensure **predictable engagement during flashpoints,** reducing the risk of accidental escalations and strengthening crisis diplomacy.
- 💡 **Co-develop Supply Chain Infrastructure in Neutral Regions:** Rather than decoupling completely, India can engage China in **third-country economic zones,** particularly in **Africa or Southeast Asia,** to jointly develop logistics hubs, agri-processing units, or digital infrastructure.
  - ✦ This neutral zone of cooperation will allow both powers to build **mutual stakes in non-contentious geographies,** reducing binary competition.
  - ✦ It also contributes to a **rules-based development model** that can be multilateralised through **BRICS or G77.**

- 💡 **Institutionalise a Strategic Autonomy Dialogue Track:** India should initiate a **Track 1.5 Strategic Autonomy Dialogue** with China, focused on aligning visions for **a multipolar world and multipolar Asia**, away from bloc-centric politics.
  - ✦ This dialogue can explore long-term perceptions, regional order frameworks, and **strategic hedging models** that ensure peaceful coexistence.
  - ✦ By bringing academia, retired diplomats, and policy advisors into the fold, it fosters **pre-emptive understanding of intentions**, especially in the Indo-Pacific.
- 💡 **Launch a Bilateral Green Transition and Energy Security Pact:** India can propose a **joint Green Transition Framework** to align on clean energy investments, battery storage cooperation, and climate-resilient infrastructure, particularly for the Global South.
  - ✦ This would anchor strategic engagement in a **non-zero-sum framework**, where both countries co-create global solutions while advancing their respective transitions.
  - ✦ The pact should also include **a dispute-free technology-sharing mechanism** and encourage **public-private collaboration** on sustainability.
- 💡 **Propose a Coordinated Indo-Pacific Maritime Dialogue:** To reduce maritime insecurity, India can initiate a **bilateral Indo-Pacific Maritime Confidence-Building Dialogue** that focuses on issues like freedom of navigation, transnational crime, disaster management, and marine ecology.
  - ✦ This would move beyond the military lens and help set **functional norms for coexistence in shared waters**.
  - ✦ It also signals India's leadership in promoting **inclusive maritime governance**, rather than confrontation.
- 💡 **Establish an India–China Council for Emerging Technologies and AI Ethics:** As AI, biotech, and quantum computing evolve, India can take the lead in forming a **bilateral council for responsible technology governance**.
  - ✦ This council can facilitate **policy harmonisation, ethical frameworks, and cybersecurity norms** in dual-use technologies.
  - ✦ Building tech-related guardrails would help avoid misperceptions and encourage **shared leadership in shaping digital norms** for the Global South.
- 💡 **Co-invest in Blue Economy and Coastal Resilience Projects:** India and China can identify specific **coastal regions in the Indian Ocean Rim** to launch joint projects in fisheries, marine conservation, coastal resilience, and port safety.
  - ✦ This would build **functional cooperation** in the blue economy domain without impinging on sovereignty.
  - ✦ The focus on **shared vulnerabilities (e.g., climate, overfishing)** helps reframe the ocean from a theatre of conflict to one of **cooperative stewardship**.
- 💡 **Expand Multilateral Coordination in Financial and Development Institutions:** India should engage China in **co-financing South-South development initiatives** via platforms like the **New Development Bank (NDB) or the Asian Infrastructure Investment Bank (AIIB).**
  - ✦ This allows the creation of **"joint global goods"**, such as **clean water, health systems, and digital infrastructure** in fragile regions.
  - ✦ Shared leadership in such spaces will **depersonalise bilateral conflict** and shift focus to common responsibilities.

Conclusion:

While foundational challenges persist, **India-China relations are gradually transitioning from confrontation to cautious engagement.** By leveraging areas of convergence—such as **climate action, trade pragmatism, and regional stability**—both nations can build incremental trust**. Diplomatic patience, strategic autonomy, and cooperative multilateralism** remain key. A **calibrated, interest-based approach** can ensure a sustainable and rules-based equilibrium in Asia.

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Indian Cities As Growth Engines

This editorial is based on "Urban development must shed masterplan system" which was published in Hindustan Times on 21/04/2025. The article brings into picture the evolution of Indian urbanization—from isolated industrial centers post-independence to post-liberalization growth hubs driving regional development.

Tag: GS Paper - 1, Urbanization, GS Paper - 2, Government Policies and Interventions

Post-independence India initially **saw urbanization** linked solely to **industrialization**, creating isolated economic centers with weak regional connections. Recent liberalization has transformed major cities into **"Growth Hubs"** that spur development in surrounding areas, creating productive urban agglomerations wit**h thick labor markets and specialized supply chains**. The **2024 Union Budget** formalized this **city-as-growth-hub concept**, recognizing the potential of **India's 474 urban agglomerations to drive economic growth.** However, these hubs face significant challenges in mixed land use planning, incomplete transport networks, fragmented utilities, and revenue generation.

How Indian Cities Serve as Engines of Regional Growth?

- 💡 **Emergence of Regional Clusters and Satellite Cities:** The growth of satellite cities and urban agglomerations is enhancing the **regional economic footprint of metro cities.**
  - ✦ Regions such as the **Delhi NCR and Bengaluru's peripheral towns** have seen **economic spillover,** transforming surrounding areas into dynamic business hubs
  - ✦ For instance, In the **Delhi NCR, regions like Noida and Greater Noida have become industrial powerhouses**.
- 💡 **Knowledge and Innovation Ecosystems:** India's urban regions are fostering **innovation and knowledge-driven growth**, with universities, research hubs, and tech parks emerging as centers of development.

- ✦ Cities such as **Pune, Hyderabad, and Chennai** are developing thriving ecosystems for R&D and startups.
- ✦ For instance, **Hyderabad's Genome Valley, home to 200+ biotech firms,** is positioned as a global hub for life sciences innovation, contributing significantly to **regional economic development.**
- 💡 **Service-led Economic Growth in Metro Cities:** India's metro cities, especially **Bengaluru, Delhi, and Hyderabad,** are driving service-led economic growth.
  - ✦ These cities **attract both skilled and unskilled workers** due to abundant job **opportunities in IT, finance, and services.**
  - ✦ A **thick labor market has enhanced productivit**y, reduced staffing delays, and increased income levels.
  - ✦ For example, **Bengaluru is the hub for India's $150 billion tech sector,** which accounts for nearly **10% of the country's GDP.** This service growth is supported by **rapid urbanization and improved physical infrastructure.**
- 💡 **Infrastructure Development Driving Regional Connectivity:** The upgrading of urban infrastructure, such as **metro systems and smart road networks**, is transforming cities into engines of growth.
  - ✦ Cities like **Pune and Ahmedabad** have improved connectivity through metro projects, **facilitating faster movement of goods and people.**
  - ✦ For instance, recent data shows that **Chennai Metro's adoption reduced traffic by 15-20%.** Similarly, the **Delhi-Mumbai Expressway,** which promises to cut travel time between the cities by half, **is expected to enhance regional economic integration.**
- 💡 **Sustainability and Green Infrastructure for Future Growth:** Sustainability is becoming a cornerstone of urban growth in India, with an increasing focus on **green infrastructure, water conservation, and waste management.**
  - ✦ Cities like **Chennai and Mumbai have integrated rainwater harvesting,** waste-to-energy projects, and green buildings.

✦ **Mumbai's initiative to reduce water leakage by 30% through smart meters** and pipeline upgrades showcases a growing trend.

  📎 **100 cities are now part of the Smart Cities Mission**, integrating green practices into urban planning.

💡 **Financialization and Investment in Urban Real Estate:** The real estate sector has been a key driver of economic growth in urban areas, with **rising property values and growing demand for residential and commercial spaces.**

  ✦ Cities like **Mumbai and Delhi are seeing increasing foreign direct investment (FDI) in real estate,** pushing the regional economy forward.

  ✦ For instance**, institutional investments in Indian real estate crossed $6.5 billion inflows in 2024.** Moreover, the **Real Estate (Regulation and Development) Act, 2016**, and tax reforms like GST have enhanced transparency and investment flow.

💡 **Policy Reforms Enhancing Regional Growth:** Recent policy reforms, including the **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)** **and the National Transit-Oriented Development Policy 2017**, have been pivotal in reorienting urban planning towards regional integration.

  ✦ These reforms focus on improving transportation, water supply, sanitation, and creating sustainable, livable cities.

  ✦ For example, **AMRUT's allocation** of ₹77,640 crore for city development has enabled cities like **Bhopal and Varanasi** to improve infrastructure and urban services, enhancing their regional economic roles.

What are the Key Issues Hindering the Sustainability and Effectiveness of Indian Cities?

💡 **Urban Infrastructure Deficits and Poor Planning:** Many Indian cities struggle with outdated and fragmented infrastructure, **failing to support rapid urbanization.**

  ✦ The **urban population is projected to reach 600 million by 2031,** according to the Union Ministry of Housing and Urban Affairs, **demanding urgent infrastructure upgrades**.

    📎 India needs an annual investment of **₹4.6 lakh crore for urban infrastructure,** yet the current funding is limited to ₹1.3 lakh crore.

💡 **Air Pollution and Environmental Degradation:** Air pollution is a pressing concern for Indian cities, with many consistently ranking among the most polluted in the world.

  ✦ The **absence of stringent regulations on industries, vehicles, and construction** activities has led to alarming pollution levels.

- India ranked as the fifth most polluted country worldwide in 2024, with Byrnihat in Meghalaya being the most polluted metropolitan area globally
  - In Delhi, the air quality index (AQI) often reaches hazardous levels, affecting millions of people.
- **Housing Shortage and Informal Settlements:** The housing shortage in urban areas is exacerbated by rapid migration and rising land costs, resulting in the growth of informal settlements.
  - The most recent comprehensive slum census in India, conducted in 2011, revealed that 65 million people resided in slums across urban areas—a figure that has only grown since then.
  - Despite a high number of house sanctions under Pradhan Mantri Awas Yojana (PMAY), completion and occupancy rates fall short of targets.
    - For instance, the scheme aimed to build 1.12 crore houses by 2022, with 1.08 crore approved. However, only 60.5 lakh houses were completed (60% of the target).
- **Water Scarcity and Poor Resource Management:** Water scarcity is a growing crisis in Indian cities, worsened by over-extraction, poor water management, and increasing demand.
  - Many cities depend on depleting groundwater reserves while rivers like the Yamuna and Ganga face severe pollution.
    - For instance, Bangaluru and Delhi faced acute water crises in 2024.
  - By 2030, the country's water demand is projected to be twice the available supply, implying severe water scarcity for hundreds of millions of people., underlining the urgency for sustainable water management.
- **Traffic Congestion and Inefficient Public Transport:** Traffic congestion is a severe issue in Indian cities, reducing productivity and quality of life.
  - Poor public transport systems and an increasing number of private vehicles contribute to this challenge.
  - For instance, Mumbai's congestion level was 53% in 2021 followed by Bengaluru and New Delhi (48%) each and Pune (42%)
- **Inefficient Waste Management and Solid Waste Crisis:** India's cities generate massive amounts of solid waste, but waste management systems are largely ineffective.
  - Poor segregation, inadequate recycling, and lack of awareness are major issues.
  - For instance, the Municipal Corporation of Delhi informed the Supreme Court of India earlier this year that over 10,000 tonnes of waste are generated daily in the city, with most of it being dumped into the already overflowing landfill sites at Ghazipur, Bhalswa, and Okhla.
- **Ineffective Governance and Bureaucratic Hurdles:** Weak governance structures, fragmented decision-making, and bureaucratic delays hinder efficient urban management in Indian cities.
  - Political and administrative fragmentation often leads to delays in implementing urban development projects.
    - For example, in Mumbai, ongoing infrastructural projects like the coastal road and metro expansion have faced delays due to regulatory hurdles.
- **Climate Change Vulnerability:** Indian cities are becoming increasingly vulnerable to the impacts of climate change, such as extreme heat (urban heat island effect), flooding, and rising sea levels.
  - A new study by IPE-Global and Esri-India has revealed that over 85% of Indian districts are vulnerable to extreme climate events.
  - Recent urban flood events in India, like the 2020 and 2023 Mumbai floods, Chennai floods in 2015, and the July 2023 Delhi floods, highlight the vulnerability of Indian cities to extreme weather events.

What Measures can be Adopted to Foster the Sustainable Development and Growth of Indian Cities?

- **Integrated Urban Planning with Smart Growth Principles:** Urban planning must be integrated, adaptive, and forward-looking, focusing on a balanced mix of residential, commercial, and green spaces.

- **Adaptive land-use policies must replace rigid zoning laws** to accommodate dynamic urban needs, integrating modern technologies like GIS for efficient urban management.
  - India can learn from the **city of Portland, Oregon** that uses adaptive land-use policies with a strong emphasis on mixed-use zoning

- **Enhancing Public Transport Infrastructure and Mobility Solutions:** Investing in multimodal public transportation networks is crucial for decongesting cities and promoting sustainable mobility.
  - **Expanding metro rail systems, bus rapid transit (BRT),** and non-motorized transport infrastructure like **cycling lanes can reduce traffic congestion** and reliance on private vehicles.
  - Implementing **mobility-as-a-service (MaaS) platforms** can provide seamless, inter-connected transportation options for urban residents, promoting efficiency and reducing carbon footprints.
    - India can draw inspiration from **Bogotá, Colombia, which implemented a world-renowned Bus Rapid Transit (BRT) system**, reducing traffic congestion and promoting sustainable transport.

- **Water Resource Management and Conservation Initiatives:** Cities must implement robust water conservation techniques such as **rainwater harvesting, groundwater recharge, and wastewater recycling** to address growing water scarcity.
  - **Establishing city-wide water management frameworks** that integrate monitoring, data analytics, and predictive modeling can help in better water distribution and resource management.
  - Green infrastructure like **permeable pavements and urban wetlands** should be promoted to manage stormwater and replenish aquifers, reducing flood risks.
    - **India could adopt Singapore's water management strategies** in this regard.

- **Circular Economy Practices in Waste Management:** Transitioning to a circular economy approach in waste management can reduce pollution and resource wastage.
  - Cities should focus on **waste segregation at source, increase recycling rates, and invest in waste-to-energy plants** to minimize landfill dependency.
  - Promoting **extended producer responsibility (EPR)** for manufacturers, requiring them to take back their products post-consumption, can close the resource loop.
    - India can benefit from **Sweden's waste-to-energy model**, where waste is recycled and converted into energy

- **Affordable and Inclusive Housing Policies:** Sustainable urban growth demands a focus on affordable, resilient, and inclusive housing.
  - A **combination of land pooling, public-private partnerships, and increased investment** in affordable housing schemes can address the urban housing deficit.
  - Urban renewal projects should focus on upgrading slums and informal settlements with proper sanitation, infrastructure, and access to amenities, ensuring that all city residents benefit from economic growth.

