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GS Paper I: Art & Culture

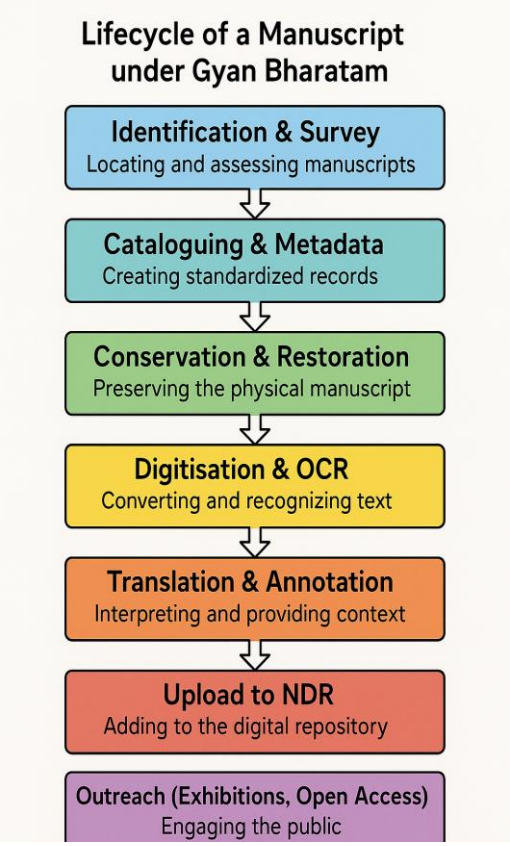
1. Gyan Bharatam Mission: Reclaiming India's Manuscript Heritage Through Digital Knowledge Infrastructure

a. Introduction

The Government of India has launched the Gyan Bharatam Mission under the Ministry of Culture as a landmark effort to identify, digitise, conserve, and disseminate India's vast manuscript heritage. With nearly fifty institutions joining a coordinated national network, the mission marks a shift from fragmented preservation efforts to a centralised, technology-driven cultural knowledge system. More than a heritage initiative, it is an attempt to institutionalise India's civilisational memory and embed it within a modern digital public infrastructure.

b. India's Manuscript Legacy: Context and Historical Evolution

India possesses one of the world's richest manuscript traditions—estimated at 5–10 million manuscripts across diverse classical and regional languages. These texts preserve the intellectual evolution of millennia, covering philosophy, mathematics, medicine, astronomy, aesthetics, and governance.



i. Earlier Preservation Efforts

- National Mission for Manuscripts (2003) was the first coordinated attempt at cataloguing and conservation.
- The National Digital Repository initiated digital archiving but remained limited due to scattered institutional silos.
- Absence of standardised practices and weak inter-institutional linkages meant that India's manuscript ecosystem remained fragmented and uneven.

ii. Emergence of a Unified Framework

The Union Budget 2024–25 recognised the need for an integrated structure, leading to the Gyan Bharatam Mission—a consolidation of all manuscript-related projects within a single digital heritage framework, linking physical preservation with digital governance.

c. Objectives and Institutional Architecture

The mission blends traditional scholarship with digital innovation, attempting to transform a vast, dispersed manuscript corpus into a coherent, accessible knowledge system.

i. Core Objectives

- Comprehensive documentation, conservation, and digitisation of manuscripts across institutions and private collections.
- Integration of research, translation, comparative studies, and public outreach within a common platform.
- Development of a unified National Digital Repository (NDR) for open access to digitised content.

- Creation of a sustainable network that supports scholarship across disciplines and regions.

ii. Institutional Design

- **Cluster Centres**: Lead institutions coordinating up to 20 partner institutions, enabling scale and quality control.
- **Independent Centres**: Smaller institutions tasked with preserving their own collections.
- **Gyan Bharatam Cell**: Operational unit in each centre managing progress, volunteers, and community engagement.
- **Funding Structure**: 70% initial release; remaining 30% contingent on progress and utilisation reports, promoting accountability.

The multi-tier structure brings standardisation, oversight, and decentralised execution within a unified governance ecosystem.

d. Scope: From Preservation to Knowledge Transformation

The mission's scope is deliberately broad, positioning manuscripts not merely as artefacts but as living knowledge assets.

Key Activities

- **Survey and Cataloguing**: Identifying manuscripts, creating metadata standards, and developing interoperable catalogues.
- **Conservation and Restoration**: Scientific preservation, climate-controlled storage, and restoration of fragile or decaying materials.
- **Digitisation**: Standardised imaging formats, high-resolution scanning, and exploration of AI-enabled text recognition for ancient scripts.
- **Research & Translation**: Supporting interdisciplinary scholarship that contextualises manuscripts for contemporary audiences.
- **Outreach, Exhibitions & Public Platforms**: Democratising knowledge through open access portals, community-led exhibitions, and digital storytelling.

This integrated workflow ensures that manuscripts shift from obscurity to public knowledge and scholarly value.

e. Significance and Governance Relevance

The Gyan Bharatam Mission sits at the intersection of cultural preservation, digital infrastructure, and governance reform.

i. Cultural Significance

- Revitalises India's civilisational knowledge systems, many of which were at risk of physical decay or institutional neglect.
- Enhances India's soft power by showcasing intellectual traditions—from Ayurveda and classical arts to astronomy and jurisprudence—on global platforms.
- Promotes scholarly revival in classical languages and traditional knowledge systems.

ii. Governance Value

- Builds a participatory governance model involving universities, archives, private custodians, and local knowledge communities.
- Aligns with Digital India through creation of shared digital public infrastructure for heritage.
- Encourages standardisation, interoperability, and decentralised implementation, improving cultural governance quality.

- Complements Atmanirbhar Bharat by creating domestic capabilities in digital humanities, archival science, and heritage management.

iii. Global Parallels

Initiatives like UNESCO's Memory of the World and Europe's Europeana highlight the global shift towards digital preservation of intangible heritage—placing India's mission within an internationally recognised framework.

f. Key Challenges and Bottlenecks

Despite its scale and vision, the mission confronts persistent systemic gaps:

- Severe manpower shortages in conservation science, palaeography, manuscriptology, and digital humanities.
- Lack of uniform standards in metadata, imaging formats, and long-term archiving protocols.
- Financial and infrastructural constraints, especially the need for steady maintenance of large digital repositories.
- Coordination challenges between cluster centres, state institutions, private collections, and traditional custodians.
- Risk of fragmentation and duplication in the absence of strong real-time monitoring and shared workflows.

These issues underline the need for capacity-building and sustained investment rather than one-time project funding.

g. Way Forward: Building a Self-Sustaining Knowledge Network

For long-term sustainability, the mission must evolve into a dynamic cultural-scientific ecosystem.

i. Integrative Digital Infrastructure

- Link the NDR with the National Virtual Library of India, ensuring seamless public access and interoperability.

ii. Capacity Building

- Establish national training institutes for manuscript conservation, cataloguing, and digital humanities.
- Introduce fellowship programmes to build a cadre of manuscriptologists, codicologists, and technologists.

iii. Technological Innovation

- Deploy AI-based OCR for ancient scripts, machine translation tools, and metadata automation.
- Invest in digital preservation technologies ensuring authenticity, longevity, and low-cost storage.

iv. Community Engagement

- Involve traditional custodians, monasteries, mutts, temples, and families holding private collections.
- Encourage volunteer networks, local scholars, and linguistic communities.

v. Public–Private Partnerships

- Develop long-term funding through corporate social responsibility (CSR), philanthropic foundations, and digital heritage startups.

Conclusion

The Gyan Bharatam Mission represents a transformative shift in India's approach to knowledge preservation—moving from isolated archival work to a national digital heritage infrastructure. By uniting cultural institutions, integrating technology, and democratising access, the mission converts ancient manuscripts into living, global knowledge resources.

In doing so, it strengthens India's cultural identity, advances digital governance, and positions the country as a global leader in heritage preservation—affirming that knowledge, once preserved and shared, becomes a powerful instrument of civilisational continuity and soft power.

GS Paper I: Society

1. Legal Hoodwinking of Adivasis in Hasdeo Arand: Weakening of Forest Rights and the Rise of Procedural Evasion

a. Introduction

The Hasdeo Arand forests of Chhattisgarh constitute one of India's most biodiverse and culturally rich landscapes, inhabited for generations by Adivasi communities whose identity is inseparable from the forest. The recent High Court judgment declaring the community forest rights (CFRs) of Ghatbarra village as void ab initio reflects a broader trend: the systematic dilution of Adivasi rights through procedural manoeuvres whenever forest land intersects with mining and infrastructure priorities.

This case reveals not merely a legal anomaly but a deeper governance pattern in which statutory protections under the Forest Rights Act (FRA), 2006 are overridden in practice, despite being constitutionally anchored in justice, self-governance and cultural autonomy.

b. Community Forest Rights: The Statutory Foundation Being Undermined

CFRs—one of the strongest provisions of the FRA—give Gram Sabhas:

i. Rights Over Access, Use and Livelihood

- Collection of minor forest produce
- Sustainable access to forest resources for household and community use

ii. Rights to Protect and Manage Forests

- Authority to conserve biodiversity
- Power to regulate forest use and prevent external exploitation

iii. Decision-Making Power Over Forest Diversion

- Free, prior and informed consent (FPIC) of the Gram Sabha is mandatory before any diversion
- Diversion cannot proceed until all rights are settled and recorded

CFRs were conceptualised as collective, inalienable rights, insulating communities from state or corporate overreach.

c. What Happened in Hasdeo Arand: A Pattern of Rights Recognition, Violation and Retraction

i. Initial Denial and Reversal

- The Forest Advisory Committee initially rejected mining clearance due to ecological sensitivity and incomplete rights settlement.

ii. Clearances Despite Legal Bars (2012)

- Mining was approved even though FRA processes were pending, in direct violation of statutory requirements.

iii. NGT Intervenes, But Mining Continues (2014)

- The National Green Tribunal cancelled the clearance, yet operations continued because of interim Supreme Court orders allowing activity during reconsideration.

iv. CFR Recognition (2013)

- Ghatbarra's Gram Sabha legally received CFRs as mandated under the FRA.

v. Abrupt Cancellation (2016)

- The district-level committee revoked CFRs soon after the Gram Sabha resisted mining—without due process or justification.

vi. The High Court Judgment (2025)

- Held that CFRs were void from the outset because the land was already diverted.
- Suggested monetary compensation as a substitute.

The sequence reflects pre-determined project priorities, with rights being recognised on paper but nullified when invoked to resist extraction.

d. Why the Judgment Raises Deep Legal and Democratic Concerns

i. Direct Violation of FRA's Mandatory Conditions

- FRA requires settlement of rights prior to forest diversion, not after mining plans are approved.
- The Gram Sabha's consent is not optional. It was never properly obtained.

ii. Incorrect Legal Interpretation

The court argued that existing mining leases predated CFRs. However:

- FRA recognises rights "notwithstanding any existing laws".
- Pre-existing leases or diversions cannot override community rights.
- CFRs are not grants—they are recognition of pre-existing customary rights.

iii. Breakdown of Administrative Due Process

- Rule 12(B) mandates field verification and reasoned, written rejection.
- Cancellation occurred without any FRA-compliant inquiry.

iv. Community's Right to Challenge Overlooked

- CFRs vest in the entire Gram Sabha, giving villagers direct legal standing.

v. The Problematic "Fait Accompli" Logic

- The Court accepted irreversible ecological damage as reality.
- This encourages a perverse incentive: violate the law first, gain judicial validation later.

vi. Erasure of Adivasi Cultural Relationship with Forests

- Monetary compensation ignores:
    - Cultural identity
    - Spiritual sites
    - Ecological stewardship roles
- Forests cannot be reduced to economic assets without undermining Adivasi constitutional rights.

e. What the Hasdeo Case Reveals About India's Forest Governance

i. FRA's Weak Enforcement

Though FRA is among the world's strongest forest justice laws, ground-level implementation remains skewed toward extractive priorities.

ii. Administrative Manipulation

- Rights recognition is frequently delayed, diluted or reversed to align with project approvals.
- Gram Sabha resolutions are ignored, fabricated or replaced with parallel committees.

iii. Judicial Drift Toward Development-First Reasoning

- Courts increasingly favour economic projects in ecologically sensitive zones.
- Procedural shortcuts are often retrospectively validated.

iv. Erosion of the Niyamgiri Precedent

- The Niyamgiri judgment (2013) upheld Gram Sabha sovereignty over forest decisions.
- Hasdeo signals a weakening of that landmark participatory principle.

f. Implications for Adivasis, Forest Governance and Environmental Justice

i. For Adivasi Communities

- Threats to livelihood, food security, cultural identity
- Increased vulnerability to displacement
- Growing distrust in legal and administrative institutions

ii. For Forest Governance

- Statutory rights become symbolic if authorities can nullify them after diversion
- Administrative discretion eclipses democratic forest management

iii. For Ecological Security

- Fragile forest ecosystems face aggressive extraction
- Community conservation traditions weaken under institutional pressure

The Hasdeo judgment sets a precedent that could threaten forest-dependent communities across India.

g. Way Forward: Rebuilding Rights and Restoring Constitutional Morality

i. Enforce FRA with Integrity

- No forest diversion without completed rights settlement
- Cancel illegal clearances
- Penalise wrongful cancellation or fabrication of consent

ii. Protect Gram Sabha Autonomy

- Independent verification of Gram Sabha resolutions
- Strict action against coercive consent processes

iii. Transparent and Accountable Forest Diversion System

- Publish rights-verification documents on public portals
- Digitised tracking of objections and decisions
- Mandatory field audits for diversion approvals

iv. Reject the Logic of Fait Accompli

- Halt operations during disputes
- Prevent irreversible damage before due process is completed

v. Declare "No-Go Zones" for Mining

- Ecologically sensitive regions like Hasdeo must be legally protected
- Aligns with India's biodiversity goals and climate commitments

vi. Centre Adivasi Stewards in Conservation

- Recognise forests as socio-cultural ecosystems
- Build joint management frameworks that elevate Adivasi ecological knowledge

Conclusion

The Hasdeo Arand case is emblematic of the growing disconnect between statutory rights and ground realities. Cancelling CFRs after clearing forests for mining not only contradicts the Forest Rights Act but undermines Adivasi constitutional protections and ecological integrity. True justice requires more than retrospective compensation—it demands accountable institutions, empowered Gram Sabhas, and genuine application of FRA's transformative vision. Unless India enforces these principles, forest governance will continue to prioritise extraction over equity, and Adivasi rights will remain largely notional.

GS Paper II: Polity

1. Governor's Powers Under Article 200: Supreme Court's 2025 Advisory and Its Federal Implications

a. Introduction

Article 200 of the Constitution governs how a Governor deals with Bills passed by a State Legislature—granting assent, withholding assent, returning a Bill, or reserving it for the President.

However, the provision is silent on a crucial issue: what if the Governor simply does nothing?

In recent years, prolonged gubernatorial inaction on State Bills—especially in politically adversarial States—turned this silence into a serious constitutional and federal faultline. Bills remained pending for months or years, effectively stalling the legislative agenda of elected governments without any formal refusal or accountability.

Amid mounting litigation and Centre–State tensions, the President invoked Article 143, seeking the Supreme Court's advisory opinion. The Court's 2025 advisory attempts to clarify:

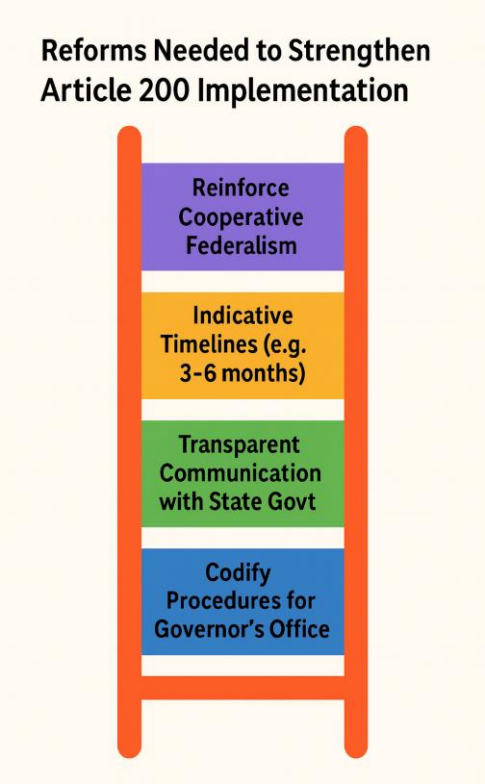
- the limits of gubernatorial discretion,
- the extent of judicial intervention, and
- the balance between constitutional text and democratic practice in the assent process.

b. Article 200: Textual Scheme and the Problem of Silence

i. The Four Textual Options

Article 200 authorises the Governor to:

- Grant Assent – the Bill becomes law.
- Withhold Assent – the Bill fails.
- Return the Bill (if not a Money Bill) – the Legislature may reconsider and, if passed again, the Governor must ordinarily assent.
- Reserve the Bill for the President – the Union executive enters the process.



ii. The Unaddressed Fifth Scenario: Inaction

The Constitution does *not* state what happens if the Governor:

- neither assents nor withholds assent,
- does not return the Bill, and
- does not reserve it for the President.

Such inaction:

- blocks the legislative programme indefinitely,
- avoids political responsibility that comes with explicit refusal, and
- creates a grey zone in which constitutional design offers no direct remedy.

Thus, Article 200 becomes not just a procedural clause but a site of federal contestation.

c. The Presidential Reference: Questions Before the Court

The Article 143 reference put five interlinked questions to the Supreme Court, each probing a constitutional silence or ambiguity:

- Can courts prescribe timelines for the Governor to act on a Bill when the Constitution is silent?
- Is the Governor bound by the aid and advice of the Council of Ministers in the assent process, or does he act independently?
- Can courts declare "deemed assent" if the Governor delays unreasonably?
- Is gubernatorial conduct judicially reviewable before a Bill becomes law, or only after enactment?
- Can Article 142 ("complete justice") be used to alter or supplement the Article 200 framework, e.g. by creating timelines or deemed assent?

These questions forced the Court to confront a core dilemma:

How far can the judiciary go in filling constitutional silences without rewriting the Constitution?

d. Core Principles of the Supreme Court's 2025 Opinion

i. Governor's Options Are Exhaustive: Silence Is Not One of Them

The Court affirmed that the textual options in Article 200 are exhaustive. The Governor may:

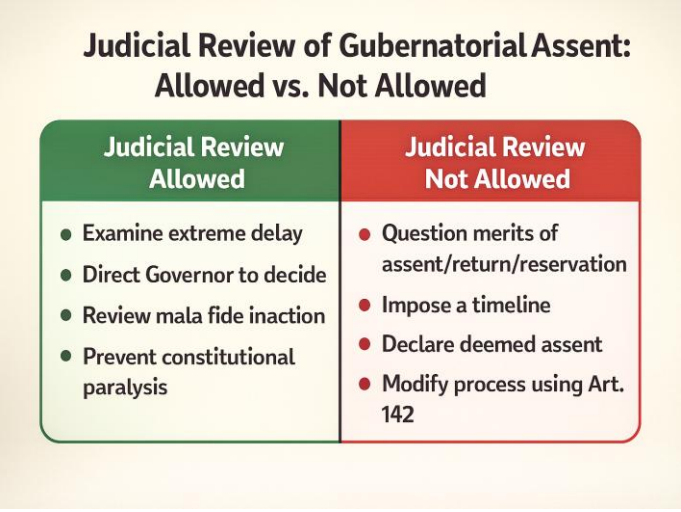
- assent,
- return (if permissible), or
- reserve for the President.

Therefore, indefinite inaction is unconstitutional. The Governor cannot treat silence as a fourth/fifth option—some decision must follow presentation of a Bill.

ii. Inaction Is Unconstitutional, But No Judicial Timelines

The Court drew an important but uneasy line:

- It held that prolonged silence violates constitutional duty, and courts can direct the Governor to *take a decision.*
- However, it also held that courts cannot prescribe specific timelines (e.g. three or six months).



Reasoning:

- Introducing strict timelines amounts to judicial amendment of the Constitution.
- Such changes must come from Parliament or constitutional amendment, not judicial innovation—even under Article 142.

This creates a paradox:

- Silence is impermissible,
- but the Constitution still has no explicit time limit, leaving scope for delayed action.

iii. Duty to Give Reasons When Withholding Assent

The Court held that if the Governor withholds assent, reasons must be:

- communicated to the State government, and
- amenable to judicial review for mala fides, arbitrariness, or irrelevance.

This ensures:

- transparency of constitutional decision-making,
- a record for future judicial scrutiny, and
- a check on using Article 200 as a political veto.

iv. Limited and Structured Discretion Under Article 200

On the question of aid and advice, the Court reaffirmed the basic principle:

- The Governor is generally bound by the aid and advice of the Council of Ministers.

But under Article 200, it recognised a narrow pocket of independent discretion:

- whether to reserve a Bill for the President,
- whether to return a Bill.

However, this discretion is:

- not absolute,
- constrained by constitutional conventions,
- guided by democratic norms, and
- cannot be used to systematically frustrate an elected legislature's mandate.

v. "Deemed Assent" Is Constitutionally Impermissible

The Court rejected the idea that, after a certain period of delay, assent could be deemed to have been granted:

- Assent is a positive constitutional act, not a legal fiction.
- Courts cannot presume assent merely due to delay without rewriting Article 200.

Thus, "deemed assent" is beyond judicial power, even under Article 142.

vi. Judicial Review: Narrow but Real

The Court drew a careful boundary:

- Permissible review: Courts may examine whether the Governor's *delay* is unreasonable, mala fide, or obstructive, and may direct the Governor to take a decision.
- Impermissible review: Courts cannot sit in appeal over the *substance* of the Governor's choice (assent vs return vs reservation), except on limited grounds like irrelevant or extraneous considerations.

This preserves a minimum judicial safeguard against constitutional paralysis, while avoiding judicial takeover of the assent function.

e. Constitutional Elasticity: Justification and Critique

i. Court's Justification – The Need for "Elasticity"

The Court invoked the idea of constitutional elasticity:

- High constitutional offices require space to respond to complex or unforeseen situations.
- Rigid timelines might hinder deeper scrutiny in exceptional cases.

ii. Critique – Risk of Unbounded Discretion

However, unlimited flexibility carries serious risks:

- It may encourage avoidance rather than deliberation, as Governors can delay under the guise of scrutiny.
- It erodes the Legislature's primacy in lawmaking by allowing unelected authorities to stall elected mandates.
- It can subvert democratic accountability, especially when Governors are aligned with the Union but not with the State government.

Thus, elasticity must be bounded by constitutional morality and the spirit of responsible government—not used to justify prolonged inaction.

f. Lessons from Previous Practice: Tamil Nadu and Commissions

In earlier litigation (notably involving Tamil Nadu), the Court had informally indicated that around six months might be a reasonable outer limit for gubernatorial action. Though not binding, it served as a practical reference point for States.

By avoiding any indicative timeframe in the 2025 advisory, the Court revives uncertainty.

Additionally, the Sarkaria and Punchhi Commissions had recommended that:

- Governors must act promptly on Bills,
- reservation for the President be used sparingly, and
- Governors respect the political mandate of elected governments.

These recommendations now gain renewed relevance as *non-binding but persuasive conventions* that should guide practice in the absence of formal timelines.

g. Democratic and Federal Stakes

i. Democratic Functioning

State legislatures represent the sovereign will of the people at the State level. Prolonged gubernatorial inaction:

- undermines this mandate,
- converts a procedural step into a political veto, and
- weakens faith in representative institutions.

ii. Federal Balance

Because Governors are appointed by the Union, extended delays can appear as indirect central intervention in State policy-making, aggravating Centre–State tensions.

iii. Separation of Powers

Frequent recourse to courts to nudge Governors into acting drags judicial institutions into political controversy, widening the judiciary's footprint in routine governance issues—an outcome the Court itself is wary of.

iv. Constitutional Morality

Constitutional offices carry duties of responsiveness, neutrality, and restraint.
Persistent inaction or strategic delay is inconsistent with the ethics of the office and damages public trust in constitutional processes.

h. Way Forward: Restoring Balance and Predictability

i. Statutory or Constitutional Timelines

- Parliament or the constituent power could introduce flexible but clear timeframes (e.g. "as soon as possible and ordinarily within X months") to limit scope for abuse.

ii. Mandatory Written Communication

- Both withholding of assent and reservation should require written, reasoned communication to the State government.
- This enables clarity, public scrutiny, and judicial review where necessary.

iii. Codified Procedures and Record-Keeping

- A standardised protocol for dealing with Bills—recording dates of receipt, queries, returns, and decisions—would:
    - reduce factual disputes,
    - aid courts where review is necessary, and
    - embed administrative discipline.

iv. Narrowing Discretion to Exceptional Cases

- Circumstances warranting reservation for the President or repeated return could be codified or conventionally agreed, ensuring that exceptions do not become the norm.

v. Reinvigorating Cooperative Federalism

- Governors must function as impartial constitutional umpires, not political veto points.
- Orientation programmes, clear conventions, and adherence to Sarkaria/Punchhi principles can deepen respect for elected State governments.

Conclusion

The Supreme Court's 2025 advisory opinion on Article 200 achieves a delicate balance:

- It rejects gubernatorial silence as a constitutional option and reaffirms the duty to act and to give reasons.
- It simultaneously refuses to create timelines or deemed assent through judicial fiat, insisting on fidelity to constitutional text and separation of powers.

Yet, by leaving timelines to the political and legislative process, the Court also leaves open a space in which delay—short of total silence—can still impede democratic governance and inflame Centre–State tensions.

The real solution, therefore, lies beyond the courtroom:

- in Parliamentary clarification,
- in codified conventions, and
- in constitutional statesmanship by Governors, State Cabinets, and the Union alike.

Only when constitutional elasticity is disciplined by constitutional responsibility will Article 200 function as intended—a safeguard within parliamentary democracy, not a tool of its frustration.

2. Tribunals in India: The Structural Conflict Between Judicial Independence and Executive Control

a. Introduction

Tribunals were introduced in India to deliver faster, specialised, and technically informed justice, especially in fields like taxation, corporate regulation, environmental disputes, and service matters.

Their purpose was to reduce the burden on High Courts and provide adjudication by experts. However, rather than easing judicial load, tribunals have become the epicentre of an institutional confrontation between the Supreme Court and the Union Government—a clash that revolves around appointments, tenure, eligibility, and administrative control.

At its heart, this conflict is about a foundational constitutional question:

Can a judicial body housed within the executive structure genuinely remain independent?

The answer determines whether tribunals can serve as credible substitutes for constitutional courts.

b. Why Tribunals Matter

Tribunals exercise judicial power, decide critical economic and regulatory disputes, and often replace the jurisdiction of High Courts. Their legitimacy therefore rests on the public perception of neutrality, independence, and reasoned adjudication.

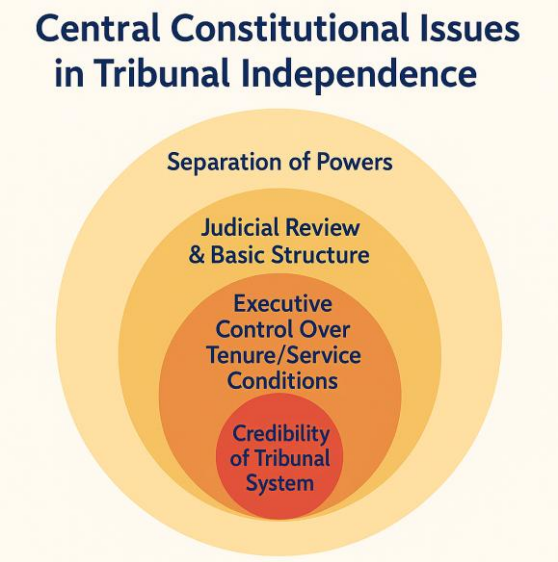
Yet unlike High Courts—which enjoy constitutional stature—tribunals are created, staffed, and administered by the executive. This generates a delicate tension: tribunals must remain judicially independent while being structurally embedded in the very branch of government that appears before them as a litigant.

Any erosion of independence risks:

- undermining rule of law,
- weakening public trust in specialised justice mechanisms, and
- overburdening regular courts as litigants return to High Courts through appeals.

c. Core of the Conflict: Who Controls Tenure and Appointments?

The long-running conflict between the government and the Supreme Court centres around two structural control levers:



i. Tenure of Tribunal Members

- Government view: A four-year tenure is sufficient for performance evaluation and administrative flexibility.
- Supreme Court view: Tenure must be at least five years, ideally longer, without reappointment, because short tenures create dependence on the executive and undermine judicial freedom.

ii. Age and Eligibility Criteria

- Government preference: Minimum age of 50, arguing that seniority ensures maturity and expertise.
- Supreme Court concern: This excludes younger but highly qualified professionals—including those eligible to become High Court judges—without justifiable reason.

The Court believes these two conditions, especially in combination, can result in subtle executive influence and weaken the independence of tribunal courts.

d. How the Conflict Escalated: A Timeline of Judicial–Executive Disagreement

i. Finance Act, 2017

- Consolidated tribunal administration under the executive and granted the Centre sweeping rule-making powers.
- The Supreme Court expressed concerns but allowed tribunals to function while reviewing the rules.

ii. *Rojer Mathew* (2019)

- The Court struck down several aspects relating to appointments and service conditions, emphasising that tribunal independence is a constitutional necessity, not administrative discretion.

iii. 2020 Rules and Judicial Pushback

- Government issued revised rules that largely replicated previous provisions.
- The Court warned that repeated violations of its directions could constitute contempt.

iv. 2021 Ordinance and Subsequent Legislation

- An ordinance reinstated many provisions the Court had already rejected.
- In July 2021, the Supreme Court again struck them down.
- Parliament then enacted the Tribunals Reforms Act, 2021, reintroducing the same disputed elements, deepening institutional confrontation.

This cycle of invalidation → re-enactment → invalidation illustrates not merely policy disagreement but a breakdown of constitutional dialogue.

e. Why the Supreme Court Is Alarmed

The Court's concerns go beyond technicalities—they touch core constitutional principles:

i. Independence of Quasi-Judicial Bodies

Short tenures and reappointment possibilities make members vulnerable to executive pressure.

ii. Exclusion of Younger Talent

Artificial age bars prevent recruitment of capable individuals who are otherwise eligible for constitutional courts.

iii. Erosion of Judicial Review

When Parliament reintroduces provisions repeatedly struck down, the authority of judicial review—a basic feature of the Constitution—is threatened.

iv. Equality of Standards

Since tribunals substitute High Courts, their independence must be equivalent, not diluted.

For the Court, the real danger is the transformation of tribunals into executive-controlled administrative forums, compromising justice.

f. Why the Union Government Defends Its Position

The government articulates a broad constitutional and policy rationale:

i. Legislative Policy-Prerogative

- Parliament has the authority to design tribunal mechanisms as part of governance reform.
- The judiciary should not "micromanage" policy choices around tenure or eligibility.

ii. Efficiency and Accountability

- Shorter tenures allow for performance assessment and ensure rotation.
- Seniority ensures maturity in handling complex disputes.

iii. Separation of Powers Argument

- The executive claims that judicial insistence on specific tenure and criteria infringes upon legislative authority.

In essence, the government views tribunal structuring as policy, while the Supreme Court views it as constitutional design.

g. Practical Fallout: Vacancies and Institutional Paralysis

The unresolved power struggle has had severe operational consequences:

i. Widespread Vacancies

Key tribunals suffer chronic shortages of members and chairs:

- National Company Law Tribunal (NCLT)
- Armed Forces Tribunal (AFT)
- Income Tax Appellate Tribunal (ITAT)
- Debt Recovery Tribunals (DRTs)
- Environmental tribunals

ii. Case Backlogs and Delays

- Pendency rises sharply.
- Litigants return to High Courts, nullifying the objective of specialised adjudication.
- Regulatory sectors like insolvency (IBC), tax, and competition law face bottlenecks.

iii. Loss of Public Faith

When tribunals struggle to deliver timely justice, their very purpose is questioned.

Thus, the institutional standoff has real-world consequences for economic governance and citizens' access to speedy justice.

h. The Larger Constitutional Question: Tribunal Independence

Tribunals occupy a unique constitutional position:

- They exercise judicial power,
- But are not constitutional courts,
- And are administered by the executive.

This creates a structural vulnerability:

When the executive controls appointments, service conditions and continuance, judicial independence becomes contingent, not intrinsic.

The dispute is therefore a contest over institutional design, not merely administrative rules.

Ensuring tribunal autonomy is essential because:

- Tribunals increasingly adjudicate high-stakes commercial and regulatory matters,
- Their decisions affect citizen rights, state power, and corporate interests,
- They replace High Courts but lack equivalent constitutional protections.

The integrity of the tribunal system is thus a rule-of-law question, not simply a governance one.

i. Way Forward: Building a Constitutionally Sound Tribunal Ecosystem

i. Establish a National Tribunals Commission

A permanent, independent body to:

- Oversee appointments,
- Manage service conditions,
- Ensure uniform standards of independence,
- Act as the administrative umbrella for all tribunals.

ii. Secure, Uniform, Non-Renewable Tenures

Stable terms without reappointment pressures safeguard judicial independence.

iii. Transparent and Balanced Selection Committees

With balanced representation of judiciary and executive, avoiding dominance of either branch.

iv. Rationalise and Consolidate the Tribunal Landscape

India's multiplicity of small tribunals creates administrative inefficiencies; consolidation can improve management.

v. Urgent Filling of Vacancies

Streamlined and timely appointments are essential to revive the credibility of key institutions.

vi. Reaffirm Constitutional Dialogue

A cooperative framework between Parliament and the judiciary is needed to prevent repeated cycles of invalidation and re-enactment.

Conclusion

The conflict between the Supreme Court and the Union Government over tribunal reforms is not a narrow legal dispute but a constitutional confrontation over institutional independence. Tribunals can succeed only if they function as credible, impartial, and autonomous adjudicatory bodies—not as extended arms of the executive.

Strengthening the tribunal ecosystem is crucial for India's regulatory state, economic governance, and access to timely justice. A stable, independent, and well-resourced tribunal structure is not simply a matter of administrative efficiency; it is central to the rule of law and the integrity of India's constitutional democracy.

GS Paper II: Current Affairs

1. Electricity (Amendment) Bill, 2025

a. Introduction

India's power distribution sector has long been the weakest link in the electricity value chain. Despite capacity expansion in generation and major upgrades in transmission, distribution companies (discoms) have remained financially fragile due to chronic losses, inefficient billing systems, inadequate investment and politically driven tariff structures. Consumers, meanwhile, have been tied to a single monopolistic distributor, limiting service quality and choice.

