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## Shifting Tides Of India-Maldives Diplomacy

This editorial is based on “**PM Modi’s visit to the Maldives: A diplomatic reset**” which was published in *The Indian Express* on 29/07/2025. The article brings into picture the strained India-Maldives ties post-2023 and the recent diplomatic efforts to renew relations, underscoring Maldives’ strategic value in India’s regional and maritime interests.

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

**India-Maldives relations** experienced significant strain after Maldives’s current President rose to power in 2023 on an “**India Out**” platform, followed by the outreach to China and demands for Indian troop withdrawal. The diplomatic row was further complicated by derogatory remarks from Maldivian ministers that led to a sharp decline in Indian tourism, a crucial economic lifeline for the archipelago. However, recent high-level diplomatic engagement signals a potential reset in bilateral ties. The Maldives remains strategically vital to India’s maritime security and “**Neighbourhood First**” policy, given its location astride critical Indian Ocean shipping lanes.

### How India-Maldives Evolved Over Time?

- 💡 **Early Diplomatic Relations (1965–1980s):** India was among the first to recognize the Maldives’ independence in 1965, laying the foundation for cordial ties rooted in shared geography and culture. India supported the Maldives in international forums and extended early economic and security assistance.
  - ✦ A defining moment was **Operation Cactus (1988)**, when India swiftly intervened to foil a coup attempt, reinforcing its role as a trusted security partner.
- 💡 **Strengthening Ties (1990s–Early 2000s):** The relationship deepened through development assistance, especially in health, education, and infrastructure.



- ✦ India emerged as a key economic and trade partner as Maldivian tourism flourished. Both countries collaborated in regional platforms like **SAARC**, focusing on disaster relief, economic cooperation, and regional security.
- 💡 **Democratic Transition and Strategic Shifts (2008–2012):** The election of Mohamed Nasheed in 2008 marked Maldives’ shift to multiparty democracy and closer India ties, particularly on **climate diplomacy**.
  - ✦ However, Nasheed’s ouster in 2012 led to a more China-leaning tilt under President Yameen, who welcomed Chinese investment in strategic sectors, triggering concerns in India about diminishing influence.
- 💡 **Diplomatic Reset and Pragmatic Engagement (2013– Present):** India was the first responder to assist the Maldives during both the **2004 Tsunami** and the Malé water crisis (**Operation Neer**) in December 2014.
  - ✦ In January 2020, India’s prompt supply of 30,000 measles vaccine doses and its timely Covid-19 aid reaffirmed its role as the Maldives’ “**first responder**” in crises.
  - ✦ In 2023, President Muizzu rose to power on the “**India Out**” plank, demanding withdrawal of Indian personnel and adopting a nationalistic, sovereignty-focused stance.

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- ✦ However, 2024 reflects a shift toward **pragmatic diplomacy**. Indian Prime Minister's visit in July 2025, commemorating 60 years of ties, marked a turning point, with multiple agreements signed.

### What are the Key Areas of Convergence in India-Maldives Relations?

💡 **Economic and Financial Cooperation:** India remains the Maldives' largest financial partner, providing crucial economic support during periods of financial instability.

- ✦ India's recent offering of a **₹4,850 crore line of credit for infrastructure projects** is a clear indicator of this growing partnership.
- ✦ In addition, **India rolled over \$50 million worth of Treasury Bills**, a vital financial gesture to ease the Maldives' debt pressures.
  - 📎 In 2024, **India's development assistance to the Maldives has increased by 50%**, underscoring the urgency and significance of India's role in stabilizing the Maldivian economy.
- ✦ In 2024, India and the Maldives signed a vision document for the **Comprehensive Economic and Maritime Security Partnership**.

💡 **Infrastructure Development:** Infrastructure cooperation remains a cornerstone of bilateral ties, with India playing a central role in several key projects.

- ✦ India's assistance in the **Greater Malé Connectivity Project (GMCP)** and the **Thilamale Bridge** reflects India's commitment to bolstering the Maldives' infrastructure.
  - 📎 Despite some delays due to domestic politics, these projects are pivotal in addressing urban overcrowding and fostering regional economic integration.
- ✦ Additionally, **India is supporting 65 High Impact Community Development Projects (HICDPs) across the Maldives** further solidifying India's role in the nation's long-term development goals.

💡 **Maritime Security and Defence Cooperation:** The strategic location of the Maldives in the Indian Ocean makes it central to regional maritime security.

- ✦ Despite earlier strains, both countries have maintained strong security ties, as seen in the continuation of **trilateral "Dosti" exercise with Sri Lanka in 2024**.

- ✦ India's support includes **upgrading Maldives National Defence Force (MNDF) assets** with advanced radar systems to improve maritime domain awareness.

📎 Additionally, India committed to enhancing the Maldives' coastal security infrastructure by providing platforms for **search and rescue operations**, as well as disaster response.

💡 **Tourism and People-to-People Ties:** Tourism remains a vital sector for the Maldivian economy, with India being the largest source of tourists.

- ✦ Despite the recent diplomatic tensions, India has continued to provide support to boost the Maldivian tourism sector.
- ✦ The reinstatement of air and sea links post-crisis, coupled with **MoUs for enhancing ferry services in the Maldives** signifies the ongoing relevance of people-to-people engagement.
- ✦ Post Covid-19 pandemic, Indian tourists occupied the top slot of arrivals to Maldives continuously from 2020 till 2023.

💡 **Climate Change and Sustainable Development:** Both nations have shared interests in climate adaptation strategies and environmental sustainability, especially given the **Maldives' low-lying geography** and susceptibility to rising sea levels.

- ✦ **India's support in developing renewable energy infrastructure**, such as solar power projects, underscores this convergence.
- ✦ India has pledged assistance for climate resilience projects, including **solar-powered water and sewage systems across 28 islands**, contributing to the Maldives' fight against climate change.
- ✦ Furthermore, the **Greater Malé Connectivity Project** incorporates climate-conscious designs, such as environmentally-friendly construction and energy-efficient lighting, to mitigate the country's environmental footprint.

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## What are the Areas of Friction Between India and Maldives?

💡 **China's Growing Influence in the Maldives:** The Maldives' increasing engagement with China, has raised concerns for India.

- ✦ The Maldives' signing of numerous agreements with China, including in **infrastructure and defence**, coupled with **China's support for the Maldives' debt restructuring**, is seen as an effort to reduce dependence on India.

✎ This shift is particularly evident in the strategic agreements involving ports and agricultural land, with some tracts, located near the **Uthuru Thila Falhu base** (an Indian grant-in-aid project), allegedly being used by China for military-linked activities.

- ✦ In January 2024, Muizzu's visit to China upgraded their relationship to a **"comprehensive strategic partnership,"** showcasing his alignment with Beijing.

✎ The **docking of Chinese military vessels in Malé** and the construction of Chinese-funded infrastructure near India's strategic assets highlight the growing Maldivian tilt towards China, despite India's critical economic and military support.

💡 **Hydrography and Maritime Concerns:** One of the more technical but significant issues between India and the Maldives is the **termination of the hydrographic survey agreement between the two nations.**

- ✦ This agreement, vital for maritime security and environmental studies, was suspended by the Maldives in late 2023, citing sovereignty concerns.

✎ **India's role in surveying and mapping the sea bed** near the Maldivian waters has been a longstanding collaboration that now faces uncertainty.

- ✦ This development has been seen as a **consequence of the Maldives seeking to reassert its independence in the face of both Indian and Chinese interests**, though it risks reducing cooperation on broader maritime security.

💡 **Tourism and Anti-India Sentiments:** In 2024, derogatory remarks by junior Maldivian ministers about Indian Prime Minister triggered a significant backlash in India, leading to **the #BoycottMaldives campaign on Indian social media.**

- ✦ These remarks, though later condemned and resulting in suspensions of the ministers involved, strained people-to-people ties.
- ✦ The diplomatic fallout led to a sharp **decline in Indian tourist arrivals, a critical sector for the Maldivian economy.** In 2024, Indians visiting Maldives declined by around **37.47%.**

💡 **Debt and Financial Dependence:** Despite receiving significant financial aid from India, the Maldives' ongoing economic crisis has led it to seek additional financial assistance from China and Gulf nations.

- ✦ The **Maldivian government's growing debt burden**, continues to strain relations with India, especially when compared to **India's own concessional loans.** This economic imbalance complicates the bilateral relationship.
- ✦ The Maldives' dependence on Indian aid, juxtaposed with its debt to China, underscores the **difficult balancing act the country faces in managing its foreign financial commitments, impacting its relationship with India.**

💡 **Issue over India's Military Presence and the "India Out" Campaign:** The presence of Indian military personnel in the Maldives, especially for operating and maintaining Indian-donated aircraft and coastal radars, has been a contentious issue domestically in the Maldives.

- ✦ The **"India Out" campaign**, spearheaded by opposition parties and amplified by the current President during his election campaign, gained traction by portraying India's military presence as a violation of Maldivian sovereignty.
- ✦ While the Indian government maintains that its personnel are there on invitation and for training and humanitarian support, the **public narrative in the Maldives has been increasingly critical.**

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💡 **Fishing Rights and Marine Resource Disputes:** Tensions have periodically surfaced over fishing zones, particularly in the **Exclusive Economic Zones (EEZs)** near the **Lakshadweep-Maldives maritime boundary**.

✦ Maldivian concerns about Indian fishing vessels encroaching into their territorial waters have been raised during bilateral meetings.

✦ These issues are sensitive, as fishing is a critical livelihood sector for both countries, and perceived violations can trigger diplomatic protests and domestic backlash in the Maldives.

📌 In January, 2024, the Indian troops intercepted a Maldivian fishing boat engaged in fishing activities within the **Maldives' Special Economic Zone (EEZ)**, which raised significant bilateral concerns.

### What Measures can India Adopt to Enhance Ties with Maldives?

💡 **Recalibrated Defence Diplomacy through Civilian Interface:** India must reframe its defence cooperation with Maldives by enhancing **non-militarised security support—focusing on capacity building, maritime domain awareness, and humanitarian assistance**.

✦ Transitioning from a troop-based presence to a **civilian-led strategic footprint** can ensure sensitivity to Maldivian domestic sentiments.

✦ Deploying **dual-use assets like coastal radars and medical evacuation platforms** can reinforce soft security partnerships. This approach balances strategic imperatives with sovereignty concerns.

💡 **Joint Infrastructure Development with Co-Ownership Models:** India should propose **co-investment frameworks** in infrastructure especially in sustainable ports, digital connectivity, and energy to foster mutual ownership and transparency.

✦ Moving away from a donor-recipient dynamic towards **equal partnership models** can reduce geopolitical suspicion.

📌 Establishing joint project steering committees will improve accountability and prevent perception of dominance.

💡 **Reviving People-to-People Linkages via Cultural Diplomacy:** To counter public perception gaps, India must scale up soft diplomacy through cultural exchanges, language scholarships, academic fellowships, and youth dialogues.

✦ Reinvigorating **civil society engagement** can rebuild grassroots goodwill, independent of political cycles. Leveraging tools like the **"International Solar Alliance" scholarships** or **"Study in India" platform** can enhance India's soft image.

💡 **Strategic Tourism Corridors with Local Empowerment:** India can establish **cross-border eco-tourism and heritage circuits** involving Lakshadweep, Minicoy, and northern Maldives to foster economic interdependence.

✦ Such initiatives must embed **local community participation**, employment generation, and sustainable practices. It will not only offset tourism rivalries but promote shared prosperity narratives.

💡 **High-Level Strategic Dialogue Mechanism:** Institutionalising a structured **India-Maldives Strategic and Economic Dialogue** with annual summits, working groups, and crisis-resolution hotlines can ensure continuity of engagement irrespective of regime changes.

✦ It offers a mechanism for **confidence-building**, transparent communication, and coordinated response to geopolitical developments like third-party naval presence.

💡 **Debt Sustainability and Regional Financial Assistance Framework:** India should lead a regional effort for **debt transparency and sustainable financing** in the Indian Ocean, offering Maldives alternatives to high-interest or politically conditional loans.

✦ Introducing a **Maldives-India Development Financing Facility** underlines India's role as a stabilising economic partner without coercive strings.

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💡 **Digital and Climate Resilience Cooperation:** Joint efforts on **digital public infrastructure**, fintech regulation, and early warning systems for climate disasters can deepen functional ties.

- ✦ **India's Digital Public Infrastructure** experience like UPI or DigiLocker can be adapted for Maldivian use under a **technology transfer with respect to framework**.
- ✦ Climate adaptation technologies in water security and coral reef protection also offer collaborative ground.

💡 **Blue Economy Innovation Partnership:** Creating a bilateral **Blue Economy Innovation Hub** focused on marine biotech, fisheries sustainability, and clean shipping can unlock new-age economic sectors.

- ✦ This can serve as a **strategic development compact**, combining India's scientific expertise with Maldivian resource potential. Joint patents, start-up incubators, and ocean fellowships can institutionalise it.

### Conclusion:

**India-Maldives relations**, though recently marred by strategic tensions and political rhetoric, continue to rest on a foundation of deep historical ties, geographic proximity, and shared regional interests. As, **"There are no permanent friends or enemies in diplomacy, only permanent interests."** Anchoring its policy in this wisdom, India must prioritise stable, interest-driven, and people-centric ties with the **Maldives**, ensuring that the **Indian Ocean** remains a region of peace, prosperity, and partnership.



## Turning Tariffs into Trade Opportunity

*This editorial, based on "**The Opportunity in Tariff War**" published on 31/07/2025, in Financial Express, examines how the 25% tariff on Indian goods and penalties imposed by the US, linked to India's dealings with Russia, present both challenges and opportunities for India.*

**Tag:** GS Paper-3, Growth & Development, Deglobalisation & Protectionism, GS Paper - 2, Effect of Policies & Politics of Countries on India's Interests, International Treaties & Agreements, Government Policies & Interventions.

The **imposition of 25% tariffs by the United States on Indian imports**, along with penalties linked to India's defense and energy dealings with Russia, represents a significant shift in **India-US trade relations**. These measures not only strain bilateral economic ties but also have a ripple effect on India's export competitiveness, investment climate, and **broader geo-economic positioning in a multipolar world**. While they pose immediate challenges, they also offer India a strategic opportunity to **reassess and strengthen its manufacturing, trade diversification, and long-term economic growth strategies**.

### How do US Tariffs Affect India's Economy and Trade Dynamics?

💡 **Weakened Export Edge and Potential Growth Strain:** The 25% tariff on Indian exports to the US **threatens India's competitiveness**, particularly in labor-intensive sectors like textiles, seafood, and gems.

- ✦ **The US was India's largest trading partner for the fourth consecutive year** in 2024-25, with bilateral trade valued at USD 131.84 billion.
- ✦ Estimates suggest that if half of the US demand disappears, **India's exports could decline by USD 40 billion**, reducing GDP growth by 1% in FY26.
  - 📎 The imposition of tariffs **can lead to the depreciation of the Indian rupee** as well.
  - 📎 Also, lower US tariffs on ASEAN countries like Vietnam and Indonesia **divert export orders away from India**, further reducing its market share.

💡 **Risks to Small and Medium Enterprises (SMEs):** SMEs, often operating with limited working capital and small margins in labour-intensive sectors like garments, leather, and handicrafts, are **particularly vulnerable to tariff hikes**.

- ✦ These businesses could face challenges in managing the increased costs, resulting in potential job losses **as they lack the financial and logistical bandwidth** to absorb cost increases or explore alternate markets quickly.

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✦ Simultaneously, tariff-driven restrictions on Chinese goods in the US push **China to dump surplus inventory into alternative markets like India**, leading to price suppression and increased pressure on domestic industries.

💡 **Potential Vulnerability in High-Growth Sectors:** Though high growth sectors like **electronics and pharma** are currently not subject to reciprocal tariffs, both sectors could face a larger impact later, particularly when the US introduces **sectoral tariffs**.

✦ This could diminish India's competitive edge in electronics and other high-value sectors, even though these industries have seen rapid growth due to **Foreign Direct Investment (FDI)** and **Production Linked Incentive Scheme (PLI)** schemes.

💡 **Compromised Scope for Value Chain Upgradation:** India is trying to shift from being a **low-value exporter** (e.g., raw materials, intermediates) to **high-value manufacturing** and design-based exports.

✦ US tariffs, particularly if applied on high-tech or precision engineering goods, may freeze India's movement up the value chain. This **risks keeping India stuck in low-margin segments**, limiting its ability to compete in the advanced manufacturing race.

### What Strategic Opportunities Can India Derive from US Tariff Policies?

💡 **Enhancing Position in Global Supply Chains:** Amid US "friend-shoring" and "China+1" strategies, India has a chance to become a trusted node in global value chains (GVCs). Sectors like electronics, **semiconductors**, and defence manufacturing are ripe for integration.

✦ Additionally, India **can capitalize on sunrise sectors such as Active Pharmaceutical Ingredients (APIs)** and technical textiles, further expanding its role in global supply chains and driving long-term economic growth.

✦ The impact of tariffs can push **Indian industries to upgrade** their quality, technology readiness, and scale, **moving away from only seeking temporary protection** to building robust, long-term global capabilities.

💡 **Strategic Opening for Services and Data Trade Diplomacy:** While US tariffs largely target goods, they offer India a strategic window to recalibrate trade diplomacy toward services, digital commerce, and cross-border data flows—domains where India holds a clear competitive edge.

✦ India can leverage platforms like **iCET (Initiative on Critical and Emerging Technology)** to shape norms around data sovereignty, fintech interoperability, and digital taxation. This **allows India to transition from a tariff-reactive posture to a rule-shaping partner** in the digital domain.

💡 **Boost to Domestic Manufacturing and Export Diversification:** The US decision to impose tariffs provides India with an opportunity to strengthen its domestic manufacturing, **particularly in sectors like auto components, electronics, and industrial machinery**, where tariffs on China's exports have created new competitive openings.

✦ Indian manufacturers can benefit from the **USD 20 billion in China's exports** to the US that are at risk because of the **tariff war**.

✦ For example, India's auto components sector could grow by **establishing operations in tariff-neutral regions** or increasing direct exports.

💡 **Deepening Economic Ties with Alternative Partners:** The unpredictability of US tariffs pushes India to accelerate trade with alternative partners, such as the **European Union (EU), ASEAN nations, and Latin American and Caribbean (LAC)** countries.

✦ This strategy aims to diversify India's export markets, **reducing reliance on the US** and insulating its economy from US-centric risks.

✦ By strengthening these trade relations, **India can safeguard its economic growth and open new avenues for investment** and market access, ensuring long-term stability amid global trade uncertainties.

### What Measures Can India Adopt to Maximize Trade Gains Amid Global Tariff Shifts?

💡 **Strengthening Domestic Manufacturing and Innovation:** India must continue focusing on

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advanced manufacturing technologies and improving product quality to make its industries globally competitive.

✦ Key sectors like electronics, pharma, auto components, and textiles **must ramp up R&D, compliance, and innovation** to meet global standards.

✦ Strengthen **Production Linked Incentive Schemes** and **Make in India** in semiconductors, electronics, APIs, and solar modules to curb overdependence on imports.

💡 **Enhancing Trade Diplomacy and FTAs:** India must expedite negotiations for **free trade agreements (FTAs)** with the European Union and ASEAN countries to mitigate the impact of tariffs. These agreements can offer market access and tariff cuts that can offset the burden of US tariffs.

✦ Strengthening sectors like **renewable energy, electric vehicles, and high-tech manufacturing** should be a priority, as these areas align with global sustainability trends and offer long-term growth potential.

✦ Additionally, a **reformed India-US trade pact should be prioritized**, aiming for comprehensive, long-term alignment that goes beyond temporary tariff negotiations to address non-tariff barriers, investment flows, and policy flexibility.

✦ Also, instead of expanding volume in a few sectors, **India should prioritise horizontal diversification (new sectors) and vertical upgrading (high-value stages).**

📌 For example, rather than exporting raw textiles, India must aim for branded garments or smart fabrics.

💡 **Supporting SMEs and Protecting Vulnerable Sectors:** SMEs, especially in textiles and seafood, should receive targeted financial support through measures like **interest rate subventions and export incentives.**

✦ A sector-specific response could help ease the burden for SMEs, including **support for industries** like marine food products, gems, and jewelry, where India has a significant market share in the US.

✦ At the same time, the **private sector must step up as a key partner to invest in R&D**, enhance quality standards, and develop a future-ready workforce. This **synergy between state and industry** will be critical to drive productivity and attract global investors.

💡 **Strategic Resilience Against China's Dumping:** India needs to deploy stringent anti-dumping policies in line with the **WTO's Anti-Dumping Agreement** to counter the risk of Chinese overproduction in sectors like steel, chemicals, and electronics.

✦ India should **deploy a real-time tariff monitoring system** to ensure that domestic industries are shielded from aggressive pricing strategies by Chinese producers.

📌 India imposes import duties on solar panels to promote domestic manufacturing and reduce reliance on foreign imports, it serves as a useful precedent.

💡 **Policy Reform and Structural Changes:** India must focus on improving its infrastructure, logistics, and energy reliability to lower factor costs and improve the **ease of doing business**. This can help ensure that **Indian goods remain competitive despite tariff hikes.**

✦ Structural reforms, including land acquisition modernization, credit access for MSMEs, and regulatory efficiency, are essential for creating a **business-friendly environment conducive to long-term manufacturing growth.**

## Conclusion

India has a unique opportunity to optimize trade relations and enhance economic resilience in the face of global uncertainties amid rising tariffs. By focusing on **sectoral growth, technological advancements, and regional trade partnerships**, India can capitalize on the shifting global landscape. With a strategic emphasis on sustainable development, capacity building, and innovation-driven growth, **India can position itself as a key player in the global economy.**



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## Strengthening India's Energy Security

*This editorial is based on "For Energy Security, A Redesign," published on 04/08/2025. Despite commendable progress in renewable energy, it highlights India's energy security strategy and emphasizes the need for simplifying energy regulations, improving existing coal infrastructure, and accelerating the shift towards renewable energy to ensure sustainable growth and decarbonization.*

**Tag:** GS Paper - 2, Government Policies & Interventions, GS Paper - 3, Renewable Energy

Energy security in India has traditionally focused on **access, reliability, and the affordability of fossil fuels**. However, in light of **global warming** and India's commitment to **net-zero emissions by 2070**, this perspective is now too limited. India needs to follow a **two-track energy path**: one focusing on reducing **fossil fuel consumption** (coal, oil, and gas) and the other on **expanding renewables** (solar, wind, and bioenergy). Achieving this requires not only conserving fossil fuel use but also simplifying and aligning the energy regulatory system for greater efficiency.

### How is India Progressing Toward Energy Security?

- 💡 **Rise in Installed Power Capacity and Energy Mix:** As of June 2025, India's total installed power capacity has reached 476 GW.
  - ✦ Thermal power contributes **240 GW (50.52%) of India's total installed capacity**, primarily driven by coal.
  - ✦ Non-fossil fuel sources, including renewables and nuclear, **constitute 49% (235.7 GW) of the total installed capacity**.
    - 📎 **Renewable energy** accounts for 226.9 GW (47.7%) of total capacity, placing India 4<sup>th</sup> globally.
    - 📎 According to IRENA RE Statistics 2025, India ranks 4<sup>th</sup> in wind power and 3<sup>rd</sup> in solar power capacity.

- ✦ This shift reflects a **diverse energy mix** aimed at ensuring energy security while reducing fossil fuel dependence and supporting **India's decarbonization and Paris Agreement commitments**.

- 💡 **Advancement in Power Supply:** India has made remarkable progress in enhancing the reliability and consistency of its power supply.

- ✦ Power shortages have **dropped from 4.2% in 2013-14 to 0.1% in 2024-25**, reflecting substantial progress in ensuring a reliable and consistent power supply to meet the growing demand.

- 📎 Under the **Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGYA)**, India achieved **100% village electrification by April 2018**, making electricity accessible to remote areas across the country.

- ✦ Initiatives such as **Tata Power's solar micro-grids, which aim to electrify 10,000 villages**, play a crucial role in ensuring energy access in remote areas.

- 📎 These decentralized solutions are **critical to making energy accessible and affordable to all**.

- 💡 **Electrifying the Mobility Sector:** India is leveraging clean energy to decarbonize its transportation sector, aiming for 30% **electric vehicle (EV)** penetration by 2030.

- ✦ Electric buses and **Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME II) schemes** have enhanced urban public transport while reducing emissions.

- 📎 The **PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) Scheme** builds upon these developments.

- ✦ The **Indian EV battery market is projected to surge** from USD 16.77 billion in 2023 to a remarkable USD 27.70 billion by 2028.

- 💡 **Strategic Petroleum Reserves (SPR):** To enhance energy security, India has invested in SPR to safeguard against disruptions in global oil supply.

- ✦ India's SPR capacity, managed by the **Indian Strategic Petroleum Reserves Limited (ISPRL)**, aims to store up to 5.33 million metric tonnes of crude oil.

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✦ This reserve provides a cushion against supply shocks, **stabilizing the market during global crises**, such as geopolitical tensions or natural disasters that may disrupt oil flows.

✦ **Expanding and diversifying these reserves will strengthen India's energy security** and reduce vulnerability to external supply disruptions.

💡 **Global Energy Diplomacy as a Pillar of India's Energy Security:** India's global leadership in renewable energy is showcased through initiatives such as the **International Solar Alliance (ISA)** and its active push for equitable energy funding at **COP29** in Baku.

✦ At COP29, India raised concerns over unilateral actions by developed nations, stressing the need for shared responsibility and equitable distribution of resources to tackle global energy and climate challenges.

✦ The ISA's 'Towards 1000' strategy aims to **unlock USD 1 trillion in solar investments by 2030**, significantly contributing to global renewable energy efforts.

### What are the Major Challenges Impeding the Growth of India's Energy Sector?

💡 **Dependence on Coal and Other Fossil Fuels:** Despite the progress in renewable energy, India's energy mix is still heavily dependent on coal, which constitutes a significant portion of the country's power generation.

✦ This **ongoing reliance on coal is a major challenge**, as it not only hampers efforts to decarbonize the energy sector but also results in high emissions, which undermine India's global climate commitments, including achieving net-zero emissions by 2070.

✦ The Government of India **proposes to add a minimum of 80 GW of coal-based capacity by 2031–32**, which runs counter to the nation's drive toward renewable energy.

💡 **Regulatory Hurdles Hindering Energy Expansion:** While India has made impressive progress in renewable energy capacity, the pace of growth has slowed in recent years.

✦ This is primarily due to regulatory complexities, with **multiple compliance requirements** across different government departments creating delays in the approval processes.

📎 For instance, a **1 MW solar plant may require over 100 licenses** and multiple approvals, slowing down the growth of the sector.

✦ India's energy sector is plagued by the absence of a single executive authority with nodal responsibility and accountability for the entire energy system.

📎 The **multiplicity of regulatory agencies and departments creates coordination problems** and results in fragmented decision-making.

💡 **Limited Domestic Solar Manufacturing Capacity:** India's goal to scale up solar energy capacity faces challenges due to limited domestic production capabilities in key solar materials, such as **solar wafers and polysilicon**, which are crucial for manufacturing solar modules.

✦ The country is **currently reliant on imports, particularly from China**, for these critical materials. This exposes India to risks related to supply chain vulnerabilities and **cost fluctuations in foreign markets**, undermining efforts to achieve energy independence.

✦ **China controls 75–95% of the global solar PV supply chain**, including 91% of polysilicon and over 97% of wafers, making it the primary supplier worldwide.

📎 India **continues to depend on China for over 50% of its solar cells** and modules, with imports valued at nearly USD 4 billion in FY2024.

💡 **Inadequate Grid Infrastructure for Renewables:** A major hurdle in scaling up renewable energy is the lack of infrastructure to accommodate the intermittent nature of solar and wind power.

✦ While India is making progress with the addition of renewable energy capacity, its grid infrastructure needs a significant overhaul.

✦ Inadequate **Battery Energy Storage Systems (BESS)**, makes it difficult to store excess energy during periods of high generation, which is critical for ensuring a consistent supply.

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- ✎ As of December 2024, India's cumulative installed battery energy storage capacity stood at approximately 442 MWh.
- ✎ However, this **remains inadequate to meet the projected need of 82.37 GWh energy storage by 2026–27.**
- 💡 **Financing and Investment Issues:** The financing of renewable energy projects continues to be a challenge, especially when it comes to attracting long-term investment.
  - ✦ While the **Reserve Bank of India (RBI)** has included renewable energy in priority lending, the sector still requires further steps to attract low-cost foreign capital.
  - ✦ The government's initiatives, including **PLI (Production Linked Incentive)** and **SPECS (Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors)**, are promising, but they need to be supplemented with stronger administrative levers and better land laws to create a conducive environment for investment.
- 💡 **Energy Access Inequality:** While universal village electrification has been achieved, there are still gaps in energy access, particularly in remote and rural areas. A significant portion of India's rural population continues to face issues with energy quality and affordability.
  - ✦ Additionally, **there is a lack of energy-efficient technologies in rural areas**, which increases energy consumption and leads to higher costs.
  - ✎ A study by the **Council on Energy, Environment and Water (CEEW)** found that one-third of households experienced at least one of the supply quality issues—**long blackouts, low voltages, or appliance damage due to voltage fluctuations** particularly in states like UP, Jharkhand, Assam, Bihar, and Haryana.
  - ✦ According to the **India Residential Energy Survey (IRES) 2020**, about 2.4% of Indian households remain unelectrified, with the **majority located in rural regions of Uttar Pradesh, Madhya Pradesh, Rajasthan, Haryana, and Bihar.**

💡 **Land Acquisition and Environmental Concerns:** Renewable energy projects, particularly solar parks and wind farms, require vast amounts of land. This has led to land acquisition issues and conflicts with local communities.

- ✦ Moreover, **environmental concerns, such as the impact on biodiversity and migratory bird patterns**, especially with wind farms in ecologically sensitive regions like the **Western Ghats**, are also challenges that need careful management.
- ✦ Ongoing **protests have erupted in Barmer, Rajasthan**, where villagers have protested against the **illegal cutting and burning of Khejri trees** by solar power companies.

#### What are the Key Initiatives Shaping India's Energy Transition?

- 💡 **Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME)**
- 💡 **Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA)**
- 💡 **Green Energy Corridor (GEC)**
- 💡 **National Solar Mission (NSM)**
- 💡 **National Biofuels Policy and SATAT**
- 💡 **International Solar Alliance (ISA)**

#### What are the Key Strategies for Advancing India's Energy Security and Transition?

- 💡 **Encouraging Policy Reforms and Better Implementation:** Current policy frameworks and administrative processes need streamlining to encourage **renewable energy investments and ensure smooth project execution.**
  - ✦ India **should focus on simplifying regulatory processes**, especially concerning land acquisition, approvals, and compliance.
  - ✦ The implementation of streamlined legislation and administrative reforms will foster an attractive investment climate, thereby supporting the country's green energy goals.
- ✎ **Fast-track offshore wind deployment** by creating a centralised project clearance cell, seabed leasing policy, and viability gap funding mechanisms.

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- ✎ Promoting sustainability in the **coal sector** through enhanced policy measures in the field of carbon capture technologies.
- 💡 **Upgrading EPC (Engineering, Procurement, and Construction) Capabilities:** The EPC capability in India is currently insufficient to scale up solar and wind projects at the pace needed to meet energy goals.
  - ✦ India needs to **build stronger EPC capabilities** to handle large-scale renewable energy projects.
  - ✦ This includes training skilled labor, improving technological expertise, and investing in large-scale project management to accelerate the execution of renewable projects.
- 💡 **Modernizing Grid Infrastructure:** Upgrading to smart grids is crucial to handle the fluctuating nature of renewable energy.
  - ✦ Investments in **smart meters, predictive maintenance systems, and improved transmission networks** will help ensure the reliable integration of renewable power into the grid, balancing supply and demand effectively.
  - ✦ Integrate **EV charging with grid stabilization through vehicle-to-grid (V2G) technologies**, managed load scheduling, and smart charging infrastructure.
    - ✎ EVs can act as mobile energy assets, improving grid flexibility and enabling distributed storage.
- 💡 **Land Acquisition Reforms:** The acquisition of land for large-scale renewable projects is often slowed down due to **regulatory issues and land use conflicts, especially with agricultural land.**
  - ✦ **Reforms in land acquisition laws** are essential to streamline the process and facilitate the faster implementation of renewable energy projects.
  - ✦ The government should explore policies that ease the conversion of agricultural land for energy generation purposes without undermining food security.
    - ✎ Promote **agro-PV systems that allow simultaneous crop cultivation and solar**
- generation on the same land, especially in semi-arid and smallholder regions. It reduces land-use conflict, supports farm income, and fosters distributed clean power generation.
- 💡 **Attracting Long-Term Investment:** The renewable energy sector requires long-term capital investments, which are often difficult to attract due to financing challenges.
  - ✦ India should enhance **efforts to create a conducive environment for long-term investments**, particularly by focusing on attracting foreign capital.
    - ✎ Strengthening policy stability, improving investment protection, and offering fiscal incentives for renewable energy projects can help draw in much-needed capital.
  - ✦ **By incentivizing foreign investment, particularly “patient capital”**, India can attract the necessary resources for large-scale projects
- 💡 **Advancing Green Hydrogen for a Clean Energy Future:** Green hydrogen is a critical component of India’s decarbonization efforts, but it is heavily dependent on green electricity from renewables.
  - ✦ India should **focus on scaling up green hydrogen production** by leveraging its abundant solar energy resources.
  - ✦ Supporting green hydrogen infrastructure and **creating incentives for industries such as steel, fertilizer, and refineries to adopt hydrogen** as a clean fuel source can reduce dependency on fossil fuels and move India closer to its net-zero target.
- 💡 **Exploring Small Modular Reactors (SMRs) for Clean Nuclear Energy:** **Small modular reactors (SMRs)** offer a promising **nuclear technology that provides scalable and safer clean energy solutions.** With lower initial investment requirements than traditional nuclear plants, SMRs are well-suited for developing economies like India.
  - ✦ By **collaborating with countries such as the US**, which are advancing in SMR technology, India can diversify its energy mix while ensuring low emissions.

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✦ Additionally, SMRs have the potential for off-grid applications, making them ideal for powering remote areas.

💡 **Energy Transition-Linked Green Sovereign Bonds:** India can issue Energy Transition-Linked Green Sovereign Bonds to fund clean energy projects.

✦ These bonds, **linked to measurable energy transition goals** like renewable capacity growth and reduced coal dependency, **would attract sustainable investments**.

✦ They offer long-term, low-cost financing for renewable energy infrastructure and grid modernization, **aligning with India's 2070 net-zero target** while enhancing energy security.

💡 **Expanding Waste to Energy (WTE) Plants:** Expanding WTE plants is a promising solution to address both waste management and energy generation in India.

✦ With the growing amount of municipal and industrial waste, **WTE plants can play a critical role in reducing landfill use** while providing a sustainable energy source.

✦ To further enhance energy security, **India should mandate energy circularity in industrial clusters**.

✍ This includes encouraging industries to reuse waste heat, recycle process gases, and co-locate waste-to-energy units which **can significantly reduce its reliance on conventional energy sources** and will promote a more sustainable industrial ecosystem, and contribute to its decarbonization goals.

💡 **Fostering Collaboration Between Public and Private Sectors:** Leveraging PPP models for transmission upgrades, battery storage systems, offshore wind, and smart grid development can fast-track infrastructure expansion while ensuring commercial viability.

✦ **Structured risk-sharing frameworks and long-term revenue certainty** are key to attracting private capital. Institutional capacity-building and regulatory clarity will make PPPs more scalable and efficient in the energy sector

✦ India's transition to renewable energy **requires investments in infrastructure, technology, and workforce skills**.

✍ Both sectors must work together to meet India's energy security and decarbonisation goals, with a focus on long-term strategies.

## Conclusion

India's path to energy security lies in **simplifying regulations, modernizing infrastructure, and boosting investment in renewable energy**. By enhancing domestic manufacturing, adopting new technologies like green hydrogen, and fostering public-private collaboration, India can reduce its dependence on fossil fuels. The **push towards "Energy Atmanirbharta"** will drive the country's decarbonization efforts and help secure a sustainable and self-reliant energy future, contributing to the **achievement of SDG 7 (ensuring access to affordable, reliable, sustainable, and modern energy for all)**.



## Transforming E-Waste Management in India

*This editorial is based on the article "[The Missing Link in India's Battery Waste Management](#)," published on 05/08/2025 in The Hindu. It addresses India's rising e-waste crisis and highlights the challenges of managing e-waste in India while stressing the need for stronger regulations and efficient recycling practices.*

**Tag:** GS Paper - 2, Government Policies & Interventions, GS Paper - 3, Environmental Pollution & Degradation, Issues Arising Out of Design & Implementation of Policies

**India's rapid digital transformation**, driven by increased reliance on electronic devices, is propelling its journey toward **Viksit Bharat**. However, this growth has a by-product—**electronic waste (e-waste)**. As one of the world's top e-waste generators, alongside China, the US, Japan, and Germany, India faces a significant challenge in managing the rising volume of e-waste. The growing demand for **lithium batteries**, spurred by **EV adoption** and **renewable energy** storage, is further contributing

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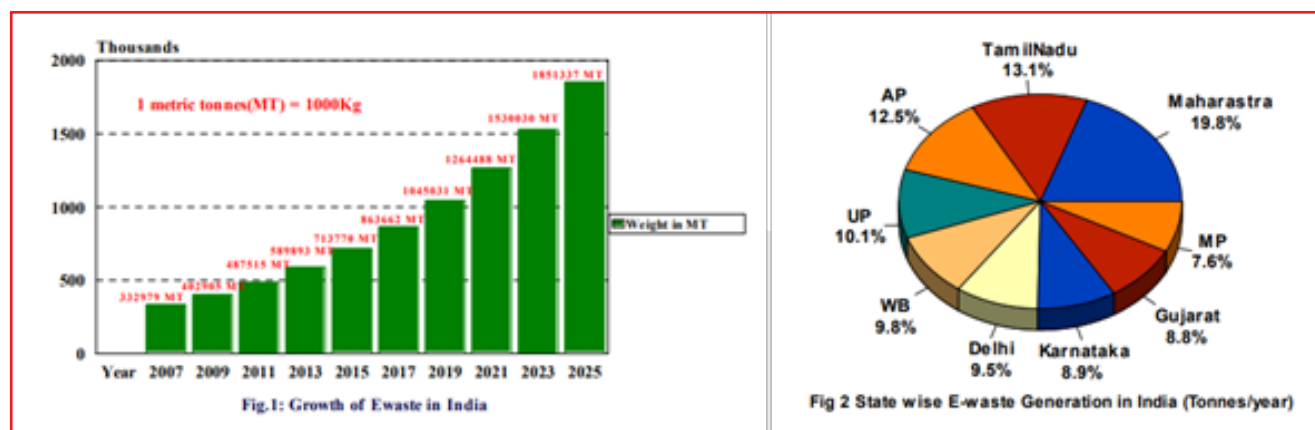
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to the crisis, with lithium batteries alone accounting for 700,000 of the 1.6 million metric tonnes of e-waste generated in 2022.

### What is the Status of E-waste in India?

- 💡 **Current Scenario:** India has emerged as the **world's third-largest generator of e-waste** after China and the USA, with 3.8 MMT (million metric tonnes) produced in FY24.
- ✦ India's **e-waste volumes soared by 151.03% in six years (2017-24)**.
  - 📎 The 65 cities generate more than 60% of the total generated e-waste, whereas **10 states generate 70% of the total e-waste**.
- ✦ The **sharpest rise in e-waste generation occurred between 2019-20 and 2020-21**, driven by increased electronic consumption for work-from-home and remote learning during the **Covid-19 pandemic**.



#### 💡 E-Waste (Management) Rules:

##### ✦ E-Waste (Management) Rules 2022:

- 📎 **Extended Producer Responsibility (EPR):** Producers are mandated to achieve annual recycling targets via registered recyclers.
- 📎 **Expanded Product Coverage:** Inclusion of 106 Electrical and Electronic Equipment (EEE) items from FY 2023-24 (up from 21 items).
- 📎 **Integration of Bulk Consumers:** Public institutions and offices must dispose of e-waste via registered recyclers/refurbishers.

##### ✦ E-Waste (Management) Second Amendment Rules, 2023: Under Rule 5 of E-Waste (Management) Rules, 2022, a new clause was added to ensure safe, accountable, and sustainable refrigerant management in refrigeration and air-conditioning manufacturing.

##### ✦ E-Waste (Management) Amendment Rules, 2024: The Central Government may establish platforms for trading EPR certificates as per guidelines issued by the **Central Pollution Control Board** with its approval.

- 📎 The CPCB has set the **price range for EPR certificates at 100% (maximum) and 30% (minimum)** of the environmental compensation for non-compliance.

### What Are the Major Challenges Hindering Effective E-Waste Management in India?

- 💡 **Weak Enforcement Mechanisms:** The enforcement of recycling regulations is currently insufficient in India. There is a **lack of robust audit systems, tracking of EPR certificates**, and penalties for non-compliance or fraud.
- ✦ While the E-Waste (Management) Rules, 2022, encourage recycling, they give **only limited attention to repair as a preventive strategy**.

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- ✦ This weak enforcement allows illegal recycling activities to proliferate, complicating efforts to control e-waste.

✎ For instance, in 2023, a significant audit by the CPCB revealed that over **600,000 fake plastic recycling certificates were issued by companies** in Gujarat, Maharashtra, and Karnataka.

#### 💡 **Inadequate EPR Floor Price & Market Distortions:**

The EPR system, which compels producers to fund battery collection and recycling, relies on an EPR floor price. However, the current price is too low to sustain proper recycling operations.

- ✦ This **insufficient pricing makes it economically unviable for legitimate recyclers** to meet the demands for battery recycling, resulting in a reliance on informal and often harmful practices.
- ✦ These actors **often issue false recycling certificates or illegally dump hazardous waste**.
- ✎ Such practices distort the market, **undermine the integrity of recycling systems**, and ultimately threaten India's circular economy goals.

#### 💡 **Resistance to Compliance by Large Manufacturers:**

Many large electronics and battery manufacturers, especially those operating in developing countries, resist complying with recycling regulations.

- ✦ In April 2025, **major multinational companies like Daikin, Hitachi, and Samsung filed lawsuits** against the Indian government, opposing a new e-waste policy that mandates a minimum price for recyclers handling electronic appliances.
- ✎ This **resistance leads to a significant gap in compliance**, further hindering the establishment of a sustainable battery recycling ecosystem.

#### 💡 **Unaccounted Financial Costs:** It is estimated that improper battery recycling could cost India over USD 1 billion in **foreign exchange losses by 2030**. These financial repercussions, alongside the environmental costs, pose a serious risk to India's economic stability if corrective actions are not taken promptly.

- ✦ The inefficiency in e-waste recycling leads to significant resource loss, as **valuable materials like lithium, cobalt, nickel, copper, gold, and silver are not effectively recovered**.

- ✦ Improper processing methods prevent the efficient recovery of these materials, and while formal recycling processes could help recover them, they **are often costly and not widely implemented**, leaving valuable resources untapped.

#### 💡 **Illegal E-Waste Imports:** India faces significant challenges in managing e-waste imports, both legal and illegal. Many developed countries export their e-waste to India. The illegal trade of e-waste **adds to the already overwhelming challenge of managing domestic waste**.

- ✦ Between 2019 and 2022, the **Indian government identified 29 instances of illegal e-waste imports** across various states, including Tamil Nadu, Maharashtra, Gujarat, West Bengal, and Uttar Pradesh.

#### 💡 **Infrastructure Gaps and Regional Disparities:** India faces a severe lack of proper infrastructure to manage e-waste. This includes insufficient recycling facilities, a lack of technical expertise, and a dearth of safe disposal practices.

- ✦ As a result, a **large portion of e-waste is either dumped in landfills or burned in open spaces**, exacerbating air, soil, and water pollution.
- ✦ While some states like Telangana have made progress in e-waste processing, others, such as Chandigarh, face challenges due to the lack of accessible, formal recycling facilities.
- ✎ This **uneven distribution hampers effective nationwide e-waste management**.

#### 💡 **Limited Awareness Among Consumers:** There is a general lack of awareness among consumers about the proper disposal of e-waste. Most people continue to dispose of electronic waste through informal channels, which often involve unsafe practices.

- ✦ A **study conducted in Delhi in 2021** revealed that 70% of electronic repair workers and 79% of scrap dealers were **unaware of e-waste**.

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✎ Additionally, only 17% of electronic repair workers and 13% of scrap dealers were aware of government legislation on e-waste.

💡 **Lack of Clear Roles for Stakeholders:** The roles and responsibilities of stakeholders involved in e-waste management, including producers, recyclers, and consumers, are not well-defined.

✦ For instance, **producers lack clarity under the EPR framework**, recyclers operate informally without oversight, and consumers remain unaware of proper disposal methods, hindering effective e-waste management, further increasing environmental and health risks.

✎ This lack of clarity **hinders the development of a cohesive and effective e-waste management system.**

### How Can India Transform E-Waste Management for Greater Sustainability and Efficiency?

💡 **Transforming the Informal Sector for Sustainable E-Waste Recycling:** The informal sector handles a significant portion of e-waste in India, often using unsafe methods that pose serious environmental and health risks.

✦ To address this, efforts should focus on transforming the informal sector by **providing training, enhancing infrastructure**, and supporting formal certification.

✎ For instance, **rag pickers can be effectively integrated into e-waste management systems**, transforming them from informal waste collectors into “e-waste heroes” by formalizing their role, providing training, and recognizing them as key contributors to a sustainable recycling process.

✎ **Incentivizing participation in recycling programs**, such as offering tax rebates or financial subsidies to producers and consumers, can further encourage this transformation.

✦ **Simplifying the collection and return processes for electronic devices** would make it easier for both informal and formal sectors to engage in sustainable recycling practices.

💡 **Strengthening E-Waste Recycling through EPR Pricing and Enforcement:** A fair EPR floor price ensures recyclers are properly compensated for their infrastructure, technology, and labor investments. This will **make recycling economically viable** and prevent informal, fraudulent recycling practices.

✦ Effective enforcement requires robust audit systems, **digitization of EPR certificate tracking**, and strict penalties for non-compliance or fraud.

✎ This would help curb illegal recycling and ensure adherence to proper disposal practices.

✦ India **can adopt and refine a similar EPR model to South Korea's**, where around 70% of e-waste is collected by producers.

💡 **Stronger Enforcement of E-Waste Rules:** The enforcement of E-Waste (Management) Rules needs to be strengthened. This includes better monitoring and penalizing companies or individuals involved in illegal dumping or improper recycling of e-waste.

✦ Effective implementation of regulations is necessary to ensure compliance with set standards.

✎ **Local authorities should be more actively involved** in enforcing e-waste management rules, especially in urban and industrial areas where e-waste generation is high. **They can collaborate with the MoEFCC and CPCB** for better ground-level monitoring and reporting.

💡 **Promoting Consumer Awareness for Proper E-Waste Disposal:** Awareness among consumers about the proper disposal of e-waste is crucial. The government and **NGOs must run extensive awareness campaigns** to educate people on the dangers of improper disposal and the importance of recycling.

✦ The potential to engage **Resident Welfare Associations (RWAs) and Self-Help Groups (SHGs)** to promote awareness and guide people toward responsible e-waste disposal would play a crucial role in improving community participation.