- **Strengthening Climate Resilience and Disaster Preparedness:** To safeguard cities from climate-related risks, it's essential to integrate climate resilience into urban development plans.
  - Building **climate-adaptive infrastructure such as flood barriers, heat-resistant buildings, and green roofs** can reduce vulnerability to extreme weather events.
  - Urban heat island mitigation strategies like urban forestry and green spaces can provide cooling effects and improve the quality of life in cities.

- **Technological Integration for Smart Cities:** The effective deployment of smart city technologies can improve urban management and service delivery.
  - Using IoT, AI, and data analytics for real-time monitoring and decision-making can optimize traffic flow, waste management, energy use, and public safety.

- Smart grids, smart meters, and intelligent transportation systems can increase operational efficiency and reduce costs.
  - India can adopt **Barcelona, Spain's approach to smart cities,** where IoT sensors are used for real-time management of waste, traffic, and energy consumption.
- 💡 **Governance Reforms and Decentralization:** Effective governance is critical for sustainable urban growth. **Decentralizing powers to local governments will enable better management of resources**, promote accountability, and enhance citizen participation in urban decision-making.
  - **Strengthening urban local bodies and empowering urban planners** through training and capacity-building will improve policy implementation and responsiveness.
  - A **more transparent and participatory governance model (like Pune)** will help in addressing the unique challenges faced by different cities and ensure equitable distribution of urban benefits.

Conclusion:

While Indian cities have evolved into critical engines of regional growth, significant challenges remain in infrastructure, sustainability, and governance. To ensure long-term development, it is essential to integrate **smart urban planning, enhance public transportation, and implement sustainable resource management.** promoting sustainable cities (SDG 11), climate action (SDG 13), and reducing inequalities (SDG 10), ensuring that urban growth benefits all citizens equitably.

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India and the Arctic Opportunity

This editorial is based on "Exploring India's potential in the Arctic region" which was published in The Hindu on 23/04/2025. The article brings into picture the strategic trade opportunity emerging from the Northern Sea Route due to Arctic melting.

Tag: GS Paper - 3, Environmental Pollution & Degradation, Conservation

As global trade patterns shift amid geopolitical tensions and climate change, the **Arctic's melting ice** is opening the **Northern Sea Route (NSR),** a potential game-changer linking **Europe and Asia that promises significant time and cost savings**. India, with its early **Arctic engagement through the Svalbard Treaty** and research base **Himadri**, has recognized this opportunity in its **2022 Arctic policy,** but must now focus on practical implementation including shipbuilding capabilities suited for harsh Arctic conditions. The **2025-26 Budget**'s $3 billion Maritime Development Fund and promotion of shipbuilding clusters marks a positive step.

What is the Significance of the Arctic Region for India?

- 💡 **Climate Change and Impact on India's Monsoon:** The **Arctic plays a critical role in global climate systems,** and its rapid warming directly impacts India's monsoon patterns, which are vital for its agriculture and water security.
  - **Rising Arctic temperatures disrupt atmospheric circulation**, leading to unpredictable monsoons, which can hurt food production.
  - For instance, **recent research reveals that less sea ice in the central Arctic leads to lower rain in western and peninsular India** but more rain in central and northern India.
    - The **Arctic has warmed nearly 4 times faster than the rest of the planet during the last 40 years**, and further warming may exacerbate these shifts in monsoon patterns.
- 💡 **Access to Arctic Hydrocarbons:** India's energy security is deeply tied to Arctic resources**, particularly oil and natural gas,** with the **region holding 13% of the world's undiscovered oil and 30% of its gas reserves**.
  - As India looks to diversify its energy sources, access to these resources becomes increasingly critical amidst fluctuating global energy prices.
  - **India's energy deals with Russia**, including the **Sakhalin-I and Vankorneft projects,** represent growing involvement in Arctic hydrocarbon exploration.

Arctic Regions

- **Russia, with its vast Arctic reserves,** has already started supplying significant amounts of oil to India where **it became India's top supplier.**
- 💡 **Strategic Maritime Routes and Shipping:** The opening of the **Northern Sea Route (NSR)** due to melting ice offers a shorter and more cost-effective path between Europe and Asia, which is crucial for India's trade interests.
  - ✦ This route, bypassing traditional chokepoints like the **Suez Canal,** could significantly reduce shipping time and costs, fostering better economic ties.
  - ✦ **Increased NSR traffic**, which rose to 37.9 million tonnes in 2024, underscores its growing importance for global trade.
    - The **INSTC (International North-South Transport Corridor)**, which connects **India to the Arctic via Russia,** is also poised to enhance India's trade with European and Central Asian markets.

- 💡 **Access to Critical Minerals:** The Arctic's mineral wealth, including rare earth metals, could be pivotal to India's **'Make in India'** and technological ambitions.
    - ✦ The region hosts deposits of critical minerals like **rare earths**, vital for electronics and defense systems.
    - ✦ With **rare earth minerals** being found in Greenland, India's future economic growth, particularly in tech and defense through the National <u>Critical Mineral Mission</u>, **is linked to access to these resources.**
- 💡 **Scientific Collaboration and Research Opportunities:** India's **Himadri Research Station in Svalbard** and the growing scientific collaborations with Arctic nations position India as a key player in global climate research.
    - ✦ The **Himalayan region, often called the "Third Pole,"** shares notable similarities with the Arctic, offering **India valuable insights into its own high-altitude ecosystems.**
    - ✦ The recent **India-Norway cooperation on climate change research demonstrates India's active role in exploring the links between Arctic melting and climate anomalies in the tropics,** particularly on the Indian subcontinent.

What are the Critical Issues Presently Affecting the Arctic Region?

- 💡 **Accelerating Climate Change and Environmental Degradation:** The Arctic region is warming at a rate 4 times faster than the global average, **contributing to rapid ice melt and rising sea levels,** which have significant global environmental consequences.

✦ This warming **accelerates feedback loops**, such as the **release of methane from permafrost,** further exacerbating climate change.

✦ **Recent NASA data** shows that Arctic sea ice is now shrinking at a rate of 12.2% per decade, and **scientists warn that the Arctic could be ice-free in the summer by 2050.**

  ✐ The **permafrost** thaw is releasing significant amounts of greenhouse gases, accelerating global warming.
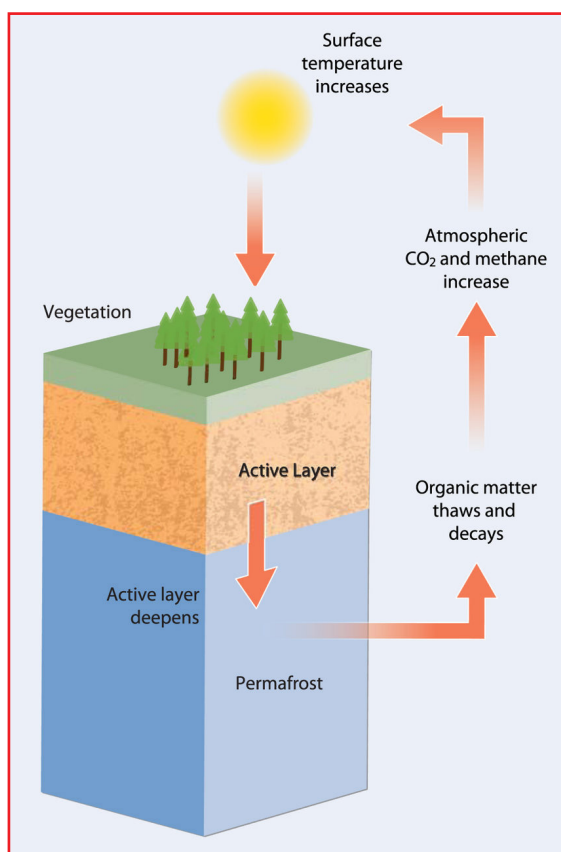
✦ **Geopolitical Tensions and Territorial Disputes:** The Arctic is becoming a major geopolitical hotspot, with increasing territorial disputes among Arctic states over resource extraction rights and sea routes.

  ✦ As climate change opens new shipping lanes, **competition between nations like Russia, Canada, and the U.S. intensifies**, especially over the Northern Sea Route (NSR) and the continental shelf.

✦ The **U.S. and Russia** have ongoing disagreements over the **Northwest Passage**, which Canada claims as internal waters.

  ✐ **Russia's military presence** in the Arctic has expanded, heightening tensions with NATO countries and other Arctic nations.

💡 **Resource Extraction and Environmental Risks:** The Arctic holds vast reserves of untapped resources, making it a prime target for economic exploitation.

  ✦ However, the region's fragile ecosystem means that exploitation carries significant risks, including oil spills and habitat destruction.

  ✦ As **Arctic sea routes** open up, resource extraction will increase, with companies like **ExxonMobil** already investing heavily, raising concerns over sustainability.

💡 **Lack of Comprehensive International Governance:** Despite the importance of the Arctic, there is no overarching international legal framework to govern the region's resources and environmental protection comprehensively.

  ✦ The **Arctic Council**, while instrumental, lacks enforcement powers, and territorial disputes remain unresolved.

  ✦ The **United Nations Convention on the Law of the Sea (UNCLOS)** provides some structure, but many Arctic states continue to assert conflicting territorial claims**, complicating global governance efforts.**

💡 **China's Growing Presence and Arctic Ambitions: China has increasingly asserted itself as a "Near-Arctic State"** and has deepened its involvement in Arctic affairs through investments and partnerships with Arctic nations.

  ✦ This has raised concerns among India and the West about China's strategic ambitions in the region, especially regarding access to Arctic resources and shipping routes.

  ✦ **China's Polar Silk Road initiative** seeks to secure access to the **Northern Sea Route**, bypassing traditional chokepoints like the Malacca Strait, has shifted the balance of power in the region.

💡 **Impact of the Ukraine War on Arctic Cooperation:** The ongoing conflict in Ukraine has disrupted cooperation in the Arctic, particularly within the **Arctic Council**, where key member states suspended collaboration with Russia following its invasion.

Overview of Pahalgam

- Aaru Valley
- Chandanwari
- Betaab Valley
- Pahalgam
- Baisaran Meadow
  Attack site
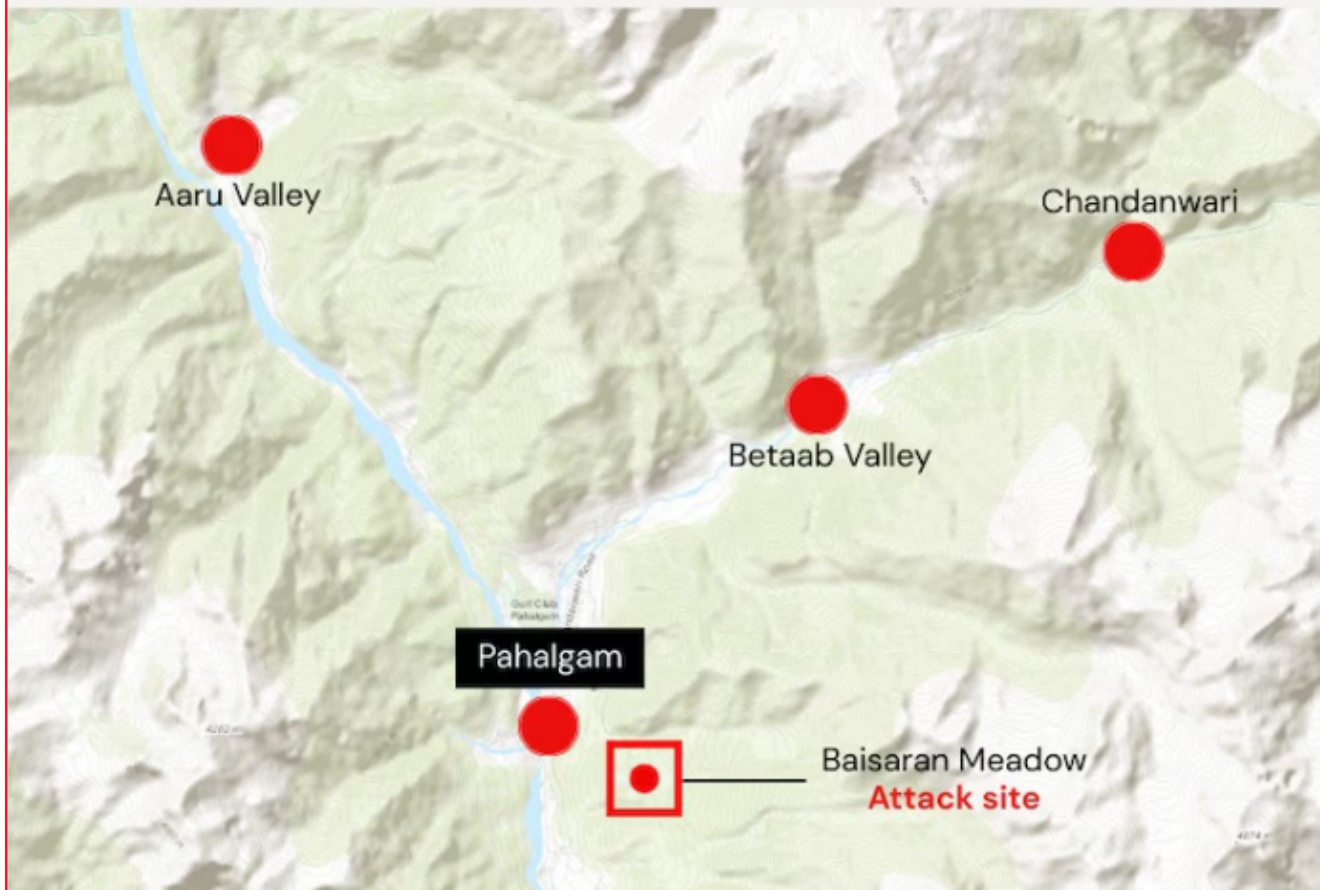
- ✦ This has led to a **halt in many joint scientific research projects** and environmental initiatives that are crucial for understanding and mitigating climate change.
- ✦ **Russia's isolation from the Arctic Council** has hindered important data sharing and scientific research, **particularly on permafrost and Arctic warming, w**hich are essential for global climate models.

What Role can India Assume in Promoting Sustainable and Responsible Exploration in the Arctic Region?

- 💡 **Strengthening Arctic Scientific Research and Collaboration:** India can expand its role by enhancing collaborative research in the Arctic, particularly in the **areas of climate change, glaciology, and ecosystem monitoring**.
  - ✦ By increasing investment in polar research infrastructure, such as expanding the <u>Himadri Research Station</u>, India can actively contribute to global scientific understanding.
  - ✦ Partnering with Arctic nations and international scientific bodies will allow India to play a crucial role in collecting and sharing data on environmental changes.
- 💡 **Advocating for an Arctic Resource Governance Framework:** India can take a leadership role in **advocating for a binding, rules-based governance framework** for the sustainable and responsible exploitation of Arctic resources.

- By pushing for international agreements under the **Arctic Council** that regulate resource extraction while prioritizing environmental sustainability, India can help ensure that Arctic development respects both the region's unique ecosystem and the rights of indigenous communities.
- Proactively engaging in dialogues about **eco-friendly mining practices** and **carbon-neutral energy projects** can help build consensus for long-term preservation.