The Electricity (Amendment) Bill, 2025 marks a structural reform effort aimed at breaking this monopoly, enabling regulated competition, modernising networks, rationalising tariffs, and strengthening sustainability. It attempts to redesign the incentive framework of distribution so that the sector becomes financially viable, consumer-centric, and aligned with India's renewable-energy trajectory.

b. Context and Sectoral Background

i. Constitutional Setting

Electricity falls under the Concurrent List, requiring coordinated efforts from both Centre and States. Historically, divergent political priorities and varying State capacities have led to uneven implementation of reforms, making cooperative federalism central to sectoral performance.

ii. Legacy Challenges in the Distribution Ecosystem

Discom distress stems from:

- Weak billing and metering systems,
- High aggregate technical and commercial losses (AT&C),
- Theft and outdated infrastructure,
- Monopoly distribution devoid of competitive pressure,
- Distorted tariff structures due to heavy cross-subsidisation.

Industries have long borne the burden of inflated tariffs, while discoms struggled to modernise due to poor revenues. This structural imbalance has constrained manufacturing competitiveness and slowed renewable integration.

c. Key Provisions of the Electricity (Amendment) Bill, 2025

i. Introducing Regulated Competition in Distribution

The Bill allows multiple distribution companies to operate within the same area, using a shared network and competing on service quality.
Key elements:

- Monopoly supply is dismantled; consumers gain choice.
- All licensees face a universal service obligation (USO).

- State regulators may relax USO for very large industrial consumers to facilitate open access and efficiency.

This reform targets inefficiency by shifting the incentive structure from monopolistic entitlement to performance-driven competition.

ii. Tariff Rationalisation and Cross-Subsidy Reduction

The Bill shifts towards cost-reflective tariffs, ensuring discoms recover the actual cost of supply. Major changes:

- Cross-subsidy for industry, railways and metro systems is phased out over five years.
- Support for farmers and low-income households is maintained through direct, on-budget subsidies (Section 65).

This reform enhances transparency by replacing hidden tariff burdens with accountable fiscal transfers.

iii. Optimising Distribution Infrastructure

To prevent network duplication and financial inefficiency:

- No parallel distribution networks may be created.
- Regulators will determine uniform wheeling charges for all licensees.
- Energy storage systems are formally recognised, supporting grid stability as renewable penetration rises.

This ensures shared infrastructure becomes more predictable and commercially rational.

iv. Strengthening Regulatory Institutions

A new Electricity Council is proposed to improve Centre–State coordination.
State regulatory commissions will gain:

- Powers to penalise non-compliance,
- Authority to initiate tariff determination when discoms delay filings,
- Expanded oversight over quality-of-service metrics.

This aims to address long-standing concerns around regulatory weak capacity and inconsistent enforcement across States.

v. Sustainability and Competitive Power Markets

Key steps toward a greener, more flexible electricity system:

- Stronger renewable purchase obligations (RPOs) with penalties for non-compliance,
- Promotion of new market instruments and platforms enabling dynamic procurement,
- Facilitation of demand response and flexibility services.

vi. Legal and Operational Clarifications

The Bill updates provisions to align with newer laws (e.g., Companies Act, 2013) and clarifies the Electric Line Authority's powers regarding laying of lines, compensation and resolution of local disputes—reducing delays in infrastructure expansion.

d. Analytical Perspective

i. Significance of the Reforms

The Bill represents a systemic shift that could:

- Lower industrial tariffs, boosting competitiveness,
- Strengthen discom finances and attract private investment,

- Improve consumer experience through competitive pressure,
- Enable renewable-energy integration and storage,
- Improve regulatory discipline via clearer institutional roles.

It also signals a transition to a distribution model consistent with India's goal of becoming a developed economy by 2047.

ii. Emerging Challenges

Implementation risks remain substantial:

- States may resist reforms reducing their control over discoms.
- Cost-reflective tariffs may face political pushback, especially in subsidy-heavy States.
- Private players may "cream-skim" profitable consumers unless USOs are rigorously enforced.
- Cross-subsidy elimination must be sequenced carefully to avoid burdening vulnerable consumers.
- Regulatory commissions in weaker States may lack capacity to oversee competition effectively.

iii. Stakeholder Impacts

- **State governments**: Key drivers of implementation; may see reduced discretion over tariffs.
- **Discoms**: Face competitive pressures; must modernise metering, billing and loss-reduction systems.
- **Industrial consumers**: Likely beneficiaries through reduced tariffs and flexible procurement.
- **Farmers and low-income households**: Continue to receive support, now through transparent DBT-like subsidies.
- **Private licensees**: Gain new market opportunities but must meet stringent service obligations.

iv. Comparative Insights

International experience—particularly from countries like UK and Australia—demonstrates that competitive retail supply can deliver efficiency gains only when regulation is strong and transparent. India's successful inter-state transmission reforms show that shared infrastructure under regulated competition can work well when governance is robust.

e. Way Forward

i. Strengthen Billing and Metering Infrastructure

Scaling prepaid smart meters and advanced metering infrastructure is critical to curb leakages and improve revenue recovery.

ii. Move Towards DBT for Subsidies

Direct benefit transfers ensure transparency, reduce distortions, and reinforce fiscal discipline.

iii. Build Regulatory and Institutional Capacity

State regulators require more personnel, technical expertise, digital tools and financial independence.

iv. Enforce Universal Service Obligations

Competition must not lead to exclusion of unprofitable segments; regulators must strictly implement USOs.

v. Accelerate Renewable Integration

Investment in energy storage, flexible grids and demand response is essential for a high-renewable future.

Conclusion

The Electricity (Amendment) Bill, 2025 represents one of the most far-reaching reforms in the distribution sector since the Electricity Act, 2003. By shifting to a competitive, transparent and consumer-centric model, rationalising tariffs and embedding clear subsidy mechanisms, the Bill attempts to correct the structural weaknesses that have burdened Indian discoms for decades.

If supported by strong regulatory capacity and sustained Centre–State cooperation, the reforms can modernise India's electricity ecosystem, support industrial competitiveness, and deepen the integration of clean energy—positioning the power sector as a foundational pillar of India's development towards 2047.

2. Draft Seeds Bill

a. Introduction

Seeds determine crop productivity, farmer incomes and national food security. Yet India's regulatory framework—the Seeds Act, 1966—was designed for an era when public institutions dominated seed supply, technologies were simple, and private-sector research was limited.

With rapid advances in hybrids, biotechnology, globalised seed trade, and the rise of digital marketplaces, the older law is misaligned with contemporary agricultural realities.
The Draft Seeds Bill seeks to modernise the system by strengthening scientific evaluation, improving market oversight, and protecting farmers from fraudulent or poor-quality seeds—thereby aligning India's seed governance with modern agricultural science and global trade norms.

b. Rationale for a New Seeds Law

i. Outdated Provisions of the 1966 Act

The existing Act addresses only basic quality parameters. It does not account for:

- transgenic traits,
- hybrid breeding technologies,
- private-sector innovation,
- online seed commerce, or
- global harmonisation standards.

This creates regulatory inconsistencies across States and enables poor-quality seeds to circulate.

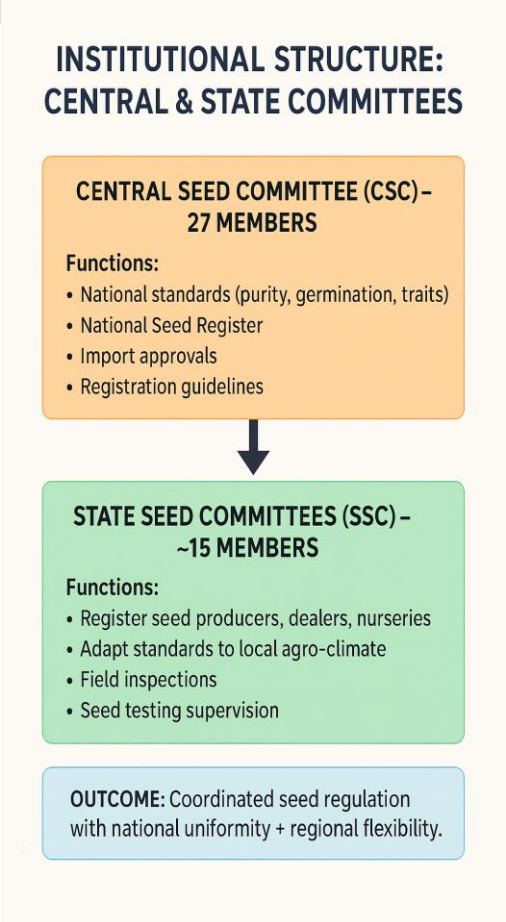
ii. Rapid Technological Transformation

Modern seed science requires rigorous evaluation of genetic purity, biosafety, and trait performance. Without updated legal tools, oversight remains uneven, creating risks for farmers and research institutions.

iii. Changing Trade Dynamics

India is now a major seed producer and exporter. Competitiveness in global markets depends on transparent, scientifically validated quality standards.

iv. Protecting Farmers from Losses



Frequent cases of crop failure due to misbranded or substandard seeds underscore the need for stronger compliance mechanisms and legal remedies.

v. Need for Uniform National Standards

Variations in testing, certification and enforcement across States hinder efficiency. A new law aims to establish uniformity, clarity and accountability throughout the seed ecosystem.

c. Key Features of the Draft Seeds Bill

i. Compulsory Registration of Seed Varieties

All varieties must undergo scientific evaluation before sale. The process includes:

- germination and purity tests,
- field performance verification,
- Value for Cultivation and Use (VCU) assessment.

This prevents untested or fraudulent varieties from entering the market and protects farmer incomes.

ii. Registration of All Actors Across the Seed Chain

Producers, processors, distributors, dealers and nurseries must be registered, ensuring traceability, accountability and regulatory oversight across the supply chain.

iii. Safeguarding Farmers' Rights

Farmers retain the freedom to:

- grow,
- save,
- exchange, and
- resow seeds.

However, branded commercial sales require registration. This balances traditional practices with market regulation.

iv. Strengthening Testing Infrastructure

A coordinated network of Central and State Seed Testing Laboratories will enhance quality assurance and reduce regional disparities in testing capacity.

v. Enhanced Penalties for Violations

The Bill introduces graded penalties:

- fines from ₹50,000 to ₹30 lakh,
- imprisonment up to three years for major offences.

This creates stronger deterrence against misbranding, adulteration or sale of inferior seeds.

vi. Liberalised Seed Imports

Imports are permitted if global varieties meet India's prescribed performance and biosafety standards—allowing access to superior germplasm while protecting domestic farmers.

vii. Central Accreditation System

Entities operating across multiple States may obtain Central accreditation, reducing administrative burdens and promoting uniform professional standards nationwide.

d. Why Farmers' Groups Have Concerns

Despite its regulatory improvements, several farmer organisations raise critical concerns:

i. Fear of Corporatisation

Stricter registration requirements may favour large seed companies, potentially shrinking the space for small local breeders and increasing dependency on corporates.

ii. Over-Centralisation

The Central Seed Committee wields extensive authority. Farmers fear this may dilute the role of States, which better understand local agro-climatic needs.

iii. Threats to Seed Sovereignty

Stricter certification norms could unintentionally curb traditional farmer-to-farmer seed exchanges and weaken community seed systems.

iv. Overlap with the PPVFR Act

Concerns persist that unless harmonised, the new Bill may undermine the Plant Varieties and Farmers' Rights (PPVFR) Act, which protects farmer rights and biodiversity.

v. Burden on Small-Scale Seed Sellers

High penalties and compliance costs could disproportionately affect small dealers.

vi. Potential Increase in Seed Prices

Testing, certification and administrative costs may ultimately be transferred to farmers, raising input prices.

e. Institutional Framework: National–State Coordination

i. Central Seed Committee

A 27-member apex body responsible for:

- setting national standards,
- maintaining the National Seed Register,
- approving guidelines for varietal registration,
- regulating seed imports.

ii. State Seed Committees

Usually comprising 15 members, they:

- register seed producers and dealers,
- conduct field inspections,
- supervise local testing and enforcement,
- adapt standards to agro-climatic conditions.

This two-tier structure aims to combine national consistency with regional relevance.

f. Analytical Perspective

i. Significance of the Reforms

The Draft Bill can:

- modernise India's seed ecosystem,
- strengthen quality assurance,

- promote scientific innovation,
- reduce crop losses from poor-quality seeds,
- enhance India's competitiveness in global seed markets.

ii. Challenges and Concerns

Implementation will require:

- harmonising the Bill with PPVFR to safeguard farmer rights,
- ensuring the Central authority does not overshadow State needs,
- preventing monopolistic consolidation,
- managing compliance costs,
- building adequate testing infrastructure and regulatory capacity.

iii. Broader Impact

If effectively implemented, the Bill can help:

- boost productivity,
- encourage sustainable farming through better varieties,
- expand India's presence in global seed supply chains.

g. Way Forward

i. Protect Farmer Autonomy

Ensure the Bill explicitly safeguards traditional seed-saving and exchange practices.

ii. Harmonise with PPVFR Act

Clear provisions must ensure farmers' rights and biodiversity protections remain robust.

iii. Build Regulatory Capacity

Invest in modern laboratories, trained personnel and digital monitoring systems.

iv. Support Small Seed Producers

Introduce graded compliance mechanisms and capacity-building support.

v. Ensure Price Stability

Transparent oversight should prevent excessive price increases due to certification costs.

Conclusion

The Draft Seeds Bill represents a significant and necessary modernisation of India's seed governance architecture. By emphasising scientific evaluation, robust testing and transparent market practices, it aligns the regulatory framework with contemporary agricultural technologies and global trade demands. Yet, its long-term success will depend on safeguarding farmer rights, preventing excessive corporatisation and ensuring that small producers remain integral to India's seed ecosystem.
A balanced, inclusive and transparent implementation will determine whether the law enhances productivity while strengthening rural livelihoods.

3. The Higher Education Commission of India (HECI) Bill 2025

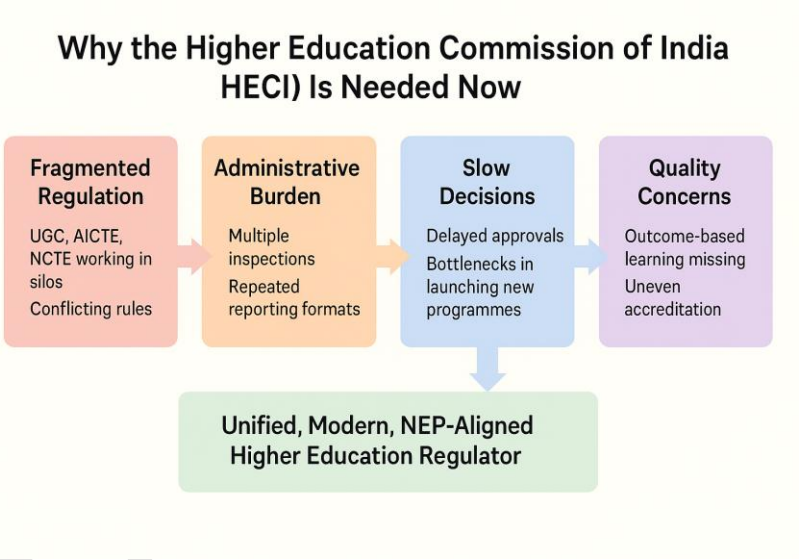
a. Introduction

India's higher education ecosystem has long operated through a multiplicity of regulators—the University Grants Commission (UGC), All India Council for Technical Education (AICTE), and National Council for Teacher Education (NCTE). While each was created to respond to specific sectoral demands, their parallel jurisdictions have generated overlaps, inconsistent norms, and procedural redundancies. The outcome has been a fragmented regulatory environment marked by slow decision-making, contradictory rules and significant administrative burden for institutions.

The Higher Education Commission of India (HECI) Bill 2025 proposes to replace this architecture with a unified regulatory authority—arguably the most sweeping governance reform in the sector since Independence. Anchored in the vision of the National Education Policy (NEP) 2020, it seeks to shift the system from compliance-heavy controls to outcomes-based, transparent and academically grounded regulation.

b. Core Mandate of HECI: What the New Regulator Is Designed to Achieve

The HECI is conceptualised as the umbrella regulator for all higher education—excluding medical and legal studies—tasked with bringing coherence, predictability and quality enhancement. Its mandate includes:



i. Standard-setting and Academic Norms

Establishing uniform learning standards, curricular expectations and teaching-quality benchmarks across disciplines.

ii. Institutional Approval and Programme Recognition

Providing a single-window system for establishing new institutions, starting programmes, and complying with academic guidelines.

iii. Oversight of Quality and Transparency

Shifting the regulatory culture from rigid inspections to performance-driven assessments, with greater reliance on self-disclosure and evidence-based evaluation.

iv. Accreditation Governance

Coordinating accreditation processes to ensure transparent, credible grading systems and progressive improvement pathways for institutions.

v. Financial Linkages

While final contours on funding powers remain under debate, the Bill envisions linking financial support to quality metrics, thereby reinforcing accountability.

This consolidated role aims to eliminate duplication while promoting a holistic, learner-centric, innovation-friendly regulatory ecosystem.

c. Why Reform Was Imperative: Structural Drivers Behind HECI

NEP 2020 identified the existing regulatory landscape as fragmented, outdated and overly prescriptive. The HECI Bill responds to several systemic challenges:

i. Procedural Complexity

Institutions grappled with multiple approvals, parallel norms and divergent reporting formats, often delaying academic planning and innovation.

ii. Contradictory Rules and Ambiguous Jurisdictions

Split authority led to conflicts—for example, in defining programme standards, faculty norms or institutional categorisation.

iii. Weak Accountability and Quality Incentives

An inspector-raj culture emphasised compliance over academic improvement, discouraging innovation and autonomy.

iv. Misaligned Funding and Regulation

The separation of regulatory oversight (UGC) and funding authority (the Ministry) diluted both effectiveness and coherence.

HECI seeks to restore unity of purpose, bringing regulation, standards and funding incentives closer together to drive systemic transformation.

d. Learning from the 2018 Draft: How the New Bill Attempts Course Correction

The earlier HECI proposal (2018) faced strong opposition for its perceived centralisation and limited representational diversity. Its key shortcomings and the 2025 responses include:

i. Federal Concerns

- *2018 Issue:* Minimal role for States despite education being in the Concurrent List.
- *2025 Fix:* Greater consultative mechanisms, broader institutional participation, and structured avenues for State representation.

ii. Inadequate Social and Gender Representation

- *2018 Issue:* Weak inclusion of women and marginalised communities.
- *2025 Fix:* Expanded membership norms and deliberate representation criteria to ensure heterogeneity.

iii. Incomplete Structural Integration

- *2018 Issue:* AICTE and NCTE functions remained partly outside the proposed framework; funding oversight was ambiguous.
- *2025 Fix:* Comprehensive merger of sectoral regulators and clearer thinking on linking grants to quality (though final executive-regulator balance remains pending).

These revisions indicate an effort to build a more inclusive, institutionally coherent and politically acceptable reform blueprint.

e. Organisational Architecture: The Four Verticals of HECI

The Bill envisions a specialised, expert-driven structure comprising four verticals, each with a distinct mandate:

i. National Higher Education Regulatory Council (NHERC)

- Frames norms and governance standards.
- Regulates institutional operations.
- Ensures compliance through light-touch, risk-based oversight.

ii. National Accreditation Council (NAC)

- Conducts accreditation through independent rating agencies.
- Establishes transparent, evidence-based benchmarks.
- Drives continuous institutional quality enhancement.

iii. General Education Council (GEC)

- Defines expected learning outcomes.
- Standardises academic frameworks such as credit systems and interdisciplinary pathways.
- Ensures coherence in curriculum structures across disciplines.

iv. Higher Education Grants Council (HEGC)

- Oversees financial support and performance-linked funding.
- Aims to connect academic quality with resource allocation.

This division of labour is intended to ensure regulatory clarity, functional specialisation and reduced bureaucratic overlap.

f. Anticipated Systemic Gains

If implemented well, HECI could mark a structural shift in India's higher education governance through:

i. Simplified and Predictable Regulation

A single regulator reduces compliance load, eliminates redundancy, and enables long-term academic planning.

ii. Enhanced Quality Assurance

Uniform benchmarks and transparent accreditation can drive institutional competition, improve teaching-learning environments and strengthen global credibility.

iii. Realising NEP 2020 Objectives

HECI is central to NEP's pillars of autonomy, accountability, multidisciplinary education and research orientation, paving the way for a modernised higher education landscape.

iv. Performance-Linked Incentives

By connecting funding with measurable outcomes, the system encourages institutions to prioritise quality, innovation and inclusion.

g. Concerns and Unresolved Debates

Despite its transformational promise, the HECI Bill raises important questions:

i. Federalism and State Autonomy

States remain cautious that greater central control may marginalise their role in shaping higher education, potentially undermining the Concurrent List mandate.

ii. Representation and Inclusivity

Ensuring gender balance, social diversity and regional representation is critical for the Commission's legitimacy and sensitivity to India's varied educational contexts.

iii. Funding Authority and Regulatory Effectiveness

If funding powers stay largely with the Ministry, HECI's ability to enforce standards may weaken. Clear delineation of authority is essential.

iv. Risk of Over-regulation

Merging multiple functions—regulation, accreditation, standard-setting—may inadvertently centralise power and perpetuate old bureaucratic tendencies if not accompanied by a cultural shift toward trust, transparency and institutional autonomy.

These issues highlight that legal design must be matched by institutional culture and decentralised implementation.

Conclusion

The HECI Bill 2025 is a bold attempt to reimagine India's higher education regulatory landscape. By consolidating fragmented institutions, promoting uniform academic standards, and aligning governance structures with NEP 2020, it aspires to build a system that is coherent, transparent, learner-centred and globally competitive.

Yet, the reform's credibility will depend on its ability to balance central coordination with federal participation, embed inclusive representation, and cultivate a regulatory ethos that prioritises quality enhancement over procedural policing. If these challenges are addressed, HECI could become a cornerstone of India's educational transformation in the coming decade.

4. Digital Personal Data Protection Rules, 2025 and the RTI Amendment

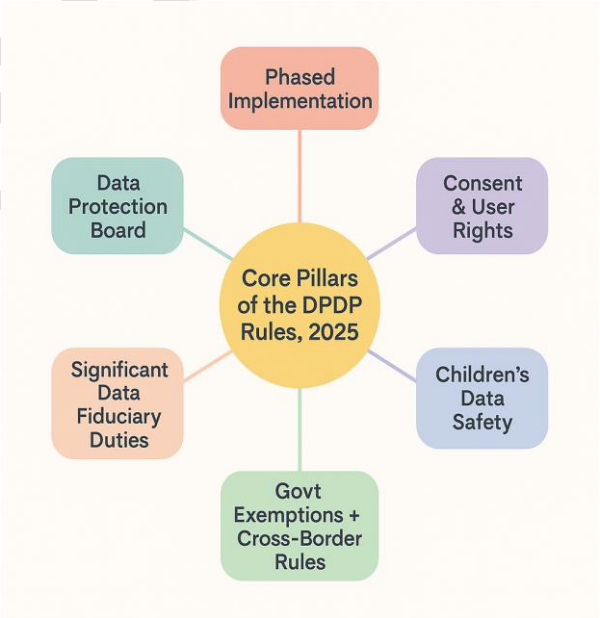
a. Introduction

The notification of the Digital Personal Data Protection (DPDP) Rules, 2025 and the simultaneous amendment to the Right to Information (RTI) Act, 2005 mark a decisive turning point in India's governance architecture.

Together, they reshape two foundational democratic guarantees:

- Privacy – the individual's right to control personal information, and
- Transparency – the citizen's right to know how public power is exercised.

The DPDP framework gives India its first operational privacy regime, nearly eight years after the Supreme Court in *K.S. Puttaswamy (2017)* recognised privacy as a fundamental right. The RTI amendment, however, has sparked concern that the pendulum may now swing too far towards secrecy—narrowing the space for public-interest disclosures that RTI had opened up.



b. Evolution of India's Privacy Question

i. From Digitisation to Datafication

Over the past decade, India has undergone a rapid shift:

- Explosion of smartphone use, cheap data and digital platforms (fintech, health-tech, ed-tech, e-governance).
- Massive volumes of personal data collected by both the State and private firms.

The existing Information Technology Act, 2000 was framed to address cybercrimes and basic data security, not complex, contemporary issues such as:

- Algorithmic profiling and targeted advertising
- Behavioural manipulation
- Data brokerage and mass surveillance
- Large-scale data breaches

The gap between technological reality and legal protection became stark.

ii. Constitutional Anchoring of Privacy

In *Puttaswamy (2017)*, a nine-judge Bench held that:

- Privacy is intrinsic to Article 21 (right to life and personal liberty).
- Any restriction on privacy must satisfy the test of legality, necessity, proportionality, and procedural safeguards.

This created a constitutional mandate for a coherent data protection law. The DPDP Act, 2023 was the legislative response; the 2025 Rules now operationalise that framework.

c. The DPDP Rules, 2025: India's First Operational Privacy Regime

The DPDP Act set out broad principles. The 2025 Rules supply the "how":

i. Phased Implementation

To avoid compliance shocks:

- Larger entities, especially Significant Data Fiduciaries (SDFs), face earlier deadlines.
- Smaller firms, start-ups and low-risk entities receive 12–18 months to set up consent dashboards, grievance mechanisms, breach reporting and data-retention systems.

This staged rollout recognises India's uneven institutional and technological capacities.

ii. Consent Architecture and User Autonomy

The Rules seek to transform consent from a formal ritual into a meaningful safeguard:

- Consent must be specific, informed, freely given and revocable.
- Interfaces must provide clear notices, dashboards, withdrawal and deletion options.
- Manipulative "dark patterns" are implicitly discouraged.

This nudges India away from the long-standing "tick-box" culture where users agree without understanding.

iii. Data Life-Cycle Governance

The framework regulates data across its full life cycle:

- Collection – limited to what is necessary and purpose-bound.
- Storage – secure, with defined retention periods.
- Sharing – with safeguards, purpose limitation and logging.
- Deletion – when the lawful purpose is exhausted or consent withdrawn.

iv. Mandatory Breach Reporting

Given frequent, large-scale data leaks:

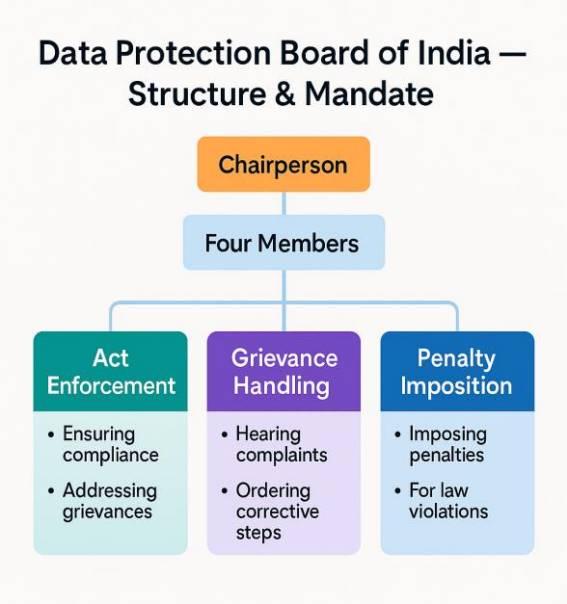
- Data breaches must be promptly reported to the Data Protection Board (DPB) and affected individuals.

- Notifications must explain: nature of breach, potential harm, and mitigation steps.
- Non-disclosure can attract penalties up to ₹250 crore, signalling a strong push for breach transparency and corporate accountability.

d. Institutional Core: The Data Protection Board of India

i. Structure and Mandate

- Chairperson + four members, functioning under the Ministry of Electronics and IT.
- Acts as adjudicator, compliance watchdog and breach investigator.



ii. Key Powers and Responsibilities

- Receive and adjudicate complaints from Data Principals.
- Direct remedial action against errant Data Fiduciaries.
- Impose financial penalties for non-compliance.
- Oversee SDFs and high-risk processing operations.

The Board's real effectiveness, however, will depend on:

- Technical and legal expertise
- Adequate staffing and regional presence
- De facto independence from executive influence

e. Roles in the New Data Order: Data Principals and Fiduciaries

i. Data Principals (Citizens)

Individuals whose data is processed enjoy rights to:

- Give or withdraw consent
- Seek correction or deletion of inaccurate or unnecessary data
- Demand to know how and why their data is being used

Guardians exercise these rights for children. This enhances informational self-determination in a data-saturated economy.

ii. Data Fiduciaries (Organisations)

They include:

- Banks, hospitals, schools, telecom operators
- E-commerce and social media platforms
- Government departments managing citizen databases

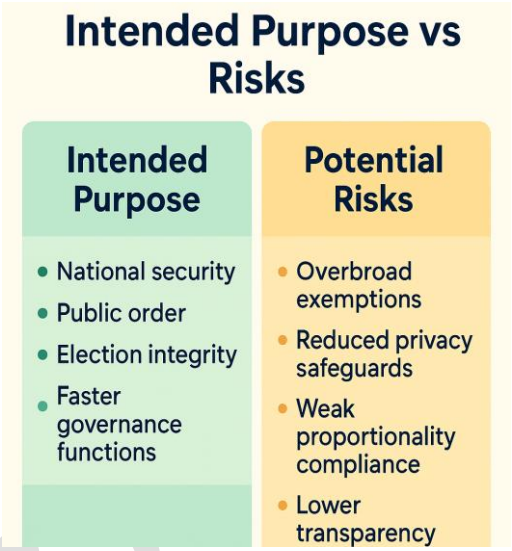
Significant Data Fiduciaries (large-scale or sensitive-data processors) must:

- Appoint a Data Protection Officer (DPO)
- Conduct Data Protection Impact Assessments
- Undergo annual independent audits

This mirrors a risk-based regulatory model: greater systemic influence implies higher regulatory burden.

f. Protection of Children: A Strict, Global-Standard Approach

Recognising children as a high-risk category:



i. Parental Consent & Data Minimisation

- Verifiable parental consent is mandatory for processing a child's data.
- Firms must collect only the minimum data necessary.

ii. Prohibited Practices

- No behavioural profiling of minors.
- No targeted advertising directed at children.
- Mandatory deletion when data is no longer required.

This aligns India with global norms (GDPR, COPPA-like approaches) and forces platforms to redesign their business models for minors.

g. Government Exemptions and Cross-Border Data Flows

i. Wide-Ranging Exemptions

The Act and Rules permit broad exemptions for:

- National security
- Public order
- Electoral functions of the State

The concern is that these categories are wide and vaguely defined, potentially diluting the Puttaswamy-mandated proportionality test.

ii. Cross-Border Data Transfers

- No blanket localisation rule; instead, case-by-case approvals through a government committee.
- This avoids rigid localisation but introduces regulatory discretion and uncertainty for global firms.

These two aspects—exemptions and discretionary cross-border rules—are seen as the most contestable elements of the framework.

h. The RTI Amendment: Privacy's Shadow on Transparency

i. How Section 8(1)(j) Originally Worked

Earlier, Section 8(1)(j) of the RTI Act allowed disclosure of personal information:

- If connected to a public activity, or
- If larger public interest justified disclosure

This clause enabled RTI users and social audits to access:

- Beneficiary lists
- Muster rolls, ration records, land records
- Salary and posting details linked to alleged corruption
- Inspection and audit reports

ii. What the Amendment Changes

The DPDP-linked amendment:

- Removes the public-interest override, expanding the shield of "personal information".
- Departments can now deny data simply by labelling it "personal", even where disclosure exposes corruption or leakages.

Result: privacy protection is formally strengthened, but transparency is structurally weakened.

i. Why the RTI Amendment Is Controversial

i. Shielding Governance from Scrutiny

The State can now lawfully refuse:

- Welfare beneficiary lists needed for social audits
- Records of transfers, promotions, or recruitment processes
- Internal inspection and vigilance reports

This undermines grassroots accountability in programmes where corruption and leakage are systemic risks.

ii. Weakening Social Audits and Citizen Oversight

Social audit groups, journalists, and citizen activists depend on access to granular records. Without them:

- Leakages remain hidden
- Community monitoring is blunted
- RTI's role as a "poor person's instrument of accountability" diminishes

iii. Disturbing the Privacy–Transparency Balance

A modern democracy needs both:

- Privacy – to protect the individual from arbitrary or exploitative data use
- Transparency – to protect society from arbitrary or abusive use of power

Critics argue that the amendment shifts the balance too sharply toward privacy, allowing it to become a pretext for opacity rather than a shield for the vulnerable.

j. The MKSS Perspective: Restoring Democratic Equilibrium

The Mazdoor Kisan Shakti Sangathan (MKSS), which led the RTI movement, frames the issue as one of democratic imbalance:

- Privacy must not become a cloak for corruption or misuse of public funds.
- Information crucial to social audits and public scrutiny should not be blocked under a blanket definition of "personal data".
- MKSS calls for restoring a public-interest override, where transparency prevails wherever disclosure prevents injustice or rights violations.

Their critique underscores that privacy and transparency are complementary, not competing rights in a democracy.

k. Interpreting the New Framework: Significance and Fault Lines

i. Achievements

- India finally has a coherent, operational privacy regime.
- Citizens gain concrete rights: informed consent, breach notifications, and remedial mechanisms.
- Global digital partners see India moving closer to international privacy norms, aiding digital trade and cross-border services.

ii. Structural Gaps

- Broad State exemptions may not meet Puttaswamy's proportionality standards.
- The Data Protection Board's independence is structurally weak given executive control over appointments.
- Key rights—data portability, algorithmic transparency, a robust "right to be forgotten"—remain diluted or absent.
- RTI's narrowed scope risks institutionalising opacity in areas where transparency is vital.

l. Way Forward: Rebalancing Privacy with Transparency

- **Narrow and Justify Government Exemptions**
    - Enact clear statutory limits and judicially reviewable safeguards.
    - Apply proportionality tests for all exemption notifications.
- **Strengthen the Data Protection Board**
    - Ensure independent appointments and multi-disciplinary expertise.
    - Build regional presence and transparent procedures.
- **Create Predictable Cross-Border Data Rules**
    - Move from ad hoc approvals to clear criteria (whitelists/adequacy frameworks).
- **Restore a Public-Interest Override in RTI**
    - Allow disclosure where transparency protects rights, prevents corruption or strengthens democratic oversight.
- **Embed Privacy-by-Design in Institutions**
    - Encourage data minimisation, encryption, privacy impact assessments and role-based access as default.
- **Promote Digital Literacy and Rights Awareness**
    - Educate citizens about consent tools, complaint avenues, and the limits of both privacy and secrecy.

Conclusion

The DPDP Rules, 2025 mark a historic advance in India's journey from an ad hoc IT-based regime to a structured, rights-based system of data protection. Yet, the accompanying RTI amendment has raised serious concerns about the shrinking space for democratic transparency.