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- ✎ Additionally, educating consumers about existing disposal systems, such as **collection points and safe recycling practices**, will encourage them to adopt sustainable behavior.
- 💡 **Reducing Environmental Impact by Promoting Safer Materials in Electronics:** The reduction of hazardous substances such as lead, mercury, and cadmium in electronic products would reduce the environmental impact of e-waste.
  - ✦ This can be achieved by encouraging manufacturers to adopt **design-for-environment (DfE) principles**, which promote the use of safer materials.
  - ✎ Encouraging manufacturers to use lead-free solders in electronic components to avoid lead contamination. **Tin-silver-copper (SAC) alloys** and other non-toxic alternatives can be used in place of traditional lead-based solders.
- 💡 **Advancing E-Waste Management:** Promoting systems that allow the recovery of valuable materials from spent batteries would reduce India's dependence on imports.
  - ✦ This approach supports the creation of a **circular economy**, where materials are recycled and reused, contributing to long-term sustainability.
  - ✎ Additionally, **aligning with Mission LiFE (Lifestyle for Environment)**, introduced in **COP 26**, these steps will encourage sustainable consumption patterns and environmentally responsible recycling practices
  - ✦ India has launched its **Right to Repair portal**, but it provides only basic information such as customer care details and service centers. It **does not address the Right to Repair in the way it is truly intended**, as seen in the EU.
  - ✎ India's portal must learn from the EU's approach, particularly in areas such as mandating manufacturers to offer spare parts and tools at reasonable prices and preventing the use of software or hardware techniques that hinder repairs.
- ✦ **More investment in research and development (R&D)** is needed to improve battery recycling processes, increase efficiency, and recover valuable materials while minimizing environmental risks.
- 💡 **Establishing a National E-Waste Collection Target:** Setting a national e-waste collection target, similar to the **European Union's per capita goal**, would help India significantly increase its recycling rates.
  - ✦ This initiative would involve establishing clear collection and recycling targets for manufacturers and other stakeholders, **ensuring that e-waste is properly managed and processed**.
  - ✎ By implementing such a target, **India can promote responsible disposal practices**, enhance recycling infrastructure, and contribute to a more sustainable e-waste management system.
- 💡 **Expanding Infrastructure for Greater Accessibility and Efficiency:** Expanding formal e-waste recycling facilities across India is essential.
  - ✦ Establishing more collection centers and modernizing existing ones will ensure better processing of e-waste.
  - ✎ The **Delhi government's initiative to develop India's first integrated e-waste recycling eco-park** exemplifies a dedicated space for sustainable e-waste management.
  - ✎ **E-Waste Bank** can serve as a successful model for e-waste management, as seen globally with collection points for old electronics. Also, **Bhopal's e-waste clinic has proven effective in streamlining the recycling process**, and more such units can be established across India to make e-waste recycling more accessible and efficient.

## Conclusion

Addressing India's e-waste crisis offers a significant opportunity to foster sustainable development and economic growth. By enhancing the regulatory framework, strengthening enforcement mechanisms, and promoting innovation in recycling technologies, India can effectively

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mitigate environmental and health risks while simultaneously creating economic value. This strategy aligns with **SDG 12 (Responsible Consumption and Production)**, transforming e-waste into a driver of green growth and contributing to the establishment of a truly circular economy.



## Futureproofing India Against Climate Change

*This editorial is based on “**India’s climate challenge**” which was published in The Hindu on 03/08/2025. The article brings into picture the deepening climate crisis India faces—rising sea levels, erratic monsoons, and recurring disasters—highlighting the urgent need for a climate-resilient and adaptive development approach.*

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

India stands at the edge of an **unprecedented climatic crisis**. With economic losses of **\$79.5 billion from climate disasters** over two decades and erratic monsoons destabilizing entire regions, the nation faces mounting challenges from **rising sea levels, extreme weather events, and agricultural disruption**. Coastal cities like **Mumbai, Chennai, and Kochi** risk partial submergence by **2040**, while the **Sundarbans mangrove** forests could lose **80% of their area by 2100**, threatening both biodiversity and natural disaster buffers. The recent floods in **Uttarakhand, Wayanad landslide**, and intensifying **cyclones in the Indian Ocean** are not seasonal misfortunes but urgent climate alarms demanding that India should adopt a more **climate resilient and adaptive approach to sustainable development**.

### What are the Key Climate Change Related Threats that India is Facing?

- 💡 **Rising Double Whammy of Heatwaves and Flooding** : India is grappling with increasingly severe heatwaves alongside floods.
  - ✦ The frequency and intensity of extreme heat events, **particularly in Northern and Central India**, are threatening public health, agriculture, and energy systems.

✎ By 2030 cities like **Mumbai, Delhi and Chennai** are supposed to experience a **two-fold increase in heatwave days**.

- ✦ On the other hand recently a **cloudburst triggered flash floods** in the high-altitude villages of **Dharali in Uttarkashi, Uttarakhand**.
- ✦ States like **Gujarat, Rajasthan and Tamil Nadu** are witnessing the double whammy of heat stress and extreme rainfall, with **more than 80% of the districts projected to be impacted by this by 2030**.
- 💡 **Sea-Level Rise and Coastal Flooding:** India’s coastal regions, home to about 170 million people, are highly **vulnerable to sea-level rise** driven by climate change.
  - ✦ This will impact infrastructure, livelihoods, and biodiversity. Cities like Mumbai and Chennai face imminent threats.
  - ✦ Studies project that by 2100, under worst-case scenarios, **Mumbai could experience up to 101.4 cm of sea level rise**, potentially inundating 22% of the city.
- ✎ West Bengal has lost **110 square kilometres of mangroves in the Sundarbans** in the past two decades due to climate change and global warming, intensifying India’s vulnerability to coastal flooding.
- 💡 **Water Scarcity and Groundwater Depletion:** India’s water crisis is deepening due to climate change, with over 600 million people facing high to extreme water stress.
  - ✦ With an annual per capita freshwater availability below the international threshold of 1,700 cubic metres (m<sup>3</sup>), **India ranks 132nd in the world with respect to per capita water availability**. This makes the country “**water stressed**”.
  - ✎ Between 1950 and 2024, there has been a decline of **73% in per capita surface water availability in the country**.
  - ✦ The overexploitation of groundwater is exacerbating the crisis. The estimated groundwater depletion in India is in the range of **122–199 billion metre cubes**.

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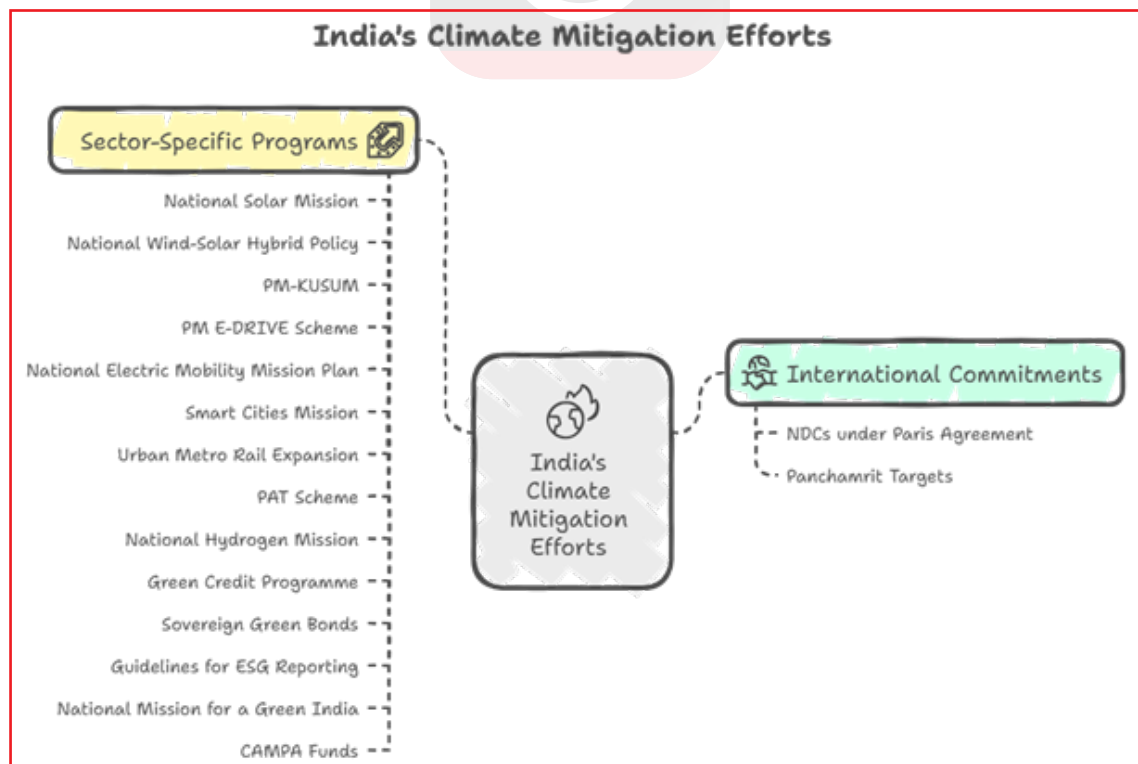
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- 💡 **Rising Healthcare Burden and Vector-Borne Diseases:** The health burden from climate change is rising, with increased cases of heat-related illnesses and vector-borne diseases.
  - ✦ India saw a **55% rise in deaths due to extreme heat** between 2000-2004 and 2017-2021. **With 49% of India's workforce employed outdoors**, this poses significant health risks, particularly for vulnerable groups like laborers and the elderly.
    - 📎 Also, rising temperatures **extend the habitat for disease vectors like mosquitoes, leading to more malaria and dengue outbreaks.**
- 💡 **Climate Induced Energy Security Challenges:** Climate change is compounding India's energy security issues, with increased temperatures **putting pressure on cooling demands and hydroelectric power generation.**
  - ✦ While India has ambitious renewable energy targets, **the country still relies heavily on coal, which accounts for 70% of energy production.** The push for coal mining, including in environmentally sensitive regions like **Hasdeo Arand**, **threatens to undermine India's climate commitments**, making it harder to transition towards a sustainable energy future.
- 💡 **Disruption of Agriculture and Impact on Food Security:** The agriculture sector, vital to India's economy and food security, **is bearing the brunt of shifting weather patterns.**
  - ✦ In absence of adoption of adaptation measures, rainfed rice yields in India are projected to reduce by **20% in 2050** and **wheat yield by 19.3% in 2050.**
    - 📎 Also, Climate change is projected to reduce the kharif maize yields by 18 and 23% in 2050 and 2080 scenarios, respectively.
- 💡 **Economic Ripples of Climate Change:** The economic impact of climate change in India is profound, with an estimated **\$79.5 billion in losses between 1998 and 2017.**
  - ✦ India may lose **3-10% of its gross domestic product (GDP) annually by 2100 due to climate change.** The lack of a cohesive national strategy on climate adaptation exacerbates these losses.



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## What are the Major Challenges Undermining the Effectiveness of India's Climate Mitigation Efforts?

💡 **Weak Enforcement of Climate Policies and Regulatory Gaps:** Despite comprehensive climate frameworks, India's climate action is consistently undermined by fragmented enforcement, bureaucratic overlaps, and poorly resourced regulators, resulting in a persistent “policy–practice” gap.

✦ India's strong push for renewables is **undercut by major new coal investments and prolonged reliance**, especially for base-load power, working against long-term decarbonization targets.

📎 The government approved plans to add **80 GW of new coal capacity by 2032** and has **not indicated a timeline for coal phaseout**

✦ Moreover, the **2023 amendments to the Forest Conservation Act** have weakened legal protections against deforestation, further compromising mitigation efforts.

💡 **Conflict Between Economic Growth and Environmental Sustainability:** India's pursuit of economic growth often clashes with **climate mitigation objectives**. The government's focus on industrialization and infrastructure development sometimes leads to policies that weaken environmental safeguards.

✦ For instance, the **Great Nicobar Island project was cleared in 2024** amidst reports of inadequate public hearings and biodiversity risks, reflecting systemic loopholes in the EIA process.

✦ This approach pits developmental interests against the urgent need for climate action, raising concern over sustainable development.

💡 **Risks of Greenwashing in Green Credit Scheme:** **India's green credit program** and carbon credit schemes, while innovative, face challenges in terms of transparency and effectiveness.

✦ The risk of **greenwashing**—where companies falsely claim to meet environmental standards—remains high.

✦ Also, while the government's focus on afforestation and tree plantations aims to boost carbon sinks, recent reports found that most of the forest cover increase is in non-forest areas, **casting doubt on the true environmental impact of such initiatives**.

💡 **Insufficient Focus on Urban Climate Resilience:** India's urban areas, which are rapidly growing, lack the resilience to face the growing impacts of climate change.

✦ The government's **Smart Cities Mission**, though ambitious, has been criticized for failing to integrate sustainable urban planning fully.

✦ Indian cities are prone to heat islands, water scarcity, and poor air quality, and urbanization exacerbates these vulnerabilities.

📎 Despite some progress, **6 of the 10 most polluted cities in the world are in India**, highlighting the need for more aggressive urban climate strategies.

💡 **Undervalued Climate Adaptation:** While mitigation gets headline focus, adaptation and **resilience-building measures especially for vulnerable agriculture and water-stressed communities are underprioritized and underfunded**.

✦ Adaptation spending, though up from **3.7% of GDP in FY16 to 5.6% in FY22**, remains well short of actual needs, particularly for agriculture and rural infrastructure.

📎 In November 2022, **National Adaptation Fund for Climate Change (NAFCC) was converted to a “non-scheme”** without citing any reasons or stating if the objectives of the fund had been fulfilled (**Down to Earth**).

💡 Critics highlight that, despite the urgent need for adaptation, NAFCC's proactive role has diminished in recent years.

✦ India is projected to need an **estimated 85.6 trillion rupees (\$1.05 trillion) by 2030 to adapt its industries in order to meet climate change compliance standards**.

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## What Measures can India Adopt to Enhance Climate Resilience and Adaptation?

💡 **Localized Climate Risk Mapping and Micro-Zonation:** India must invest in high-resolution **climate vulnerability mapping** at the district and sub-district levels using GIS, satellite data, and AI.

✦ **Micro-zonation of areas** based on exposure to heatwaves, floods, and droughts will enable **targeted interventions**.

✦ This granular approach strengthens **decentralized climate planning** under State Action Plans.

✍ Integration with **disaster preparedness** frameworks enhances community-level resilience. It fosters proactive, place-specific adaptation over reactive response.

💡 **Climate-Responsive Urban Design:** Urban local bodies must adopt **climate-integrated master plans** using principles like **nature-based solutions**, permeable surfaces, and blue-green infrastructure.

✦ Retrofitting cities with **urban heat island mitigation** techniques, such as reflective materials and vertical gardens, can greatly reduce vulnerability. Focus should be on **low-income settlements**, often the worst affected.

✦ Embedding **resilience standards in building codes** and zoning laws will ensure long-term adaptation. This aligns with **SDG 11 on sustainable cities**.

💡 **Agroecological Transition Zones:** Establish **agroecological corridors** across vulnerable agro-climatic zones to promote regenerative, climate-smart farming systems. Transitioning to **agroforestry**, **millet-based systems**, and **soil-carbon enrichment** in rain-fed areas improves food security and climate buffers.

✦ These zones act as **resilience buffers** against erratic monsoons and desertification. **Convergence with MGNREGA and Krishi Vigyan Kendras** ensures operational scalability. It also supports livelihood diversification.

💡 **Climate-Resilient Infrastructure Audits:** Institutionalize mandatory **resilience audits** for all major public infrastructure- **roads, power lines, railways**- in climate-vulnerable zones.

✦ Using **risk-based engineering norms**, these audits can identify and mitigate exposure to floods, cyclones, and temperature stress.

✦ Embedding such audits into **environmental clearance** mechanisms adds preventive strength. Leveraging **PPP models** for climate-proofing infrastructure can accelerate funding. This ensures lifecycle resilience of critical assets.

💡 **Decentralized Renewable Energy Clusters:** Promote **community-managed renewable energy clusters** using hybrid solar-wind-bio systems to ensure resilient energy access in disaster-prone and remote areas.

✦ These systems reduce reliance on centralized grids vulnerable to disruption. Deployment through **energy cooperatives** empowers local governance and women-led enterprises.

✦ Coupling with **cold storage and irrigation** enhances adaptive capacities in agriculture. It ensures climate-proofed rural energy security.

💡 **Hydroclimatic Early Warning Systems:** Expand **real-time hydroclimatic alert systems** with predictive analytics for flash floods, glacial lake outbursts, and droughts.

✦ Integration of **Indigenous knowledge systems** with digital forecasting models enhances community responsiveness.

✦ State disaster authorities must deploy last-mile communication through **mobile alerts, sirens, and community radios**. This proactive risk communication transforms passive victims into active participants. It operationalizes resilience at the grassroots

💡 **Integrated Coastal Buffer Zones:** Develop multi-functional **coastal buffer belts** with a layered approach: mangrove restoration, bioshields, eco-tourism zones, and resilient housing.

✦ Zonation must integrate **livelihood safeguards** for fisherfolk and vulnerable communities.

✦ Use of **satellite monitoring and LIDAR mapping** enables dynamic coastal regulation. This strategy must be embedded in the **CRZ guidelines** with clear enforceability. It enhances both ecological and socio-economic resilience.

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💡 **Climate-Linked Skill Development Missions:** Launch a national **Green Resilience Skilling Mission** to train youth in climate-adaptive sectors such as solar repair, water harvesting, eco-construction, and biodiversity monitoring.

✦ Linking skills to **climate-sensitive sectors** ensures both employment and resilience. Incorporate modules on sustainability in ITIs and skilling platforms like PMKVY. This creates a **future-ready workforce** equipped for climate challenges. It builds adaptive human capital.

💡 **Water Security via Decentralized Aquifer Governance:** Empower village-level water user associations with **aquifer-level management plans**, grounded in hydrogeological mapping.

✦ Promote community-driven **managed aquifer recharge (MAR)**, local rainwater harvesting, and **water budgeting**. Integration with **Jal Shakti Abhiyan** and Atal Bhujal Yojana can ensure convergence. This enables **resilient groundwater ecosystems** that sustain agriculture and drinking water. It anchors resilience in hydro-social contracts.

💡 **Policy Support for Green Finance and Climate Investments:** India should accelerate the mobilization of green finance by incentivizing investments in low-carbon, climate-resilient projects through tax breaks, green bonds, and financial instruments like climate insurance.

✦ Developing a **robust framework for financing adaptation and resilience-building activities** will empower businesses and governments to invest in sustainable solutions. Creating a conducive policy environment for private sector involvement in climate resilience projects can bridge funding gaps.

💡 **Promoting Climate Education and Awareness:** India should prioritize climate education and awareness programs at all levels of society, from rural to urban areas, to empower individuals with the knowledge to take climate-resilient actions.

✦ This includes incorporating climate change into school curricula, creating community-level awareness campaigns, and facilitating capacity-building workshops for local leaders and policymakers.

✦ A well-informed public is crucial for fostering **collective responsibility** and ensuring widespread adoption of climate-resilient practices.

### Conclusion:

To safeguard its development trajectory, **India must embed climate resilience as a core pillar of national planning**, aligning with the **Panchamrit goals and SDGs 2, 6, 11, 13, 15 and 16**. A shift from reactive disaster response to anticipatory, systems-based adaptation is crucial. With integrated, inclusive, and innovation-driven strategies, India can transform its climate vulnerabilities into resilience dividends. Building **"Climate-smart Bharat"** is not just a necessity it is a strategic imperative for sustainable and equitable growth.



## Agricultural Transformation for Bharat@2047

*This editorial is based on "[Why agriculture is key to building Viksit Bharat](#)" which was published in The Hindustan Times on 04/08/2025. The article brings into picture India's remarkable agricultural transformation—from pre-1960s food insecurity to record output in 2024–25—while highlighting the pressing need to address challenges in productivity, sustainability, and modernization to realize the vision of Viksit Bharat by 2047.*

**Tag:** GS Paper-3, Direct & Indirect Farm Subsidies, Public Distribution System (PDS), Buffer Stocks & Food Security, Agricultural Marketing

**India's agricultural transformation** from pre-1960s food insecurity to record-breaking production of **353.96 million tonnes in 2024-25** exemplifies the nation's journey toward **Viksit Bharat**. This agricultural renaissance has evolved from basic subsistence to diversified **agri-industries spanning dairy, poultry, and fisheries**. However, despite these remarkable achievements, agriculture still faces critical challenges in **productivity, sustainability, and modernization**. As the foundation of economic stability, agriculture serves as the vital river

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that, once these hurdles are overcome, will **decisively flow toward India's vision of becoming a developed nation by 2047.**

### What are the Key Developments Transforming Indian Agriculture?

💡 **Agricultural Infrastructure Investment:** The Indian government's substantial investment in agricultural infrastructure is transforming the sector. Initiatives like the **Agricultural Infrastructure Fund (AIF)** and **Pradhan Mantri Kisan Sampada Yojana (PMKSY)** are modernizing storage, processing, and transportation systems.

✦ These efforts are crucial in reducing post-harvest losses and improving supply chain efficiency.

✦ The **Gross Capital Formation (GCF)** of the **agriculture sector** grew at the rate of **19.04% in 2022-23**

📌 The AIF, with an **investment target of ₹1 lakh crore**, is improving storage, cold chains, and market linkages, essential for reducing food wastage.

💡 **Technology Integration and Digitalisation of Agriculture:** India is increasingly adopting modern technologies such as AI, blockchain, and drones to enhance agricultural productivity.

✦ The **Digital Agriculture Mission**, launched in **2024** with a financial outlay of ₹2,817 crore, aims to establish **Digital Public Infrastructure (DPI)** for agriculture.

📌 **AgriStack** is the foundational pillar of the **DPI**, designed to be a digital public good similar to "Aadhaar" for farmers.

✦ Digital initiatives like **e-NAM (National Agriculture Market)** are enhancing market access for farmers, ensuring better price discovery and reducing middlemen.

💡 **Push for Sustainable Agriculture and Organic Farming Growth:** Sustainability is gaining momentum with organic farming's rapid growth, spurred by policy incentives and changing consumer demand.

✦ As of March 2024, the country had approximately 1.76 million hectares of certified organic farming land, with an additional 3.63 million hectares under conversion to organic practices.

✦ The market for organic products in India is set to reach **Rs. 75,000 crore (US\$ 9.1 billion) by 2025**. In line with this, **India's organic exports have increased, with organic fruit exports growing 47.5% over the last five years**, showing robust international demand.

💡 **Livestock and Dairy Sector Renaissance:** India's dairy and livestock sectors have seen a boom due to increased production and global demand.

✦ India remains the **world's largest milk producer**, contributing approximately 24% of global milk production.

📌 The government's push for **infrastructure like milk chilling plants and cattle breed improvements** has positioned India as the world's largest milk producer.

✦ The development of indigenous genomic chips like **"Gau Chip"** and **"Mahish Chip"** is helping accelerate the genetic improvement of Indian cattle and buffaloes.

💡 **Fisheries and Aquaculture Development:** The fisheries sector is emerging as a key growth area with the government investing heavily in infrastructure and sustainable aquaculture practices.

✦ The **Pradhan Mantri Matsya Sampada Yojana (PMMSY)** is expected to boost fish production to 220 lakh tonnes by FY25.

✦ Between 2014-15 and 2024-25, India's seafood exports grew by **60% in volume** to 16.85 lakh metric tonnes.

📌 With initiatives like the **Fisheries and Aquaculture Infrastructure Development Fund (FIDF)**, India is positioning itself among world's largest seafood exporters.

💡 **Food Processing Sector Expansion:** The growth of the food processing sector in India is creating numerous opportunities for value addition, expanding both the domestic and export markets.

✦ The sector is poised to grow to **Rs. 3.45 lakh crore (US\$ 470 billion) by 2025**, driven by government initiatives like PMKSY and the **Production Linked Incentive Scheme for Food Processing Industry (PLISFPI) scheme**.

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✦ Also, the food processing sector is one of the largest employment providers in the organized manufacturing sector with **12.41% employment** in the total registered/organized sector as per the report of **Annual Survey of Industries (ASI), 2022-23**.

💡 **Strengthening Agricultural Research and Development:** Investment in agricultural R&D is playing a critical role in improving crop varieties, pest management, and climate resilience.

✦ The government is focusing on advanced research in genetic improvements and alternative farming practices.

✦ A major focus of R&D is the development of climate-resilient crop varieties. ICAR has been instrumental in creating these. In 2024, the **Indian Prime Minister unveiled 109 crop varieties** that are **high-yielding, climate-resilient, and biofortified**, aimed at enhancing agricultural productivity, nutritional security, and adaptability to climate stress.

### What are the Key Issues Hindering the Effectiveness of the Indian Agriculture System?

💡 **Structural & Resource-Based Issues (Affecting Production Capacity)**

✦ **Fragmented Land Holdings:** The fragmentation of land holdings remains a significant barrier to agricultural productivity in India.

📌 Small and marginal farmers, over **85% of India's agricultural population**, cultivate nearly **45% of the net sown area (Agricultural Census 2015-16)**. Yet, small landholdings yield insufficient returns for a decent livelihood.

💡 **Small landholdings hinder mechanization**, lead to inefficient use of inputs, and lower overall productivity.

✦ **Poor Irrigation Infrastructure:** Despite efforts like the **Pradhan Mantri Krishi Sinchai Yojana (PMKSY)**, Irrigation remains highly dependent on monsoons. About **61% of India's farmers rely on rain-fed agriculture** and **55% of the gross cropped area is under rain-fed farming**, making it vulnerable to climate change.

📌 Inadequate irrigation infrastructure exacerbates water scarcity and limits crop production during dry periods.

📌 Land acquisition is a major bottleneck for large-scale irrigation projects. Also, the **heavy subsidies on power for agriculture have incentivized the over-pumping of groundwater**, further compounding the water scarcity issue.

✦ **Persistent Dependence on Chemical Fertilizers:** Overreliance on chemical fertilizers, while boosting yields in the short term, is causing long-term soil degradation and environmental damage.

📌 India is the **second-largest consumer of fertilizers globally**. In 2023-24, the total annual consumption was around **601 lakh metric tonnes (LMT)**.

💡 India's extensive use of fertilizers contributes to soil health depletion and has led to declining per hectare productivity in certain regions.

📌 Also, **100% of the country's Muriate of Potash (MOP)** and about **60% of Di-Ammonium Phosphate (DAP)** are imported.

💡 This makes India's fertilizer supply chain vulnerable to global price fluctuations and geopolitical events.

📌 The **shift towards organic farming** and bio-fertilizers remains slow despite their proven benefits.

✦ **Climate Change and Environmental Stress:** India's agriculture is highly vulnerable to climate change, with irregular rainfall patterns, rising temperatures, and extreme weather events like droughts and floods adversely affecting crop yields.

📌 This environmental uncertainty makes long-term agricultural planning difficult for farmers.

📌 In 2023-24, **food grain production was low at 328.8 million tonnes**, primarily because of **poor and delayed monsoons**, showing the direct impact of climate unpredictability.

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- ⚡ A recent study finds that, for wheat, a 1 °C temperature increase would result in a 6.1% yield loss.

#### ⚡ Institutional & Financial Constraints:

- ✦ **Lack of Even Access to Credit and Financial Support:** Access to timely and affordable credit remains a significant challenge for many farmers, especially smallholders.

✎ Despite recent growth under the **Kisan Credit Card (KCC) Scheme**, credit distribution remains highly imbalanced. The **Southern region** receives **47.13%** of the total agricultural credit but only accounts for **16.96%** of the gross sown area.

✎ Also, the **dependency on informal credit sources**, which charge **exorbitant interest rates**, keeps many farmers trapped in a cycle of debt.

- ✦ **Minimum Support Price (MSP) Issues:** While the **Minimum Support Price (MSP)** system is designed to protect farmers from market price fluctuations, it faces **significant issues in implementation and effectiveness**.

✎ The lack of **proper procurement infrastructure**, **delayed payments**, and **limited coverage of crops** undermine the MSP's effectiveness.

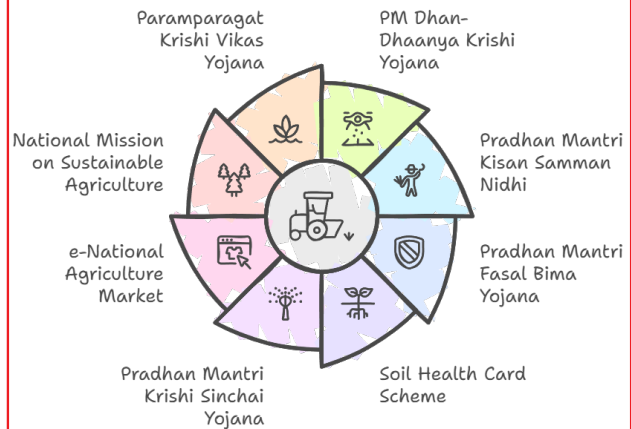
- ⚡ Although MSP is set for over 23 crops, **procurement is limited**.

✎ Farmers are demanding a **legal guarantee for MSP**. However, a legal guarantee for MSP could have a direct impact on inflation. **Economists argue that setting prices above market rates could lead to food inflation**, which would disproportionately affect low-income consumer

✎ Sometimes, **MSP, by guaranteeing a price, can distort market signals and create an artificial demand for certain crops**.

- ⚡ This can lead to an oversupply of these crops and a shortfall in others, resulting in price volatility in the open market.

#### Key Government Initiatives Related to Agriculture



#### ⚡ Post-Production & Market-Linked Challenges

- ✦ **Inadequate Post-Harvest Infrastructure:** Post-harvest losses in India remain alarmingly high due to a lack of adequate storage, transportation, and processing facilities.

✎ India suffers a **food loss of about ₹1.53 trillion every year** as per the latest large-scale study conducted by NABCONS during 2020 to 2022.

✎ **Horticultural crops** (fruits, vegetables, plantations, and spices) face the highest losses in terms of quantity.

✎ An estimated **30-40% of fruits and vegetables** are lost between harvest and consumption

#### ⚡ Agronomic & Ecological Concerns

- ✦ **Insufficient Crop Diversification:** The agricultural landscape, especially in the **"Green Revolution" states of Punjab, Haryana, and Western Uttar Pradesh**, is dominated by the paddy-wheat cropping cycle. This system accounts for a major portion of the country's food grain production.

✎ Also, while the cultivation of water-guzzling crops like **sugarcane, rice, and cotton has increased**, there is a serious lack of incentives for farmers to shift to less water-intensive alternatives like **millets and pulses**.

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- 💡 This persistent cultivation pattern contributes to the depletion of groundwater resources, especially in states with limited rainfall.

### How can India Reimagine its Agricultural Sector to Align with the Goals of Viksit Bharat?

- 💡 **Land Consolidation via Digital Cooperative Farming Platforms:** To overcome land fragmentation, India should promote **Digital Cooperative Farming Platforms** where smallholders voluntarily pool land and resources through **smart contracts and blockchain-backed agreements**.
  - ✦ These platforms can facilitate **shared mechanization, input procurement, and market access** while preserving ownership rights.
  - ✦ Leveraging **FPOs and GIS-based land records**, the model can achieve economies of scale without legal consolidation. This ensures asset security while driving **collective efficiency**.
    - 📝 It modernizes land use without disrupting rural tenure dynamics.
- 💡 **Decentralized Micro-Irrigation Hubs through Panchayat-Level Water Councils:** To tackle poor irrigation infrastructure, **Water Resource Councils at the gram panchayat level** should be empowered to implement **cluster-based drip and sprinkler irrigation systems** using **solar-powered pumps and real-time soil moisture data**.
  - ✦ Integration with **PMKSY and MGNREGA** can fund community assets like micro-reservoirs and aquifer recharge structures.
  - ✦ **Water budgeting and local governance** will ensure efficient allocation. This strengthens climate resilience while ensuring equitable water access across fragmented holdings.
- 💡 **Soil Health Sovereignty through Region-Specific Bio-Input Parks:** Combatting fertilizer overdependence requires regionally customized **Bio-Input Parks** producing **biofertilizers, compost, and microbial consortia** using local organic waste.
  - ✦ These parks can be managed by FPOs with training from **ICAR-KVKs** and backed by **soil health cards** for targeted application.
- ✦ Institutionalizing a **Bio-Input Certification System** will ensure quality and marketability. This decentralizes soil restoration while creating **circular rural economies** and reducing chemical load.
- 💡 **Hyperlocal Agri-Fintech Integration through Jan Dhan-KCC Linkages:** To improve credit access, launch **hyperlocal agri-fintech models** that integrate **Jan Dhan accounts, land records, KCC eligibility, and digital transaction histories** to generate automated credit scores.
  - ✦ Partnering with fintechs, these platforms can offer **risk-adjusted microcredit** with **embedded crop insurance**.
  - ✦ Aadhaar-enabled, real-time disbursements will ensure financial inclusion for smallholders. It shifts agriculture finance from collateral-based to **data-driven lending ecosystems**.
- 💡 **District-Level Climate-Contingent Crop Planning Cells:** To combat climate stress, set up **District Climate-Contingent Planning Cells** that use **seasonal climate forecasts through agri-IoT, GIS analytics, and crop risk models** to guide sowing, input use, and crop insurance targeting.
  - ✦ Adaptive plans will ensure **crop alignment with forecast variability**, reducing climate-induced income shocks. It institutionalizes **agro-climatic risk intelligence** at the local level.
- 💡 **Rural Agri-Logistics Nodes under Gati Shakti Framework:** Addressing post-harvest losses requires creating **Rural Agri-Logistics Nodes (RALNs)** integrated with the **PM Gati Shakti masterplan** to develop cold chains, aggregation centers, and packhouses near farm gates.
  - ✦ These nodes must be digitally mapped and **linked to e-commerce and export corridors**.
  - ✦ Priority should be given to perishable crop zones and tribal areas. This boosts value retention, reduces food waste, and makes farming **export-aligned and market-resilient**.
- 💡 **Nutritional Cropping Missions Anchored in Agri-Nutri Linkages:** To encourage crop diversification, India must launch **Agri-Nutrition Missions** promoting **millets, pulses, oilseeds, and medicinal crops** based on agro-ecological feasibility and nutritional needs.

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- ✦ State procurement policies must be reoriented to prioritize these crops in **PDS and mid-day meals**. Nutritional zoning will link **soil health, diet security, and climate resilience**.

✎ This positions agriculture as a **public health enabler**, not just a food producer.

- 💡 **Agri-Mechanization as a Service (AMAAS) Ecosystem:** To scale modern farming, create an **Agri-Mechanization as a Service (AMAAS)** model where drone services, harvesters, and AI-based precision tools are **rented via digital platforms** managed by FPOs or rural startups.

- ✦ Capital subsidies can be linked to **shared-use models** rather than ownership. Backend integration with training and repair hubs ensures sustainability. This democratizes **fourth-gen agriculture technologies** for smallholders.

- 💡 **Smart Subsidy Transition Model through Direct Efficiency Incentives:** To address subsidy inefficiencies, develop a **Smart Subsidy Transition Framework** where input subsidies (e.g., fertilizer, water, power) are gradually shifted to **direct efficiency-linked incentives**.

- ✦ Farmers adopting **soil-friendly inputs, micro-irrigation, and low-carbon practices** should be rewarded via **Digital Agriculture Benefit Transfers (DABT)**.

- ✦ This model ensures environmental stewardship while maintaining income support. It reorients subsidies towards **performance-based sustainability**.

- 💡 **MSP 2.0: Dynamic, Decentralized and Digitally Procured:** To reform MSP, create **Dynamic MSP Platforms** with **district-specific floor prices** based on real-time cost indices and climate forecasts.

- ✦ Procurement should be expanded via **digital farmer registration, mobile-based receipts, and instant payments** through e-RUPI.
- ✦ Diversify MSP coverage to include **pulses, oilseeds, and regionally relevant crops**, with decentralized procurement by SHGs and cooperatives. This builds a **responsive, inclusive, and technology-driven price support system**.

- 💡 **Agri-Tech Zones for Innovation-Led Farming:** Establish **Agri-Tech Innovation Zones (ATIZs)** in rural districts to pilot frontier technologies like **AI-based crop diagnostics, drone farming, and IoT-based irrigation**.

- ✦ These zones can serve as **testbeds for public-private-CSR collaboration** under Startup India and Atal Innovation Mission. Institutionalizing **farmer-scientist-startup linkages** can accelerate tech absorption. Scaling these models across agro-climatic zones will mainstream **smart farming ecosystems**. This embeds innovation as a growth multiplier.

## Conclusion:

India's journey from a food-deficient economy to a global agricultural powerhouse now demands a leap from **food security to farmer prosperity, and from plough to platform**. To realise the vision of Viksit Bharat, agriculture must evolve into a **tech-integrated, climate-resilient, and value-driven sector**. This calls for a shift **beyond the Green Revolution to evergreen solutions**, where **soil meets software, and innovation coexists with inclusivity**. By **seeding Viksit Bharat from rural roots**, India can ensure that agriculture not only feeds the nation but also fuels its transformation into a developed economy.



## India's Welfare Architecture- Equity, Efficiency, and Empowerment

*The editorial is based on "[The Technocratic Calculus of India's Welfare State](#)," published on 06/08/2025, in The Hindu. It discusses India's shift towards a data-driven welfare system with Aadhaar and Direct Benefit Transfers (DBT), aimed at improving efficiency and coverage. It also highlights concerns about the welfare regime and emphasizes the need for a more inclusive welfare framework.*

**Tag:** GS Paper- 2, Government Policies & Interventions, Poverty, Important Schemes, Social Sector Initiatives, Welfare Schemes, GS Paper-3, Employment, Inclusive Growth

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India's social protection coverage has doubled from 24.4% in 2021 to 48.8% in 2024, marking significant progress in expanding welfare reach, according to the International Labour Organization (ILO). India's welfare system is increasingly adopting a data-driven approach, with Direct Benefit Transfers (DBT) improving efficiency. Despite this progress, concerns such as declining social sector spending and weakened transparency and accountability mechanisms persist. These issues **highlight the need for a more inclusive and democratic welfare framework that ensures fairness and accountability.**

### What are the Achievements of the Key Welfare Programmes in India?

#### 💡 Poverty Alleviation and Employment Programs:

- ✦ **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA):** Provides at least 100 days of guaranteed wage employment to registered adult rural households willing to undertake unskilled manual work.

✎ Work demand under the flagship scheme in December 2024 was 8.3% higher compared to the same period in 2023.

- ✦ **National Rural Livelihood Mission (NRLM):** Aims to eliminate rural poverty through the promotion of multiple livelihoods and improved access to financial services for the rural poor households across the country.

✎ As of February 2025, **10.05 crore rural women households** have been mobilized into more than 90.90 lakh SHGs.

- ✦ **Public Distribution System (PDS):** An Indian food Security System established to address food scarcity by providing foodgrains at affordable prices, governed by the National Food Security Act (NFSA), 2013.

✎ As of 2023, **80.10 crore beneficiaries** across the country are availing the benefits of the PDS.

#### 💡 Health and Social Security Initiatives:

- ✦ **National Health Mission (NHM):** Aims to provide accessible, affordable, and quality healthcare, focusing on vulnerable and underserved populations.

✎ Between FY 2021-24, NHM engaged over **12 lakh additional healthcare workers**.

✎ Additionally, 1.56 lakh Ni-kshay Mitra volunteers supported over 9.4 lakh TB patients under the Pradhan Mantri TB Mukh Bharat Abhiyan, improving healthcare delivery in rural areas.

- ✦ **AB-Pradhan Mantri Jan Arogya Yojana (PMJAY):** It is the world's largest health coverage scheme, covering approximately 45% of India's population.

✎ As of 2024, over **35.4 crore Ayushman cards** have been issued, empowering millions of families with health coverage.

- ✦ **National Social Assistance Program (NSAP):** Aims to provide support to aged persons, widows, disabled persons and bereaved families on the death of the primary income producer, belonging to BPL households.

✎ As of 2024, the NSAP **caters to 3.09 crore** BPL beneficiaries.

- ✦ **POSHAN Abhiyaan:** Aims to address the nutrition needs of adolescent girls, pregnant women, lactating mothers, and children (0-6 years) through a targeted and convergent approach.

✎ As per the NFHS-5, the nutrition indicators for children under 5 years have improved as compared with NFHS-4.

- 💡 **Stunting has reduced from 38.4% to 35.5%**, wasting has reduced from 21.0% to 19.3% and Underweight prevalence has reduced from 35.8% to 32.1%.

#### 💡 Education and Skill Development Schemes:

- ✦ **Sarva Shiksha Abhiyan (SSA):** Focused on universal primary education.

✎ During the implementation of SSA, the total enrolment in elementary schools has risen from 18.79 crore children in 2009-10 to **19.67 crore children in 2015-16**.

- ✦ **Pradhan Mantri Kaushal Vikas Yojana (PMKVY):** Aims to provide free, short-term, quality-assured skill training to enhance the employability of youth.

✎ Since 2015, the scheme has trained/ oriented **1.48 crore candidates** by 30<sup>th</sup> June, 2024.

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✦ **PM- Vidyalaxmi Scheme:** It aligns with the **National Education Policy (NEP) 2020** and aims to provide collateral-free, guarantor-free loans to students.

✦ **PM e-VIDYA:** A comprehensive initiative that unifies all efforts related to digital/online/on-air education to enable multi-mode access to education.

✎ This will benefit nearly **25 crore school going children** across the country.

💡 **Women and Child Welfare Programs:**

✦ **Sukanya Samriddhi Yojana:** Aims to provide financial security for the future of the girl child through bank accounts, focusing on education and empowerment.

✎ As of November 2024, over **4.1 crore Sukanya Samriddhi accounts** have been opened.

✦ **Beti Bachao Beti Padhao (BBBP) Campaign:** Launched to address the declining **Child Sex Ratio (CSR)**, prevent **gender-biased sex-selective elimination**, and promote the survival, protection, and education of the girl child.

✎ As per the NFHS-5, the **sex ratio of the population** (females per 1,000 males) for the country was estimated as 1,020.

✎ Girls' enrollment in secondary education has increased significantly, with the **Gross Enrollment Ratio (GER)** for girls rising from 75.51% in 2014-15 to 78% in 2023-24.

✦ **PM Matru Vandana Yojana:** It provides maternity benefits to eligible pregnant and lactating women.

✎ As of 2022, more than **3.11 crore** beneficiaries have been enrolled under the scheme.

💡 **Financial and Digital Inclusion:**

✦ **Jan Dhan Yojana:** A financial inclusion program that aims to ensure access to financial services, namely, basic savings & deposit accounts, remittance, credit, insurance, pension in an affordable manner.

✎ PMJDY has **grown significantly**, from 147 million accounts in March 2015 to 520 million accounts by March 2024.

✦ **Digital India:** Launched to transform India into a digitally empowered society and knowledge-based economy by strengthening digital infrastructure, ensuring digital delivery of services, and promoting financial inclusion.

✎ India's **internet penetration** rose from **250 million** users in 2014 to **over 970 million** by 2023, with growing connectivity in rural areas.

💡 **Tribal and Specially Abled Welfare:**

✦ **Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM-JANMAN):** Launched for the socio-economic welfare of **PVTGs**.

✎ The scheme allocation has **doubled to Rs 300 crore** in Budget 2025-26 to enhance healthcare, education, and livelihoods for PVTGs.

✦ **Dharti Aaba Janjatiya Gram Utkarsh Abhiyan (DA- JGUA):** A transformative initiative to drive inclusive and sustainable development in tribal regions.

✎ It will cover 63,843 villages, benefiting over 5 crore tribal citizens.

✦ **Sugamya Bharat Abhiyan:** Focuses on creating accessible infrastructure, digital spaces, and services for PwDs.

### What are the Key Issues Undermining the Effectiveness of India's Welfare Ecosystem?

💡 **Widening Inequality and Inadequate Coverage:** India's growth story has been marked by widening **inequality**. Despite overall economic growth, the benefits have not been equally distributed, **leaving a significant portion of the population in poverty and at a margin**.

✦ India ranks **4<sup>th</sup>** globally in income equality, with a **Gini score** of 25.5, yet the top 1% of the population owns 40.1% of the country's wealth.

✦ Moreover, a **NITI Aayog** report identifies a **"missing middle"** of about **40 crore individuals** who are not covered by any form of financial protection for health.

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- ✎ Over **90% of India's workforce is in the informal sector**, yet most social security schemes are designed for formal employment, leaving a vast population outside the welfare net.
- 💡 **Administrative and Implementation Challenges:** Many welfare programs, especially the **PDS**, have been marred by corruption and leakages in the distribution network. These **inefficiencies have reduced the effectiveness of welfare schemes**, preventing them from reaching the intended beneficiaries.
  - ✦ According to a report by the Indian Council for Research on International Economic Relations (ICRIER), **approximately 28% of the grains supplied through India's PDS fail to reach the intended beneficiaries.**
  - ✦ CAG report on the Ayushman Bharat scheme reveals irregularities, including **invalid mobile numbers and potential fraud**. It also highlighted that in some cases patients **earlier shown as "dead" continued to avail treatment** under the scheme.
  - ✦ Initiatives like **ICDS and Mid-Day Meal Scheme (MDMS)** have consistently faced challenges primarily due to poor implementation. While there has been some improvement, the execution of these programs remains inconsistent.
    - ✎ For instance, in Mumbai, 30,000 to 50,000 children miss out on ICDS services due to **migration and poor documentation, highlighting gaps in access.**
- 💡 **Limitations of Schemes in Addressing Long-Term Challenges:** India's welfare structure is built around isolated schemes rather than a comprehensive social protection system. These schemes often **provide short-term support but fail to offer long-term solutions** to the multidimensional challenges faced by citizens.
  - ✦ Many welfare programs have focused on immediate needs (**e.g., food, cash transfers**) without addressing the underlying causes of deprivation. This has **limited the effectiveness of social welfare policies in fostering lasting social mobility.**
- ✎ For instance, while MGNREGS provides short-term employment and income support to rural households, it **does not address long-term livelihood security or sustainable development.**
- ✎ Also, while **Minimum Support Price** is intended to protect farmers, it has **encouraged a paddy-wheat monoculture** in states like Punjab and Haryana. This has resulted in environmental issues such as **groundwater depletion** and limited crop diversification.
- 💡 **Lack of Effective Grievance Redressal Mechanism:** Despite the establishment of the **Centralized Public Grievance Redress and Monitoring System**, there is a lack of political accountability.
  - ✦ Between 2022 and 2024, it successfully resolved over 70 lakh grievances. However, despite these achievements, **challenges persist in ensuring local accountability.**
  - ✎ This algorithmic insulation **limits the ability of local authorities to effectively address issues**, undermining the efficiency and impact of welfare programs, especially for marginalized communities.
  - ✦ Without local involvement, welfare schemes remain disconnected from beneficiaries' needs.
    - ✎ Moreover, a recent parliamentary committee has noted that the **focus is often on the "quantity of disposal" rather than the "quality of redressal."**
- 💡 **Digital Barriers in Welfare Delivery:** The increasing reliance on Aadhaar-linked and DBT-based welfare schemes has led to significant challenges, particularly for marginalized groups.
  - ✦ **45% of the Indian population lack internet access** preventing them from accessing essential welfare services.
  - ✦ A **Parliamentary Public Accounts Committee (PAC)** report released in July 2025 highlighted the high failure rate of Aadhaar biometric verification as a serious concern.
    - ✎ **Aadhaar authentication failures and data mismatches exclude many eligible beneficiaries**, especially farmers and women, from key programs like **PM KISAN**.