💡 **Promoting Green Energy Initiatives in the Arctic:** India can lead efforts to promote renewable energy technologies in the Arctic by leveraging its expertise in **solar** and **wind energy**.

- Through collaboration with **Arctic nations, India can help introduce green energy solution**s that minimize the environmental impact of resource extraction and transportation.
- Initiatives like setting up joint **renewable energy projects** for Arctic communities and research stations can not only contribute to sustainable development but also support India's climate commitments under the **Paris Agreement.**

💡 **Fostering Environmental Diplomacy for Climate Resilience:** India can champion environmental diplomacy by building coalitions with other non-Arctic states, particularly within **BRICS**, **ASEAN**, and **G20**, to influence international policy on Arctic climate change.

- By facilitating multilateral forums on Arctic resilience, India can ensure that the region's environmental concerns are addressed in global climate negotiations.
- India's strong diplomatic reach can be used to push for the **inclusion of Arctic-specific adaptation strategies** in international climate frameworks..

💡 **Implementing Arctic-Adapted Sustainability Standards:** India can support the creation of **Arctic-adapted sustainability standards** that focus on protecting fragile ecosystems while enabling responsible exploration.

- These standards could address areas such as **ship navigation** through ice-covered waters, safe extraction of resources, and the protection of Arctic biodiversity.

💡 **Leading Initiatives on Arctic Indigenous Rights Protection:** India can push for stronger **indigenous rights protection** within the framework of Arctic governance, ensuring that indigenous communities have a say in the sustainable use of Arctic resources.

- India's experience in **democratic governance** and **inclusive policymaking** can be leveraged to advocate for **fair compensation, land rights, and cultural preservation as part of Arctic development.**
- By fostering partnerships between indigenous peoples and international organizations, India can help create equitable and **respectful pathways for resource use in the Arctic.**

💡 **Supporting Sustainable Arctic Infrastructure Development:** India can engage in promoting sustainable Arctic infrastructure development that integrates **green building technologies** and **low-carbon transportation systems**.

- Collaborating with Arctic states and industries, India can help build infrastructure that minimizes environmental footprints while boosting **economic opportunities** for Arctic communities.
- This could include supporting **eco-tourism** initiatives, **sustainable port development**, and the implementation of **smart grid systems** for energy efficiency in remote Arctic regions.

Conclusion:

The Arctic holds **immense strategic, environmental, and economic significance for India**—from shaping monsoon patterns to unlocking energy and trade routes. As global interest intensifies, **India must balance its aspirations with sustainability by enhancing polar research, green technology deployment, and multilateral environmental diplomacy.** Strengthening institutional capacities and advocating for a rules-based Arctic governance framework will be vital.

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Terrorism and India'S Security Landscape

This editorial is based on "Unity and resolve: On the Pahalgam terror attack" which was published in The Hindu on 24/04/2025. The article brings into picture the enduring threat of terrorism in Kashmir, as seen in the Pahalgam attack, and underscores the need for India to enhance intelligence, technology, and global counter-terror collaboration.

Tag: GS Paper-3, Challenges to Internal Security Through Communication Networks, Government Policies & Interventions, India and its Neighbourhood

The **recent Pahalgam attack in Kashmir,** serves as a somber reminder of **terrorism'**s persistent threat to **India's security and social fabric.** Despite significant progress in **counter-terrorism measures since 2019,** including **infrastructure development and regional integration efforts in Kashmir,** such attacks demonstrate the evolving nature of terrorist tactics and the need for continued vigilance. Moving forward, India needs to strengthen its counter-terrorism security initiatives through enhanced intelligence coordination, technological capabilities, and international partnerships.

How does Terrorism Continue to Challenge India's Internal Security and Geopolitical Interests?

- 💡 **Cross-Border Terrorism (Pakistan-Sponsored):** India faces the **constant threat of cross-border terrorism from Pakistan,** with militants infiltrating through Kashmir and other border areas. These groups are often backed by Pakistan's intelligence agencies.
  - ✦ The **2019 Pulwama attack and the recent Pahalgam massacre,** which targeted tourists based on their religion, illustrate the persistence and brutality of these attacks.
- 💡 **Radicalization of Local Populations:** The radicalization of local populations, particularly in conflict zones like **Kashmir,** remains a significant concern.
  - ✦ Youth in these regions, disillusioned with the state or manipulated by extremist ideologies, are increasingly joining terrorist groups.
  - ✦ The **rise of online radicalization and social media platforms like Telegram** as tools for spreading extremist propaganda further exacerbates this issue, making it harder to contain terrorism from within.
- 💡 **Cyber Terrorism:** Cyber terrorism has emerged as a modern form of threat, where terrorist groups utilize the internet for recruitment, propaganda, and **even launching attacks on critical infrastructure.**
  - ✦ Cyber-attacks targeting government websites, financial institutions, and power grids are on the rise.
  - ✦ India emerged as the **second most targeted nation in terms of cyber attacks** in the world as **95 Indian entities came under data theft attacks in 2024.**
- 💡 **Left-Wing Extremism (Naxalism):** **Left-wing extremism,** continues to be a significant internal terrorism issue in central and eastern India. These groups, primarily operating in **tribal areas, employ guerilla tactics** to challenge the state and propagate their revolutionary ideologies.
  - ✦ For instance, in **2019, several commandos lost their lives in Maharashtra** due to a bomb blast attributed to Maoist insurgents.
  - ✦ Despite a decline in attacks, these groups continue to **disrupt governance and development in affected regions.**
- 💡 **Insurgency in Northeastern States:** The **insurgency in India's northeastern states,** particularly in **Manipur and Nagaland,** has seen increasing links with larger terror networks.
  - ✦ For instance, the **Kuki-Meitei conflict in Manipur,** particularly intensified in 2023 and 2024, has escalated into significant violence, **with deep ethnic and political undertone**
    - 🖉 The insurgents' ability to exploit the **porous border with Myanmar and access arms from external sources like China** complicates efforts to address the issue

- ✦ The weak governance in remote areas allows these groups to thrive, complicating counter-terrorism efforts.
- 💡 **Persistence of Organized Crime Networks:** **Organized crime** has become intertwined with terrorism in India, especially in urban centers.
  - ✦ Criminal syndicates, involved in activities such as **smuggling, extortion, and drug trafficking,** often collaborate with terrorist organizations to fund their operations.
    - 🖉 For instance, **in January 2025**, the **Punjab Police** announced the dismantling of a cross-border drug and weapon smuggling cartel.
  - ✦ The nexus between crime and terrorism has been responsible for several high-profile bombings and terror attacks in major cities like **Delhi and Mumbai,** complicating efforts to curb terrorism.

What is the Current Security Architecture in Place to Combat Terrorism in India?

- 💡 **National-Level Counter-Terrorism Agencies**
  - ✦ **National Investigation Agency** (NIA): Primary agency for investigating and prosecuting terrorism-related cases, particularly those involving cross-border terrorism and organized terror networks
    - 🖉 Handles high-profile terror cases, conducts operations, and ensures national security by coordinating with other agencies.
  - ✦ **Research and Analysis Wing (R&AW)**: India's external intelligence agency responsible for countering cross-border terrorism, particularly from Pakistan-based groups.
- 💡 **Legislative Framework**
  - ✦ **Unlawful Activities (Prevention) Act (UAPA), 1967**: Provides the legal foundation for prosecuting terrorism-related offenses and allows for the designation of terrorist organizations.
    - 🖉 Empowers law enforcement agencies to conduct surveillance, freeze assets, and detain suspects without charge for extended periods.

- ✦ **National Security Act (NSA), 1980**: A preventive detention law that allows authorities to detain individuals involved in terrorism-related activities for a specified period without formal charges.
  - 🖉 Used to curb terror-related activities by detaining suspected terrorists and preventing their release on bail.
- 💡 **Security Forces and Specialized Units**
  - ✦ **Central Armed Police Forces** (CAPFs): Agencies like the CRPF, BSF, ITBP, and SSB are crucial for counter-terrorism operations, especially in border and conflict regions.
    - 🖉 Deploy in sensitive areas to prevent infiltration, maintain public order, and support anti-terrorism operations.
  - ✦ **National Security Guard** (NSG): An elite special forces unit specializing in counter-terrorism operations, especially for high-risk situations like hostage rescues.
    - 🖉 Handles situations involving large-scale terrorist attacks, such as Mumbai-style attacks or terrorist sieges.
- 💡 **Technological and Intelligence Infrastructure**
  - ✦ **National Intelligence Grid (NatGrid)**: Integrated intelligence framework that combines data from multiple agencies to provide real-time threat analysis.
    - 🖉 Monitors terrorist activities across various sectors (banking, immigration, phone records) to detect patterns.

What Measures can India Adopt to enhance its Counter-terrorism Efforts?

- 💡 **Strengthening Intelligence Sharing and Integration:** India must further enhance the integration of intelligence across different agencies like the **NIA, IB, RAW, and state police force**s to create a seamless flow of actionable information.
  - ✦ There is a **need for swift identification of terror cells and their activities,** and help in early intervention, re**ducing response times during critical situations.**
  - ✦ Promoting collaboration with international intelligence agencies will further improve the accuracy and timeliness of counter-terrorism operations.

- 💡 **Implementation of Advanced Surveillance and AI-Driven Monitoring Systems:** Adopting AI-driven technologies for surveillance can significantly improve India's counter-terrorism efforts.
  - ✦ **Deploying advanced facial recognition systems, predictive analytics,** and data mining tools can assist in identifying potential terrorist threats and networks before they can strike.
  - ✦ These technologies can help detect unusual patterns in financial transactions, communications, and social media activity that often precede terrorist activities.
- 💡 **Enhanced Border Security through Smart Fencing and Drones:** To curb cross-border infiltration by terror groups, India should invest in **"smart fencing"** along sensitive borders, incorporating sensors, surveillance cameras, and **unmanned aerial vehicles (UAVs)** to create a comprehensive and responsive monitoring system.
  - ✦ The use of drones to patrol borders and track movement in real-time will make it harder for infiltrators to cross undetected.
  - ✦ This initiative, **when coupled with better communication and coordination between the BSF and other local security forces**, will significantly reduce cross-border terrorism and smuggling.
- 💡 **Community Engagement and Counter-Radicalization Programs:** India must focus on robust counter-radicalization strategies at the grassroots level. By engaging local communities, particularly in conflict zones like **Jammu & Kashmir and the Northeast,** authorities can build trust and prevent the spread of extremist ideologies.
  - ✦ Implementing **educational programs, vocational training, and social integration initiatives** for vulnerable youth will help divert potential recruits away from terrorist groups.
- 💡 **Revising and Strengthening Terrorism-Related Legislation:** India should consider revising its **counter-terrorism laws to make them more effective in the face of emerging threats like cyber terrorism and hybrid warfare.**
  - ✦ Strengthening provisions under the UAPA and NSA to address newer forms of terrorism, such as **lone wolf attacks** and radicalized individuals operating independently, will help the government respond more proactively.
- 💡 **Comprehensive Counter-Terrorism Cybersecurity Infrastructure:** As cyber warfare becomes a **crucial aspect of modern terrorism**, India must establish a specialized cybersecurity division focused on countering terror-related cyber threats.
  - ✦ This **division should work closely with the NIA** and other law enforcement agencies to detect and prevent cyber attacks targeting critical infrastructure, financial institutions, and communication systems.
  - ✦ Building resilience through **public-private partnerships will enable better defense against digital terrorism,** and a nationwide effort to protect critical data infrastructure will reduce vulnerabilities.
- 💡 **Public Awareness and Intelligence-Driven Citizen Participation:** Encouraging public participation in counter-terrorism efforts in prone areas through awareness campaigns and community vigilance programs can act as a force multiplier.
  - ✦ Citizens must be educated on identifying suspicious activities and reporting them **without fear of reprisal.** This can be done through **regular workshops, media campaigns, and outreach programs** aimed at creating a vigilant society.
  - ✦ In this regard, reviving and strengthening **Village Defence Guards (initiated in the mid-1990s in Jammu and Kashmir)** can further bolster grassroots security efforts.
- 💡 **Use of Economic and Diplomatic Leverage to Combat Terrorism:** India should expand the use of **economic and diplomatic leverage** as part of its broader counter-terrorism strategy, targeting nations that harbor or sponsor terrorist groups.
  - ✦ A recent example of this is India's **suspension of the Indus Water Treaty (IWT)** with Pakistan in **April 2025**, which was seen as a direct response to Pakistan's continued support for cross-border terrorism.

✦ It is essential, however, that India articulates such measures as **targeted and proportionate responses to the policies and actions of the Pakistani state apparatus**, especially its military-intelligence establishment.

    📎 This ensures the **distinction between the government and the people of Pakistan is maintained,** reinforcing India's commitment to **principled statecraft and responsible diplomacy.**

Conclusion:

The persistence of terrorism, **as highlighted by the Pahalgam attack,** underscores the evolving and multifaceted nature of threats to India's internal security. India must continue enhancing intelligence cooperation, technological vigilance, and community engagement. As reaffirmed in the **Delhi Declaration on countering the use of new and emerging technologies for terrorist purposes,** a zero-tolerance approach and international collaboration are imperative to dismantle terror networks and uphold peace.

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India'S Growth Amid Global Headwinds

This editorial is based on "India amid global strain: Rate cut relief versus trade war challenges" which was published in Business Standard on 22/04/2025. The article begins by pointing to the resilience of India's economy amid low trade exposure, but warns of growth moderation due to global tensions and falling FDI.

Tag: GS Paper - 3, Growth & Development, GS Paper - 2, Government Policies & Interventions

India's economy, while relatively insulated with low external trade exposure, faces growth moderation to **6.5% in FY25 and 6.2% in FY26** amid escalating global trade tensions. The direct impact of **US tariffs** remains limited at **0.2-0.3% of GDP**, but indirect effects through reduced global growth and diminished capital flows pose greater concerns as **FDI inflows plummeted to $1.4 billion from $11.5 billion year-over-year.** India can navigate these

challenges by accelerating reforms, **strengthening domestic demand, and enhancing competitiveness to capitalize on shifting global supply chains** while building resilience against external shocks.

What are the Key Drivers of India's Economic Growth Amid Global Uncertainties?

💡 **Resilient Domestic Demand Led by Rural Rebound:** Domestic consumption remains India's strongest growth pillar, aided by **rural recovery, welfare schemes, and inflation control.**

    ✦ Government transfer schemes like PMGKAY, tax cuts, and **better rural incomes have helped sustain aggregate demand** despite urban consumption slowing

    ✦ For instance, **Private Final Consumption Expenditure** (PFCE) is projected to grow at **7.3% in FY25** and rural **Gini coefficient** dropped to **0.237** and **softening CPI to 3.3% (Mar 2025)** support rural optimism.

💡 **Public Capex as Growth Anchor Amid Private Investment Lag:** While private investment remains hesitant due to **global headwinds,** public capital expenditure has taken the lead in driving growth, infrastructure creation, and employment generation. This counter-cyclical investment ensures a steady growth baseline.