India now stands at a crucial juncture: it must prove that privacy need not come at the cost of accountability. A sustainable digital future will depend on restoring a principled equilibrium—where strong privacy safeguards coexist with robust public scrutiny, ensuring that the State is not only powerful and data-rich, but also answerable, rights-respecting and genuinely democratic.

5. The Four Labour Codes: Towards a Modern, Unified Labour Governance Framework

a. Introduction

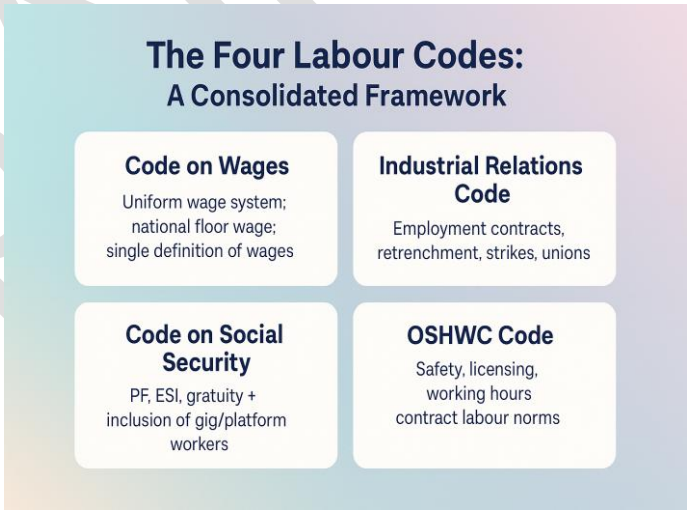
For decades, India's labour governance rested on 29 Central laws—complex, overlapping, and often inconsistent. Each governed a narrow domain such as wages, industrial disputes, workplace safety, or social security. This framework struggled to keep pace with an economy marked by rising informalisation, the emergence of gig and platform work, shortened production cycles, and the need for flexible yet fair employment relationships.

The Four Labour Codes—on Wages, Industrial Relations, Social Security, and Occupational Safety & Working Conditions—represent the most comprehensive consolidation of labour legislation since Independence. Their core ambition is to build a coherent, transparent and predictable labour ecosystem that protects workers, reduces compliance complexity, and enhances economic competitiveness.

b. Why Labour Law Consolidation Became Necessary

i. Structural Gaps in the Old Framework

- **Multiple definitions of "wages"** created ambiguity, litigation, and inconsistent benefit calculations.
- **Scattered welfare laws** left large segments—especially unorganised and gig workers—outside formal protections.
- **High compliance burden** discouraged formalisation and increased transaction costs for industry.
- **Fragmented dispute-resolution mechanisms** weakened industrial harmony and predictability.



ii. Goals of the New Codes

The consolidation reflects three strategic objectives:

- **Simplification of Procedures**
  Uniform definitions, single registration and returns, and digitised compliance ease governance for both State and industry.
- **Expansion of Social Protection**
  Bringing gig, platform, informal and migrant workers into the national welfare architecture.

- **Balanced Industrial Relations**

  Promoting investments and job creation while ensuring transparent worker safeguards.

c. Substance of the Four Labour Codes: A Conceptual Overview

i. Code on Wages, 2019: Creating a Uniform Wage Architecture

Purpose
To harmonise wage-related laws and ensure universal wage protection across sectors.

Key Features

- **Single Definition of "Wages"**
  Eliminates inconsistent calculations across PF, gratuity, bonus, and other entitlements, reducing disputes.
- **National Floor Wage**
  Centre may set a floor wage; states cannot go below it. Establishes a minimum dignity of living nationally.
- **Universal Minimum Wage Coverage**
  Extends beyond "scheduled employments," offering protection to all categories of workers.
- **Formalisation Measures**
  Mandatory employment letters and digital/physical wage slips strengthen transparency and reduce informal exploitation.

Significance
A foundational shift toward wage clarity, improved enforceability, and greater uniformity across states and sectors.

ii. Industrial Relations Code, 2020: Reconciling Flexibility with Worker Protection

Purpose
To modernise the framework governing industrial disputes, trade unions, and employment relationships.

Core Provisions

- **Fixed-Term Employment**
  Offers flexibility to employers while granting fixed-term workers benefits comparable to permanent employees.
- **Stricter Strike Procedures**
  Mandatory 14-day notice; mass casual leave deemed a strike. Encourages negotiation and predictability in industrial relations.
- **Higher Threshold for Retrenchment & Closure Approval**
  Establishments employing up to 300 workers may lay off or close without prior government approval. Reduces rigidity for MSMEs while retaining oversight for larger enterprises.
- **Single Negotiating Union**
  Majority union acts as the sole bargaining agent, reducing fragmentation.
- **Grievance Redressal Committees**
  Institutionalise internal dispute resolution and prevent escalation.

Significance
Aims to create a stable industrial climate conducive to investment while safeguarding essential worker rights.

iii. Code on Social Security, 2020: Expanding and Modernising the Welfare Net

Purpose
To unify social-security laws and move toward universal social protection.

Key Components

- **Recognition of Gig and Platform Workers**
  First-ever legal acknowledgment of digital-economy workers, enabling dedicated welfare schemes and funding.
- **Wider EPFO & ESIC Coverage**
  Expands formal-sector safety nets; ESI extended across districts to increase insurance access.
- **Gratuity for Fixed-Term Employees**
  Eligibility after one year (earlier five), correcting a long-standing disparity.
- **National Social Security Board**
  Responsible for designing schemes for unorganised, gig, migrant and platform workers.
- **Digital Registration and Portability**
  Lays groundwork for seamless access for migrant and seasonal labour.

Significance
Transforms social protection from a narrow, sector-specific model to an inclusive, adaptive welfare architecture.

iv. Occupational Safety, Health & Working Conditions (OSHWC) Code, 2020: Establishing Uniform Workplace Standards

Purpose
To harmonise diverse laws on workplace safety, contract labour, inter-state migrants, and welfare facilities.

Major Reforms

- **Single Registration and Single Return**
  Simplifies compliance for establishments formerly governed by multiple licences.
- **Mandatory Annual Health Check-Ups**
  Strengthens preventive occupational health measures.
- **Women in All Sectors, Including Night Shifts**
  Permitted with safety conditions, promoting gender inclusion and economic participation.
- **Protection for Contract & Migrant Labour**
  Standardised working conditions across industries; higher thresholds for contract-labour applicability.
- **Digital Inspection System**
  Reduces inspector raj, enhances transparency, and creates data trails for enforcement.

Significance
Moves India toward internationally aligned workplace standards with emphasis on dignity, safety, and uniformity.

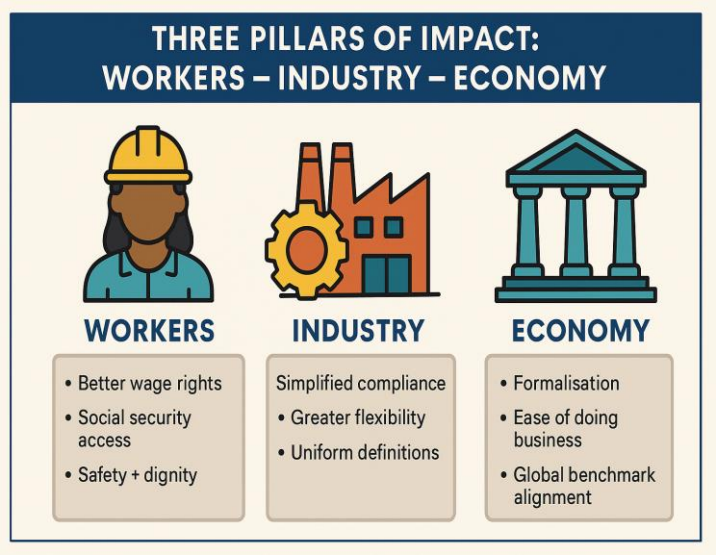
d. Significance of the Four Labour Codes: A Multi-Level Impact Assessment

i. For Workers

- Clear and enforceable wage rights.
- Expanded safety nets across PF, ESI, gratuity, and maternity benefits.
- Recognition and inclusion of gig/platform workers.
- Safer and more regulated workplaces through unified standards.
- Greater formalisation through documentation and digital compliance.

ii. For Industry

- Simplified, predictable compliance environment.
- Reduced paperwork via single registration/return systems.
- Greater hiring and operational flexibility.
- Uniform definitions minimise litigation and ambiguity.
- Digital inspections reduce arbitrary discretion.



iii. For the Economy

- Supports formal job creation and reduces informal vulnerabilities.
- Enhances ease of doing business and investment climate.
- Aligns Indian labour governance with global regulatory trends.
- Facilitates competitiveness under programmes such as Make in India.

e. Key Concerns and Roadblocks: The Reform–Implementation Gap

i. Implementation Delays

The Codes require states to frame corresponding rules. Divergent progress across states has slowed nationwide rollout.

ii. Worker Concerns

- Higher threshold for retrenchment approval may weaken job security.
- Strict strike norms potentially dilute collective bargaining strength.
- Rising prevalence of fixed-term contracts could reduce stable employment.

iii. Gig Worker Protection Challenges

Legal recognition exists, but issues persist around:

- Contribution mechanisms for the Social Security Fund,
- Tracking and registering workers across platforms,
- Ensuring portability and ease of access.

iv. Industry Reservations

- Uniform wage definition may increase contribution liabilities.
- Digital readiness varies widely across SME clusters.
- State-level variations may create compliance uncertainty during transition.

f. The Road Ahead: Ensuring Effective and Equitable Reform

- **Accelerated State-Level Rulemaking** to enable nationwide implementation.
- **Robust digital infrastructure** for registration, compliance, and grievance redress.
- **Tripartite dialogue mechanisms** to balance the legitimate concerns of workers, employers, and governments.

- **Clear funding architecture for gig-platform welfare**, including aggregator contributions and state support.
- **Capacity-building for inspectors and labour officials** to shift from punitive to facilitative regulation.
- **Awareness campaigns** to educate workers—especially informal and migrant workers—about entitlements.

Conclusion

The Four Labour Codes mark a profound shift in India's labour governance—from a fragmented, outdated system to a unified, technology-enabled, worker-inclusive framework. Their ambition lies not merely in consolidation but in reimagining labour regulation for a 21st-century economy driven by mobility, digital platforms, flexible production systems, and rising formalisation needs.

Their ultimate impact, however, will depend on timely implementation, cooperative federalism, effective enforcement, and sustained dialogue between stakeholders. If executed well, the Codes can enhance worker dignity, improve industrial competitiveness, and align India's labour ecosystem with global standards of fairness and efficiency.

6. India's Critical Minerals Sector and the Rationale behind Royalty Reforms

a. Introduction

Critical minerals have emerged as the strategic backbone of 21st-century economic, technological, and security systems. Their importance spans clean-energy transitions (EVs, batteries, hydrogen storage), advanced manufacturing (electronics, semiconductors), and sensitive defence applications (missiles, drones, guidance systems). For India, the challenge is acute: domestic deposits remain under-explored, processing capacities are limited, and reliance on import-dependent value chains creates systemic vulnerability—especially as China dominates refining and mid-stream processing globally.

Against this backdrop, royalty reforms are central to incentivising exploration, improving investor sentiment, and catalysing a domestic critical minerals ecosystem.

b. Why Critical Minerals Matter for India's Economic and Strategic Security

i. Scarce, Concentrated, and Hard to Substitute

Many critical minerals—lithium, cobalt, nickel, rare earths, graphite, caesium, rubidium, zirconium—have:

- Sparse geological occurrence,
- High processing complexity, and
- Concentrated supply chains, often controlled by a few countries.

China's dominance across refining stages magnifies the geopolitical risk.

ii. Drivers of India's Rising Demand

- Energy transition: Solar, wind, EV batteries require graphite, nickel, lithium.
- Electronics and semiconductors: Need specialty minerals for wafers, permanent magnets, and high-purity chemicals.
- Defence electronics: Rare earths and strategic metals are indispensable for sensors, radars, and propulsion systems.

A secure supply of critical minerals is now integral to India's industrial competitiveness and national security strategy.

c. The Concept of Royalty and Its Relevance to Critical Minerals

i. What Royalty Represents

Royalty is the price mining firms pay for extracting a publicly owned resource. It serves three functions:

- Compensates the state for mineral depletion,
- Provides predictable revenue,
- Regulates industry incentives.

ii. Global Royalty Models

- Fixed Royalty: A constant amount per tonne; insensitive to price cycles.
- Ad Valorem Royalty: A percentage of the sale price; rises and falls with market fluctuations.

iii. Why Ad Valorem Is Better Suited for Critical Minerals

Critical minerals exhibit extreme price volatility due to geopolitical shocks, speculative trading, and supply bottlenecks. Ad valorem:

- Shields investors during downturns,
- Allows governments to benefit from price booms,
- Aligns with international practice in strategic minerals.

This flexibility becomes crucial for minerals with uncertain commercial viability and high exploration risk.

d. India's Recent Royalty Reforms: A Shift Toward Investor-Friendly Regimes

i. Revised Royalty Structure

India rationalised royalties to more globally competitive levels:

- Graphite (high grade): 2% ad valorem
- Graphite (low grade): 4% ad valorem
- Caesium: 12% → 2%
- Rubidium: 12% → 2%
- Zirconium: 12% → 1%

The sharp reductions signal a strategic intent to attract serious exploration and development.

ii. ASP-Based Transparency

The Indian Bureau of Mines now publishes monthly Average Sale Prices (ASP), providing:

- Predictability,
- Reduced valuation disputes,
- Better risk assessment for bidders.

iii. Policy Purpose

The reforms aim to increase auction participation, reduce deterrents for companies, and accelerate the discovery-to-production pipeline for critical minerals.

e. Why These Reforms Became Necessary

i. Weak Auction Outcomes

Of 81 critical mineral blocks auctioned since 2023, only 34 received bids.
High royalties—combined with price volatility—made projects commercially unattractive.

ii. Geopolitical Pressure

China's export restrictions on minerals like graphite exposed the fragility of India's import dependence and highlighted the need for domestic capability.

iii. Surge in Domestic Consumption

EV manufacturing, renewable energy commitments, defence modernisation, and emerging semiconductor ambitions require mineral inputs India currently lacks.

iv. Structural Gaps in Processing

Even where minerals exist, India lacks:

- Modern refining and separation facilities,
- Technology for mid-stream processing,
- Integrated value chains linking mines to advanced manufacturing.

This leads to the paradox of exporting raw ore and importing high-value refined material—a strategic disadvantage.

f. Benefits of Moving Toward Ad Valorem Royalties

i. Flexibility for Investors

Ad valorem structures reduce payments during downturns, making it viable to:

- Exploit low-grade deposits,
- Absorb cyclical swings in global prices.

ii. Revenue Stability for States

Governments benefit automatically during price spikes without revising royalty rates repeatedly.

iii. Alignment with Global Practices

Most advanced mining jurisdictions rely on ad valorem systems, and Indian reforms improve:

- Investor confidence,
- Ease of doing business,
- Comparability with international benchmarks.

iv. Boost to Exploration Activity

Reduced financial risk encourages firms to:

- Participate in auctions,
- Undertake high-risk reconnaissance drilling,
- Invest in frontier geology.

This is vital because exploration—not extraction—is India's weakest link.

g. Are Royalty Reforms Enough? A Look at Persistent Structural Bottlenecks

Royalty reforms alone cannot transform the sector. India still faces:

- Incomplete geological mapping and inadequate deep-earth surveys.
- Weak processing infrastructure, especially for rare earths and battery minerals.
- High capital intensity, with few domestic firms capable of long-gestation investments.
- Complex approvals and regulatory overlaps that delay project timelines.
- Technology dependence on foreign partners for refining, separation, and purification.
- Fragmented value chains, preventing domestic industries from sourcing minerals locally.

Thus, royalties adjust incentives, but strategic transformation requires a holistic ecosystem.

h. The Way Forward: Building a Resilient Critical Minerals Ecosystem

i. Accelerate Geological Surveys

Use LiDAR, hyperspectral imaging, deep-seismic mapping, and satellite tools to chart India's mineralised belts.

ii. Build Domestic Processing and Refining Capacity

Establish rare-earth separation units, graphite anode plants, lithium refining clusters, and invest in:

- R&D,
- Technology partnerships,
- Pilot-scale facilities.

iii. Streamline Approvals and Incentivise Exploration

Rationalise clearances, reduce duplication across ministries, and provide fiscal incentives for high-risk exploration companies.

iv. Strengthen International Partnerships

Collaborate with resource-rich nations (Australia, Argentina, Chile, Namibia) and join emerging global critical mineral alliances for supply diversification, technology sharing, and joint ventures.

v. Create Strategic Reserves

Stockpile minerals with high geopolitical risk to ensure supply continuity during international disruptions.

vi. Integrate Mining with National Industrial Missions

Align mining reforms with:

- Make in India,
- PLI schemes for batteries and electronics,
- Atmanirbhar Bharat,
- Defence and semiconductor roadmaps.

This integration is crucial for creating complete value chains, from exploration to end-use manufacturing.

Conclusion

India's royalty reforms mark a decisive shift toward a more competitive, predictable, and investment-friendly critical minerals regime. By adopting flexible ad valorem rates and rationalising previously prohibitive royalties, India has taken an important step toward mobilising private sector participation and strengthening mineral security.

However, royalty reforms alone cannot guarantee self-reliance. India must expand geological knowledge, build world-class refining capacities, enable faster regulatory clearances, develop value chains, and secure technology partnerships. In this sense, royalty reform is a foundational enabler, not the final solution—an essential starting point for a long-term national critical minerals strategy.

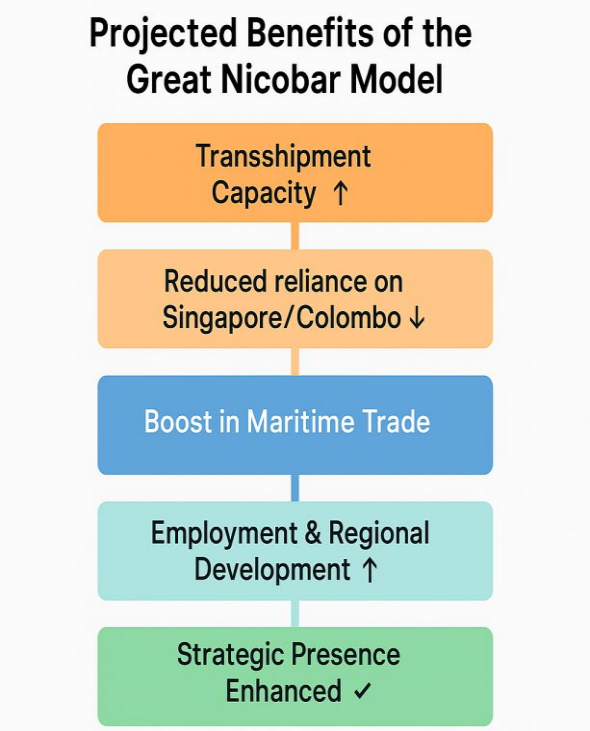
7. The Great Nicobar Transshipment Project

a. Introduction

The proposed transshipment port at Galathea Bay, Great Nicobar is one of independent India's most ambitious maritime infrastructure proposals. Envisioned under the Sagarmala Programme and the National Maritime Vision 2030, it aspires to position India as a major player in global shipping networks traditionally dominated by Singapore and Colombo.
Yet the project has ignited intense debate. Its strategic promise is counterbalanced by ecological fragility, commercial uncertainty, and socio-cultural risks—exemplifying India's broader governance challenge of aligning economic ambition with environmental judgment in ecologically sensitive zones.

b. Strategic and Policy Context: The Logic Behind the Project

The transshipment hub proposal emerges from India's larger Blue Economy narrative, which seeks to harness maritime resources through sustainable infrastructure.



i. Geostrategic Rationale

- Nearness to the Malacca Strait, through which nearly one-third of global trade passes, gives Great Nicobar unparalleled positioning at an Indo-Pacific chokepoint.
- It fits into India's strategic doctrine of strengthening Eastern Ocean presence and enhancing maritime domain awareness.

ii. Institutional and Planning Framework

- Conceptualised by NITI Aayog and executed through ANIIDCO, the project integrates a port, airport, power plant, and a greenfield township.
- The scale—₹72,000 crore and a proposed township of nearly 300,000 people—marks a radical transformation of a remote island located 1,200 km from mainland India.

This policy background creates developmental momentum but also highlights asymmetries between strategic ambition and ecological realities.

c. Projected Rationale and Anticipated Gains

Proponents frame the project as a pillar of India's maritime resurgence and Indo-Pacific strategy.

i. Economic Logic

- Reduce dependence on Singapore and Colombo for transshipment, enabling India to retain cargo value and become a regional logistics leader.

- Strengthen coastal shipping corridors under Sagarmala, enhancing national multimodal efficiency.

ii. Strategic Utility

- Reinforce India's maritime posture, complement surveillance over the eastern Indian Ocean, and support Indo-Pacific partnerships.

iii. Regional Development Promise

- Generate employment, spur tourism, and uplift infrastructure across the underdeveloped Andaman & Nicobar region.

These aspirations project Great Nicobar as both a strategic outpost and a developmental showcase—but the underlying assumptions face serious contestation.

d. Emerging Contradictions: Ecological, Economic, Strategic, and Social Faultlines

Despite the rhetoric of "port-led growth," the project exposes fundamental contradictions that challenge its long-term viability.

i. Ecological Fragility

- The island contains tropical rainforests, coral reefs, and critical nesting habitats for the Leatherback turtle, as well as endemic species like the Nicobar megapode.
- Deforestation (over 8 lakh trees), dredging, and land reclamation threaten irreversible biodiversity loss in one of India's most sensitive ecosystems.
- The project risks undermining constitutional environmental duties under Articles 48A and 51A(g).

ii. Commercial Viability Concerns

- The island lacks a natural hinterland, industrial base, or feeder cargo network—limiting organic port traffic.
- High transport and energy costs due to extreme remoteness raise the risk of structural unviability.
- Past experiences (e.g., Vallarpadam, Krishnapatnam) caution that world-class ports fail without secure cargo commitments and ecosystem integration.

iii. Strategic Redundancy

- India already operates INS Baaz, providing substantial surveillance capability over the Malacca Strait.
- Building a parallel civilian port may duplicate rather than enhance strategic capacity, diverting scarce resources without proportional strategic payoff.

iv. Socio-Cultural Disruptions

- Proposed development intrudes upon the habitats of the Shompen and Nicobarese tribes, among India's most vulnerable indigenous communities.
- Risks violating the Forest Rights Act (2006), PESA, and global norms like UNDRIP, which emphasise free, prior, and informed consent.

These contradictions suggest that the project's promise obscures structural vulnerabilities in its design and assumptions.

e. Comparative Global Perspective: Lessons from Successful and Failed Hubs

A global and national comparative lens reveals that transshipment success depends less on geography and more on connectivity ecosystems and shipping alliances.

i. Singapore

- Thrives not merely due to location but due to dense global carrier integration, competitive tariffs, and seamless hinterland connectivity.

ii. Colombo

- Became a preferred hub through predictable regulation, low handling costs, and long-standing shipping partnerships.

iii. Vizhinjam (India)

- Illustrates that excellent natural depth and proximity to shipping routes are not sufficient indicators of viable cargo flows.

Connectivity, integration, and ecosystem linkages—not isolated megaprojects—determine the viability of transshipment hubs.

f. Way Forward: Balancing Strategic Imperatives with Ecological Intelligence

A calibrated, evidence-based approach is essential for reconciling national ambition with sustainability.

i. Robust Environmental Governance

- Undertake comprehensive cumulative EIAs, covering hydrology, coral ecology, seismic vulnerability, and tribal livelihoods.
- Integrate climate-resilience planning given the island's seismicity and rising sea-level risks.

ii. Phased and Demand-Linked Development

- Prioritise incremental development tied to demonstrable container traffic and secured shipping alliances.
- Avoid upfront mega-capital expenditure in a fragile, logistics-poor region.

iii. Strategic Reassessment

- Strengthen dual-use enhancement at INS Baaz (naval + limited civilian logistics) instead of constructing a fully new township-port complex.
- Focus on maritime domain awareness rather than replicating global transshipment models.

iv. Indigenous and Community Safeguards

- Ensure strict compliance with FRA 2006, PESA principles, and consent-based engagement with local tribes.
- Develop alternative livelihood and cultural preservation frameworks.

v. Blue Economy Orientation

- Incorporate low-carbon technologies, marine biodiversity safeguards, and circular economy principles linked to SDGs 9 and 14.

Conclusion

The Great Nicobar Transshipment Project encapsulates the dilemma of 21st-century development: the desire for maritime prominence juxtaposed against the realities of ecological fragility and socio-cultural vulnerability.
Without logistics integration, ecological stewardship, and indigenous participation, the project risks becoming a symbol of overreach rather than strategic capacity.
A reoriented, environmentally attuned, and strategically coherent approach offers the potential to transform Great Nicobar from a contested megaproject into a sustainable cornerstone of India's Indo-Pacific narrative.

8. e-KYC Under MGNREGA: Balancing Transparency with the Risk of Exclusion

a. Introduction

The rollout of electronic Know Your Customer (e-KYC) verification for workers under MGNREGA marks the latest chapter in India's drive to integrate digital systems with welfare delivery. While the Centre positions e-KYC as a tool to strengthen transparency and curb leakages, the policy has ignited concerns about an unintended outcome: exclusion of the very households the programme was designed to protect. Rising job-card deletions across several States, coupled with persistent digital barriers, have fuelled apprehensions that technological efficiency may be coming at the cost of equitable access.

The debate, therefore, is not about the desirability of verification itself but about the inclusiveness, accessibility, and fairness of the verification mechanism in rural socio-economic conditions.

b. Rationale Behind e-KYC: Strengthening the Integrity of MGNREGA

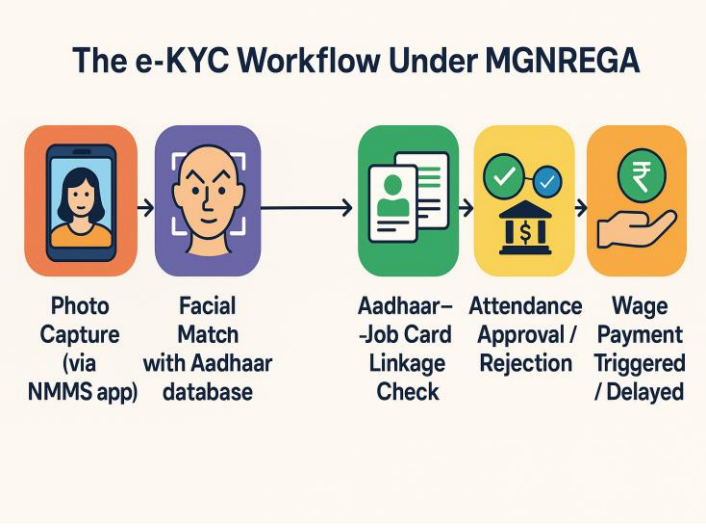
The government envisions e-KYC as a logical extension of its broader reforms in MGNREGA meant to ensure financial accountability. Its stated aims include:

- Purifying beneficiary lists by removing duplicate or ghost entries.
- Ensuring wage payments reach the correct individual, eliminating impersonation or false attendance.
- Increasing transparency in attendance management, especially after introducing the NMMS and Aadhaar-based payments.

Thus, e-KYC is meant to plug residual leakages within an already digitised ecosystem—comprising Aadhaar-Based Payment System (ABPS), geotagged attendance, and digital muster rolls.

c. Pre-e-KYC Verification Framework: A System Already Under Transition

Before e-KYC came into force, MGNREGA operated through a hybrid monitoring structure:



i. Physical Verification by Local Bodies

- Panchayat officials conducted worksite inspections and verified muster rolls.
- Manual attendance, though vulnerable to manipulation, allowed flexibility for workers with low digital access.

ii. National Mobile Monitoring System (NMMS)

- Introduced in 2022; mandated geotagged photographs twice daily.
- Brought real-time authentication, but heavily depended on smartphone access and stable connectivity.

iii. Aadhaar-Based Payment System (2023 onward)

- Required complete and error-free linkage between Aadhaar, bank accounts, and job cards.
- Minor mismatches (name spellings, date of birth errors) routinely delayed payments.

These features indicate that e-KYC does not enter a vacuum but a welfare ecosystem already grappling with technological constraints and database-linked vulnerabilities.

d. How e-KYC Works: Precision That Rural Systems Struggle to Match

The verification pipeline involves:

- Photo-based facial matching through NMMS.
- Aadhaar–job card–bank account linkage checks.
- Real-time authentication through NPCI systems.

This creates a highly synchronised digital chain in which even minor variations—orthographic differences, inconsistent naming, clerical errors, poor lighting in photographs—can break the authentication loop.
Such failures directly affect attendance and therefore wage entitlement, making technological friction a livelihood risk.

e. The Risk of Exclusion: Why Alarm Levels Are Rising

The surge in job-card deletions has become the most visible symptom of exclusion. Evidence points to structural rather than fraudulent causes:

i. Data Inconsistencies

- Multiple naming conventions across rural India—use of initials, patronymics, caste names, local spellings—create unavoidable mismatches.
- Transliterations from vernacular languages to English amplify errors.

ii. Digital and Infrastructure Barriers

- Patchy network connectivity disrupts attendance uploads.
- Workers often rely on shared devices or supervisors' phones.
- NMMS app failures translate into "zero attendance days," effectively denying wages.

iii. Administrative Burden Leading to Over-Cautious Deletions

Local authorities, under pressure to "clean" databases, may delete job cards pre-emptively rather than invest in error correction—turning exclusion into a bureaucratic shortcut.

Because MGNREGA links wages to daily attendance, every technological failure disproportionately harms the poorest and most digitally vulnerable households.

f. The Government's Justification and Emerging Contradictions

The Centre maintains that:

- e-KYC is not the cause of deletions.
- A 2025 SOP clearly defines valid grounds for deletion.
- Removals mainly target inactive or duplicate cards.

However, States with high e-KYC compliance are paradoxically witnessing higher deletion rates. This misalignment suggests deeper issues:

- Systemic error rejection may masquerade as "data cleaning."
- Local administrators may be interpreting SOPs rigidly due to fear of audit objections.
- The Centre–State information asymmetry on digital readiness remains unaddressed.

These contradictions fuel the perception that efficiency metrics are overshadowing welfare objectives.

g. Analytical Assessment: Technology's Promise vs. Ground Realities

i. Benefits of e-KYC

- Enhances authenticity of beneficiary records.
- Reduces corruption and impersonation risks.
- Builds trust in public expenditure systems.
- Complements the shift towards DBT-based welfare delivery.

ii. Challenges and Risks

- Technological determinism may override socio-economic diversity.
- Errors in Aadhaar seeding disproportionately hurt marginalised groups (women, elderly, migrants).
- Digital dependency increases vulnerability to delays, exclusion, and income uncertainty.
- Over-centralisation reduces local discretion to resolve ground-level mismatches.

At its core, the challenge lies in ensuring that the administrative convenience of digital tools does not dilute the rights-based character of MGNREGA.

h. Policy Pathways: Ensuring Inclusion Without Compromising Transparency

i. Multi-Channel Verification

- Permit manual attendance and physical verification when digital authentication fails.
- Allow offline modes or deferred uploads in low-connectivity zones.

ii. Systematic Data Correction Campaigns

- Conduct regular village-level drives to correct Aadhaar and bank details.
- Build institutional capacity to assist workers rather than penalise them.

iii. Strengthening Digital Infrastructure and Support

- Expand rural connectivity and device availability.
- Provide dedicated helpdesks for NMMS and e-KYC troubleshooting.

iv. Procedural Safeguards Against Wrongful Deletion

- Make home visits mandatory before deletion.
- Ensure transparent communication and appeal mechanisms.
- Strengthen social audits to detect wrongful exclusions early.

These measures preserve the programme's integrity while reaffirming its social justice mandate.

Conclusion

The introduction of e-KYC in MGNREGA encapsulates the central dilemma of digital welfare governance: how to harness technology for transparency without allowing technological imperfections to erode rights.
While the gains from a cleaner, more reliable database are undeniable, they cannot outweigh the risks posed to workers whose survival depends on timely wage payments. The policy imperative must therefore move beyond a binary of "technology vs. corruption control" and embrace a rights-sensitive design that respects MGNREGA's foundational objective—guaranteeing dignified employment to all who seek it.

A more nuanced, flexible, and inclusive verification architecture is essential for ensuring that digital reforms strengthen, rather than weaken, India's flagship rural employment programme.