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- ✎ Digital illiteracy, particularly among women and the elderly, further limits access to government services.
- ✦ Moreover, **privacy concerns around Aadhaar data** compromise trust and accessibility, leaving marginalized communities vulnerable to exclusion.
- 💡 **Budgetary Constraints Affecting Welfare Program Implementation:** Social sector spending has witnessed a notable decline, **falling from an average of 21% of GDP during 2014–2024 to 17% in the 2024–25 fiscal year.**
  - ✦ Critical welfare areas, including minority affairs, labour and employment, nutrition, and social security, experienced a sharp reduction in budgetary allocation, **dropping from 11% of total expenditure in the pre-Covid period to just 3% post-Covid.**
  - ✦ In the FY 2024-25, the **social sector's share in total expenditure declined to 17%, the lowest in the last decade.**
    - ✎ This reduction in funding has led to challenges in the effective implementation of welfare programs, particularly in areas such as health, education, and rural development.
- 💡 **Poor Monitoring, Evaluation, and Impact Assessment:** Despite having social audit mechanisms like MGNREGA's, there are significant gaps in their execution.
  - ✦ For instance, a 2023 report revealed that **out of 34 states and union territories, only six had completed social audits for over 50% of works** done under the MGNREGS at the gram panchayat level.
    - ✎ This **indicates poor oversight** and hinders the ability to assess whether the welfare schemes are effectively reaching beneficiaries and achieving desired outcomes.
  - ✦ Without proper evaluation and continuous feedback, **many welfare programs fail to realize their full potential**, allowing inefficiencies and corruption to persist.

## How can India Strengthen Its Welfare Delivery System and Ensure Inclusivity?

- 💡 **Citizen-Centric Welfare Delivery:** Strengthen the role of local governance bodies such as **Gram Panchayats** and municipalities in designing context-sensitive welfare programs.
  - ✦ **Village-level welfare committees** can be set up to oversee the implementation of schemes like MGNREGA or PM-KISAN, **conducting regular surveys and feedback sessions with beneficiaries** to assess whether the programs are reaching the intended populations and achieving their desired outcomes.
    - ✎ Institutionalizing community-driven impact audits, as **suggested by the UN Special Rapporteur on Extreme Poverty**, can enhance accountability.
  - ✦ Programs like **Rashtriya Gram Swaraj Abhiyan** and **Gram Panchayat Development Plans**, alongside **Kerala's Kudumbashree Initiative**, effectively empower marginalized communities, especially women, by providing economic opportunities and promoting inclusivity.
- 💡 **Improve Budgetary Allocations for Social Sectors:** Increase the allocation for the social sector to ensure that welfare programs can effectively reach marginalized communities.
  - ✦ **Prioritize investments in healthcare, nutrition, and education** to build a resilient economic security system that benefits all citizens, particularly the vulnerable.
  - ✦ There is a need to **blend India's primary healthcare system with a preventive one** through enhanced budget allocation. For instance, **Kerala's healthcare system**, with a focus on primary healthcare and preventive measures, demonstrates how investment in healthcare can significantly improve overall well-being and **can be replicated across the country.**
- 💡 **AI-Driven Beneficiary Targeting and De-duplication:** Deploy AI and **machine learning** tools to identify eligible but excluded populations, detect ghost beneficiaries, and rationalize welfare allocations.

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✦ These systems **can analyze consumption patterns, geospatial data, and transaction footprints** to refine targeting. Integration with data from upcoming Census enables dynamic updates.

✎ This **enhances efficiency, fiscal prudence, and equity in delivery**. It transitions from static lists to adaptive targeting systems.

💡 **Reducing Resource Leakages and Improving Efficiency:** A major challenge in India's welfare programs has been the issue of resource leakages, where a significant portion of aid intended for beneficiaries never reaches them due to mismanagement, and inefficient implementation.

✦ **Aadhaar-based biometric authentication** can be **enhanced to minimize errors and data mismatches**, improving accuracy in welfare delivery.

✎ The **use of smart cards and POS devices** at ration shops further ensures accurate distribution and monitoring of food grain subsidies.

✦ India can **actively pursue the adoption of e-Rupi**, a digital voucher system where beneficiaries receive vouchers in the form of an SMS or QR code on their phones.

✎ This **system can streamline welfare delivery**, ensuring that benefits reach the intended recipients directly and efficiently.

💡 **Ensuring Universal Digital Inclusion:** Along with improving digital infrastructure, it is essential to launch digital literacy campaigns targeting marginalized communities, especially women, the elderly, and rural populations.

✦ Offline alternatives, such as **SMS-based services and mobile vans**, should be **developed**, much like the **PMGDISHA (Pradhan Mantri Gramin Digital Saksharta Abhiyan)**, which uses mobile vans to train rural citizens.

✦ Furthermore, **simplifying digital platforms by making them user-friendly** and available in multiple languages, as seen with the Aadhaar enrollment process, will ensure accessibility.

✦ **Collaborating with local authorities and NGOs**, which have helped empower women digitally, will further bridge the digital divide, ensuring inclusive access to all citizens.

💡 **Community-Led Inclusion Audits:** Institutionalize annual inclusion audits at the **panchayat and ward level, conducted by community-based organizations and SHGs**, to identify exclusion errors.

✦ These audits should feed directly into scheme databases for mid-year course corrections. Empowering communities **ensures social accountability and participatory governance**.

✦ It democratizes monitoring and fosters citizen ownership of welfare systems. This **creates an inclusion loop that is both bottom-up and iterative**.

💡 **Focusing on Holistic Development:** Welfare programs must go beyond addressing immediate needs such as food, cash transfers, and healthcare, and instead focus on long-term empowerment by integrating various facets of an individual's well-being.

✦ **PMKVY** should be **linked with employment guarantee schemes** to provide a continuous pathway from training to work, enabling a cycle of self-sustained growth.

✎ A holistic approach will address **not only the symptoms of poverty but also its root causes**, enabling sustainable progress for marginalized groups building upon **Article 38 of the Indian Constitution**.

💡 **Welfare Portability beyond PDS through 'One Nation, One Entitlement:** India can pilot to extend portability of entitlements beyond food security to schemes like pensions, scholarships, health insurance, and housing, enabling migrant and urban poor to access benefits anywhere.

✦ Build a **unified One Nation, One Entitlement (ONOE) framework** with geo-tagged digital verification. Leverage cloud-based MIS and Aadhaar-linked platforms for real-time service delivery.

✎ This ensures that mobility does not mean exclusion. **It creates a welfare net that follows the citizen, not the address**.

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## Conclusion

For a Viksit Bharat, India must reimagine its welfare architecture by integrating democratic decentralization with digital governance, making citizens not just beneficiaries but active stakeholders in the development process. Strengthening **local governance, improving budget allocations, ensuring inclusivity, and addressing inefficiencies** will build a more resilient welfare framework. By reducing leakages and promoting long-term empowerment, India can create an equitable and transparent system **guided by Amartya Sen's welfare economics** that benefits all citizens, particularly the marginalized, fostering lasting social mobility and economic security.



## Empowering India's Defence Sector

*This editorial is based on "As GPS Disruptions Grow, India Eyes Indigenous Quantum Navigation Boost," published on 07/08/2025 in Business Standard. It highlights that while India is advancing in defence technology, persistent challenges remain, which can be addressed through continued investment, innovation, and strategic collaboration.*

**Tag:** GS Paper-2, Government Policies & Interventions, GS Paper-3, Defence Technology, Indigenization of Technology

India's advancements in defence technology are making its military smarter and more agile. Under the "**Aatmanirbhar Bharat**" initiative, India is leveraging **innovations in AI, robotics, cyber warfare**, and advanced manufacturing to strengthen its capabilities. While these efforts are addressing modern security challenges and strengthening deterrence, **India continues to face challenges** such as dependence on foreign components and slow integration with the private sector, **hindering its goal of becoming a global defence leader**.

## What Are the Key Technological Innovations Driving India's Defence Growth?

💡 **Leveraging AI to Strengthen India's Defence Capabilities:** India is strategically advancing its use of AI to strengthen its defence capabilities, enabling faster and more accurate decision-making, **minimizing human errors**, and enhancing operational efficiency to address evolving security challenges.

- ✦ In 2022, **75 newly developed AI products/technologies** were developed during the first-ever '**AI in Defence**' (AIDef) **symposium**.
- ✦ In 2024, the Department of Defence Production has earmarked approximately **USD 12.6 million annually for AI projects**
  - 📌 AI is being applied in defence for various purposes, **including AI-driven intercept management, predictive maintenance systems**, decision intelligence, and target tracking and identification.

💡 **Advancing Military Dominance with Autonomous Systems and Robotics:** The rapid development of autonomous defence systems and technologies is becoming a crucial element of military dominance.

- ✦ The **Indian Armed Forces** are increasingly incorporating **unmanned aerial vehicles (UAVs)** for a variety of roles, including reconnaissance, combat, and logistics support.
- ✦ Robotics technology is also gaining significant attention, **with innovations like the 'NETRA' UAV**, an indigenous unmanned aerial vehicle designed for surveillance and reconnaissance missions.
  - 📌 Additionally, the **DRDO's Remote Operated Vehicle (ROV), Daksh**, serves as a **versatile tool for detecting and managing** improvised explosive devices (IEDs), conducting surveys of nuclear and chemical contamination, and handling hazardous materials.

💡 **Enhancing Defence with Cybersecurity and Electronic Warfare:** **Cybersecurity** and electronic warfare (EW) are essential for detecting anomalies, countering intrusions, and adapting communication protocols in real time.

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✦ The **National Technical Research Organisation (NTRO)** and the **Defence Intelligence Agency (DIA)** are investing in advanced technologies and developing specialized cyber defence units.

✦ The electronic warfare networked **command, control, communications, computers, intelligence, surveillance, reconnaissance (C4ISR)**, and advanced sensor systems, including those used in **Operation Sindoor** with **Rafale and Tejas aircraft**, enhance India's capability to disrupt enemy communications and radar systems.

✎ Additionally, the DRDO has developed jamming systems like the advanced EW system '**Shakti**'.

💡 **Revolutionizing Defence Manufacturing with 3D Printing:** In India, one of the significant advancements in defence manufacturing is additive manufacturing, particularly **3D printing**, which is revolutionizing defence production.

✦ The adoption of 3D printing enables rapid prototyping and the creation of complex components, thereby **reducing costs and shortening lead times for developing critical items** such as missiles, UAVs, and protective gear.

✎ Additionally, **Hindustan Aeronautics Limited (HAL)** and **Wipro3D** have partnered to 3D print metal parts for aero engines, further enhancing India's defence manufacturing capabilities.

💡 **Indigenous Defence Production Surge:** India has made significant progress in achieving **self-reliance in defence manufacturing**, reducing dependence on imports, exemplified by **Positive Indigenisation Lists**.

✦ This effort has contributed substantially to both national security and economic growth.

✦ In FY 2023-24, **India's indigenous defence production reached ₹1.27 lakh crore**, up by 16.7% from 2022-23.

✎ Moreover, 65% of defence equipment is now produced within India, showcasing the effectiveness of the **Make in India** initiative.

💡 **Driving Innovation in Defence Technology through iDEX:** The Acing Development of Innovative Technology with iDEX (**ADITI scheme**), a sub-scheme under the iDEX initiative, is designed to support the development of critical and strategic technologies. Its goal is to create a '**Technology Watch Tool**' for monitoring advancements.

✦ Through iDEX, companies are harnessing advanced manufacturing techniques and algorithms **for next-generation technologies, fostering indigenous research and development (R&D)** and strengthening India's technological capabilities.

💡 **Strengthening Defence with Quantum Technologies:** In 2025, DRDO launched the Quantum Technologies Research Centre (QTRC) to develop **quantum communication systems**, focused on distribution techniques that enable ultra-secure communication to protect national security in the post-quantum era.

✦ Recently, **DRDO's Industry-Academia Centre of Excellence** at IIT Delhi successfully demonstrated free-space quantum secure communication over a distance exceeding 1 km.

✎ Additionally, **private companies have supported these initiatives**, positioning India as a strong contender in next-generation warfare technologies.

💡 **Defence Industrial Corridors (DICs) Development:** India has established two **Defence Industrial Corridors** in Uttar Pradesh and Tamil Nadu to boost indigenous defence production and attract foreign investments.

✦ These corridors provide significant infrastructure and incentives to industries, creating a conducive environment for defence manufacturing.

✦ **Over ₹8,658 crore has already been invested in these corridors.** These corridors aim to attract a potential investment of ₹53,439 crore, making them critical to India's defence industrial expansion.

💡 **Strategic Defence Partnerships and Global Diplomacy:** India's growing role as a global defence exporter is supported by strategic partnerships with nations like the USA, France, and Russia.

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- ✦ The **BrahMos missile** export deal to Indonesia, valued at ₹3,800 crore, showcases India's technological prowess in missile systems.
- ✦ Additionally, India's participation in **multilateral defence exercises with countries** like Japan, the Philippines, and Malaysia further cements its position as a dependable partner in global security.
- 💡 **Indigenisation of Critical Defence Platforms:** India is significantly reducing its reliance on foreign military platforms through the indigenisation of critical systems.
  - ✦ One key development is the **INS Vikrant**, **India's first indigenous aircraft carrier**, commissioned in 2022. The ship, which has 76% overall indigenous content, demonstrates India's ability to design and manufacture complex naval platforms.
  - ✦ Furthermore, the **T-90 Bhisma tank overhaul by the Indian Army** highlights the nation's commitment to enhancing the life cycle of its existing fleet.



### What Are the Key Challenges Hindering India's Defence Growth and Self-Reliance?

- 💡 **Struggle with Achieving Complete Defence Self-Reliance:** Despite advancements in **indigenisation**, the defence procurement cycle is still slow, and India continues to face limitations in developing high-end defence technologies.
  - ✦ As of 2023, **36% of India's defence procurement budget is still allocated to imports**, highlighting the gap in technological capabilities.
    - ✍ **'Atmanirbharta' is the government slogan**, but jet engines, radars, missile seekers, and stealth tech are still sourced abroad.
  - ✦ Ensuring complete domestic capability to meet its defence needs remains a major challenge.
- 💡 **Cybersecurity Challenges & Digital Vulnerabilities:** India's cyber and digital defence capabilities are still developing, limiting its ability to counter advanced threats.

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✦ The **Cybersecurity Strategy** is in a transitional phase, lacking a cohesive defence architecture and a **Cyber Offensive Strategy**, focusing mainly on defence.

✎ Cybersecurity infrastructure faces inadequate investment, and policies need constant updates to adapt to evolving technologies and threats.

✎ A 2024 report revealed that **92% of Indian organizations experienced cybersecurity breaches** in the past year.

✦ Additionally, the **skills gap limits organizations' ability** to manage cyber challenges effectively.

✎ As per the Data Security Council of India (DSCI), **the country needs approximately 790,000 cybersecurity experts** to meet the growing demands of the industry.

💡 **Budget Constraints & Bureaucratic Hurdles:** India continues to encounter budgetary constraints and challenges in prioritizing defence projects, leading to **delays in the deployment of critical infrastructure** and technological advancements.

✦ While progress has been made, the technological ecosystem is still not as robust as that in more advanced defence sectors.

✎ India's procurement of the **Russian-made S-400 Triumf missile system** has experienced delays due to financial constraints and geopolitical considerations.

💡 **Technological Lag and Capability Gaps:** India lags 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 defence-civil synergy is still evolving**. Dependence on foreign components also raises cyber-vulnerability.

✦ ISRO's current **annual budget of approximately USD 1.6 billion** is significantly smaller compared to other major space agencies.

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

💡 **Barriers to Private Sector Growth in Defence Sector:** Even though private sector participation in India's defence sector has increased, it still faces several challenges.

✦ For instance, **companies like Bharat Forge, Data Patterns, and MTAR Technologies** are now playing a more prominent role in defence manufacturing.

✦ However, despite this progress, slow integration with government procurement processes, regulatory challenges, and limitations in **scaling up production capacity remain barriers**.

✎ The establishment of **defence corridors** in Tamil Nadu and Uttar Pradesh, intended to attract private investment, **has not met expectations due to fluctuating requirements** from the armed forces and inconsistent policy implementation.

💡 **Limited Export Market and Global Competition:** Despite significant growth in defence exports, India's share in the global arms market remains modest.

✦ In the fiscal year 2024–25, defence exports reached a record high of ₹23,622 crore, with the private sector contributing ₹15,233 crore.

✎ However, this still accounts for a **small fraction of the global arms trade, where the top five exporters, US, France, Russia, China, and Germany**, collectively hold approximately 72% of the market share.

💡 **Execution and Credibility Concerns:** India's defence manufacturing execution, particularly its ability to meet deadlines and maintain **consistent quality**, **has raised credibility concerns** among potential buyers.

✦ Doubts persist regarding India's capacity to ensure timely delivery and provide reliable after-sales support key factors for international buyers.

✎ Despite the **growing demand for India's Tejas fighter jets and BrahMos missiles**,

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logistical challenges and diplomatic hurdles continue to hinder the country's efforts in convincing global customers.

💡 **Lack of Integrated Defence Strategy:** India's defence planning suffers from a lack of integration across its three armed forces, which operate in silos.

✦ Despite the creation of the **Chief of Defence Staff (CDS)** position, challenges remain in harmonizing the strategies, resources, and capabilities of the Army, Navy, and Air Force.

✦ A notable example of these integration challenges is the delayed implementation of the **Integrated Theatre Commands**, a key reform aimed at enhancing jointness among the services.

### What Steps Can India Take to Enhance Its Defence Capabilities and Self-Reliance?

💡 **Foster Collaboration Between Private and Public Sector Giants:** Private companies have the agility to innovate, but need better integration with public sector firms like HAL and BEL. **Collaborative projects** can enhance production capabilities and technological advancements.

✦ **Policy reforms should incentivize private companies** to develop indigenous technology and focus on specialized niches like drones, electronic warfare systems, and UAVs.

📌 Provide **tax breaks, subsidies, and incentives to attract private sector investments** into the defence manufacturing ecosystem. This can help **increase domestic production** and reduce dependency on imports.

💡 **Enhance India's Defence Export Potential and Global Credibility:** India needs to strengthen its reputation as a reliable supplier by improving its execution record, ensuring timely delivery, and providing strong after-sales services.

✦ **Establishing robust supply chains** and demonstrating consistency will make India a more attractive defence exporter.

📌 **Independent bodies can be established to monitor** defence projects and ensure

they meet deadlines. Regular progress reviews, project audits, and clear milestones will ensure better execution.

✦ **India can target specialized markets where its defence technology excels**, such as Tejas fighter jets, BrahMos missiles, and air defence systems in **Southeast Asia, Africa, and Latin America**.

📌 Engagement in platforms like the **India-Africa Defence Dialogue, Southeast Asia Defence Dialogue**, and others can help foster new markets.

💡 **Overcoming Technological Gaps through Partnership:** To reduce reliance on foreign technologies, India should increase investment in indigenous defence research.

✦ **Developing critical technologies** like jet engines, radars, missile seekers, and stealth technology domestically will reduce the gaps and make India self-reliant.

📌 **Collaborating with global defence manufacturers** like GE Aviation and Dassault can help India access cutting-edge technologies, which can then be integrated into domestic defence projects.

📌 India can enhance defence manufacturing by **entering into more joint ventures with foreign companies**, ensuring that critical technologies are transferred and adapted for local needs.

💡 **Focusing on 'Buy Indian' Over 'Buy Global':** India should prioritize "Buy Indian" policies to strengthen domestic defence manufacturing. Programs like **Defence Production and Export Promotion Policy (DPEPP)** and the Positive Indigenisation List are steps toward achieving this goal.

✦ **Shifting to locally sourced defence systems** like Tejas jets and Akash missiles will support private companies and reduce dependence on global suppliers, improving strategic autonomy.

📌 **Long-term contracts and incentives** can boost local production capacity.

💡 **Co-Development of Dual-Use Infrastructure:** Foster the co-development of infrastructure that benefits both military and civilian sectors.

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✦ For instance, the **Dholera Special Investment Region (DSIR) in Gujarat** is being developed as an integrated smart city with provisions for both defence infrastructure and commercial operations.

✍ The region aims to become a world-class destination with efficient infrastructure for manufacturing, boosting industrial output, creating jobs, and **providing a balanced environment**

💡 **Comprehensive Defence Skill Development Program:** Developing a highly skilled workforce is key to sustaining growth in indigenous defence production.

✦ India should **establish specialized defence training institutes** and incentivize collaborations with global defence corporations for skills development.

✦ A **dedicated Defence Talent Academy**, in partnership with top-tier educational institutions, could create a pipeline of skilled engineers, technicians, and cyber specialists tailored to defence needs.

✍ Such initiatives would address the gap in advanced skill sets and enhance R&D capabilities.

## Conclusion

India's defence sector stands at a pivotal moment, with advancements in technology and indigenous capabilities driving its growth. While challenges persist, particularly in integration, technological development, and export competitiveness, the country's commitment to strengthening its defence ecosystem remains unwavering. **The continued pursuit of these goals will position India as a formidable player on the global defence stage.**



## Reforming the Electoral System in India

*The editorial is based on "The ECI's lack of transparency is worrying", published in The Hindu on 11/08/2025. It highlights the lack of transparency in voter deletions*

*during the SIR in Bihar and the unclear rationale behind the revision, stressing that electoral reforms need greater accountability and justification to ensure a fair democratic process.*

**Tag:** GS Paper - 2, Constitutional Bodies, Transparency & Accountability, Representation of People's Act

The **Election Commission of India's** recent **Special Intensive Revision (SIR)** of electoral rolls has sparked concerns due to its lack of transparency. The process, which involves verifying millions of voter records, was carried out with little public information or consultation. This situation **underscores the urgent need for electoral reforms focused on improving transparency, accountability, and public trust** in the electoral system.

## How has the Electoral System Evolved in India?

### Pre-Independence Era:

✦ **Government of India Act, 1858:** British Crown assumed control; no representative governance.

✦ **Indian Councils Act, 1861 & 1892:** Introduced limited participation of Indians in legislative councils but without electoral representation.

✦ **Government of India Act, 1909 (Morley-Minto Reforms):** Introduced communal representation with separate electorates for Muslims.

✍ Marked the first instance of limited form of electoral representation for Indians

✦ **Government of India Act, 1919 (Montagu-Chelmsford Reforms):** Expanded the electorate to include property owners and taxpayers.

✍ Introduced dyarchy, with partial Indian representation in provincial councils.

✦ **Government of India Act, 1935:** Provided for provincial autonomy and expanded electorates.

### Post-Independence Era:

✦ **Constituent Assembly Debates:** Universal adult suffrage adopted as a fundamental principle and ensured an inclusive, democratic process for elections.

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### ✦ Articles Governing Elections:

- ✎ **Article 324:** Establishment of the Election Commission of India (ECI) to oversee free and fair elections.
- ✎ **Articles 325–329:** Enshrine the framework for elections, delimitation of constituencies, and prohibition of discrimination.

### 💡 Key Developments in the Electoral System:

- ✦ **Initial General Elections (1951-52):** First democratic elections held with universal adult suffrage.
  - ✎ Over 173 million voters participated; **85% were illiterate**, necessitating innovative measures like symbols for parties.
- ✦ **Institutional Strengthening of ECI:** Initially, the commission consisted of **only a Chief Election Commissioner**.
  - ✎ In 1989, ECI became a multi-member body.
  - ✎ It briefly reverted to a single-member body in 1990, but since 1993, it has been functioning as a three-member body (one **Chief Election Commissioner** and two Election Commissioners).
- ✦ **Reduction of Voting Age:** The **61<sup>st</sup> Constitutional Amendment Act, 1989**, lowered the voting age from 21 to 18 years, enabling youth participation in the electoral process.
- ✦ **Right to Information Act (2005):** Brought political parties under public scrutiny.
  - ✎ The Supreme Court in 2020 ordered political parties to publish the entire criminal history of their candidates for the Assembly and Lok Sabha elections.
- ✦ **Model Code of Conduct (MCC):** Originating in Kerala (1960), the MCC was expanded by 1979 with the participation of political parties.
  - ✎ T.N. Seshan's tenure (CEC) is noted for the strict enforcement of the MCC and the introduction of Electors' Photo Identity Cards (EPICs) in 1993.
- ✦ **Key Technological Integration:**
  - ✎ **1989:** Provision for **Electronic Voting Machines (EVM)** was made.

- ✎ **2011:** Prototype of Voter-Verifiable Paper Audit Trail (VVPAT) was developed to enhance transparency and used for the first time in 2013.

- ✦ **Introduction of None of the Above (NOTA):** In 2013, following a Supreme Court directive, the NOTA option was introduced in EVMs, allowing voters to abstain from choosing any candidate while maintaining ballot secrecy.
- ✦ **Electoral Bonds Scheme:** The scheme was introduced in 2018, allowing anonymous funding to political parties.
  - ✎ In February 2024, the Supreme Court (SC) of India unanimously struck down the scheme and associated amendments as unconstitutional in the case of **Association for Democratic Reforms (ADR) vs. Union of India**.

### What are the Major Issues Undermining the Effectiveness of Electoral Reforms in India?

- 💡 **Persistent Electoral Malpractices Weakening MCC Enforcement:** Voter bribery, booth capturing, and other illegal practices **exacerbated by AI, especially deepfake** continue to undermine the integrity of elections. These activities distort the will of the electorate and, in certain regions, create an atmosphere of threats and manipulation.
  - ✦ During the **2024 Lok Sabha elections in UP**, the Election Commission received over 200 complaints, including alleged booth capturing, along with voter intimidation and EVM malfunctions, highlighting the persistent challenge of electoral malpractices.
    - ✎ ECI reported record **seizures of over Rs 1,000 crore in Maharashtra and Jharkhand** during the 2024 assembly bypolls, seven times higher than in 2019.
  - ✦ The MCC is intended to ensure fairness during election campaigns, but its enforcement has been inconsistent. **Violations often go unchecked or are addressed with delays**, reducing its deterrent effect.
    - ✎ **'Star Campaigners'** have been criticized for using inappropriate language, making caste and communal appeals which undermine the integrity of the campaign process and violate the MCC.

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💡 **Voter List Accuracy Concerns:** Accurate and up-to-date voter lists are fundamental to free and fair elections. However, issues such as duplicate entries, **incorrect details, outdated information, and wrongful exclusion of eligible voters** remain persistent.

✦ **Special Intensive Revision (SIR)** of electoral rolls in Bihar ahead of the 2025 Assembly elections triggered concerns when approximately 65 lakh names were excluded from the draft voter lists.

✍ This large-scale deletion **raised fears of potential disenfranchisement**, particularly among marginalised and migrant communities.

💡 **Criminalization of Politics:** The **Association for Democratic Reforms (ADR)** highlighted that **46% of elected MPs in 2024** have criminal cases against them, with 31% facing serious charges such as rape, murder, and kidnapping.

✦ **Bibek Debroy** has highlighted the **growing trend of criminalisation of politics and the politicisation of criminals**.

✦ Political parties often field these candidates because they are perceived as more **"winnable"** due to their financial resources or muscle power.

✦ This criminalization of politics is a significant concern, as it **undermines public trust in elected representatives** and poses a serious challenge to the integrity of the political system.

💡 **Misuse of Media in Election Campaigns:** Media platforms, both traditional and digital, are often used by political parties to spread biased narratives or manipulate public opinion.

✦ This includes paid news, fake news, and unverified claims being circulated widely, often without sufficient checks. **Political parties use micro-targeting techniques** to influence specific voter segments with tailored messages.

✦ This **blurs the line between journalism and propaganda**, allowing parties with deep pockets to dominate the narrative.

✍ This manipulation of the media undermines the democratic process and distorts the fairness of elections.

✦ The **ECI's Media Certification and Monitoring Committees (MCMCs)** have been set up to combat this, yet their capacity to monitor the vast media landscape, especially regional and online outlets, remains limited.

💡 **Lack of Full VVPAT Verification Fueling Distrust:** The core issue with the EVM and VVPAT process is the limited scope of physical verification, which creates a trust deficit among political parties and a segment of the electorate.

✦ While the **Voter Verified Paper Audit Trail (VVPAT) system** was introduced to provide a verifiable paper trail, the **ECI only conducts a mandatory count of VVPAT slips in a small, randomized sample of five polling stations per assembly constituency (as backed by the Supreme Court)**.

✍ This limited sample size, while statistically argued by the ECI to be sufficient, while the critics argue that **it is insufficient for assuaging widespread doubts about potential tampering or machine malfunctions**.

💡 **Unregulated Election Expenditure:** Political parties often exceed spending limits, with the Centre for Media Studies estimating that close to **₹1,00,000 crore was spent in the 2024 elections**. The lack of expenditure caps for parties allows for the disproportionate influence of wealth on the election process, fostering corruption.

✦ This **unregulated spending creates an uneven playing field**, where financially stronger parties have an advantage, leading to corruption and undermining the fairness of the election process.

✦ The lack of stringent regulation **exacerbates the vicious cycle of money and politics in India**.

✍ Additionally, this **unregulated spending contributes to the freebie culture** further distorting the integrity of the electoral system.

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💡 **Gaps in Representation and Participation in Politics:** Women and marginalised communities continue to be left out of both the ballot and decision-making spaces.

✦ In the 2024 Lok Sabha elections, women's representation in the Indian Parliament was only **13.6%**.

✍ While the **Nari Shakti Vandan Adhiniyam, 2023** calls for a 33% reservation to ensure greater female participation in politics, its **implementation is scheduled to take place only after 2029**.

✦ In terms of participation, millions of **internal migrants are effectively disenfranchised** as they cannot vote in their home constituencies due to logistical and legal barriers.

✍ The Election Commission's proposal to introduce **Remote Voting Machines (RVMs)** has been met with both interest and criticism, particularly regarding its feasibility, particularly regarding its feasibility.

💡 **Lack of Inner-Party Democracy:** Political parties often lack transparency and internal democracy, leading to centralized decision-making and dynastic politics.

✦ Presently, there is **no statutory backing for internal democratic regulation** of political parties in India and the only governing provision is under Section 29A of the **Representation of the Peoples' Act, 1951**.

✍ This curtails opportunities for grassroots leaders and weakens accountability.

✦ For instance, **30% of 2019 Lok Sabha MPs belonged to political families**, reflecting the entrenched nature of dynastic politics in India

✍ **Concerns over Election Commission's Independence and Autonomy:** Concerns regarding the autonomy and impartiality of the EC have emerged due to perceptions of bias and delayed actions in addressing electoral violations.

✦ These **concerns have raised questions about the EC's ability** to function independently and ensure free and fair elections.

✦ In March 2023, the **Supreme Court proposed a neutral three-member panel**, comprising the Prime Minister, the Leader of the Opposition, and the Chief Justice of India to appoint Election Commissioners, as an interim measure to reduce executive influence until Parliament enacted a law.

✍ **CEC and Other ECs (Appointment, Conditions of Service, and Term of Office) Act, 2023** replaced the Chief Justice with a Union Cabinet Minister, giving the executive a two-thirds majority. The change has drawn concerns about diluting the Court's intent and is currently under constitutional scrutiny.

### What Key Reforms are Needed to Strengthen the Electoral System in India?

💡 **Progressing Towards Simultaneous Elections:** Conducting simultaneous elections for the Lok Sabha and state assemblies **can reduce logistical challenges and financial costs** while minimizing governance disruption due to frequent polls as advocated by **Kovind Committee**.

✦ This would **require constitutional amendments** and synchronization of terms, but it is achievable through political consensus.

✦ Implementation could involve pilot testing in select states before nationwide rollout.

💡 **Strengthening the Enforcement of the Model Code of Conduct (MCC):** The ECI should have the authority to revoke the 'Star Campaigner' status of any leader who violates the MCC. This would deprive candidates of financial relief for their campaigns, ensuring stricter compliance with the MCC.

✦ The ECI should **exercise its existing powers under the Symbols Order, 1968** to suspend or withdraw recognition of any political party that fails to adhere to the MCC or lawful directives from the ECI.

💡 **Strengthening ECI's Independence and Powers:** The ECI's budget should be charged upon the **Consolidated Fund of India**, similar to other constitutional bodies, ensuring financial autonomy and preventing potential political influence over the Commission.

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✦ As recommended by the Supreme Court, the **appointment of Election Commissioners should involve the Chief Justice of India** in the selection panel, which would increase the Commission's independence and reduce executive influence.

💡 **Fast-Track Courts for Political Criminal Cases:** Set up dedicated **fast-track courts** to handle criminal cases involving elected representatives, ensuring judgments within a fixed timeframe, preferably one year.

✦ This would prevent prolonged trials from allowing individuals with serious charges to remain in positions of power.

✦ Such a mechanism strengthens accountability, deters criminal infiltration into politics, and builds upon **Dinesh Goswami Committee's recommendations**.

💡 **Mandatory Inner-Party Democracy:** Internal elections within political parties should be made mandatory for selecting candidates and leaders, ensuring transparency and accountability.

✦ The **Representation of the People Act, 1951** should be amended to introduce penalties, such as deregistration of parties, for non-compliance.

💡 To encourage compliance, political parties adhering to these reforms could be incentivized with additional public funding.

💡 **Managing Digital Campaigning:** To regulate digital campaigning effectively, the ECI should introduce clear guidelines for social media advertising and online political content.

✦ This includes ensuring transparency in **paid political ads, requiring disclosure of sponsors and expenditure**, and fact-checking all digital content to prevent the spread of misinformation.

✦ Moreover, the **ECI should collaborate with social media platforms to create self-regulation mechanisms** and audit trails for political campaigns.

💡 Additionally, introducing a **legal mandate for rapid detection and takedown of deepfake content** during the election period, with strict penalties for creators and disseminators.

💡 **Combating Freebie Culture:** Establish guidelines for electoral promises to differentiate between genuine welfare initiatives and unsustainable freebies.

✦ The Election Commission (EC) **can require political parties to submit a fiscal roadmap for their promises**.

💡 Parties proposing **unsustainable schemes should be held publicly accountable** through mandatory disclosures. Additionally, voter education on the long-term impacts of such freebies is essential to ensure informed decision-making.

✦ In line with the **Indrajit Gupta Committee's recommendations** on state funding of elections, providing regulated, need-based campaign resources **could reduce the competitive populism** that fuels excessive and fiscally irresponsible promises.

💡 **Improving Voter Turnout:** To enhance voter turnout, the Election Commission should focus on increasing voter awareness, **particularly in rural and marginalized areas**, through targeted campaigns and community outreach.

✦ The **"Main Bharat Hoon" campaign** is a significant step by Election Commission of India (ECI) initiative to promote voter awareness and participation.

✦ **Mobile voter registration units and online voting facilities** can be introduced to make voting more accessible, especially for women, and migrant workers.

✦ The Election Commission's **proposal for RVMs is a promising initiative**, but it necessitates thorough testing and strong safeguards to ensure its effectiveness and security.

💡 **Enhancing the EVM and VVPAT Verification Process:** The sample size for the matching of EVM counts and VVPAT slips should be scientifically determined by dividing states into large regions.

✦ In **case of even a single error**, full counting of VVPAT slips for that region should be mandatory to ensure statistical confidence in the counting process.

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- ✦ The introduction of 'totaliser' machines should be considered to aggregate votes from a set of EVMs before revealing the candidate-wise results.

- ✎ This step would increase transparency and reduce the chances of tampering at the booth level.

## Conclusion

The path forward for India's electoral system lies in continuous innovation and reform. By **prioritizing transparency, inclusive representation**, and accountable governance, the country can address the existing gaps in the system. As India continues to evolve, the **focus should be on strengthening democratic values**, fostering trust in institutions, and ensuring that every voter's voice is heard. With the right mix of policy reforms and public participation, India's electoral system can emerge as a true beacon of democracy for the world. A future-ready electoral system must be built on the **4Es- Empowerment, Equity, Efficiency, and Ethics**- to safeguard the spirit of Indian democracy.



## Achieving Universal Health Coverage in India

*The editorial is based on "The First Step to Universal Healthcare: Make Diagnostics Accessible and Cheap," published in The Indian Express on 11/08/2025. It emphasizes the critical role of diagnostics in achieving Universal Health Coverage (UHC) in India, focusing on strengthening healthcare infrastructure, digital health initiatives, and capacity building across the country.*

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

**Universal Health Coverage (UHC)** is a fundamental goal of India's healthcare policy, aiming to provide equitable and affordable healthcare services to all citizens. While significant progress has been made in expanding access, challenges remain, particularly in primary care. Moving forward, **India must focus on bridging the existing**

**gaps in healthcare infrastructure**, improving service delivery in underserved regions, and ensuring that **essential healthcare services are accessible to all**, thereby **achieving comprehensive healthcare coverage across the country**.

## What are the Key Developments in India's Healthcare Sector?

- 💡 **Expansion of Healthcare Infrastructure:** The expansion of government hospitals, medical colleges, and healthcare infrastructure is pivotal in addressing the evolving healthcare needs of India's rapidly growing population.
  - ✦ From 2005 to 2021, the **number of public hospitals in India surged from 7,008 to 60,621**, reflecting a **Compound Annual Growth Rate (CAGR)** of approximately **14.4%**.
  - ✦ The government's commitment to expanding health infrastructure is evident through initiatives like the **PM-Ayushman Bharat Health Infrastructure Mission (2020)**.
    - ✎ From 2018-19 to 2023-24, the **Ayushman Aarogya Mandirs (AAMs)** have grown at a CAGR of 46.6%, reflecting the increasing commitment to expanding primary healthcare services across India.
- 💡 **Healthcare Delivery through Digital Innovation:** India has embraced the digital health revolution, transforming the healthcare delivery system.
  - ✦ Initiatives such as the **Ayushman Bharat Digital Mission (ABDM)**, **CoWIN App**, **e-Sanjeevani**, and **e-Hospital** represent a paradigm shift in the country's healthcare structure.
    - ✎ The **"Scan & Share"** service under ABDM, which uses QR codes for faster OPD registration, is gaining traction in hospitals, streamlining patient flow and reducing waiting times.
    - ✎ By leveraging digital technologies, these efforts make **healthcare services accessible** to even the most remote areas of the country.
- 💡 **Growth in the Pharmaceutical Industry:** India ranks third in global pharmaceutical production by volume and is known as the **"pharmacy of the world."** Its medicines are preferred worldwide due to their low cost and high quality.

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## Healthcare Initiatives in India



- ✦ India's pharmaceutical sector is projected to reach a market size of **USD 130 billion by 2030**, as per FICCI.
  - ✍ India also **accounts for 60% of global vaccine production** making it the largest vaccine producer in the world.
- 💡 **Increase in Healthcare Investment:** Healthcare financing in India has seen a significant increase in recent years.
  - ✦ The share of healthcare expenditure as a percentage of GDP has **grown from 1.2% in 2014-15 to 2.1% in 2022-23**.
    - ✍ This increase in healthcare funding is crucial for improving the availability and quality of healthcare services nationwide.
  - ✦ Moreover, India has made significant progress in improving healthcare quality through the establishment of **National Quality Standards (NQAS)**.
    - ✍ The number of NQAS-certified public health facilities has **increased from just 10 in 2016-17 to over 2,000 in 2023-24**, reflecting a strong commitment to improving healthcare quality at all levels of service delivery.
- 💡 **Reduction in Out-of-Pocket Expenditure (OOPE):** The shift from the Rashtriya Swasthya Bima Yojana (RSBY) to the **Pradhan Mantri Jan Arogya Yojana (PM-JAY)**, the world's largest government-funded health assurance scheme, has played a vital role in **reducing OOPE**.

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✦ PM-JAY extends coverage to nearly 12 crore families, with INR 5 lakh per family annually, encompassing secondary and tertiary care with 1,900 packages and no pre-existing condition exclusions.

✦ From 64.2% in 2013-14, OOPe has dropped to 47.1% in 2019-20, improving the affordability and accessibility of healthcare services for millions of citizens.

💡 **Strengthening Community Engagement:** Initiatives like Jan Arogya Samitis, Mahila Arogya Samitis, and the involvement of Accredited Social Health Activists (ASHAs) have empowered local communities to actively participate in healthcare decision-making and service delivery.

✦ ASHAs, in particular, play a critical role in bridging the gap between formal healthcare systems and communities.

📌 The number of ASHA workers has grown by 1.8% CAGR from 8.95 lakh in 2013-14 to 10.65 lakh in 2023-24, indicating the increasing importance of community-driven healthcare.

### What are the Key Barriers to Achieving Universal Health Coverage in India?

💡 **Inadequate Healthcare Infrastructure:** Despite the improvements in India's healthcare sector, the country continues to face a significant shortage of healthcare facilities, particularly in rural areas where the majority of the population resides.

✦ Many PHCs and sub-centers still lack essential infrastructure, medical equipment, and resources, making it challenging to provide even basic healthcare services.

📌 This shortage further exacerbates the existing difficulties in ensuring the delivery of quality healthcare to rural populations.

✦ According to the National Health Profile of 2021, India has 0.6 beds per 1,000 people, which is lower than what was recommended in the National Health Policy, 2017.

💡 **Shortage and Uneven Distribution of Healthcare Professionals:** India faces a significant shortage of

healthcare professionals which is a critical challenge for the healthcare system, impacting the quality and accessibility of services.

✦ While WHO recommends 44.5 doctors, nurses, and midwives per 10,000 inhabitants, the national density is only 20.6.

📌 Furthermore, Human Resource for Health (HHR) distribution is uneven, with urban areas having a doctor density four times higher than in rural areas.

✦ There is nearly 80% shortage of specialist doctors at community health centres (CHCs) across rural India.

💡 **Persistent Out-of-Pocket Healthcare Expenses and Insurance Gaps:** Though reduced recently, high out-of-pocket expenses for healthcare services is still a significant burden for many Indians.

✦ Health insurance coverage in India is not as widespread as in countries like Germany, where health insurance is mandatory, leading to delayed or avoided treatments, which can result in further complications.

📌 India's insurance penetration fell to 3.7% in 2023-24 from 4% in the FY 2022-23.

✦ Although PM-JAY primarily covers inpatient hospitalization, it does not include outpatient and chronic care, which affects the affordability of treatment and hinders early intervention for various health conditions.

📌 The Comptroller and Auditor General (CAG) of India's performance audit of the PM-JAY exposed significant irregularities, revealing critical implementation weaknesses.

💡 These shortcomings have, to some extent, left vulnerable beneficiaries underserved while contributing to increased health expenditure.

💡 **Insufficient Public Healthcare Expenditure:** The Indian government's expenditure on healthcare has historically been low compared to other countries, which contributes to the inadequacy of public healthcare facilities and the high reliance on private healthcare services, which may not be affordable for all citizens.

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- ✦ India's public health expenditure **stands at only 2.1% of GDP (2022-23)**, below the **2.5% recommended by the 15<sup>th</sup> Finance Commission**.

✎ This limits the expansion of essential services, despite rising demand. In comparison, **many developed countries allocate 5-10% of their GDP to health**, highlighting India's challenge of underinvestment in the sector.

- 💡 **Insufficient Focus on Preventive and Primary Healthcare:** Healthcare in India continues to be predominantly focused on curative tertiary care, with less emphasis on prevention and primary health services.

- ✦ **Non-communicable Diseases** (NCDs) have been on the rise, putting additional strain on the healthcare system.

✎ The proportion of deaths due to NCDs in India has **increased from 37.9% in 1990 to 61.8% in 2016**.

- 💡 **Inadequate Focus on Mental Healthcare:** Mental health remains an under-prioritized area within India's healthcare system, with limited infrastructure, stigma, and low budget allocation.

- ✦ As per the National Mental Health Survey (2015–16), **India has only 0.75 psychiatrists per 1 lakh population**, far below the desirable standard of at least **3 per 1 lakh (recommended by WHO)**, leading to significant gaps in early diagnosis, treatment, and community-based support.

- 💡 **Privacy Concerns Amid Growing Digitalisation:** The **growing use of digital tools in healthcare**, such as electronic health records (**Ayushman Bharat Health Account**) and telemedicine, raises significant privacy concerns.

- ✦ The risk of unauthorized access to sensitive patient information, data breaches, and **insufficient security measures** can lead to the compromise of personal health data.

✎ In 2023, **personal details of more than 80 crore people** were leaked from the Indian Council of Medical Research (ICMR). This threatens patient confidentiality and undermines trust in the healthcare system.

- ✦ In 2022, **AIIMS Delhi faced a massive ransomware attack** posing critical vulnerabilities in India's healthcare IT infrastructure.

### What Strategies can India Adopt to Achieve Universal Health Coverage?

- 💡 **Expand Universal Health Insurance to Holistically Cover Outpatient, Preventive, and Chronic Care:** India can rethink PM-JAY and insurance schemes to encompass outpatient diagnostics, medicines, and preventive screenings, tackling the major share of out-of-pocket expenditure (**only for the most vulnerable section in the initial stages**).

- ✦ Introduce **modular insurance products for chronic disease management**, incentivizing **early intervention** and **reducing hospitalization**.

- ✦ This paradigm shift will ensure financial risk protection while aligning with global best practices for universal health coverage.

- 💡 **Transform Health Workforce Capacity:** Establish an incentive-based system that encourages healthcare professionals to serve in underserved areas through measures such as **rural service bonds, fast-tracked career growth**, and financial incentives.

- ✦ Additionally, medical education curricula should be aligned with community health needs, integrating training for multidisciplinary health workers, including **AYUSH practitioners**, through initiatives like the **National Health Mission**.

✎ This approach will foster a resilient, adaptable workforce capable of **addressing India's epidemiological transition** and demographic diversity.

- 💡 **Create AI Enabled Digital Healthcare Infrastructure:** India must prioritize the development of **AI-ready infrastructure in healthcare facilities, ensuring stable electricity, strong internet connectivity, and the necessary hardware in healthcare centers**.

- ✦ The government can leverage existing initiatives like the **National Rural Health Mission** to incorporate upgrades in digital infrastructure.

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- ✍ A successful example is the **solar-powered primary health centers in Chhattisgarh**, which provide 24/7 electricity; this model can be expanded to include essential digital infrastructure.
- ✦ Further, integration of **AI will help bridge the gap in healthcare access and delivery**, improving efficiency and enabling better healthcare outcomes.
- 💡 **Strengthening Healthcare Connectivity through Digital Innovation:** Government hospitals at all levels should be **well-connected, particularly through digital platforms**.
  - ✦ This would **facilitate the exchange of best practices**, clinical protocols, and innovative solutions across the healthcare network, thereby elevating the overall standard of healthcare.
  - ✦ **Mobile Health Units with E-Health Integration** can bridge healthcare access gaps in remote areas by providing medical services, ensuring timely care for underserved populations.
    - ✍ **Regular seminars and symposiums** can be organized to foster a culture of knowledge sharing and continuous learning among healthcare providers.
- 💡 **Unified Regulatory Framework for Private Healthcare with Digital Oversight:** Create a centralized regulatory authority empowered to enforce comprehensive quality standards, ethical pricing, and grievance redressal across private providers.
  - ✦ **Integrate this framework with digital health initiatives such as ABDM** and hospital accreditation bodies to enable real-time monitoring and transparency.
  - ✦ Such harmonization will **foster trust, reduce exploitative practices**, and promote equitable healthcare delivery.
- 💡 **Empowering Community Health Workers (CHWs):** CHWs, such as ASHAs, are the frontline of India's health system. Instead of viewing them as mere volunteers, **a transformative strategy is to professionally empower them**.
  - ✦ This involves providing them with better and more consistent salaries, not just performance-based incentives.
  - ✦ Furthermore, they **should be equipped with modern digital tools** for data collection, telemedicine, and referral management, and be given an enhanced training curriculum that **expands their roles to include screening for NCDs and basic mental health support**.
- 💡 **Drive Innovation and Self-Reliance in Pharmaceuticals and Medical Devices:** Promote public-private partnerships and increase R&D funding for frontier technologies like **organ bioprinting, robotics, and AI diagnostics** under the **Medical Device Policy 2023**.
  - ✦ Facilitate backward integration in supply chains and **streamline regulatory approvals** to bolster India's global competitiveness.
    - ✍ India **can increase domestic production of Active Pharmaceutical Ingredients (APIs)** to reduce reliance on imports, especially from China, which currently supplies around 70% of India's API requirements.
  - ✦ Align these initiatives with the **Make in India** and **Aatmanirbhar Bharat** missions to transform India into a global hub for affordable, high-quality healthcare innovation.
- 💡 **Strengthening Mental Healthcare:** India must urgently prioritize mental health by **increasing dedicated funding and expanding mental healthcare infrastructure across the country**.
  - ✦ Strengthening the mental health workforce through the training and recruitment of **more psychiatrists, psychologists, and counselors is essential to meet growing demand**.
  - ✦ **Integrating mental health services into primary healthcare centers** and community-based programs will enhance accessibility, promote early diagnosis, and ensure timely treatment.
  - ✦ Initiatives like **Tele-MANAS** represent **important advances in improving mental healthcare reach through digital platforms**.