    ✦ For instance, Centre's capex rose **8.2% YoY (Jul–Nov 2024)** and **₹11.1 lakh crore** allocated in FY25.

    ✦ Also, key infrastructure programs include **PM Gati Shakti**, **Smart City Mission,** **Amrit Bharat Station Scheme**, and **50-year interest-free loans to states**.

💡 **Services Sector Momentum and IT Export Resilience:** India's services sector continues to be the backbone of growth, showing strong domestic performance and export momentum.

    ✦ IT, financial services, and professional services have supported jobs, value addition, and **external stability** even as manufacturing exports slowed.

    ✦ For instance, Services GVA is projected at **7.2% in FY25** and **services exports up 12.8% YoY** (Apr–Nov FY25).

- India is **7th globally in services exports** and a global hub for **GCCs (Global Capability Centres)**.
- 💡 **Manufacturing Push via PLI, China+1, and Digital Ecosystem:** India's industrial growth is now supported by the **PLI scheme, improved logistics, and rising investor interest under the China+1 strategy.**
  - ✦ Though challenges remain, sectors like electronics, pharma, and defence manufacturing have seen meaningful gains.
  - ✦ For instance, **PLI was implemented across 14 sectors; smartphone exports crossed $15 billion** and India stood out as a global leader in IPO activity by volume, launching 327 IPOs in 2024.
- 💡 **Strengthened Financial Sector and Credit Flow:** The financial sector's improved health has enabled **smoother credit transmission and capital access**, especially for MSMEs and infrastructure projects. This enhances economic resilience and investor confidence.
  - ✦ For instance, **Non-Performing Assets** declined to a **12-year low of 2.6%** and **Capital to Risk (Weighted) Assets Ratio** at a robust **16.7% (Sep 2024)**.
  - ✦ Also, credit growth in MSMEs and services remains strong, and FDI inflows rose **17.9% YoY to $55.6 billion (Apr–Nov FY25)**.
- 💡 **Structural Reforms, Deregulation & Digital Governance:** India's growth outlook is bolstered by ongoing structural reforms — **from EoDB 2.0 to targeted deregulation and mission-mode schemes** in education, infrastructure, and green energy. These reforms enhance competitiveness and medium-term productivity.
  - ✦ **PM-Vishwakarma**, **PLI**, and **Self-Reliant India Fund (₹50,000 crore)** aim to scale MSMEs.
  - ✦ Also, Renewable capacity rose 15.8% YoY. **NEP 2020, and green energy schemes** like **PM E-DRIVE** drive long-term transformation

What are the Negative Implications of Rising Global Trade Tensions on India?

- 💡 **Slowdown in Merchandise Exports and Industrial Output:** India's manufacturing sector is directly impacted by global demand softening due to trade wars and protectionism.

- ✦ Export-oriented industries like **textiles, chemicals, and engineering** are seeing weaker orders, lowering capacity utilisation.
- ✦ For instance, India's merchandise exports grew just **1.6% (Apr–Dec FY25)** and the **World Bank** cut India's FY26 growth to **6.3%** citing weak external demand.
- 💡 **Vulnerability of Services Exports to Global Growth Shocks:** Though resilient, India's IT and professional services exports are exposed to economic slowdowns in the US and EU, affecting employment and revenue in the services sector.
  - ✦ Services exports form over **40% of India's total exports** and since IMF revised global growth to **3.2% over next 5 years**, below historical average, this slowdown may hit India's **GCC and ITES job market**, a **major white-collar employer.**
- 💡 **Capital Flow Volatility and Weakening Investor Sentiment:** Escalating trade tensions reduce risk appetite globally, triggering FPI outflows and volatility in India's equity and debt markets. Investor confidence weakens amid uncertainty.
  - ✦ For instance, **FPI inflows** down from **$41 billion (FY24)** to **$2.7 billion (FY25)**. The equity market saw a 5-month **losing streak till Feb 2025**, worst since 1996.
- 💡 **Supply Chain Disruptions Affecting Industrial Efficiency:** Global trade fragmentation and policy uncertainty have disrupted supply chains, affecting input availability, cost structures, and export deadlines for Indian firms.
  - ✦ The **Economic Survey 2024-25** flags **slowdown in global manufacturing** due to supply chain shocks, **Q2 FY25 industrial growth** dampened partly due to **monsoon-linked and external supply chain issues**.
- 💡 **Imported Inflation Risks via Rupee Depreciation:** Trade tensions elevate risk aversion, boosting the US dollar and pressuring the Indian rupee, increasing the cost of imported commodities like crude oil and electronics.
  - ✦ For instance, by February, 2025 the **Rupee has depreciated by 1.8% against USD,** this decline is already more than the 1.5% depreciation seen in 2023

- **Job Market Fragility in Export-Oriented Sectors:** Slower exports and subdued global demand impact hiring and wages in labour-intensive sectors like **textiles, gems & jewellery, and IT services,** exacerbating youth unemployment.

  - India's **youth unemployment** already remains high at **~15%** and **Economic Survey 2023-24** highlighted a slowdown in hiring within India's IT sector over the past two years.

- **Geo-Economic Fragmentation Weakening Multilateralism:** Trade wars shift focus from open multilateralism to bilateralism and strategic blocs, where **India risks being squeezed unless it deepens regional partnerships or Free Trade Agreements.**

  - For instance, **India has only 13 FTAs, far fewer than peers like Vietnam**, and ongoing but inconclusive negotiations with Canada and the EU highlight deeper structural challenges.

What Measures can India Adopt to Ensure Resilient Economic Growth amid Rising Global Headwinds?

- **Decentralised Capital Spending through Fiscal Federalism:** India must empower states with greater financial autonomy and **incentivise outcome-linked capital spending.**

  - A **formula-based approach to devolve capex funds** through Finance Commissions can improve regional infrastructure and job creation.

  - Strengthening **state capacity in planning and execution will amplify multiplier effects.**

    - Decentralised public investment can **crowd-in private players** at the state level.

- **Build a Domestic Manufacturing Mittelstand**: India should focus on creating a **competitive base of medium-sized manufacturing firms, akin to Germany's Mittelstand model.**

  - This requires **systematic deregulation, simplified tax regimes, predictable policy environments,** and access to technology and finance.

  - **MSME clustering and integration into global value chains** must be a policy priority. Manufacturing scale can thus be **built bottom-up.**

- **Shift from Scheme-Centric to Outcome-Based Rural Development:** To sustainably boost rural demand, India must redesign schemes for **employment, skilling, and agriculture** around localised outcome metrics.

  - **Integrated rural clusters with access to markets, credit, storage, and digital services** will enhance productivity and consumption.

  - Panchayats can be made nodal agencies for implementation. Stronger monitoring and decentralized feedback loops are essential.

- **Export Strategy Towards High-Value, Niche Sectors:** India should transition from **volume-led exports to value-led and IP-intensive sectors like semiconductors,** biopharma, EV components, and defence hardware.

  - This requires **robust trade intelligence units, targeted R&D financing**, and coordinated diplomacy for regulatory harmonization.

  - Sector-specific export hubs can be created. High-value exports can buffer India from low-margin global trade volatility.

- **Develop Strategic Reserves and Sovereign Funds Beyond Oil and Forex:** India should establish sovereign resilience fun**ds — not just for oil or forex, but also for essential inputs like semiconductors, rare earths, and food commodities**.

  - These funds can be deployed during external supply shocks. An inter-ministerial resilience task force must be institutionalised.

  - Such financial and material buffers would help **manage price volatility and supply chain risk.**

- **Catalyse Green Industrial Policy with Focus on Circular Economy:** India must integrate climate action with industrial policy through incentives for green tech, **waste-to-energy, and circular economy ventures.**

  - Regulatory clarity, **green patents, and long-term carbon market frameworks** are crucial. A green taxonomical classification will guide capital allocation.

    - This ensures growth is **sustainable, inclusive, and future-proof.**

💡 **Create Employment-Focused Urban Economic Clusters:** Beyond metro-centric urban growth, India needs to develop secondary cities as hubs of formal employment, startup innovation, and industrial services.

✦ Urban employment schemes linked to **skilling and digital platforms can ease migration pressures**. Such clusters decentralise job creation and de-risk urbanisation patterns.

💡 **Anchor Investment in Research, Design and Tech Transfer Ecosystems:** India must move beyond manufacturing incentives to create innovation ecosystems via university-industry-government linkages.

✦ Mission-mode funding for applied research in **AI, biotech, advanced materials, and quantum tech** must be scaled up.

📎 National labs can incubate public-purpose technologies. This transforms India into an **innovation-driven economy rather than a cost-driven one.**

💡 **Institutional Reform of Factor Markets—Land, Labour and Logistics:** Structural bottlenecks in **land acquisition, rigid labour laws, and fragmented logistics** reduce investment attractiveness.

✦ **A model land leasing code and labour code digitisation** should be fully implemented across states.

📎 National logistics cost must be cut through **digitised freight corridors and port reform.**
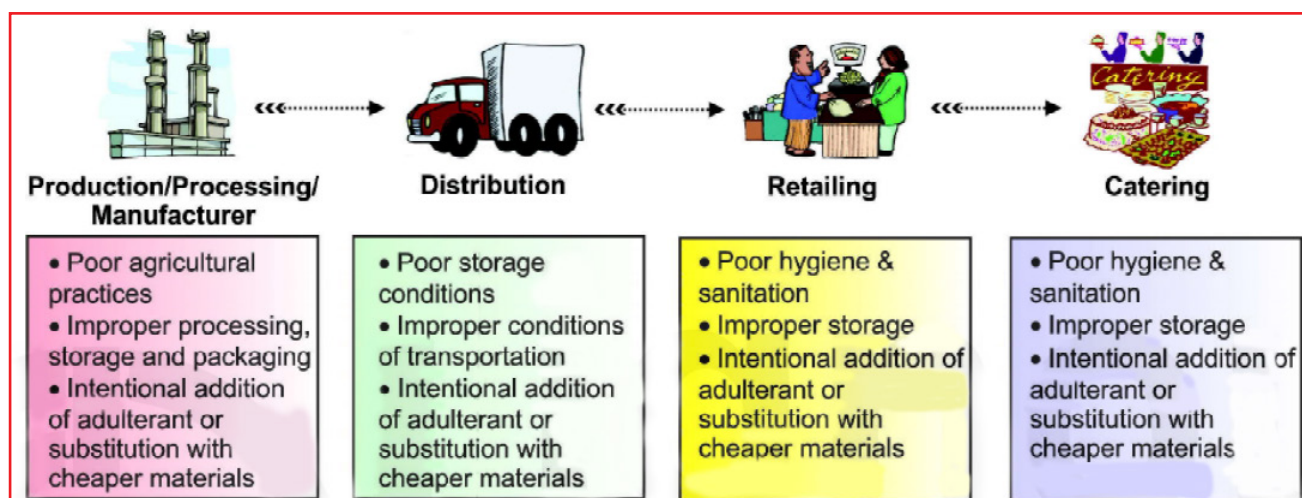
Conclusion:

Despite strong domestic fundamentals, **India cannot remain immune to mounting global trade tensions and geo-economic fragmentation.** To ensure resilient and inclusive growth, it must act decisively—**scaling public investment, deepening FTAs, nurturing high-value exports, and building a robust manufacturing base.** Simultaneously, future-proofing the economy through green innovation, institutional reforms, and decentralised development is key.

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A Call for Action to Battle Food Adulteration

This editorial is based on "India has a serious food adulteration problem," which was published in the Indian Express on 22/04/2025. The article highlights the state of food adulteration in India, presenting case studies and addressing regulatory issues related to food safety. It also suggests remedies to tackle the issue of food adulteration in India.

Production/Processing/Manufacturer	Distribution	Retailing	Catering
• Poor agricultural practices • Improper processing, storage and packaging • Intentional addition of adulterant or substitution with cheaper materials	• Poor storage conditions • Improper conditions of transportation • Intentional addition of adulterant or substitution with cheaper materials	• Poor hygiene & sanitation • Improper storage • Intentional addition of adulterant or substitution with cheaper materials	• Poor hygiene & sanitation • Improper storage • Intentional addition of adulterant or substitution with cheaper materials

Tag: GS Paper-3, Public Distribution System (PDS), Buffer Stocks & Food Security, Food Processing, Issues Relating to Poverty & Hunger, Sustainable Development, Food Processing, GS Paper-2, Governance, Health

Food adulteration in India has become a pressing issue, affecting millions of citizens and causing irreversible harm to public health. **Despite a robust regulatory framework**, the practice continues to thrive due to **a lack of effective enforcement**, widespread corruption, and limited consumer awareness. The government's efforts through the **Food Safety and Standards Authority of India (FSSAI)** and state-level food authorities are commendable, yet they remain insufficient in curbing this menace.

LIST OF FOOD ADULTRANTS

ADULTERANTS	MILK	HARMFUL EFFECTS
• Unhygenic water • Chalk powder • Soap powder • Hydrogen peroxide • Urea		• Food poisoning • Heart problems • Cancer • Vomiting • Nausea

BLACK PEPPER
- Papaya seeds — • Liver disorders • Stomach disorders

OIL
- Argemone seeds — • Epidemic dropsy • Severe glaucoma

GHEE
- Vegetable oil
- Animal body fats — • Anaemia • Enlargment of Heart

CHILLY POWDER
- Brick powder
- Saw dust — • Stomach problems • Artificial colors can cause cancer

TURMERIC POWDER
- Yellow aniline dye
- Non-permitted colourants like metanil yellow — • Carcinogenic • Stomach disorders

What is Food Adulteration?

- As per FSSAI, **food adulteration refers to the intentional addition,** substitution, or removal of substances that negatively impact the nature, quality, or safety of food.

- ✦ It also **includes unintentional contamination** that may occur during cultivation, harvesting, storage, processing, transportation, or distribution.
- 💡 Type of Adulterants in Different Food Items:

What is the State of Food Adulteration in India?

- **Prevalence of Adulteration:** According to the Food Safety and Standards Authority of India (**FSSAI**), **around 26.4% of the food samples tested in 2018–19** were found to be adulterated, compared to 23.4% in 2016–17.
  - ✦ **In 2023–24,** the FSSAI analyzed over **1.5 lakh food samples,** of which more than **33,000 were found to be non-conforming.**
  - ✦ The most commonly found **adulterants include non-food substances** that are added to food products to either increase their weight or improve their appearance.
  - ✦ **Nestlé India's Maggi noodles** were found to **contain excessive levels of lead and monosodium glutamate (MSG).**
- **High Adulteration Rates:** In 2024, nearly **25% of food samples tested in Rajasthan** were **found adulterated**, leading to the seizure or destruction of over 6.6 lakh kilograms of food products.
- **Dairy Products Under Scrutiny:** A significant **83% of paneer samples in Noida and Greater Noida failed quality** tests, with 40% deemed unsafe due to harmful chemicals and unidentified substances.
- **Spice Contamination:** Approximately **12% of spice samples tested nationwide failed to meet safety standards,** raising concerns over pesticide residues and other contaminants.
  - ✦ **Example: MDH and Everest spices** have been found **adulterated with ethylene oxide**, a carcinogenic pesticide, leading to product recalls in countries like Singapore and Hong Kong, and rejections in the United States due to contamination.