9. India's Fight Against Tuberculosis: Why Elimination Remains Difficult

a. Introduction

Tuberculosis (TB) remains India's most persistent infectious disease challenge despite a decade of expanded diagnostics, digitised monitoring, and improved treatment protocols. The goal of eliminating TB by 2025—reducing incidence to fewer than one case per million—now appears beyond reach. The *Global TB Report 2025* shows that although India is progressing faster than many high-burden countries, the pace and depth of that progress remain inadequate. The unfinished agenda lies at the intersection of social determinants, treatment behaviour, drug resistance, and uneven state capacity.

b. Understanding the Scale: India's Disproportionate Burden

India continues to carry the largest TB burden globally:

- ~27 lakh cases in 2024
- ~3 lakh deaths
- Over 25% of global TB cases, including the world's highest number of drug-resistant TB (DR-TB) patients

This burden is not uniform. Urban slums, tribal districts, migrant-heavy regions, and malnourished populations face significantly higher prevalence. TB remains both a medical and a socio-economic disease.

c. What "Elimination" Means—and Why It Is Hard

TB "elimination" is a statistical milestone, not complete disappearance. It requires:

- Incidence <1 case per million
- 50% reduction in cases (2015–2025)
- 75% reduction in deaths

India's trajectory shows improvement but falls far short of these steep benchmarks. The pandemic years created structural setbacks from which recovery is still ongoing.

d. Why India Is Struggling: The Seven Structural Barriers

i. COVID-19's Aftershocks

- Diagnostics and follow-ups collapsed during lockdowns.
- Treatment interruptions increased recurrence and drug resistance.
- Human resources were diverted to COVID duties.

ii. Treatment Completion Challenges

- Standard TB regimens last 6 months or more; DR-TB regimens longer.
- Side effects, stigma, migration, and economic insecurity lead to dropouts.
- Interrupted treatment is the biggest driver of drug resistance.

iii. Rising Drug-Resistant TB

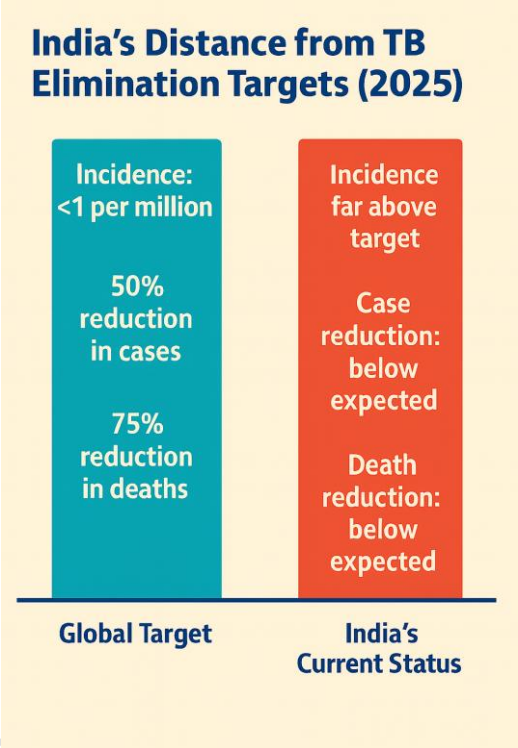
- More than 1 lakh DR-TB cases annually in India.
- Regimens remain more toxic, lengthier, and more expensive.
- Child-friendly formulations remain patchy across districts.

iv. Social & Environmental Determinants

TB thrives where deprivation persists:

- Malnutrition, especially among women & children
- Diabetes, which delays recovery
- Smoking, alcoholism, overcrowding, poor ventilation
- Air pollution, which worsens lung vulnerability

These require multi-sector interventions beyond the health ministry.



v. Medicine and Supply Chain Gaps

- Some states saw intermittent stock-outs of essential drugs.
- Even a few days' interruption can trigger treatment failure or resistance.

vi. Slow Uptake of Preventive Treatment

- Household contacts should get chemoprophylaxis.
- Implementation varies widely across states.
- Untreated latent infections sustain silent transmission.

vii. Uneven State-Level Capacity

- Weak health systems in high-burden states slow progress.
- Under-reporting by the private sector—where ~50% of patients initially seek care—skews data and delays treatment.

e. Areas of Substantive Progress: The Foundation for Acceleration

i. Near-Universal Treatment Coverage

- Coverage increased from ~50% (2015) to >90% today.
- Active case-finding and better referral systems drove this shift.

ii. Shorter, All-Oral Regimens

- Older 18–24 month DR-TB regimens replaced by 6-month all-oral treatment.
- Better tolerability = better adherence.

iii. Technology as a Force Multiplier

- Portable X-ray machines and AI-based interpretation used widely.
- National 100-day campaign screened ~19 crore people.
- Digital platforms (Nikshay) track adherence and notify treatment gaps.

iv. Community Support Ecosystem

- Nikshay Poshan Yojana nutrition support expanded.
- Nikshay Mitras (civil society volunteers) provide food kits & counselling.
- Community engagement helps reduce stigma and improve adherence.

v. State-Led Innovation

- Tamil Nadu's triage model identifies vulnerable patients early.
- Several states use micro-planning to target local transmission hotspots.

Together, these improvements strengthen the baseline but need deeper scale and consistency.

f. What India Must Do Next: The Acceleration Strategy

i. Scale Early Detection & Active Screening

- Expand use of AI-enabled X-rays, community-level sputum collection, and house-to-house screening for high-risk groups.
- Integrate TB screening into routine primary care and NCD clinics.

ii. Guarantee a Zero-Stock-Out Drug Supply Chain

- District-level real-time inventory dashboards.
- Predictive procurement based on case trends.

iii. Universalise Preventive Treatment

- Provide chemoprophylaxis to all household contacts, PLHIV, children, and high-risk adults.
- Integrate into ASHA and primary health worker routines.

iv. Improve Treatment Completion

- Home delivery of medicines for vulnerable patients.
- Digital adherence tools (SMS, 99DOTS-like systems).
- Counsellors trained for psychosocial support.

v. Address Social Determinants Head-On

- Nutrition support anchored in POSHAN and community kitchens.
- Strong diabetes and tobacco control programs integrated with TB care.
- Indoor air quality improvements for slum settlements.

vi. Strengthen Private Sector Engagement

- Mandatory notification enforcement.
- Incentivise private hospitals through reimbursements & public-private models.
- Standardised treatment protocols to avoid irrational drug use.

vii. District-Specific Micro-Planning

- Localised hotspots need tailored interventions.
- Urban slums, tribal belts, mining regions require differentiated strategies.

Conclusion

India has made significant strides in diagnosis, treatment modernisation, and community engagement, yet TB elimination demands a deeper overhaul of social conditions, health systems, and preventive care. The 2025 target is unachievable, but the 2030 global goal remains within reach—if India sustains momentum through district-level micro-planning, uninterrupted drug supply, universal preventive therapy, and aggressive early detection.

Ultimately, TB elimination is not solely a medical challenge; it is a development, nutrition, housing, and air-quality challenge. Only a whole-of-society and whole-of-government approach can transform incremental progress into a genuine public health success.

GS Paper II: International Relations

1. The High Seas Treaty

a. Introduction

The High Seas Treaty—formally the *Biodiversity Beyond National Jurisdiction (BBNJ) Agreement*—represents the most significant evolution in ocean governance since UNCLOS (1982). It operationalises, for the first time, a legally binding global framework for conserving and sustainably using marine biodiversity in waters lying beyond national jurisdiction (ABNJ), which constitute nearly half the planet's surface.

Beyond its legal import, the treaty embodies a shift in global ethics: treating the high seas not as a regulatory vacuum or a frontier to exploit, but as a *shared ecological commons* whose stewardship and benefits must be equitably distributed. This makes it a foundational pillar for the future of multilateral cooperation in the Anthropocene era.

b. Why a Treaty Was Necessary: The Governance Gap in UNCLOS

While UNCLOS codified rules on navigation, fishing rights, seabed minerals, and maritime zones, it left ABNJ biodiversity largely unregulated. This created:

i. Unprotected Ecological Wealth

Deep-sea organisms, genetic materials, microbes, corals, algae and other biotic resources in the high seas hold immense potential for pharmaceuticals, biotechnology, food, and climate solutions. Yet no global rules existed to govern their extraction or use.

ii. Escalating Anthropogenic Pressure

The high seas face increasing threats from:

- Industrial-scale overfishing
- Plastic and chemical pollution
- Proposed deep-sea mining
- Warming, acidification, and deoxygenation due to climate change

These pressures have pushed ecosystems beyond recovery thresholds in many areas.

iii. Absence of Benefit-Sharing Norms

Marine genetic resources (MGRs) were accessed freely by technologically advanced states, enabling commercial monopolisation and widening the North–South divide. UNCLOS did not establish a framework for equitable redistribution of benefits.

The BBNJ Treaty emerged precisely to close these normative and regulatory gaps.

c. Core Objectives of the High Seas Treaty

i. Conservation & Sustainable Use of Marine Biodiversity

Establish a global legal regime that protects fragile ecosystems through science-based, precautionary, and ecosystem-oriented approaches.

ii. Equitable Sharing of Benefits from Marine Genetic Resources

Ensure developing countries receive fair monetary and non-monetary benefits from access, utilisation, patents, and commercial products derived from MGRs.

iii. Marine Protected Areas (MPAs) in High Seas

Enable creation of global "ocean sanctuaries" by designating ecologically or biologically significant areas and regulating human activity within them.

iv. Mandatory Environmental Impact Assessments (EIAs)

Introduce *ex-ante* assessments for activities likely to affect marine ecosystems, emphasising precaution over unregulated exploitation.

v. Capacity Building & Technology Transfer

Support developing states with scientific training, research facilities, infrastructure, and technology access so they can participate meaningfully in high-seas governance.

d. Ethical and Legal Foundations: Reconciling Two Principles

i. The Principle of Common Heritage of Humankind

This principle asserts that resources of ABNJ—especially deep-seabed minerals and now biological resources—belong collectively to humanity. States have a duty to ensure that:

- No country monopolises access
- Benefits are equitably shared
- Exploitation does not jeopardise future generations

It emphasises stewardship, equity, and intergenerational justice.

ii. Freedom of the High Seas

Historically, the high seas were governed by freedom-based norms permitting open access to navigation, fishing, and research. However, this has resulted in unregulated extraction and a "tragedy of the commons."

iii. The Treaty's Balancing Act

BBNJ does not eliminate freedom of the seas; it *regulates* it.
It seeks to ensure that:

- Freedom does not become an excuse for ecological harm
- Common heritage becomes a practical, enforceable norm

This harmonisation represents one of the treaty's most significant legal contributions.

e. Key Implementation Challenges

i. Legal Ambiguities & Competing Norms

The Treaty overlays the common-heritage principle onto a historically freedom-based maritime order. Operationalising fairness—especially for MGR benefit-sharing—remains unclear, risking future disputes.

ii. Absence of a Concrete Benefit-Sharing Formula

BBNJ mandates fairness but avoids specifying:

- How monetary benefits will be computed

- When benefit-sharing obligations trigger (discovery vs development vs commercialisation)
- How digital sequence information (genetic data) will be shared

Without clarity, fears of biopiracy persist.

iii. Non-Ratification by Major Maritime Powers

The absence of the US, China, and Russia constrains enforcement, scientific cooperation, and legitimacy. Non-participation may enable selective compliance or alternative governance arrangements.

iv. Institutional Overlaps & Turf Conflicts

The treaty must coexist with:

- International Seabed Authority (ISA) regulating deep-sea mining
- Regional Fisheries Management Organisations (RFMOs) managing fisheries

Overlap in mandates—especially on MPAs and fishing rights—could cause regulatory fragmentation.

v. Monitoring, Surveillance, and Enforcement Gaps

Ensuring compliance requires:

- Satellite tracking
- AI-based vessel monitoring
- Joint patrol platforms
- Scientific data repositories

Developing countries often lack these capacities, making enforcement uneven.

vi. Climate Change as a Moving Target

Dynamic ecological shifts caused by warming seas, acidification, species migration, and habitat collapse demand adaptive, flexible governance—something that fixed treaty provisions struggle to accommodate.

f. Why the Treaty Is a Global Milestone

i. First Legally Binding Framework for Biodiversity in ABNJ

It closes the most significant gap left by UNCLOS, providing rules for protection, use, and equity.

ii. Strengthens Collective Stewardship of Global Commons

Promotes shared responsibilities and shared benefits, enabling a more inclusive blue economy.

iii. Advances SDG-14 (Life Below Water)

MPAs, EIAs, and scientific cooperation directly support global biodiversity targets.

iv. Reimagines the High Seas as Ecological Spaces

Moves global governance away from resource-driven perspectives to ecosystem-driven stewardship—crucial for climate regulation and global biodiversity.

g. Policy & Implementation Priorities

i. Clear, Transparent Benefit-Sharing Mechanisms

Define rules for:

- Access to MGRs

- Patent disclosures
- Revenue-sharing arrangements
- Open-access scientific data

ii. Ensuring Universal Participation

Diplomacy must encourage ratification by major maritime powers by highlighting common interests such as climate stability, scientific research, and responsible ocean economies.

iii. Harmonising Global Institutions

Clarify how BBNJ will interact with ISA and RFMOs through coordination mechanisms to avoid regulatory duplication.

iv. Strengthening Capacities of Developing Nations

Invest in:

- Marine research stations
- Oceanographic vessels
- Technical training
- Technology transfer partnerships

v. Enhanced Monitoring & Compliance Systems

Use remote sensing, AI analytics, international patrols, and transparent reporting systems to ensure credible oversight.

vi. Integration with Climate & Biodiversity Regimes

Create synergy with the Paris Agreement and the Kunming–Montreal Global Biodiversity Framework so that marine conservation becomes part of a unified global sustainability strategy.

h. Way Forward

The treaty's long-term success hinges on:

i. Equity

Fair MGR benefit-sharing and equal scientific access are essential for developing-country support.

ii. Science

Adaptive regulation informed by continuous research is crucial to keeping pace with dynamic ocean systems.

iii. Cooperation

Bridging geopolitical divides, funding implementation, and fostering shared custodianship are vital for operational success.

The High Seas Treaty is not merely a legal instrument but a normative redefinition of humankind's relationship with the ocean. Effective implementation will determine whether the high seas become a model of cooperative global governance or remain vulnerable to fragmented, competitive exploitation.

Conclusion

The High Seas Treaty marks a transformative moment in multilateral environmental governance. By embedding the principle of the *common heritage of humankind* into a contemporary, legally enforceable framework, it elevates the high seas from unregulated global space to a protected ecological trust.

Yet the treaty's promise will only be realised through transparent benefit-sharing systems, scientific collaboration, widespread participation, and robust monitoring. The oceans' future depends on

nations embracing the role of *joint custodians* rather than competing exploiters—ensuring that the vast "blue commons" remains a living legacy for generations to come.

2. China's Proposal for a Global AI Cooperation Organisation

a. Introduction

Artificial Intelligence has rapidly become a transformative force in global economics, governance, security, and societal organisation. Yet, despite AI's sweeping impact, no single multilateral institution governs its ethical use, risk management, or equitable access. This institutional vacuum has allowed fragmented regulatory regimes, widening technological divides, and heightened geopolitical competition. Against this backdrop, at the 2025 APEC Summit, China proposed the establishment of the World Artificial Intelligence Cooperation Organisation (WAICO)—a global framework aimed at fostering inclusive governance, joint research, and equitable access to AI for developing nations. The proposal signals China's ambition to shape global AI norms at a moment when international governance structures remain unsettled.

b. Background: Fragmented Global AI Governance

AI governance today reflects competing national visions and regulatory philosophies:

i. United States – Innovation-Led, Market-Driven

The U.S. prioritises private-sector dynamism and frontier innovation, with the government playing a limited but growing role in safety testing and risk mitigation.

ii. European Union – Ethics and Rights-Based Regulation

The EU's AI Act focuses on transparency, accountability, and human rights, placing stringent obligations on high-risk AI systems.

iii. China – State-Led and Multilateralist

China combines internal regulatory control with an emphasis on South–South cooperation internationally, advocating global governance frameworks that expand participation of developing nations.

These differing approaches have created regulatory fragmentation, increasing the urgency for global norms. Simultaneously, the misuse of AI—deepfakes, cyberattacks, algorithmic discrimination—and intensifying U.S.–China technological rivalry underline the need for coordinated global safeguards.

c. The WAICO Proposal: Objectives and Institutional Ambition

WAICO is conceived as an international platform that promotes AI cooperation, equitable access, and responsible innovation. Its core aims include:

i. Joint Research and Data-Sharing

Facilitating cross-border collaborations in foundational AI, safety research, and datasets—areas currently dominated by a handful of advanced economies.

ii. Global Ethical and Safety Standards

Developing common principles for risk assessment, transparency, accountability, and AI deployment across sectors such as health, education, and defence.

iii. Technology Access for Developing Countries

Reducing the AI divide by providing infrastructure, training, and open-access tools for nations with limited technological capacity.

iv. Preventing Misuse of AI

Addressing risks relating to automated surveillance, weaponisation, disinformation, and algorithmic manipulation.

Structurally, WAICO is envisioned as a multilateral body modelled loosely on institutions such as the WTO or WHO, enabling shared rule-making and capacity-building.

d. China's Strategic Rationale

i. Influencing Global Rule-Making

As a leading AI power, China seeks to shape international norms during the formative stage of AI governance—similar to how early participants shaped trade and internet standards.

ii. Expanding Soft Power

WAICO positions China as a champion of inclusive development, appealing to countries that fear marginalisation in a Western-led technological order.

iii. Providing an Alternative to Western Norms

With the EU, OECD, and U.S.-led bodies setting their own regulatory standards, WAICO offers a Global South-oriented model emphasising access, cooperation, and capacity-building.

iv. Bridging the North–South Divide

Developing countries often lack the infrastructure necessary to benefit from AI. WAICO allows China to present itself as a facilitator of equitable growth.

e. Global Response: Support, Hesitation, and Strategic Calculations

International reactions reflect broader geopolitical divisions.

i. Supportive Perspectives

- WAICO fills the current vacuum in global AI governance.
- It provides developing nations a platform to voice concerns and secure technology access.
- It promotes cooperation over rivalry, reducing the risk of fragmented tech blocs.

ii. Critical Concerns

- Western countries fear WAICO may entrench China's geopolitical influence under the guise of multilateralism.
- Concerns persist around data privacy, transparency, and the governance of surveillance technologies.
- There is apprehension that WAICO could duplicate or compete with existing forums, further fragmenting global AI governance.

Thus, the proposal's viability depends on its ability to build trust across sharply divided geopolitical lines.

f. Comparison with Other Global AI Frameworks

Framework / Region	Core Orientation	Governing Principle
China (WAICO)	South-led multilateralism	Access, equity, capacity-building
U.S. AI Safety Institute	Innovation-centric	Safety testing, private-sector cooperation
EU AI Act	Rights-based regulation	Transparency, accountability
UNESCO (AI Ethics Framework)	Human-centred	Inclusion, fairness, societal benefit
U.K. AI Safety Summit	Risk mitigation	Frontier-AI and existential-risk governance

The diversity of these frameworks shows that no unified global consensus exists on the appropriate balance between innovation, ethics, and state control.

g. Why WAICO Matters in Global AI Governance

i. Closing the Institutional Gap

There is currently no global body with the authority to set AI norms. WAICO could become the first coordinated multilateral mechanism for governance.

ii. Empowering Developing Nations

By prioritising technology-sharing and capacity-building, WAICO addresses the asymmetries in global AI capabilities—something Western initiatives often overlook.

iii. Linking Technology and Diplomacy

AI governance is now a geopolitical issue, shaping trade, security, supply chains, and global influence. WAICO integrates these dimensions.

iv. Addressing Ethical Challenges

Fairness, accountability, and transparency are central concerns in AI deployment. WAICO's mandate seeks to embed these values in global frameworks.

h. Challenges and Structural Risks

i. Geopolitical Polarisation

U.S.–China competition may hinder widespread participation, turning WAICO into a parallel bloc rather than a universal institution.

ii. Institutional Overlap

With G20, OECD, UN, and numerous national bodies already active in AI governance, WAICO must avoid duplication and fragmentation.

iii. Risk of Dependence

Developing nations may become reliant on Chinese digital infrastructure, raising concerns regarding technology sovereignty.

iv. Ethical and Governance Concerns

True global cooperation requires shared commitments on privacy, data protection, algorithmic transparency, and human rights—areas where consensus remains fragile.

i. Way Forward: Building Equitable and Effective Global AI Governance

i. Strengthen Dialogue Within Existing Multilateral Platforms

Coordination with UN bodies, G20 frameworks, and UNESCO principles can prevent parallel institutional fragmentation.

ii. Develop Shared Ethical Norms

A global charter built around fairness, accountability, and responsible innovation can serve as foundational principles for AI governance.

iii. Support Capacity-Building for the Global South

Financing digital infrastructure, training programmes, and open-source AI tools is essential to reduce inequalities.

iv. Establish Data Protection Norms

Transparent, privacy-oriented frameworks are needed to balance data flows with individual and national rights.

v. Align AI Development With the SDGs

Particularly SDG-9 (industry, innovation, infrastructure) and SDG-16 (strong institutions), ensuring AI advances global public good rather than power concentration.

Conclusion

China's WAICO proposal reflects a pivotal moment in global technology governance. It represents both an opportunity—to democratise AI benefits and create inclusive norms—and a challenge, given geopolitical rivalries and divergent regulatory philosophies. Whether WAICO becomes a meaningful institution or a symbol of technological fragmentation will depend on the world's ability to build trust, harmonise standards, and align AI governance with ethical imperatives. The future of AI will not be determined by algorithms alone but by the values, institutions, and cooperation that shape them.

3. The Trilateral ACITI Partnership: India, Australia & Canada in the Emerging Tech Order

a. Introduction

The Australia–Canada–India Technology and Innovation Partnership (ACITI) signals an important shift in global technology geopolitics. It reflects a move from broad multilateralism toward trusted plurilateral coalitions among like-minded democracies seeking resilience against geopolitical vulnerabilities in supply chains, digital ecosystems, and frontier technologies. ACITI brings together India's scale, Australia's mineral endowment, and Canada's advanced research ecosystem, creating a strategic complementarity rare in existing tech alliances. At heart, ACITI is both a technology partnership and a norm-shaping initiative, aimed at embedding democratic values into the governance of emerging technologies.

b. Strategic Logic: Complementarities That Enable Partnership

i. India: Scale, Digital Public Infrastructure, and Human Capital

India anchors ACITI with:

- A massive and rapidly growing digital economy powered by Digital Public Infrastructure (UPI, Aadhaar, ONDC, etc.).
- A globally competitive IT and software services workforce.
- Proven capacity to deploy technology solutions at population scale across diverse socio-economic contexts.

This scale advantage makes India indispensable in testing, deploying, and commercialising emerging technologies.

ii. Australia: Critical Minerals and Transparent Supply Chains

Australia's strategic value lies in:

- World-class reserves of lithium, cobalt, nickel, and rare earth elements—resources central to batteries, semiconductors, and clean energy systems.
- Stable regulatory frameworks for mining and environmental compliance.
- Reliable logistics infrastructure that reduces geopolitical risk.

As global competition over critical minerals intensifies, Australia enables ACITI to build trusted, non-fragmented mineral supply chains.

iii. Canada: Frontier Research Leadership

Canada contributes:

- International leadership in AI and deep machine-learning research.
- Strong public research universities and federally funded innovation ecosystems.
- Strengths in quantum technologies, biotechnology, and advanced cybersecurity frameworks.

Because Canada participates in the Five Eyes intelligence grouping, its standards and protocols add high-trust research governance to ACITI.

Together, the three countries form a holistic innovation triangle: scale (India) + resources (Australia) + frontier research (Canada).

c. Principal Domains of Collaboration

i. Critical & Emerging Technologies

The partnership focuses on joint development and governance of:

- Artificial intelligence
- Quantum technologies
- Secure and resilient communication systems
- Cybersecurity
- Semiconductor manufacturing and design

These technologies define national power and economic competitiveness for the next several decades.

ii. Supply-Chain Resilience

ACITI aims to:

- Reduce overdependence on single-country supply chains (particularly in minerals, semiconductors, and electronics).
- Promote transparent and predictable value chains.
- Coordinate investment into processing, refining, and downstream manufacturing.

This is a direct response to rising techno-nationalism and geopolitical fragmentation.

iii. Green-Energy Innovation

Key areas include:

- Joint R&D on green hydrogen.
- Next-generation battery technologies.
- Sustainable industrial processes.
- Harmonised climate-friendly standards.

ACITI thus connects emerging technologies with long-term sustainability transitions.

iv. Mass Adoption & Governance of AI

The partnership emphasises:

- Safe, inclusive, and rights-respecting AI frameworks.
- AI for public service delivery and governance.
- Shared testing datasets and responsible AI benchmarks.

India's hosting of the Artificial Intelligence Impact Summit (2026) will serve as a pivotal platform to operationalise these commitments.

d. Why ACITI Matters: Strategic and Systemic Significance

i. A Democratic Technology Coalition

ACITI seeks to shape a values-based digital order grounded in transparency, accountability, open innovation, and individual rights. It provides a counterweight to authoritarian models of digital governance.

ii. Enhanced Technology Security for India

Through this partnership, India gains:

- Access to advanced research networks.
- Trusted partners for secure digital systems.
- Collaborators in AI, quantum, semiconductors, and cybersecurity—domains that require high confidence and long-term cooperation.

iii. Long-Term Mineral Security

For India's clean-energy and semiconductor ambitions, reliable sources of lithium, cobalt, and rare earths are essential. Australia and Canada offer politically stable, non-coercive supply chains crucial for strategic autonomy.

iv. Synergy With National Tech Missions

ACITI reinforces:

- India AI Mission
- National Quantum Mission
- India Semiconductor Mission
- National Green Hydrogen Mission

It supplements India's domestic capabilities with global research expertise and investment flows.

v. Indo-Pacific and Trans-Atlantic Convergence

India already partners with Australia through the Quad and Indo-Pacific frameworks. Canada's entry extends this cooperation into the trans-Atlantic sphere, enabling India to shape norms across both Indo-Pacific and North American technology ecosystems.

e. Challenges & Structural Constraints

i. India–Canada Diplomatic Tensions

Political strain reduces trust—critical for cooperation in sensitive domains like quantum research, AI security, or cyber systems.

ii. Divergent Regulatory Regimes

Differences in:

- Data protection laws
- AI ethics frameworks
- Technology-governance norms
  may slow progress on cross-border interoperability.

iii. Trust Deficit in High-Sensitivity Technologies

Emerging technologies often involve dual-use (civilian and military) applications. Deep, institutional trust is essential—and still evolving.

iv. Uneven Technological Maturity

While India excels in digital scale, it still lags behind Canada in frontier research and behind Australia in mineral processing. Balancing expectations will require customised coordination mechanisms.

f. The Path Ahead: Building a Durable and Effective Partnership

i. Develop Shared Governance Norms

Harmonised standards for:

- AI ethics
- Data protection
- Secure cross-border digital flows
  will reduce regulatory friction.

ii. Build a Trilateral Critical-Minerals Corridor

This may include:

- Long-term supply contracts
- Joint refining & processing capacity
- Transparent certification systems
  ensuring traceability and sustainability.

iii. Establish Joint Research Centres

Co-branded institutions across:

- AI
- Quantum technologies
- Green hydrogen
  can pool capacity and accelerate innovation cycles.

iv. Foster Cross-Border Innovation Ecosystems

Linking:

- Start-ups
- Academic institutions
- Innovation incubators
  ensures that ACITI becomes a society-wide, not merely a state-driven, collaboration.

v. Leverage the 2026 AI Summit

The summit can serve as:

- A forum to institutionalise standards
- A platform to showcase trilateral pilot projects
- A mechanism to build global coalitions for responsible innovation

Conclusion

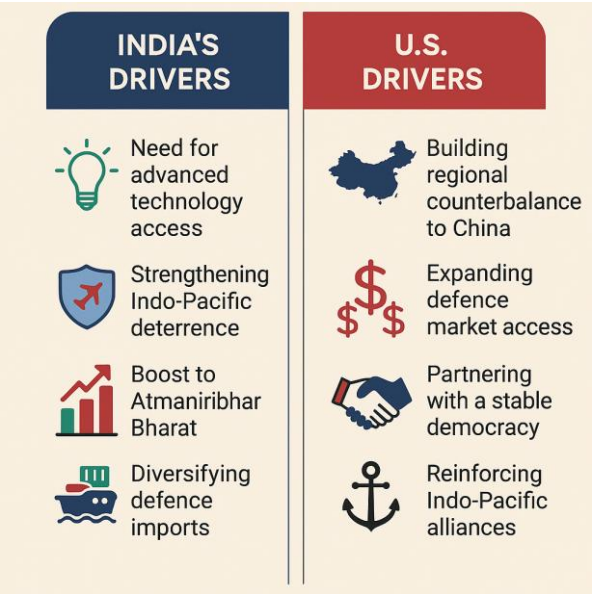
The ACITI partnership represents a forward-looking model for democratic technology alliances. By combining India's digital scale, Australia's mineral wealth, and Canada's research strength, it builds an integrated ecosystem capable of shaping the future of advanced technologies responsibly and resiliently. Its success, however, will depend on sustained diplomatic trust, cross-border regulatory harmonisation, and long-term investment in shared innovation frameworks. If managed effectively, ACITI could become a cornerstone of the emerging democratic technology order, balancing innovation with values, resilience with sustainability, and national priorities with collective technological leadership.

4. India–US Strategic Partnership: Defence Framework (2025–2035) and LPG Diversification

India–US Defence Partnership Framework (2025–2035)

a. Essence of the Framework

A decade-long roadmap that shifts India–US defence ties from platform purchases to technology co-development, industrial integration, and Indo-Pacific operational coordination. It institutionalises long-term strategic convergence while preserving India's autonomy.



b. How the Partnership Evolved

Foundational agreements—LEMOA, COMCASA, BECA—created secure logistics, communication and geospatial links. This moved the relationship from episodic engagement to real-time interoperability, enabling the 2025–2035 framework's deeper techno-industrial focus.

c. Core Features

- **Predictability:** 10-year horizon supports R&D, capital investment, production cycles.
- **Full-spectrum Cooperation:** joint production, MRO hubs, training, logistics and supply-chain resilience.

- **Technology-centric:** INDUS-X drives collaboration in AI, drones, space, autonomous systems.
- **Operational Synergy:** exercises like Malabar link to COMCASA–BECA networks, enhancing maritime and air coordination.
- **Industrial Integration:** engine, UAV, artillery and naval co-development embeds Indian firms in global value chains.
- **Indo-Pacific Anchor:** supports maritime security, Maritime Domain Awareness (MDA), resilient sea lanes in line with SAGAR.

d. Analytical Significance

- **Strategic:** elevates India to a system-shaping Indo-Pacific actor while retaining non-alliance autonomy.
- **Operational:** shared platforms and joint Maintenance, Repair, and Overhaul (MRO) reduce costs and enhance readiness.
- **Technological:** dual-use innovations spill into civilian sectors, strengthening the domestic innovation ecosystem.
- **Diplomatic:** deepens Quad cooperation and boosts regional confidence in rule-based maritime norms.

e. Challenges

- Balancing US partnership with ties to Russia, Europe, West Asia.
- Export controls and IP restrictions slowing technology transfer.
- Risks of overdependence on US-origin systems.
- Chinese and regional sensitivities.
- Broader trade and policy divergences occasionally influencing defence coordination.

f. Way Forward

- Accelerate co-development in propulsion, autonomous systems, space and counter-drone tech.
- Build India-based MRO and diversified supply chains.
- Strengthen Quad-led MDA and Humanitarian Assistance and Disaster Relief (HADR) frameworks.
- Preserve strategic autonomy through multi-vector partnerships.
- Invest in defence R&D talent, start-ups and academia–military collaboration.

Conclusion

The Framework consolidates India–US defence ties into a long-term, technology-driven, industrially integrated partnership aligned with Indo-Pacific stability. Its success rests on India extracting technological gains while maintaining strategic autonomy.

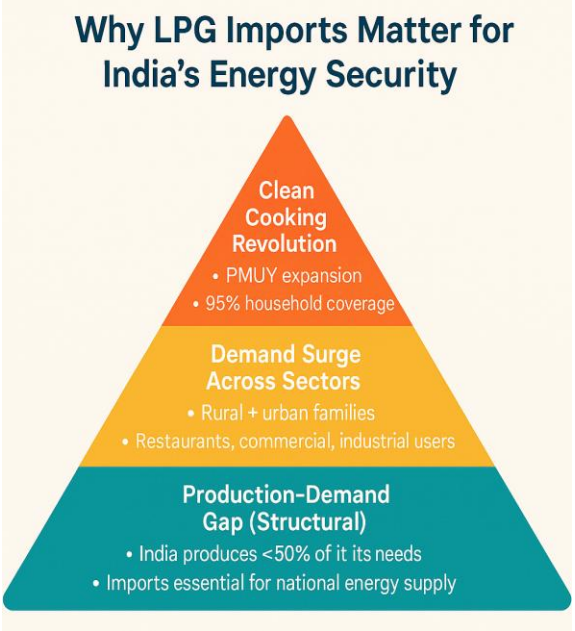
India–US LPG Import Agreement: Energy Diversification and Strategic Security

a. Significance of the Agreement

India's first structured long-term contract (2.2 MT annually) with the US diversifies LPG sourcing away from the Middle East, strengthening supply security, pricing leverage, and strategic economic ties.

b. Why Diversification Matters

- LPG demand has surged due to high household penetration and Pradhan Mantri Ujjwala Yojana (PMUY).
- Middle East concentration exposes India to geopolitical and freight risks.
- US entry provides a parallel supply stream, reducing vulnerability.



c. Strategic Benefits

- **Energy Security:** hedges against Middle East disruptions and stabilises inventories.
- **Economic Diplomacy:** deepens bilateral trade and rebalances India's surplus with the US.
- **Bargaining Power:** diversified origins enable better commercial terms with all suppliers.
- **Domestic Stability:** smoothens supply planning and cushions spot-market volatility.

d. Challenges

- Higher freight and insurance costs from the Atlantic.
- Exposure to Henry Hub–linked price movements.
- Need for expanded port, storage, and pipeline infrastructure.

e. Way Forward

- Move towards multi-year contracts for price predictability.
- Enhance LPG storage, port capacity, and pipeline networks.
- Explore an LPG Strategic Reserve for crisis resilience.
- Maintain balanced energy diplomacy across Gulf, US, Africa and Asia-Pacific.

Conclusion

The LPG agreement marks a strategic diversification in India's energy matrix, enhancing resilience while complementing broader India–US economic ties. With infrastructure upgrades and balanced diplomacy, it strengthens India's long-term energy security.

5. India–Indonesia Defence Ties and the Emerging BrahMos Partnership

a. Introduction

India–Indonesia defence ties have entered a new phase with Jakarta's prospective purchase of the BrahMos supersonic cruise missile.
For India, this reflects its rise as an exporter of advanced strategic systems; for Indonesia, it offers a crucial maritime deterrent across its vast archipelagic geography.
The partnership strengthens India's Act East outreach and contributes to a more resilient, multipolar Indo-Pacific.

b. Strategic Value of BrahMos

- **High-speed, precision strike** makes interception difficult.

- **Dual roles:** land-attack and anti-ship.
- **Combat-proven credibility** within Indian forces.
- Its export success (Philippines) has already opened Southeast Asia as a new sphere of Indian defence diplomacy.

c. Key Capability Enhancements

- **Extended Range:** up to ~500 km (land-attack) and ~400 km (anti-ship) post-MTCR entry.
- **Continuous supersonic trajectory**: minimal reaction time for adversaries.
- **Miniaturised & flexible variants:** deployable from aircraft, mobile coastal batteries, and naval platforms.
- **Robust electronic safeguards** against jamming and cyber interference.

d. Why Indonesia Wants BrahMos

- The world's largest archipelago faces maritime coercion, grey-zone pressure, illegal fishing, and South China Sea tensions.
- Seeks credible coastal deterrence, rapid-response capability, and diversified suppliers beyond Western or Chinese dependence.
- BrahMos provides a cost-effective but high-impact maritime denial system.

e. Wider Defence Cooperation Tracks

- **Defence medicine** collaboration and military pharmaceuticals.
- **Technology transfer & industrial cooperation**, aligning with both states' defence manufacturing goals.
- **Institutional mechanisms:** proposed Joint Defence Industry Cooperation Committee, training exchanges, and maritime exercises.

f. Strategic Significance

For India

- Strengthens Act East and ASEAN outreach.
- Positions India as a responsible security provider and credible defence exporter.
- Expands India's maritime influence in the Indo-Pacific.

For Indonesia

- Enhances coastal defence and deterrence.
- Reduces reliance on single-source suppliers.
- Gains access to battle-tested, flexible, maritime-focused capabilities.