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- ✎ Additionally, sustained public awareness campaigns are vital to reduce stigma and foster a culture that supports mental well-being, making mental health an integral part of India's comprehensive healthcare system.

## Conclusion

India stands at a pivotal moment in its journey towards achieving **Universal Health Coverage (UHC) by 2030**. While significant progress has been made, addressing the remaining challenges requires a comprehensive and forward-looking approach. The future of India's healthcare lies in ensuring the **4 A's: Affordability, Accessibility, Availability, and Accountability**. By prioritizing these pillars, India can build a healthcare system that is inclusive, equitable, and sustainable, ensuring that all citizens have access to quality healthcare services.



## Building Inclusive and Sustainable Employment in India

*The editorial is based on “**Debunking the Myth of Job Creation**,” published in The Hindu on 13/08/2025. It highlights the persistent challenges in job creation in India and emphasizes the need for more inclusive, skill-focused policies to ensure sustainable job creation and economic empowerment across the country.*

**Tag:** GS Paper-2, Government Policies & Interventions, GS Paper-3, Employment, Growth & Development, Skill Development, Human Resource

India has seen a **significant increase in employment in recent years**, driven by various government initiatives aimed at job creation. However, issues such as skill mismatches, wage disparities, and the dominance of the informal labor market continue to limit the creation of more sustainable and inclusive employment opportunities. To address these challenges, **India needs policies that focus on skills development and inclusivity, ensuring the generation of quality jobs across sectors.**

## What is the Current Status of Employment in India?

- 💡 **Labour Force Participation Rate:** As per **PLFS** data (July 2023-June 2024), the Labour Force Participation Rate (LFPR) for individuals aged 15 years and above has **increased from 49.8% in 2017-18 to 60.1% in 2023-24**.
  - ✦ During the same period, the **Worker Population Ratio (WPR)** rose from 46.8% to 58.2%.
  - ✦ **Female Labour Force Participation Rate (FLFPR)** has increased from 23.3% in 2017-18 to 41.7% in 2023-24.
  - ✦ Notably, **female unemployment has dropped** significantly from 5.6% to just 3.2%, reflecting a shift toward greater inclusion and economic empowerment.
- 💡 **Formalization of the Job Market:** Net additions to **EPFO** subscriptions have more than doubled, rising from 61 lakh in FY19 to 131 lakh in FY24, indicating the formalization of the job market.
  - ✦ The **proportion of self-employed workers in the workforce has risen** from 52.2% in 2017-18 to 58.4% in 2023-24 which reflects the growing entrepreneurial activity and preference for flexible work arrangements.
  - ✦ Moreover, **around 80% of India's labour force is employed in the informal sector**, and the remaining 20% in the formal sector (2021).
- 💡 **Sectoral Employment Trends:** According to the **Economic Survey 2024-25** agriculture sector's share in employment was 44.1% in 2017-18, which has increased to 46.1% in 2023-24.
  - ✦ In comparison, **the industry and services sectors saw declines in employment share**, with manufacturing falling from 12.1% to 11.4%, and services from 31.1% to 29.7% during the same period.
- 💡 **Unemployment Rate:** The Unemployment Rate, for individuals aged 15 years and above, has **steadily declined from 6% in 2017-18 to 3.2% in 2023-24**.
  - ✦ Despite the significant decline, challenges such as **skill mismatches, informal sector dominance, and underemployment** continue to persist in the labour market.

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## Employment Generation Schemes



### What are the Key Challenges Affecting Employment Generation in India?

- 💡 **Jobless Growth:** India's economic growth is increasingly decoupled from employment generation, leading to jobless growth.
  - ✦ Sectors like **IT and finance show rising GDP contributions while absorbing fewer workers**, reflecting capital-intensive rather than labor-intensive growth.
    - ✎ For example, according to a recent research, between 2011 and 2021, India's **GDP growth rate was around 5.3%** on average, while the **employment growth rate was a mere 0.39% per annum**, highlighting a significant gap between economic expansion and job creation.
  - ✦ While recent growth in formal jobs, as noted by the EPFO, indicates growth, it still falls short of the estimated 7.85 million **non-farm jobs needed annually by 2030** to productively engage the growing working population.
- 💡 **Slowdown in the Manufacturing Sector:** Manufacturing, historically a key job generator, has not experienced the level of expansion needed to absorb India's growing labor force.
  - ✦ The focus on services and technology-led growth has shifted attention away from manufacturing, which typically creates more jobs.

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✦ According to the ILO report, **post-2019, there has been a significant decline in non-agriculture employment**, with the manufacturing sector being the worst affected.

✎ Despite efforts like the Make in India campaign, the employment share of the manufacturing sector has **remained stagnant at 12-14%**, with a large portion of the blue-collar workforce still earning insufficient wages.

💡 **Skill Mismatch & Employability Crisis:** Despite the growing number of graduates, a significant portion of the labour force is underemployed in semi-skilled or elementary jobs.

✦ The **Economic Survey 2024-25** reveals that **only 8.25% of graduates are employed in roles matching their qualifications**.

✎ Moreover, 53% of graduates and 36% of postgraduates are employed in lower-skill jobs, which reflects the inefficiency of India's **education-to-employment pipeline** and the persistent mismatch between available jobs and workers' skills.

✦ **Less than 5% of India's workforce undergoes formal skills training**, compared to 80% to 96% in Japan and South Korea.

💡 **Gender Disparity in Workforce Participation:** Despite the significant improvement in FLFPR, the female labour force participation rate in India is still half of the LFPR of men and far **below the global average of female LFPR of 47.2%**.

✦ While recent policies and economic reforms have attempted to increase female participation, social norms, safety concerns, and the lack of support for working women (e.g., childcare facilities) continue to restrict their entry into the workforce, especially in formal sector jobs.

✎ This **discrepancy not only limits the potential workforce but also restricts economic growth** by not fully utilizing the talents and skills of half the population.

💡 **Gaps in Formalizing Informal Sector:** As per the IMF, the **informal sector continues to employ more than 80% of India's workforce**, but it remains largely excluded from policy benefits like social security, job stability, and formal contracts.

✦ The **informal sector contributes about 45% to India's total GDP**, highlighting its crucial role in the economy. While **formalization efforts are underway, they have been limited**, leaving informal workers vulnerable to low wages and job insecurity.

✎ Additionally, the growing gig workforce, which now includes approximately **12 million workers as of fiscal year 2024-25**, faces similar challenges.

✦ Also, while there have been efforts to extend social security to informal workers, such as the Atal Pension Yojana, which has **enrolled over 8 crore subscribers as of July 2025**, challenges persist in ensuring comprehensive coverage and effective implementation.

💡 **Digital Disruption and Job Displacement:** The rapid advancement of digital technologies, particularly AI and automation, **is significantly transforming India's job market**.

✦ While these technologies offer opportunities for innovation and efficiency, they also pose challenges, especially for workers in traditional and low-skilled roles.

✎ In August 2025, **TCS announced the layoff of over 12,000 employees**, approximately **2% of its workforce**. The company attributed this decision to skill mismatches and the increasing adoption of AI technologies.

✦ A report by the McKinsey Global Institute estimated that **automation could displace up to 60 million workers in India's manufacturing sector by 2030**, with significant impacts on jobs in textiles and electronics.

💡 **Geo- Economic Shifts and Rising Trade Tensions:** The ongoing US tariff imposition has impacted India's trade and industrial employment.

✦ The Asian Development Bank (ADB) has revised India's GDP growth forecast for FY26 downward to 6.5% from an earlier 6.7%, citing the negative effects of US tariffs on India's exports and industrial output.

✎ These trade disruptions can **potentially trickle down to industrial employment, particularly in sectors reliant on global trade, such as textiles, electronics, and manufacturing**.

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💡 **Climate Vulnerability and Livelihood Threats:** Climate change poses significant risks to livelihoods, especially for informal workers who are often the most vulnerable.

✦ Between 2001 and 2020, India lost approximately 259 billion labor hours annually due to climate impacts, with extreme heat alone accounting for a loss of 181 billion labor hours.

✍ This disproportionately affects informal workers, particularly those working outdoors in agriculture, construction, and other labor-intensive sectors, where they lack adequate protection against the climate's harsh effects.

### What Strategies Can be Adopted to Enhance Job Creation and Workforce Development in India?

💡 **Strengthen the Formalization of the Informal Sector:** Given that the informal sector employs a large portion of India's workforce, it is crucial to formalize this sector by ensuring access to social security, job stability, and formal contracts.

✦ Offering incentives to businesses that transition from informal to formal employment structures can create stable and secure jobs while integrating workers into the formal economy.

✍ The e-Shram portal, as a national database for unorganized workers, plays a key role in formalizing the sector by connecting workers to social security benefits, skill development programs, and formal employment opportunities.

✦ Increasing access to microfinance, collateral-free loans, and credit facilities for small businesses will enable the informal sector to grow while providing workers with more secure jobs.

✍ This will ensure that informal workers have access to basic benefits like health insurance, pension schemes, and minimum wages.

💡 **Service Sector Modernization:** To drive economic growth and create quality employment, modernization of India's service sector is essential.

✦ Focus should be placed on high-growth service sectors such as healthcare, tourism, and education, with a strong emphasis on equipping the workforce with job-ready skills tailored to industry demands.

✦ Establishing centers dedicated to fostering global standards and best practices in service delivery will ensure that workers are trained to meet international benchmarks.

✦ Additionally, India can introduce specialized training programs for emerging sectors like wellness tourism, addressing the increasing demand for skilled workers and creating new job opportunities in these fields.

💡 **Enable Women's Participation in the Workforce:** A holistic, systemic approach is needed to increase female workforce participation.

✦ Programs like MUDRA Yojana and Mahila Shakti Kendras that provide collateral-free loans and skills development should be expanded to ensure economic empowerment of women.

✦ Small and medium enterprises (SMEs) can play a crucial role by implementing practices such as offering gender-neutral pay, equal promotion opportunities, and safe working environments.

✍ Successful examples, like Even Cargo (a women-driven logistics company) and Farm Didi (a rural women-led food startup), should be replicated to empower women in both urban and rural areas.

💡 **Accelerate Implementation of Labor Codes for Flexibility and Inclusivity:** India must accelerate the implementation of its labor codes to ensure they are more inclusive and adaptable to the needs of today's evolving job market.

✦ Also, greater flexibility in gig employment, contractual labor, and informal work can provide legal protections such as social security, healthcare benefits, and pension schemes.

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- ✦ Simplifying the **labor code to promote ease of doing business, while protecting worker rights**, will encourage formalization of employment, making it more attractive for employers to create quality, well-paying jobs.

💡 **Strengthening Public-Private Partnership (PPP):** PPPs play a pivotal role in creating sustainable employment opportunities by leveraging both public sector support and private sector innovation.

- ✦ Through PPPs, the government can partner with private enterprises to implement skill development programs, **establish vocational training centers, and create job opportunities** in sectors such as infrastructure, manufacturing, and services.

📎 Initiatives like the **Skill India Mission** and **PMKVY** benefit from private sector expertise, ensuring that the training provided aligns with industry needs and enhances employability.

- ✦ PPPs can also foster entrepreneurship by **supporting small businesses and startups**, ultimately leading to job creation and economic growth.

💡 **Promoting Rural Entrepreneurship:** To foster economic growth in rural areas, it is essential to promote rural entrepreneurship by providing financial support, skill development, and market access.

- ✦ **Creating rural innovation hubs, supporting local agro-based industries**, and integrating digital technologies can enhance productivity and business sustainability.

📎 These efforts will help create jobs, reduce migration to urban areas, and tap into the untapped potential of rural India.

- ✦ **Common Service Centres (CSCs)** can further support rural entrepreneurship by providing digital infrastructure, training, and access to government services, helping create jobs, reduce urban migration, and **unlock rural India's potential**.

💡 **Enhance Digital Literacy and Technology Adoption:** With increasing job opportunities in the digital economy, investing in digital literacy programs, particularly for women and rural youth, is crucial.

- ✦ Providing **access to technology and online learning platforms** will help workers adapt to the digital economy.

📎 Under the **PMGDISHA**, approximately 7.35 crore candidates were registered, and 6.39 crore individuals received training in digital literacy.

- ✦ Encouraging **Micro, Small, and Medium Enterprises (MSMEs)** to adopt digital technologies will enhance productivity and create more jobs in the formal economy.

💡 **Nurturing a Green Workforce for a Future-Ready India:** To build a sustainable and future-ready workforce, it is crucial to invest in green energy jobs.

- ✦ For instance, **Andhra Pradesh has set an ambitious target of creating 3 lakh green energy jobs** over the next five years, and this model can be replicated by other states to drive **employment in renewable energy sectors, such as solar, wind, and energy efficiency**.

📎 By fostering a **green workforce**, India can contribute to sustainable development and create long-term employment opportunities aligned with global environmental goals.

## Conclusion

India's future employment generation hinges on the **3Es: Enablement through policy reforms and infrastructure development, Empowerment via skill development, entrepreneurship, and digital literacy, and Equity by ensuring opportunities for all**. By equipping the workforce with relevant skills and addressing sectoral imbalances, **India can build a dynamic, equitable workforce, driving long-term economic growth and sustainability**.



## Gender Equity As the Blueprint for A Stronger India

*The editorial is based on "**A Supreme Court ruling with no room for gender justice**" article published in The Hindu on 12/08/2025, focusing on the persistent challenges*

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*to gender equality in India. It highlights the gaps in legal protections, social norms, and institutional biases that continue to hinder women's full participation in society.*

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

India has made substantial strides in women's empowerment, reflected in improved educational attainment, workforce participation, and targeted skill-building initiatives. Yet, achieving comprehensive **gender equality** remains a pressing challenge. According to the **World Economic Forum's Global Gender Gap Report 2025**, India ranks **131<sup>st</sup> out of 148** countries, which underscores significant disparities, especially in areas like political representation, economic participation, and access to healthcare, highlighting the need for more comprehensive and **effective policies to address gender inequality**.

### How is India Progressing Towards Achieving Gender Equality?

💡 **Catalyzing Women's Education:** According to the latest **All India Survey on Higher Education (AISHE) report**, female enrolment in higher education rose to **2.07 crore** in 2021-22, making up nearly 50% of total enrolment.

✦ As of July 2025, **43% of India's STEM graduates are women**, the highest proportion among major economies globally.

📌 The **New Education Policy (NEP) 2020** has further paved the way for higher retention and opportunities in the fields of STEM.

💡 **Enhanced Workforce Participation:** According to the **Periodic Labour Force Survey (PLFS) 2023-24**, India's overall female labour force participation rate (FLFPR) has risen to **41.7%**, a meaningful jump after years of stagnation.

✦ However, the **increase is sharper for rural women (47.6%)** than in urban areas (25.4%).

📌 Women's participation in the **Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)** stood at **57.47%** in 2022-23.

💡 **Rise of Women in Leadership Roles:** Women's representation on boards of companies has increased from **6% in 2013 to 18.3% in 2023**.

✦ Industries such as **Education at 30%** and **Government Administration at 29%** have the highest representation of women in leadership roles, followed by Administrative and Support Services and Hospitals and Health Care, each with 23%.

📌 For instance, **Justice Nagarathna will become India's first female Chief Justice of India**, marking a historic achievement in the judiciary.

📌 **Colonel Sofiya Qureshi** co-led the briefing on **Operation Sindoor** with Wing Commander **Vyomika Singh**, highlighting significant milestones for women in the military.

✦ Moreover, India is home to over **7,000 active women-led startups**, accounting for 7.5% of all active startups in the country.

📌 **Falguni Nayar's Nykaa, Shradha Sharma's YourStory, and Upasana Taku's MobiKwik** are prominent examples of successful women-led startups in India.

💡 **Transforming Women's Financial and Digital Access:** 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.

📌 For instance, as per MoSPI (2024), **39.2% of bank accounts** and 39.7% of deposits are now held by women.

📌 Also, economic inclusion is now seen as a community effort. **Bank Sakhis model** processed transactions worth **USD 40 million (2020)**.

💡 **Enhanced Social Consciousness and Cultural Shift:** Over the years, there has been a noticeable change in how women are perceived and represented across various sectors.

✦ For instance, **PM Awas Yojana (PMAY)** allocates homes in women's names, empowering them economically.

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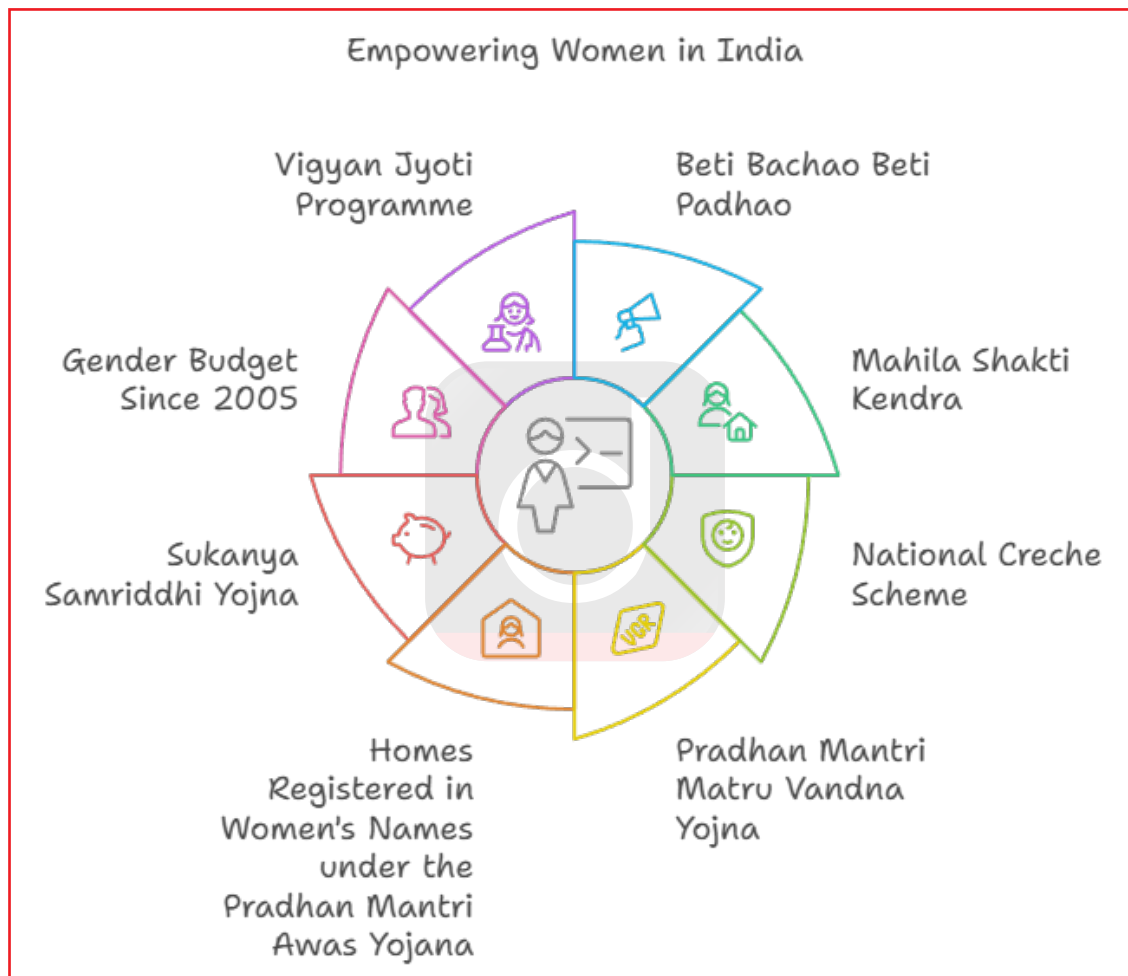
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- ✍ As of August 2024, **over 89 lakh houses** under PMAY-Urban (PMAY-U) are either **solely or jointly owned by women**.
- ✦ Moreover, Women are excelling in traditionally male-dominated sports, like **boxing (Mary Kom)** and **badminton (Saina Nehwal)**.
- ✍ Additionally, **women driving for Ola and Uber** reflect changing work norms.
- ✦ Films like **Neerja** and **web series like Panchayat** portray women as resilient and independent, reinforcing these cultural changes.



### What are the Key Challenges Hindering Women's Progress Towards Gender Equality in India?

- 💡 **Low Female Labour Participation:** As per the **PLFS 2023-24**, the FLFPR stands at **41.7%**, indicating that less than half of the working-age female population is either employed or actively seeking employment.
  - ✦ This rate is significantly **lower than the global average of approximately 47%**, highlighting a substantial gender disparity in workforce engagement.
  - ✍ **Many women leave their jobs after marriage or childbirth**, and returning to employment is challenging due to the **lack of supportive work environments**.
- 💡 **Gender Pay Gap and Informal Employment:** The gender pay gap and the rise of informal employment continue to hinder women's economic progress.

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- ✦ Despite participating in the workforce, **women are often engaged in low-wage, insecure jobs**, particularly in informal and rural sectors, where social security benefits are limited.

✎ **81% of women are employed in the informal sector.**

- ✦ This pay disparity impacts long-term job retention and reduces the motivation for women to enhance their skills.

✎ For example, **as per the NSSO, men earn 29.4% more than women in urban areas**, and 51.3% more in rural areas.

- 💡 **Gendered Violence and Security Barriers:** Concerns about safety in both public and private spaces significantly limit women's freedom of movement, access to employment, and educational opportunities.

- ✦ **Gender-based violence contributes to both psychological and economic disempowerment.** The situation is exacerbated by delays in justice, inadequate enforcement of laws, and widespread under-reporting of incidents.

✎ Despite the introduction of legal reforms aimed at protecting women, enforcement remains inconsistent, and **gender bias in judicial processes continues to hinder progress.**

✎ As per the **NCRB** data, a total of more than **4 lakh** cases of crimes against women were registered in **2022**, showing a **4.0% increase over 2021.**

- ✦ Also, a 2022 report stated that approximately **30% of the Nirbhaya Fund**, a corpus established to enhance women's safety and security in India, **remains unutilized.**

- 💡 **Unpaid Care Work and Domestic Burden:** Women disproportionately shoulder unpaid domestic work, which remains invisible in official economic metrics.

- ✦ 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.

- ✦ According to the Time Use Survey 2024, **women spend 201 minutes more per day** on unpaid household work compared to men.

✎ This discrepancy is attributed to the additional burden of unpaid domestic responsibilities.

- 💡 **Women's Underrepresentation in Politics and Leadership:** Although women have made progress at the grassroots level, they continue to be underrepresented in higher decision-making roles.

- ✦ The lack of women in Parliament and on corporate boards hampers the creation of gender-sensitive policies. **While reservations in panchayats have been implemented, this has not led to proportional political power** at the national or state levels.

✎ According to the **Election Commission of India (ECI)**, **women constitute 13.6% members** of the Lok Sabha in 2024 as against 14.3% of all members in the 17<sup>th</sup> Lok Sabha elected in 2019.

✎ Although the **Women's Reservation Bill has been passed**, progress remains **sluggish**, with its implementation anticipated only after 2029.

- ✦ In key leadership roles, **women often face the glass ceiling along with the glass cliff**, where they are more likely to be appointed to leadership positions during times of crisis, making it more difficult to succeed.

- 💡 **Digital Gender Gap:** Although **digital literacy** is improving, women, especially in rural India, still face limited access to digital tools.

- ✦ Gender disparities in access to mobile phones, internet and digital finance restrict women's ability to fully utilize digital platforms for education, employment, or entrepreneurial opportunities.

✎ **India has one of the highest digital gender gaps with 57% of women being aware of mobile internet, but only 37% adopting it**, and just 26% using it regularly, according to the **UNDP** (2024).

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💡 **Lack of Supportive Infrastructure and Policies:** The absence of gender-sensitive infrastructure, such as adequate sanitation, childcare facilities, and safe transportation, **discourages women from entering or remaining in the workforce.**

✦ Additionally, insufficient maternity benefits, paid leave, and flexible work hours make it **challenging for women to balance their professional and personal responsibilities**, leading many to leave the workforce due to caregiving obligations.

💡 Despite progressive laws, **approximately 93.5% of women workers in India cannot access maternity benefits** due to their employment in the informal sector and exemptions for small firms from providing these benefits.

✦ Additionally, **73% of Indian women leave their jobs** after giving birth (The Better India) while balancing full-time employment.

### What Steps Can India Adopt to Foster Gender Equality?

💡 **Enhancing Political Representation:** Reservation of seats in legislature should be blended with targeted programs should focus on capacity-building at the Panchayat, municipal, and state levels, equipping women with **essential skills in public administration, governance, and leadership.**

✦ By **nurturing a generation of women leaders with hands-on experience**, India can gradually increase female participation in higher political offices, ensuring their stronger influence in **policymaking at both the national and state levels.**

💡 Link panchayat incentives to women in leadership roles and **establish gender budgeting programs.**

✦ The **Bibipur Model, initiated by Sunil Jaglan, is a pioneering community-led initiative in Haryana**, where houses and streets were named after daughters, **promoting their rights and recognition within the community.**

💡 **Empowering Women Through Skill Development:** Skill development programs for women are crucial for improving their **employability and empowering them economically.**

✦ These programs help women acquire relevant skills, improve job opportunities, and reduce dependency.

✦ By focusing on areas such as digital literacy, entrepreneurship, and vocational training, these initiatives ensure women are equipped to thrive in various industries.

💡 Schemes like **Pradhan Mantri Kaushal Vikas Yojana (PMKVY)** and Skill India focus on training women in diverse sectors, including manufacturing, technology, and services.

💡 **Partnerships with private industries can offer industry-specific training** and internship opportunities, ensuring that women gain hands-on experience and are prepared for real-world challenges.

💡 **Strengthening Gender-Sensitive Practices and Laws:** Gender-sensitive practices and laws are fundamental to creating an equitable environment for women in all aspects of life, including education, employment, and healthcare.

✦ Strengthening laws like the **Protection of Women from Sexual Harassment Act, 2013**, and the **Domestic Violence Act, 2005**, is crucial to protect women's rights and ensure gender equality.

💡 Implementation and enforcement of these laws need to be consistent and rigorous.

✦ **Workplaces and educational institutions should focus on gender-sensitive policies** such as **equal pay for equal work and support systems for women balancing work and family life**, such as flexible working hours and childcare facilities.

💡 Mandate the inclusion of paternity leave and gender audit disclosures within **Corporate Social Responsibility (CSR)** and **Environmental, Social, and Governance (ESG)** frameworks.

💡 Encourage **private companies to implement returnship programs** and re-skilling for women returning from career breaks.

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### Encouraging Women Entrepreneurs and Startups:

To foster women entrepreneurship, it is crucial to provide women with the necessary resources, mentorship, and access to capital.

✦ Government initiatives like **Startup India** and **MUDRA loans** have already made significant strides in supporting women-led businesses.

✦ Additionally, **creating women-focused business incubators and mentorship networks** can provide guidance, networking opportunities, and **financial backing for women to scale their startups**.

✍ By removing barriers to entry and providing ongoing support, we can empower women to lead successful businesses and contribute to economic growth.

### Revise the Educational Curriculum to Address Gender Norms:

To transform societal perceptions and break gender stereotypes, India should incorporate gender sensitivity into both school and higher education curricula.

✦ This **approach would not only highlight the accomplishments of women but also educate both boys and girls** on principles such as gender equality, mutual respect, and shared responsibilities.

✦ Emphasizing the need to challenge traditional gender roles encouraging girls to **pursue STEM fields and boys to explore caregiving professions** will help dismantle long-standing societal barriers.

✍ Such an **educational shift will foster a generation more receptive** to gender equality in every aspect of life.

### Digital Empowerment for Women:

Digital empowerment plays a crucial role in enabling women to access education, financial resources, and opportunities in the digital economy.

✦ Initiatives like **Tamil Nadu's 'Agal Vilakku' scheme** focus on educating girl students about **safe digital practices and addressing challenges such as cyberbullying**.

✍ Other states can also implement similar programs that empower women with the skills **to navigate the digital world safely while tackling issues like online harassment** and promoting digital literacy.

## Conclusion

Achieving gender equality in India requires **ongoing efforts to address the persistent barriers that women face in various aspects of life**. Strengthening laws, improving access to education and employment, supporting women in leadership, and creating inclusive policies are crucial steps toward empowering women. After all, if **"Development is not engendered, it is endangered"**. By aligning targeted initiatives with **Sustainable Development Goal 5 (Gender Equality)**, India can ensure a future where **women have equal opportunities, contributing to India's Women-led development**.



## Carbon Credits in India: Hopes and Challenges

*This editorial is based on "**Are carbon credits for people, planet or consultants?**" which was published in The Hindu Business Line on 14/08/2025. The article examines the complexities of carbon credit markets, focusing on their role in offsetting emissions and the challenges of ensuring genuine environmental benefits.*

**Tag:** GS Paper-3, Conservation, Sustainable Development, Achievements of Indians in Science & Technology, GS Paper-2, Government Policies & Interventions,

**Carbon credits (CCs)** represent a complex intersection of **environmental responsibility and economic strategy**. While they offer a **pathway to offset emissions** and promote sustainability, their implementation is fraught with challenges. From inflated claims to uneven benefits for communities, the journey of CCs reveals a balance between **hope, hypocrisy, and opportunity** in the fight against **climate change**. As India navigates its path toward net-zero, the future of carbon credits must evolve into a tool for both **environmental justice** and market integrity.

### What are Carbon Credits and the Carbon Market?

#### Carbon Credits

✦ **About:** Carbon credits, or carbon offsets, refer to carbon emissions reductions or removals, measured in tonnes of **carbon dioxide equivalent (tCO<sub>2</sub>e)**.

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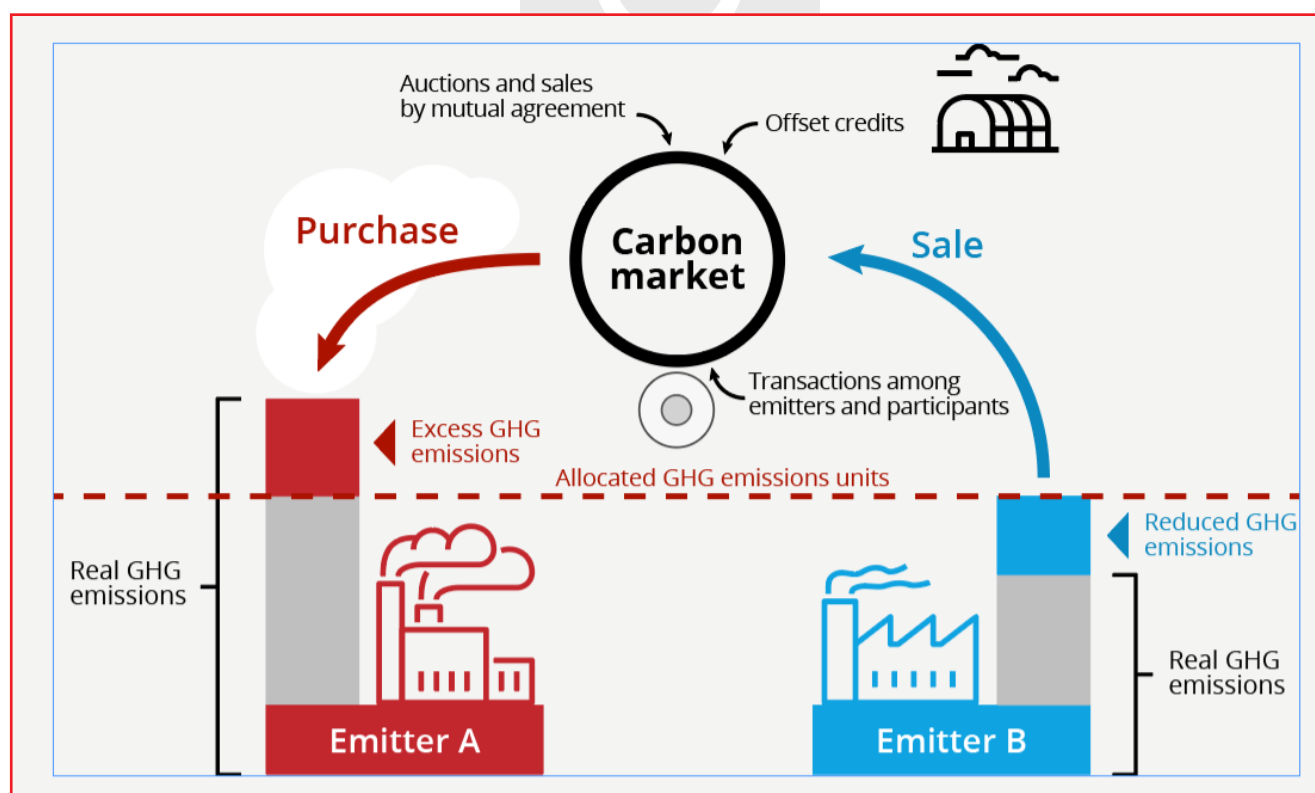
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- ✦ The concept of carbon credit, introduced in the Kyoto Protocol, 1997 and reinforced by the **Paris Agreement, 2015**, aims to reduce **greenhouse gas (GHG)** emissions through carbon trading.
  - ✎ Each carbon credit permits the emission of one tonne of CO<sub>2</sub> or its equivalent.
- ✦ These credits are generated by projects that **absorb or reduce carbon emissions** and are certified by international bodies like the **Verified Carbon Standard (VCS)** and the Gold Standard.

### Carbon Markets

- 💡 **Carbon Markets:** Under the **Paris Agreement, Article 6** allows countries to collaborate by transferring carbon credits from emission-reducing projects to help meet climate goals, aiming to create reliable systems for trading carbon credits and ensuring transparency in emissions reductions.
- 💡 **Types of Carbon Markets:** The mandatory carbon markets, valued at **\$800 billion**, are expected to **reach \$1.88 trillion by 2030**, while the voluntary carbon markets, currently at \$3 billion, are projected to grow to \$24 billion by the same year.
  - ✦ **Mandatory Carbon Markets: Kyoto Protocol (1997)** laid the foundation for mandatory carbon markets, where companies are **legally required to limit their greenhouse gas (GHG) emissions**.
    - ✎ Companies are allowed to operate under a '**cap-and-trade**' system, where a cap is set on emissions, and entities can purchase carbon credits (CCs) to offset their emissions within the cap.
  - ✦ **Voluntary Carbon Markets:** Evolved later, driven by socially conscious action, offering opportunities for companies or individuals to voluntarily offset their emissions.
    - ✎ This is often done as part of **corporate social responsibility (CSR)** initiatives or to gain a market advantage by showcasing environmental responsibility.



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## What are India's Initiatives Related to Carbon Credits?

- 💡 **Perform, Achieve and Trade (PAT) scheme:** It is a regulatory scheme to reduce energy consumption in **energy-intensive industries**, using a market-based mechanism to enhance cost effectiveness.
- 💡 **Renewable Energy Certificates (REC):** This mechanism is a **market based instrument** to promote renewable energy and facilitate compliance of renewable purchase obligations (RPO).
- 💡 **Green Credit Programme:** It is an innovative market-based mechanism designed to **incentivize voluntary environmental actions** across diverse sectors, by various stakeholders like individuals, communities, private sector industries, and companies.
- 💡 **Energy Conservation (Amendment) Act, 2022:** It empowers the Central Government to implement a **Carbon Trading Scheme** and issue carbon credit certificates. One CC represents **one tonne of CO<sub>2</sub> equivalent** reduced, avoided, or removed from the atmosphere.
- 💡 **Carbon Credit Trading Scheme (CCTS):** The CCTS is a market-based mechanism introduced to regulate and trade carbon credits under the Indian Carbon Market (ICM).
  - ✦ The CCTS aims to decarbonize the Indian economy by pricing **greenhouse gas (GHG) emissions** and facilitating carbon trading.
  - ✦ CCTS replaces PAT, shifting the focus from energy intensity to reducing GHG emission intensity, monitoring emissions per tonne of GHG equivalent.
    - 📎 It issues **Carbon Credit Certificates (CCC)**, each representing a one-tonne CO<sub>2</sub> equivalent (tCO<sub>2</sub>e) reduction.
  - ✦ Managed by multiple government bodies, including the **Bureau of Energy Efficiency (BEE)** and the National Steering Committee for Indian Carbon Market (NSCICM).
- 💡 **Nationally Determined Contributions (NDCs):** India updated its **NDCs** in 2023 to include the establishment of a **domestic carbon market**.

- 💡 **Monitoring and Verification:** The **Bureau of Energy Efficiency (BEE)** and the National Steering Committee for Indian Carbon Market (NSCICM) are responsible for ensuring the **integrity of the carbon credits** through rigorous monitoring, reporting, and verification processes.

## What are Opportunities and Challenges Associated with Development of Carbon Market in India?

### Opportunities

- ✦ **Global Climate Commitment:** India's development of a carbon market aligns with its **Paris Agreement goals**, aiming for a **45% reduction in GHG emissions** by 2030 (from 2005 level) and achieving net-zero emissions by 2070.
- ✦ **EU CBAM Influence:** The European Union's **Carbon Border Adjustment Mechanism (CBAM)** has pushed India to develop a national carbon market, ensuring its **exports remain competitive** by meeting international carbon standards, especially in high-emission sectors like steel and cement.
- ✦ **Advancing Cleaner Technologies:** The carbon market **incentivizes cleaner technologies** by setting **sector-specific emission** intensity targets, encouraging industries to adopt **low-carbon solutions**, and positioning India to lead in sustainable practices and attract **green investments**.
- ✦ **Economic Growth through Carbon Credits:** India's carbon market creates new financial opportunities, allowing industries to earn and sell carbon credits, with an **estimated value of \$1.2 billion**, supporting **decarbonization** efforts and promoting investments in **renewable energy**.

### Challenges:

- ✦ **Limited Scope and Exclusion of Major Emitters:** Key sectors like **steel** and thermal power, which contribute significantly to emissions, are excluded from the CCTS, undermining its effectiveness in tackling overall CO<sub>2</sub> emissions.

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- ✦ **Weak Emission Reduction Targets:** The emission reduction targets for some sectors, such as cement (3.4% reduction over two years), are seen as **insufficient to meet long-term climate goals**, potentially delaying necessary decarbonisation efforts.
- ✦ **Challenges for MSMEs:** **MSMEs** face high compliance costs, **inadequate financial support**, and a lack of technical capacity, making participation in the carbon market difficult and exclusionary.
- ✦ **Complexity of MRV Systems and Market Volatility:** India's carbon market struggles with outdated **measuring, reporting, and verification (MRV) systems**, impairing accurate emission tracking and eroding investor confidence.
  - ✎ Coupled with **inconsistent price signals** and market volatility, driven by fluctuating emission targets and financial speculations, these challenges hinder long-term investments in emission reduction technologies.
- ✦ **Weak Oversight:** India's voluntary carbon market, **valued at \$500 million**, suffers from minimal oversight, with nearly 90% of its value being lost in the supply chain.

### What are the Concerns Regarding Carbon Credits?

- 💡 **CC Trade and Complexity:** Carbon credit (CC) trade simplifies Earth's ecosystems into numbers. In India, **forestry projects use satellite data** to predict **deforestation**, and agriculture projects estimate soil carbon. But these predictions have big errors. A 2024 *Nature* article showed that many carbon projects overestimate results.
- 💡 **Additionality in Carbon Markets:** Additionality means carbon offset projects should reduce emissions that wouldn't happen otherwise (like wind farms replacing coal).
  - ✦ However, a 2024 report found that millions of carbon credits are questionable, meaning many projects don't actually cut emissions, leading to **greenwashing**.

- 💡 **Community Benefits from Projects:** India is a major supplier of carbon offset projects, like afforestation. But many projects don't benefit local communities. A World Rural Forum (2023) study showed only **0.3% of climate funds reach them**.

- ✦ Furthermore, a 2025 *Nature* report found that half of India's forestry projects failed due to issues with community rights.

- 💡 **Permanence and Climate Risks:** Carbon credits aren't permanent if forests are burned or farming practices stop. For example, **Cyclone Tauktae** in 2021 destroyed Gujarat's forests, releasing carbon and wiping out the credits. Buffer systems hold 20%, but they often fail during major climate disasters.

- 💡 **Inequitable Access:** Developing countries may encounter obstacles in accessing the necessary resources or technology to engage in carbon credit generation, restricting their ability to benefit from the market and **reinforcing global climate inequalities**.

### What Steps are Required to Address Carbon Credit Concerns?

- 💡 **Reframe Carbon Credits as an Environmental Responsibility:** Carbon credits should be viewed as a **duty to the planet rather than a tradable commodity**. When industries like coal plants purchase these credits, it can delay their **transition to renewable energy**, reducing the long-term effectiveness of such projects.
- 💡 **Enhance Transparency and Accountability:** Strengthening monitoring, reporting, and verification (MRV) systems is crucial to ensure the credibility of carbon credit projects. **Real-time tracking and third-party verification** can help expose inflated baselines and improve market transparency.
- 💡 **Support Fair Negotiation Platforms for Communities:** Start-ups like C-GEM are creating platforms that help **communities negotiate better terms** in carbon credit markets, ensuring fairer agreements and that the benefits reach those directly involved.
- 💡 **Prioritize High-Impact Projects:** Focus on carbon credit projects that demonstrate clear and

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significant emissions reductions, such as **HFC-23 abatement**. Avoid projects with poor success rates or low-impact potential, which could undermine the integrity of the carbon credit system.

- 💡 **Align with Global Standards and Strengthen Regulation:** Align carbon credit systems with international standards such as those outlined in the Paris Agreement. The upcoming CCTS provides an opportunity to **introduce stricter regulations**, ensuring accountability and more robust market practices.

## Conclusion

While carbon credits offer an innovative way to address climate change, they are **fraught with complexities and contradictions**. The system often falls short in ensuring real, lasting environmental benefits, with issues such as overestimates, greenwashing, and a lack of community involvement. For carbon credits to be truly effective, they must **evolve from mere offsets to instruments** that drive meaningful change, promoting both environmental sustainability and social justice.



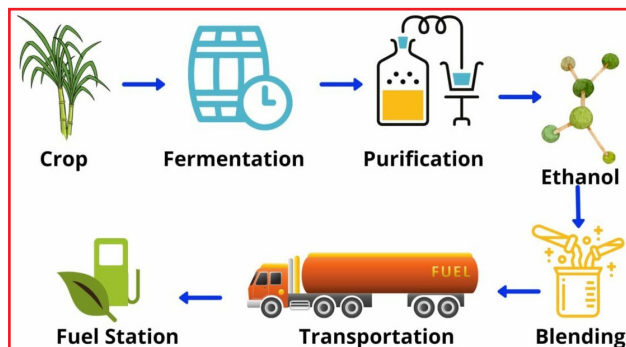
## Ethanol for Energy Environment and Empowerment

*This editorial is based on “**Assuaging concerns: On India and ethanol-blended fuel**” which was published in The Hindu on 12/08/2025. The article brings into focus India’s 20% ethanol blending program, which can save \$10 billion in imports and boost energy security, but requires clear pricing, automaker transparency, and strong policies.*

**Tag:** GS Paper - 3, Environmental Pollution & Degradation, Renewable Energy

**India’s ethanol blending program**, targeting **20% blend levels**, promises annual import substitution worth **\$10 billion while enhancing energy security**. Global experience and India’s **BS-2 vehicle standards** indicate compatibility with **E15–E20 ethanol blends**. However, critical implementation challenges remain, including

**unclear pricing incentives and insufficient transparency from automakers regarding vehicle compatibility**. Achieving India’s ethanol vision requires comprehensive policy reforms that **prioritize transparency, consumer protection, gradual support for fleet transition**, and robust safeguards to balance energy security with food security and environmental sustainability.



## What are the Strategic Implications of Ethanol Blending for India’s Growth and Energy Sustainability?

- 💡 **Enhancing Energy Security and Reducing Import Bills:** Ethanol blending directly contributes to **reducing India’s dependence on crude oil imports**, thereby improving energy security.
  - ✦ As a major importer of crude oil, India is highly vulnerable to global price volatility and geopolitical risks.
  - ✦ Over the past 11 years, from **Ethanol Supply Year (ESY) 2014-15 to July 2025**, the ethanol blending programme has saved more than **₹1.44 lakh crore in foreign exchange**, replacing **245 lakh metric tonnes of crude oil**.
- 💡 **Boosting the Agricultural Sector and Farmer Incomes:** The ethanol blending program provides a reliable and profitable market for agricultural produce, particularly **sugarcane and maize**.
  - ✦ The government’s policy of assured procurement and fixed prices for ethanol has incentivized farmers to increase their production.
  - 📎 With the **20% blend**, public sector **Oil Marketing Companies** are expected to **pay farmers close to ₹40,000 crore in 2025 alone**, directly contributing to rural economic upliftment and potentially reducing farm distress.

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- ✦ The program thus turns farmers into “Urjadaatas” (energy providers) in addition to being “Annadaatas” (food providers).

💡 **Mitigating Environmental Pollution and GHG Emissions:** The use of ethanol-blended fuel leads to a reduction in harmful vehicular emissions, contributing to cleaner air in urban areas.

- ✦ Ethanol burns more cleanly than conventional petrol, leading to a decrease in the emission of pollutants like **carbon monoxide (CO)**.
- ✦ A **NITI Aayog** study on the life cycle emissions of ethanol found that the use of sugarcane and maize-based ethanol can reduce **greenhouse gas (GHG)** emissions by **65% and 50%**, respectively, compared to petrol.
- ✦ Ethanol blending programme has **reduced CO<sub>2</sub> emissions by approximately 736 lakh metric tonnes**, equivalent to planting 30 crore trees.

💡 **Fostering a Circular Economy and Waste-to-Wealth Model:** The ethanol program is a key driver of India’s move towards a **circular economy** by promoting a **waste-to-wealth model**.

- ✦ By utilizing surplus food grains, damaged crops, and agricultural residues like rice and wheat straw, the program creates value from what would otherwise be considered waste.
- ✦ This not **only provides an additional revenue stream for farmers but also addresses the significant environmental problem** of stubble burning, which is a major contributor to air pollution.
- ✍ The **use of agricultural waste as feedstock for second-generation (2G) ethanol plants, like the one in Panipat**, exemplifies this by converting biomass into a clean fuel and mitigating a source of harmful emissions.

💡 **India at the Forefront of the Biofuel Revolution:** India has surpassed its **E20 blending target 5 years** ahead of schedule under the **National Policy on Biofuels**, cementing its stature on the global stage.

- ✦ By demonstrating a viable path for large-scale biofuel adoption, India has positioned itself as a leader in the global energy transition.

- ✦ This was cemented with the launch of the **Global Biofuels Alliance (GBA)** during **India’s G20 presidency in 2023**.