Why Food Adulteration Persists in India?

- **Inadequate Enforcement of Food Safety Laws and Informal Market:** The Food Safety and Standards Authority of India (FSSAI) faces challenges in implementing food safety laws effectively.

- About **one-third of the food industry** is unaware about the **FSSA** and therefore ignorant about the rules there under.
- India's food supply chain is fragmented, with **80%** of sales in informal markets lacking oversight.
- **Lack of Comprehensive National-Level Policy:** The absence of a unified and comprehensive national policy on food processing, **both at the national and state levels,** as well as between national and international standards, leads to varying regulatory practices across Indian states and **creates a situation where adulterated food may be rejected by international buyers**.
  - For example, the **permissible lead limits in food products differ between India and the WHO,** with India allowing a higher permissible limit in some products, thereby undermining food safety efforts.
- **Limited Resources in Food Processing Industries:** Many food processing industries in India face resource constraints that hinder their ability to maintain proper hygiene and safety standards.
  - Used frying oil is often repeatedly reused to **cost-cutting measures**, leading to the formation of harmful **compounds like acrolein and trans fats**, which can **cause cardiovascular and gastrointestinal issues.**
  - The inability to dispose of residual food products and oils safely exacerbates the problem of adulteration.
  - A **shortage of trained manpower hampers** the effective implementation of food safety standards, with a **FICCI study noting that 25.53% of respondents identified it as a key challenge.**
- **Neglect of Supply Chain of Food Production:** Neglect in monitoring and regulating the food production supply chain significantly contributes to food adulteration.
  - For instance, the **use of high-intensity pesticide chemicals in agriculture** has been linked to **heavy pesticide residues in final crop** products, which later contaminate food (e.g., **levels of ethylene oxide, a cancer-causing pesticide, found in MDH spices**).

- Regulatory oversight for pesticide residues and other food safety laws is often inadequate, allowing contaminated food products to enter the supply chain.
- **Substandard Supporting Infrastructure: The Code of Practice for Water Supply in Buildings**, **1957** prohibits the use of lead pipes for domestic water supply**,** limiting lead concentrations to 10 µg/L in water.
  - However, **it permits lead piping for overflow systems which are sometimes** used in food processing industries, leading to contamination of food with lead.
  - **Substandard fortification** also **leads to food adulteration**, such as when the **fortification content is poorly mixed in rice**.
    - These **issues are often concealed by misleading labeling** that falsely claims the product's quality.
  - This issue highlights the gaps in regulations that allow unsafe practices in the food industry, contributing to food adulteration and the risk of poisoning.

What are Legal and Policy Framework for Food Regulation in India?

- **Food Safety and Standards Act (FSSA), 2006:** The Act establishes the Food Safety and Standards Authority of India (FSSAI) to regulate and monitor the manufacture, processing, distribution, sale, and import of food to ensure safe and wholesome food for human consumption.
  - The Act aimed at preventing the sale of adulterated food to safeguard public health and allows the government to specify food standards and ensure that food is free from harmful substances.
- **Food Safety and Standards (Packaging and Labelling) Regulations, 2011:** It governs the packaging and labelling of food products to ensure that consumers receive accurate information about the contents.
  - They mandate clear labelling of ingredients, nutritional value, allergens, and expiry dates.

- **National Food Security Act (NFSA), 2013:** This <u>Act</u> ensures food security for vulnerable sections of society by providing access to safe and nutritious food.
    - It also mandates that the **food distributed under the Act be safe, hygienic, and free from adulteration.**
- **The Consumer Protection Act, 2019:** The <u>Act</u> safeguards consumers against unfair trade practices, including food adulteration.
    - It grants consumers the right to seek compensation for harm caused by adulterated food and empowers regulatory bodies like the FSSAI to take strict action against violators.
- **FSSAI's DART (Detect Adulteration with Rapid Test) Manual:** The DART manual provides a user-friendly guide to help consumers detect food adulteration through simple and rapid tests.
    - It supports public awareness through educational campaigns and promotes active consumer participation in identifying common adulterants in food.

What Steps Need to be Taken to Address the Food Adulteration?

- **Formalization of the Food Processing Industry:** There is a need for more formalization of the food processing industry under schemes like the <u>Pradhan Mantri Formalisation of Micro Food Processing Enterprises Scheme</u>.
    - This will bring more of the industry under regulation, create a more consolidated food market, and improve the processing sector.
- **Comprehensive Food Regulation Policy:** India needs a more comprehensive food regulation policy by amending the **Food Safety and Standards Act (FSSA)** and aligning it with international standards.
    - This will not only help boost the food export market but also create a robust food regulation framework for a proactive health ecosystem.
    - This will align with global goals such as <u>Sustainable Development Goal</u> **2.1 (end hunger) and 3.3 (combat diseases).**

- **Adequate Resources:** There is a need for a larger, skilled workforce in the food processing industry. Policies such as <u>PM Kaushal Vikas Yojana</u> and <u>PM Internship Scheme</u> should be extended to ensure industry-ready, skilled workers.
    - Promoting collaboration between industry and academia will ensure the youth are equipped with cutting-edge skills.
- **Stronger Surveillance and Penalties:** FSSAI must intensify its surveillance and sampling of food products, coupled with stricter penalties for offenders.
    - There should also be more stringent deterrents in the form of fines and punishments to prevent practices like adulteration, which are often used as cost-cutting measures.
- **Expand Mobile Laboratories:** The **"Food Safety on Wheels"** mobile laboratories must be expanded to cover all regions.
    - Portable testing technologies such as spectrometers and DNA-based tests should be used for quick on-site detection of common adulterants.
- **Addressing Technical Errors:** **Substandard fortification and misleading labeling** are major issues. The government should address these issues to improve food quality, which is often overlooked by consumers.
    - Enhanced monitoring and verification systems must be implemented to ensure correct fortification and proper labeling.
- **Streamline the Supply Chain:** A streamlined supply chain must be established to manage food processing residues, such as reused cooking oil.
    - Initiatives like <u>Repurpose Used Cooking Oil (RUCO)</u> should be promoted to prevent the continuous reuse of frying oil, which leads to harmful health effects.
- **Adopt the One Health Approach:** The <u>One Health approach</u> should be adopted, addressing both food adulteration and related issues in food processing.
    - One Health approach will cover both direct and indirect forms of adulteration, such as pesticide residues in crops and antibiotics in

meat, as well as contamination from upstream and downstream supply chains (e.g., lead in water pipes).

- 💡 **Use of Cutting-Edge Technology**: Introduce mandatory traceability systems for high-risk foods like milk, spices, and oils.
  - ✦ Implement blockchain or QR-code systems to ensure transparency and allow for swift action if adulteration is detected.
  - ✦ **Blockchain** will help ensure transparency, enabling real-time verification and reducing food fraud.
- 💡 **Consumer Awareness Campaigns**: Increase consumer awareness through educational programs and the widespread distribution of FSSAI's **DART (Detect Adulterants with Rapid Testing) manual**. Encourage citizens to report adulterated products via mobile apps and helplines.

Conclusion

Food adulteration in India poses a serious threat to public health, food security, and consumer rights. While regulatory frameworks like the FSSA and initiatives by FSSAI provide a foundation, the persistent gaps in enforcement, resource availability, and supply chain regulation demand urgent reforms. A comprehensive and coordinated approach, focusing on regulatory strengthening, technological adoption, industry formalization, and consumer empowerment—is essential to address this systemic issue. Only through sustained government action, responsible industry practices, and informed public participation can India ensure the availability of safe, unadulterated food for all.

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Rebuilding India'S Water Resilience

This editorial is based on "Saving water: India needs a balanced management template to avert crisis" which was published in The Business Standard on 27/04/2025. The article brings into picture the severe water crisis in India, highlighted by a 23-year low in Himalayan snowfall and rapid groundwater depletion.

Tag: GS Paper-2, Water Resources, Conservation of Resources, Government Policies and Interventions

India faces an **unprecedented water crisis with Himalayan snowfall at a 23-year low,** threatening major river systems. **Nearly 600 million Indians already experience high water stress,** with groundwater depletion accelerating due to agricultural overexploitation and urbanization. Effective solutions are required to implement **realistic water pricing, crop diversification, and stronger pollution controls,** alongside community-based approaches like water harvesting and check dams.

What are the Major Factors Contributing to the Water Crisis in India?

- 💡 **Climate Change and Decline in Snow Persistence:** Accelerated melting of glaciers and **declining snow retention** are critically **reducing river flows and destabilizing water availability.**
  - ✦ For instance, in 2024, **India faced extreme weather events on 93% of the days** in the year's first nine months, highlighting the impact of rising climate
    - 📎 In turn, reduced snowfall in Himalayas directly impacts **Ganga, Brahmaputra, and Indus basin water inflows,** heightening summer scarcity.
  - ✦ Recent data suggest that snow persistence over the **Hindu Kush Himalaya region** between November 2024 and March 2025 was **23.6% below normal level.**
- 💡 **Groundwater Over Extraction and Aquifer Depletion:** Excessive dependence on groundwater for irrigation and **urban supply without recharge** has exhausted critical aquifers.
  - ✦ Unsustainable drawdown rates threaten long-term water security and agricultural resilience in northern plains.
  - ✦ For instance, About 450 cubic kilometres of groundwater was lost in northern India during 2002-2021 and climate change will further accelerate its depletion.
    - 📎 According to **NITI Aayog's "Composite Water Management Index" report 2019,** India is suffering from the most severe water crisis in its history, with almost **600 million people experiencing high to extreme water stress.**

- **Unsuitable Agricultural Practices and Crop Misalignment:** Green Revolution legacies promote water-intensive crops like paddy and sugarcane even in semi-arid regions.
    - ✦ Free power and cheap irrigation water encourage **inefficiency, wastage, and overuse in farming and urban sectors**
    - ✦ For instance, according to the **Agriculture Census 2015–16,** large farmers, who **own 10% of the paddy-growing area in Punjab**—around 3,50,000 hectares—consume an **estimated 5,337 litres of water to produce just one kilogram of rice**, highlighting the excessive use of water resources.
- **Urbanisation, Heat Islands and Infrastructure Deficits:** Rapid, unplanned urbanisation and heat islands are aggravating surface water evaporation and exhausting supplies.
    - ✦ As high as **31% of urban households in cities,** mostly those who live in unauthorised colonies and slums, **do not have access to piped water leading to unsustainable urbanisation.**
    - ✦ Urban water management systems lag behind demand, **risking urban "Day Zero" crises across major cities.** For instance, Bengaluru faced near "Day Zero" in 2024.
        - 🖉 Also, research indicates that **urban areas with intense heat island effects experience higher water demand for irrigation**, landscaping, and domestic use, leading to increased water stress in regions already facing water scarcity.
- **Water Pollution and River Contamination:** Industrial effluents, sewage discharge, and agricultural runoff have heavily degraded surface and groundwater quality.
    - ✦ Toxic water reduces usable resources for **drinking, irrigation, and ecosystem health, compounding scarcity.**
    - ✦ A NITI Aayog report on Water Quality stated that **70% of India's water is contaminated.**
        - 🖉 **Lead contamination due to PVC pipes** is one of the major contributing factors of groundwater pollution in India.

- **Fragmented Water Governance and Policy Paralysis:** Multiple overlapping authorities, poor coordination, and lack of integrated basin-level planning undermine action.'
    - ✦ **Weak enforcement of water laws** and absence of accountability accelerates depletion and mismanagement.
    - ✦ The **World Bank** found that failing to implement better water management policies could result in **regional GDP losses from 2-10% by 2050.**
- **Slow Adoption of Water-Efficient Technologies:** Low penetration of **drip irrigation, rainwater harvesting, and smart water monitoring** has limited conservation success.
    - ✦ Traditional flooding methods dominate, leading to massive wastage in agriculture and urban distribution systems.
    - ✦ Only a few states like **Andhra Pradesh,. Maharashtra and Tamil Nadu** have adopted significant areas under micro-irrigation**. (NITI Aayog)**
- **Destruction of Natural Recharge Systems: Urban sprawl, lake encroachments, and floodplain destruction** have crippled aquifer recharge capacity.
    - ✦ Reduced groundwater replenishment accelerates long-term aquifer decline, especially in urban hotspots.
    - ✦ India has lost nearly **one-third of its natural wetlands over the last four decades.**
        - 🖉 Major cities are facing the crisis on a much larger scale. According to a recent report, about **10,787 acres of lake land in Bengaluru** worth Rs 1.5 lakh crore had been encroached upon.
- **Water-Related Health and Sanitation Crises:** Contaminated and scarce water fuels outbreaks of **vector-borne and waterborne diseases, aggravating public health burden.**
    - ✦ Water scarcity directly links to **morbidity, mortality, and socio-economic** vulnerabilities among marginalized groups.
    - ✦ According to the **Stockholm International Water Institute report,** 210 million Indians lack access to improved sanitation and **21% of communicable diseases are linked to unsafe water.**

- **Interstate and Local Water Conflicts:** Competing demands over finite water resources are fuelling disputes between regions, farmers, and sectors.
  - Tensions over water-sharing agreements highlight the emerging risk of **"water wars" within India.**
  - For instance, in Maharashtra's Upper Godavari Project, farmers at the **upper end of the canal illegally diverted water,** triggering disputes over its distribution.
    - Also, Keoladeo National Park faces recurring disputes with farmers over irrigation water, as it depends on supplies from nearby rivers and the **Panchna Dam.**

What is the Current Framework for Water Governance in India?

- **Constitutional and Legal Framework**
  - **Water is a State Subject** under Entry 17 of the State List in the Seventh Schedule, giving states primary responsibility for water supply, irrigation, canals, drainage, and embankments.
    - However, the **Union Government** plays a role in inter-state river regulation and disputes under **Entry 56** of th**e Union List.**
  - Article 262 empowers Parliament to adjudicate inter-state water disputes and bars the jurisdiction of the Supreme Court over such disputes.
    - Key laws include the **Inter-State Water Disputes Act, 1956** and **River Boards Act, 1956**.
- **Institutional Architecture**
  - **The Ministry of Jal Shakti (created in 2019)** oversees national water resource management, combining the Ministry of Water Resources and Ministry of Drinking Water and Sanitation.
  - Central Water Commission **(CWC)** advises on flood control, irrigation, and multipurpose projects.
  - **Central Ground Water Board (CGWB)** manages groundwater resources and regulatory approvals.