For the Indo-Pacific

- Bolsters rule-based maritime order.

- Strengthens mid-sized power resilience.
- Counters unilateral assertiveness and enhances regional deterrence.

g. Challenges & Sensitivities

- **China's reaction** may complicate regional signalling.
- **High acquisition costs** may push Indonesia towards phased procurement.
- **Russian supply-chain constraints** introduce reliability risks.
- Integration requires training, C2 compatibility, long-term logistics and maintenance.

h. Way Forward

- Movement towards co-production, greater technology transfer, and regional sustainment hubs.
- Potential uptake of next-generation BrahMos variants with longer ranges and wider platform compatibility.
- Deeper India–ASEAN maritime cooperation, improving interoperability and shared situational awareness.

Conclusion

The emerging BrahMos partnership marks a strategic inflection point in India–Indonesia defence relations. It enhances Indonesia's maritime deterrence, elevates India's status as a credible security partner, and strengthens a multipolar Indo-Pacific order. As India's defence-industrial capacity grows, such partnerships will increasingly shape regional stability and India's strategic profile.

GS Paper III: Economics

1. Reforming India's Special Economic Zones

a. Introduction

Special Economic Zones (SEZs) were conceived as globally competitive, tax-efficient export hubs capable of driving investment, manufacturing, and employment. For a period, they performed impressively—contributing significantly to India's merchandise and services exports.

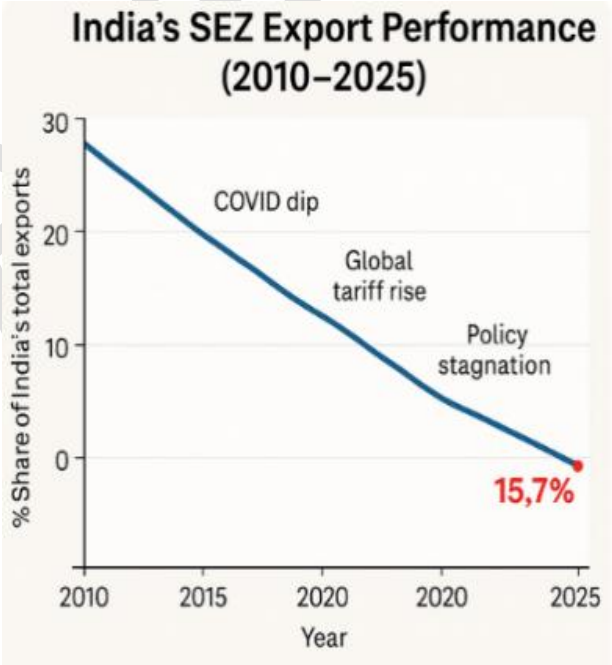
But over time, SEZs became constrained by policy rigidity, global trade disruptions, falling export competitiveness, and limited domestic linkages. Their contribution to national exports has steadily declined.

Recognising these structural issues, the government is revisiting the SEZ framework with reforms that shift the paradigm from export-only enclaves to flexible, innovation-driven production clusters. Notably, proposals like "reverse job work" and deeper integration with the domestic economy signal a shift toward modern industrial ecosystems aligned with *Atmanirbhar Bharat*, global value chains, and new trade realities.

b. Understanding SEZs: Purpose and Institutional Design

i. Definition and Legal Basis

SEZs are designated areas treated as *foreign territories* for trade and customs, governed by the Special Economic Zones Act, 2005 and SEZ Rules, 2006.



ii. Core Objectives

- Promote exports
- Attract foreign and domestic investment
- Create high-quality jobs
- Enable globally competitive industrial infrastructure

iii. Incentive Structure

- Duty-free imports
- Direct and indirect tax concessions
- Single-window systems
- Simplified customs and regulatory norms

SEZs were thus central to India's shift toward export-led industrialisation under *Make in India* and *Atmanirbhar Bharat*.

c. Why Reforms Are Necessary: Stagnation of the SEZ Model

SEZs once contributed over 30% of India's exports; now their share has fallen to ~15.7%. This decline stems from multiple structural, competitive, and regulatory challenges:

i. Erosion of Global Competitiveness

Softening global demand and rising competition in labour-intensive sectors (textiles, gems and jewellery, electronics assembly).

ii. Policy and Tariff Barriers Abroad

Tariff hikes—especially by the U.S.—have reduced demand for SEZ-based exports.

iii. Idle and Underutilised Capacity

Seasonal export cycles leave expensive infrastructure unused for months.

iv. Decline in Fresh Investment

Uncertain incentives, competition from Vietnam/UAE, and weak branding reduce new FDI inflows.

v. Weak Innovation and Skills Infrastructure

Most SEZs focus on manufacturing or assembly, not design, R&D, or high-skilled services.

vi. Low Value Addition

Some SEZs have become import-dominated units, contributing little domestic value.

These weaknesses reveal that India's SEZ framework has not kept pace with changing global value chains, fiscal regimes, and trade patterns.

d. The Pivotal Reform: Introducing "Reverse Job Work"

The proposal permits SEZ units to undertake manufacturing or processing work on behalf of Domestic Tariff Area (DTA) firms, especially during lean export periods.

i. Rationale

- Fills idle capacity
- Sustains employment in export downturns
- Deepens domestic–SEZ integration
- Enhances operational flexibility

ii. Example

A jewellery SEZ unit can process gold or stones for an Indian DTA firm when export orders shrink.

iii. Key Challenge

Ensuring tax parity between SEZ and DTA units, as SEZs enjoy duty exemptions.

If implemented carefully, reverse job work can redefine SEZs as multi-use industrial hubs rather than isolated export zones.

e. Case Study: The Gems and Jewellery Sector

This sector illustrates the fragility of the old SEZ model:

- SEZs contribute ~65% of India's studded jewellery exports.
- Global recession and U.S. tariffs sharply reduced orders.
- Many SEZ units shut down or sought de-notification.

Industry demands include:

- Permission for reverse job work
- Relief on working capital
- Extended export timelines
- Temporary interest waivers during global downturns

For labour-intensive sectors reliant on global cycles, flexible policy tools are essential for survival and resilience.

f. Broader Structural Challenges Facing SEZs

i. Weak FDI Performance

India's SEZs attract far less FDI than export zones in Vietnam, UAE, or China.

ii. Limited Skill and Innovation Ecosystems

Most SEZs lack R&D centres, design labs, and skilling hubs—crucial for competitiveness.

iii. Poor Global Branding and Value Chain Integration

India's SEZs are not yet embedded in global production networks the way Shenzhen or Hai Phong are.

These deficits emphasise that future SEZs must be innovation-driven ecosystems, not mere tax-incentive zones.

g. Expected Gains from the New SEZ Framework

i. Improved Capacity Utilisation

Higher operational hours and better use of fixed assets.

ii. Employment Stability

Reduced seasonal layoffs in labour-intensive industries.

iii. Domestic–Export Synergy

Smooth flow of goods and services between SEZs and Indian firms.

iv. Enhanced Global Competitiveness

More flexible SEZ frameworks bring India closer to global best practices.

v. Push for Innovation and Technology

Upgraded R&D and skill infrastructure catalyse high-value manufacturing.

Collectively, these reforms can reposition India's SEZs as competitive, adaptive industrial clusters.

h. Concerns and Policy Risks

i. Potential Revenue Loss

Domestic access for SEZ units may reduce government tax collections.

ii. Level-Playing-Field Concerns

DTA manufacturers may demand equivalent tax treatment.

iii. Administrative and Compliance Complexity

Synchronisation between customs, GST, and industrial ministries is essential.

iv. Transition to the DESH Framework

Replacing the SEZ Act with the proposed Development of Enterprise and Services Hubs (DESH) Act must be managed to ensure continuity and investor confidence.

These risks necessitate careful sequencing and stakeholder consultation.

i. Way Forward: Building Modern, Competitive, Integrated SEZs

i. Deep Domestic Integration

Allow dual-use manufacturing for both export and domestic markets.

ii. Harmonised Tax Regime

Create clear, neutral duty structures to minimise distortions between SEZ and DTA units.

iii. Innovation-Centric SEZs

Establish design studios, R&D labs, skill centres, and digital infrastructure to nurture high-tech manufacturing.

iv. Streamlined Governance

Improve single-window systems, customs efficiency, and regulatory predictability.

v. Global Benchmarking

Study successful models in China, Vietnam, and the UAE to adopt best practices in logistics, governance, and industrial clustering.

vi. Transition to DESH

A flexible, multi-sectoral DESH framework can align SEZs with India's new industrial strategy—covering services, digital trade, and advanced manufacturing.

Conclusion

SEZs were once central to India's export growth, but changing global and domestic dynamics demand a new model. Reforms such as reverse job work, enhanced domestic linkages, and the shift toward a DESH framework aim to future-proof these zones.

The next-generation SEZ must be flexible, innovation-led, and deeply integrated with India's broader industrial ecosystem—transforming them from isolated enclaves into dynamic economic engines producing for both India and the world.

If implemented effectively, these reforms can restore SEZs as powerful catalysts for export expansion, job creation, and global competitiveness—realising India's vision of *"Make in India for the World."*

2. Strengthening India's Banking Architecture: Forward-Looking ECL Provisioning and Acquisition Finance Reforms

a. Introduction

India's banking sector has travelled a long distance from the high-NPA era of the 2010s to a phase marked by improved balance sheets, digital modernisation, and regulatory maturity. As credit demand expands and India integrates deeper into global markets, the Reserve Bank of India (RBI) is steering the system toward anticipatory risk management rather than retrospective clean-ups.
Two recent reforms underscore this strategic shift:

- Expected Credit Loss (ECL) provisioning, and
- Permission for acquisition financing under clear safeguards.

Together, they move Indian banking closer to IFRS-9 and Basel-III global standards, reshaping banks into forward-looking, data-driven institutions capable of supporting India's long-term economic ambitions without compromising stability.

b. Core Concepts Underpinning the Reforms

i. Expected Credit Loss (ECL) Provisioning: From Incurred Loss to Anticipated Risk

Traditionally, Indian banks used the *incurred loss* model — making provisions only after a loan showed signs of deterioration. This reactive approach often led to sudden surges in NPAs during downturns.

Under the ECL framework, banks must:

- estimate potential losses in advance,
- use borrower repayment history, sectoral trends, early warning signals, and financial metrics, and
- provision systematically over time.

Benefits include:

- early detection of stress and timely corrective action,
- smoother provisioning cycles instead of disruptive spikes, and
- more transparent and realistic financial statements.

ECL thus shifts Indian banking culture from *firefighting* to *forecasting*.

ii. Acquisition Financing: Enabling Responsible Corporate Consolidation

Acquisition finance refers to loans extended to companies to fund mergers, takeovers, or strategic consolidations. Earlier, restrictions existed due to concerns about leveraged buyouts and potential instability.

The RBI's revised stance permits acquisition financing with strong safeguards, such as:

- loan-to-value limits,
- strict credit assessments,
- exposure caps, and
- continuous monitoring of leverage and cash flows.

This reform enables Indian corporates to expand scale and competitiveness — both domestically and globally — without allowing reckless financial engineering.

c. Why These Reforms Matter for India's Economic and Financial Architecture

i. Accelerating Investment and Growth

Acquisition finance allows productive restructuring, enabling firms to expand operations, enter new markets, and enhance global competitiveness — creating jobs and stimulating investment.

ii. Strengthening Banking Resilience

ECL promotes early recognition of credit deterioration, reducing the probability of sudden NPA crises and stabilising provisioning behaviour.

iii. Reinforcing Systemic Stability and Trust

Transparent accounting and predictable risk management strengthen depositor confidence, investor sentiment, and India's global financial credibility.

d. Key Features of the RBI's New Framework

i. Forward-Looking ECL Model

- Predictive analytics, AI-based scoring, and quantitative modelling form the backbone of risk estimation.
- Aligns Indian banks with global best practices for provisioning and balance sheet integrity.

ii. Regulated Acquisition Financing

- Lending permitted only under clearly defined guidelines concerning capital adequacy, risk concentration, sectoral exposure, and deal viability.
- Encourages strategic consolidation while curbing speculative transactions.

iii. Rationalised Borrower and Lending Norms

- Lending restricted to transactions backed by listed, investment-grade, or transparent assets.
- Prevents over-leverage and sharpens credit discipline.

iv. Simplified and Unified Regulatory Expectations

- Replaces earlier restrictive and fragmented norms with a harmonised framework.
- Provides banks flexibility while maintaining strong prudential guardrails.

v. Multi-Layered Oversight and Risk Tracking

- Stress tests, exposure caps, scenario modelling, and continuous monitoring ensure early detection of vulnerabilities.

Collectively, these reforms embed data-driven discipline into India's credit ecosystem.

e. Analytical Significance: What These Reforms Achieve Systemically

i. A Growth-Conducive Banking Environment

Acquisition financing smoothens market consolidation, encourages efficient capital allocation, and supports India's industrial upgrading.

ii. Predictive Risk Governance

ECL forces banks to actively scan for vulnerabilities, improving prudential behaviour and reducing the likelihood of large-scale defaults.

iii. Enhancing Investor and Rating-Agency Confidence

Accurate provisioning strengthens the credibility of financial statements, supporting capital raising and lower borrowing costs.

iv. Alignment with International Norms

Adoption of IFRS-9-style provisioning and global lending standards signals India's commitment to transparent, modern banking.

v. Sustainable Stability

The combined approach ensures that banks expand credit while maintaining prudence — essential for a fast-growing but stability-conscious economy.

f. Implementation Challenges: Navigating the Transition

i. Data and Modelling Limitations

ECL depends on granular borrower data, sectoral databases, and robust statistical models — areas where many banks still lag.

ii. Near-Term Capital Pressure

Upfront provisioning under ECL may temporarily suppress profits and affect capital adequacy ratios.

iii. Skill and Technology Requirements

Banks require:

- data scientists,
- model developers,
- risk specialists, and
- strong digital infrastructure.

iv. Monitoring Risks in Acquisition Finance

Constant vigilance is needed to prevent excessive leverage, sectoral concentration, and financial misconduct.

v. Multi-Institutional Coordination

Banks, auditors, credit rating agencies, and regulators must align methodologies and expectations for consistent implementation.

The transition demands long-term capacity building and governance reforms.

g. Way Forward: Embedding Foresight into India's Banking DNA

i. Build Advanced Risk Capabilities

Train credit officers in predictive analytics, AI-driven risk scoring, stress testing, and early-warning frameworks.

ii. Strengthen Data Infrastructure

Develop national credit registries, integrated borrower-level databases, and uniform data standards to enhance modelling accuracy.

iii. Ensure Prudent Acquisition Lending

Encourage financing of value-accretive mergers while discouraging speculative or excessively leveraged transactions.

iv. Promote Transparency and Disclosure

Banks should publish methodological notes on ECL assumptions, provisioning adequacy, and risk parameters.

v. Maintain the Growth–Stability Balance

RBI's regulatory philosophy — growth anchored in stability — must guide the adoption of both reforms.

Conclusion

The RBI's twin reforms — ECL provisioning and regulated acquisition financing — mark a decisive transition in India's financial architecture. They embed anticipatory risk recognition, transparent lending norms, and globally aligned accounting into the banking system.
These measures support India's growth ambitions while insulating the economy from future financial shocks.
They represent a banking ecosystem that is modern, disciplined, and forward-looking — one that can finance India's aspirations with prudence, innovation, and resilience.

India's banking reforms now rest on foresight rather than reaction, ensuring a financial system capable of supporting a robust, competitive, and sustainable economic future.

3. Export Promotion Mission and India's Strategic Response to the US Tariff Shock

a. Introduction

The steep ~50% tariff hike imposed by the United States on selected Indian exports created an immediate shock for India's external sector—especially labour-intensive industries such as engineering goods, textiles, leather, gems and jewellery, and marine products. These sectors rely heavily on US demand, and even short-term disruptions threaten production cycles, cash flows, export orders and employment in major industrial clusters.

In response, the Government launched:

- A six-year Export Promotion Mission with an outlay of ₹25,000+ crore, focused on long-term competitiveness, and
- A ₹20,000 crore collateral-free credit initiative for MSME exporters, designed to offer immediate liquidity support.

Together, these interventions reflect a dual approach: stabilising vulnerable sectors in the short term while building systemic capacity for future export resilience.

b. Why the Tariff Shock Is Strategically Significant

i. Overdependence on the US Market

The US is India's largest export destination. Several labour-intensive industries depend on predictable American demand to sustain operations and employment. Sharp tariff hikes push US buyers towards competitors such as Vietnam, Bangladesh, Turkey or Mexico, whose price competitiveness improves overnight.

ii. Immediate Economic Impact

Indian exporters face higher landed costs in the US market, resulting in:

- Order cancellations,
- Inventory pile-up,
- Delayed payments,
- Compressed profit margins,
- Pressure on working capital.

Clusters in Tiruppur, Surat, Moradabad, Kanpur, Ludhiana, Coimbatore and the coastal marine-export belts face disproportionate vulnerability.

iii. Structural Lesson in Trade Dependence

The tariff shock exposes the risk of excessive concentration in a single market and the fragility of export sectors that depend on external policy environments.

c. The Export Promotion Mission: Strategic Pillars

The mission attempts to align India's export ecosystem with evolving global value chains while mitigating dependence-induced vulnerabilities.

i. Building Long-Term Competitiveness

The mission focuses on:

- Technology upgradation,
- Product quality enhancement,
- Standards compliance,
- Modernisation of transport, warehousing and port logistics.

By raising productivity and lowering costs, India aims to remain competitive even after tariff disadvantages.

ii. Targeted Support for Affected Sectors

Labour-intensive sectors such as textiles, leather, marine products, gems and jewellery, and engineering goods receive priority interventions because:

- They employ millions of semi-skilled workers,
- They are heavily concentrated in MSME clusters,
- They face the sharpest demand contraction due to tariffs.

iii. Diversifying Export Markets

A central objective is to reduce dependence on the US by expanding India's presence in:

- Gulf and West Asia,
- Africa,
- Southeast Asia,
- Latin America,
- Europe (where trade negotiations are advancing).

Diversification mitigates risks from unilateral tariff decisions by any single nation.

iv. Lowering Export Credit Costs

Indian exporters typically borrow at higher real interest rates than global competitors. The mission seeks to expand affordable export credit channels so exporters can price goods competitively without eroding margins.

d. Collateral-Free Credit Initiative: Why It Is Critical

The ₹20,000 crore collateral-free credit window is targeted specifically at MSME exporters—those most vulnerable to external shocks.

Key Benefits:

- **Immediate Liquidity:** Working capital for processing existing orders despite reduced cash flows.
- **Risk Cushion:** Helps firms survive cancellations or delayed shipments without layoffs.
- **Global Connectivity:** Ensures MSMEs remain integrated into supply chains rather than exiting due to financial distress.
- **Employment Protection:** Many labour-intensive clusters rely almost entirely on uninterrupted export cycles.

This measure acts as a shock absorber to prevent long-term structural damage to MSME export capacity.

e. Why These Measures Matter: Strategic and Economic Significance

i. Protecting Employment

Labour-intensive export sectors such as textiles, leather, and marine products are major employers. Even small disruptions translate into large job losses. Stabilising these sectors is vital for socio-economic security.

ii. Sustaining Export Momentum

At a time of global slowdown and rising protectionism, preserving export momentum prevents a broader industrial slump.

iii. Strengthening MSMEs

MSMEs contribute nearly half of India's exports in some sectors but face chronic challenges: high credit costs, limited technology access, and exposure to external volatility. Government support helps prevent permanent attrition.

iv. Risk Diversification

Reducing excessive reliance on the US market is essential for resilience. A diversified export profile enhances bargaining power and strategic autonomy.

v. Enhancing Long-Run Competitiveness

The mission addresses structural constraints—technology gaps, quality deficits, logistics inefficiencies—which have long limited India's export growth.

f. Persistent Structural Challenges

Despite the interventions, India faces broader export challenges:

- High logistics costs reduce competitiveness.
- Slow customs processes and procedural inefficiencies affect shipment timelines.
- Dependence on imported inputs, particularly in electronics, APIs, and advanced materials.
- Limited penetration into major markets lacking FTAs (e.g., US, EU).
- Concentration of export basket in a few product groups.
- Need for greater integration into global value chains.

These issues require deeper reforms in trade policy, industrial strategy, infrastructure, and global market access.

Conclusion

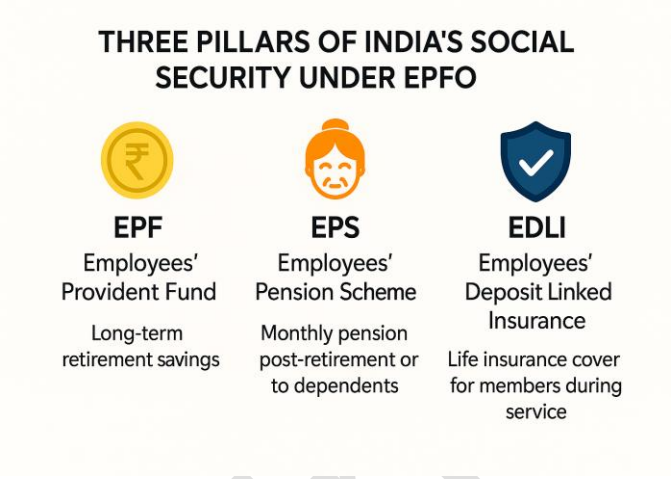
The Export Promotion Mission and the collateral-free credit initiative represent India's calibrated response to the US tariff shock. They address both immediate vulnerabilities and long-term structural challenges by protecting employment, strengthening MSMEs, reducing market dependence and improving competitiveness.

The broader strategic lesson is clear:
India must build an export ecosystem capable of withstanding geopolitical and policy-driven disruptions. This requires market diversification, domestic capability enhancement, logistical reform, and a resilient industrial base.

Ultimately, export strength—and thereby economic sovereignty—depends not on the stability of external markets but on the robustness India builds at home.

4. EPFO Reforms: Building a Transparent, Responsive, and Citizen-Centric Social Security System

a. Introduction



The Employees' Provident Fund Organisation (EPFO) — one of the world's largest mandatory savings and pension bodies — has embarked on a comprehensive reform programme to address long-standing inefficiencies in service delivery. Historically, workers faced routine hurdles: mismatched records, delayed withdrawals, slow pension settlements, and opaque grievance handling. The present reform agenda marks a structural transition from a file-driven bureaucracy to a citizen-first, technology-enabled, and accountable social security system.

These reforms complement broader national priorities such as Digital India, Ease of Living, and Minimum Government, Maximum Governance. By integrating digital upgrades with human outreach, the EPFO aims to ensure that every worker — including the most vulnerable — receives timely, transparent, and dignified service.

b. Background: Why EPFO Required Structural Reform

i. EPFO's Role in India's Social Security Architecture

Established under the EPF & MP Act (1952), EPFO manages three flagship schemes:

- Employees' Provident Fund (EPF) — long-term savings for retirement;
- Employees' Pension Scheme (EPS) — monthly pension post-retirement or on death/disability;
- Employees' Deposit Linked Insurance (EDLI) — life insurance for employees.

With 30 crore accounts, 7 crore active contributors, and a financial corpus of over ₹26 lakh crore, EPFO's performance directly shapes financial security for millions of workers and their families.

ii. Why Reforms Became Necessary

For years, EPFO's legacy systems and processes struggled to match the scale and complexity of its operations. The major challenges included:

- Fragmented paper-based records leading to inaccurate or duplicate accounts,
- Slow claim settlements and pensions,
- Weak grievance redressal mechanisms,
- Limited digital literacy and awareness among workers,
- Low accountability for delays or errors.

These challenges created distrust among members, particularly low-income workers who depend on EPFO for security during emergencies, retirement, or family crises.

c. Key Reform Initiatives: A Blend of Digital Modernisation and Grassroots Outreach

i. Samadhan Initiative: Daily Grievance Resolution

A platform enabling members to meet EPFO officers in person, ensuring:

- Same-day registration of grievances,
- Officer-wise accountability until resolution,
- Elimination of long waiting periods.

ii. Nidhi Aapke Nikat: Institutionalising Monthly Outreach

A monthly nationwide interface where workers, employers, and pensioners can:

- Verify personal and service details,
- Correct discrepancies,
- Learn about entitlements,
- Seek assistance directly from EPFO staff.

This bridges the gap between the institution and underserved communities.

iii. Single-Window Death Claim Counter

A compassionate reform simplifying documentation for bereaved families, ensuring:

- Speedy settlement of claims,
- Reduced paperwork,
- Minimisation of bureaucratic barriers during distress.

iv. IT System Overhaul and Database Unification

In collaboration with C-DAC and MeitY, EPFO has:

- Merged 123 disparate databases,
- Upgraded servers and software architecture,
- Redesigned online forms to reduce user errors,
- Improved claim-processing speed and system stability.

v. Digitisation of Legacy Records

Paper files from decades ago — crucial for pension verification and transfer — are being digitally archived, enabling quicker access for both staff and retirees.

vi. Process Simplification

Forms like Form 19 (withdrawal) and Form 13 (transfer) have been streamlined to reduce rejections and improve user experience.

d. Why These Reforms Matter: Strengthening Trust, Transparency, and Access

i. Faster and More Accountable Grievance Redressal

Real-time tracking ensures that grievances no longer languish for months. Local officer responsibility reduces bureaucratic opacity.

ii. Digital Empowerment and Transparency

With modern IT systems:

- Withdrawal and transfer claims are processed quicker,
- Errors are reduced,
- Members can track claims and balances online, improving trust.

iii. Inclusion of Informal and Marginalised Workers

Outreach programmes bring EPFO's benefits to:

- Small factories,
- Construction workers,
- Rural and semi-urban workforce,
  who previously remained outside the formal safety net.

iv. Enhancing Public Trust and Good Governance

Face-to-face interactions backed by digital trails enhance:

- Transparency,
- Responsiveness,
- Credibility of the institution.

v. Moving from Transaction-Based to Citizen-Centric Social Security

EPFO is redefining service delivery by integrating empathy with efficiency — a crucial expectation from modern welfare institutions.

e. Challenges to Sustaining Reform Momentum

i. Digital Literacy Gaps

Millions of workers, especially in the informal sector, lack access or skills to navigate online platforms, resulting in dependence on intermediaries.

ii. Accuracy Issues in Legacy Data

Old employment records often contain errors in name, date of birth, or service history, complicating claims and transfers despite digital upgrades.

iii. Heavy Workload at Regional Offices

With millions of concurrent cases, manpower shortages strain service delivery and delay resolutions.

iv. Low Awareness of Rights

A large proportion of EPF members do not know how to:

- Check balances,
- File online claims,
- Raise grievances effectively.

v. Connectivity Challenges

Remote and rural areas lack reliable internet connectivity, limiting access to online services.

f. Way Forward: Consolidating Gains for a Robust Social Security Ecosystem

i. Large-Scale Awareness Campaigns

Focused efforts in industrial belts and rural clusters can empower workers with knowledge of EPFO benefits and digital tools.

ii. Expanding Digital Access Points

Mobile help centres, kiosks, and on-site assistance staff can support digitally inexperienced workers.

iii. Continual IT Modernisation

Artificial intelligence, automation, and enhanced cybersecurity can streamline workflows and improve fraud detection.

iv. Capacity Building for EPFO Staff

Training programmes must strengthen:

- Technical proficiency,
- Grievance-handling skills,
- Human-centric communication.

v. Institutionalising Feedback Loops

Citizen feedback through mobile apps, SMS surveys, and post-service calls can guide real-time improvements in service quality.

Conclusion

EPFO's reform trajectory represents a fundamental shift towards a transparent, accountable, and citizen-centric social security system. By modernising IT systems, simplifying processes, digitising records, and institutionalising outreach, EPFO is transforming from a traditionally bureaucratic institution into a responsive public service platform.

These changes reflect the evolving aspirations of India's workforce and the national vision of accessible, efficient, humane governance. Ultimately, social security must not be an abstract entitlement but a lived reality — swift, reliable, and dignified — for every worker across India's diverse socio-economic landscape.

GS Paper III: Environment

1. The Belem Action Plan

a. Introduction

The Belem Action Plan, announced at COP30 in Brazil, is the most ambitious global attempt yet to integrate public health resilience into climate adaptation. As climate change shifts from an environmental threat to a direct determinant of mortality, disease patterns, and health-system stability, the Plan reframes climate policy around human well-being.

Its central aim is twofold:

- Strengthen health systems to withstand climate-related shocks—heatwaves, floods, wildfires, vector-borne diseases.
- Decarbonise health-care infrastructure, reducing the sector's own environmental footprint.

This represents a paradigm shift in climate diplomacy, placing human health—not emissions targets—at the heart of adaptation strategies.

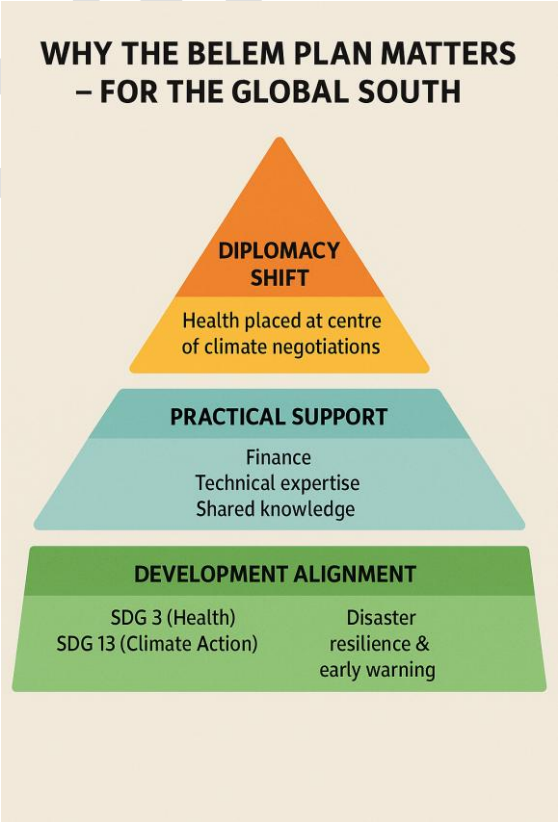
b. Why the World Needed the Belem Action Plan

i. Climate Change as a Direct Health Crisis

The Plan emerges from the growing scientific recognition that climate change now functions as a global health emergency:

- **Extreme heat** is linked to nearly half a million deaths each year.
- **Wildfire smoke** contributes to over 100,000 fatalities annually.
- **Vector-borne diseases** such as dengue, malaria, chikungunya are expanding into previously non-endemic regions.
- **Extreme rainfall, floods, and cyclones** disrupt hospitals, supply chains, and emergency-response networks.
- **Mental health burdens**—trauma, anxiety, post-disaster stress—are rising across vulnerable populations.

These intersecting risks expose the fragility of health systems, especially in countries with underfunded public health infrastructure.



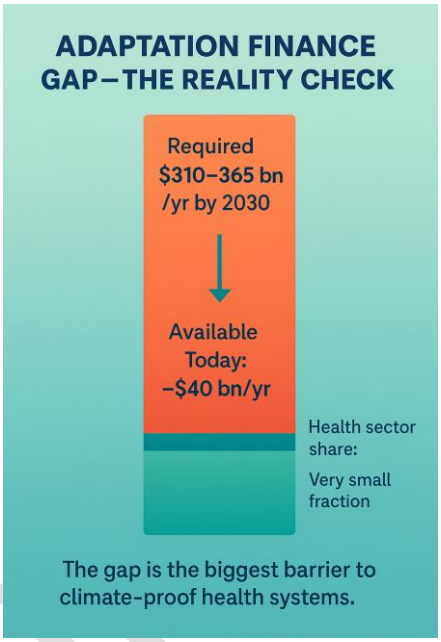
ii. Weak Climate–Health Preparedness

Despite rising threats:

- Most nations lack climate-resilient hospital design, backup power systems, or heat-ready infrastructure.
- Health budgets rarely include adaptation-specific allocations.
- Climate surveillance (heat mapping, vector tracking, early warnings) remains limited in many low-income regions.

The Belem Plan addresses these systemic gaps by integrating *health resilience* into *climate governance*—an overdue but transformative alignment.

c. Core Elements of the Belem Action Plan



i. A Clear, Dual Objective

- Build climate-resilient health systems capable of absorbing climate shocks.
- Lower the health sector's carbon footprint, given that global health-care emissions rival those of a major G20 economy.

ii. A Broad, Multilateral Coalition

- Over 80 countries have endorsed the initiative.
- Participation from WHO, UNFCCC bodies, and philanthropic institutions marks a strong convergence of health and climate actors.

This coalition signals a major normative shift: climate adaptation is no longer a sectoral issue but a central pillar of global public health.

d. Funding Commitments and Scientific Foundations

Funding

- $300 million pledged by 35 philanthropic institutions for early-warning systems, climate-health research, and national adaptation plans.
- Initial funding is catalytic but not sufficient—intended to build technical capacity and institutional readiness.

Scientific grounding

- Evidence from the Lancet Countdown and similar assessments quantifies the health impacts of climate change, giving the Plan a strong empirical basis.
- Losses from floods, storms, diarrhoeal diseases, heat stress, and climate-induced displacement already number in the millions annually.

e. The Global Adaptation Finance Gap

i. Scale of Necessary Finance

Developing countries require $310–365 billion annually for adaptation by the early 2030s.
But current flows are around $40 billion—barely one-tenth of the need.

ii. Health Sector's Marginal Share

Despite being one of the most climate-exposed sectors:

- Only a small fraction of adaptation finance supports health infrastructure, disease surveillance, or health-system strengthening.
- Many vulnerable countries lack the fiscal flexibility to invest in resilient hospitals, local early-warning systems, or emergency logistics.

The Belem Plan cannot succeed without addressing this structural resource gap.

f. India's Climate-Health Vulnerabilities and Policy Response

i. Intensifying Climate Stressors

India faces a wide climate spectrum:

- Severe and prolonged heatwaves
- Intensifying urban flooding
- More powerful cyclones in both coasts
- Drought cycles affecting agricultural regions
- Expansion of vector-borne diseases as temperature and humidity rise

These risks stretch India's public health system—already burdened by uneven infrastructure and regional disparities.

ii. India's Scale of Adaptation Needs

- India estimates requiring $643 billion for adaptation by 2030.
- Domestic climate finance overall spending has risen to over 5.5% of GDP, reflecting increasing recognition of the climate threat.

iii. National Initiatives

- National Action Plan on Climate Change and Human Health (NAPCCHH) integrates climate considerations into public health planning.
- Several states conduct climate-health vulnerability assessments to guide local planning.