### What are the Key Issues Associated with India’s Ethanol Blending Ambitions?

💡 **Food vs. Fuel Dilemma:** A significant strategic challenge of ethanol blending is the **potential conflict between food security and energy security**.

- ✦ In 2023, the **government temporarily banned the use of sugarcane juice for ethanol** due to concerns over sugar production (though reversed), highlighting this delicate balance.
- ✦ The diversion of food crops like **surplus rice and maize for ethanol production** raises concerns about the stability of food prices and their availability, **especially during periods of erratic monsoons or poor harvests**.

✍ For instance, **in 2024, India, traditionally a net corn exporter, had to import a record 1 million tonnes** of corn due to domestic shortages caused by ethanol production.

💡 **Managing Water Scarcity and Environmental Stress:** Ethanol production, particularly from **first-generation feedstocks like sugarcane**, is a **water-intensive process, posing a serious environmental risk**.

- ✦ Sugarcane requires a large amount of water, which strains groundwater reserves in already water-stressed regions of India.
- ✦ For example, producing one litre of ethanol from sugarcane can consume over **2,860 litres of water**.
- ✦ This **over-reliance on a water-guzzling crop for ethanol production** threatens long-term water sustainability, raising questions about the environmental viability of the program in a country grappling with water scarcity.

💡 **Limited Production of Advanced Biofuels:** Despite a policy focus on **second-generation (2G) ethanol**, the program remains heavily dependent on first-generation (1G) feedstocks.

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✦ The high capital cost and technological complexity of setting up 2G ethanol plants, which **use agricultural waste and biomass, have slowed their adoption.**

✦ As of now, **only a handful of large-scale 2G plants** are operational, and their contribution to the overall blending target is minimal.

💡 **Environmental Concerns:** Rapid ethanol production causes **notable pollution risks, particularly through the discharge of vinasse**—a toxic, nutrient-rich distillery waste—often released untreated into rivers and groundwater.

✦ **Ethanol factories are classified as “red category”** (core pollution index  $\geq 60$ ) industries due to their high risk of hazardous emissions.

✦ Ethanol production releases pollutants like **acetaldehyde and formaldehyde**, and lead to **waste spillage**, for instance, near the Krishna River.

💡 **Geopolitical and Trade Policy Pressures:** India's domestic ethanol program has attracted international scrutiny and trade pressures from major biofuel producers like the **United States.**

✦ They have raised concerns at the WTO, arguing that **India's policies, which restrict ethanol imports and provide subsidies to domestic producers, are a form of protectionism.**

✦ This external pressure could lead to **trade disputes and force India to adjust its policy**, potentially undermining the program's economic foundation.

✍ While **India has a strong case for its policy on grounds of energy security and farmer welfare**, these pressures highlight the need for India to ensure that its biofuel strategy remains in compliance with global trade rules.

💡 **Vehicular Compatibility and Consumer Concerns:** The rapid transition to higher ethanol blends like E20 is raising concerns about the compatibility and long-term health of the existing vehicle fleet.

✦ From April 2023, all new vehicles were required to be E20-compliant, with stricter enforcement from April 2025.

✍ But **9 out of 10 cars currently on Indian roads are only E10-ready**, meaning they're built to handle a maximum of 10% ethanol in petrol.

✦ The use of E20 in these vehicles can lead to issues such as reduced fuel efficiency, corrosion of rubber and plastic parts, and engine damage over time.

### What Measures can be Adopted to Ensure Sustainable and Efficient Ethanol Production and Blending in India?

💡 **Diversification of Feedstock Sources:** Accelerate a strategic shift from sugarcane and rice towards **waste-based, second-generation (2G) ethanol using agricultural residues**, municipal waste, and non-food biomass.

✦ Incentivize private sector R&D and technology transfer for advanced processing methods that can handle varied feedstock.

✦ **Promote circular economy practices and decentralized production models.** Integration with existing waste management infrastructure should be prioritized for scalability. This will mitigate food-fuel conflict and enhance climate resilience.

✦ Additionally, it must incentivize the **use of carbon capture and utilization (CCU)** technologies at ethanol plants to capture the carbon dioxide byproduct and convert it into high-value products, creating a more sustainable and economically viable operation.

💡 **Water-Smart Ethanol Production:** Implement **resource-sensitive water budgeting** and **enforce mandatory water footprint audits** for every distillery.

✦ Shift procurement norms towards **drought-tolerant crops and dryland farming** systems for ethanol sourcing.

✦ **Subsidize drip irrigation, rainwater harvesting, and adoption of low-water-use fermentation technologies** in high-stress regions.

✍ Develop model zones for climate-adaptive crop planning linked to ethanol output. Such policies will decouple production from excessive groundwater and river extraction.

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💡 **Regulatory and Quality Control Reinforcement:** Establish an independent **Ethanol Quality Regulatory Authority** to enforce standardized blending, vehicle compliance, and pollution benchmarks nationwide.

- ✦ Mandate real-time monitoring of pollution outputs and public disclosure of environmental audits.
- ✦ **Integrate blending targets with rigorous lifecycle emission** accounting and periodic third-party verification. **Regulatory harmonization with global best practices (like Brazil)** will build public trust and reduce engine risks.

💡 **Value-Chain and Infrastructure Upgradation:** Invest in dedicated ethanol transportation, storage, and blending infrastructure especially in non-cane and grain-producing regions.

- ✦ **Digitize supply-chain tracking** using blockchain and IoT to ensure end-to-end transparency and minimal pilferage.
- ✦ **Encourage “ethanol corridor” development for seamless interstate movement** and distribution, aligned with logistics policies.
  - 📌 Create viability gap funding for infrastructure in **resource-constrained states** to balance regional disparities.

💡 **Farmer Capacity Building and Crop Diversification:** Launch sustained outreach for farmer training on multi-crop rotation, resource-efficient cultivation, and direct ethanol supply contracts.

- ✦ **Provide crop insurance and minimum price guarantees** for ethanol-diversified crops to reduce monoculture risks.
- ✦ Invest in **skill development linked to new-age bioeconomy processes**. Facilitate formation of **farmer-producer organizations** and cooperatives specializing in non-traditional feedstock, enabling equitable participation.

💡 **Integrated Wastewater and Byproduct Utilization:** Mandate each ethanol facility to operate **zero-liquid discharge** and **valorize byproducts** such as **vinasse**—using **biogas, compost, or electricity generation**.

- ✦ Create market linkages for secondary products through green credit and labeling systems.

- ✦ Sponsor technology pilots for nutrient recovery and emissions reduction from process waste. Integrate these solutions as eligibility criteria for fiscal and tax incentives.

💡 **Financial De-Risking Frameworks:** High capital costs deter investment in ethanol infrastructure. Instruments like **green bonds, viability-gap funding, and sovereign guarantees** can de-risk projects.

- ✦ Long-term ethanol procurement contracts with **OMCs** ensure assured markets and financial stability.
- ✦ **Tax incentives and interest subventions can encourage SMEs to enter ethanol value chains.** A strong financing ecosystem ensures scale-up without burdening fiscal resources disproportionately.

### Conclusion:

India's ethanol blending program should be guided by the **Three Es—Energy security, Environmental sustainability, and Economic empowerment**. Its effectiveness depends on adopting advanced technologies, optimizing resource use, and promoting inclusive growth, in line with global climate objectives. This shift directly advances **SDGs 7 (Affordable and Clean Energy), 12 (Responsible Consumption and Production), and 13 (Climate Action)**, fostering a resilient and sustainable energy future for the nation.



## A New Paradigm in India-Africa Engagement

*This editorial is based on “[In Namibia, India shows a new way to engage Africa](#)” which was published in The Hindu on 18/08/2025. The article brings into focus India's engagement with Africa, highlighting a shift from paternalism to partnership through shared heritage, targeted investments, and knowledge transfer initiatives.*

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

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India's recent diplomatic engagement with **Africa**, exemplified by the **Indian Prime Minister's culturally nuanced address to Namibia's National Assembly**, signals a strategic shift toward **partnership over paternalism**. Unlike Western approaches often tied to conditional aid and migration control, **India is following a three-pronged approach in its engagement with Africa**: leveraging shared anti-colonial heritage, deepening present-day cooperation through targeted investments in education and technology, and building future-oriented ties through knowledge transfer initiatives. This approach emphasizes trust-building through inclusive dialogue and letting African priorities shape the agenda, positioning **India as a credible Global South partner**.

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## What Factors Underscore the Transformation in India-Africa Relations?

💡 **Heritage, Harmony, and Strategic Partnership:** India's early support for African liberation movements has paved the way for modern-day collaboration based on mutual respect and equality.

✦ The philosophy of “**Vasudhaiva Kutumbakam**” (the world is one family) reflects India's approach to fostering closer ties with Africa.

📌 This spirit of unity transcends mere diplomacy, becoming an emotional bond.

✦ The **African Union's inclusion as a permanent member of the G20 in 2023** underscores India's commitment to Africa's enhanced global standing.

📌 India also opened 16 new diplomatic missions in Africa, reflecting stronger ties.

💡 **Educational and Capacity-Building Cooperation:** Education remains a central pillar of India's engagement with Africa, with a focus on skills development and capacity building.

✦ India's commitment to training African youth is evidenced by the **Indian Technical and Economic Cooperation (ITEC) program**, which has trained nearly 40,000 Africans in the past decade.

✦ India has also established educational institutions across Africa, such as the **Indian Institute of Technology (IIT) in Zanzibar**.

✦ **Over 23,000 African students are currently studying in India.** This knowledge transfer is fundamental in empowering Africa's next generation of leaders and professionals.

💡 **Digital and Technological Transformation:** India's digital revolution is a powerful tool for enhancing Africa's technological infrastructure, with a growing focus on digital literacy and e-governance.

✦ The **introduction of India's UPI system in Namibia** and telemedicine projects across Africa showcases the potential for India to assist in Africa's digital transformation.

✦ In 2021, Togo's National Agency for Identification partnered with International Institute of Information Technology Bangalore

through an MoU to deploy the **Modular Open-Source Identification Platform** as the backbone of its national digital ID system.

💡 **Trade and Economic Integration:** Trade has long been a cornerstone of India-Africa relations, with the value of bilateral exchanges reaching nearly **USD103 billion over the past decade**, reflecting substantial growth.

✦ Currently, **India is Africa's third largest trading partner.** India's top export products in Africa are machinery and transport equipment, pharmaceuticals, textiles, automobiles, mineral fuels, oils, and wooden products.

✦ Moreover, many **African Least Developed Countries (LDCs)** benefit from **India's Duty-Free Tariff Preference (DFTP) scheme**.

💡 **Strategic and Security Cooperation:** India's growing defense cooperation with Africa reflects the **evolving geopolitical dynamics** and the need to ensure regional security.

✦ Additionally, **India has actively supported maritime security in the Indian Ocean region, where Africa is a key player.** India's strategic interests are also shaped by the increasing importance of the Indian Ocean, a region vital for global trade and energy security.

✦ **India has deployed nearly 5,000 personnel in UN peacekeeping missions** in Africa.

📌 Additionally, **India's contribution to maritime security includes the Djibouti Code of Conduct and the Jeddah Amendment**, aiming to combat piracy in the Gulf of Aden and Western Indian Ocean.

💡 **Health and Humanitarian Assistance:** India has been a steadfast partner in Africa's healthcare journey, providing critical medical aid and expertise.

✦ The **'Vaccine Maitri' initiative** is a prime example of India's commitment, supplying **Covid-19 vaccines** to multiple African countries during the pandemic.

✦ Additionally, India's commitment includes donating ambulances and medical equipment, such as **'Bhabhatron' cancer treatment machines**, to countries in need.

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## What are the Key Areas of Friction Between India and Africa?

💡 **Economic Competition with China & Debt Dynamics:** The rising economic presence of China creates significant friction, as Beijing's "checkbook diplomacy" often overshadows India's more measured approach.

- ✦ While India focuses on capacity building and skill development, China's massive infrastructure projects and state-backed loans, though often opaque, are more immediately attractive to cash-strapped African nations.
- ✦ For example, between 1995 and 2020, China invested nearly USD 87 billion in West Africa, funding energy and mining projects while diversifying its industrial supply chains to support Chinese manufacturing.
  - 📎 This has led to concerns of debt traps, with countries like Angola and Ethiopia accumulating billions in debt to China, which limits their economic sovereignty and creates a stark contrast to India's more transparent, concessional lines of credit.
- ✦ This disparity, coupled with China's growing military and port presence, such as in Djibouti, raises concerns about the militarization of the Indian Ocean and places India in a reactive, rather than proactive, geopolitical position.

💡 **Infrastructure, Trade & Investment Challenges:** Poor infrastructure in many African countries raises transaction costs and limits integrated regional value chains critical for Indian firms' market access.

- ✦ This infrastructural lag restricts the scale and viability of Indian manufacturing investments in Africa.
- ✦ Also, Indian companies have faced setbacks in Africa due to corruption and transparency concerns.
  - 📎 Major infrastructure deals, including a 2024 airport leases in Kenya that was annulled following bribery allegations, affecting India's image as a reliable partner

💡 **Governance and Political Instability Concerns:** While India has traditionally been a strong proponent of African sovereignty, it faces difficulty in dealing with Africa's political instability and governance challenges, particularly in conflict-prone regions.

- ✦ The frequent military coups and unstable political environments in countries like Mali, Sudan, and Guinea complicate India's engagement, as it struggles to find effective ways to support democracy without interfering in local politics.
- ✦ From 2020-2023, Africa witnessed 9 successful coups, with countries like Mali, Guinea, and Burkina Faso leading the charge.
  - 📎 India's role in conflict resolution remains limited, and political instability has led to a decline in investment and diplomatic efforts in some regions.

💡 **Divergence in Climate Action and Adaptation Goals:** While both India and Africa acknowledge the severity of climate change, differences exist over the methods and financial commitments required to combat it.

- ✦ India's growing emphasis on renewable energy and climate adaptation is sometimes seen as insufficient in addressing Africa's urgent need for funding and technology transfer, particularly in areas like agriculture and infrastructure resilience.
- ✦ Africa faces acute climate vulnerability, with 282 million people estimated to be undernourished in 2022 exacerbated due to climate impacts.
  - 📎 India, despite leading the International Solar Alliance, has yet to match the scale of investments and technology transfer needed by Africa to mitigate the climate crisis.

💡 **Technology, Digital Economy & Innovation Divide::** While India promotes its digital public goods model (like Aadhaar, UPI, CoWIN) in Africa, its outreach sometimes clashes with Africa's growing partnerships with Western Big Tech firms and China's Digital Silk Road.

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✦ India's approach emphasizes **open-source, low-cost, scalable innovations**, but limited financing & weak digital infrastructure in Africa hinder uptake.

✦ Meanwhile, Chinese firms like Huawei dominate telecom backbone, creating security concerns & squeezing India's space.

✍ For example, **Huawei accounted for over 70% of Africa's 4G backbone, reducing the room for Indian ICT firms.**

✍ The **resulting imbalance not only weakens India's digital diplomacy** but also raises concerns about data sovereignty and dependency on extra-African players.

💡 **Diaspora & Labor Market Tensions:** The **Indian diaspora (about 3 million especially in East and Southern Africa)** has historically been a bridge for trade and culture.

✦ However, it can also create tension, as Indians often dominate small and medium-sized businesses in countries like **Kenya and Tanzania** leading to resentment among locals who view them as **disproportionately influential in the economy.**

✦ Moreover, **as Africa pushes for "Africanisation" of jobs**, there is growing scrutiny of Indian firms **bringing skilled labor from India instead of building local capacity**, complicating India's image as a partner in development versus a competitor in limited job markets.

### What Measures can India Adopt to Enhance Ties with Africa?

💡 **Promote Comprehensive Debt Relief and Financial Restructuring:** India can play a more proactive role in advocating for debt restructuring mechanisms for African nations, addressing concerns over the mounting debt burden.

✦ By engaging with international financial institutions and collaborating with African governments, **India can facilitate more flexible and transparent loan conditions**, ensuring that financial cooperation doesn't lead to economic instability.

✦ **Supporting multilateral debt relief efforts** would enhance India's credibility as a partner committed to Africa's long-term development.

💡 **Expand and Enhance the Scope of the ITEC Program:** India should significantly increase the scale of the Indian Technical and Economic Cooperation (ITEC) program, expanding its reach into **specialized sectors like technology, green energy, and agriculture.**

✦ By offering cutting-edge training programs and building local capacity through tailored skill development initiatives, **India can solidify its role as a key partner in Africa's human capital development.**

✦ This would not only empower African youth but also increase India's strategic influence by aligning its expertise with Africa's most pressing needs.

✍ Such capacity-building efforts would further **strengthen people-to-people ties** and build a knowledge-driven ecosystem across the continent.

💡 **Championing Digital and Knowledge-Based Partnership:** India should take the lead in advancing digital connectivity and technology partnerships with Africa by supporting infrastructure projects that promote internet access, e-governance, and digital literacy.

✦ Initiatives like providing **affordable internet connectivity in underserved regions**, introducing digital financial services like UPI, and supporting mobile-based solutions can accelerate Africa's integration into the global digital economy.

✦ **India can also assist in developing Africa's tech ecosystem by fostering innovation hubs**, creating spaces for entrepreneurship, and mentoring African tech startups, thereby boosting the digital economy and fostering inclusive growth.

💡 **Support Agricultural Transformation with Agro-Tech Solutions:** India should focus on enhancing Africa's agricultural productivity by facilitating the adoption of agro-tech solutions that integrate modern technology with local farming practices.

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- ✦ This could involve **partnerships for precision farming, drone technology, and AI-based tools** for monitoring soil health, crop yields, and pest management.
- ✦ **India's expertise in smallholder farmer support systems** can help African nations diversify their agriculture, reduce dependency on imports, and build sustainable food security.
- ✦ Strengthening agriculture and food systems will directly align with Africa's economic aspirations and improve livelihoods across rural communities.
- 💡 **Increase Investments in Renewable Energy and Climate Change Mitigation:** India should prioritize renewable energy investments in Africa, **focusing on solar, wind, and hydroelectric power** to meet the continent's growing energy demands.
  - ✦ Collaborating on climate adaptation initiatives, particularly in agriculture and water management, can help African countries build resilience against climate change.
  - ✦ **India's expertise in large-scale solar power projects** can be leveraged to support Africa's energy transition, reducing dependency on fossil fuels and promoting sustainable development.
    - 📌 Joint efforts in this area would align with both India's and Africa's commitments to achieving the **Sustainable Development Goals (SDGs)** while fostering green economic growth.
- 💡 **Establish Strategic Trade and Investment Zones:** India should promote the creation of **Special Economic Zones (SEZs) and Industrial Parks in key African countries**, particularly focused on manufacturing and processing industries.
  - ✦ By providing the necessary infrastructure, technology, and training, India can facilitate the establishment of factories and value-added industries that can support Africa's industrialization efforts.
  - ✦ These zones can also **foster intra-Africa trade**, improving regional economic integration in line with the **African Continental Free Trade Area (AfCFTA)** goals.

💡 **Cultivate a New Framework for Strategic Diplomacy:** India must adapt its diplomatic approach by adopting a more flexible, consultative framework with African nations, focusing on **mutual interests and co-development**.

- ✦ Establishing a **'flexible diplomacy' model that accounts for Africa's diverse regions and political landscapes** can ensure that India's engagement remains relevant and responsive.
- ✦ This will create a platform for Africa to voice its concerns and aspirations while aligning those with India's strategic objectives.

💡 **Champion Africa's Voice in Global Governance:** India must continue its strong advocacy for African representation in global governance platforms, such as the **United Nations Security Council (UNSC) and the World Trade Organization (WTO)**.

- ✦ India should lead efforts to build consensus on reforms that ensure Africa's presence at decision-making tables, amplifying the continent's voice on issues like **climate change, trade, and security**.
- ✦ By championing African-led reforms and fostering stronger multilateral diplomacy, India can cement its role as a key partner in reshaping global governance structures to reflect the interests of the Global South.

### Conclusion:

As highlighted by India's External Affairs Minister, 'We put emphasis on the aspirations of Africa, not just the needs of Africa.' Similarly, the Indian Prime Minister stated in 2018, 'India's priority is not just Africa; India's priority is Africans – every man, woman and child in Africa. Together, these statements reflect India's people-centric, trust-based approach, reinforcing its role as a credible Global South partner.'



## Pathway to A Plastic-Free and Sustainable India

*The editorial is based on "**Familiar Impasse: On the Global Response to Eliminating Plastic Pollution**," published in The Hindu on 19/08/2025. It addresses global resistance*

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*to a universal plastic pollution treaty and highlights India's significant plastic waste challenge and the need for a more effective as well as coordinated approach to reduce plastic production and improve recycling.*

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

India is facing a significant **plastic waste challenge**, generating **3.4 million tonnes annually**, with only 30% being recycled. As plastic consumption continues to rise, reducing plastic production at the source becomes essential. While **global discussions on a universal treaty to eliminate plastic pollution** are ongoing, India's role in shaping effective solutions remains crucial. The challenge lies in **reconciling national priorities with the need for stronger international cooperation and agreements**.

### What is the Current Scenario and Institutional Mechanism for Plastic Waste Management in India?

💡 **Current Scenario:** India is among the top producers of plastic waste globally, generating approximately **9 million tons annually**, accounting for nearly one-fifth of the global total.

✦ This figure is significantly higher than **Nigeria** (3.5 mt), **Indonesia** (3.4 mt), and **China** (2.8 mt).

✍ The quantity of plastic waste produced worldwide is projected to increase almost three times from 353 million tonnes in 2019 to **1,014 million tonnes by 2060**, with India expected to contribute a significant share to this rise.

✦ Also, according to the FICCI, **India may lose USD 133 billion in material value** from plastic packaging waste by 2030.

💡 **Related Institutional Mechanism:**

✦ **Solid Waste Management Rules, 2016:** Focused on waste segregation at source, manufacturer responsibility, and user fees for waste collection, ensuring scientific waste management practices.

✦ **Plastic Waste Management Rules, 2016:** Introduced **Extended Producer Responsibility (EPR)** for plastic producers, raising plastic carry bag thickness to 50 microns.

✍ It mandated segregation and proper disposal of plastic waste, including in rural areas, in its implementation.

✦ **Plastic Waste Management Amendment Rules, 2018:** Phased out non-recyclable Multi-Layered Plastics (MLP) and introduced a registration system for producers under **CPCB**, enhancing accountability in plastic waste management.

✦ **Plastic Waste Management Amendment Rules, 2021:** Banned Single-use Plastics (SUPs) by 2022 and increased plastic bag thickness to **120 microns**.

✍ Strengthened EPR rules for packaging waste, promoting recycling and design for reuse.

✦ **Plastic Waste Management Amendment Rules, 2022:** Establish mandatory recycling and reuse targets, accompanied by environmental compensation for non-compliance, and promote a circular economy approach for plastic recovery and reuse.

✦ **Plastic Waste Management Amendment Rules, 2024:** Defined registration, reporting, and certification requirements for manufacturers.

✍ Introduced **certification for biodegradable plastics** and mandates reporting of pre-consumer plastic waste.

### What are the Key Challenges Hindering Effective Plastic Waste Management in India?

💡 **Lack of Adequate Infrastructure for Waste Collection and Recycling:** Under the **Swachh Bharat Mission – Urban 2.0**, **Urban Local Bodies (ULBs)** are mandated to ensure 100% waste segregation and provide access to **Material Recovery Facilities (MRFs)**. However, India's waste management systems are still not equipped to handle the growing volume of plastic waste.

✦ Around **77% of the waste generated in cities is dumped into open landfills** without treatment, and **only 60% of plastic waste is recycled**, often inefficiently, through the informal sector.

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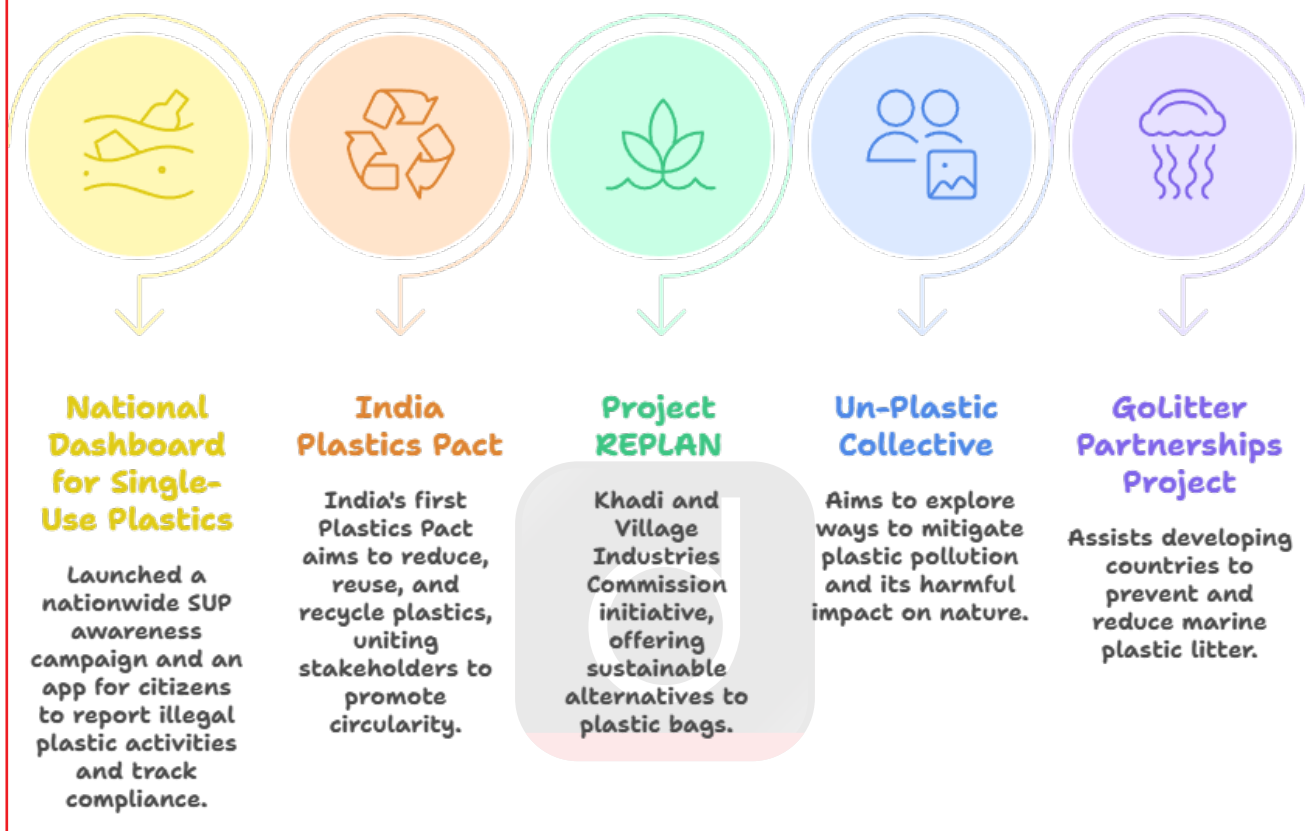
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## Initiatives Related to Plastic Waste Management



- ✎ For example, the **Ghazipur landfill in Delhi continues to expand**, posing severe environmental and health risks.
- ✦ Moreover, **India burns roughly 5.8 million tonnes (mt) of plastic each year**, and releases another 3.5 mt of plastic into the environment (land, air, water) as debris.
- 💡 **Fragmented Extended Producer Responsibility (EPR) System:** The EPR system in India, although a step forward, is largely inefficient due to weak compliance monitoring and reliance on self-reporting.
  - ✦ Producers are supposed to collect and recycle an equivalent amount of plastic waste they produce, but a **lack of third-party auditing and data transparency** has led to subpar outcomes.
    - ✎ As per the **report by the Centre for Science and Environment (CSE)**, data shows significant issues with the EPR system, highlighting that over 40,000 registrations exist, but major polluters, such as **producers (responsible for 65% of plastic)**, are underrepresented.
  - ✦ Also, a CPCB report stated that **plastic recyclers in India generated about 7 lakh fake certificates**, which is 38 times higher than their actual recycling capacity, exposing major loopholes in the enforcement of EPR.
- 💡 **Weak Execution of Plastic Waste Management Policies** India's plastic waste management faces significant challenges due to fragmented governance across various levels, **ranging from local municipal bodies to state and national agencies**.

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✦ Although India has enacted **Plastic Waste Management (PWM) Rules (2016)** and subsequent amendments, enforcement remains weak.

✎ Despite bans on Single-use Plastics such as bags, straws, and cutlery, a FICCI report states that packaging consumption of **Single Use Plastic (SUP) in India accounts for 43%, compared to the global average of 35%.**

✦ **Informal workers**, who are responsible for managing about 60% of the country's plastic recycling, **are often excluded from formal waste management systems**, further undermining the efficiency and coherence of governance.

✦ While cities like **Pune in Maharashtra and Ambikapur in Chhattisgarh have made strides in managing plastic waste**, coordination at the national level remains inadequate, leaving local bodies without the necessary support to implement strategies effectively.

💡 **E-commerce and Packaging Proliferation:** The rapid growth of **e-commerce** in India has significantly contributed to the proliferation of plastic packaging, **particularly single-use plastics** such as bubble wraps, plastic bags, and shrink wraps.

✦ With increasing online shopping, **the demand for convenient and cost-effective packaging materials has risen**, leading to a surge in plastic waste.

✦ In 2023, India's e-commerce sector generated about **1.2 million tonnes (MT)** of plastic waste.

✎ This **not only strains the existing waste management systems but also hampers recycling efforts** due to the mix of materials used in e-commerce packaging.

💡 **Lack of Sufficient Alternatives and Innovation in Plastic Substitutes:** India's transition away from Single Use Plastics is hindered by the limited availability and scalability of effective alternatives.

✦ Despite **biodegradable alternatives like palm leaf and bagasse (sugarcane residue) products**, people often choose readily available plastic cutlery, prioritizing convenience over environmental sustainability.

✎ This **preference for easy-to-use plastic items** highlights the challenge of shifting consumer behavior toward more sustainable choices.

✦ Also, for example, **bioplastics can be 2 to 5 times more expensive than traditional plastics**, making it difficult for companies to adopt them at scale without increasing consumer prices.

💡 **Gaps in Public Awareness and Resistance to Change:** A major challenge hindering India's plastic waste management efforts is the insufficient public awareness.

✦ Although initiatives like the **Swachh Bharat Mission** exist, they sometimes fall short in deeply engaging communities and fostering lasting changes in behavior regarding plastic use and waste management.

✦ A 2025 study found that **only 42% of participants were aware of single-use plastics.**

✎ Moreover, a 2023 report by **NITI Aayog** indicates that **only 17% of Indian households practice full waste segregation.**

### What Strategies can be Adopted to Strengthen Plastic Waste Management in India?

💡 **Decentralized Waste Management:** A shift in focus is needed towards developing **decentralized, localized waste management systems** rather than depending entirely on large-scale centralized facilities.

✦ One potential solution is the **establishment of community or ward-level Material Recovery Facilities (MRFs)**, which could be equipped with advanced sorting technologies, such as **AI-powered machines.**

✎ These facilities would streamline the separation of plastics and other waste materials, reducing transportation expenses while ensuring faster processing and improved recycling efficiency.

💡 **Promoting Micro-Level Waste Segregation:** A key strategy for improving local waste management is fostering **waste segregation at the micro level within communities.**

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- ✦ This entails motivating households and small businesses to sort their waste at the source, focusing on categories like plastics, food waste, and non-recyclables.
  - ✍ Countries like **Germany, Sweden, and Singapore** have implemented **robust waste segregation** and recycling systems, supported by strong policy frameworks and public participation.
- ✦ To encourage participation, **local waste collection systems could offer incentives or public recognition** (such as the **Indore Model**) to those who consistently adhere to proper segregation practices, thereby cultivating a community-led approach to managing plastic waste.
- 💡 **Strengthened Extended Producer Responsibility:** EPR must move beyond tokenistic compliance towards a digitally traceable, accountable framework.
  - ✦ Integrating **blockchain-led plastic tracking systems** and **geo-tagged collection networks** can bring transparency across the value chain.
  - ✦ Industries should be **mandated to submit annual plastic neutrality certificates**, verified through third-party audits.
  - ✦ By **integrating informal waste workers into formal EPR compliance**, social inclusivity is ensured. This will **create a robust polluter-pays ecosystem** aligned with sustainable business practices.
- 💡 **Regulated Market for Plastic Alternatives:** A regulated market for plastic alternatives is crucial to **encourage the development and adoption of sustainable materials**.
  - ✦ Governments **can implement policies and standards** that promote the use of biodegradable, recyclable, or reusable materials while ensuring they meet safety and environmental guidelines.
    - ✍ In the **European Union**, the SUPs Directive has set regulations that ban certain plastic products while encouraging the development and use of sustainable alternatives.
  - ✍ Moreover, **Vadodara's (Gujarat) cotton bag vending machines** are a positive step towards promoting eco-friendly alternatives to plastic, supporting the shift to sustainable materials.
- ✦ **Linking farmers with agro-waste-to-packaging industries** can create rural employment while addressing plastic substitution. This ensures a gradual but resilient transition away from single-use plastics.
- ✦ Such **regulatory frameworks would create a level playing field for businesses** to innovate and transition from conventional plastics to more eco-friendly alternatives.
- 💡 **Formalizing and Integrating the Informal Waste Sector:** India's recycling economy relies on **1.5 to 4 million informal waste workers**, but their potential is hindered by unsafe working conditions, lack of recognition, and unstable supply chains.
  - ✦ Municipal segregation can improve their income and working conditions.
    - ✍ For example, **Pune's SWaCH cooperative** boosted waste pickers' incomes by up to 40% by partnering with the municipality and gaining access to cleaner, sorted plastic waste.
  - ✦ **Recognizing waste pickers as "environmental service providers"** and offering micro-loans, PPE kits, and training could enhance efficiency and create green livelihoods.
- 💡 **Strengthening Plastic Waste Regulations for Small and Medium Enterprises (SMEs):** There should be a focused effort to help SMEs transition from plastic use to sustainable alternatives.
  - ✦ Government programs **can offer subsidies, training, and technology support to these businesses**, ensuring they adopt eco-friendly practices without compromising their operations.
  - ✦ Streamlining the process for SMEs to adopt compliance with plastic waste regulations would facilitate their participation in national plastic reduction goals.
- 💡 **Enhanced Enforcement of Plastic Bans through Technology:** Implementing a technology-driven approach can significantly strengthen the enforcement of plastic bans.

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- ✦ By utilizing data analytics and AI-powered surveillance, authorities can monitor plastic usage and sales in real-time.
- ✦ Developing mobile applications would enable citizens to report illegal plastic activities, while a centralized digital platform could automate penalties and facilitate communication between regulators and the public.
  - ✍ For instance, in China, cities have deployed facial recognition technology in public trash bins to encourage proper waste disposal.
- ✦ This integrated system would enhance monitoring capabilities and ensure prompt action against violators.
  - ✍ E-commerce platforms can also be incentivised to adopt sustainable packaging solutions, promoting the use of biodegradable or recyclable materials.

💡 **Public-Private Partnerships (PPPs) for Technology Adoption:** To enhance recycling infrastructure, the government should foster PPPs aimed at developing advanced sorting technologies and waste-to-energy systems.

- ✦ These partnerships can also support the use of plastic waste as a resource for innovative solutions, such as creating high-quality 3D printing filaments from recycled plastic.
- ✦ Additionally, the government can encourage investments in plastic-to-fuel technologies, turning waste plastics into valuable energy resources.
- ✦ By offering incentives and subsidies to clean-tech startups in the waste management sector, the government can accelerate the growth of sustainable solutions.

💡 **National Plastic Waste Awareness and Education Campaigns:** There is a need for large-scale educational campaigns aimed at both urban and rural communities to highlight the environmental consequences of plastic pollution and the importance of waste segregation.

- ✦ These initiatives should focus on shifting behaviors, promoting sustainable consumption, and encouraging responsible waste disposal.

- ✦ For instance, in a Kashmiri village, the “Give Plastic-Take Gold” initiative motivated residents to trade plastic waste for gold coins, resulting in a nearly plastic-free environment.
  - ✍ Such innovative initiatives can be scaled up to promote awareness and drive behavioral change towards better plastic waste management.
- ✦ Additionally, integrating waste management education into school curricula can help instill sustainable habits from a young age.

## Conclusion

India's plastic waste challenge requires a forward-looking approach driven by innovative solutions and sustainability. To achieve the targets of **SDG 12 (Responsible Consumption and Production)**, India must focus on creating a **circular economy** that emphasizes reducing plastic production at the source, improving recycling, and fostering sustainable alternatives. The future of plastic waste management hinges on **collaboration, stronger enforcement, and a commitment to sustainable practices** that support both environmental and economic growth.



## Revolutionizing India's Judicial System

*The editorial is based on “Streamlining Case Management at the Supreme Court: A Successful Approach to Reducing Pendency,” published in the Indian Express on 20/08/2025. It highlights the SC's success in reducing its case backlog by 4.83%; however, challenges persist in India's judiciary, with case pendency still a significant concern across various courts.*

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

The **Supreme Court** has recently achieved a significant milestone by **reducing its case pendency by 4.83% in just 100 days** through a series of well-planned reforms. However, the challenges in the judiciary extend beyond the Supreme Court. The **persistent issue of “justice**

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delayed is justice denied” continues to affect the system, with delays still widespread at various levels of the judiciary. While this progress offers a valuable model for other judicial forums, it **highlights the need for a more systemic and data-driven approach to address the root causes** of case pendency and ensure the timely delivery of justice across India.

## What Reforms have been Introduced to Improve the Justice Delivery System in India?

### 💡 Institutional and Mission-Based Reforms:

- ✦ **National Mission for Justice Delivery and Legal Reforms (2011):** It was set up to improve access by reducing delays and arrears, and to enhance accountability through structural changes and performance standards.

- ✦ **Fast Track Courts (FTCs):** Under the aegis of the **14<sup>th</sup> Finance Commission**, the government has established **Fast Track Courts** for dealing with cases of heinous crimes; cases involving senior citizens, women, children, etc.

✎ As of October 2024, over 800 FTCs were operational across India.

- ✦ **National Judicial Data Grid (NJDG):** **NJDG** provides a comprehensive database of orders, judgements, and case details of District and Subordinate Courts and High Courts.

✎ Currently, it covers case details of **18,735 District and Subordinate Courts** across India.

- 💡 **Legislative Measures for Judicial Reform:** To reduce pendency and unclogging of the courts, the Government has amended various laws like the **Commercial Courts (Amendment) Act, 2018**, **Criminal Laws (Amendment) Act, 2018** and the **Arbitration and Conciliation (Amendment) Act, 2019**.

- ✦ **Jan Vishwas (Amendment of Provisions) Act, 2023**, decriminalised 183 provisions across **42 Central laws** under 19 ministries/departments, helping reduce the judiciary's burden.

### 💡 Digital Transformation of Judiciary:

- ✦ **e-Courts:** The **e-Courts Mission Mode Project** aims to enhance justice delivery through digital solutions.

- ✎ Additionally, **virtual courts and eSewa Kendras** have been made functional to bridge the digital divide by providing citizen-centric services to lawyers and litigants.

- ✎ 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.

- ✦ **Tele-Law and Promotion of Pro Bono Culture:** The programme was launched in 2017 to provide an effective and reliable e-interface platform **connecting disadvantaged sections** seeking legal advice via Common Service Centres (CSCs).

- ✎ Moreover, efforts have been made to **institutionalize pro bono culture**, with a technological framework allowing advocates to register as Pro Bono Advocates on **NyayaBandhu**.

- 💡 **Alternate Dispute Resolution (ADR):** To promote **ADR**, the Commercial Courts Act, 2015, was amended, making **Pre-institution Mediation and Settlement (PIMS)** mandatory in case of commercial disputes.

- ✦ Additionally, an amendment to the Arbitration and Conciliation Act, 1996 has been made for **expediting the speedy resolution of disputes by prescribing timelines**.

- ✦ **Lok Adalats** are an important ADR mechanism available to common people.

## What are the Major Challenges Impacting the Effectiveness of the Indian Judiciary?

- 💡 **Mounting Pendency and Delayed Justice:** India's judicial system is **currently burdened with over 5 crore pending cases across courts**. In subordinate courts, more than **50% of these cases have been pending for over three years**.

- ✦ According to data shared in the **Rajya Sabha (2023)**, 1,514 cases in High Courts and 1,390 cases in subordinate and district courts have been **pending for over 50 years**.

- ✦ This massive backlog not only denies timely justice to litigants but also erodes public faith in the judicial system.

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- ✦ This highlights that the phrase “**tareekh pe tareekh**” (date after date) has become emblematic of the chronic delays in India’s judicial system.
- 💡 **Persistent Judicial Vacancies:** The **shortage of judges** across all levels of the judiciary continues to be a pressing concern, contributing significantly to case backlogs.
  - ✦ According to the **India Justice Report (IJR) 2025**, between 2020 and 2024, pending cases in Indian courts surged nearly 20%. Despite this sharp rise, **judicial vacancies have remained persistently high**, with High Courts operating with about 33% of sanctioned posts unfilled.
  - ✦ India’s **judge-to-population ratio remains among the lowest in the world**, with only 21 judges per million people.
    - 📎 This figure is less than half of the 50 judges per million benchmark **recommended by the Law Commission** back in 1987 (Supreme Court Observer).
    - 📎 This shortage not only places a greater burden on the current judges but also hampers the overall judicial process.
  - ✦ The **Collegium system**, while ensuring judicial independence, is **often criticized for its opaqueness and delays** in appointments, exacerbating the problem.
- 💡 **Infrastructure and Technological Gaps:** Despite efforts to modernize, many Indian courts still lack adequate infrastructure and technological support, hindering efficient justice delivery.
  - ✦ For the sanctioned strength of 25,081 judges in the district judiciary, there is a **shortage of 4,250 courtrooms and 6,021 residential units**.
  - ✦ In courts across India, **e-Courts initiatives struggle due to poor connectivity**, untrained personnel, and inadequate infrastructure.
  - ✦ **E-Sewa Kendras, e-filing systems, and live-streaming of proceedings** offer promising solutions, but their impact is uneven and often symbolic. **As the IJR cautions, “technology cannot be a substitute for structural reform.”**
- 📎 A 2021 survey by the **CJI** revealed that **only 41%** of lower court complexes had studio-based video conferencing facilities, and **38% had video linkages with jails**, highlighting the technological deficiencies.
- 💡 **Lack of Judicial Accountability:** The absence of a robust mechanism for ensuring judicial accountability has been a point of concern, potentially affecting public trust in the judiciary.
  - ✦ The **current system of impeachment for removing judges is rarely used** and is seen as inadequate for addressing misconduct that falls short of impeachable offenses.
  - ✦ The proposal for a **National Judicial Appointments Commission (NJAC)** to replace the collegium system was **struck down by the Supreme Court in 2015**, leading to ongoing debates about judicial independence versus accountability.
    - 📎 Recent controversies, including the **Justice Yashwant Varma (Delhi High Court)**, have sparked increased demands for greater transparency in judicial functioning and appointments.
  - ✦ Also, a recent **RTI query** revealed that the **Delhi High Court refused to provide data on complaints against district judges**, citing that “no such data is maintained,” raising serious concerns about accountability.
- 💡 **Barriers to Accessing Justice:** Barriers to accessing justice remain a significant issue, particularly for marginalized and economically weaker sections of society.
  - ✦ While the **Legal Services Authorities Act, 1987**, mandates the provision of free **legal aid to economically disadvantaged individuals**, the implementation remains inconsistent. **Resource constraints, limited outreach, and procedural complexities** often impede the effective delivery of legal aid services.
    - 📎 Approximately 80% of India’s population is eligible for free legal aid under the Legal Services Authorities Act, 1987. **However, only about 1% of eligible individuals access these services.**

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✦ Over the past decade, Indian prisons have increasingly had more undertrial prisoners.

✎ As per the IJR 2025, **undertrial prisoners now make up 76% of the jail population in the country, up from 66% in 2012.**

💡 **Lack of Representation and Diversity in Judiciary:** The underrepresentation of diverse groups in the Indian judiciary, especially in terms of **gender, caste, and regional diversity, continues to be a significant concern.**

✦ India still **awaits its first woman CJI, with Justice B.V. Nagarathna** expected to assume the role in 2027.

✦ As of March 2025, the representation of women judges in the High Courts stands at only 14.27%.

✎ In 8 High Courts, there is only one woman judge, while the High Courts of Uttarakhand, Meghalaya, and Tripura have no female judges at all.

✦ The representation of judges from the **Scheduled Castes, Scheduled Tribes, and Other Backward Classes** also remains low.

✎ This lack of diversity not only affects the perception of the judiciary but also potentially impacts the understanding and interpretation of cases involving marginalized communities.

✦ Further, the '**Uncle judge syndrome**' reflects favoritism, which erodes meritocracy and diminishes public trust in the judicial appointment process.

💡 **Judicial Activism and Potential Overreach:** The fine line between **judicial activism** and overreach continues to be a subject of debate.

✦ Judicial activism has played a vital role in filling legislative gaps, as seen in the **Vishaka judgment (1997)**, and in broadening the scope of fundamental rights, as in **Maneka Gandhi v. Union of India (1978)**.

✎ However, critics contend that it occasionally intrudes into the legislature's domain.

✦ The **Supreme Court's ruling in the recent Electoral Bond Scheme** case, where it not only struck down the law but also issued detailed

directives for the disclosure of donor information, is a recent example that has been debated as judicial overreach.

💡 **Executive Interference and Judicial Independence:** The delicate balance between judicial independence and executive oversight continues to be a contentious issue.

✦ The government's **delay in clearing judicial appointments** recommended by the Supreme Court Collegium and the **selective transfer of judges have raised concerns.**

✎ Also, the transfer of **Justice S. Muralidhar in 2020** is often cited as a key example of concerns regarding the potential influence of the executive on the judiciary.

✦ Furthermore, the **nomination of former Chief Justice of India Ranjan Gogoi** to the Rajya Sabha has sparked debate, with some observers cautioning that such moves **may create perceptions of a "quid pro quo"** (i.e., a favour granted in return for something) and raise questions about judicial independence.

### What Reforms are Needed to Enhance the Efficiency and Effectiveness of the Indian Judiciary?

💡 **Streamlining Case Management through Technology:** India can significantly reduce case pendency by fully implementing and expanding the e-Courts project, focusing on digitization of court records, online case filing, and **AI-assisted case management.**

✦ The Singapore judiciary's success with its **Integrated Case Management System (ICMS)** serves as an excellent model.

✦ The launch of the **FASTER (Fast and Secured Transmission of Electronic Records) system** by the Supreme Court for the quick transmission of bail orders is a step in the right direction.

✦ Moreover, **SUVAS** and **SUPACE** are innovative AI-driven initiatives that could be further expanded to improve access to justice and to enhance court efficiency.