- **Regulatory and Policy Initiatives**
  - National Water Policy (2012) provides guiding principles for water management, advocating integrated water resource management, prioritising drinking water, and promoting conservation.
  - **Model Groundwater (Sustainable Management) Bill, 2017**: Drafted by the Centre, empowering local bodies to regulate groundwater.
  - **Power Tariff Policy 2016:** It mandates that thermal power plants within a 50km radius of sewage treatment plants must use treated sewage water, with the cost passed through in the tariff.
  - Composite Water Management Index **(CWMI)** by NITI Aayog tracks and ranks states on water management performance to promote cooperative and competitive federalism.
  - **National Aquifer Mapping and Management Programme (NAQUIM)** by CGWB for detailed groundwater mapping.
- Judicial and Rights-Based Developments
  - The **Supreme Court** has recognised access to safe water as part of the **Fundamental Right to Life under Article 21**.
    - Courts have intervened in issues related to pollution of rivers **(e.g., Yamuna, Ganga),** groundwater extraction limits, and industrial compliance norms.

What are the Key Case Studies Related to Effective Water Management in India?

- **Mission Kakatiya, Telangana:** Restores tanks to boost minor irrigation across Telangana. Promotes community-based water management for sustainable agriculture.
- **Neeru-Chettu Programme, Andhra Pradesh:** Focused on improving irrigation and water supply in drought-prone areas through better management practices. Prioritizes repairing and maintaining irrigation infrastructure.
- **Jalyukt Shivar Abhiyan, Maharashtra:** Targets making Maharashtra drought-free by improving water storage and conservation. Uses innovative solutions like geo-tagging for efficient monitoring.

💡 **Kapil Dhara Yojana, Madhya Pradesh:** Provides irrigation support to small farmers through MGNREGA. Focuses on constructing water-harvesting structures on private lands.

💡 **Pani Bachao, Paise Kamao Scheme, Punjab:** Encourages farmers to save water and electricity by providing financial incentives. Helps reduce wastage and promotes resource efficiency.

💡 **Jakhni Village Model, Bundelkhand, Uttar Pradesh:** Community-driven efforts led to water self-sufficiency in a water-scarce village. Involves rainwater harvesting, pond restoration, and sustainable agriculture practices.

What Measures can India Adopt for Effective Water Management?

💡 **Transition to Integrated Water Resource Management:** India must adopt a basin-centric approach by managing water as an **interconnected ecological system.**

 ✦ Watershed restoration, river reforestation, and catchment area protection must be prioritized to secure natural hydrological cycles.

  🖉 **Payment for Ecosystem Services (PES) models** can incentivize rural communities for conserving water catchments.

 ✦ Ecological flow norms must be mandated in dam operations. Water management must internalize **biodiversity, soil health, and climate resilience objectives.**

💡 **Institutionalise Participatory Water Governance:** Water governance must shift from **top-down bureaucratic control to empowering Panchayats and Water User Associations (WUAs).**

 ✦ Decentralising decision-making ensures **context-specific conservation practices** and equitable water sharing.

 ✦ Capacity-building and accountability frameworks for local institutions should be strengthened.

 ✦ **Community-led watershed development** must be mainstreamed as a governance model.

💡 **Reorient Agricultural Policies Towards Water-Smart Farming:** Crop diversification policies must incentivise low-water-use crops adapted to local agroecological conditions.

 ✦ Linking **Minimum Support Prices (MSP) to water productivity** rather than calorie output will shift incentives.

  🖉 **Micro-irrigation systems like drip and sprinkler must become the norm,** not the exception.

 ✦ **Agroforestry, rainfed farming systems, and precision agriculture** need targeted expansion.

💡 **Effective Water Pricing:** India must rationalise water pricing to discourage wastage, while **ensuring affordable access for the poor and rural communities.**

 ✦ Introducing volumetric water pricing for industries and large farmers can create strong conservation incentives.

  🖉 Urban water tariffs can be designed progressively based on usage slabs.

 ✦ **Transparent tariff-setting mechanisms** aligned with groundwater and surface water stress levels are critical.

💡 **Urban Water-Sensitive Planning and Infrastructure Revamp:** City master plans must **integrate water-sensitive design principles (Blue Green Infrastructure),** protecting recharge zones, wetlands, and drainage systems.

 ✦ **Stormwater harvesting, aquifer recharge, and decentralized wastewater reuse** must be embedded into city development.

 ✦ Smart metering, leak detection, and water recycling infrastructure need urgent scaling.

  🖉 Cities must be mandated to achieve a **circular urban water economy.**

 ✦ Also, there is a need for **Tiered volumetric water pricing** that can be introduced by charging lower prices for recycled or non-potable water (used for chores like cleaning and gardening) and higher prices for potable (drinking) water.

  🖉 This **approach encourages use of treated wastewater** for non-essential purposes, saving fresh water for critical needs.

- 💡 **Groundwater Aquifer Mapping and Regulation:** Comprehensive mapping and zoning of aquifers should precede any extraction permissions.
  - ✦ **Groundwater management must shift from a "private good"** mindset to regulated **community resource stewardship.**
  - ✦ Legal frameworks for aquifer-based collective management models are needed.
    - 📎 **Technology-driven groundwater monitoring networks** must be expanded nationwide.
- 💡 **Enforce Strict Pollution Control Across Rivers, Lakes, and Aquifers:** Water bodies must be protected through stringent enforcement of effluent discharge standards and zero liquid discharge mandates.
  - ✦ **Polluter-pays principles and penalties** must be rigorously applied on industries, municipalities, and agricultural runoffs.
  - ✦ **Sewage treatment plants must be upgraded to tertiary levels** before river discharge.
    - 📎 **Restoration of urban lakes and wetlands** (like **Restoration of the Wazirabad lake in Gurgaon)** must be made legally binding on local bodies.
- 💡 **Anchor Water Conservation in Education, Behaviour Change, and Cultural Revival:** Water literacy campaigns must become part of school curricula and adult education programs across India.
  - ✦ **Reviving traditional water harvesting systems** and culturally embedded conservation ethics can boost local stewardship.
  - ✦ Mass movements around **"Water as a Sacred Resource"** must be created through civil society partnerships.

Conclusion:

India's escalating water crisis, driven by climate change, groundwater depletion, and unsustainable practices, demands urgent, multifaceted solutions. To mitigate the crisis, the country must adopt **integrated water resource management, decentralized governance, and water-smart agriculture.** Achieving **SDG 6 (Clean Water and Sanitation)** will require a collective effort across sectors to enhance water efficiency, conservation, and equitable distribution.

■ ■ ■

Accelerating Renewable Energy Adoption

This editorial is based on "Why India's renewable energy targets are insufficient" which was published in Hindustan Times on 23/04/2025. The article brings into picture the challenges in meeting India's 2030 renewable energy targets, highlighting issues like supply-demand mismatch, solar-heavy dependence, and the need for diversified energy sources and dynamic pricing mechanisms.

Tag: GS Paper-2, GS Paper-3, Renewable Energy, Government Policies & Interventions

India's ambitious target of **500 GW non-fossil capacity by 2030** faces significant challenges, with **renewable growth likely falling short by nearly 12%** in meeting incremental energy demand. The mismatch between **renewable generation timing and actual demand creates periods of both surplus and deficit**, particularly as solar dominates the renewable mix. Addressing these challenges requires a **more balanced solar-wind portfolio, accelerated renewable installations with better capacity utilization,** and time-of-day electricity pricing to shift demand patterns.

What are the Key Developments in India's Renewable Energy Sector?

- 💡 **Expansion of Solar Power Capacity:** India's **solar power** capacity is experiencing significant growth, **driven by aggressive government policies** and **favorable investment conditions.**
  - ✦ With a target of **500 GW renewable energy capacity by 2030,** solar energy plays a crucial role, constituting **44% of India's renewable energy.**
  - ✦ As of **October 2024,** India has installed 90.76 GW of solar capacity, which is 26 times its capacity in 2014.
    - 📎 The solar capacity is projected to reach **170 GW by March 2025,** reinforcing India's leadership in solar energy.
- 💡 **Driving Towards Green Hydrogen:** India is betting on green hydrogen as a critical component of its energy transition. The **National Green Hydrogen Mission,** launched with **Rs. 600 crores funding in 2024**, aims to make India a global leader in green hydrogen production.

Renewable Energy
Capacity in India

- **Hydro** — 46.92 GW | 23.3%
- **Solar Power** — 90.76 GW | 45.1%
- **Wind Power** — 47.36 GW | 23.5%
- **Bio Power** — 11.32 GW | 5.6%
- **Small Hydro Power** — 5.07 GW | 2.5%
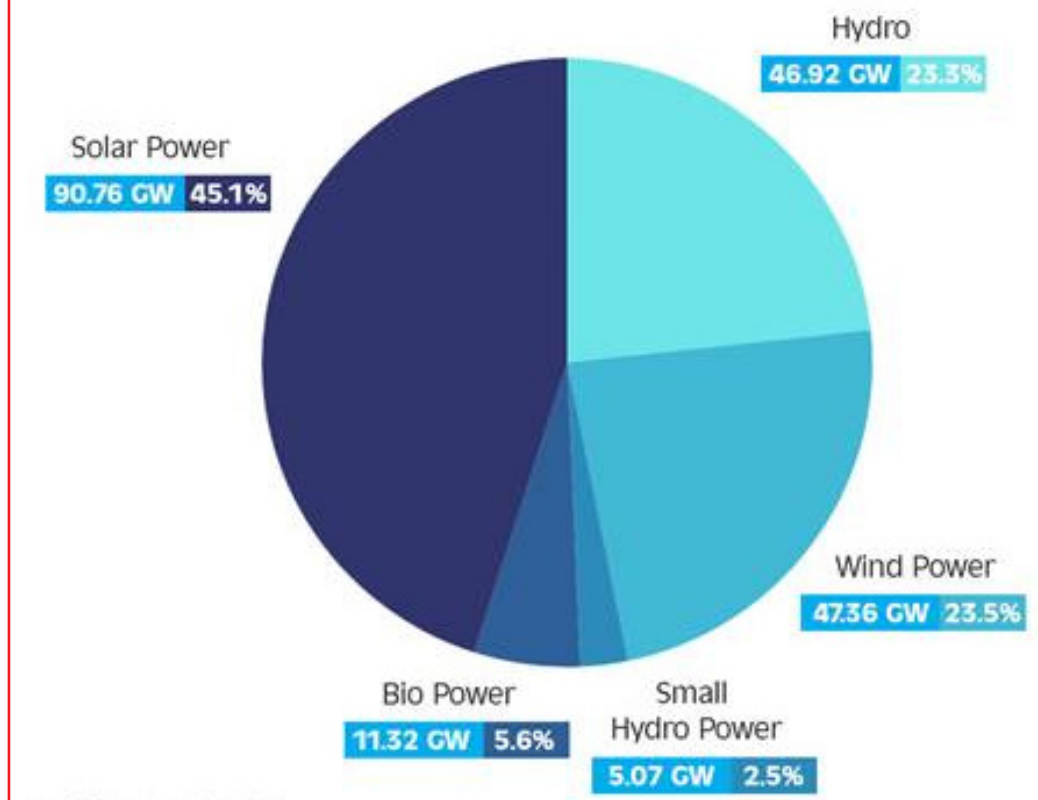
✦ This aligns with **India's net-zero target by 2070.** For instance, Bharat Petroleum Corporation Limited plans to invest around $1 billion in green hydrogen projects to produce 2 GW by 2025, positioning **green hydrogen as a sustainable fuel.**

💡 **Renewable Energy Investment Surge**: India's renewable energy sector has attracted substantial foreign investments, reinforcing the viability of its clean energy transition.

  ✦ **FDI inflows in the non-conventional energy space amounted to US$ 15.36 billion between 2000-2023,** showing growing global confidence.

  ✦ In 2024 alone, **investments are expected to increase by 83%,** with over US$ 16.5 billion projected in renewable energy.

📎 The commitment from global players, **including Brookfield Asset Management,** highlights India's role as a global renewable investment hub.

💡 **Pumped Storage and Battery Energy Storage Systems (BESS):** To enhance grid reliability and support renewable integration, India is focusing on pumped storage and **battery energy storage systems (BESS).**

  ✦ The government's approval for **13,000 MW of renewable energy projects with a 12,000 MWh BESS in Ladakh** is a notable step in strengthening storage capacity.

  ✦ The introduction of **pumped storage projects in Tamil Nadu and Andhra Pradesh,** aimed at adding 4-6 GW by 2030, demonstrates India's shift towards long-duration storage.

- **Renewable Energy Parks:** India's Renewable Energy Parks are instrumental in scaling up capacity, with **59 solar parks totaling 40 GW approved as of 2024**.
  - These parks provide the necessary infrastructure for large-scale solar and wind installations.
  - The **30 GW hybrid solar-wind project in Gujarat,** set to be the world's largest, is an example of such large-scale initiatives.
  - By consolidating renewable energy projects in these parks, India aims to reduce land acquisition issues and streamline power generation.
- **Rural Electrification and Decentralized Renewable Energy (DRE):** India's **decentralized renewable energy (DRE)** initiatives are crucial for rural electrification, where grid access remains limited.
  - Programs like **PM-KUSUM have provided over 140 MW of solar power plants** and 2.73 lakh solar pumps, significantly boosting rural energy access.
  - Moreover, the **Green Energy Open Access Rules 2022** are designed to make renewable energy more accessible to farmers and rural communities.
- **International Solar Alliance and Global Collaboration:** India's leadership in global renewable energy has been strengthened by its role in the International Solar Alliance (ISA), which now **includes over 120 countries.**
  - The ISA's efforts to scale up solar energy adoption worldwide align with India's goal of increasing its solar capacity to **500 GW by 2030.**
  - India's diplomatic engagement through the ISA ensures mutual benefits for member countries in achieving sustainable energy goals.
- **Progress in Bioenergy and Waste-to-Energy Initiatives:** India is tapping into bioenergy, with projects focusing on biomass and waste-to-energy solutions.
  - The **PM JI-VAN scheme, with Rs. 908 crore allocated for 2G bioethanol projects,** is advancing bioenergy development in India.
  - Bioenergy accounts for 11.32 GW of installed capacity, with projects like waste-to-energy plants in Delhi making significant strides.
- **Wind Energy-Onshore and Offshore Developments:** India is expanding its wind energy capacity, both onshore and offshore:
  - In 2024, India reached 47.2 GW of wind energy capacity with **key projects in states like Tamil Nadu, Gujarat, and Rajasthan.**
  - The Ministry of New And Renewable Energy has estimated the offshore wind potential in India around 70 GW, split between **Gujarat (36 GW)** and Tamil Nadu (35 GW).**

What are the Key Issues Associated with India's Renewable Energy Sector?

- **Intermittency and Grid Integration Challenge:** The intermittent nature of renewable energy sources, especially **solar** and **wind**, poses significant challenges to grid stability.
  - This intermittency requires robust **energy storage** solutions and improved **grid infrastructure**.
  - For instance, the country's solar and wind capacity accounted for **44%** of total renewable capacity in FY24, but these sources still **face grid integration issues.**
- **Land Acquisition and Infrastructure Bottlenecks:** Land acquisition for large-scale renewable energy projects, such as **solar parks** and **wind farms**, remains a major issue, especially in land-scarce regions.
  - **Complicated land laws, delays in approvals,** and local opposition hinder the timely execution of projects.
  - For example, **Rajasthan** and **Gujarat**, which are pivotal for solar and wind energy, are seeing rising land-use conflicts.
- **High Dependence on Imported Solar Components:** India's renewable energy sector, particularly **solar energy**, is heavily dependent on imports for critical components such as **solar cells** and **modules**.
  - This dependency not only impacts **cost competitiveness** but also exposes India to geopolitical risks.