Yet health adaptation in India remains at an early, fragmented stage—highlighting the importance of global frameworks such as the Belem Plan.

g. Significance of the Belem Action Plan

i. Reframing Global Climate Governance

For the first time, climate diplomacy:

- Places human health at the centre,
- Recognises health systems as frontline adaptation infrastructure,
- Creates a unified framework linking early-warning systems, climate data, epidemiology, and health-policy planning.

ii. Support for Developing Countries

- Technical assistance, research, modelling, and health-system planning.
- Shared toolkits for climate-resilient infrastructure design.
- Potential for cooperative regional surveillance, especially for vector-borne diseases and heat impacts.

The Plan thus strengthens international solidarity around climate adaptation.

h. Structural Challenges Ahead

i. Slow and Unpredictable Funding

- Climate finance pledges often remain undisbursed for years.
- Application procedures are bureaucratic and fragmented.
- Health projects struggle to compete with infrastructure-heavy proposals.

ii. Institutional Capacity Gaps

- Many countries lack climate epidemiologists, health modellers, or adaptation planners.
- Intersectoral coordination—health, environment, disaster management—is often weak.

iii. Overstretched Health Systems

- Health infrastructure deficits (beds, specialists, diagnostics) limit the ability to integrate climate resilience.
- Climate-health planning remains aspirational in regions facing basic health system gaps.

i. Way Forward

i. Climate-Resilient Health Infrastructure

- New and retrofitted hospitals with heat-resistant design, elevated structures, flood-proof systems, backup power, renewable energy integration.
- Strengthened supply chains for emergencies.

ii. Enhancing Adaptation Finance

- Increase the size and pace of global disbursement.
- Simplify access for vulnerable countries.
- Encourage blended finance for climate-health investments.

iii. Greening the Health Sector

- Solar-powered facilities, energy efficiency, sustainable procurement, waste reduction.
- Net-zero hospitals as long-term goals.

iv. Strengthening Surveillance and Local Planning

- GIS-based heat mapping, vector tracking, early-warning systems.
- District-level climate–health plans tailored to local vulnerabilities.

Conclusion

The Belem Action Plan represents a decisive turn in global climate governance: a recognition that resilient societies require resilient health systems. By linking health adaptation to climate diplomacy, the Plan bridges a long-standing gap between environmental policy and human development.

Its success will depend on predictable finance, strengthened national institutions, cross-sectoral coordination, and the ability of countries—especially developing ones—to turn global commitments into operational resilience.

If implemented meaningfully, the Plan can become a cornerstone of global climate justice—protecting lives, reducing inequality, and ensuring that health systems worldwide can withstand the accelerating climate crisis.

2. COP30: Global Roadmaps for Forest Protection, Fossil Transition, and Adaptation

a. Introduction

Held in Belém, at the gateway to the Amazon, COP30 shifted climate governance from fragmented commitments to structured global pathways. Instead of headline pledges, the summit delivered three long-horizon frameworks:

- A global roadmap to halt and reverse deforestation,
- A roadmap for a just and equitable transition away from fossil fuels,
- A renewed global push for adaptation backed by enhanced finance expectations.

Together, these roadmaps bring clarity, fairness, and predictability to climate action—especially for developing nations balancing growth and decarbonisation.

b. Why Global Roadmaps Matter

Countries differ in resource endowments, development pressures, and vulnerability. Global roadmaps provide:

- Common reference frameworks for aligning national policies;
- Clear expectations around equity and differentiated responsibilities (CBDR);
- Reduced ambiguity for governments, industries, and financial institutions;
- Coherence in global efforts previously fragmented across sectors.

They shift climate action from voluntary patchwork to coordinated pathways.

c. Key Outcomes of COP30

i. Global Roadmap to Halt and Reverse Deforestation

- Prioritises critical forests: Amazon, Congo Basin, Southeast Asia — treated as global carbon and biodiversity assets.
- Centres Indigenous Peoples' rights and livelihood security as core to durable forest governance.
- Emphasises restoration, not just stopping deforestation—regenerating large degraded landscapes.
- Reframes forests as global public goods requiring shared stewardship.

ii. Roadmap for a Just and Equitable Transition Away from Fossil Fuels

No global phase-out date was set; instead, COP30 adopted principles enabling differentiated transitions:

- Just, orderly, equitable pathways acknowledging energy access and poverty eradication needs.
- Historical responsibility guiding deeper, faster action by developed nations.
- Safeguards for fossil-dependent economies, preventing abrupt economic shocks.

This roadmap creates a moral and structural basis for future fossil transition negotiations.

d. Finance and Equity: Still the Core Fault Line

Developing countries argued that ambition must be matched with resources. Key gaps persist:

- Pledges fall far short of the USD 100 bn promise;
- High cost of capital blocks clean energy expansion;
- Weak technology transfer and IP barriers limit access;
- Limited institutional capacity for Measurement, Reporting, and Verification (MRV) and forest governance.

COP30 revived debate on global finance architecture reform, though transformative decisions now shift to COP31 and the New Collective Quantified Goal (NCQG).

e. Trade–Climate Tensions

Developing countries raised strong objections to border carbon measures such as the EU's Carbon Border Adjustment Mechanism (CBAM), viewing them as:

- Burdens on Global South exporters;
- Potentially protectionist;
- Misaligned with CBDR.

COP30 initiated structured dialogue (UNFCCC–WTO–UNCTAD), signalling the start of formal governance of trade–climate interactions.

f. Strengthening NDCs: Next Major Frontline

Ahead of the 2025 update, countries were asked to align NDCs with 1.5°C through:

- Stronger mitigation commitments;
- Robust adaptation plans;
- Just transition strategies;
- Forest and land-use reforms;
- Concrete implementation frameworks.

The persistent ambition–implementation gap remains the Paris regime's central weakness.

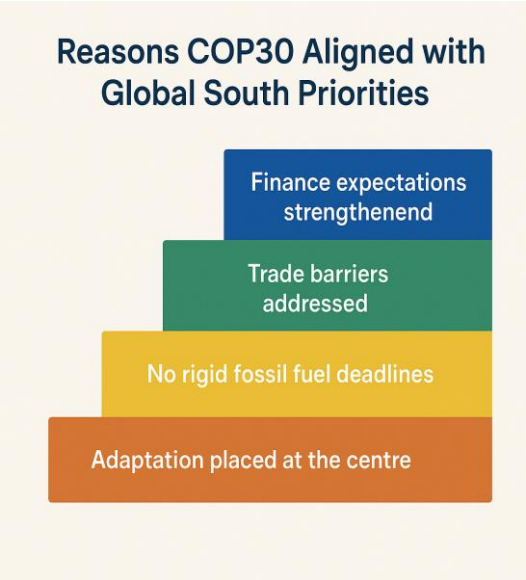
g. India's Position: Climate Justice as Non-Negotiable

India emphasised:

- No uniform fossil phase-out timelines due to energy needs and equity concerns;
- Priority on energy security, affordability, and developmental imperatives;
- Persistent global finance and technology deficits;
- Support for forest protection but with sovereignty safeguards;
- Strong reaffirmation of CBDR and climate justice, positioning India as a Global South leader.

h. Adaptation at COP30: Why It Became Central

Climate impacts are now present realities, not future risks. Developing nations stressed that without adaptation, lives, livelihoods, and development gains are endangered.



i. Tripling Adaptation Finance by 2035

A major political signal—non-binding but norm-setting. It enables scaling:

- Climate-resilient agriculture;
- Water and flood management;
- Coastal and urban resilience;
- Early-warning systems.

ii. Two-Year Review of Climate Finance Architecture

This review will shape the NCQG by addressing access, transparency, and balance between mitigation and adaptation.

iii. Advancing Just Transition Frameworks

COP30 broadened focus to people and regions affected by decarbonisation—worker retraining, social protection, and regional transition planning.

iv. Integrating Trade and Climate

Structured dialogue aims to prevent unilateral green trade measures from harming developing economies.

v. No Agreement on Fossil Phase-Out Timelines

Deep divides persist: developed countries seek rapid phase-out; developing nations stress energy access and CBDR.

i. Why COP30 Was Welcomed by the Global South

- Adaptation finally received equal political priority as mitigation.
- Recognition of national circumstances avoided unrealistic global deadlines.
- Pushback against protectionist trade measures gained formal space.
- Finance debates moved toward predictability and structural reform.

j. Persistent Challenges

- Chronic under-delivery of finance and slow multilateral access;
- Weak private sector participation in adaptation due to low returns;
- Complex trade–climate governance alignment;
- Lack of enforceability of commitments.

Conclusion

COP30 did not deliver dramatic headline pledges, but it accomplished something more foundational:

- A global forest roadmap,
- An equitable fossil transition roadmap,
- A structural elevation of adaptation,
- A reframed finance and trade debate,
- Clear signals for next-generation Nationally Determined Contributions (NDCs).

These moves give climate governance a structured, ethical, and inclusive direction. The challenge now is translating roadmaps into action—through finance delivery, system reform, and implementation on the ground. If implemented earnestly, COP30 may mark the beginning of a more equitable and resilient global climate order.

3. Rationalising Penalties under the Forest (Conservation) Act

a. Introduction

India's forests are central to climate resilience, ecological security, and community livelihoods. As the country expands its infrastructure and industrial capacity, forest land continues to be diverted for non-forest purposes. The Forest (Conservation) Act, 1980 — renamed in 2023 as the Van (Sanrakshan Evam Samvardhan) Adhiniyam — regulates this diversion by requiring prior central approval and imposing penalties when violations occur.

Over the years, however, penalties such as Compensatory Afforestation (CA) and Net Present Value (NPV) were applied inconsistently across states, creating ambiguity, inefficiency, and unequal treatment. The Forest Advisory Committee (FAC) now proposes a uniform, transparent, and rational penalty structure — shifting enforcement from discretionary and uneven practices to a science-driven, predictable, and ecologically meaningful system.

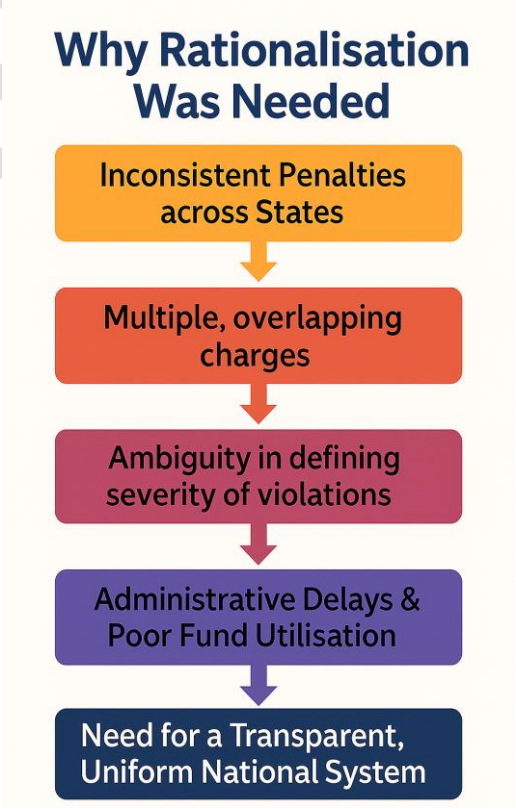
b. Background: Evolution of Penalties and Emerging Gaps

Since 1980, the Act has required project developers to compensate for forest diversion by undertaking afforestation or paying environmental charges. The 2023 amendment modernised the Act, clarified definitions, expanded categories of permissible activities, and strengthened the legal basis for penalties.
However, implementation remained uneven:

- States devised their own formulas for penal CA and NPV.
- Similar violations attracted different penalties across regions.
- Lack of standardisation weakened environmental accountability and delayed restoration efforts.
  The FAC's rationalisation effort responds to these long-standing inconsistencies by proposing a unified national framework.

c. Why Rationalisation Was Necessary

The push for reform stems from multiple structural and governance challenges:



i. Inconsistent Application of Penalties

Different states imposed penalties using varied formulas, resulting in unequal treatment and confusion among developers.

ii. Overlapping or Redundant Charges

In certain cases, violators paid under several overlapping heads, creating administrative complexity and potential over-penalisation.

iii. Ambiguity in Defining Severity

There was no clear basis for determining the gravity of different violations, leading to subjective penalty decisions.

iv. Administrative Inefficiencies

Varied state procedures delayed the collection and utilisation of penalty funds, slowing down ecological restoration.

v. Transparency and Predictability

A single national system enhances consistency, improves investor confidence, and makes enforcement easier to monitor both institutionally and publicly.

Overall, rationalisation was required to bring clarity, fairness, and ecological purpose to the penalty regime.

d. Key Recommendations of the Forest Advisory Committee (FAC)

The FAC proposes a structured, science-based penalty framework that standardises enforcement across India:

i. Uniform National Penalty Formula

A single formula for calculating penalties ensures consistency across all states, reducing ambiguity and discretion.

ii. Penal Compensatory Afforestation (Penal CA)

Violators must undertake plantation equal to the area misused — replacing earlier practices where some states required double the area.

iii. Linking Penal CA with Penal NPV

For serious or repeated violations:

- NPV may be charged up to five times the normal rate, ensuring proportionality and deterrence.
  This links ecological damage with a commensurate restorative obligation.

iv. Mandatory Reporting and National-Level Monitoring

States must periodically report violations, restoration actions, and penalty utilisation to the Centre.

v. Independent Oversight

A national committee comprising forest officials and independent experts will review compliance and guide best practices.

This framework integrates deterrence, fairness, and ecological restoration.

e. Significance of the Reform

The rationalisation is important for both governance and environmental protection:

i. Ensures Fairness and Uniformity

Similar violations now attract comparable penalties nationwide, ending arbitrary variations.

ii. Strengthens Deterrence

Predictable and proportionate penalties discourage illegal forest use.

iii. Improves Compliance

Developers are incentivised to follow due procedures to avoid punitive charges.

iv. Enhances Transparency

Standardised reporting and oversight enable public scrutiny and accountability.

v. Prioritises Ecological Restoration

The focus shifts from punitive revenue collection to restoring ecological function, reforestation, and ecosystem health.

This marks a transition from a penalty-driven system to one centred on restorative environmental governance.

f. Implementation Challenges

Despite its merits, several operational and ecological challenges must be addressed:

i. Limited Administrative Capacity

State forest departments often face staff shortages, inadequate funding, and weak technological infrastructure.

ii. Quality of Afforestation

Plantation alone does not guarantee ecological recovery. Survival rates, species diversity, soil health, and ecosystem function require careful monitoring.

iii. Centre–State Coordination

Forests fall under the Concurrent List, and cooperative federalism is crucial for consistent implementation.

iv. Potential for Legal Disputes

Developers may challenge penalties, delaying restoration processes.

v. Community Awareness and Participation

Local communities often remain unaware of afforestation obligations and cannot effectively monitor compliance.

Implementation, therefore, demands strong institutions, scientific expertise, and community engagement.

g. Way Forward: Building a Transparent and Ecologically Sound Penalty Framework

i. Publish Clear National Guidelines

A detailed manual linking types of violations with standard penalties enhances clarity for both regulators and developers.

ii. Technology-Driven Monitoring

Leverage:

- GIS mapping
- satellite imagery
- mobile dashboards
  to track diversion, afforestation progress, and survival rates in real time.

iii. Independent Audits

Universities, research institutions, and third-party experts should assess ecological outcomes rather than mere plantation numbers.

iv. Public Disclosure

An online portal should list violations, penalties imposed, funds collected, and afforestation progress, improving accountability and civic oversight.

v. Capacity-Building Measures

Training forest officers, panchayat-level institutions, and community groups in restoration ecology and digital tools can strengthen implementation.

This integrated approach ensures credibility, scientific grounding, and participatory governance.

Conclusion

The rationalisation of penalties under the Forest (Conservation) Act represents a pivotal shift from fragmented and inconsistent enforcement to a standardized, transparent, and ecology-oriented model of environmental governance.
By linking penalties directly to ecological restitution — through calibrated penal CA and NPV — the reform aligns development needs with conservation imperatives.

Its success will depend on institutional capacity, technological adoption, and community participation.
Ultimately, the new penalty regime reframes compliance as ecological accountability, ensuring that forest restoration becomes the true measure of governance effectiveness.

4. Aravalli Hills and the New 100-Metre Cutoff

a. Introduction

The Aravalli Range, among the world's oldest fold mountain systems, stretches from Gujarat to Delhi, shaping the ecology of western and northern India. Despite their modest elevations, especially near Haryana and Delhi, these ridges exert outsized environmental influence: they act as a barrier to desert winds, moderate regional temperatures, reduce dust transport, and sustain a biodiversity corridor connecting wildlife habitats such as Sariska, Ranthambore, Kuno and Jhalana.

In this context, the Union government's new policy—defining Aravalli hills only as landforms rising at least 100 metres above their immediate surroundings—marks a significant shift. The revised technical criterion alters which landforms receive legal protection and has prompted intense ecological and governance debates.

b. What the Policy Change Entails

The new threshold adopts a single-parameter definition: elevation alone, measured relative to surrounding terrain. Only landforms rising 100 metres or more qualify as Aravalli hills.

Earlier, the Forest Survey of India (FSI) applied a multi-dimensional scientific method, considering geological structure, slope, landform behaviour, and ecological function. Under that classification, even ridges as low as 20–30 metres were recognised because they had measurable influence on dust interception, groundwater recharge and habitat connectivity.

The shift from a landscape-based to a height-based definition will determine which landforms remain protected and which may become vulnerable to mining or real-estate development.

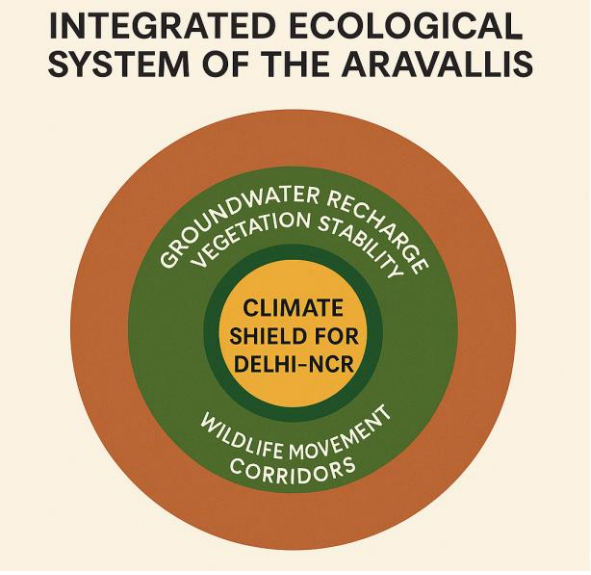
c. Why the New Cutoff Is Ecologically Problematic

i. Sharp Reduction in Recognised Hills

Internal FSI assessments suggest a dramatic contraction:

- Approx. 12,000 landforms were previously classified as part of the Aravalli system.
- Under the new rule, just over 1,000 qualify—an estimated 90% reduction.

Such a drastic narrowing removes ecological safeguards from large swathes of terrain that have historically served as the natural defensive belt of northern India.



ii. Undervaluing Low-Elevation Ridges

The ecological services of the Aravallis are not a function of height alone. Lower ridges (20–60 metres) are critical because:

- They trap coarse sand and heavy dust, preventing desert particles from drifting eastward.

- Higher hills then slow finer pollutants such as PM2.5, creating a layered dust-filtering system.
- These ridges preserve soil moisture, anchor vegetation, and prevent the eastward creep of aridity.

Removing them from protection disrupts this multi-tiered natural barrier, weakening the entire landscape irrespective of how many taller hills remain safeguarded.

iii. Increased Exposure to Mining and Construction

Once low ridges fall outside the notified definition, they become accessible to extractive and commercial interests. This entails:

- Intensified mining, which releases particulate matter and accelerates erosion.
- Construction-driven fragmentation, breaking ecological continuity and degrading recharge zones.
- Vegetation loss, reducing carbon sequestration, drying soils and amplifying heat stress.

Such degradation risks turning parts of the Aravalli zone into semi-arid pockets, undermining long-term regional resilience.

iv. Threats to Wildlife Movement and Genetic Health

The Aravallis form a continuous ecological chain that enables animal movement between major habitats. Shrinking protected areas can:

- Break corridors linking Sariska, Ranthambore, Kuno and Jhalana.
- Increase human–wildlife conflict as animals attempt to cross degraded or built-up patches.
- Reduce gene flow, leading to isolated populations and declining diversity.

Over time, this weakens species stability and undermines landscape-level conservation.

d. Implications for Delhi–NCR's Air Quality and Climate Stability

i. Rising Dust Load During Summer

The Aravallis act as a first line of defence against dust-laden winds from the Thar Desert. Lower ridges capture heavier particles; higher peaks disperse finer dust. If low ridges are altered or mined:

- More coarse dust will reach Delhi.
- Seasonal dust storms may intensify.
- PM2.5 and PM10 levels will rise during pre-monsoon months.

ii. Aggravation of Winter Pollution

Winter inversion already traps pollutants near the surface. Additional dust load from compromised ridges will:

- Deepen smog episodes.
- Increase re-suspension of soil dust due to vegetation loss.
- Push air quality readings further into the "severe–hazardous" range.

This undermines both public health and urban liveability, worsening Delhi-NCR's already precarious air-quality profile.

iii. Long-Term Desertification Risks

Removing low ridges compromises the ecological buffer against desert expansion. The consequences include:

- Accelerated erosion and soil degradation.
- Reduced agricultural productivity.

- Altered hydrology and declining groundwater recharge.
- Eastward movement of arid conditions from Rajasthan.

This could transform the region's environmental baseline over decades.

e. A More Balanced, Science-Based Alternative

A technical committee previously recommended a composite definition blending geomorphology and ecological function:

i. Key Elements of the Proposed Criteria

- Minimum 30-metre relative height,
- Slope of at least 4.5 degrees,
- Geological and geomorphic characteristics consistent with the Aravalli system.

ii. Advantages of This Approach

- Preserves both high hills and ecologically active lower ridges.
- Retains protection for approximately 40% of the Aravalli terrain—far more than the 8–9% retained under the 100-metre rule.
- Reflects the true behaviour of Aravalli landforms in dust blocking, groundwater recharge and biodiversity maintenance.
- Aligns legal classification with ecological performance rather than simplistic height metrics.

Conclusion

The new 100-metre cutoff treats the Aravallis as isolated physical structures rather than an interlinked ecological system. Their value lies not in height alone but in their collective ability to moderate climate, filter dust, stabilise soils and maintain wildlife corridors. A definition that excludes most low-elevation ridges risks weakening the entire ecological shield that protects Delhi-NCR and western India.

A sustainable policy framework must therefore be science-driven, ecosystem-based and function-oriented. Recognising the full spectrum of Aravalli landforms—low ridges, mid-slopes and higher peaks—is essential for ensuring the long-term environmental security and resilience of northern India.

5. New Rules for Sustainable Fisheries in India's Exclusive Economic Zone (EEZ)

a. Introduction

India's new Rules for Sustainable Harnessing of Fisheries in the Exclusive Economic Zone (EEZ) mark a decisive shift in national fisheries governance. Historically, deep-sea fishing policy oscillated between conservation concerns and demands for industrial expansion. The new framework introduces a more balanced paradigm that foregrounds scientific regulation, traceability, and equitable access, especially for traditional fishing communities.

By prioritising cooperatives, Self-Help Groups, and Fish Farmer Producer Organisations (FFPOs) over large private fleets, the rules attempt to correct decades of structural imbalance. They embed sustainability within the broader vision of India's Blue Economy, ensuring that ocean resources are harvested responsibly while empowering coastal livelihoods.

b. Background: Why India Needed a New Deep-Sea Fisheries Regime

i. The Scale and Potential of India's EEZ

Under UNCLOS (1982), India exercises sovereign rights over a massive 2.02 million sq. km EEZ, half of which surrounds the island territories. Yet, over 85% of fishing effort remains confined to nearshore waters, leading to:

- Overexploitation of shallow ecosystems, and
- Underutilisation of offshore resources such as tuna, billfish, and oceanic squid.

ii. Importance of Deep-Sea Fishing for Sustainability and Growth

Deep-sea fishing allows India to:

- Shift pressure away from overfished coastal stocks,
- Tap high-value export species,
- Reduce conflicts among coastal users, and
- Expand the Blue Economy through value-added processing, cold chain integration, and global market access.

iii. Government Push for Modernisation and Ecological Alignment

Reforms reflect the convergence of national initiatives:

- PM Matsya Sampada Yojana (PMMSY): infrastructure, vessel upgradation, modern landing centres.
- India's Blue Economy Policy Framework (2021): integration of ecological protection with maritime economic strategies.

India's earlier regulatory structure lacked uniformity, scientific basis, and mechanisms for equitable access — gaps this new framework seeks to address.

c. Core Features of the New EEZ Fisheries Rules: Embedding Science, Traceability, and Equity

i. Science-Driven Regulatory Objective

Fishing rights, effort allocation, and vessel approvals are now tied to scientific assessments and ecosystem-based management to maintain long-term stock health.

ii. Prioritisation of Cooperatives and FFPOs

By reserving rights primarily for community-based organisations, the rules:

- Democratised access to deep-sea resources,
- Prevent concentration of marine wealth, and
- Strengthened bargaining power of small fishers in value chains.

iii. Clear Definition of "Operator"

Recognising individuals, firms, and cooperatives ensures accountability and enables graded compliance mechanisms.

iv. Mother-and-Child Vessel System

The adoption of transhipment models improves fuel efficiency, enhances safety, and enables longer voyages — crucial for offshore fisheries.

v. Ban on Destructive Methods

Prohibitions on LED fishing, pair trawling, bull trawling, etc., safeguard juvenile fish, benthic habitats, and coral ecosystems.

vi. Mandatory Catch Certification

Through the Marine Products Export Development Authority (MPEDA), certification ensures:

- Food safety,
- Traceability along the supply chain, and
- Compliance with EU and US import norms — raising India's export competitiveness.

vii. Digital Registration and Monitoring (ReALCRaft Portal)

GPS-based vessel tracking closes loopholes that historically enabled Illegal, Unreported, and Unregulated (IUU) fishing.

viii. Minimum Legal Size (MLS) Regulations

MLS norms align with biological reference points, allowing maturation cycles to complete and natural replenishment of stocks.

ix. Fisheries Management Plans (FMPs)

Region-specific FMPs institutionalise:

- Seasonal closures,
- Gear restrictions, and
- Effort optimisation.

x. Skilling and Modernisation of Traditional Fishers

Training promotes navigation safety, hygienic handling, and quality maintenance — enabling fishers to integrate with global supply chains.

xi. Promotion of Mariculture

Mariculture and seaweed farming diversify livelihoods, reducing dependence on capture fisheries and improving climate resilience.

d. Significance: Strengthening India's Blue Economy while Advancing Social Justice

i. Blue Economy Expansion

Science-based harvesting prevents stock collapse, enabling sustained export growth and long-term viability of marine industries.

ii. Empowerment of Traditional and Small-Scale Fishers

By recognising cooperatives as key actors, the policy strengthens community stewardship and reduces corporate monopolisation.

iii. Environmental Integrity

Bans on destructive gear, adherence to MLS, and data-driven management preserve coral reefs, spawning grounds, and pelagic species.

iv. Global Competitiveness through Traceability

Certification and digital monitoring ensure India meets strict global quality norms — essential amid rising scrutiny from EU/US regulators.

v. Evidence-Based Governance

Reliable data on catch, effort, and stock health shifts policy from ad-hoc decision-making to scientifically aligned management.

vi. Livelihood Security and Diversification

Mariculture and seaweed farming stabilise incomes and reduce vulnerability to fluctuating marine stocks.

e. Challenges: Implementation Complexity in a Fragmented Governance Landscape

i. Monitoring and Enforcement

India's EEZ is vast, vessel numbers high, and inter-agency coordination remains weak. Real-time surveillance capacity is limited.

ii. Economic Constraints for Cooperatives

Deep-sea vessels require significant capital investment. Limited access to credit, insurance, and technology marginalises small players without targeted support.

iii. Climate-Induced Uncertainty

Ocean warming, acidification, and current shifts disrupt migratory patterns, complicating stock prediction and management.

iv. Data Gaps and Institutional Fragmentation

Fisheries governance involves centre, states, research agencies, and coastal authorities — often operating with inconsistent datasets.

v. Digital Literacy and Awareness

Traditional fishers face barriers in adopting GPS tracking, certification processes, and electronic documentation.

f. Way Forward: Building a Coherent, Science-Led, and Community-Centered Fisheries Regime

i. Establishing a National Deep-Sea Fisheries Authority

A specialised authority can integrate regulation, scientific research, monitoring, and inter-state harmonisation.

ii. Financial and Technological Enablement

Subsidised credit, vessel modernisation schemes, and affordable insurance can help cooperatives compete with industrial fleets.

iii. Strengthening Scientific Research

Regular stock assessments, habitat mapping, and ecosystem monitoring are essential for setting quotas and seasonal closures.

iv. Advancing Digital Traceability

Expanding satellite monitoring, onboard sensors, and AI-enabled reporting strengthens compliance and international credibility.

v. Capacity Building and Market Integration

Training modules under PMMSY must go beyond navigation — covering handling, storage, certification, and value-addition.

vi. Alignment with Global Commitments

The rules operationalise SDG-14 (Life Below Water), linking conservation with livelihood security and sustainable economic use.

Conclusion

The new EEZ Fisheries Rules signal a transformative change in India's marine governance — shifting from open-access exploitation to scientific stewardship grounded in community rights. By embedding sustainability, equity, and traceability in regulatory design, India is moving towards a Blue Economy model that protects marine ecosystems while empowering coastal communities.

This reform recognises that sustainable fisheries are not merely an economic sector but a foundation of ecological balance, nutritional security, and coastal dignity. Ensuring effective implementation will determine whether India can truly achieve the dual goals of prosperity and planetary health.

6. Tropical Forest Forever Facility (TFFF): Rethinking Global Finance for Forest Conservation

a. Introduction

Tropical forests anchor the global climate system: they store massive volumes of carbon, regulate rainfall at continental scales, host extraordinary biodiversity, and sustain millions of indigenous and forest-dependent communities. Yet, they continue to be cleared for agriculture, mining, logging, infrastructure and speculative land use.

The Tropical Forest Forever Facility (TFFF) is a proposed global financing mechanism that attempts to correct a fundamental economic distortion: deforested land has immediate monetary value; intact forests, though ecologically priceless, rarely do.

The core idea of the TFFF is therefore simple but radical:

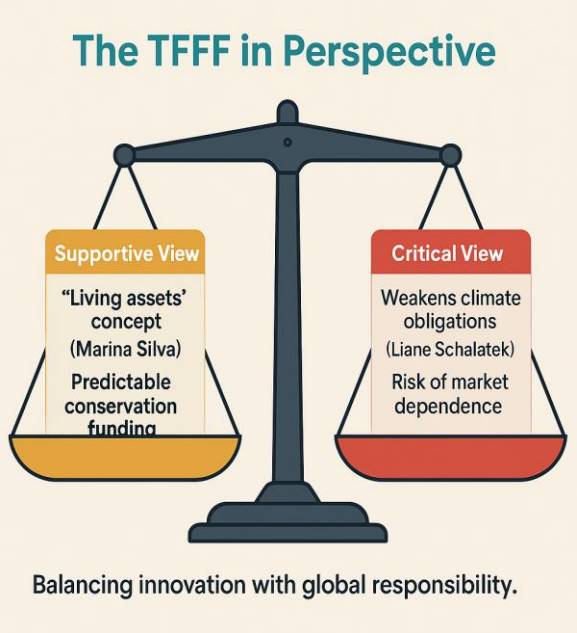
Make a living forest financially more valuable than a cleared forest.

By providing long-term, predictable payments to tropical countries that maintain or expand forest cover, the TFFF seeks to turn forest conservation from a moral plea into an economically rational choice for developing economies.

b. Why a New Mechanism Was Needed

Existing climate finance instruments such as the Green Climate Fund (GCF) or REDD+ have delivered mixed results and suffer from recurring structural weaknesses:

- **Unreliable, short-term finance**
  Pledges are often tied to political cycles in donor countries, leading to delays, uncertainty and frequent under-delivery.
- **Perverse incentive structure**
  Immediate profits from clearing forests (for crops, cattle, mining or timber) outweigh delayed, fragmented, and bureaucratically disbursed conservation finance.
- **High transaction and procedural costs**
  Complex MRV (measurement, reporting, verification) requirements and lengthy negotiations discourage many forest nations.



- **Limited scale and continuity**
  Funding windows are episodic and project-based rather than continuous and systemic, which makes long-term commitments difficult for forest countries.

The TFFF attempts to invert this logic by tying a stable flow of finance directly to verifiable forest cover outcomes, and by structuring the facility as a permanent, investment-backed global fund rather than a traditional donor-driven pool.

c. Design and Structure of the TFFF

The TFFF is conceived as a self-financing, long-term facility with a global pool of capital whose investment returns are used to reward forest conservation.

i. Objective and Scope

- **Primary Goal:**
  Provide ongoing financial incentives to tropical countries for conserving and enhancing forest cover.
- **Geographic Coverage:**
  Around 70–75 tropical forest countries across South America, Africa, and Asia — including Brazil, Indonesia, the Democratic Republic of Congo, and India (notably the Western Ghats and Andaman forests).

ii. Financing Model

- **Target Corpus:**
  Approximately USD 125 billion:
  - ~USD 25 billion from governments and philanthropies,
  - ~USD 100 billion from private investors.
- **Investment Strategy:**
  Capital is invested in relatively safe financial assets (e.g., government and high-grade corporate bonds).
  - The principal remains intact.
  - Annual returns (interest and yields) form the pool for payments to forest nations.

This design aims to convert conservation into a perennial income stream, independent of constantly renewed pledges.

iii. Performance-Based Payments

- **Monitoring Tool:**
  Independent satellite-based assessment of forest cover change, with annual verification.
- **Payment Logic:**
  Countries that maintain or expand their forest cover receive payouts proportionate to results, enabling a direct link between conservation performance and financial reward.
- **Key Supporters (Political Backing):**
  The early political momentum reportedly comes from countries like Brazil, Indonesia, Colombia, with support from Norway and some European states, signalling interest from both forest-rich and traditionally climate-ambitious nations.

In essence, the TFFF moves from a charity-based conservation model to a market-linked investment mechanism, positioning forests as long-term productive assets.

d. Significance: Environmental, Economic and Political Dimensions

i. Environmental Significance

- Helps preserve major carbon sinks and biodiversity hotspots.