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- ✎ Expanding such initiatives to all levels of courts, coupled with comprehensive training for judicial staff and lawyers, can improve case management efficiency.
- 💡 **Promoting Alternative Dispute Resolution (ADR) Mechanisms:** Promoting and strengthening ADR mechanisms like **mediation, arbitration, and Lok Adalats** can significantly reduce the burden on formal courts.
  - ✦ India's recent **Mediation Act, 2023**, provides a statutory basis for mediation, but its implementation needs to be accelerated.
  - ✦ Establishing more mediation centers, training professional mediators, and **incentivizing ADR through tax benefits** or faster enforcement of settlements can encourage litigants to opt for these faster, less adversarial methods of dispute resolution.
- 💡 **Reforming Judicial Appointments and Vacancies:** Addressing judicial vacancies requires **simplifying the appointment process and expanding the sanctioned number of judges**.
  - ✦ There is a **need to revamp the collegium system by introducing a Judicial Appointments Commission** ensuring transparency, accountability, and broader representation across social, regional, and gender lines.
    - ✎ Additionally, the **establishment of an All India Judicial Service (AIJS)** (as envisaged under **Article 312**) for merit-based, uniform recruitment could also be considered.
  - ✦ Furthermore, **raising the retirement age of judges**, as implemented in the UK (to 75 for SC judges), could help retain seasoned jurists and alleviate vacancies.
- 💡 **Strengthening Legal Aid and Access to Justice:** Enhancing legal aid services is crucial for improving access to justice.
  - ✦ India can draw inspiration from the **Netherlands' system**, where every citizen is entitled to subsidized legal aid based on income levels.
  - ✦ Strengthening the **National Legal Services Authority** by increasing its funding, expanding its reach through mobile legal clinics (as seen

in some Indian states), and **partnering with law schools for pro bono services** can make legal aid more accessible.

- ✎ The introduction of the Tele-Law service, providing free legal advice through video conferencing, is a positive step that can be further expanded and publicized.
- ✦ Specifically, **the focus should be on ensuring justice that is both social and economic in nature**, as stipulated under Articles 38 and 39 of the Indian Constitution.
- 💡 **Court Infrastructure and Resource Management:** Improving court infrastructure is crucial for efficient justice delivery.
  - ✦ Former CJI, N.V. Ramana, suggested developing a **National Judicial Infrastructure Authority of India (NJIAI)** for arranging adequate infrastructure for courts.
  - ✦ A large portion of the **funds allocated under the Centrally Sponsored Scheme (CSS) remains unutilized** due to rigid guidelines and bureaucratic red tape. Introducing flexibility in the use of funds, as seen in the **NITI Aayog's Guidelines for Flexi-Funds**, could allow states to utilize funds for broader infrastructure needs related to the judiciary.
    - ✎ Additionally, it is recommended that a **thorough audit by the CAG** on the financial and material performance of the CSS be undertaken before giving extension to the scheme.
  - ✦ Focus areas should include **creating more courtrooms, improving facilities for litigants and witnesses**, and ensuring all courts have basic amenities and technology.
    - ✎ Efficient resource management, including optimal utilization of court hours and proper case scheduling, can further enhance productivity.
- 💡 **Specialized Courts and Tribunals:** Establishing more specialized courts and tribunals can expedite case resolution in specific areas of law.
  - ✦ For instance, India's **National Company Law Tribunals (NCLTs)** have shown success in resolving corporate disputes efficiently. In FY 2024, the NCLT approved 269 resolution plans, **marking a 42% increase** from 189 in FY 2023.

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- ✎ The establishment of special **POCSO courts** is another positive step.
- ✦ Learning from **Germany's system of specialized courts for various legal domains**, India could expand this model to areas like environmental law, cyber crimes, and **intellectual property rights**, ensuring faster and more informed judgments through judges with domain expertise.
- 💡 **Enhancing Transparency and Public Engagement:** Encourage live-streaming of proceedings, issue multilingual judgments, and launch legal literacy programmes to build public trust and accessibility.
  - ✦ Implementing a transparent system of judicial performance evaluation can enhance accountability and efficiency.
    - ✎ The **United States' use of judicial performance evaluations** in many states offers a model.
- 💡 **Implementing Compassion Training for Judicial Officers:** Implementing comprehensive compassion training programs for judicial officers at all levels can significantly enhance the quality and perceived fairness of justice delivery.
  - ✦ In India, the **National Judicial Academy could incorporate mandatory compassion training** in its curriculum for judges, focusing on real-case scenarios and role-playing exercises.
  - ✦ Also, **mandatory continuing legal education for judges and lawyers** can significantly improve the quality of legal services and judicial decision-making.
    - ✎ Singapore's mandatory **Continuing Professional Development (CPD) scheme** for lawyers is an excellent model.
  - ✦ Moreover, the **Bangalore Principles of Judicial Conduct** provide a framework for ethical conduct among judges, emphasizing integrity, impartiality, and accountability.
  - ✦ Also, the **Supreme Court's new handbook**, which highlights and discourages the use of **gender-unjust language in Indian courts** marks a step in the right direction towards ensuring gender sensitivity in the judiciary.

## Conclusion

Judicial reform in India must transcend institutional efforts and become a broader societal demand. As **Dr. A.P.J. Abdul Kalam** once said, "**Judiciary is the Angel and the Marshal that ensures that democracy survives. It is the guardian of civilised life, standing exalted on a pedestal the whole nation looks up to.**" Therefore, reforms need to be implemented with urgency, ensuring that justice is accessible to all citizens.



## India'S Path to Manufacturing Excellence

*This editorial is based on "**Govt must bite the bullet on land reforms to ease manufacturing growth**" which was published in Business Standard on 21/08/2025. The article brings into picture the bottlenecks of land acquisition and pending labour reforms that hinder India's manufacturing growth, stressing the urgent need for factor market reforms to realise the vision of **Viksit Bharat 2047**.*

**Tag:** GS Paper - 3, Industrial Policy, Infrastructure, Growth & Development

**India's manufacturing growth** faces a critical bottleneck in **land acquisition**, where fragmented records, multiple authorities, and unclear titles create costly delays that deter investors. The **Confederation of Indian Industry** has proposed comprehensive reforms including a GST Council-like land coordination body and integrated state authorities, but political consensus remains elusive. Beyond land issues, **pending reforms like the four labour codes further constrain India's manufacturing potential** at a time when global supply chains are reshaping. As India aspires for **Viksit Bharat 2047**, reimagining the manufacturing sector through decisive factor market reforms has become an economic imperative that cannot be delayed.

## What are the Key Recent Developments Shaping India's Manufacturing Sector?

- 💡 **Surge in Foreign Direct Investment (FDI):** India's manufacturing sector has seen a significant surge in foreign direct investment (FDI), solidifying its position as a global investment magnet.

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✦ The growth in FDI enhances domestic capabilities and brings in cutting-edge technologies.

✦ FDI in manufacturing has reached **USD 165.1 billion, marking a 69% increase over the past decade.**

📌 In the last 5 years, India's manufacturing sector saw Rs. 33.58 lakh crore (US\$ 383.5 billion) in total FDI inflows, highlighting robust confidence from global investors.

💡 **Robust Government Initiatives:** The government's proactive policies, such as the **"Make in India"** initiative and the **introduction of Production Linked Incentive Scheme**, are actively fostering growth in key sectors.

✦ These policies are incentivizing global companies to establish production hubs in India, reducing import dependency.

✦ For instance, the PLI scheme has attracted major players like **Apple, with smartphone exports surging by 42% in FY24**, reaching Rs. 1.36 lakh crore (US\$ 15.6 billion). These efforts are expected to boost India's export-driven growth in the coming years.

💡 **Digital Transformation in Manufacturing:** The push towards **Industry 4.0** is reshaping India's manufacturing landscape, with automation and digital tools driving efficiency.

✦ The increasing adoption of **AI, IoT, and robotics** is improving production rates and operational efficiency.

✦ **India's manufacturing PMI for April 2025 stood at 58.2**, signaling growth, driven by digital transformation.

📌 Moreover, **India's digital economy** is projected to grow at twice the rate of the overall economy, further enhancing its global competitiveness.

💡 **Growth in Exports and Market Diversification:** India's export landscape is diversifying, with a significant rise in **non-petroleum goods**, particularly in **pharmaceuticals, electronics, and chemicals**.

✦ The total export value reached **USD 820.93 billion in FY25**, with a notable contribution from the e-commerce and electronics sectors.

✦ **Merchandise (goods) exports**, excluding petroleum products, also reached an all-time high of **USD 374.1 billion, representing a 6% increase**, reflecting the success of India's manufacturing and export strategies under the PLI scheme.

💡 **Emerging Sunrise Sectors:** India is making substantial strides in emerging sectors like **renewable energy components, medical devices, and semiconductors**, positioning itself as a leader in these high-growth industries.

✦ The government's focus on green energy and electronics manufacturing is beginning to yield results.

✦ For example, India's semiconductor market is projected to reach **USD 63 billion by 2026**, as investments in chip manufacturing increase, spurred by initiatives like the **Rs. 76,000 crore Semicon India program**.

### What are the Key Issues Associated with India's Manufacturing Landscape?

💡 **Land Acquisition Bottlenecks:** The **fragmented land records and unclear title issues** continue to delay land acquisition for manufacturing facilities, hindering sector growth.

✦ The lack of a streamlined, unified land acquisition process leads to time-consuming disputes and regulatory challenges.

✦ Political consensus remains elusive, as seen in the **failure of the 2015 land acquisition ordinance**.

✦ A prominent example is the **Hyderabad Future City project**, where land acquired for one purpose (**PharmaCity Project**) is now facing legal challenges for being repurposed, causing significant delays and uncertainty for investors.

💡 **Labour Reforms Delays:** The slow and piecemeal implementation of India's new **labor codes** creates significant uncertainty for manufacturers.

✦ The reforms, **passed by the central government**, have yet to be fully implemented **because labor is a concurrent subject**, requiring states to frame and notify their own rules.

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✦ For instance, **West Bengal and Lakshadweep have not pre-published draft rules under any of the codes, while others like Delhi have only done so for the Code on Wages.**

✦ This inconsistency across states hinders the creation of a seamless, unified national labor market, **perpetuating the 'inspector raj' mentality that the reforms were meant to abolish.**

💡 **Infrastructure Gaps and Logistics Challenges**  
Although India has made progress in digital and physical infrastructure, **key logistics and transport inefficiencies remain major barriers.**

✦ The lack of efficient and integrated infrastructure hampers the smooth movement of goods, affecting production timelines.

✦ The **Economic Survey 2022-23** estimated India's logistics costs at a high 14–18% of Gross Domestic Product (GDP).

✎ However, recent estimates by the **National Council of Applied Economic Research (NCAER)** place them lower, at **7.8–8.9% of GDP for 2022-23**, reflecting significant improvement.

✎ Yet, they continue to remain slightly above the global benchmark of 8% of GDP.

✦ These logistics deficits **raise manufacturing costs by 20-30%**, limiting competitiveness against neighbors like Vietnam with superior systems.

💡 **Skilled Labour Shortage:** India's vast workforce is a demographic advantage, but its effectiveness is diminished by a severe skill mismatch.

✦ The **lack of formal technical training and industry-specific skills**, particularly in advanced manufacturing, makes it difficult for firms to adopt modern technologies and improve productivity.

✦ Only **4.1% of India's workforce (in the 15-59 age group)** has formal technical training, a stark contrast to over **70% in countries like Germany and South Korea.**

✎ In the automotive sector, for instance, the demand for skilled workers is high, but **training programs remain insufficient** to meet the growing requirements.

💡 **Environmental Compliance Issues:** Stricter environmental norms have increased compliance costs especially for high-pollution sectors like cement, chemicals, and textiles.

✦ The **textile industry alone accounts for about 20% of India's industrial water pollution**, facing growing enforcement of wastewater treatment and Zero Liquid Discharge norms.

✦ For instance, in 2024, many small-scale dyeing units in **Punjab's Ludhiana cluster** faced shutdowns due to failure to meet effluent standards, highlighting the compliance risk.

💡 **Supply Chain Fragmentation and Over-dependence on Imports:** India's manufacturing remains vulnerable due to fragmented supply chains and heavy dependence on imported raw materials and components.

✦ This over-reliance exposes industries to global supply shocks and escalates input costs, undermining production stability.

✦ Foreexample, **60-75% of electronic components for India's domestic production are imported**, causing input cost inflation amid supply chain disruption.

✦ **Local supplier fragmentation** further increases transaction costs and hampers scalability efforts.

💡 **Potential Impacts of US Tariffs on Indian Manufacturing Exports:** The recent **imposition of steep tariffs by the US** poses a significant threat to key Indian manufacturing sectors by **raising the cost of Indian goods and making them less competitive.**

✦ This is particularly impactful for labor-intensive industries that are highly dependent on the US market. The tariffs could lead to a loss of market share to competing nations.

✦ A recent analysis by the Indian Council for Research on International Economic Relations (ICRIER) found that almost **70% of Indian goods exports to the US—around \$60.85 billion, are now exposed to a 50% tariff.**

✎ This places labor-intensive sectors like textiles and apparel at a significant disadvantage

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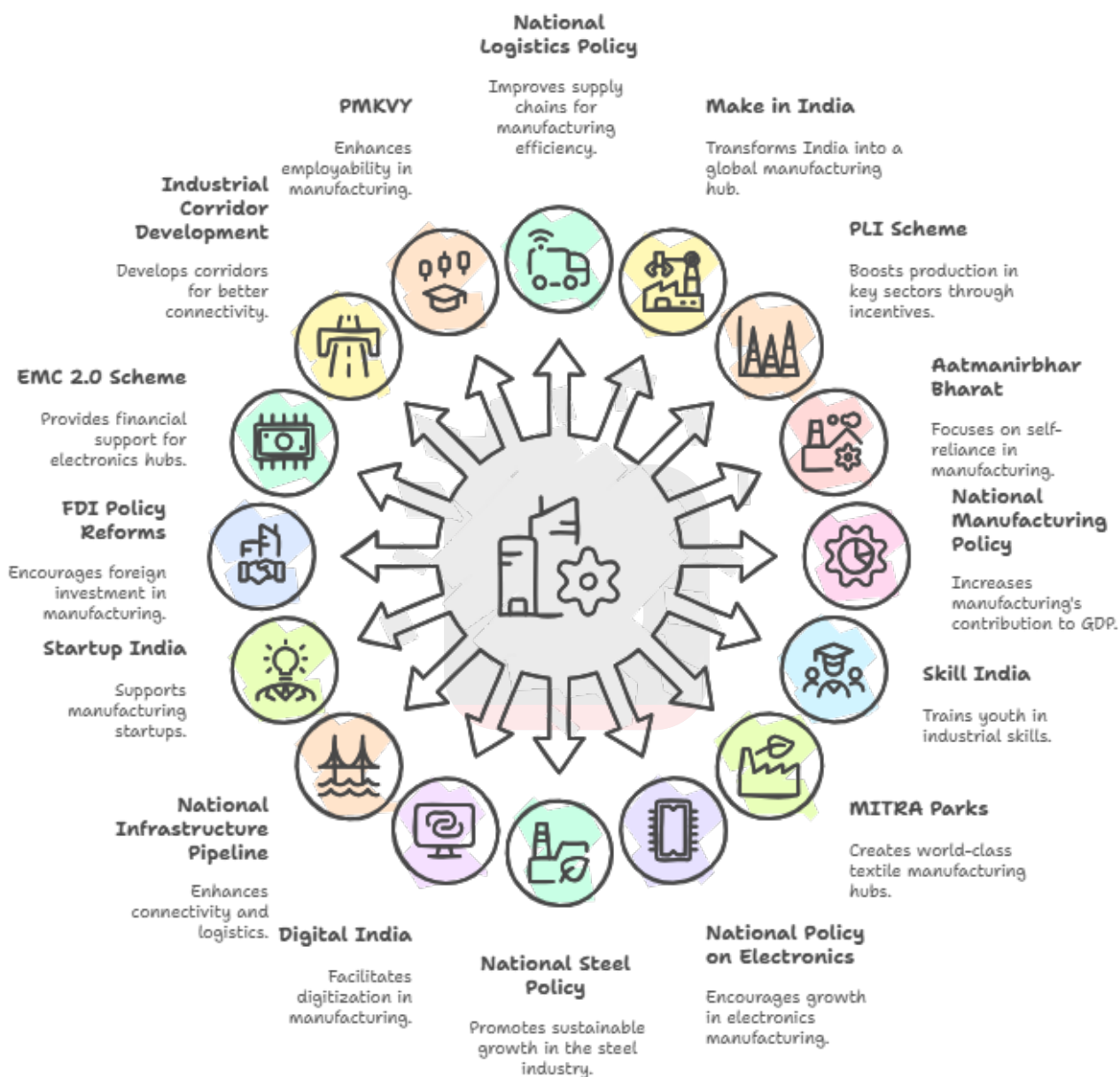
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## Government Initiatives for Manufacturing



### What Measures India Can Adopt to Enhance the Effectiveness and Efficiency of the Manufacturing Sector?

- 💡 **Optimizing Land Use and Acquisition**: India needs a **National Industrial Land Bank 2.0** using GIS mapping and blockchain for title verification.
  - ✦ Pre-cleared **plug-and-play industrial corridors** should be developed to cut legal disputes.
  - ✦ A **single-window clearance system** must ensure quick approvals with transparent compensation.

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- ✎ Rehabilitation packages should balance investor confidence with farmer welfare. Such reforms will make land access predictable and litigation-free.
- 💡 **Streamlining Labor Regulations:** Labour codes must move from paper to practice through a **Centre–State coordination mechanism**.
  - ✎ Reform-linked fiscal incentives can push states to notify pending rules quickly.
  - ✎ A **Unified Labour Compliance Portal** should digitise inspections and filings, curbing inspector raj. Worker representation must be protected to avoid a hire-and-fire perception. This balance will create a fair, flexible, and modern labour market.
- 💡 **Enhancing Logistics and Connectivity:** A **National Integrated Logistics Grid** under **PM Gati Shakti** linking roads, railways, ports, and air cargo is essential.
  - ✎ **Multimodal logistics parks** and freight corridors can reduce delays and costs. AI-enabled tools for **route optimisation, inventory tracking, and smart warehousing** will modernise supply chains.
  - ✎ Special focus is needed on hinterland connectivity for balanced industrial growth. Lower logistics costs will make Indian manufacturing globally competitive.
- 💡 **Building a Future-Ready Workforce:** A **National Manufacturing Skills Mission** should target Industry 4.0 skills like robotics, EV batteries, and green hydrogen. **Dual apprenticeship models** combining classroom learning with factory exposure will close the training gap.
  - ✎ Large firms should be incentivised to run **public–private skilling academies** for MSME clusters.
  - ✎ AI-driven platforms can link employers with skilled workers in real time. This will transform India's workforce from abundant to truly competitive.
- 💡 **Integrating Sustainability into Manufacturing:** Instead of seeing green norms as hurdles, India should invest in **Green Technology Parks** with shared treatment plants and renewable units.
  - ✎ A **Green Credit System** can reward firms for adopting circular economy practices. AI-driven monitoring systems must replace outdated manual inspections to reduce compliance costs.
  - ✎ **MSMEs should receive subsidies for clean technologies.** This will align manufacturing growth with global sustainability benchmarks.
- 💡 **Strengthening Domestic Supply Chains:** India must build **domestic component ecosystems** in sectors like electronics, semiconductors, and pharma. MSMEs should be integrated into **Global Value Chains (GVCs)** through targeted supplier development programs.
  - ✎ Tax incentives for **backward integration** can encourage domestic production of raw materials. Strategic reserves of key inputs will reduce vulnerability to global shocks.
  - ✎ Strengthening local supply chains will boost resilience and reduce import dependence.
- 💡 **Diversifying Global Market Access:** India should **diversify trade partnerships** through **Free Trade Agreements** with EU, ASEAN, and Africa to cut US dependency.
  - ✎ Export industries must adopt **global quality certifications and branding** for greater competitiveness.
  - ✎ **Export hubs should get policy support for scaling up high-value products.** This proactive diversification will protect India's market share globally.
- 💡 **Digital Public Infrastructure for Manufacturing:** Just as India transformed finance with UPI, a similar digital manufacturing stack can be created for production units.
  - ✎ This may include **interoperable platforms for supply chain traceability, machine data, and compliance monitoring.** Such DPI can foster efficiency, transparency, and accountability.

### Conclusion:

India's manufacturing success depends on resolving the **3 Ms** - **Money** (efficient land acquisition and financing), **Materials** (reliable supply chains), and **Manpower** (flexible labor policies through pending

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reforms). The convergence of global supply chain shifts and India's demographic advantage creates a narrow window that demands immediate political will. Such holistic reforms will not **only enhance global competitiveness but also generate large-scale employment**, driving inclusive and resilient economic growth in the coming decade.



## Harnessing India's Nuclear Energy Growth

*The editorial, titled "**Nuclear Energy Can Help Power India's Economic Growth, Private Push Welcome**," was published in Business Standard on 21/08/2025. It discusses the Government's shift towards allowing private participation in the nuclear energy sector. However, challenges such as regulatory hurdles and public concerns continue to persist, which could potentially hinder the growth of nuclear energy in India.*

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

**India's energy landscape** is undergoing a transformative shift, with the **government planning to open up the nuclear energy sector to private players** for the first time in decades. This move is part of the country's broader vision to **scale up nuclear power capacity to an ambitious 100,000 MW by 2047**. However, challenges, including cost overruns, licensing delays, and public concerns, hinder nuclear energy growth in India. There is a need to streamline timelines, strengthen supply chains, and create a regulatory framework that fosters investment and public trust in the sector.

### How is Nuclear Energy Contributing to India's Economic Growth and Sustainability Goals?

- 💡 **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**.

- ✦ 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**.

💡 **Meeting Energy Demands:** To ensure energy reliability in this evolving urban-industrial ecosystem, nuclear energy is a critical pillar.

- ✦ Unlike renewable sources like wind and solar, which are intermittent, **nuclear plants can operate 24/7**, ensuring a consistent energy output.
- ✦ Currently, **India's per capita electricity consumption stands at 1,395 kWh** (as of 2024), but this figure is expected to double by 2035.
- ✦ The **Union Budget 2025-26** allocated Rs. 20,000 crore to the **Nuclear Energy Mission**, targeting the **deployment of five Bharat Small Reactors (BSRs) by 2033** to diversify energy infrastructure.

💡 **Sustainable Urbanization and Industrialization:** With India's urban population projected to grow to **600 million by 2031**, nuclear energy can meet the rising demand for clean and uninterrupted electricity in cities.

- ✦ It **supports industrial growth, particularly energy-intensive sectors** like manufacturing and steel, which require a steady power supply.
- ✦ Upcoming projects like the **Rajasthan Atomic Power Station units 7 & 8** aim to address such demands sustainably.

💡 **Supporting Diplomatic and Economic Growth:** India's growing nuclear sector is not only a domestic achievement but also a powerful tool for diplomacy and global economic engagement.

- ✦ The pivotal **2008 US-India Civil Nuclear Agreement** marked a major milestone, paving the way for India to forge collaborations with leading nuclear nations.
- ✦ Strategic partnerships, particularly with **Russia, exemplified by the Kudankulam**

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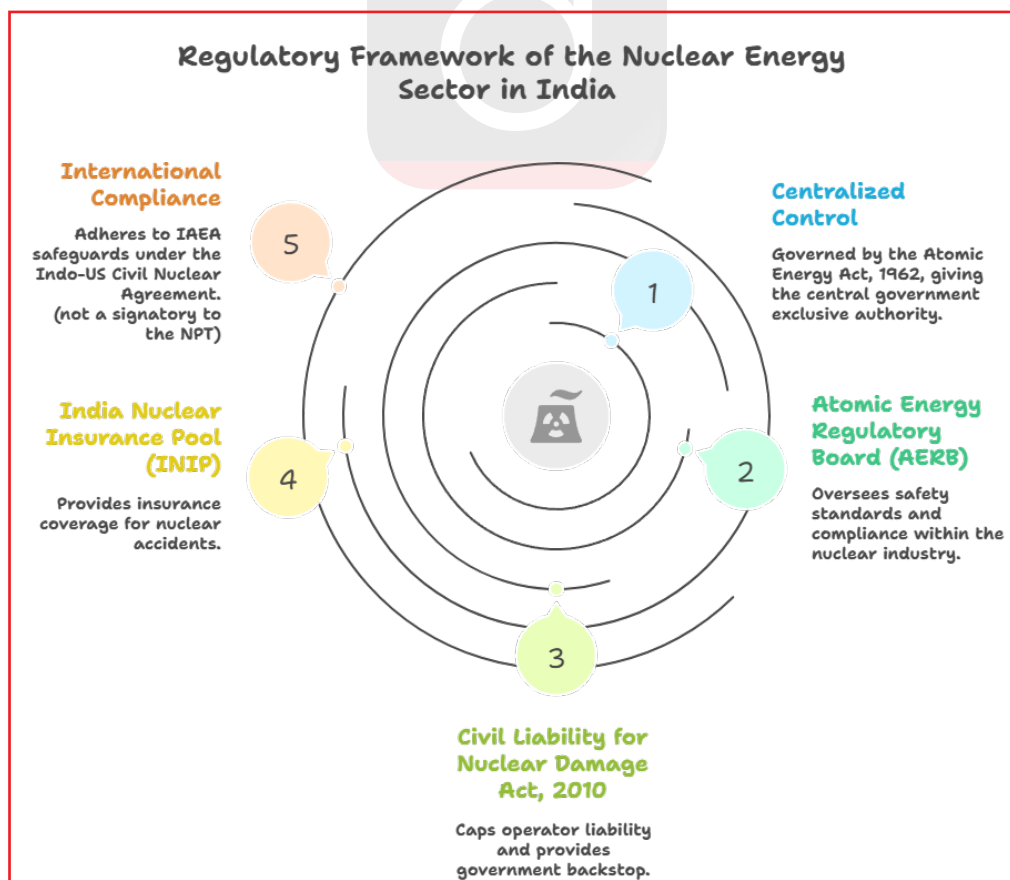


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**Nuclear Power Project**, have substantially enhanced India's access to advanced nuclear technologies and infrastructure.

- ✍ These collaborations **have been crucial in expediting project timelines, improving reactor safety, and fostering local expertise**. The economic benefits of these partnerships are equally profound, contributing to India's energy security and driving economic growth.
- 💡 **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.
  - ✦ As per the **International Atomic Energy Agency**, 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 in other renewable sectors.
  - ✍ This **aligns with India's broader goal of enhancing its industrial workforce** to meet future energy demands.
- 💡 **Driving 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**.



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## What are the Major Challenges Hindering India's Nuclear Energy Growth?

💡 **Uranium Supply Constraints:** One of the most pressing challenges confronting India is the restricted availability of indigenous uranium reserves, which significantly hinders the uninterrupted functioning of its nuclear reactors.

✦ India has an **estimated 76,000 tonnes of domestic uranium reserves**, which is not enough to sustain the expanding fleet of **Pressurised Heavy Water Reactors (PHWRs)**.

✍ Consequently, India is dependent on imports to fulfill its uranium requirements, with primary suppliers **including Australia, Kazakhstan, and Canada**.

✦ Also, **geopolitical instabilities, volatile global pricing, and logistical impediments** have the potential to disrupt the supply chain, which may adversely affect reactor operations.

💡 **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.

✦ Though India **possesses approximately 846,000 tonnes of thorium reserves**, constituting roughly 25% of the global total, the current utilization remains relatively low.

✍ 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 and Regulatory Barriers:** The initiation of nuclear power generation facilities necessitates considerable financial investment, extended timelines, and intricate infrastructural requirements.

✦ Financial constraints have hindered the advancement of projects like the upgrades to the **Kakrapar and Kudankulam plants**.

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

✦ The **high initial costs and uncertain returns discourage private sector investment** in nuclear energy, leading to a preference for renewable energy projects that offer quicker returns.

✦ Moreover, India's regulatory framework, though thorough, is often criticized for its sluggishness and complexity.

✍ **Delays in obtaining approvals, particularly for land acquisition and environmental clearances**, can extend project timelines.

✍ For instance, the **Jaitapur Nuclear Power Project**, which aims to be the world's largest nuclear facility, has faced delays due to regulatory challenges and local opposition.

✦ Also, the strict liability laws in India, particularly the **Civil Liability for Nuclear Damage Act of 2010**, are a major deterrent for foreign technology suppliers.

💡 **Shortage of Skilled Workforce:** India's nuclear sector is facing a critical shortage of skilled professionals, including engineers, scientists, and technicians, worsened by limited training opportunities and the impending retirement of experienced staff.

✦ Institutions like **Bhabha Atomic Research Centre (BARC)** have limited intake capacity, and expanding the workforce to meet upcoming projects remains challenging.

✍ This expertise **gap threatens operational efficiency and hinders expansion efforts**.

✦ Also, **India's brightest minds in the nuclear field are often lured by more lucrative opportunities abroad**, particularly in countries with established and expanding nuclear programs like the US, France, and China.

💡 **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.

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✦ 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.

📌 The **2010 Mayapuri radiation incident in Delhi** highlighted critical gaps in nuclear waste control outside of regulated sites.

✦ As per the **World Nuclear Waste Report 2019**, no country currently has a fully operational final disposal site for nuclear waste.

📌 Finland is the only country that is currently constructing a permanent repository.

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

✦ India's nuclear industry has mostly operated outside International Atomic Energy Association (IAEA) safeguards, with only four nuclear plants under specific facility agreements.

✦ Incidents like the Fukushima disaster (2011) 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.

### What Measures can India take to Accelerate Nuclear Energy Growth?

💡 **Facilitating Private Sector Participation:** India should amend the Atomic Energy Act, 1962, to allow private sector participation in reactor operations, ensuring stringent regulatory safeguards.

✦ Private investment can accelerate technological innovation, reduce project delays, and unlock funding for large-scale projects.

📌 The government's plan to end the state monopoly and allow private firms in uranium mining and nuclear power generation marks a significant shift in the sector.

✦ A hybrid development model, combining government oversight with private expertise, would fast-track projects like Bharat Small Modular Reactors (BSMR).

💡 **Enhancing Domestic Uranium Exploration:** To address the uranium supply shortage, India should ramp up domestic uranium exploration and expedite mining projects.

✦ The recent re-discovery in Jaduguda Mines in Jharkhand 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.

💡 **Establishing Strategic Reserves for Nuclear Fuel:** To mitigate the risks of supply chain interruptions due to geopolitical factors, India needs to create a strategic reserve of nuclear fuel.

✦ By strengthening partnerships with nations like Russia, Kazakhstan, and Canada through Civil Nuclear Cooperation Agreements, India can secure a stable supply of uranium over the long term.

✦ Additionally, India should prioritize investments in advanced nuclear fuel-cycle technologies, particularly thorium utilization, taking advantage of its abundant domestic thorium resources to align with the nation's long-term sustainability and energy goals.

💡 **Reforming Regulatory Framework for Project Approvals:** India needs to reform the Atomic Energy Regulatory Board (AERB) to streamline the approval process for nuclear projects without compromising safety standards.

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✦ Establishing an **independent National Nuclear Energy Authority (NNEA)** with clear mandates for reactor approvals, safety monitoring, and collaboration with state governments would reduce bureaucratic delays.

✦ 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**.

💡 **Enhancing Nuclear Workforce Capabilities:** Building a skilled workforce for India's nuclear sector necessitates the integration of the **Skill India Mission** with specialized training programs offered by institutions like BARC and other institutions.

✦ These programs, **focused on advanced nuclear technologies, reactor operations, and waste management**, would help address workforce shortages while improving safety compliance.

✦ Additionally, **collaborations with international organizations**, such as those under the **International Atomic Energy Agency (IAEA) agreements**, can further strengthen technical expertise in the sector.

💡 **Leveraging AI and Digital Twins for Reactor Operations:** India can integrate Artificial Intelligence (AI) and Digital Twin technology to monitor and optimize reactor performance in real time but **should be backed with stringent cybersecurity measures**.

✦ AI can predict maintenance needs, detect anomalies, and improve operational safety, reducing risks of human error.

✦ **Digital Twins—virtual models of reactors**—can simulate operations, allowing for predictive analysis and efficient training of operators.

📌 The **Tarapur Atomic Power Station (TAPS) reactors located in Maharashtra**, have commenced pilot trials of digital twin technologies.

💡 **Managing Nuclear Waste Management Systems:** India should set up a centralized facility for nuclear waste management to ensure the sustainable handling of spent fuel.

✦ Although current practices involve **on-site storage and long-term disposal**, a more comprehensive approach focused on waste reuse and recycling is essential for long-term sustainability.

📌 India can learn from **Finland's Onkalo repository** that is a leading model of a deep geological storage facility.

✦ Investments in advanced reprocessing technologies will reduce environmental risks and improve public acceptance of nuclear energy.

💡 **Promoting Public Awareness and Community Engagement:** To enhance public awareness and address opposition, the government should initiate widespread campaigns focusing on the safety, advantages, and environmental sustainability of nuclear energy.

✦ **Actively involving local communities in discussions**, sharing transparent safety data, such as **Kudankulam's safety track record**, and offering incentives like subsidized electricity or funding for local development projects can help mitigate resistance.

📌 Building trust through open communication and fostering strong partnerships with communities will be **crucial in gaining support and accelerating project approvals**.

💡 **Thorium Valley Development Model:** Like Silicon Valley, India can create a "Thorium Valley", a **dedicated innovation zone in coastal Andhra or Kerala** (thorium-rich regions).

✦ This would integrate research institutes, reactor prototypes, startups, and thorium mining industries into one cluster.

✦ A special economic and regulatory regime for this zone **could fast-track India's thorium fuel cycle**.

## Conclusion

India's nuclear energy sector holds significant promise for the nation's sustainable growth and energy security. By addressing key challenges, fostering private sector participation, and leveraging technological advancements, the country can unlock its full nuclear

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potential. With strategic reforms and a focus on innovation, **India can pave the way for a robust and clean energy future (SDG 7)**, driving economic growth and contributing to global climate goals. The coming years will be crucial in shaping the trajectory of India's nuclear energy sector, and proactive measures will be key to realizing its ambitious targets.



## India's Logistics Transformation for A Sustainable Future

*The editorial, titled "**How India's Transport Future is Being Rewritten**," was published in Hindustan Times on 25/08/2025. It highlights the government's policy push for stricter fuel-efficiency standards and the Maritime Amrit Kaal Vision 2047 as game-changers for sustainable mobility and logistics efficiency. However, challenges such as high costs, infrastructure gaps, and the need for industry readiness persist.*

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

**India's logistics sector** is at the cusp of transformation. Once synonymous with congestion, high logistics costs, and fragmented supply chains, it is now being reshaped through bold policy pushes such as the **PM Gati Shakti National Master Plan**, **Dedicated Freight Corridors**, and the development of multimodal logistics parks. These initiatives promise to lower transportation costs, improve efficiency, and build a more competitive backbone for trade and mobility. Yet, challenges persist, from high costs and infrastructure gaps to a shortage of skilled manpower. How India addresses these hurdles **will determine whether logistics becomes a bottleneck or a backbone** in its journey to **Viksit Bharat@2047** and **net-zero** by 2070.

### How is India Transforming Its Logistics Sector?

- 💡 **Government Reforms:** The government has been instrumental in accelerating the growth of the logistics sector.

- ✦ The **PM Gati Shakti National Master Plan** stands out as a transformative initiative, designed to build an integrated multi-modal transport network that seamlessly links rail, road, **ports**, and airways.

🔗 This framework is **expected to cut down transportation time and costs**, while significantly boosting supply chain efficiency.

- ✦ The rollout of the **Goods and Services Tax (GST)** has further reshaped the sector by **removing interstate tax barriers**, ensuring quicker and more efficient movement of goods nationwide.

- 💡 **Infrastructure Push:** Large-scale infrastructure projects such as the **Dedicated Freight Corridors (DFC)**, the development of industrial corridors, and the establishment of **logistics parks** are reinforcing the sector's backbone and paving the way for robust and sustainable growth.

- ✦ In FY 2023–24, India completed and commissioned over 1,000 km of DFC track, **boosting daily train operations by 42%**.

- ✦ A total of **35 Multimodal Logistics Parks (MMLPs)** are being developed under the Bharatmala Pariyojana, with an estimated outlay of ₹50,000 crore.

- 💡 **E-commerce Boom and Last-mile Connectivity:** India's **e-commerce** boom has fundamentally transformed the logistics landscape.

- ✦ The **demand for faster and more dependable delivery solutions has surged**, making last-mile delivery a critical focus.

- ✦ Companies are investing heavily to expand their networks into Tier 2 and Tier 3 cities, while **hyperlocal delivery models are also gaining momentum**, ensuring quicker turnaround times.

🔗 India's last-mile delivery market is projected to **expand to USD 10.55 billion by 2032**.

- 💡 **Digital Transformation and Automation:** Technology is reshaping India's logistics sector through a paradigm shift in operations. **AI-driven route optimization** and **IoT-enabled fleet management** are making supply chains smarter, faster, and more data-centric.

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✦ For instance, **Delhivery** has developed an AI-powered “**RTO(Return to Origin) Predictor**” that assesses the risk of a shipment being returned.

✦ At the same time, **warehouse automation, robotics, and predictive analytics** are streamlining processes, reducing errors, cutting turnaround times, and boosting overall efficiency.

✦ **Blockchain technology** is steadily gaining traction, strengthening transparency, traceability, and security across the supply chain.

💡 Together, these innovations are not only reducing costs but also **elevating service quality, thereby enhancing the global competitiveness** of Indian logistics.

✦ In India, the emergence of logistics **start-ups** backing this technology is gradually transforming the unorganized transportation sector.

💡 **Growing Demand for 3PL and 4PL Services:** As companies seek to optimize their supply chains, **third-party logistics (3PL) and fourth-party logistics (4PL)** providers are gaining prominence.

✦ These providers offer end-to-end logistics solutions, enabling businesses to focus on core operations while ensuring seamless warehousing, transportation, and distribution.

✦ The growing reliance on **3PL and 4PL services** is expected to further drive efficiency and cost savings in the sector.

💡 3PL accounts for the largest share of India's overall logistics market in 2024.

💡 **Workforce and Formalisation Drive:** A systematic transition from informal to formal logistics has driven improvements in skilling, job creation, and overall workforce productivity.

✦ Government-supported initiatives such as **Employee-Linked Incentive (ELI) schemes** and targeted training programmes for logistics and warehousing are reshaping this traditionally unorganised sector.

✦ These efforts are also strengthening India's **demographic dividend** by unlocking new employment opportunities and enhancing human capital.

💡 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 Green Transition:** Growing environmental awareness and global **ESG standards** are driving a transformation in Indian logistics.

✦ The **PM e-Drive scheme** is promoting electric vehicles in logistics to reduce fossil fuel reliance and curb emissions, while **ethanol blending is encouraged to reduce carbon emissions** and support cleaner energy solutions.

✦ The sector is increasingly adopting **electric vehicle** fleets, coastal shipping, energy-efficient ports, and carbon-tracked supply chains to reduce its ecological footprint.

💡 India is also aligning with international benchmarks such as the **Carbon Intensity Rating and the Energy Efficiency Existing Ship Index (EEXI)** to promote sustainable shipping practices, while simultaneously attracting ESG-sensitive investments.

✦ Furthermore, **initiatives like freight villages and coastal shipping corridors, supported by platforms such as the Sagar Sethu portal**, are being scaled up to lower both emissions and logistics costs.

💡 10 major highway segments in India have been designated for **exclusive use of zero-emission trucks (ZETs)** to decarbonize logistics, reduce **air pollution**, and enhance energy security on routes critical for freight transport.

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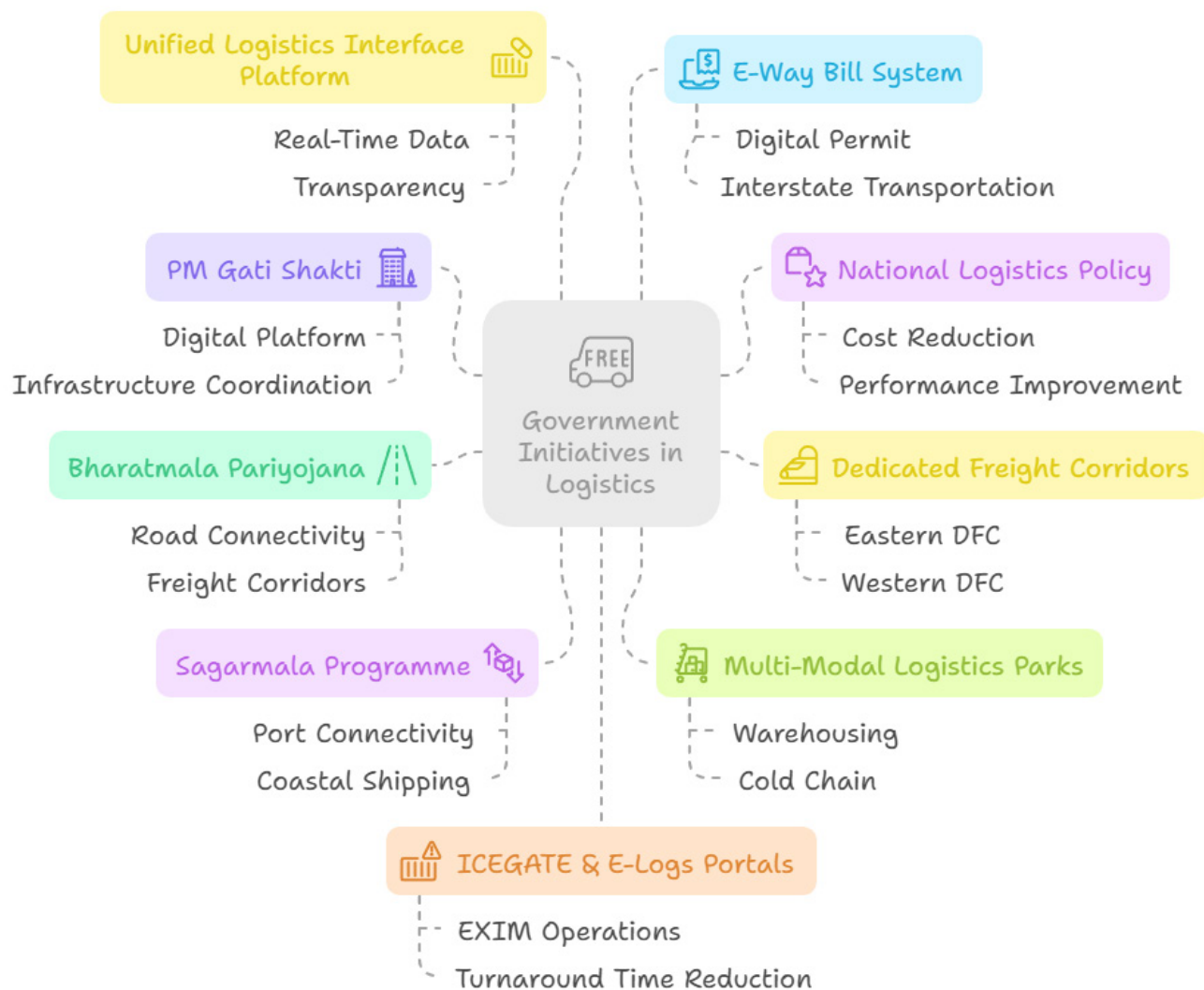
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## Key Government Initiatives in Indian Logistics Sector



### What Factors Constrain the Efficiency of India's Logistics Sector?

- 💡 **High Logistics Cost:** India's logistics cost remains significantly higher than global benchmarks, impacting the competitiveness of exports and domestic production.
  - ✦ India's logistics costs have **declined to around 7.8–8.9% of GDP** in 2021–22, marking a significant improvement, **yet they remain marginally higher than the global average**.
  - ✦ The fragmented supply chain, **over-reliance on roads (70% of freight movement)**, and lack of modal integration inflate costs.
    - ✍ This affects **MSMEs** the most, reducing their margins and limiting global competitiveness.
- 💡 **Infrastructure Bottlenecks & Project Delays:** Despite programs like **Bharatmala** and DFCs, gaps in road quality, port congestion, and rail connectivity persist, leading directly to increased delays and elevated logistics costs.

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- ✦ For example, though the average turnaround time at major ports has fallen from 127 hours in 2010-11 to 53 hours as of 2021-22.

✍ The **World Bank's Logistics Performance Index 2023** ranked India **38<sup>th</sup> out of 139 countries**, with infrastructure quality being a key area of concern.

- ✦ Furthermore, **delays in land acquisition and regulatory clearances** continue to be a critical challenge for infrastructure projects.

✍ Lack of time bound land acquisition and clearances resulted in a **delay of approximately 850 government run projects** (till December 2022).

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

- ✦ Although the GST regime streamlined many interstate tax barriers, such **policy fragmentation continues to inflate costs** and hinder seamless operations.

✍ Moreover, even with the launch of PM Gati Shakti, **coordination between the Centre and states remains inconsistent**.

- ✦ 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.

💡 **Gaps in Multimodal Connectivity:** Despite efforts to promote multimodal transportation, integration between different modes remains a challenge.

- ✦ As per **NITI Aayog report (2021)**, **road transport dominates with a 71 % modal share** of freight movement, while rail accounts for just 18 %, and **inland waterways a negligible 2%**.

✍ This disproportion underscores the difficulty of shifting cargo onto more efficient, sustainable modes.

- ✦ Furthermore, the **Dedicated Freight Corridor (DFC) project has experienced significant delays**, and the persisting gaps in multimodal integration continue to hinder logistics efficiency while driving up overall costs.

💡 **Skill Gap and Workforce Challenges:** The logistics sector faces a significant skill gap, with a shortage of trained professionals across various levels.

- ✦ The logistics sector, growing at a compound annual growth rate of 12%, is expected to add 10 million jobs by 2027, but there's a **severe shortage of skilled workers**.

✍ This skill gap is particularly acute in areas like supply chain management, warehouse operations, and technology adoption.

- ✦ Also, **over 90% of the logistics industry is unorganized**, leading to low productivity, unsafe work conditions, and limited career mobility.

💡 **Technology Gap in Logistics:** Despite rapid growth, India's logistics sector suffers from a significant digital divide. The **absence of a centralized database** to map goods movement hampers evidence-based policymaking and limits effective monitoring of freight flows.

- ✦ Existing digital solutions such as **e-way bills, FASTag**, and port community systems are fragmented and **fail to provide end-to-end visibility across the supply chain**.

- ✦ Moreover, **poor adoption of advanced digital technologies like AI, IoT, and blockchain** means that route optimization, fleet management, and predictive planning remain underutilized.

✍ As a result, **many operators continue to rely on manual processes**, leading to inefficient route selection, uninformed decisions, and rising logistics costs.

💡 **Environmental Concerns and Sustainability:** The logistics sector faces increasing pressure to reduce its environmental impact, particularly in terms of carbon emissions.

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- ✦ In India, transport contributes nearly **14% of India's CO<sub>2</sub> emissions, with 90% from road transport.**

✎ Fuel economy and emission standards like **phases 3 and 4 of Corporate Average Fuel Efficiency (CAFE) norms** are still under finalisation.

- ✦ While the government has set ambitious targets, **including reducing carbon intensity by 45% by 2030**, the logistics sector lags in the adoption of sustainable practices.

💡 **Cold Chain Deficit & Agri-Supply Chain Leakages:** India's cold chain logistics infrastructure is significantly underdeveloped, leading to substantial post-harvest losses.

- ✦ Despite being the **world's largest producer of milk and the second-largest producer of fruits and vegetables**, the country faces a severe cold storage deficit.
- ✦ The cold chain sector is highly fragmented, with **over 90% of facilities being privately owned.**
- ✎ Due to this, approximately **40% to 50% of perishable agricultural produce is lost annually** due to inadequate cold storage facilities and inefficient supply chain management.

### What Reforms are Required to Boost India's Logistics Sector?

💡 **Streamline Regulatory Processes:** Establish a **single-window clearance system** for logistics approvals across states and harmonise state-level regulations to create a truly unified national market.