- ✦ In 2023-24, India imported **$7 billion worth of solar equipment**, with China supplying **62.6% of it**. (though declined recently)
- 💡 **Financing and Investment Shortfalls:** While India is seeing rising investments in renewable energy, the sector still faces significant **financing challenges** due to high capital expenditure and risks associated with long-term projects.
  - ✦ Meeting India's renewable energy targets requires annual finance flows to grow to around **USD 68 billion by 2032.**
  - ✦ Despite the projected **$16.5 billion** investment in 2024, many smaller projects in rural and remote areas struggle to secure financing.
    - ✏ This issue affects the broader goal of **500 GW renewable energy by 2030**.
- 💡 **Regulatory and Policy Uncertainty:** The renewable energy sector faces **policy instability** and inconsistent regulations across states, hindering the uniform growth of the industry.
  - ✦ Frequent changes in **solar tariffs**, **taxation policies**, and **grid codes** create uncertainty, making it difficult for investors to plan long-term investments.
  - ✦ For example, the **Inter-State Transmission System (ISTS)** charges waiver has been introduced to facilitate renewables, but its implementation is still inconsistent across regions.
- 💡 **Environmental and Social Impacts:** While renewable energy is crucial for reducing emissions, it also raises environmental and social concerns.
  - ✦ Large-scale projects like **hydropower** and **solar parks** sometimes displace local communities or disrupt fragile ecosystems.
  - ✦ The **Sillahalla Hydro Project in Tamil Nadu**, has raised concerns over **biodiversity loss** and **community displacement**.
    - ✏ The challenge lies in balancing the need for clean energy with the **rights of local communities** and **environmental sustainability**.
- 💡 **Water Usage in Renewable Energy Production:** Water consumption in some renewable energy production processes, especially **biomass** and **biofuels**, raises concerns about the sector's water footprint.

- ✦ India is already facing **water scarcity issues** in several states, and the expansion of water-intensive renewable projects could exacerbate these problems.
- ✦ For example, **bioethanol production** from **crops** uses significant water resources. Although initiatives like **PM-JI-VAN** support sustainable biofuel production, the need for **water-efficient technologies** in energy generation is becoming increasingly urgent.
- 💡 **Slow Pace of Rooftop Solar Adoption:** Although rooftop solar is a key strategy for decentralizing renewable energy, its adoption in India has been sluggish.
  - ✦ The high **initial cost**, lack of **awareness**, and fragmented state-level policies are significant barriers.
  - ✦ The initial target for India's Rooftop Solar Programme was 40 GW installed capacity by 2022, part of a larger 100 GW target by 2030.
    - ✏ However, the **40 GW target was not met, and the deadline was extended to 2026.**
- 💡 **Limited Energy Storage Capacity:** Energy storage, particularly **battery storage**, is crucial to mitigate the intermittent nature of renewable energy.
  - ✦ Despite India's renewable energy growth, **battery storage capacity** remains limited, making it difficult to store excess power generated during peak solar or wind periods.
    - ✏ As per **National Electricity Plan (NEP) 2023** of Central Electricity Authority (CEA), the energy storage capacity requirement is projected to be 82.37 GWh in **2026-27.**

How can India Accelerate Renewable Energy Adoption to Meet Rising Energy Demand?

- 💡 **Strengthening Renewable Energy Infrastructure:** To meet the rising energy demand, India must focus on building and modernizing its **energy transmission and storage infrastructure**.
  - ✦ Expanding **smart grids** and investing in **pumped storage systems** will enhance grid flexibility and enable seamless integration of renewable energy into the grid.

✦ This includes ensuring **inter-regional transmission capacity** is upgraded to facilitate power distribution from renewable-rich regions to energy-deficient areas.

    📎 Prioritizing **energy storage solutions** such as **lithium-ion batteries** will address the intermittency of solar and wind power, ensuring a stable supply.

💡 **Streamlining Land Acquisition and Regulatory Processes:** Simplifying **land allocation procedures** through **single-window clearances** and providing **land banks** dedicated to renewable energy projects can expedite development.

    ✦ Alongside this, **fast-tracking environmental and regulatory approvals** through digital platforms will reduce bureaucratic delays, enabling quicker deployment of projects while maintaining compliance with sustainability standards.

💡 **Enhancing Financial Support Mechanisms:** Providing **accessible and affordable financing** for renewable energy projects, particularly for smaller developers, is crucial.

    ✦ Expanding **green bonds** and **renewable energy financing schemes** will attract both domestic and international investments.

    ✦ Additionally, the government can provide **subsidies** or **tax incentives** for small and medium-sized enterprises (SMEs) involved in manufacturing **solar panels** and **wind turbines**, ensuring greater domestic manufacturing and reducing dependency on imports.

💡 **Promoting Decentralized Energy Solutions:** Encouraging **decentralized renewable energy systems**, such as **rooftop solar** and **microgrids**, will help distribute the energy load and reduce the strain on centralized grids.

    ✦ **Localized solutions** enable communities in remote and rural areas to generate and consume energy, making them more energy-resilient.

💡 **Expanding Renewable Energy in the Transportation Sector:** Integrating renewable energy into the **transportation sector** can significantly reduce carbon emissions and energy demand.

✦ Promoting **electric vehicle (EV) adoption**, coupled with the expansion of **EV charging infrastructure** powered by renewable sources, will help reduce fossil fuel consumption.

💡 **Strengthening Public-Private Partnerships (PPPs):** Encouraging **public-private partnerships** (PPPs) can drive renewable energy innovation and project execution.

    ✦ By collaborating with private sector players, the government can leverage **private capital** and **expertise** to scale up **renewable energy projects**.

    ✦ Offering clear **policy frameworks**, **tax breaks**, and **guaranteed power purchase agreements** (PPAs) will encourage long-term investments in both large-scale and off-grid renewable projects.

💡 **Fostering Research and Development in Clean Energy:** India must enhance its focus on **research and development (R&D)** in **emerging renewable technologies**, such as **floating solar** and **offshore wind energy**.

    ✦ Creating **innovation hubs** for clean energy startups and encouraging **collaborations with international research institutes** will foster new solutions to optimize energy production and consumption.

    ✦ Incentivizing private sector innovation through **R&D grants** and **patent protections** will ensure India stays at the forefront of clean energy advancements.

💡 **Localizing Manufacturing and Supply Chains:** To reduce reliance on imports, India must focus on **localizing renewable energy manufacturing**. This includes setting up **domestic supply chains** for critical components like **solar panels**, **batteries**, and **wind turbines**.

    ✦ The **PLI scheme** can be expanded to support large-scale **manufacturing hubs**, providing jobs and enhancing the country's competitive edge in the global renewable energy market.

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Unlocking India'S Industrial Potential

This editorial is based on "Growth pangs: On industrial activity" which was published in The Hindu on 30/04/2025. The article brings into picture the sharp slowdown in India's industrial growth to 4% in FY25, highlighting weak manufacturing, tepid exports, and rising pressure on MSMEs, stressing the need to revive domestic demand for sustainable recovery.

Tag: GS Paper-3, Industrial Policy, Infrastructure, Growth & Development

India's industrial growth has slowed to a **four-year low of 4% in 2025,** with mining and manufacturing sectors showing significant deceleration amid **global economic uncertainties and tepid exports**. The flat growth in goods exports further highlights the strain on India's MSME sector, which **contributes nearly half of all exports and has quadrupled in size since FY21.** As India navigates trade negotiations with the United States, protecting its **60 million MSMEs** that provide over **250 million jobs** must remain a **priority for sustainable industrial growth.**

What are the Key Factors Driving Industrial Growth in India?

- 💡 **Government Initiatives and Policy Support:** India's industrial growth is increasingly supported by strategic government initiatives such as the **Make in India** and **PLI (Production-Linked Incentive) schemes.**
  - ✦ These initiatives are fostering industrial expansion by enhancing production capacity and making India an attractive destination for foreign investments.
  - ✦ The **PLI scheme** alone has attracted significant investments, with **FDI in manufacturing** growing by 69% over the last decade, reaching Rs. 14,45,781 crore (US$ 165.1 billion).
    - 🖇 Additionally, the **National Manufacturing Mission** is set to support MSMEs and innovation, aiming to **boost manufacturing's share of GDP to 25% by 2025.**

- 💡 **Rise in Domestic and Foreign Investments:** The surge in domestic investment, notably reaching **Rs. 37 lakh crore (US$ 428.04 billion) in FY 23-24,** signals a strong recovery in industrial activity.
  - ✦ This growth is accompanied by a marked increase in **FDI**, particularly in key sectors like **automobiles, electronics**, and **pharmaceuticals**, reflecting investor confidence.
  - ✦ As per data, **FDI inflows in manufacturing** reached Rs. 14,45,781 crore (US$ 165.1 billion), underpinned by **production-linked incentives (PLIs).**

- 💡 **Technological Advancements and Automation:** The increasing adoption of **Industry 4.0** technologies, including **automation, AI, and digital transformation**, is reshaping India's industrial landscape.
  - ✦ These technologies are significantly improving production efficiency and competitiveness, especially in sectors like **electronics** and **automobiles**.
  - ✦ As an example, the **HSBC Manufacturing PMI** surged to **59.1 in March 2024**, its highest in 16 years, driven by innovation and technology integration.
    - 🖇 India's manufacturing industry has also seen a **CAGR of 17.5%** from FY15 to FY24 in **electronics production**.

- 💡 **Robust Consumer Demand and Growing Middle-Class Consumption:** India's expanding middle class, projected to have the second-largest share in global consumption by 2030, is fueling demand in **consumer-focused sectors** like **automobiles, electronics, and pharmaceuticals**.
  - ✦ The consumer durable sector alone grew from **3.6% in FY24 to 8% in FY25,** indicating a clear uptick in urban consumption.
  - ✦ Alongside this, **India's merchandise exports surged 6% YoY during** April-December 2024, driven by robust growth in non-petroleum goods.

- 💡 **Infrastructure Development and Urbanization:** Infrastructure development, driven by projects like **smart cities**, **road networks**, and **housing schemes**, is creating a favorable environment for industrial expansion.

- The government's push for urban and rural infrastructure is a critical factor driving demand for **steel, cement**, and **construction materials**.
- The **steel sector** witnessed a growth of **3.3% in crude steel production** during April-November FY25, supported by infrastructure projects.
  - Additionally, the **cement industry** is benefiting from **the government's focus on mega projects like highways and railways**, further boosting industrial output.

- 💡 **Strategic Location and Export Potential:** India's strategic geographic position and access to global markets play a key role in positioning it as a manufacturing hub, especially in sectors like **electronics** and **automobiles**.
  - With initiatives like the **PM Gati Shakti** and **National Logistics Policy**, the country is improving its logistics and supply chain infrastructure.
  - India's **mobile phone exports** reached US$ 5 billion by August FY24, marking a 92% surge, which underscores its growing role in global trade.

- 💡 **Sustainability and CleanTech Manufacturing:** The growing emphasis on **green manufacturing** and **clean technologies** is propelling industries towards sustainable practices.
  - India's focus on renewable energy projects, including wind and solar, and the push for **electric vehicles** (EVs) are important growth drivers.
  - The **Union Budget 2025-26** allocated **Rs. 20,000 crore** for **nuclear energy** and **solar power** projects, reinforcing the shift towards sustainable manufacturing.
    - Additionally, the **EV sector** is seeing rapid growth with **PM E-DRIVE**.

What are the Key Roadblocks in Sustained Growth of India's Industrial Sector?

- 💡 **Global Economic Uncertainty:** The o**ngoing global economic slowdown,** marked by **inflationary pressures**, supply chain disruptions, and **geopolitical tensions (tariff wars)**, poses a significant threat to India's industrial growth.

- For instance, the **IMF** recently downgraded India's growth forecast to **6.2% for FY2025-26**, citing these external factors as significant contributors.
  - Also, India could incur direct export losses of about **$14 billion, or 0.38% of GDP**, owing to reciprocal tariffs imposed by the US.

- 💡 **Rural Consumption Slump:** Despite **India's thriving urban economy**, rural consumption remains sluggish, affecting industries reliant on **non-durable goods and agricultural products.**
  - In December 2024, **rural food inflation was 8.65%**, higher than the urban rate of 7.90%, indicating a **greater strain on rural purchasing power**.
    - This financial stress has led to increased household caution and reduced discretionary spending—**a classic case of the paradox of thrift.**

- 💡 **Inadequate Infrastructure and Logistics Bottlenecks:** Although India has made strides in improving infrastructure, challenges persist in logistics, transport, and industrial connectivity, which hinder industrial efficiency and cost competitiveness.
  - The **National Logistics Policy** and **PM Gati Shakti** are steps in the right direction, but the overall logistics costs in India still stand at 14-18% of GDP **(Economic Survey 2022-23)**, compared to **8-10% in developed nations.**
  - Despite significant investments in **smart cities** and transport corridors, India's **infrastructure gaps** limit the sector's ability to scale efficiently, raising costs and reducing competitiveness on the global stage.

- 💡 **Regulatory Hurdles and Complex Business Environment:** While India has made progress in **ease of doing business**, regulatory complexities and compliance burden continue to obstruct industrial growth.
  - Many sectors, **particularly MSMEs,** face difficulties in obtaining clearances, access to finance, and regulatory compliance.