- Supports global efforts to limit warming by discouraging large-scale forest conversion.
- Encourages long-term stewardship rather than short-term, project-bound conservation.

ii. Economic Significance

- Transforms conservation into a profitable and predictable fiscal option for forest nations.
- Offers an alternative to revenue based on logging, plantations or mining, thereby realigning incentives in favour of ecological protection.

iii. Global Climate Justice and Equity

- Recognises that tropical forests generate global public goods (carbon storage, rainfall stabilisation, biodiversity) for which forest countries often receive little compensation.
- Moves closer to the principle that those who protect global commons deserve structural financial rewards, not just ad hoc grants.

iv. Sustainability and Predictability of Finance

- By using investment returns rather than episodic contributions, the TFFF aims to become financially self-sustaining.
- Less dependent on donor-country domestic politics, offering forest nations longer planning horizons.

v. Transparency and Accountability

- Satellite monitoring and clear performance metrics can make payment decisions verifiable and less politicised, increasing credibility.

e. Criticisms and Structural Concerns

Despite its innovation, the TFFF has attracted serious criticism, highlighting deep tensions in global climate finance.

i. Exposure to Financial Market Volatility

- Since the TFFF corpus is invested in global financial instruments, returns are vulnerable to market cycles, crises, and interest-rate shocks.
- In years of poor returns, conservation payouts may shrink even if forest cover is maintained, making the mechanism unstable for recipient countries.

ii. Operating Outside the UN Climate Architecture

- The TFFF is not formally anchored in the UNFCCC or Paris Agreement regime.
- Critics argue it could become a way for some developed countries to claim "climate credit" via private or blended investments without fulfilling their public climate finance obligations under Paris.

iii. "Financialisation of Nature"

- Turning forests into financial assets risks:
    - Prioritising profitability metrics over ecological integrity,
    - Treating conservation success primarily as an investment performance issue rather than an ethical and ecological imperative.

iv. Power Imbalance and Governance Risks

- With large private investors involved, there is concern that decision-making in the facility could skew towards financial actors, marginalising:
    - Community voices,
    - Indigenous rights,
    - Local priorities.

v. Uncertain and Asymmetric Risk Distribution

- Forest countries bear the political and socio-economic cost of restricting deforestation.
- But if returns collapse due to external financial shocks, they may still receive reduced payouts, effectively shouldering conservation obligations without stable compensation.

f. Expert Views: Innovation vs Accountability

- **Supportive View (e.g., Marina Silva, Brazil)**
    - Sees the TFFF as a bold recognition of forests as "living assets" providing continuous ecosystem services.
    - Welcomes the prospect of a steady, predictable funding stream in place of fragmented donor finance.
- **Critical View (e.g., Liane Schalatek, climate finance analysts)**
    - Warns that the TFFF could dilute the binding responsibility of developed countries to provide public climate finance.
    - Argues that bypassing UNFCCC mechanisms risks weakening global accountability.

These competing perspectives encapsulate the core debate: Can innovative finance complement global climate obligations, or will it become a device to sidestep them?

g. Analytical Perspectives

i. Economic Lens

- **Strength:**
  Uses financial markets to generate perpetual flows for conservation, and internalises the global value of forests into country-level fiscal decisions.
- **Risk:**
  Links forest protection to the health of global capital markets, making climate finance vulnerable to financial crises and interest-rate cycles.

ii. Ethical and Philosophical Lens

- Raises the question:

Should the survival of ecosystems depend on whether they can generate competitive financial returns?

- Purely market-based valuation may undervalue:
    - Cultural and spiritual ties of indigenous communities,
    - Intrinsic ecological worth beyond carbon and financial metrics.

iii. Governance and Equity Lens

- Success hinges on:
    - Transparent rules,
    - Strong safeguards for indigenous and local communities,
    - Fair and equitable benefit-sharing within forest nations.
- Without this, TFFF could become another top-down, investor-driven instrument, reproducing existing power asymmetries in climate governance.

iv. Political and North–South Lens

- The TFFF strengthens bargaining power of tropical countries, who can now demand explicit financial recognition of their stewardship.
- But if it is used as a substitute for, rather than a complement to, public climate finance, it may erode the principle of "common but differentiated responsibilities" under the Paris framework.

h. Way Forward: Making TFFF Credible and Just

For the TFFF to contribute meaningfully to global climate action and justice, several safeguards and design improvements are crucial:

- **Anchoring within Global Climate Governance**
    - Integrate or formally align the TFFF with UNFCCC/Paris Agreement mechanisms, ensuring that it supplements, not replaces, developed countries' finance obligations.
- **Financial Risk Management and Floor Guarantees**
    - Create stabilisation funds, guarantees, or insurance mechanisms to buffer forest payments against financial downturns.
    - Consider minimum guaranteed payouts to avoid penalising forest nations for external market shocks.
- **Robust Community and Indigenous Inclusion**
    - Ensure meaningful participation of indigenous peoples and local communities in decision-making.
    - Mandate benefit-sharing frameworks at national and sub-national levels.
- **Blended Finance, Not Purely Market-Driven**
    - Combine TFFF's investment-based returns with public grants and traditional conservation funding to diversify risk and uphold climate justice.
- **Transparency and Public Accountability**
    - Public dashboards, annual audits, and open reporting of:
        - Investment portfolios,
        - Returns generated,
        - Criteria and amounts of payments to countries.
- **Strong Social and Environmental Safeguards**
    - Clear safeguards against dispossession, land grabs, or exclusion of communities in the name of conservation.
    - Protection of non-carbon values of forests (biodiversity, cultural landscapes, livelihoods).

Conclusion

The Tropical Forest Forever Facility represents a striking attempt to re-engineer the economics of forest conservation. By tying long-term financial rewards to the protection of tropical forests, it reframes conservation as a rational, revenue-generating choice rather than a costly sacrifice demanded of developing countries.

If designed and governed well, the TFFF could:

- Provide stable, large-scale finance for conserving vital ecosystems,
- Enhance global climate equity by compensating forest stewards, and
- Encourage a shift from short-term extraction to long-term ecological stewardship.

However, without strong safeguards, public oversight, and alignment with UN climate commitments, the TFFF risks commodifying nature, amplifying financial and political power imbalances, and weakening existing obligations of developed countries.

For the TFFF to truly live up to its name — ensuring that tropical forests remain alive, thriving, and "forever" — it must marry financial innovation with ecological ethics, social justice, and robust global governance.

GS Paper III: Science and Technology

1. India's AI Governance Guidelines (2025): Adaptive Regulation for an Ethical, Innovative Future

a. Introduction

Artificial Intelligence has moved from being a niche technology to a structural force shaping how governments function, markets operate, and citizens live. In India, AI now informs welfare targeting, credit scoring, recruitment, predictive policing, medical diagnostics, infrastructure planning, and digital communication. This brings transformative opportunities — but also systemic risks: deepfakes undermining trust, opaque algorithms embedding bias, intrusive data practices threatening privacy, and automated decisions affecting rights without clear accountability.

To respond, the Ministry of Electronics and Information Technology (MeitY) has issued AI Governance Guidelines (2025) — a principled, adaptive, and human-centric framework for responsible AI. Importantly, India has not rushed to enact a separate, rigid AI statute. Instead, it has chosen to work within and gradually adapt its existing legal architecture — chiefly the Information Technology Act, 2000 and the Digital Personal Data Protection (DPDP) Act, 2023 — while adding institutional, ethical, and risk-management layers.

The underlying philosophy is two-fold:

- "Do No Harm" — AI must not inflict physical, psychological, or social harm.
- "Regulate through evolution, not pre-emptive rigidity" — the law should learn and adapt as the technology evolves.

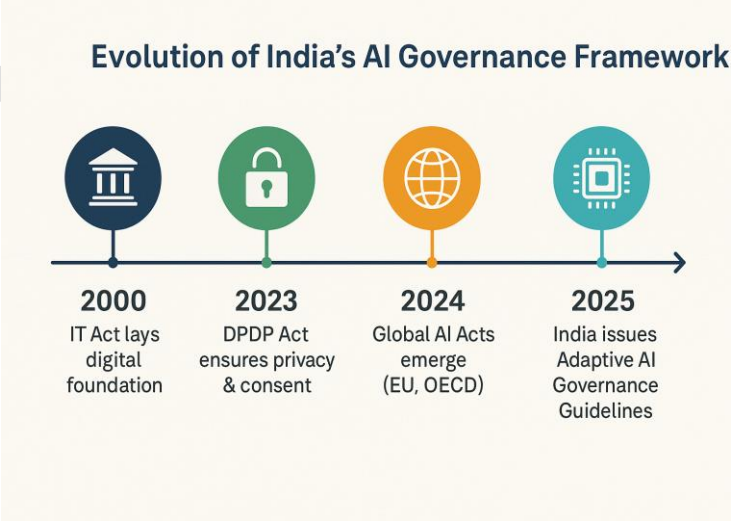
India thus positions itself on a middle path between the EU's highly prescriptive AI Act and the largely market-led, sectoral approach of the US — aiming to protect citizens without stifling innovation.

b. Why AI Governance Became Urgent

i. High-Stakes Public Decision-Making

AI is now embedded in core state functions:

- Welfare delivery: Beneficiary identification, fraud detection, targeting of subsidies.
- Policing and internal security: Predictive policing, hotspot mapping, facial recognition, crime analytics.
- Infrastructure and urban management: Monitoring assets, prioritising repairs, traffic and resource optimisation.



Without safeguards, these uses can entrench bias, enable over-surveillance, or create opaque decision systems that citizens cannot understand or challenge.

ii. Generative AI and the Deepfake Challenge

Text, image, and video generation tools can create:

- Convincing but false political messages,
- Morphed images and videos targeting individuals and communities,

- Misleading narratives that spread faster than fact-checking.

This threatens electoral integrity, public order, and trust in information ecosystems — making content authentication and media literacy central to governance.

iii. Sensitive Government and Citizen Data

Officials increasingly experiment with AI tools — including foreign or commercial models — to draft documents, analyse data, or summarise reports. Without clear guidance, this can lead to:

- Uploading confidential government data to external systems,
- Sharing personal data of citizens beyond authorised purposes,
- Exposure of classified or strategic information.

iv. The Limits of Static, One-Time Legislation

Traditional law-making struggles with technologies that evolve in months rather than decades. A rigid, one-size-fits-all AI law risks:

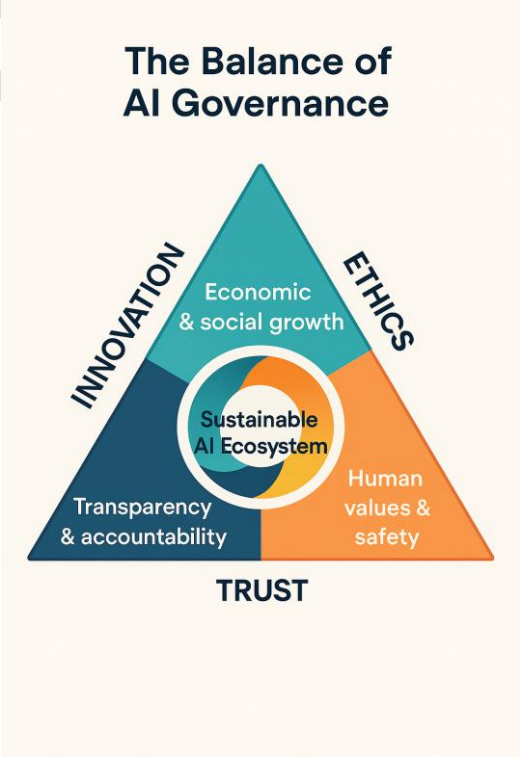
- Becoming quickly outdated, or
- Over-regulating legitimate innovation.

India's choice, therefore, is to strengthen and reinterpret existing frameworks, while instituting flexible, iterative, sector-specific guidance and institutional oversight.

c. Core Architecture of the 2025 AI Governance Guidelines

India's AI framework can be understood along two axes:

- Adaptive legal–institutional design
- Operational pillars for safe and trustworthy AI



Adaptive Legal–Institutional Design

- **No Standalone AI Law (for now)**
  - AI is governed through updated interpretations of the IT Act, DPDP Act, and sectoral regulations (RBI, SEBI, IRDAI, health regulators, etc.).
  - This preserves regulatory agility as technology, risks, and global norms evolve.
- **Continuous Legal Review**
  Existing laws will be periodically examined for AI-specific gaps relating to:
  - Liability and redress for AI-caused harm,
  - Transparency and explainability requirements,
  - Platform responsibility,
  - Data governance, consent, and purpose limitation in AI training.
- **Institutional Structure and Coordination**
  - An AI Governance Group (AIGG) under MeitY is envisaged as a central coordination body to:
    - Monitor emerging AI risks,
    - Issue advisories and guidelines,
    - Work with sectoral regulators,

        - Recommend targeted legal amendments.
    - An AI Safety Institute (AISI) is proposed to:
        - Conduct safety evaluations and audits,
        - Maintain incident databases,
        - Develop risk assessment methodologies.

Together, these institutions are meant to avoid regulatory fragmentation and create a whole-of-government response rather than isolated departmental approaches.

Six Operational Pillars of the Guidelines

i. Risk Management

AI systems are assessed and governed according to their potential to cause harm, not merely their technical features.

- National AI Risk Assessment Framework: standardises how risk is identified and classified.
- AI Incident Database: records safety failures, misuse cases, and ethical violations for learning and regulatory response.

This shifts governance from reactive firefighting to anticipatory regulation.

ii. Content Authentication and Integrity

To combat deepfakes and synthetic media:

- Mandated or strongly encouraged watermarking, labelling, or traceability for AI-generated content.
- Platform-level tools to detect and flag synthetic content.

The aim is to preserve informational trust, which is essential for democratic debate and social stability.

iii. Accountability and Liability

The Guidelines recognise that AI is not "neutral" and require clear responsibility chains:

- A graded liability model is envisaged, with stricter obligations for high-risk applications (e.g., healthcare, policing, credit scoring).
- Both developers (those who design and train models) and deployers (those who integrate AI into services) are expected to share responsibility across the AI lifecycle.

This is a conceptual shift from "blame the user" to system-level accountability.

iv. Infrastructure and Data Sovereignty

India aims to reduce dependence on foreign AI ecosystems by investing in:

- AIKosh – a national repository of curated datasets, including Indian languages and local-context data.
- Domestic GPU and compute infrastructure for training and deployment.
- Integration of AI capabilities with Digital Public Infrastructure (DPI) such as Aadhaar, UPI, DigiLocker, and other open APIs.

This supports technological sovereignty, reduces geopolitical vulnerability, and democratises AI access for Indian startups and researchers.

v. Capacity Building and Awareness

The Guidelines treat capacity as a prerequisite for effective regulation:

- Training modules and programs for bureaucrats, police, regulators, and judiciary.

- AI-related curriculum for students and professionals.
- Public awareness campaigns on deepfakes, misinformation, privacy, and safe AI practices.

Without an AI-literate state and citizenry, even well-designed rules remain ineffective.

vi. Institutional Coordination

Given AI's cross-sectoral nature:

- The AIGG is envisioned as a nodal coordination layer between MeitY, data protection authorities, and sectoral regulators.
- The AISI acts as a technical backbone for safety evaluation and standard-setting.

This seeks to ensure that India's AI response is coherent, not fragmented.

d. Ethical and Governance Principles: The Normative Spine

India's AI framework is explicitly value-laden.

- **Do No Harm**
  AI must avoid physical, psychological, and social harm, especially to vulnerable individuals and communities.
- **Trust and Reliability**
  Systems must be robust, secure, and predictable; users should be able to rely on outcomes.
- **Equity and Non-Discrimination**
  AI should minimise bias and prevent discriminatory outcomes on the basis of caste, gender, religion, region, or socio-economic status.
- **Transparency and Understandability**
  - Users must know when they are interacting with AI.
  - For high-stakes decisions, AI should be explainable in a way that affected persons can understand and challenge if necessary.
- **Privacy by Design and Data Protection**
  AI architectures should embed:
  - Purpose limitation,
  - Data minimisation,
  - Security safeguards,

  in line with the DPDP Act.
- **Accountability and Redress**
  Clear allocation of responsibility among developers, deployers, and institutional users, with mechanisms for remedy when harm occurs.
- **Safety, Resilience, and Security**
  Systems must be tested against adversarial attacks, misuse, and systemic failures.
- **Sustainability and People-Centricity**
  AI should support human and environmental well-being, not merely efficiency or profit.

These principles anchor AI within constitutional morality, democratic values, and human rights, ensuring technology remains a means, not a master.

e. Strengths and Gaps of India's "Middle-Path" Approach

i. Strengths

- **Flexibility and Agility**
  Avoids locking AI innovation into outdated legal definitions; rules can be revised as risks and technologies emerge.

- **Innovation-Friendly**
  Encourages experimentation and startup participation, including through ideas like regulatory sandboxes where AI can be tested in controlled environments.
- **Context-Sensitive**
  Designed around India's socio-economic diversity, digital inclusion goals, and multilingual reality.
- **Sovereignty-Focused**
  Emphasis on domestic compute, datasets, and DPI ensures India is not merely a consumer of foreign AI systems.

ii. Key Limitations and Risks

- **Lack of Statutory Force (for now)**
  Guidelines alone may be insufficient to deter serious violations or shape powerful private actors' behaviour.
- **Ambiguities in Liability**
  No settled standard yet for allocating responsibility when autonomous systems cause harm.
- **Over-Reliance on Voluntary Compliance**
  Soft-law tools work in early phases, but high-risk applications may require binding obligations and sanctions.
- **Fragmented Regulatory Landscape**
  AI touches domains regulated by RBI, SEBI, IRDAI, TRAI, health regulators, etc. Coordination remains a practical challenge.
- **Dependence on Foreign Models and Infrastructure**
  Despite AIKosh and domestic GPU plans, India currently relies on global AI ecosystems — with implications for data sovereignty and bargaining power.

f. Comparison with Global Models

Region	Approach	Key Features
European Union	Strict, risk-based AI Act	Detailed classifications, heavy compliance burdens, strong penalties
United States	Market-led, sectoral guidance	Innovation-first, fragmented, limited federal regulation
India	Adaptive, ethics-driven middle path	Builds on existing laws, emphasises flexibility, ethics, and infrastructure

India's model is thus pragmatic and evolutionary, aiming to learn from both extremes while tailoring regulation to its development and inclusion priorities.

g. The Way Forward: From Guidelines to a Mature AI Governance Ecosystem

i. Toward a Dedicated AI Law (When Ready)

In the medium term, a specialised AI statute may be needed to:

- Codify rights and protections for individuals,

- Clarify duties of developers and deployers,
- Create formal grievance and redress mechanisms,
- Lay down clear standards for high-risk AI systems.

However, India intends to move toward this only once institutional capacity and risk understanding are more mature.

ii. Sectoral AI Ethics and Oversight Boards

Especially for high-risk uses, India can institute ethics boards or oversight mechanisms in:

- Policing and surveillance,
- Healthcare and genomic data,
- Financial services and credit scoring,
- Welfare administration,
- Education and exams.

These bodies can vet algorithms, review datasets, and examine outcomes from a human-rights perspective.

iii. Clarifying Liability and Redress

India needs a clear liability framework that answers:

- Who is responsible when an AI tool discriminates or makes an erroneous high-stakes decision?
- How should responsibility be apportioned between model creators, deployers, and end-user institutions?
- What remedies are available to affected individuals?

iv. National AI Ethics Code and Technical Standards

A cross-sector AI Ethics Code, backed by technical standards on:

- Fairness testing,
- Explainability benchmarks,
- Robustness and security checks,
- Documentation requirements,

would make ethical guidelines operational for developers and regulators.

v. Regulatory Sandboxes and Graded Regulation

For innovation-heavy sectors (fintech, health-tech, ed-tech, mobility):

- Regulatory sandboxes can allow controlled experimentation.
- Graded regulation can impose heavier scrutiny and compliance for high-risk applications while easing norms for low-risk use-cases.

vi. Inter-Institutional Coordination

A strong coordination mechanism linking:

- MeitY and AIGG,
- DPDP Board and data protection authorities,
- Sectoral regulators (RBI, SEBI, IRDAI, TRAI, health regulators),
- Competition Commission and judiciary,

is essential to avoid regulatory gaps or overlaps.

vii. Deepening Local Innovation and Compute Capacity

India must:

- Support Indian-language models and low-resource AI,
- Scale domestic compute capacity to reduce dependency,
- Promote indigenous foundational models aligned with Indian values and conditions.

viii. Public Literacy and Democratic Resilience

Citizen-facing initiatives on:

- Identifying deepfakes,
- Understanding algorithmic recommendations,
- Protecting one's data and privacy,

are critical to prevent AI from becoming a tool for mass manipulation.

ix. Global Norm-Building

India can project its model through:

- G20,
- UNESCO and OECD platforms,
- The Global Partnership on AI (GPAI),

emphasising equitable access, safety, and inclusion, especially for the Global South.

Conclusion

India's AI Governance Guidelines (2025) mark a pivotal moment in the evolution of its digital state. By choosing adaptive regulation over premature codification, and grounding AI in ethics, accountability, and human-centricity, India is attempting a difficult but crucial balancing act: enabling innovation while protecting rights; expanding digital capability while preserving trust.

The real test now lies in implementation — building institutional capacity, closing enforcement gaps, coordinating regulators, and eventually translating soft principles into a mature legal and governance architecture. If successful, India's model could emerge as a template for democratic, developmental, and inclusive AI governance, offering a credible alternative to both over-regulation and unregulated technological dominance.

2. India's Proposal for a Global Compact on Artificial Intelligence

a. Introduction

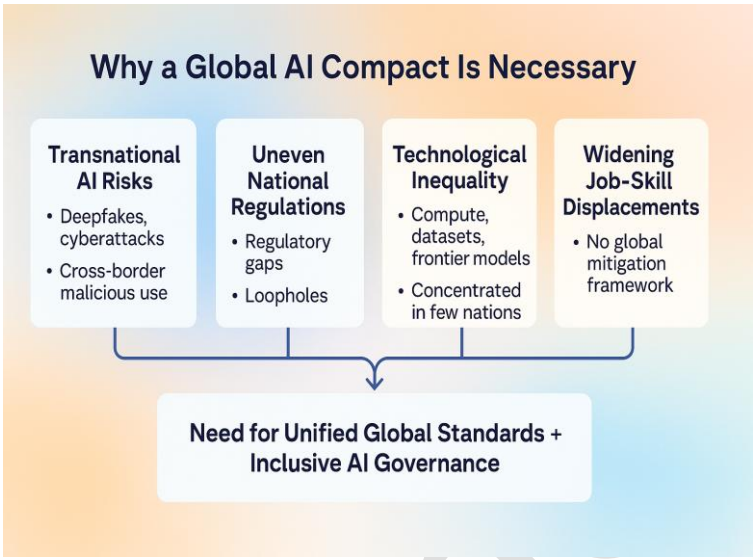
Artificial intelligence has rapidly evolved from a niche technological tool to a system-shaping force influencing healthcare, agriculture, financial markets, information flows and national security architectures. Yet the same capabilities that promise efficiency and inclusion also enable misinformation, deepfakes, cyber-enabled fraud, automated propaganda, and large-scale manipulation of public opinion.
This duality makes AI a structural global challenge—akin to nuclear governance or climate change—requiring norms that transcend national boundaries.

Against this backdrop, India proposed a Global Compact on Artificial Intelligence at the G20: a framework of shared principles and cooperative commitments to ensure that AI remains safe, human-centric and development-oriented.

b. The Underlying Challenge: Concentration of Power, Diffusion of Risks

AI today reflects a sharp asymmetry: a handful of technologically advanced countries and private corporations control computational resources, frontier models and large datasets. This concentration influences:

- Who sets global standards,
- Who accesses foundational technology, and
- Who benefits economically from AI systems.



At the same time, the harms diffuse globally:

- Deepfakes erode trust in institutions and elections,
- AI-enabled scams reinforce organised cybercrime,
- Propaganda at scale distorts democratic discourse,
- Malicious actors weaponise AI tools beyond borders.

Such risks challenge the adequacy of purely national regulation and underscore the need for multilateral coordination.

c. Why a Global Compact Is Necessary

AI already affects domains governed through global frameworks—aviation, climate, nuclear safety—yet current AI governance remains fragmented, uneven and largely voluntary. A global compact becomes essential because:

i. The Risks Are Transnational

Malicious models, disinformation, or automated cyberattacks can traverse borders in seconds, overwhelming unilateral national responses.

ii. National Regulations Alone Cannot Close Global Loopholes

Divergent standards create regulatory arbitrage: harmful actors gravitate toward jurisdictions with weak oversight.

iii. Growing Inequality in Access to AI Inputs

Unequal distribution of compute, datasets, and skilled human capital risks excluding developing economies from the AI revolution.

iv. Labour Displacement Will Be Global

Skill gaps, disrupted labour markets and unequal benefits require coordinated strategies rather than isolated national solutions.

Thus, a compact would serve as a minimum common denominator of global safety, ethics and equity.

d. India's Proposed Foundational Principles

India's framework emphasises safety, accountability and inclusiveness, rooted in the idea that technological progress must reinforce—not undermine—human dignity.

i. Human Oversight as a First Principle

AI must remain an assistive tool.
Sectors involving rights, security or public welfare—healthcare, law enforcement, finance—require accountable human judgment, ensuring that automation does not override responsibility or fairness.

ii. Safety-by-Design

Risk assessments, impact testing, secure data governance and embedded fail-safes must be part of model development. This shifts the burden from reactive regulation to preventive architecture.

iii. Transparency and Auditability

Public trust depends on the ability to scrutinise AI systems.
India advocates:

- Explainable models,
- Independent audits,
- Traceability in sensitive decision-making.

This aligns safety with democratic oversight.

iv. Prohibiting Harmful and Destabilising Uses

India proposes clear norms against AI applications that undermine security or societal stability, including:

- Deepfake-driven misinformation,
- Automated political manipulation,
- AI-enabled cybercrime,
- Tools aiding extremist or terrorist networks.

v. Ensuring Open, Inclusive AI Ecosystems

To prevent a monopolistic digital order, India emphasises:

- Open-source foundational models,
- Affordable compute access,
- Collaborative innovation platforms,
- Support for developing countries to build sovereign AI capacity.

This counters the concentration of AI power and promotes global digital equity.

e. India's Broader Strategic Vision for AI

India's proposal is anchored in a dual approach—domestic empowerment and international equity.

i. Domestic Priorities

- India-AI Mission to expand national compute infrastructure,
- AI tools for multilingual inclusion,
- Public-sector AI for rural governance, agriculture and service delivery,
- Massive skills and capacity-building programmes for the future workforce.

ii. Global Priorities

- Frameworks for skilled labour mobility,
- Enabling developing countries to adopt AI responsibly,
- Preventing technological divides from deepening existing global inequalities.

f. India's Emerging Leadership in Global Technology Governance

India is positioning itself as a bridge between advanced AI powers and the developing world. The AI Impact Summit 2026, to be hosted by India, aims to consolidate global dialogue on:

- Ethical and safe AI governance,
- Digital public infrastructure as a global public good,
- North–South and South–South cooperation.

India's diplomatic agenda—ranging from UNSC reforms to climate-resilient agriculture and counter-terrorism—reinforces its narrative as an advocate of equitable technology governance.

g. Global Significance of a Compact on AI

A well-designed compact could fundamentally reshape global digital governance by:

- Reducing cross-border risks from malicious AI,
- Building international trust in AI deployment,
- Supporting developing nations in safe adoption,
- Creating predictable and stable governance frameworks,
- Narrowing the global digital divide.

By institutionalising safety and equity, the compact aligns AI innovation with broader public interest and global stability.

h. Obstacles on the Road to a Global Framework

Progress will require navigating deep structural barriers:

i. Divergent National Approaches

Countries differ in data laws, political philosophies and regulatory tolerance, complicating alignment.

ii. Resistance from Technology Corporations

Powerful AI companies may oppose stringent transparency, audits or usage restrictions.

iii. Geopolitical Rivalries

US–China strategic competition, digital sovereignty concerns and security anxieties threaten consensus-building.

iv. Capacity Gaps in Smaller Nations

Many lack technical expertise, regulatory institutions or research infrastructure to implement global standards.

Even so, India argues that cooperation is in every nation's self-interest—because AI risks do not respect borders.

Conclusion

India's call for a Global Compact on Artificial Intelligence reflects a coherent philosophy: technological progress must serve human dignity, fairness and collective security.
By advocating a human-centric, transparent and inclusive AI framework, India seeks to shape a global digital order where innovation is balanced with accountability, and where developing countries are not mere bystanders but active shapers of the AI future.

The proposal situates AI governance within the broader project of twenty-first-century multilateralism—ensuring that the benefits of AI are shared, the risks managed, and the technological future remains aligned with democratic and developmental values.

3. India's Indigenous Gene-Editing Revolution: From Agricultural Self-Reliance to Public Health Transformation

a. Introduction

Gene editing has rapidly evolved from a frontier scientific tool into a strategic technology shaping agriculture, public health, and national biotech capacity. For years, the global landscape has been dominated by CRISPR–Cas systems, whose heavy patenting, restrictive licensing, and high deployment costs have constrained innovation in developing countries. India's simultaneous emergence of two indigenous platforms —

- a TnpB-based miniature gene-editing system for agriculture, and
- Birsa-101, a CRISPR-like therapeutic for sickle cell anaemia —

signals a new phase of technological autonomy.

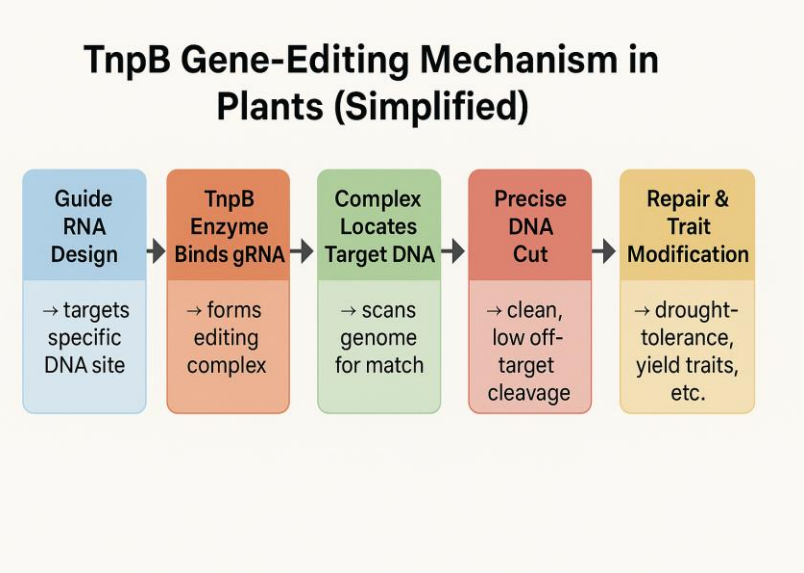
Both innovations serve different sectors, yet reflect a common national aspiration: reducing dependence on foreign IP, widening access to high-end biotechnology, and using genomics to address deeply local developmental challenges.

b. Indigenous Gene Editing for Agriculture: The TnpB-Based Alternative

i. Rationale for a CRISPR Substitute

India's agricultural research ecosystem has long been constrained by:

- Expensive global patents on Cas9/Cas12a,
- Licensing hurdles for commercial deployment,
- Limited public-sector R&D budgets,
- The urgent need for climate-resilient, nutrient-rich, and disease-resistant crop varieties.



An IP-free, compact, and domestically developed platform directly confronts these structural barriers and strengthens Atmanirbhar Bharat in agri-biotech.

ii. Scientific Foundation: Why TnpB Matters

TnpB proteins, ancestors of CRISPR enzymes, naturally mediate precise DNA cutting within transposable elements. Their key features include:

- Miniaturisation: Far smaller than Cas9, easing delivery across rigid plant cell walls.
- Precision and specificity: Suitable for targeted edits without foreign DNA insertion.
- Low resource requirements: Lower metabolic load, simplified lab protocols, and reduced risk of off-target effects.

This makes the platform not just scientifically innovative, but scale-neutral — usable in both sophisticated labs and field-oriented breeding programmes.

iii. Agricultural Applications

The platform can accelerate genomic improvements across India's key crops:

Climate Resilience

- Heat- and drought-tolerant cereals and pulses,
- Salinity-resistant rice for coastal regions,
- Varieties adapted to erratic monsoon patterns.

Nutritional Enhancement

- Iron- and zinc-rich staples,
- High-oil content oilseeds,
- Biofortified fruits and vegetables.

Pest and Disease Resistance

Targeted edits can curb dependence on pesticides and improve yield stability.

Faster Breeding Cycles

Gene editing can shorten varietal development from 7–10 years to 2–3 years, essential for responding to climate shocks and emerging pathogens.

iv. Systemic Challenges

Even a breakthrough platform requires supportive ecosystems:

- Regulatory clarity to differentiate genome-edited, non-transgenic plants from GMOs.
- Public awareness to counter misconceptions equating gene editing with genetic modification.
- Biosafety infrastructure for state-level monitoring and validation.
- Human and material capacity across ICAR institutions and agricultural universities.

v. Indian Agriculture's Way Forward

- Risk-proportionate regulation for gene-edited crops,
- Dedicated gene-editing hubs and translational research platforms,
- Public–private partnerships for rapid deployment,
- Farmer-centric communication strategies, and
- Alignment with SDG-2 and long-term food-security goals.

c. Indigenous Gene Therapy for Sickle Cell Anaemia: Birsa-101

i. Socio-medical Context

Sickle cell anaemia disproportionately affects India's tribal belt — Jharkhand, Odisha, Chhattisgarh, MP, Maharashtra, Rajasthan, Gujarat, and Northeast pockets.
The disorder:

- Deforms RBCs into rigid, sickle shapes,
- Causes severe pain episodes, anaemia, organ damage, and infection susceptibility,
- Reduces life expectancy and socioeconomic mobility.

The high prevalence among historically marginalised communities lends Birsa-101 a profound equity dimension.

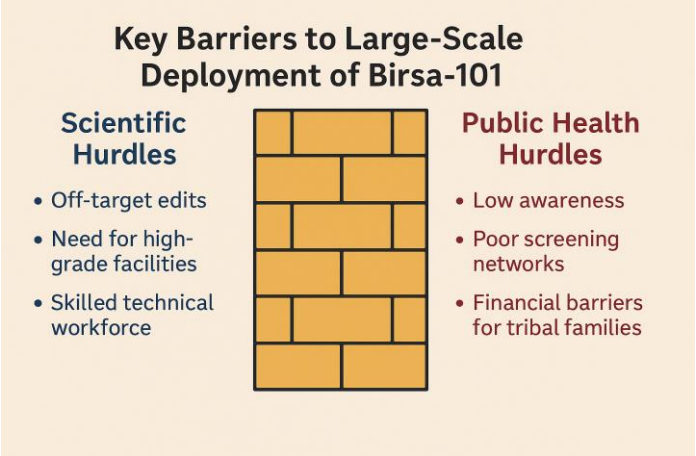
ii. Birsa-101: Scientific and Therapeutic Breakthrough

Birsa-101 uses India's indigenous gene-editing tool to repair the haemoglobin gene in a patient's own stem cells.