- ✦ **Expedite the rollout of faceless customs assessment** to minimise physical interfaces and speed up clearances, building on the success of **e-SANCHIT**, which has already digitised customs documentation.
- ✎ By leveraging technology, fostering innovation, and simplifying regulatory processes, **India can significantly reduce logistics costs and improve the overall ease of doing business.**

💡 **Fast-tracking Infrastructure Development:** Prioritise and accelerate the completion of critical infrastructure projects, with a special emphasis on enhancing multimodal connectivity.

- ✦ Strengthen **last-mile connectivity to major economic centres** and ports by expediting projects such as the Dedicated Freight Corridors (DFCs).
- ✦ Introduce a **robust project monitoring framework, similar to the PM Gati Shakti National Master Plan**, to track progress and ensure timely delivery of major logistics infrastructure initiatives, including canal development.

✎ **Introducing clear Key Performance Indicators (KPIs)** can track the impact of multimodal and last-mile projects, ensuring accountability and measurable efficiency gains.

💡 **Promote Multimodal Transportation:** Develop Integrated Multimodal Logistics Parks (IMLPs) at strategic hubs to enable smooth transfer across transport modes.

- ✦ Provide **targeted incentives to shift cargo from road to more efficient alternatives** such as rail and inland waterways.
- ✎ For instance, **fast-track the implementation of the 35 logistics parks** proposed under the Bharatmala Pariyojana.
- ✦ Encourage private sector participation in developing multimodal infrastructure through **public-private partnerships (PPPs).**
- ✎ In 2020, PPP accounted for 51% of cargo handling at major ports, and the **Maritime India Vision 2030** aims to raise this share to over 75% by 2030.

💡 **Adopting Advanced Technologies:** India must accelerate the adoption of technology-enabled solutions such as blockchain, **big data**, cloud computing, and digital twins to strengthen its logistics sector.

- ✦ Recent global trends show that these tools are critical for tackling supply chain disruptions and advancing sustainability.

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✦ Although India's current adoption levels remain modest, the government's digital initiatives like **ICEGATE (Indian Customs Electronic Gateway)** and **E-Logs** have already demonstrated the benefits of reducing inefficiencies, improving transparency, and speeding up goods movement.

✍ **Scaling up such technology-driven measures is essential** for creating a resilient, transparent, and globally competitive logistics ecosystem.

💡 **Building a Skilled Logistics Workforce:** A dedicated skilling mission, under **Skill India** and the **Logistics Sector Skill Council**, should focus on building expertise in warehouse operations, multimodal handling, and digital technologies.

✦ Introducing **modular training programmes linked to certification and employability incentives** can enhance sectoral productivity.

✍ Special attention must be given to **upskilling informal workers** in areas such as emerging technologies and ESG compliance to align the workforce with future industry needs.

✦ Sustainability and **"green skills"** have become a global priority for corporations, nations, and individuals, making it essential for India's logistics **workforce to be trained in eco-friendly practices and energy-efficient technologies**.

💡 **Formalising the Unorganised Logistics Sector:** India must simplify compliance procedures and build an enabling framework that allows small fleet operators, local warehousing agents, and truckers to register, upgrade, and formalise their businesses.

✦ A unified logistics registration portal, access to affordable finance, and **simplified GST processes** can ease this shift.

✦ Additionally, **logistics providers can utilize the ONDC platform** to streamline operations, optimize routes, and consolidate shipments from multiple sellers.

💡 **Promoting Green Logistics:** The transition to sustainable logistics is no longer optional, but a **necessity for maintaining global competitiveness and meeting climate commitments**.

✦ Moreover, India should **promote EV adoption in logistics through subsidies**, charging infrastructure, and battery support, while also encouraging alternate fuels like CNG and biofuels.

✦ A **NITI Aayog report** estimated that fleet electrification alone represents a **USD 200 billion opportunity** for India as the country moves toward achieving a **30% EV sales share by 2030**.

💡 **Agri-Centric Cold Supply Chain Networks:** India needs farm-gate integrated cold chains linked directly with processing units, mandis, and export hubs.

✦ This requires **solar-powered pack houses, reefer trucks, and AI-driven demand forecasting** to minimize food wastage.

✦ **Farmer Producer Organizations (FPOs)** should be incentivized to co-own cold infrastructure. Such networks will not only reduce post-harvest losses but also **boost farmers' incomes and agri-exports**.

💡 **Geo-Strategic Logistics Diplomacy:** India should pursue logistics diplomacy with neighbors and global partners by securing cross-border transport agreements, transit rights, and port access.

✦ Linking **BIMSTEC, INSTC, IMEC, and Indo-Pacific** supply chains strengthens India's strategic influence.

✍ This **makes logistics a tool of both economic growth and foreign policy leverage**.

## Conclusion

India's logistics sector is poised to become a driver of sustainable growth if reforms are matched with decisive execution. By embracing technology, green mobility, and workforce skilling, the sector can strengthen competitiveness while advancing **SDG 8 (Decent Work)**, **SDG 9 (Infrastructure & Innovation)**, and **SDG 13 (Climate Action)**. A future-ready logistics backbone will be central to India's journey toward **Viksit Bharat 2047**.



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## Unlocking the Potential Of India's Tourism Sector

The editorial, titled "**Tourism, the tariff-proof sector**," was published in Indian Express on 26/08/2025. It highlights tourism's potential to drive employment, foreign exchange, and national pride. It underscores the need for strategic planning, infrastructure investment, and global visibility to fully unlock the sector's growth potential.

**Tag:** GS Paper-3, Mobilization of Resources, Employment, Inclusive Growth

**Tourism** is one of the most resilient and dynamic sectors for economic growth, with significant potential to generate employment, foreign exchange, and national pride. Despite challenges such as **tariffs and global trade fluctuations**, India has a unique opportunity to leverage its rich cultural heritage, diverse landscapes, and growing demand for tourism both domestically and internationally. Recent developments in the tourism sector underscore India's potential to become a global tourism leader, aligning with its ambitious target of a **USD 3 trillion tourism economy by 2047**.

### What Role does Tourism Play in India's Development Prospects?

💡 **Economic Growth and Job Creation:** Tourism is a key driver in India's service sector, contributing to income generation, **job creation**, and **foreign exchange earnings**.

✦ Tourism has **strong linkages with sectors like hospitality, transport, handicrafts, and agriculture**.

📌 As a labor-intensive industry, it provides employment across a wide range of skills and **generates positive spillover effects**, benefiting related industries and local economies.

📌 Additionally, tourism **fosters the growth of MSMEs and startups**, especially in tier-2 and tier-3 cities.

✦ In 2024, India's total contribution of Travel & Tourism to **GDP** was USD 249.3 billion. By 2035, the sector is expected to **contribute an estimated 10.9% to the national GDP**.

📌 Also, tourism supported **46.5 million jobs in 2024**. According to the WTTC, this number is expected to rise to nearly 64 million by 2035.

✦ Moreover, in 2024, tourism generated **USD 28 billion in foreign exchange earnings** for India.

💡 **Impact on Regional Development and Social Inclusion:** Tourism promotes balanced regional development by channeling investment and infrastructure into remote, rural, and **tribal areas**, thereby enhancing social inclusion.

✦ It generates income **opportunities for marginalized communities** through homestays, local cuisine, and cultural crafts.

✦ Initiatives like **PRASHAD** and **Swadesh Darshan** play a vital role in integrating underdeveloped regions into the broader national development framework.

📌 Under the **Swadesh Darshan 2.0** and **PRASHAD** schemes, 52 projects and 54 religious sites in the country have been sanctioned by the government.

📌 For example, **projects at the Kamakhya Temple in Assam** under the PRASHAD scheme improved infrastructure, which boosted the local economy.

💡 **Driving Innovation and Entrepreneurship:** Tourism has unlocked a surge in tech-driven startups offering curated experiences, **AI-based** travel planning, and digital booking platforms.

✦ It **fosters grassroots innovation in areas like eco-tourism**, rural stays, and experiential travel. Youth, especially in tier-2 and tier-3 cities, are entering the sector through government-supported incubators and accelerators.

📌 The Ministry of Tourism, through its **"Dekho Apna Desh"** webinars, has started to offer virtual tourism.

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- ✍ Startups like **Airial** are revolutionizing the travel industry by leveraging AI to create personalized itineraries.
- ✦ Moreover, the **Tadoba Andhari Tiger Reserve (TATR)** in Maharashtra launched the **Vanyajivan Skill Academy**, empowering youth from forest-fringe villages to pursue entrepreneurship and eco-tourism opportunities.
- 💡 **Soft Power and Cultural Diplomacy:** Tourism is a vital tool of **soft power**, enhancing India's image globally by showcasing its cultural depth, spiritual diversity, and civilizational ethos. It fosters **people-to-people contact** and builds goodwill with other countries.
  - ✦ Events, **cultural festivals**, and **film tourism** strengthen India's diplomatic engagements. The diaspora and religious circuits act as cultural bridges.
    - ✍ The **Mahakumbh 2025** drew over 600 million pilgrims, including a large number of international visitors.
  - ✦ Between 2020 and 2024, US, Bangladesh, United Kingdom, Australia, Canada, Malaysia, Sri Lanka, Germany, and France **emerged as the top source countries** for India's foreign tourist arrivals.
    - ✍ Also, the **G20 Tourism Working Group meetings in 2023**, hosted in various Indian cities, have served as a platform to **showcase India's rich cultural diversity on a global stage**, reinforcing this role.
- 💡 **Promoting Traditional Arts, Crafts, and Culinary Heritage:** India's rich cultural heritage, including its diverse arts, crafts, and culinary traditions, has become a key focus of tourism promotion.
  - ✦ For example, **Mumbai's Khau Gallis** offer tourists an authentic taste of local street food, showcasing the city's vibrant culinary culture. Similarly, the **South Indian "Filter Coffee" Trail** promotes the region's iconic coffee culture.
- ✍ Such initiatives not only preserve India's cultural traditions but also **create opportunities for local artisans and culinary experts** to gain recognition on the global stage, enhancing the tourism experience.
- 💡 **Rise Medical and Wellness Tourism:** India's affordable and advanced healthcare system has made it a sought-after destination for global medical tourists, contributing significantly to the growth of the wellness tourism sector.
  - ✦ The **Heal in India initiative**, which integrates modern medicine with traditional practices like **Ayurveda, Yoga, and wellness therapies**, further strengthens India's position as a global healthcare hub.
    - ✍ Additionally, the **simplification of medical visa processes**, including the introduction of the **e-visa and Ayush visa**, has made it easier for international patients to access medical treatment and wellness services in India, thereby fueling the sector's growth.
  - ✦ India's **wellness tourism** industry is experiencing significant growth, valued at USD 19.4 billion and **projected to reach USD 29.8 billion by 2031**.
- 💡 **Accelerator of Sustainable Development Goals:** Tourism intersects with multiple **SDGs—poverty alleviation, gender equality**, sustainable communities, and environmental conservation.
  - ✦ It **enables economic growth with a low ecological footprint** when planned sustainably. Conscious luxury, eco-resorts, and community-based tourism are on the rise. The **National Strategy for Sustainable Tourism** and schemes like **SAATHI** promote eco-certification and hygiene compliance.
    - ✍ For instance, in **Himachal Pradesh's Jibhi Valley**, community-based tourism has enabled locals, once primarily farmers, to **earn through homestays, guided tours, handicrafts, and traditional cuisine**. This model boosts income while preserving local culture.

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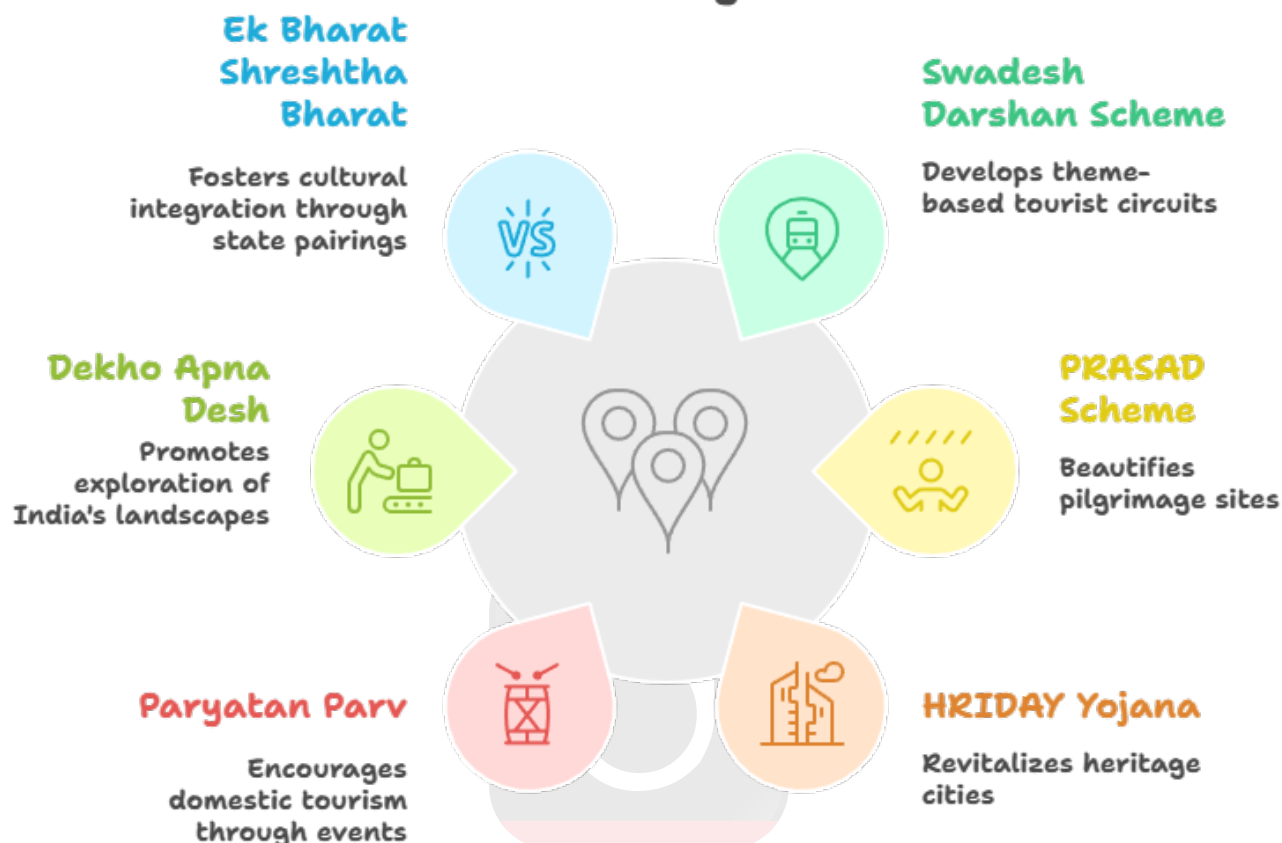
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## Initiatives Enhancing Tourism in India



### What are the Main Challenges Hindering the Growth of Tourism in India?

- 💡 **Lack of Adequate Infrastructure:** Many tourist destinations, particularly in rural or remote areas, suffer from poor roads, unreliable public transportation, and a shortage of hotels or guesthouses.
  - ✦ While cities like Delhi and Mumbai have better infrastructure, states like Odisha and North-East, which could be popular tourist attractions, are often hard to reach and lack basic facilities like clean water, proper sanitation, and consistent electricity.
    - 📎 As per the **Union Ministry of Tourism Assessment, 2023**, 41% of stakeholders consider the lack of infrastructure a significant barrier to enhancing tourist footfall in India.
  - ✦ Despite government efforts to improve tourism infrastructure, progress has been slow, and many areas remain underdeveloped.
    - 📎 Regions like the **Himalayan** religious circuits remain underdeveloped in terms of roads, airports, and accommodations.
- 💡 **Over-tourism and Environmental Degradation:** The rapid growth of tourism in certain regions has led to significant challenges, particularly in areas already facing limited resources.
  - ✦ Popular destinations like Coorg and Wayanad experience significant strain due to excessive tourist inflow, which puts immense pressure on local resources such as water, land, and ecosystems.
    - 📎 Over-tourism in these regions also disrupts the balance of natural beauty and resources, putting local communities at risk of resource depletion.

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✦ **Manali, Shimla, and Joshimath** experienced significant strain due to the surge in tourists. While the **National Strategy for Sustainable Tourism** has been established, its implementation has been inconsistent.

💡 **Shortage of Skilled Workforce and Tourism-Focused Training:** A skilled workforce is essential for providing high-quality tourism experiences. However, India's tourism and **hospitality sectors face a significant shortage of skilled labor**, especially in rural and semi-urban areas where tourism is expanding.

✦ The Indian hospitality industry **employs nearly 37 million people, yet only 1% of them receive proper training** and possess the necessary skills.

✦ The absence of formal training programs and low wages in the sector have led to inconsistent service quality, ultimately affecting the tourist experience.

💡 Even though government initiatives like the **Hunar Se Rozgar Tak scheme** aim to bridge skill gaps through vocational training, **challenges such as fragmented implementation** and limited alignment with industry requirements often reduce their overall effectiveness.

💡 **Low Global Visibility and Ineffective Branding:** India's efforts in promoting tourism have not kept up with global competitors who invest heavily in aggressive marketing and **destination branding**.

✦ Although the **'Incredible India' campaign** remains iconic, its impact has diminished over time.

💡 The absence of consistent digital and event-driven marketing hinders India's image as a modern, safe, and vibrant destination.

✦ Also, **branding is often fragmented**, with different states and agencies promoting their own unique, but isolated, campaigns, which dilutes the overall national message.

💡 Nations like **Saudi Arabia, Georgia, Azerbaijan, and Kazakhstan** have surged in popularity by using digital campaigns, easing visas, and hosting events, while India's global marketing spend remains modest.

💡 **Regulatory Hurdles and Lack of Ease of Doing Tourism:** Bureaucratic delays in approvals, licensing, and tax policies create obstacles for tourism startups, hotel chains, and foreign investors.

✦ The **complex permit systems and inter-state travel regulations** frustrate both **operators and travelers**, hindering India's potential as a smooth and efficient travel destination.

💡 According to the **WTTC 2024-25 report**, India only accounts for **1.5% of international tourist arrivals**.

✦ Also, despite ample tourism startups, many cite compliance issues and the poor **ease of doing business** in the sector.

💡 **Cultural Dilution and Community Displacement:** The commercialization of tourism often leads to the commodification of culture, where local traditions, art forms, and festivals are altered to appeal to a foreign audience.

✦ Furthermore, over-tourism in popular areas like **Goa and the Himalayas** has led to a **significant increase in real estate prices**, often displacing local communities and disrupting their traditional way of life.

✦ The **benefits of tourism often don't trickle down to the local population**, with a large share of the profits going to large, out-of-town corporations.

💡 **Safety and Security Concerns:** While the government has made significant progress in strengthening the tourism sector through improved infrastructure and promotional initiatives, **safety and security concerns continue to pose a challenge**.

✦ For instance, the recent **Pahalgam incident** highlighted the **vulnerabilities in popular tourist destinations**, undermining the progress made in ensuring a safe environment for visitors.

💡 Such incidents **not only impact the safety of tourists but also tarnish the reputation of the region** as a safe travel destination.

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## What Measures can India Adopt to Strengthen and Sustain its Tourism Sector?

💡 **Improving Connectivity and Infrastructure Development:** Improving transportation links and ensuring safety in remote tourist destinations is essential to encourage the **exploration of lesser-known areas**.

✦ For example, **Gokarna in Karnataka**, now promoted as an alternative to the crowded beaches of Goa, illustrates how improved infrastructure and connectivity are **transforming once-remote destinations into popular tourist hotspots**.

✦ **Public-private partnerships** or government investments can drive these improvements, ensuring better accessibility and promoting regional tourism.

📎 **Kerala Tourism Infrastructure Limited (KTIL)** has played a key role in developing tourism infrastructure through PPPs.

📎 By leveraging such collaborations, **other states can create sustainable tourism infrastructure** that supports both local communities and the overall tourism industry.

✦ The inclusion of tourism in the **Harmonised Master List of Infrastructure** will further catalyze investments in PPP projects, such as hotels.

✦ Moreover, measures such as **deploying tourism police, implementing strict security protocols** at attractions, and promoting safe travel practices will enhance tourists' confidence in travelling within India.

💡 **Enhancing Tourism Through World-Class Destinations:** There is a need to enhance India's tourism sector to make it more competitive on the global stage by improving infrastructure, diversifying offerings, and **providing unique experiences to visitors**.

✦ The proposal for the development of **50 world-class tourist destinations** in collaboration with state governments is a step in the right direction.

✦ By focusing on regional destinations, this plan seeks to transform India's tourism from just a **"place to see" into a "place to experience."**

📎 It will highlight the country's rich cultural, historical, and natural diversity, ensuring these destinations **meet global standards of tourist experience and sustainability**.

💡 **Simplifying E-Visas and Immigration Processes:** To enhance India's attractiveness as a tourist destination, streamlining entry procedures is essential.

✦ Simplifying the **e-visa process** and **reducing immigration queues** would greatly enhance the arrival experience, enabling tourists to start their journeys in India with ease.

📎 **Faster visa processing** and a more efficient entry system would not only improve convenience but also boost tourism arrivals, making India a more accessible and attractive destination for travelers.

💡 **Develop Destination Management Plans with Carrying Capacity Norms:** India needs to shift from **site-based tourism** to **destination-focused planning**, taking into account environmental thresholds, local resource constraints, and seasonality.

✦ Incorporating studies on **carrying capacity, zoning, and crowd control measures**, such as timed entry or ticket limitations, can help prevent over-tourism.

📎 This strategy is particularly important for destinations like **hill stations, wildlife parks, and spiritual circuits**.

💡 **Leveraging Digital Technology:** To expand India's reach, the tourism sector must focus on digital storytelling and content-driven promotion.

✦ **Collaborating with influencers** and leveraging the power of social media platforms will allow India's tourism offerings to be showcased to a global audience.

📎 The rise of **AI-enabled curation and partnerships** with major global platforms will amplify India's visibility, attracting tourists who are seeking personalized experiences in the country.

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✦ Moreover, **real-time data analytics** should be used for decision-making and emergency preparedness.

✍ The **Dekho Apna Desh** campaign, which promotes domestic tourism, can be evolved into a national movement.

💡 **Enhancing Tourism Workforce Skills:** Offering comprehensive training programs to the unskilled workforce, particularly those working in the tourism sector, will significantly improve service quality.

✦ Schemes like **Hunar Se Rozgar Tak** can be optimized to foster both tourism and employment. These programs can cover areas such as customer service, cultural sensitivity, and language skills, ensuring that tourists enjoy a positive and welcoming experience.

✦ Additionally, **providing cultural sensitivity training for both tourists and industry professionals** can help minimize misunderstandings and encourage respect for local traditions.

✍ The **Ministry of Tourism** should partner with institutes like IHMs and private platforms to build modules on responsible tourism, biodiversity ethics, and green practices.

💡 **Create Sustainable Coastal and Island Tourism Models:** India's long coastline and island ecosystems require fragile zone management with a focus on **coral reef protection**, **plastic-free zones**, and regulated cruise tourism.

✦ Integrating policies under the **Blue Economy framework** with tourism planning will ensure marine ecosystem conservation.

✦ Coastal states should **adopt eco-tourism codes of conduct**, community vigilance systems, and green transport options (like e-boats).

✍ Island destinations like **Andaman & Lakshadweep** must prioritize **zero-waste tourism policies**.

## Conclusion

Tourism offers a unique opportunity to build domestic resilience, creating demand that cannot be taxed at foreign

borders and jobs that cannot be offshored. **Moving forward, India must embrace a bold and ambitious tourism strategy that prioritizes both inward development and outward benefits.** Though global challenges like tariffs remain, the warmth of India's welcome remains a key strength, one that can shape a prosperous and resilient future for the sector.



## Building A Stronger Education System in India

*The editorial, titled "**Play-based Learning for India's Future**," was published in The Hindu on 27/08/2025. It highlights the significance of play-based learning within the broader framework of India's evolving education system. However, despite various reforms, challenges remain, including gaps in infrastructure, inadequate teacher training, and disparities in access that still need to be addressed.*

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

With approximately **26% of its population aged 0-14 years**, **India's education sector** presents significant opportunities for growth. Over the years, the country has made notable strides in educational reform, particularly through initiatives like the **National Education Policy (NEP) 2020**. However, challenges such as high dropout rates, skill mismatches, unequal access to education, and infrastructure gaps remain. To fully harness the potential of India's education system, **key reforms are essential to improve education quality, boost employability, and promote inclusive growth, empowering future generations.**

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

💡 **Growth of Digital and Online Education:** India's education system has swiftly adopted digital learning, particularly in the aftermath of the pandemic.

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- ✦ The shift to **online platforms and blended learning models** has made education more accessible, especially for students in remote regions.
- ✦ The growth of edtech companies, along with government initiatives like **PM eVidya**, has greatly extended the reach of education.
  - 📌 In 2021, **Amazon launched its global computer science education initiative** in India (for grades 6-12).
- ✦ Moreover, the government aims to set up a new **centre of excellence for AI** for education with an outlay of Rs 500 crore (**Union Budget 2025-26**).
  - 📌 Through these developments, the online education sector in India is expanding rapidly, with an anticipated growth of **USD 2.28 billion between 2021-25**, reflecting a **CAGR** of nearly 20%.
- 💡 **Integration of Vocational Education and Skills Development:** The **National Education Policy (NEP) 2020** emphasizes skill development and vocational education as key solutions to India's employment challenges.
  - ✦ By embedding **skill-based learning into mainstream education**, India seeks to better equip its youth with the practical skills required to meet evolving industry demands.
    - 📌 The **Skill India mission** aims to enhance employability and **promote skill development** across the country.
  - ✦ With this, student enrolment in skill education has surged to over **30 lakh in 2024**.
- 💡 **Transforming Early Education:** The **Foundational Literacy and Numeracy (FLN) Mission** is a transformative initiative, focusing on ensuring literacy and numeracy for children by Grade 3.
  - ✦ It emphasizes **foundational education as the cornerstone for all future learning**, addressing learning gaps at the earliest stages. By closing these basic education gaps, the mission aims to foster cognitive and social development in young learners.
- 📌 The year 2025 will be pivotal for FLN in India, as the **NIPUN Bharat Mission** strives to achieve **universal foundational literacy and numeracy** in primary schools by **2026-27**.
- ✦ Initiatives like **Navchetna** further enhance early education by providing age-appropriate, **play-based learning activities** to support the development of young children.
  - 📌 Moreover, the **Poshan Bhi Padhai Bhi (PBPB) initiative** aims to transform **Anganwadi centres** into vibrant early learning hubs, focusing on both nutrition and education.
- 💡 **Enhanced Focus on Research and Innovation:** India is gradually transitioning towards a **research-driven education model** with an emphasis on innovation and industry collaboration.
  - ✦ The government's push for 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.
    - 📌 Over **10,000 Atal Tinkering Labs** have been established across schools, engaging over 1.1 crore students in hands-on learning.
    - 📌 Moreover, India's rank in the **Global Innovation Index** improved from 76 in 2014 to 39 in 2024.
  - ✦ **Anusandhan National Research Foundation (ANRF)** has been established to promote research and development and foster a culture of research and innovation.
- 💡 **Policy Support for Private Investment and FDI:** The Indian government has proactively fostered private investment in education, leading to substantial improvements in the sector's infrastructure and innovation.
  - ✦ The **allowance of 100% FDI in education** has attracted global players, creating a more competitive environment.

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- ✍ The education market in India is **projected to reach USD 225 billion by FY25** and FDI inflow in the education sector between April 2000 to December 2024 stood at USD 9.90 billion.
- 💡 **Rise of Multilingual and Regional Language Education:** The NEP 2020's emphasis on **multilingualism and regional language education** has marked a transformative shift in India's educational system.
  - ✦ By **promoting the use of regional languages as the medium of instruction**, the policy aims to bridge regional disparities and reinforce cultural identity.
  - ✍ **AICTE's e-KUMBH** (Knowledge Unleashed in Multiple Bharatiya Languages) continues to play a pivotal role in bridging linguistic divides and promoting equitable access to quality education.
- 💡 **Advancing in Teacher Training and Pedagogical Reforms:** The emphasis on teacher training in the NEP 2020 and **NISHTHA** programs is a significant advancement. NEP 2020 requires a **4-year integrated Bachelor of Education (B.Ed.) degree**, blending subject expertise with pedagogical training.
  - ✦ These reforms are **designed to standardize and enhance teaching quality nationwide**. By incorporating modern pedagogical methods, the training fosters improved outcomes, shifting the focus from rote learning to critical thinking.
  - ✦ NISHTHA has trained over **42 lakh teachers as of 2024**, enhancing their skills in student-centered learning.
  - ✍ Moreover, with a user base of 27.5 crore, including 1.5 crore teachers across 36 states, the **DIKSHA platform has achieved 70% rural penetration** (MoE, 2023).
- 💡 **Reshaping Higher Education Governance & Autonomy:** The proposed restructuring of higher education governance, with the establishment of the **Higher Education Commission of India (HECI)**, is a positive reform.

- ✦ By granting greater autonomy to colleges and universities, this initiative fosters innovation and academic excellence.
- ✍ It **seeks to reduce centralized control**, offering institutions more freedom in their operations and curriculum development.
- ✦ Additionally, the **new accreditation reforms have contributed to improved university rankings**, with India surpassing China to become the **fourth-largest country in terms of universities in the Times Higher Education University Rankings 2024**.
- ✦ India is also expanding its global presence, with **IIT Madras opening a campus in Zanzibar** and **IIT Delhi establishing one in Abu Dhabi**.

### What are the Major Issues Impacting India's Education System?

- 💡 **High Dropout Rates in Secondary and Higher Education:** Although primary school enrollment is nearly universal, **dropout rates rise significantly in secondary and higher education**, especially among girls and socio-economically disadvantaged groups.
  - ✦ Contributing **factors include financial challenges, inadequate infrastructure, early marriages, and cultural biases**.
  - ✍ According to the **ASER 2024**, the dropout rate for 15-16-year-olds was 7.9% in 2024, with girls having a higher rate of 8.1%.
- 💡 **Unequal Access to Education:** Despite the country's rapid economic growth and rising prosperity, many rural areas, **particularly in states like Rajasthan and Bihar**, along with underprivileged communities, still face barriers to quality education.
  - ✦ This disparity is **evident in the lower literacy rates and higher dropout rates among students from these regions**.
  - ✍ As per the **PLFS 2023-24**, urban India boasts a literacy rate of 88.9%, but **rural India trails far behind at 77.5%**.
- 💡 **Inadequate Funding and Resource Allocation:** While India's education sector has attracted growing investments, the funding levels are still insufficient to carry out the extensive reforms envisioned by NEP 2020.

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✦ NEP 2020 reiterated the long-standing goal of **increasing public expenditure on education to 6% of GDP**. However, actual spending has consistently hovered **around 3-4% of GDP for years**.

✦ This funding shortfall impacts various aspects of education, including teacher salaries, infrastructure development, and the integration of digital learning tools.

📎 According to **UDISE+**, out of the over 14.71 lakh schools in India, approximately **1.52 lakh schools lack access to functional electricity**, and many also face shortages of basic facilities such as drinking water and toilet facilities.

💡 **Rote Learning and Slow Curriculum Transition:** India's education system remains heavily reliant on rote memorization, hindering the development of critical thinking and problem-solving skills.

✦ Despite the NEP 2020's emphasis on competency-based learning, schools and universities have been slow to move away from traditional examination methods.

📎 According to the ASER 2024, **76% of Class 3 students and 55.2% of Class 5 students** are unable to read at the Class 2 level, and over 66% of Class 3 and Class 5 students struggle with basic math.

💡 **Digital Divide and Technological Barriers:** While the pandemic has accelerated the shift towards digital education, a **substantial digital divide still hinders effective educational reform**.

✦ Rural areas, in particular, face unreliable internet connectivity, making online learning difficult to access.

📎 While initiatives like **PM eVidya and the Skill India Digital platform** have aimed to bridge the digital divide, a **significant number of students in rural areas still lack access to high-speed internet**.

✦ The Ministry of Education in India reported in 2024 that **only 18.47% of rural schools had internet access**, compared to **47.29% in urban areas**.

💡 **Private vs. Public School Divide:** The widening gap between private and public schools in India remains a significant challenge.

✦ In higher education, **67.51% of the 1,385 universities and 37.81% of the 60,127 colleges are private**, often with exorbitant fee structures.

✦ The privatization of education has created a scenario where **access to quality education is increasingly influenced by a student's socioeconomic background**, further deepening educational inequalities.

💡 **Teacher Shortages and Quality Issues:** India is grappling with a significant shortage of qualified teachers, with many schools relying on untrained or underqualified staff.

✦ Additionally, teacher absenteeism, **outdated teaching methods**, and the **burden of excessive non-teaching responsibilities** (such as **election and census duties**) further undermine the effectiveness of the education system.

📎 As per the **UNESCO report (2021)**, the workforce has a deficit of over 1 million teachers.

✦ As per **MoE data**, about 10 lakh teaching positions in government schools across elementary, primary, secondary and higher secondary levels are vacant.

💡 **Skill Gap and Mismatch Between Education and Employability:** Despite a rise in higher education enrollment, **many graduates struggle with employability due to a lack of practical skills**.

✦ The curriculum frequently **fails to align with industry requirements**, leading to lower workforce productivity.

✦ According to the **ILO (2024)**, India's youth account for almost 83% of the unemployed workforce and the share of youngsters with secondary or **higher education in the total unemployed has almost doubled from 35.2% in 2000 to 65.7% in 2022**.

💡 **Barriers to Quality Education for PwDs:** Despite constitutional guarantees and schemes like **Sarva Shiksha Abhiyan** and **Samagra Shiksha**, children with disabilities (PwD) continue to face significant barriers in accessing quality education.

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## Government's Key Initiatives Related to Education



- ✦ These challenges include a lack of accessible infrastructure, inadequate training for teachers, and limited availability of **specialized resources and support**.
  - ✎ According to the **76<sup>th</sup> National Sample Survey (NSS)**, the literacy rate among persons with disabilities aged 7 and above is only 52.2%.
- ✦ Despite efforts to promote inclusivity, **many schools still lack the necessary accommodations**, and there is insufficient awareness and understanding of the specific needs of students with disabilities.
- 💡 **Corruption and Leverages in Education Delivery:** Corruption and inefficiencies in India's education system are significant barriers to quality education.
  - ✦ Issues such as **ghost schools and universities, which exist only on paper**, and the **prevalence of fake degrees**, especially in higher education, undermine the credibility of the system.

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- ✍ The **University Grants Commission (UGC)** in 2023 identified **over 20 fake universities operating across the country**, highlighting the extent of fraudulent practices in higher education.
- ✦ These issues result in wasted public resources, **compromised educational outcomes**, and a **loss of trust in the system**, affecting both students and employers.

### What Measures can be Taken to Transform and Improve India's Education System?

- 💡 **Infrastructure Development in Rural and Remote Areas:** A crucial step in transforming the educational landscape is a significant investment in upgrading infrastructure in rural and underdeveloped regions.
  - ✦ This includes **ensuring access to essential facilities** such as clean water, electricity, functional toilets, and digital learning resources in schools.
  - ✦ Furthermore, **creating student-friendly environments**, such as safe playgrounds and well-equipped classrooms, will improve the learning experience and help reduce dropout rates.
    - ✍ These improvements will foster a **conducive atmosphere for learning** and contribute to better educational outcomes.
- 💡 **Enhancing Access to Technology in Education:** India should invest in improving **broadband connectivity and ensuring affordable access to digital tools** and resources for students and teachers.
  - ✦ **Public-private partnerships** can play a crucial role in providing technology-enabled education solutions, such as low-cost devices and e-learning platforms.
    - ✍ Additionally, **integrating digital education into the mainstream curriculum** from the early stages will help reduce disparities and ensure equal access to quality education for all.
  - ✦ **Expanding BharatNet and PM e-Vidya initiatives** to provide high-speed internet to rural schools can further bridge the digital divide.

- 💡 **Expanding Vocational and Skill-Based Education:** India should prioritize expanding **vocational and skill-based education** to better equip students with practical skills that meet industry demands.
  - ✦ By **integrating vocational training into mainstream education**, starting from the school level, the country can create a more diverse and employable workforce.
  - ✦ Additionally, **collaboration between educational institutions, industry stakeholders**, and government agencies is crucial to ensure that curricula are aligned with current job market requirements.
    - ✍ Increased investment in infrastructure, training programs, and certification systems can further **enhance the reach and impact of vocational education**, particularly in rural and underserved regions.
- 💡 **Enhancing Teacher Training and Professional Development:** Integrate modern teaching methodologies, including **competency-based learning**, into teacher training programs.
  - ✦ Continuous professional development opportunities should be provided, especially in rural areas, to **ensure teachers are equipped with the necessary skills** to adapt to evolving educational standards.
  - ✦ Collaborations between educational institutions, the government, and private organizations can help in **delivering high-quality training and resources**.
    - ✍ Furthermore, introducing a **clear framework for regular assessments of teaching effectiveness** and student feedback can further enhance the quality of instruction.
    - ✍ The **DIKSHA platform** should be expanded with **AI-driven personalized training modules**.
- 💡 **Shifting Towards Competency-Based Education:** To improve the quality of education, India should focus on reducing the reliance on rote learning and shift towards competency-based education, incorporating methods such as the **PARAKH**.

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✦ This can be achieved by revising the curriculum to emphasize **critical thinking, problem-solving, and practical application** of knowledge.

✦ Schools and universities should integrate project-based learning, peer evaluations, and real-world applications into assessments.

✎ The National Curriculum Framework (NCF) 2023 must be implemented effectively, emphasizing experiential learning and multidisciplinary studies.

💡 **Strengthening Women's Education and Promoting Gender Equality:** India should prioritize strengthening **women's education by ensuring equal access to quality education at all levels.**

✦ This can be achieved by **offering scholarships, financial support, and safety measures** to encourage female enrollment, particularly in rural and marginalized communities.

✦ Additionally, **promoting gender-sensitive curricula and teaching methods** can help challenge stereotypes and foster an inclusive environment.

✎ Scholarships and financial incentives for female students, **especially in STEM fields**, should be expanded.

✦ Government initiatives like Kasturba Gandhi Balika Vidyalayas and Beti Bachao Beti Padhao should be further expanded to reduce gender disparities in education.

✎ Strengthening women's education will not only empower women but also **drive broader societal change** towards greater gender equality.

💡 **Strengthening Public-Private Collaboration:** Building stronger public-private partnerships can play a vital role in **bridging resource and infrastructure gaps within the education system.**

✦ By **tapping into the expertise of private organizations** in areas such as technology, curriculum design, and teacher training, public schools can gain access to essential resources.

✦ These collaborations can also support the introduction of **advanced tools and innovative teaching methods**, ensuring that education stays relevant and adaptive to the rapidly evolving global landscape.

💡 **Enhancing Public Investment in Education:** The government must increase education **spending to at least 6% of GDP, as outlined in NEP 2020**, to drive significant improvements in quality.

✦ Funding should be performance-based, rewarding states that demonstrate better learning outcomes with additional resources.

✦ Furthermore, Corporate Social Responsibility (CSR) funds should be directed more towards education, particularly for underprivileged students.

✎ A **transparent system to track fund utilization** should also be established to ensure efficient and effective spending.

💡 **Inclusive Education for Children with Disabilities:** India must focus on improving accessibility and support within mainstream schools.

✦ This includes **enhancing infrastructure to accommodate PwD**, such as ramps, accessible toilets, and learning materials in alternative formats. Teacher training programs should be expanded to include specialized training in inclusive teaching practices.

✎ Additionally, **increasing awareness among parents, teachers, and the community** about the rights and needs of children with disabilities can foster a more supportive environment.

✦ The government should also **ensure better implementation of policies and encourage collaboration with NGOs** to provide necessary resources and support.

## Conclusion

To achieve long-term success in the **Education system**, the focus must shift towards **fostering innovation and aligning educational outcomes with market needs**. These efforts directly contribute to achieving **SDG 4 – ensuring inclusive and equitable quality education** and promoting lifelong learning opportunities for all. As India continues to **make strides towards becoming a global leader in education**, it must ensure that every child, regardless of background, has access to the resources and opportunities necessary to thrive in an ever-changing world.



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## Regulating India's Online Gaming Industry

The editorial, titled "Blanket Ban on Online Money Gaming: The Wrong Answer," was published in The Indian Express on 25/08/2025. The article argues that while the government's concerns about gaming addiction, financial losses, and fraud are valid, a ban is not the most effective solution and advocates for a more balanced regulatory approach.

**Tag:** GS Paper-2, Government Policies & Intervention, Paper-3, Money Laundering, Cyber Warfare, Cyber Security, Challenges to Internal Security Through Communication Networks

The passing of the **Promotion and Regulation of Online Gaming Bill, 2025**, has raised concerns over the blanket ban on online money gaming in India. While the government aims to address issues like gaming addiction, mental health, and financial losses, such a **ban may not be the most effective solution**. As India, with its burgeoning digital economy, emerges as a significant gaming hub, a more balanced approach focusing on regulation rather than outright prohibition would effectively address these issues while fostering the continued growth of the industry.

### What Are the Factors Driving the Growth of the Gaming Industry in India?

#### Technological Enablers:

- ✦ **Improved Internet Infrastructure and Connectivity:** Initiatives such as BharatNet and the National Broadband Mission (NBM) are focused on providing high-speed internet to rural and remote regions.
  - 📎 The 5G rollout has further boosted internet speeds and lowered latency, crucial for a smooth gaming experience.
  - 📎 As per the **Mordor Intelligence report (2023)**, the gaming market in India reached USD 2.2 billion in 2023 and is expected to grow to USD 8.6 billion by 2028, **implying a CAGR of 27.4%**.

- ✦ **Affordable Access to Data and Smartphones:** This technological democratization has played a key role in the widespread adoption of online gaming across various socio-economic groups.

- 📎 A recent survey by **MoSPI** reveals that over **85% of Indian households now own smartphones**, with internet access available within the premises for 86.3%.
- 📎 Mobile phones contribute to **90% of the gaming market in India** as compared to about 37% and 62% in the US and China, respectively.

- ✦ **Increasing Integration of Cutting-Edge Technologies:** The integration of technologies such as Augmented Reality (AR), Virtual Reality (VR), cloud gaming, and blockchain has significantly enhanced the gaming experience and unlocked new possibilities for innovation.

- 📎 The AR and VR segment is **expected to achieve a CAGR of 9.74% by 2029**.

#### Policy & Cultural Shift:

- ✦ **Government Support and Regulatory Measures:** Initiatives like the IT (Intermediary Guidelines and Digital Media Ethics Code) Rules 2021 have provided a regulatory framework for online gaming, addressing concerns about harmful content and addiction.

- 📎 The establishment of self-regulatory bodies and the Animation, Visual Effects, Gaming, and Comics (AVGC) Promotion Task Force have aimed to promote the industry's growth and development.
- 📎 Also, the government's recent **recognition of gamers in the Content Creators Award** is a significant step in enhancing the overall gaming sector.

- 💡 The **Create in Indian Campaign** further aims to empower content creators and innovators in India.

- ✦ **Cultural Shift and Changing Perceptions:** The Covid-19 lockdown accelerated the adoption of online gaming as a form of virtual entertainment and social interaction.

- 📎 The online gaming industry's turnover in India **experienced a 50% growth during the pandemic lockdown**, with the national average gaming time reaching 4.1 hours per day, up from 2.5 hours pre-Covid.

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💡 This shift in engagement **gradually changed perceptions, transforming online gaming from a casual activity** into a legitimate career path.

✦ **Rise of E-sports and Recognition:** The inclusion of e-sports as a medal event at competitions like the **Commonwealth Games 2022** and the **Asian Games** has significantly elevated its status, establishing it as a legitimate sporting activity.

✎ This recognition has been further reinforced by the success of **Indian teams and players on global e-sports platforms**, which has not only enhanced the industry's profile but also inspired a new generation of aspiring gamers.

✎ **DreamHack Hyderabad 2024** featured tournaments in various games, attracting participants from across the country and promoting the e-Sports ecosystem.

💡 Economic Drivers:

✦ **Thriving Start-up Ecosystem and Investment Inflow:** India's vibrant **start-up ecosystem**, supported by Start-up India and **Atmanirbhar Bharat** framework, has fostered the growth of numerous gaming companies and platforms.

✎ These startups are driving innovation and catering to the **diverse gaming preferences of Indian consumers**, contributing to the expansion and evolution of the gaming industry in the country.

💡 India has produced numerous gaming unicorns, including **Games24X7, Dream11 and Mobile Premier League**.

✎ In the last few years, **gaming companies raised USD 2.8 billion from domestic and global investors**, amounting to 3% of total startup funding in India.

✎ The government further supports the gaming industry through initiatives like the **Software Technology Parks of India (STPI)**.

✦ **Foreign Direct Investment:** The allowance of 100% **FDI** in the gaming sector has opened up avenues for securing funding from international investors.

✎ **NVIDIA has announced the launch of its cloud gaming service** in India in November 2025.

## How is the Gaming Industry Regulated in India?

💡 **Information Technology Act, 2000 and Related Rules:**

✦ The IT (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021, amended in April 2023, laid down norms for online gaming platforms.

✎ Online gaming intermediaries must ensure **unlawful or illegal content is not shared** on their networks.

✎ Intermediaries offering money games are **required to register with self-regulatory bodies (SRBs)**, which verify whether a game is permissible.

✦ Section **69A of the IT Act** empowers the Government to block access to illegal websites or links.

✎ Between 2022 and June 2025, **1,524 betting and gambling websites** and mobile apps were blocked.

💡 **Bharatiya Nyaya Sanhita, 2023:**

✦ **Section 111** penalises unlawful economic activities and cybercrimes.

✦ **Section 112** prescribes punishment for unauthorised betting and gambling.

✎ Offenders face a **minimum of one year imprisonment**, extendable up to seven years, along with fines.

💡 **Integrated Goods and Services Tax Act, 2017 (IGST):**

✦ Illegal and offshore gaming platforms are regulated under the IGST Act.

✦ Online money gaming suppliers must register under the **Simplified Registration Scheme**.

✦ The Directorate General of GST Intelligence is authorised to direct intermediaries to **block access to unregistered or non-compliant gaming platforms**.

✎ This ensures digital entities follow the same taxation rules as physical businesses.