Driving Industrial Growth in India

MITRA
Develops infrastructure for the textiles industry

Smart Manufacturing & Industry 4.0
Promotes automation and AI in manufacturing

Make in India
Promotes domestic manufacturing and global hub status

Digital India
Encourages digital technology adoption

PLI Scheme
Incentivizes production in key sectors

National Manufacturing Policy
Aims to increase manufacturing's GDP contribution

Startup India
Supports innovation and entrepreneurship

Atmanirbhar Bharat
Encourages self-reliance and indigenous production

National Logistics Policy
Improves supply chain efficiency

Skill India Mission
Focuses on upskilling the workforce
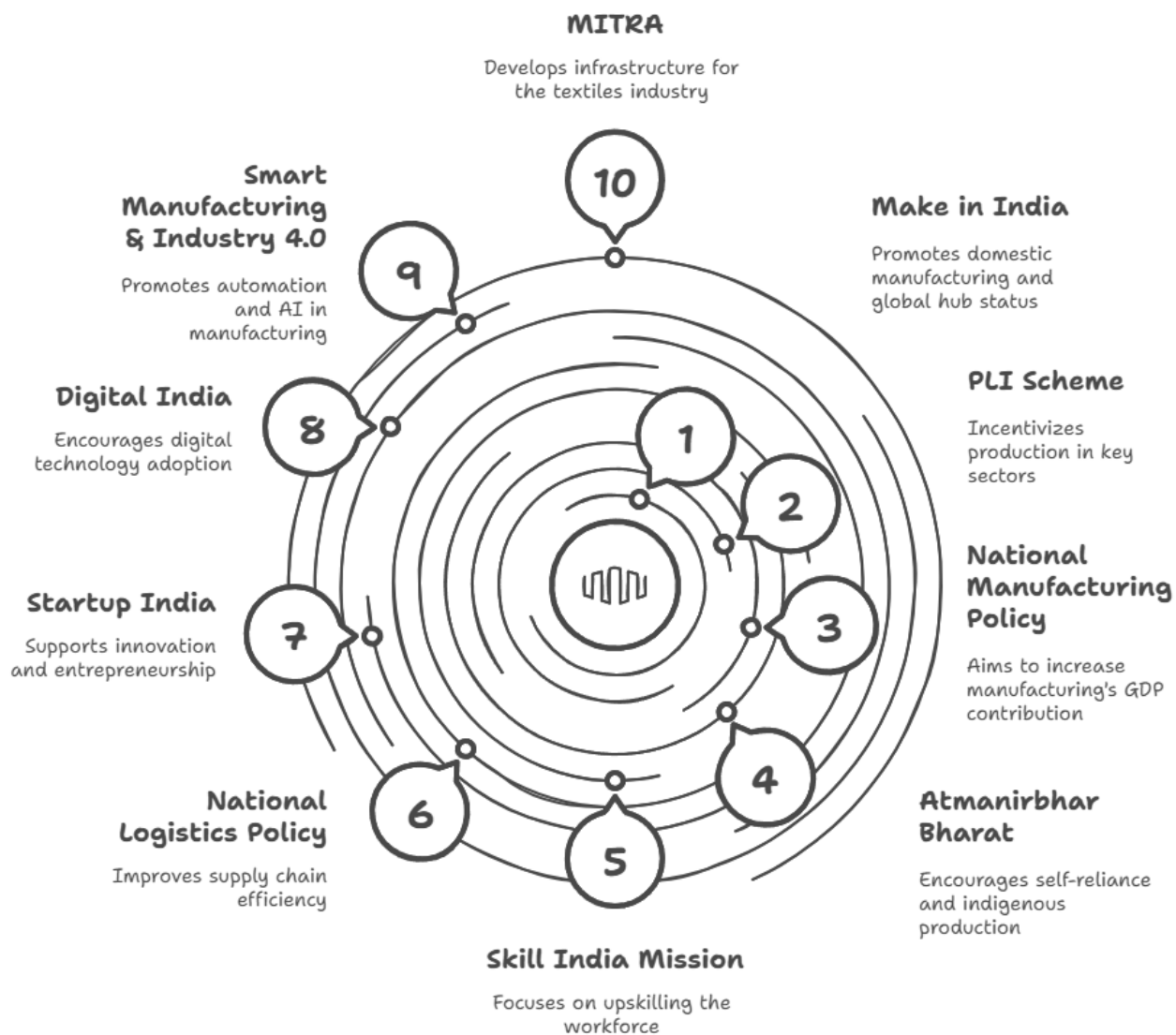
- The **Economic Survey 2024-25 calls for urgent deregulation to boost MSME growth**, stressing that excessive regulatory burdens hinder business efficiency and innovation.

- 💡 **Skilled Labor Shortage:** Despite the growth in employment, a **skills gap** remains a major roadblock for India's industrial sector.
  - ✦ The **National Skill Development Corporation's 2022** report highlights a shortfall of **29 million skilled workers** in India's manufacturing and engineering sectors
  - ✦ The **PMKVY program** has trained **over 1.4 crore individuals** since its inception, yet India's **skill development programs** have not kept pace with the rapidly evolving industrial demands.
    - This **skill mismatch results in inefficiencies,** high training costs, and slower adaptation to global manufacturing standards, affecting overall productivity.

- 💡 **Environmental and Sustainability Challenges:** Industrial growth in India faces increasing pressure to adopt **sustainable practices** amid rising concerns over climate change and environmental degradation.
  - ✦ The country's heavy reliance on coal for electricity generation, which still fuels **over 55% of its electricity,** impedes its transition toward net-zero emissions.
  - ✦ Also, the **clean tech** push under initiatives like the **PLI scheme** for **green energy** is constrained by high capital investment requirements and slow adaptation in key industries.
- 💡 **Competition from Global Manufacturing Hubs:** While India aims to become a global manufacturing hub, it faces stiff competition from established manufacturing centers like **China** and other players like **Vietnam**, which offer lower labor costs and efficient supply chains.
  - ✦ **India's share in global manufacturing remains low at 2.8%**, which reflects its challenge in competing globally.
  - ✦ India, despite possessing one of the world's largest iron ore reserves, continues to **export low-value raw materials like iron ore**—particularly to **countries like China—while importing higher-value finished products.**
    - 🖉 This trade imbalance stems primarily from structural challenges in the domestic steel industry, including limited capacity, operational inefficiencies, elevated input costs, and persistent logistical constraints.
  - ✦ Furthermore, India's **steel production growth** in FY25 has been modest at 3.3%, and its **electronics exports** lag behind China's, signaling challenges in scaling to meet global demand, especially in key industries like **electronics** and **automobiles**.
- 💡 **Limited Focus of Indian Startups on High-Impact Sectors:** Indian startups often face criticism for focusing on low-impact, consumer-driven sectors like **fancy foods and 10-minute deliveries,** which,

while innovative, **do not contribute significantly to long-term industrial growth (as highlighted recently by the Commerce minister).**
  - ✦ Instead, there is a need for a stronger emphasis on transformative sectors such as semiconductors, robotics, artificial intelligence (AI), 3D manufacturing, and other advanced technology-driven industries.
    - 🖉 These sectors have the potential to drive India's industrial growth, innovation, and global competitiveness.

What Measures can India Adopt to Accelerate Industrial Growth and Competitiveness?

- 💡 **Enhance Digitalization and Industry 4.0 Adoption:** To remain competitive in the global industrial landscape, India must push for broader adoption of **Industry 4.0** technologies.
  - ✦ By integrating **AI**, **IoT**, **big data analytics**, and **automation** across manufacturing units, India can significantly **enhance productivity, reduce costs, and improve efficiency.**
    - 🖉 This will create a **robust, future-ready industrial ecosystem t**hat can quickly adapt to evolving market demands.
  - ✦ Government incentives for digital transformation, including **tax breaks** for technology investments, can accelerate this transition, especially in **small and medium-sized enterprises (SMEs)**.
- 💡 **Strengthening Logistics and Infrastructure Integration:** One of the most effective ways to reduce industrial costs and increase competitiveness is by focusing on the **efficiency of logistics and infrastructure**.
  - ✦ This includes not just improving **physical infrastructure** like roads and ports, but also streamlining the digital infrastructure to enable **smart supply chains**.
  - ✦ **Public-private partnerships** can be encouraged to build **integrated logistics hubs** and **smart industrial parks** that facilitate seamless

movement of goods, reduce transport time, through multi modal logistics parks and dedicated freight corridors.

💡 **Targeted Skill Development for Emerging Technologies:** India needs a more **targeted approach to skill development**, focusing on **emerging technologies** like **AI, robotics, cloud computing**, and **cybersecurity** to address the growing skills gap.

✦ Establishing specialized training programs and **certification courses** in these sectors, **in collaboration with both industry leaders and academic institutions**, can bridge the mismatch between market demand and workforce capabilities.

✦ Additionally, integrating **industry-driven curriculum** into vocational training institutes will ensure that graduates are well-prepared for industry needs.

💡 **Fostering Innovation through R&D and Startups:** India can foster industrial competitiveness by actively investing in **research and development (at least 2% of GDP)** and promoting **innovation ecosystems**.

✦ Strengthening public-private collaborations, offering **grants and tax incentives** for R&D activities, and setting up dedicated innovation hubs can stimulate breakthroughs in high-value sectors such as **pharmaceuticals**, **electronics**, and **green technologies**.

✦ Recently, the Union Minister for Commerce urged Indian startups to move beyond low-impact sectors like fancy foods and instant delivery. He emphasized the need to focus on high-impact, future-ready domains such as semiconductor chips, robotics, machine learning, 3D manufacturing, advanced factories, and AI models to make India globally competitive.

💡 **Creating a Robust Domestic Demand through Policy Stimulus:** India needs to implement **demand-stimulating policies** that focus on boosting **domestic consumption**, especially in sectors like **consumer electronics**, **automobiles**, and **textiles**.

✦ To sustain rural demand, enhanced allocations to MGNREGA, direct benefit transfers to small and marginal farmers, and investment in rural infrastructure **(roads, cold chains) are essential** — echoing the grassroots needs (as highlighting in the famous webseries *Panchayat*)

💡 **Promoting Sustainable and Green Manufacturing:** Sustainability should be integrated into industrial growth strategies through a **green manufacturing** framework.

✦ India must promote **energy-efficient technologies**, incentivize **waste reduction**, and invest in **circular economy practices**.

📎 This shift will help industries **reduce their carbon footprint, comply with international regulations,** and capitalize on the growing global demand for eco-friendly products.

💡 **Improving Ease of Doing Business and Regulatory Reforms:** Streamlining the **regulatory framework** is essential for fostering industrial growth. India must continue simplifying the process for obtaining **licenses, permits, and clearances** for industrial projects, particularly for **startups** and **MSMEs**.

✦ This involves digitizing and automating government processes, reducing bureaucratic delays, and introducing **one-stop-shop platforms** for industrial permits.

💡 **Expanding Access to Finance for MSMEs:** One of the biggest challenges faced by **MSMEs** is **access to affordable capital**. India should promote innovative **fintech solutions** and **government-backed loan schemes** to provide easy and low-interest loans to MSMEs.

✦ Additionally, enhancing the **credit guarantee scheme for MSMEs** through audit mechanisms and offering **tax incentives for investors** in small businesses will enhance the financial viability of these enterprises.

- ✦ Programs such as **MSME Samadhan and SFURTI** need to be utilized effectively to support MSMEs.
  - 🖉 The *SBI's loan in 59 minutes* **initiative** is another example of facilitating quicker and more accessible financing, enabling faster business growth and resilience.
- 💡 **Leveraging Trade Agreements to Expand Market Access:** India must actively pursue **bilateral trade agreements (like with European Free Trade Association)** with key economic partners to enhance access to global markets.
  - ✦ By focusing on agreements that reduce tariff barriers, address intellectual property concerns, and improve market access for **Indian-made goods**, India can unlock new **growth avenues for its industrial sectors.**
- 💡 **Enhancing Rural Industrialization and Agri-Processing:** To balance industrial growth and regional disparities, India should focus on **rural industrialization (building upon the PURA Model of Dr APJ Abdul Kalam)** and the promotion of **agri-processing industries**.
  - ✦ Encouraging the establishment of **food processing units** and **agricultural manufacturing hubs** in rural areas will not only boost local economies but also help to diversify India's industrial base.

Conclusion:

Accelerating industrial growth in India requires aligning efforts with the **Sustainable Development Goals (SDGs), especially SDG 8 (Decent Work & Economic Growth)** and **SDG 9 (Industry, Innovation & Infrastructure).** The National Manufacturing Policy and PLI schemes must be leveraged to empower MSMEs, boost R&D, and foster sustainable, tech-driven industries.

Drishti Mains Questions

1. "Judicial independence is essential, but not absolute." In light of recent debates on judicial appointments and accountability, discuss how India can balance independence with transparency.

2. "India-China relations are marked by cooperation, competition, and confrontation." Critically examine this trilateral dynamic in the current geopolitical context.

3. Despite various reforms, the informal sector continues to dominate employment in India. Discuss the challenges in formalising the workforce and suggest solutions.

4. Discuss the significance of innovative plastic recycling technologies in addressing India's plastic waste crisis. Highlight key advancements and challenges in their large-scale adoption.

5. Discuss the key growth drivers of India's service sector and analyze the challenges that need to be addressed to sustain its global competitiveness.

6. How does BIMSTEC complement India's Act East and Neighbourhood First policies in the evolving Indo-Pacific order?

7. Critically analyze the current state of healthcare infrastructure in India. What measures can be taken to ensure equitable access to quality healthcare across rural and urban areas?

8. In the context of rising global trade complexities, examine the challenges faced by India's agricultural sector in maintaining export competitiveness

9. "A secure and stable neighbourhood is not a choice but a strategic necessity for India." In this context, critically examine the evolution of India's neighbourhood policy and suggest measures to enhance its efficacy amid growing geopolitical challenges

10. "India's growth story will remain incomplete without the economic empowerment of its women." Discuss.

11. "India's startup ecosystem is thriving but uneven." Examine the opportunities, achievements and challenges in this context.

12. "With the growing militarization of outer space, the final frontier is fast becoming the new theatre of warfare." In this context, critically examine the challenges India faces in safeguarding its space assets.

13. "High logistics cost is a structural bottleneck in India's path to becoming a global manufacturing hub." Discuss and suggest measures to improve efficiency and competitiveness of the logistics sector.

14. Examine the key challenges hindering the effectiveness of educational reforms in India, particularly in light of the National Education Policy 2020.

15. Despite legal protections, India's tribal communities continue to face displacement, cultural erosion, and marginalization. Critically examine.

16. Despite being a reliable source of clean energy, nuclear power in India has remained underutilized. Examine the key challenges in the expansion of nuclear energy in India.

17. Critically examine the Supreme Court's verdict on the role of Governors and the President in the assent process. Discuss its implications on the autonomy of constitutional offices and suggest reforms to ensure a balance between accountability and independence.

18. Despite recent diplomatic engagements, structural issues continue to impede the normalization of India-China relations. Critically examine the major areas of contention and suggest a strategic roadmap for stable bilateral ties

19. Discuss the role of urban agglomerations in driving regional economic growth in India. What are the key challenges faced by Indian cities in sustaining this growth, and how can sustainable urban planning help in addressing these challenges?"

20. "The Arctic is emerging as a geopolitical and environmental hotspot, with implications far beyond the polar region." In this context, examine the strategic, environmental, and economic significance of the Arctic for India.

21. "Terrorism remains one of the gravest threats to India's internal security, evolving in form and tactics despite countermeasures." Discuss the key challenges India faces in countering terrorism today

22. In the context of rising global trade tensions and geo-economic fragmentation, critically examine how India can sustain resilient economic growth.

23. Food adulteration in India reflects deep-rooted governance and regulatory challenges in ensuring food safety. Critically examine the causes and implications of food adulteration. Suggest comprehensive measures to address this issue effectively.

24. "India is facing an unprecedented water crisis exacerbated by climate change. In light of this, discuss the major factors contributing to it and propose a comprehensive strategy to address this crisis.

25. "India's target of achieving 500 GW of non-fossil fuel capacity by 2030 is ambitious but faces structural and technological hurdles". Examine the key developments and associated challenges in India's renewable energy sector.

26. Despite ambitious initiatives like 'Make in India' and PLI schemes, India's industrial sector continues to face structural bottlenecks. Examine the key challenges impeding industrial growth in India and suggest policy measures to make the sector globally competitive and inclusive