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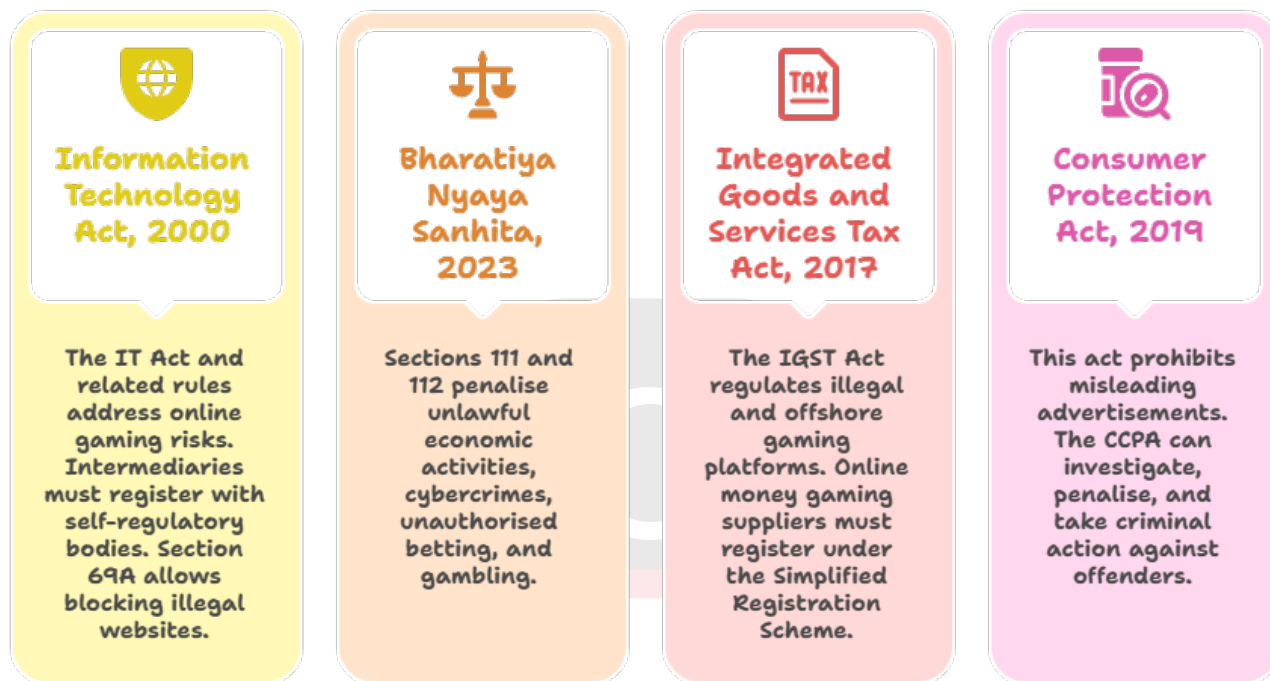
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### 💡 Consumer Protection Act, 2019:

- ✦ Prohibits misleading and surrogate advertisements.
- ✦ The **Central Consumer Protection Authority (CCPA)** has powers to investigate, penalise and take criminal action against offenders.
- 💡 CCPA has issued advisories to **prevent celebrities and influencers from endorsing betting platforms.**

## Initiatives to Counter Online Gaming Risks



### What Are the Concerns Related to the Gaming Industry in India?

- 💡 **Regulatory Ambiguity and Fragmented Policies:** The absence of a unified and comprehensive regulatory framework for the gaming industry in India has resulted in ambiguity and uncertainty for stakeholders.
  - ✦ With **varying laws and regulations across states**, the policy landscape has become fragmented.
    - 💡 **Telangana** has banned all online gaming, **Andhra Pradesh** has banned online gambling, and **Tamil Nadu** has prohibited games like Rummy and Poker. Meanwhile, **Karnataka is considering a model similar to Chhattisgarh's**, allowing skill-based gaming but banning betting and games of luck.
  - ✦ Moreover, the **absence of clear distinctions between skill-based gaming and gambling** creates regulatory uncertainty, leading to ethical debates and varying interpretations of these activities.
- 💡 **Online Gambling & Money Laundering:** The lack of adequate regulation has allowed **illegal offshore gambling markets** to flourish, resulting in harm to users and significant financial losses for the government.
  - ✦ Online gambling can be used as a means for **money laundering**, where players can deposit large amounts of cash into online accounts and then withdraw the money in a legitimate form.
    - 💡 According to the 2021 **Global Report on Corruption in Sport by the UN Office on Drugs and Crime (UNODC)**, the illegal betting market is valued at approximately USD 350 billion, while the illegal gambling market totals around USD 1.7 trillion.

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✦ The 59<sup>th</sup> Report of the Parliamentary Standing Committee on Finance noted that illegal betting applications can pose **national security** risks, such as using opaque payment routes, misusing the **Liberalised Remittance Scheme (LRS)**, and financing criminal activities.

💡 **Rising Addictive Online Gaming Behavior:** Online gaming apps can hijack the brain's reward system, causing intense "highs" from significant wins and leading to a cycle of "chasing losses."

✦ This neurological impact can result in financial ruin, psychological distress, and suicidal ideation.

💡 A nationwide study found that **23% of youths experience stress** and negative thoughts due to online gaming, with **87% of students regularly playing online games**.

✦ While the **Promotion and Regulation of Online Gaming Bill, 2025**, promises significant advancements in addressing the challenges of online gaming in India, issues related to ensuring safer gaming environments and safeguarding vulnerable users continue to persist.

💡 **Increasing Cyberattacks:** Online games collect sensitive data from players, including personal details and financial information, which raises concerns about **identity theft and data leakage**.

✦ **Cyber Attack** risks threaten user safety and data protection in gaming, while users bypass restrictions using **VPNs** and **geo-blockers** to access illegal gambling sites.

💡 In 2024, over **11 million gaming account credentials were exposed** in data breaches, highlighting the sector's vulnerability to cyberattacks.

💡 **Financial Risks in Online Gaming:** Individuals, particularly those in vulnerable demographics, are increasingly facing financial risks such as debt and economic hardship due to excessive spending on online gaming.

✦ This situation **highlights the need for responsible consumer engagement** and underscores the importance of integrating ethical considerations into the gaming industry's practices.

💡 For instance, a **17-year-old boy in 2020 spent ₹17 lakh** playing PUBG, which led to significant financial and emotional distress.

💡 Approximately **45 crore Indians collectively lose around ₹20,000 crore** annually on online real-money gaming platforms.

💡 **Taxation Concerns and Sustainability Challenges:** The imposition of a 28% **Goods and Services Tax (GST)** on the total face value of bets has sparked concerns regarding the long-term viability of the gaming industry, especially for smaller startups and players.

✦ Due to this, it is imperative that **high tax rates could drive many small gaming companies out of business**, stifling innovation and hindering the overall growth of the industry.

### What Measures Are Needed to Strengthen the Online Gaming Industry in India?

💡 **Need for Robust Regulation in Online Gaming:** There is an urgent need for comprehensive regulation in the online gaming industry.

✦ While some state governments have attempted to ban online gaming, these efforts face challenges due to the **cross-border nature of the internet**.

💡 The **Promotion and Regulation of Online Gaming Bill, 2025**, is a positive step forward, but it **should be revised to align with the evolving gaming industry** and India's economic landscape.

💡 Additionally, improving regulatory clarity is essential, particularly concerning the effective implementation of **self-regulatory bodies** as mandated by the **IT Rules of 2023**.

✦ Establishing a **central body like the UK** would be a positive step toward standardising regulations and make the regulatory landscape clearer for the industry.

✦ Stricter regulation of online real-money gaming should be introduced, including **age-gating measures**, responsible gaming features

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(such as **spending limits and self-exclusion tools**), and robust age-verification systems to ensure a safer environment for users.

- ✎ **Mental health support should be integrated into the gaming ecosystem**, with platforms offering counseling resources and collaboration with mental health professionals.
- ✦ Moreover, **public awareness campaigns** should educate players and parents on gaming risks.
- 💡 **Creation of a Whitelist and Producing Consumer Safety:** A whitelist of legal online real-money gaming (RMG) operators should be published and regularly updated to ensure that only compliant operators are allowed to function.
  - ✦ This whitelist would **enable payment gateways, hosting providers, and Internet service providers (ISPs) to serve only authorized platforms**, effectively blocking illegal and unregulated sites.
  - ✦ This measure would **promote consumer safety, reduce fraudulent activities**, and ensure that players engage with platforms that adhere to legal standards and fair practices.
    - ✎ By enforcing this system, regulatory authorities can **simplify enforcement, increase transparency**, and foster a safer and more trustworthy gaming environment.
- 💡 **Combating Illegal Gambling and Money Laundering:** Collaboration with banks and payment service providers is essential to establish protocols for blocking transactions to known illegal gambling operators.
  - ✦ By working together, **regulators and financial institutions can create real-time monitoring systems** to identify and prevent financial transactions directed towards unlicensed platforms.
  - ✦ This would help in **curbing illegal gambling activities**, ensuring that users are not unknowingly supporting fraudulent operators.

✎ Additionally, such collaboration would reinforce the enforcement of regulatory frameworks, promote compliance with **anti-money laundering (AML) laws**, and protect consumers from financial risks associated with unregulated gambling.

- ✦ Lead efforts to develop **multilateral agreements with international organizations** and other countries to enhance cooperation in combating illegal online gambling.
- 💡 **Promoting Cybersecurity in Online Gaming:** To address the growing concerns of cyberattacks and data breaches in the online gaming sector, it is crucial to implement a comprehensive approach that includes **regular system audits, multi-factor authentication**, advanced intrusion detection systems, and strong encryption protocols.
  - ✦ Gaming platforms must collaborate with financial institutions to ensure secure payment processing and work with **third-party security experts** for periodic vulnerability assessments.
    - ✎ Additionally, user education on cybersecurity best practices and compliance with data protection regulations, such as the **EU's GDPR**, are **essential steps to safeguard sensitive data and prevent identity theft**, thereby building a more secure environment for players.
- 💡 **Dedicated Gaming Hubs and Incubators:** Establish specialized gaming hubs and incubators in major cities to promote innovation, collaboration, and talent development in the gaming industry.
  - ✦ Drawing inspiration from global practices like **Montreal's Gaming Hub, Singapore's Game Incubator, and South Korea's G-STAR**, these hubs would offer state-of-the-art infrastructure, mentorship, and resources for game developers, startups, and aspiring professionals.
  - ✦ This initiative **would help foster the growth of the gaming ecosystem**, nurturing local talent and positioning India as a competitive player in the global gaming industry.

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## Conclusion

The online gaming industry has **emerged as a sunrise industry in India** and hence a balanced approach is required for regulation, with a focus on **GAME-Governance, Awareness, Monitoring, and Engagement**. By ensuring clear regulations, educating the public on gaming risks, implementing robust monitoring systems for security, and fostering collaboration among all stakeholders, India can create a thriving and sustainable gaming ecosystem. This approach will not only address current challenges but also **unlock significant economic and social potential, positioning India as a leader in the global gaming market**.



## Financial Inclusion in India

*This article is based on the editorial “**PM Jan Dhan Yojana has Removed Intermediaries to Ensure Subsidies Reach Beneficiaries**,” published in The Indian Express on 27/08/2025, which highlights how the flagship scheme has transformed financial inclusion by facilitating direct benefit transfers to the poor, while also pointing out enduring challenges such as limited digital literacy and underutilization of accounts.*

**Tag:** GS Paper-3, Inclusive Growth, GS Paper-2, Government Policies & Interventions

**Financial inclusion** is the backbone of India's **welfare state**, ensuring **subsidies** and **benefits** reach the right beneficiaries without **leakages**. Flagship schemes like **PM Jan Dhan Yojana** have reduced **intermediaries** and enabled **direct benefit transfers (DBT)**. Yet, gaps in **usage**, **accessibility**, and **awareness** show that true **inclusion** is still a work in progress.

### What is Financial Inclusion?

#### About:

- ✦ **Financial Inclusion** may be defined as the **process** of ensuring **access to financial services** and **timely and adequate credit** where needed by **vulnerable groups** such as **weaker sections**

and **low-income groups** at an **affordable cost** (*The Committee on Financial Inclusion, Chairman: Dr. C. Rangarajan*).

#### Key Components of Financial Inclusion:

- ✦ **Access to Financial Services:** Ensuring that financial services such as banking, insurance, and credit are available to everyone. This involves the establishment of physical banking outlets in underserved areas and the provision of **digital financial services**.
- ✦ **Affordability:** Financial products and services should be priced to be accessible for all segments of society. High costs can be a significant barrier, particularly for low-income groups.
- ✦ **Financial Literacy:** Educating individuals about financial products, services, and management is essential. **Financial literacy** empowers people to make informed decisions about their finances, including saving, investing, and managing credit.
- ✦ **Usage:** Beyond access, it's crucial that individuals actively use financial services to achieve financial stability and growth. This includes engaging with banking services, utilizing credit responsibly, and taking advantage of insurance products.

#### Significance:

- ✦ **Empowerment and Independence:** Financially literate individuals are more capable of making sound financial decisions, reducing vulnerability to exploitation.
- ✦ **Economic Growth:** Financial inclusion boosts economic growth by mobilizing savings, generating employment, and enhancing productivity.
- ✦ **Reduction of Inequality:** By granting access to financial services, financial inclusion can address **poverty** and **inequality**.
- ✦ **Financial Stability:** A financially literate population can lead to greater financial stability, as individuals are better prepared to handle economic uncertainties.

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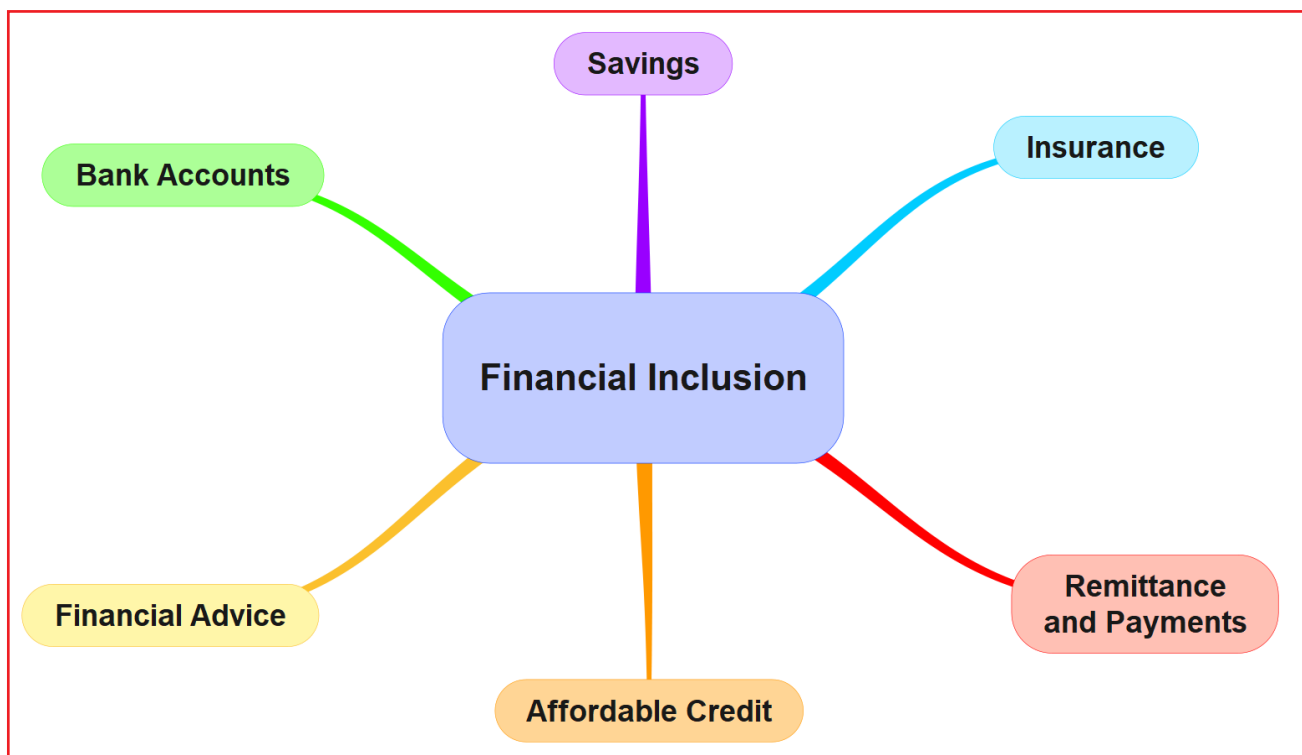


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💡 **RBI's Financial Inclusion Index (FI-Index):** It is a comprehensive measure of financial inclusion across banking, investment, insurance, pension, and postal sectors, developed with inputs from government and regulators.

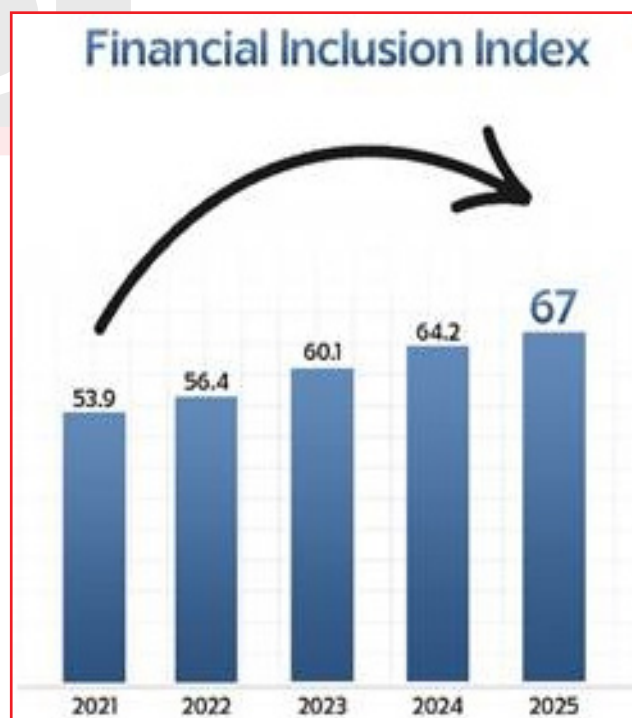
- ✦ Published annually in July, scores range from 0 (exclusion) to 100 (full inclusion).
- ✦ The index has no base year, reflecting cumulative progress over time.
- ✦ Consists of three parameters: Access (35%), Usage (45%), and Quality (20%).
- ✦ The quality parameter is a unique feature that includes financial literacy, consumer protection, and service equity

💡 The index has steadily grown from 43.4 in March 2017 to 53.9 in March 2021, and now reaches 67 in March 2025.

### What are the Key Drivers Behind the Growth of Financial Inclusion in India?

💡 **Government Schemes and Policy Push :**

- ✦ **Pradhan Mantri Jan Dhan Yojana (PMJDY):** A financial revolution providing savings accounts, RuPay cards, insurance, and overdraft facilities.



📎 As of 4 August 2025, 55.98 crore beneficiaries are enrolled, with over 55% accounts held by women.

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- ✍ A network of 13.55 lakh Bank Mitras and 107 Digital Banking Units ensures last-mile delivery.
- ✦ **Pradhan Mantri Suraksha Bima Yojana (PMSBY)**: Launched in 2015, it provides accident insurance of ₹2 lakh at an annual premium of ₹20. By March 2025, 50.54 crore enrolments were recorded.
- ✦ **Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY)**: Offers life insurance of ₹2 lakh at an annual premium of ₹436.
  - ✍ Over 23 crore people covered; more than 9 lakh families have benefited.
- ✦ **Atal Pension Yojana (APY)**: Provides a pension of ₹1,000–₹5,000/month after 60 years.
  - ✍ As of April 2025, 7.65 crore subscribers and ₹45,974 crore corpus, with 48% women participants.
- ✦ **Pradhan Mantri MUDRA Yojana (PMMY)**: Supports micro and small enterprises with loans up to ₹20 lakh.
  - ✍ By August 2025, 53.85 crore loans have been sanctioned worth ₹35.13 lakh crore, with focus on women, minorities, and first-time entrepreneurs.
- ✦ **Stand-Up India Scheme (SUI)**: Promotes entrepreneurship among SC, ST, and women. By March 2025, ₹61,020 crore has been sanctioned.
- ✦ **Mahila Samriddhi Yojana (MSY)**: Provides skill training and SHG loans up to ₹1.4 lakh. Till March 2025, ₹72,859 lakh disbursed to women.
- ✦ **Kisan Credit Card (KCC)**: Offers affordable credit to farmers.
  - ✍ Outstanding loan value rose from ₹4.26 lakh crore (2014) to ₹10.05 lakh crore (2024), benefiting 7.72 crore farmers.
- ✦ **Nationwide Financial Inclusion Campaign (2025)**: A 3-month campaign covering Gram Panchayats and ULBs.
  - ✍ By July 2025, 99,753 camps were held, 6.65 lakh new PMJDY accounts opened, and 10 lakh KYC re-verifications completed.

### 💡 Digital Revolution:

- ✦ **Unified Payments Interface (UPI)**: Launched in 2016, it powers 85% of digital transactions in India.
  - ✍ In June 2025 alone, ₹24.03 lakh crore was transacted across 18.39 billion payments.
  - ✍ Accounts for nearly 50% of global real-time transactions.
- ✦ **Aadhaar-enabled Payment Systems (AePS)**: Aadhaar-based identity verification has brought millions into the financial mainstream.
- ✦ **Digital wallets and fintech platforms** (e.g., Paytm, PhonePe) are making financial access more convenient.

### 💡 Microfinance Institutions and Fintech Innovation:

- ✦ **Microfinance institutions (MFIs)** like Bandhan Bank have empowered women borrowers.
- ✦ **Fintechs leverage Artificial Intelligence (AI), Big Data, and Blockchain** to provide **Microloans, Instant Credit Scoring, and Peer-to-Peer Lending**.

### 💡 Role of RBI and Banks:

- ✦ **Priority Sector Lending (PSL) norms** ensure **Credit Flow to Agriculture, MSMEs, and Weaker Sections**.
- ✦ **Business Correspondents (BCs) and Banking Mitras** bridge **Last-Mile Connectivity in Rural Areas**.
- ✦ **National Centre for Financial Education (NCFE) (2013)**: Joint effort of RBI, SEBI, IRDAI, and PFRDA.
  - ✍ Promotes financial education through **workshops, seminars, and campaigns** for all sections (children, youth, women, senior citizens).
  - ✍ Reported a **17% rise in youth financial literacy (2016–2020)**.
  - ✍ It's **National Strategy for Financial Education (NSFE) 2020-25** adopts a **"5 C" approach** – **Content, Capacity, Community-led model, Communication, and Collaboration**, and outlines a **comprehensive approach** to improving financial literacy.

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### What are the Concerns Regarding Financial Inclusion in India?

#### Regional Disparities:

- Despite progress, states like Bihar, Chhattisgarh, and Odisha lag behind Kerala and Maharashtra in financial penetration.
- Bihar**, with a per capita income barely above ₹68,000, underscores profound social and economic exclusion.

#### Gender Disparities: Women face additional barriers to financial inclusion due to social, economic, and cultural factors.

- Only around **35% of active borrowers** in India's formal credit markets are **women**, highlighting a significant **gender disparity** in access to credit.
- The **National Family Health Survey (NFHS-5)** in India reveals that 33% of women use the internet, while the figure is 57% for men.

#### Digital Divide:

- A joint study by the Internet and Mobile Association of India (IAMAI) and Kantar found that as of 2023, **45% of Indians—around 665 million people—do not access the internet**.

- Digital illiteracy and poor infrastructure hinder the adoption of online financial services.

#### Informal Economy and Cash Dominance:

- About **90% of workers** are engaged in informal sector jobs.
- Their heavy reliance on cash transactions, coupled with limited formal credit access, further inhibits the adoption of digital payments and financial services in this segment.

#### Low Financial Literacy:

- According to the **SEBI Investor Survey 2020**, only **27% of Indians** are financially literate.
- Lack of awareness about digital safety leads to cyber fraud and low insurance penetration.

#### Poor Credit Access:

- Small and marginal farmers remain dependent on moneylenders due to rigid collateral requirements by banks.
- As per **NITI Aayog's Report** on "Enhancing Competitiveness of MSMEs in India," only **19% of MSME credit demand** was met through formal sources by FY21.

#### Corruption and Leakages:

- Though **DBT (Direct Benefit Transfer)** has reduced **middlemen, ghost beneficiaries, and fake accounts**, they still exist.
- Misuse of **cooperative banks** and **scams** highlight **weak governance** in certain financial institutions.
- India ranked **96th** in the **Corruption Perceptions Index (CPI)** for 2024, down from 93rd in 2023, with a score of 38, a decline from 39 in 2023.

### What Should be the Way Forward for Strengthening Financial Inclusion?

#### Strengthening Digital Infrastructure:

- Expanding **broadband connectivity** in rural areas through the **BharatNet project** to bridge the digital divide.
- Promoting **affordable smartphones** and **vernacular-language financial apps** to enhance accessibility for rural and semi-literate populations.

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- ✦ Implementing recommendations of the **Nachiket Mor Committee (2013)**, which advocated for a **Universal Electronic Bank Account** and the establishment of **specialized payments banks** to deepen financial inclusion.

#### 💡 Enhancing Financial Literacy:

- ✦ Embedding **financial literacy in school curricula** to build awareness from an early age.
- ✦ Leveraging **Self-Help Groups (SHGs), Panchayats, and NGOs** as community-based platforms to educate people about **savings, insurance, and cyber safety**.
- ✦ Following the recommendations of the **Rangarajan Committee (2008)**, which stressed the importance of **technology adoption** and **financial literacy** as twin pillars for inclusive growth.

#### 💡 Innovative Credit Solutions:

- ✦ Expand **Kisan Credit Cards (KCCs)** to all farmers.
- ✦ Encourage collateral-free loans through credit guarantee schemes for **MSMEs**.
- ✦ Promote fintech–bank partnerships for instant digital lending based on transaction data.

#### 💡 Strengthening Regulatory Oversight:

- ✦ **RBI** should improve **supervision** of **cooperative banks** and **NBFCs** to prevent **scams**.
- ✦ Ensure **transparency** in **microfinance institutions** to protect **borrowers** from **over-indebtedness**.

#### 💡 Inclusive Growth with Gender Lens

- ✦ Promote women-specific financial products like **Mahila Shakti Kendras**.
- ✦ Increase the representation of women in banking correspondents and self-help group linkages.

#### 💡 Holistic Policy Coordination

- ✦ Financial inclusion should be linked with **social inclusion** (education, health, housing).
- ✦ India should **further strengthen and build upon** the **National Strategy for Financial Inclusion (2019)**, introduced to address barriers in accessing financial services and products.



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## Conclusion:

The **2030 Agenda for Sustainable Development Goals** identifies **Financial Inclusion** as a key enabler for **7 out of 17 goals**. True inclusion goes beyond merely opening bank accounts—it requires building an **ecosystem of accessible, affordable, and trustworthy financial services** that genuinely empower citizens. The path forward lies in **combining technology with trust, policy with people's participation, and finance with fairness**.

As PM Narendra Modi rightly emphasized, *“Economic growth cannot only be restricted to a few cities and a few citizens. Development has to be all-round and all-inclusive.”*



## Towards Sustainable Urbanization in India

The editorial, titled *“Small cities' outsized role in the urban future,”* was published in *Hindustan Times* on 22/08/2025. It highlights the growing importance of small towns in India's urbanization but emphasizes ongoing challenges like fragmented planning, governance gaps, and environmental issues. Despite initiatives, a robust framework is needed to ensure sustainable growth in these areas.

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

**India's urban landscape** is rapidly evolving, with small towns and peri-urban areas playing a key role in this transition. As these regions shift from agriculture to non-farm economic activities, they **face challenges such as fragmented urban planning, outdated infrastructure, and weak governance**. These areas risk replicating the problems of larger cities, like unchecked sprawl and environmental degradation, without a robust planning framework. **To ensure sustainable growth, India needs to adopt integrated, people-centric urban planning**, focusing on spatial planning, ecological preservation, and regional coordination.

## What are the Key Drivers Shaping the Course of Urbanization in India?

💡 **Demographic Transition and Rural-Urban Migration:** India's rapid urbanization is driven by continuous **rural-to-urban migration**, driven by improved livelihood opportunities and better urban amenities.

✦ This influx places increasing pressure on cities to **deliver jobs, housing, and infrastructure**, fueling urban growth while also straining governance.

📌 As of 2020–21, **approximately 34.6% of urban residents in India were migrants**, compared to 26.8% in rural areas.

📌 By 2036, India's towns and cities **will be home to 600 million people**, or 40% of the population, up from 31% in 2011, with urban areas contributing almost 70% to **GDP**. (**World Bank**)

💡 **Structural Economic Transformation and Sectoral Shifts:** The shift from agriculture to industry and services is centralizing economic activities in urban areas, transforming cities into engines of growth and innovation.

✦ As of 2022, **urban areas contribute approximately 63% to India's GDP (NITI Aayog)**, with this share expected to surpass 75% by 2030 and reach 80% by 2050 (MoHUA, 2023).

📌 This growth is primarily fueled by the **rapid expansion of the IT, manufacturing, and services sectors**.

✦ Moreover, initiatives such as **Skill India** and **PMKVY** are helping create a skilled workforce, aligning with the growing demand in urban areas.

✦ Through this, urbanisation offers pathways for **poverty reduction, increased education, and healthcare access**, linking economic development with improved human development outcomes.

💡 **Government Urban Policy Frameworks and Initiatives:** Ambitious schemes such as the **Smart Cities Mission (SCM)**, **AMRUT**, and **PMAY-U** exemplify targeted policy interventions to modernize urban infrastructure, housing, and governance.

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- ✦ As of May 2025, **more than 8,000 projects** have been completed under the SCM, and over **14,000 projects** have been sanctioned under the AMRUT and **AMRUT 2.0**.
  - ✎ These initiatives aim to **reshape urban areas into vibrant centers of economic growth and social inclusion**, marking a transition from mere infrastructure development to improving the overall quality of life.
- ✦ Moreover, initiatives like **Startup India** and **'Vocal for Local'** are transforming cities into entrepreneurial hubs, fostering self-reliance, sustainability, and balancing growth with climate commitments.
  - ✎ The **National Infrastructure Pipeline (NIP)** is another critical aspect, with investments aimed at developing sustainable urban infrastructure.
- 💡 **Technological Integration and Smart Urban Solutions:** Emerging technologies such as **AI, IoT, and big data analytics** are revolutionizing **urban management**, enhancing efficiency, transparency, and sustainability.
  - ✦ All 100 cities under the SCM **established Integrated Command and Control Centres (ICCCs)** utilizing technologies like AI and the Internet of Things for enhanced urban management.
  - ✦ Digital infrastructure, intelligent traffic systems, and smart water and waste management are **pivotal in addressing the complexities of rapid urban growth**.
- 💡 **Rural Distress and Agrarian Crisis:** The push factors contributing to migration from rural areas are primarily rooted in agricultural distress.
  - ✦ **Climate change, erratic monsoon patterns, and shrinking per-capita land holdings** have intensified the vulnerability of rural populations.
    - ✎ The average landholding for farming among farmers in the country was 1.08 hectares in 2016-17, but it **decreased to just 0.74 hectares in 2021-22**.
  - ✦ As agricultural productivity becomes increasingly unpredictable, **urban migration emerges as a critical survival strategy for many**, offering better economic prospects and a more stable livelihood.

### India's Urban Development Initiatives



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## What are the Challenges Associated with Urban Development in India?

💡 **Fiscal Constraints and Underutilization of Private Capital:** Urban local bodies face financial constraints due to **limited revenue autonomy, inefficient tax collection, and heavy reliance on state and central transfers**. This hampers their ability to fund essential services and infrastructure.

✦ Although **governments finance 72% of urban infrastructure**, private sector participation remains minimal, highlighting structural challenges in attracting commercial financing.

✦ The World Bank estimates that **India will require an investment of USD 840 billion in urban infrastructure** and municipal services over the next 15 years, averaging approximately USD 55 billion annually.

📎 This underscores the **substantial financing needs to support the country's rapid urbanization** and infrastructure development.

💡 **Infrastructure Deficit and Lack of Service Delivery:** India's urban infrastructure is **severely lagging behind demographic growth**, resulting in critical shortages of housing, potable water, sanitation, and energy services.

✦ India faces a **shortage of 10 million affordable homes**, a number expected to triple by 2030. This growing shortage not only leads to overcrowded slums but also **creates urban ghettos**.

✦ Moreover, as per the World Bank, investment in urban infrastructure **averaged only 0.6% of GDP** between 2011-18, half the required 1.2%, reflecting a persistent funding gap.

📎 Despite various initiatives, **no Indian city ranks in the top 100 of the Global Liveability Index**, and even Bangalore, India's top city, scored only 66.7 on the Ease of Living Index.

💡 **Congestion and Traffic Management Issues:** Urban residents (for example, in Bengaluru & Pune) spend an average of **1.5 to 2 hours daily in traffic**. This congestion not only contributes to higher pollution levels but also wastes valuable time and reduces productivity.

✦ Moreover, most Indian cities **lack comprehensive, efficient, and integrated public transport systems**, leading to a heavy reliance on private vehicles, which in turn exacerbates traffic congestion.

📎 For instance, **Patna requires over 1,000 buses**, but as of 2024, only 260 buses were registered in 2024-25, highlighting the lack of a comprehensive public transport system.

✦ According to the Asian Development Bank, **India loses up to USD 22 billion annually** due to urban transport inefficiencies, logistics delays, and poor infrastructure.

💡 **Environmental Degradation and Poor Urban Resilience:** Rapid urbanization has resulted in a significant loss of **green cover, the destruction of wetlands, and the pollution of water bodies**.

✦ Construction-driven development often overlooks ecological considerations, leading to **flash floods**, drainage failures, and deteriorating **air quality**.

✦ As a result, cities are increasingly vulnerable to environmental shocks, yet building regulations continue to **prioritize high-energy designs**.

📎 The **2023 Delhi floods** and the **2024 Bengaluru floods** are stark examples of how inadequate urban infrastructure fails to cope with extreme weather events.

✦ Additionally, **13 Indian cities**, including Delhi and Gurugram, **were ranked among the world's top 20 most polluted cities**.

💡 **Economic Disparities and Urban Poverty:** Urban areas in India are grappling with growing economic inequality, driven by rising living costs and insufficient job creation for low-income groups.

✦ A large proportion of the workforce, **approximately 90%, is employed in the informal sector**, where workers often lack access to social security and stable wages.

✦ Inflation, especially in food prices, has severely impacted urban households, reducing disposable income and weakening spending power.

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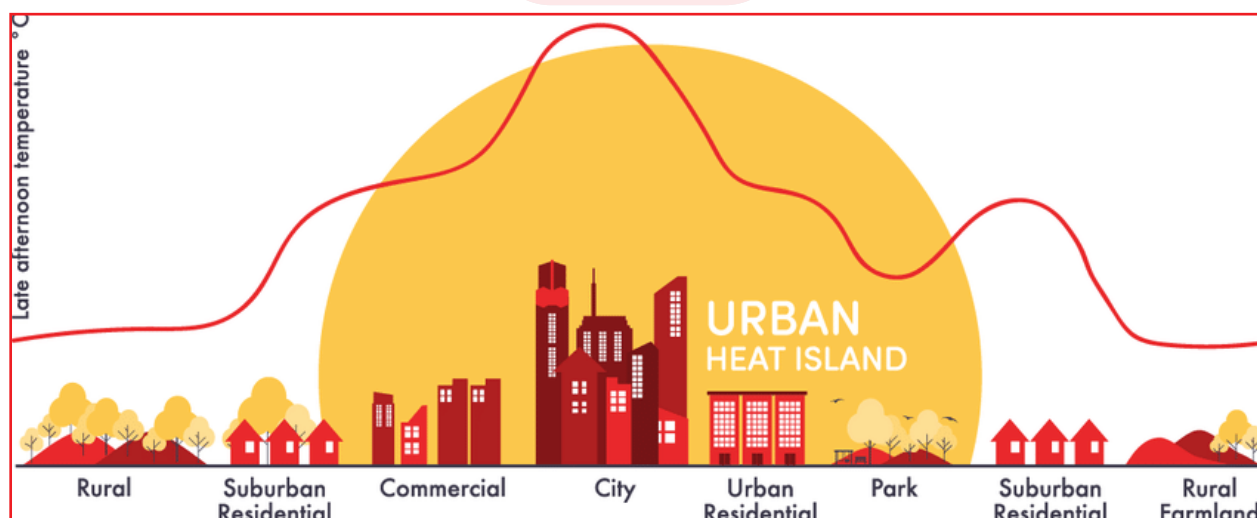


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- ✎ Additionally, **urban unemployment** reached 8.1% in April 2024, according to CMIE, further exacerbating the economic strain on city dwellers.
- 💡 **Urban Waste Management Crisis:** **Urban waste management** systems struggle to cope with rising solid waste generation, with improper disposal practices creating environmental hazards.
  - ✦ According to a report by **The Energy and Resources Institute (TERI)**, Indian cities generate approximately **62 million tonnes of municipal solid waste annually**.
  - ✎ However, only about **43 million tonnes are collected**, and merely 12 million tonnes are treated before disposal. The remaining 31 million tonnes are often discarded untreated, leading to environmental hazards.
  - ✦ Mega-landfills like **Delhi's Ghazipur and Ahmedabad's Pirana landfill** continue to expand, emitting toxic gases and polluting water bodies.
- 💡 **Urban Safety and Security Issues:** Rising urban crime rates, including theft, cybercrime, and gender-based violence, are increasingly jeopardizing the safety of city residents.
  - ✦ Contributing to this trend are **insufficient policing, inadequate urban planning, and weak legal enforcement**, all of which hinder effective crime prevention and the protection of citizens.
  - ✎ As per the data of **NCRB (2023)**, Delhi recorded over 14,000 cases of crime against women in 2022.
- 💡 **Urban Heat Island Effect:** Indian cities have witnessed a rising Urban Heat Island (UHI) effect, with temperatures in densely built areas significantly higher than in surrounding rural regions.
  - ✦ Elevated temperatures in urban areas result in **greater reliance on air conditioning**, which spikes electricity demand, particularly during the summer months. This places additional strain on power grids and **contributes to higher carbon emissions**.
  - ✦ **Urban Heat Islands** also pose significant health risks, especially for vulnerable populations, while leading to a reduction in green spaces and biodiversity.
  - ✎ They **exacerbate water shortages, heighten the risk of flooding**, and accelerate the deterioration of infrastructure, ultimately impacting the overall livability of cities.



### What Measures can be Implemented to Ensure Sustainable and Inclusive Urban Growth in India?

- 💡 **Fiscal Decentralization and Sustainable Infrastructure Financing:** Empower **Urban Local Bodies (ULBs)** through comprehensive fiscal decentralization by broadening municipal revenue sources, **reforming property taxes**,

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introducing land value capture mechanisms, and implementing dynamic user fees, all within the framework of budgetary responsibility.

- ✦ Foster the **development of municipal bond markets (Indore Municipal Corporation)**, incorporating **ESG-linked instruments**, while establishing outcome-based performance grants to incentivize fiscal prudence, transparency, and effective public-private partnerships.

✎ This approach will unlock capital for resilient infrastructure investments, ensuring sustainable urban growth.

- 💡 **Integrated Urban Development Strategy:** Revise fragmented governance structures by establishing metropolitan development authorities with comprehensive responsibilities encompassing land use, transport, housing, and environmental management.

- ✦ Promote subsidiarity and cooperative federalism in line with the **74<sup>th</sup> Amendment** to ensure empowered, accountable leadership that fosters **coordination at both vertical and horizontal levels**, dismantling bureaucratic barriers and streamlining policy implementation.

- ✦ **Enhancing accountability and fostering multi-stakeholder collaboration** to ensure responsive and transparent urban governance.

✎ Moreover, **Odisha's Rural-Urban Transition Policy** is a positive step towards ensuring a smooth and **sustainable shift from rural to urban areas** by providing urban-grade infrastructure and planning support, fostering balanced regional development.

- 💡 **Inclusive Urban Regeneration:** Operationalize integrated urban regeneration by aligning the affordable housing goals of **PMAY-Urban** with the digital governance and service delivery platforms of the Smart Cities Mission.

- ✦ Facilitate **holistic slum upgrading** that combines improved physical infrastructure, sanitation, livelihood support, and digital inclusion.

✎ This approach will **promote social equity and empower marginalized urban communities** through participatory

planning and real-time monitoring systems, ensuring sustainable development and inclusive growth.

- ✦ India can draw valuable lessons from the **Baan Mankong project in Thailand (2003)**, which **effectively upgraded slums** by providing secure land tenure, improved housing, and infrastructure through community-led efforts.

- 💡 **Enabling Data-Driven, Interoperable Urban Platforms:** India must prioritize investment in urban **digital public infrastructure (DPI)** to enable **real-time monitoring, improve service delivery, and support effective urban planning**.

- ✦ Platforms such as Integrated Command and Control Centres (ICCCs), under the Smart Cities Mission, **should be scaled and made interoperable across cities** to create a unified urban management system.

- ✦ Connecting property records, **utility billing systems, mobility data, and GIS layers** will significantly enhance urban efficiencies, facilitating seamless data exchange and decision-making.

✎ This approach ensures that **digitalization not only improves transparency but also strengthens governance** and operational effectiveness across urban areas.

- ✦ **Estonia's data-driven governance** has enhanced transparency, reduced bureaucratic inefficiencies, and fostered high levels of citizen trust, providing valuable lessons for India's urban digital ecosystem.

- 💡 **Advancing Solid and E-Waste Management:** Decentralized waste segregation systems at the ward level should be implemented to enhance recycling rates and minimize dependency on landfills.

- ✦ Advanced technologies, including **waste-to-energy plants (e.g., Narela-Bawana plant in Delhi)** and material recovery facilities, are crucial for managing the increasing volume of waste.

- ✦ **Enforcing Extended Producer Responsibility (EPR) laws** is essential to tackling **e-waste** generation by holding companies accountable for the recycling of discarded electronics.

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- ✍ **Bengaluru's success in decentralized composting** offers a scalable and replicable model for other cities to follow.
- 💡 **Mainstreaming Urban Blue-Green Infrastructure for Climate Resilience:** Indian cities must prioritize the restoration and integration of urban water bodies, wetlands, and green corridors into their core planning to **build resilience against floods and heatwaves**.
  - ✦ Urban planning should allocate land for urban forests, bioswales, and rain gardens as part of a **comprehensive Green Master Plan**.
  - ✦ Cities like **Ahmedabad and Pune serve as exemplary models**, where the revival of city lakes and parks has effectively reduced temperatures and enhanced groundwater recharge.
    - ✍ Furthermore, urban greening and watershed restoration efforts should be aligned with programs such as **AMRUT 2.0** and **SBM-U 2.0** to ensure holistic and sustainable urban development.
  - ✦ India can also draw inspiration from **China's Sponge Cities model**, which offers valuable lessons for creating climate-resilient urban environments.
- 💡 **Strengthening Urban Safety:** To address the rising urban crime rates and safety concerns, cities must enhance policing efficiency, improve urban planning, and strengthen legal enforcement mechanisms.
  - ✦ This can be achieved by **implementing a smart surveillance system** and improving community policing to foster trust between law enforcement and residents.
    - ✍ For example, **Mumbai has implemented proactive policing initiatives**, which leverage real-time data, surveillance, and analytics to enhance crime prevention.
  - ✦ Furthermore, **engaging citizens through community-led safety programs** can empower local communities to contribute to crime prevention.
- 💡 **Institutionalizing Community Participation and Participatory Planning:** Building sustainable cities requires the active involvement of the communities they serve.
  - ✦ Institutionalizing platforms like **ward committees, mohalla sabhas**, and citizen report cards can help bridge the gap between urban planning and the lived experiences of residents.
  - ✦ **Municipal budgeting must be made participatory**, enabling citizens to have a say in local infrastructure priorities and resource allocation.
    - ✍ Tools such as **digital grievance redressal systems, social audits**, and area sabhas should be mandated in state municipal laws to ensure transparency and accountability.
  - ✦ India can adopt similar frameworks like **Brazil's Participatory Budgeting model**, where citizens directly influence budget allocation for local projects.
- 💡 **Sustainable Urban Planning:** Sustainable urban planning in India requires a holistic approach that integrates environmental, social, and economic factors to promote long-term development.
  - ✦ **NITI Aayog's 2021 report** on Reforms in Urban Planning Capacity recommended the **establishment of the National Council of Town and Country Planners as a statutory body** to strengthen urban planning and improve capacity-building at various levels of governance.
    - ✍ This would ensure a **more coordinated and systematic approach to urban growth**.
  - ✦ Additionally, initiatives like the **Master Plan Delhi 2041** represent a positive step towards creating models for achieving sustainable urbanization.
  - ✦ **Also, developing more satellite towns** can help alleviate the pressures of India's highly concentrated urbanization.

## Conclusion

India's urbanization, while offering significant growth potential, also demands a **forward-thinking approach** to ensure that cities evolve into sustainable, inclusive, and resilient hubs. The key to addressing urban challenges lies in integrating the principles of **SDG 11 (Sustainable Cities and Communities)** to foster cities that are not only economically vibrant but also socially equitable and environmentally responsible.



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## Drishti Mains Questions

1. India–Maldives relations have oscillated between strategic convergence and diplomatic friction in recent years. In the context of changing regional geopolitics, critically examine the challenges and opportunities in recalibrating bilateral ties.
2. Analyze the impact of US tariffs on India’s manufacturing sector and suggest measures to strengthen its position in global supply chains.
3. Examine the challenges faced by India in managing its growing e-waste crisis. What steps can be taken to improve e-waste recycling and promote a circular economy in the country?
4. “India’s climate vulnerability is no longer a distant environmental concern but a present developmental emergency.” In this context, examine the key structural challenges in India’s climate adaptation strategy. Suggest a multi-tiered framework to strengthen climate resilience at local, state, and national levels.
5. India’s agriculture is transitioning from subsistence to a technology-driven and climate-resilient growth engine. Discuss the key developments driving this transformation and suggest measures to address the persistent challenges in aligning agriculture with the vision of Viksit Bharat.
6. Despite the shift towards a data-driven welfare model, challenges like inequality, inefficiency, and digital barriers persist in India’s welfare regime. How can India improve its welfare delivery to ensure inclusivity and long-term empowerment?
7. Examine the challenges and key initiatives for strengthening India’s defence sector and enhancing its global defence position.
8. India’s electoral system has evolved significantly over the years, but several challenges persist. Discuss the key issues in India’s electoral process and suggest reforms that could strengthen the integrity, transparency, and inclusiveness of the system.”
9. What strategies should India adopt to achieve Universal Health Coverage (UHC) by 2030? Highlight key challenges and measures to address them.
10. Discuss the key challenges in job creation in India and suggest strategies for sustainable and inclusive employment.
11. Examine the challenges to gender equality in India and recommend measures for improving women’s participation in politics, workforce, and leadership.
12. In light of India’s commitment to achieving net-zero emissions by 2070, critically analyze the potential benefits and challenges of carbon credit systems in India.
13. Examine the potential of India’s ethanol blending program in enhancing energy security and reducing import dependence. What policy measures are essential to ensure its sustainable and efficient implementation?



## Drishti Mains Questions

14. "India's engagement with Africa has evolved from a paternalistic approach to a partnership-based model, emphasizing shared heritage, capacity building, and knowledge transfer." Examine the key drivers of this transformation and discuss the challenges India faces in strengthening its strategic, economic, and technological ties with Africa.
15. Analyze the major challenges in plastic waste management in India and propose effective strategies to improve recycling, reduce plastic production, and promote sustainability.
16. Examine the actors contributing to case pendency in India and propose reforms to improve the efficiency and accessibility of the judicial system.
17. Critically examine the key challenges facing India's manufacturing sector in achieving its growth and employment potential. Discuss how policy reforms and infrastructure development can address these challenges to strengthen India's position in the global manufacturing landscape.
18. India is set to expand its nuclear energy capacity significantly by 2047. Examine the potential of nuclear energy in India's growth. What are the major challenges and how can they be addressed?
19. India's logistics sector is undergoing rapid transformation through reforms and infrastructure push, yet inefficiencies remain. Examine the major constraints to the sector's growth and suggest significant measures.
20. Discuss the key challenges facing India's tourism sector and suggest measures to enhance its growth while ensuring sustainability and regional development.
21. Discuss the key developments in India's education reforms and suggest measures to address these challenges to ensure inclusive and quality education for all, in line with SDG 4.
22. Evaluate the challenges and regulatory measures needed for the growth of the online gaming industry in India.
23. The 2030 Agenda for Sustainable Development identifies financial inclusion as a key enabler for multiple SDGs. In this context, analyze India's efforts at financial inclusion and the roadblocks that hinder equitable growth.
24. Discuss the key measures required to address the multifaceted challenges of urban development in India, focusing on governance, infrastructure, and sustainability.