Therapy workflow:

- Extraction of bone marrow stem cells,
- Precise correction of the β-globin mutation,
- Reinfusion of edited cells,
- Repopulation of the blood system with healthy RBCs.

This shifts treatment from lifelong management (transfusions, chelation therapy) to a single-shot curative modality.



iii. Differentiation from Global Therapies

Global CRISPR therapies such as *Casgevy*:

- Cost over ₹18 crore per patient,
- Rely on patented Cas9 systems,
- Are optimized for Western populations,
- Are operationally difficult to deploy in low-resource settings.

Birsa-101's advantages:

- IP Freedom: No royalties for Cas systems; drastically lower cost.
- Population Relevance: Tailored to India's genetic backgrounds.
- Scalability: Designed for Indian biomedical infrastructure.
- Public Health Reach: Fits into national programmes like the Sickle Cell Elimination Mission.

iv. Public Health and Strategic Significance

Birsa-101 strengthens India's position in frontline biotechnology by:

- Democratizing access to advanced therapies,
- Reducing disease burden in vulnerable groups,
- Building high-end biomedical capacity,
- Creating a replicable model for low-cost global therapeutics.

It represents the convergence of science, inclusion, and national innovation strategy.

v. Challenges and Readiness Requirements

- Clinical Trials: Large-scale safety verification and off-target analysis.
- Manufacturing Capacity: GMP labs, cell-processing centres, and quality control.
- Screening Gaps: Many carriers remain undiagnosed; universal screening is essential.
- Financial Protection: Even reduced-cost therapies need insurance or state support.

vi. Pathway to Sustainable Adoption

- Clear regulatory pathways for gene-editing therapeutics,
- Expansion of clinical and laboratory infrastructure,
- Workforce training (clinicians, genetic counsellors, technicians),
- Community engagement to build awareness and reduce stigma,
- Integration with NHM and tribal health initiatives.

d. Synthesis: India's Dual Gene-Editing Models as Pillars of Technological Sovereignty

The agricultural TnpB platform and the medical Birsa-101 represent two ends of the same spectrum:

- Both reduce dependence on foreign IP,
- Both democratise access to advanced biotechnology,
- Both target India's most pressing developmental challenges: food security and tribal health inequities,
- Both indicate a maturation of India's genome sciences ecosystem.

While agriculture benefits from low-cost, precision breeding and rapid translation, the public health sector witnesses the possibility of curative therapies reaching the poorest communities. Together, these platforms reveal a strategic shift: India is not merely adopting global technologies but building indigenous alternatives with global relevance.

Conclusion

India's indigenous gene-editing initiatives—TnpB for agriculture and Birsa-101 for sickle cell anaemia—mark a turning point in national biotechnology. They combine scientific innovation with social purpose: improving crops central to food security while delivering curative therapies for historically marginalized populations. The dual emphasis on precision, affordability, and IP independence positions India as a leader in responsible and equitable genomics.

If supported by coherent regulation, investment in biosafety and infrastructure, and sustained public engagement, these technologies can reshape India's agricultural resilience, public health outcomes, and global stature as a hub of ethical, accessible gene-editing solutions.

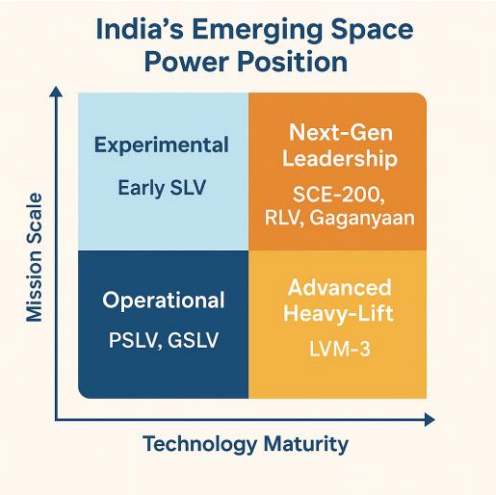
4. LVM-3 and India's Heavy-Lift Launch Capability

a. Introduction

India's space programme embodies a philosophy of progressive self-reliance—advancing from modest experimental launches to complex lunar missions and now preparing for human spaceflight. Central to this transformation is the Launch Vehicle Mark-3 (LVM-3), India's heaviest and most technologically advanced rocket. Its successful deployment of 4-tonne class satellites such as CMS-03 marks India's entry into the exclusive group of nations with independent heavy-lift capability. LVM-3 is not merely a technological achievement; it is a strategic asset that strengthens India's autonomy, commercial competitiveness, and long-term presence in outer space.

b. India's Launch Vehicle Evolution: A Gradual Technological Ladder

Launch vehicles are multi-stage rocket systems that operate on the principle of reactive propulsion. ISRO's programme has evolved through incremental capability-building:



i. SLV and ASLV – Foundational Systems

Early projects focused on demonstrating basic launch capability and mastering core propulsion and guidance technologies.

ii. PSLV – The Workhorse

PSLV enabled India to become a reliable launcher for Earth observation and sun-synchronous satellites, establishing ISRO as a global player in cost-effective launches.

iii. GSLV – Reaching Higher Orbits

With the introduction of cryogenic upper stages, India acquired the ability to place communication satellites in geosynchronous orbits.

iv. LVM-3 – The Heavy-Lift Breakthrough

LVM-3 bridges the gap between medium-lift and heavy-lift capability, enabling independent deployment of high-throughput communication satellites, deep-space missions, and upcoming human spaceflight operations.

This progression reflects ISRO's steady climb from small-satellite capability to strategic heavy-lift autonomy.

c. Key Technological Features of LVM-3

LVM-3 is a three-stage modular launcher designed for reliability, high payload capacity, and mission versatility.

i. Solid Rocket Boosters (First Stage)

Provide enormous initial thrust to lift the 640-tonne vehicle from the launch pad.

ii. Liquid Core Stage (Second Stage)

Ensures sustained acceleration and flight stability once the boosters detach.

iii. Cryogenic Upper Stage (Third Stage)

The C25 cryogenic engine, powered by liquid hydrogen and liquid oxygen, delivers high efficiency needed to insert heavy payloads into precise orbits. Its development marked a national milestone in mastering advanced propulsion.

LVM-3 can deliver:

- ~8 tonnes to Low Earth Orbit (LEO)
- ~4 tonnes to Geosynchronous Transfer Orbit (GTO)

Future upgrades include the C32 cryogenic engine and a semi-cryogenic RP-1 engine, which will boost thrust and reduce operating costs.

LVM-3 has already demonstrated reliability in missions such as Chandrayaan-2, Chandrayaan-3, multiple commercial launches (OneWeb), and will be the backbone of Gaganyaan, India's first human spaceflight mission.

d. Strategic and Technological Significance

i. Autonomy in Heavy-Lift Launches

For years, India relied on foreign launchers, especially Europe's Ariane-5, to deploy its heavy communication satellites. LVM-3 eliminates this dependence, reinforcing strategic autonomy.

ii. Technological Self-Reliance

Cryogenic engines were considered beyond India's reach due to technology denial regimes. Mastering them reflects the resilience of India's indigenous R&D ecosystem.

iii. Human Spaceflight Readiness

A human-rated LVM-3—equipped with enhanced safety, redundancies, and abort mechanisms—forms the core of the Gaganyaan programme, marking India's entry into the elite group of human spacefaring nations.

iv. Platform for Deep Space Exploration

LVM-3 is poised to support ambitious missions to Mars, Venus, and beyond, enabling heavier scientific payloads and more complex interplanetary trajectories.

v. Commercial and Strategic Leverage

Through NewSpace India Limited (NSIL) and IN-SPACe, India is now positioned to attract global customers seeking cost-efficient launch services. This strengthens India's role in space diplomacy and global supply chains for satellite launches.

e. Challenges and Structural Constraints

Despite its achievements, several hurdles remain before India can match the most advanced global launch systems.

i. Payload Limitations

While LVM-3 is a heavy-lift vehicle, its capacity remains modest compared to Falcon Heavy or Long March 5. Scaling up requires new propulsion technologies and larger vehicle architecture.

ii. Infrastructure Expansion

Future engines and reusable systems demand advanced testing facilities, precision manufacturing, and expanded ground-support infrastructure.

iii. High Development Costs

Sustained R&D, mission assurance, and testing programmes require stable financial commitments—particularly for human spaceflight.

iv. Global Competition

India faces competition from SpaceX's reusable platforms, China's extensive launch ecosystem, and Europe's Ariane series. Technological innovation must keep pace with evolving global benchmarks.

v. Human Spaceflight Complexity

Crewed missions demand exceptionally high reliability, precision, life-support systems, and re-entry technology. Achieving this requires extensive validation and rigorous safety culture.

f. Global Heavy-Lift Landscape: India's Position

Country	Rocket System	LEO Payload Capacity
India	LVM-3	~8 tonnes
USA	Falcon 9 / Falcon Heavy	~22–63 tonnes
China	Long March 5	~25 tonnes
Russia	Proton-M	~22 tonnes
Europe	Ariane 6 (upcoming)	~21 tonnes

India's capability is significant but remains intermediate compared to advanced heavy-lift systems. The next-generation propulsion roadmap aims to bridge this gap.

g. The Road Ahead: India's Spaceflight Ambitions

i. Semi-Cryogenic Engines (SCE-200)

A high-thrust, efficient engine under development will dramatically enhance launch capacity.

ii. Reusable Launch Vehicles (RLV)

India's work on demonstrators reflects a long-term transition toward reusable systems—key for competitive commercial launches.

iii. Bharatiya Antariksha Station

India's proposed space station (target: 2035) will enable sustained human presence in orbit, scientific research, and international cooperation.

iv. Human and Lunar Missions

Gaganyaan is the first step toward future crewed lunar missions and long-duration spaceflight capability.

v. Private Sector Integration

Through IN-SPACe, startups and private firms are contributing innovations in propulsion, materials, and satellite deployment—accelerating India's space ecosystem.

Conclusion

LVM-3 represents a turning point in India's space trajectory—a shift from dependence to self-reliance, from capability to confidence. It anchors India's ambitions in deep-space exploration, commercial launch services, and human spaceflight. As India enhances cryogenic and reusable technologies, its space programme is poised not just for national advancement, but for shaping global access to affordable, innovative, and inclusive space exploration. LVM-3 stands as a symbol of India's scientific maturity and its future as a leading spacefaring nation.

5. Reforming India's Nuclear Power Sector: Capital Needs, Private Participation, and the Promise of Small Modular Reactors

a. Introduction

India's energy transition now hinges on its ability to secure round-the-clock, low-carbon electricity. While solar and wind have expanded rapidly, their intermittency limits reliability without significant storage investment. Nuclear power—capable of delivering stable, base-load, near-zero-emission electricity—has therefore re-emerged as a strategic priority. Yet, India's nuclear sector remains constrained by high capital costs, long construction timelines, and restrictive legal frameworks that confine ownership to the public sector.
Recognising this bottleneck, the government is considering reforms that retain sovereign control but allow targeted private and foreign participation—not to privatise atomic energy, but to mobilise capital, accelerate deployment, and integrate technological innovations such as Small Modular Reactors (SMRs).

b. India's Nuclear Governance Framework: The Legacy Constraints

India's nuclear programme is anchored in laws designed to protect sovereignty, ensure safety, and control sensitive technologies. These safeguards, while essential, have also constrained expansion.

i. Atomic Energy Act, 1962 – Exclusive State Ownership

Only government entities—primarily NPCIL—may build and operate nuclear reactors. Private participation is legally excluded, even as project scale and financing needs grow.

ii. Civil Liability for Nuclear Damage Act (CLNDA), 2010

The operator bears primary liability but may exercise a right of recourse against suppliers. While intended to enforce safety, this clause has discouraged international reactor suppliers worried about open-ended liability.

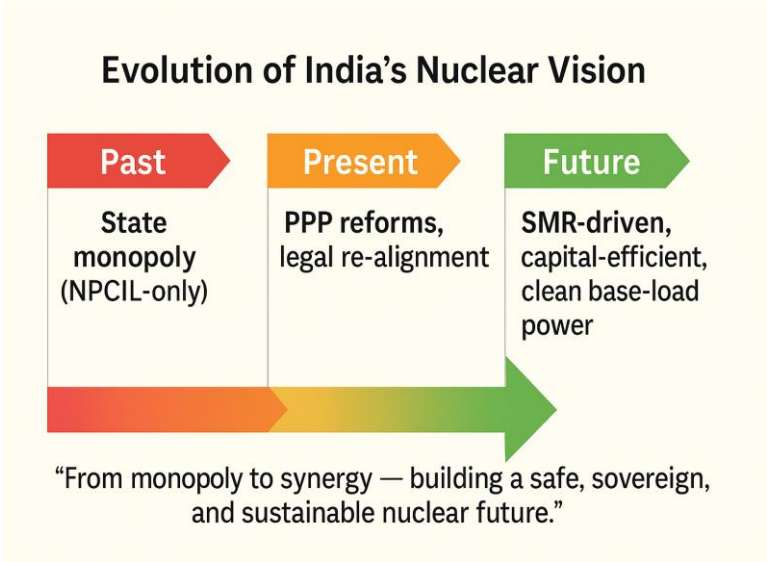
iii. Indo–U.S. Civil Nuclear Agreement, 2008

Reopened access to global technology and fuel but failed to generate large-scale reactor deployment because of unresolved liability concerns and financing constraints.

These frameworks ensured sovereignty but limited financial inflows, slowed construction, and prevented India from tapping global supply chains effectively.

c. The Reform Moment: Proposed Legal and Policy Shifts

Two key amendments under discussion aim to balance continued state ownership with capital mobilisation.



i. Reforming the CLNDA (2010)

- Limit supplier liability through a government-backed insurance pool, aligning with international norms.
- Reduce investor uncertainty and attract global vendors without diluting operator responsibility.

ii. Amending the Atomic Energy Act (1962)

- Permit up to 49% private equity participation in NPCIL-led projects.
- Introduce PPP models where the state retains control over design, operations, and safety, while private firms share financing and project management.

These reforms shift the bottleneck from technological capacity to financial and institutional capability, enabling India to scale nuclear power in line with its energy transition goals.

d. Why Reform Is Imperative

i. Capital-Intensive Projects

Nuclear plants require enormous upfront investment and have long gestation cycles. Relying solely on public funds restricts expansion.

ii. Reliable, Round-the-Clock Power

Nuclear energy stabilises the grid as renewables grow, reducing dependence on coal-based baseload power.

iii. Net Zero by 2070

Coal phase-down necessitates a strong non-fossil baseload source. Nuclear is the only scalable option technologically ready for this role.

iv. Industrial Competitiveness

Sectors such as steel, cement, and chemicals need uninterrupted power—an area where SMRs could provide decentralised, high-availability energy.

v. India Has Technology, But Not Adequate Finance

Indigenous PHWR technology is robust and globally recognised. The binding constraint is not knowledge but capital mobilisation and project execution.

e. Small Modular Reactors (SMRs): India's Strategic Pivot

SMRs represent the next generation of nuclear innovation—compact, factory-fabricated reactors with capacities below 300 MW.

Advantages of SMRs

- **Lower capital requirement** and reduced construction risk.
- **Modular deployment**, allowing phased expansion.
- **Enhanced safety** through passive cooling systems requiring no external power.
- **Flexible siting**, enabling installation near industrial clusters or remote regions.
- **Economic viability** when paired with hydrogen production, desalination, or district heating.

SMRs align with India's aspirations for decentralised clean energy and offer a scalable pathway for nuclear growth.

f. The Bharat SMR Initiative: A Hybrid Governance Model

India's proposed Bharat Small Modular Reactor (BSMR) programme envisages:

- NPCIL retaining technological, regulatory, and operational control.
- Private companies holding minority equity (up to 49%) to mobilise funds and bring project execution capabilities.
- Potential sites across Gujarat, Madhya Pradesh, Odisha, Jharkhand, Chhattisgarh, and Andhra Pradesh.
- Interest from major industrial actors—Reliance, Tata Power, Adani, JSW, Hindalco, and Jindal Steel—indicating strong market confidence.

This hybrid model keeps nuclear sovereignty intact while unlocking financial depth.

g. Reforms Are About Capital, Not Capability

India's nuclear engineering ecosystem—spanning reactors, fuel cycles, metallurgy, and heavy manufacturing—is well-developed.
What limits expansion is:

- delayed financing approvals
- cost overruns
- slow procurement cycles
- heavy reliance on budgetary support

Thus, the reforms seek to reshape the financial architecture of nuclear development, while preserving strategic control.

h. Expected Benefits of the Reform Agenda

i. Mobilising Capital at Scale

Private participation reduces fiscal burden, diversifies funding sources, and accelerates project pipelines.

ii. Greater Grid Stability

Nuclear baseload power stabilises a renewable-heavy grid, enabling deeper penetration of solar and wind.

iii. Climate Coherence

Nuclear growth supports India's Net Zero pathway by substituting coal without compromising industrial growth.

iv. Enhancing Industrial Competitiveness

SMRs could anchor industrial corridors with cheap, reliable energy.

v. Improving Global Investment Credentials

Predictable liability and partnership frameworks make India a viable market for advanced global reactor suppliers.

i. Challenges and Risks That Must Be Addressed

i. Public Perception and Local Opposition

Concerns around radiation, safety, and waste management can delay projects. Social licence must be earned through transparency and engagement.

ii. Investor Hesitation

Long payback periods and regulatory uncertainties require clear risk-sharing frameworks.

iii. Legal Ambiguities

Ownership, accountability, waste disposal, and liability-sharing must be precisely defined.

iv. Strengthening Regulatory Capacity

An autonomous, well-resourced AERB is essential for safe deployment and public confidence.

v. Technological Modernisation

India must simultaneously invest in PHWRs, advanced Light Water Reactors, thorium research, and long-term fusion readiness.

j. Global Experience and Lessons for India

i. International Trends

- U.S. and France: Encourage private sector-driven nuclear innovation under stringent regulation.
- Russia and China: Already commercialising SMRs for grid supply and desalination.
- India: Moving toward mixed public–private partnership while retaining sovereign control.

ii. Key Policy Lessons

- Balance openness with oversight.
- Provide legal certainty to reduce investment risk.
- Integrate nuclear with renewables instead of treating them as competing technologies.
- Foster public trust through transparent communication and environmental safeguards.
- Invest in skills, R&D, and waste management—critical for long-term viability.

k. Way Forward

- Amend the Atomic Energy Act and CLNDA to operationalise PPPs and clarify liability regimes.
- Pilot SMR projects to demonstrate viability before scaling.
- Establish a Green Nuclear Fund for concessional financing of clean baseload capacity.
- Strengthen the AERB with full autonomy and modern safety infrastructure.
- Build international partnerships with the U.S., France, Russia, and Japan for reactor design, fuel cycles, and safety best practices.
- Expand human resource development in nuclear engineering, regulatory science, and project finance.

Conclusion

Reforming India's nuclear sector is not merely a policy shift—it is a structural reimagining of how the country finances and governs one of its most strategic industries. With growing demand for clean, round-the-clock power, nuclear energy can become the third pillar of India's low-carbon future, alongside renewables and hydropower.

By modernising liability laws, enabling responsible private participation, and advancing SMR technologies, India can build a nuclear ecosystem that is safe, financially scalable, technologically advanced, and aligned with national sovereignty.

If implemented with transparency and long-term vision, these reforms can anchor India's energy security, industrial competitiveness, and climate commitments for decades to come.

GS Paper III: Security

1. Urban Terrorism in India: Nature of the Threat and Strategic Lessons for the Future

a. Introduction

Urban terrorism represents one of the most complex internal security challenges for modern states. In India, it has historically drawn strength from cross-border sponsorship, internal radicalisation, covert financing networks, criminal syndicates, and technological adaptation. Urban centres—dense, diverse and symbolically prominent—offer terrorists both anonymity and high-impact targets.

Although the frequency of major attacks has significantly reduced since 2008 due to improved counter-terror responses, events like the Red Fort incident underscore a critical reality:

Urban terrorism rarely disappears; it reorganises, disperses, and resurfaces when operational conditions become favourable.

The task, therefore, is not merely to prevent attacks, but to dismantle the enabling ecosystem that sustains urban terror even during quieter phases.

b. Understanding the Urban Terror Ecosystem

Terrorism in India operates not as isolated acts of violence but as a networked ecosystem. Even when attacks decline, the supporting structures often remain active:

- Financiers and hawala channels
- Radicalisers and recruiters (offline and online)
- Digital communication and encrypted coordination
- Handlers and facilitators in Pakistan and other external locations
- Criminal syndicates providing logistics, forged documents, and safehouses
- Narcotics-linked revenue streams feeding extremist modules

This ecosystem's persistence explains why periods of calm often represent strategic dormancy, not the dissolution of threat.

c. Why Urban Terrorism Persists: Cycles, Complacency, and External Sustenance

Terror organisations function cyclically:

- High intelligence pressure → networks go quiet or disperse.
- Reduced scrutiny or fresh external support → cells regenerate and re-emerge.

India's long periods of urban stability can unintentionally foster institutional complacency, creating exploitable windows. Meanwhile, Pakistan's sustained support—training, propaganda, funding and safe havens—ensures that the fundamental infrastructure of terrorism remains intact, even when operational capacity fluctuates.

Urban terrorism persists because it is low-cost, asymmetric, and strategically disruptive, allowing groups to inflict psychological and political damage with relatively small modules.

d. Emerging Trends in Urban Terrorism

i. Recruitment and Radicalisation

- Increasing footprint of educated youth, including engineers, doctors and IT professionals.

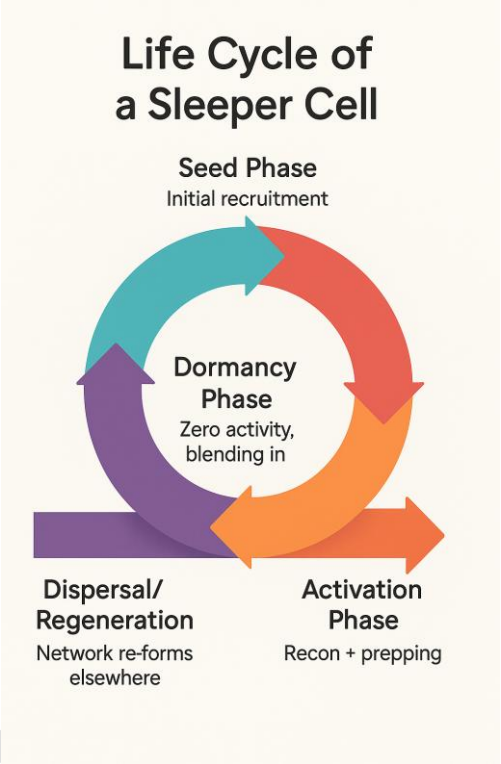
- Radicalisation occurs through encrypted platforms, private chat groups, and cross-border propaganda networks.
- Ideological content bypasses traditional monitoring systems, creating isolated micro-communities of vulnerable individuals.

ii. Funding and Criminal Linkages

- Strong narcotics–terror nexus, with drug profits recycled into terror financing.
- Decentralised financial flows (micro-donations, informal transfer systems, crypto mechanisms) reduce visibility.
- Criminal syndicates facilitate logistics: safehouses, weapons movement, identity fraud.

iii. Operational Adaptation

- Emergence of small, dispersed, hard-to-detect sleeper cells.
- Use of urban anonymity—crowded markets, public transport networks, rental housing—to mask movement.
- Preference for symbolic, high-visibility locations to maximise political and psychological impact.



e. Red Fort Incident: Lessons on Persistent Vulnerability

The Red Fort event offers key insights into the evolving nature of urban terrorism:

i. Symbolic Targeting

- National monuments remain attractive because they strike at identity, memory, and public confidence.

ii. Limits of Urban Control

- Dense movement, uneven policing, fragmented jurisdictions and porous entry points make sealing off cities impossible.

iii. Presence of Covert Support

- Access to explosives, local facilitators, and planning capacity indicates that dormant networks continue to exist across metropolitan centres, not only in traditional conflict geographies.

The incident reaffirms that counter-terrorism success must be measured not only by absence of attacks but by the neutralisation of supporting ecosystems.

f. India's Strengths: Post-2008 Counter-Terror Capability

India has made significant improvements since the Mumbai attacks:

- Integrated intelligence-sharing across central and state agencies.
- A more responsive national counter-terror grid (NATGRID).
- Specialised response units and better crisis-management protocols.
- A sharp decline in active militants in Jammu and Kashmir, weakening major groups' operational reach.

- Upgraded metropolitan policing, CCTV networks, facial-recognition pilots, and real-time monitoring.

India's counter-terror architecture is stronger than at any previous point—but terrorist groups are adaptive, requiring constant innovation.

g. Persistent Challenges in the Urban Environment

Despite progress, several structural vulnerabilities remain:

i. Technologically Skilled Micro-Cells

- Encrypted communication, VPNs, dark web platforms, and evolving digital tradecraft obscure early detection.

ii. Online Radicalisation at Scale

- Propaganda networks operate across borders with minimal physical infrastructure, making dismantling difficult.

iii. External State Support

- Pakistan's established infrastructure of training, logistics and ideological mobilisation remains a long-term threat.

iv. Criminal–Terror Nexus

- Narcotics, extortion networks, and organised crime are increasingly intertwined with terror financing.

v. Soft Targets in Urban Spaces

- Malls, markets, railway hubs, religious sites and public events cannot be fully secured without undermining everyday life.

vi. Institutional Complacency

- Periods of calm can weaken vigilance, especially at the local police and civic level.

These vulnerabilities underscore that urban terrorism must be understood as a governance, policing, technological, and diplomatic challenge simultaneously.

h. Way Forward: Building a Proactive, Ecosystem-Focused Counter-Terror Framework

i. Integrate Advanced Technologies

- AI-based behavioural analytics,
- Predictive policing,
- Automated anomaly detection,
- National database interlinking of crime, immigration, financial flows, and digital footprints.

ii. Strengthen HUMINT and Community Intelligence

- Local shopkeepers, transport workers, landlords, and neighbourhood networks often detect early anomalies.
- Community policing and trust-based relationships are essential for identifying sleeper cells.

iii. Dismantle Support Structures

- Crack down on financing networks, propaganda channels, narcotics linkages and overground workers.

- Shift focus from attacking operatives to eroding the system that enables them.

iv. Enhance Urban Preparedness

- Frequent vulnerability audits,
- Mock drills simulating multi-location attacks,
- Pre-positioned rapid response teams,
- Integrated command-and-control systems.

v. Diplomatic and Strategic Pressure

- Persistent diplomatic advocacy to expose state-sponsored terrorism, particularly Pakistan's role.
- International partnerships for intelligence, technology and financial tracking.

vi. Maintain Social Cohesion

- Avoid overreaction, heavy-handed policing or communal profiling, which can fracture trust and aid extremist narratives.
- Counter-terror strategy must be firm, precise and rights-conscious.

Conclusion

Urban terrorism in India is adaptive, networked, and externally supported. Its apparent decline masks the survival of hidden ecosystems of ideology, finance, logistics and cross-border facilitation. India's challenge is not merely to prevent attacks but to systematically weaken these underlying structures.

A resilient national response requires:

- technologically empowered intelligence systems,
- coordinated policing,
- diplomatic pressure,
- community vigilance, and
- an unwavering commitment to social harmony and proportionality.

Only a whole-of-nation approach, combining technology with human intelligence and strategic foresight, can address the evolving landscape of urban terrorism in India.

2. Custodial Torture and CCTV Compliance: Supreme Court's Directions and Continuing Concerns

a. Introduction

Custodial torture remains one of India's most deep-rooted governance and rights challenges. Despite constitutional guarantees and repeated judicial interventions, incidents of custodial violence and deaths continue to expose structural deficiencies in police accountability.

In Paramvir Singh Saini vs Baljit Singh (2020), the Supreme Court mandated the installation of functional CCTV systems — with audio-video capability — across all police stations and central investigative agencies. This was intended as a systemic, technology-based check against torture.

Five years later, however, widespread non-compliance persists. The Court has expressed serious dissatisfaction, emphasising that surveillance in custody is integral to Article 21's protections of life and dignity.

b. Why CCTV in Police Stations Is Crucial

i. Protecting Fundamental Rights

CCTV systems act as a critical safeguard for detainees, deterring torture and unlawful coercion, and aligning custodial practices with constitutional morality.

ii. Preventing Misconduct

The presence of cameras encourages adherence to lawful procedures and reduces opportunities for custodial excesses.

iii. Providing Reliable Evidence

CCTV footage creates an objective record for inquiry, helping establish truth in cases of alleged misconduct and protecting honest officers from false accusations.

iv. Strengthening Public Trust

Transparent custodial environments enhance the credibility of policing institutions and build public confidence in the justice system.

c. Core Directions of the Supreme Court's 2020 Judgment

i. Mandatory CCTV Coverage Across All Custodial Spaces

The Court required comprehensive coverage of:

- Lock-ups,
- Corridors and entry points,
- Interrogation rooms,
- Police station premises,
- Offices of central agencies (CBI, ED, NIA, DRI, NCB, SFIO).

ii. Technology Standards

CCTV systems must include:

- Night-vision capability,
- Audio + video recording,
- Uninterrupted power supply,
- Minimum 18-month storage of footage.

iii. Multi-Level Monitoring Committees

The Court created State and District Monitoring Committees tasked with:

- Conducting periodic audits,
- Ensuring functionality,
- Reporting compliance.

The goal was sustained oversight, not symbolic adoption.

d. Present Concerns Highlighted by the Supreme Court

i. Incomplete and Poor-Quality Compliance Reports

Few States and UTs have submitted verifiable reports. Many police stations lack functional cameras or technologically compliant systems.

ii. Union Government's Shortcomings

The Court criticised the Union Government for failing to provide a complete status update and for treating the directions casually.

iii. Persistent Custodial Deaths

Recent incidents — including those in Rajasthan — show that the absence of surveillance has real, immediate human costs.

iv. Weak Justifications by States

Technical excuses (e.g., difficulty installing outdoor cameras) were rejected. The Court held that administrative inconvenience cannot override constitutional rights.

e. Supreme Court's Current Directions (2025 Review)

i. Demand for Concrete, Verifiable Compliance

The Court will not accept mere affidavits. States must provide evidence such as photographs, sample footage, and audit reports.

ii. Accountability of Senior Officials

State Home Secretaries and heads of central agencies are directly responsible for compliance and may be summoned if progress remains inadequate.

iii. Fixed Timelines for Review

A scheduled review cycle ensures that compliance is monitored continuously rather than episodically.

iv. Reminder: CCTV Is Only One Element of Police Reform

The Court reiterated that technological safeguards must operate alongside deeper structural reforms in policing practices.

f. Why Custodial Torture Continues Despite Reforms

i. Poor Implementation Culture

Judicial guidelines, even when detailed, often remain unimplemented at the ground level.

ii. Weak Oversight Institutions

Monitoring Committees frequently lack independence, technical expertise, or regular review mechanisms.

iii. Non-Functional or Poor-Quality CCTV Systems

Cameras are often dysfunctional, lack storage capacity, or are strategically placed to avoid sensitive areas.

iv. Institutional Resistance to Transparency

Sections of law enforcement remain uneasy about fully visible custodial processes.

v. Delayed Investigations

Slow inquiries dilute accountability and weaken deterrence.

vi. Infrastructure and Personnel Constraints

Poorly designed police stations, overloaded lock-ups and staff shortages hinder effective supervision.

g. Significance of the Supreme Court's Intervention

i. Protecting Article 21

The Court affirms that custodial safety is inseparable from the constitutional guarantee of dignity and humane treatment.

ii. Enhancing Police Accountability

Functional CCTV systems bring India closer to global human rights norms, including obligations under the UN Convention Against Torture.

iii. Driving Long-Pending Institutional Reform

Judicial scrutiny pressures both the Union and States to modernise police infrastructure and institutionalise rights-based custodial practices.

h. Way Forward

i. Dedicated Funding and Regular Maintenance

Budgetary allocations must be ring-fenced for installation, upkeep and timely repair of CCTV systems.

ii. Independent and Periodic Review of Footage

Monitoring bodies should include independent members and submit regular reports to judicial or quasi-judicial authorities.

iii. Swift and Transparent Action Against Misconduct

Allegations of torture must be investigated promptly, with clear consequences for lapses.

iv. Human Rights-Oriented Police Training

Training must institutionalise lawful interrogation methods and custodial care standards.

v. Secure, Tamper-Proof Digital Storage

Cloud-based storage with strict access controls is essential to prevent data loss or manipulation.

vi. Continued Judicial and Public Oversight

Sustained monitoring may be necessary until nationwide compliance becomes a norm rather than an exception.

Conclusion

Custodial torture is fundamentally incompatible with India's constitutional commitment to dignity and humane treatment. The Supreme Court's renewed scrutiny emphasises that technological safeguards such as CCTV surveillance are simple but powerful tools to protect detainees and honest officers alike.

Achieving universal, verifiable, and functional CCTV compliance is therefore not a bureaucratic formality but a moral and constitutional mandate. Building a humane, transparent and accountable policing system is indispensable for strengthening India's democratic fabric and public trust.

3. Women's Induction into the Territorial Army's Home & Hearth Battalions: A Turning Point in Gender and Security Policy

a. Introduction

The decision to induct women soldiers into the Territorial Army's (TA) Home and Hearth Infantry Battalions marks one of the most meaningful expansions of women's participation in India's defence and internal-security architecture. While the Armed Forces have gradually opened avenues in legal branches, medical services, logistics, aviation and—recently—permanent commission streams, infantry roles have remained structurally closed.

The Home and Hearth Battalions represent the first structured military space that introduces women to infantry-adjacent duties in live operational environments, especially in conflict-sensitive regions like Jammu & Kashmir and parts of the North-East. The reform is both symbolically important and operationally relevant.

b. Understanding the Territorial Army and the Role of Home & Hearth Battalions

i. The Territorial Army's Mandate

- The TA is a volunteer citizen force that supplements the Army during national emergencies, internal security situations and natural disasters.
- Its part-time structure enables professionals from civil life to contribute periodically to defence tasks.
- TA units include departmental units (Railways, ONGC, Oil India) and non-departmental infantry units, which form the backbone of frontline TA operations.

ii. Home & Hearth Battalions: Localised Infantry Support

Raised in strategically sensitive zones—primarily Jammu & Kashmir and the North-East—these battalions rely on:

- Local recruitment, giving units deep situational awareness of terrain, dialects and socio-cultural dynamics.
- Roles that include patrols, area domination, intelligence gathering, convoy protection and assisting regular Army units in counter-insurgency (CI) and counter-terror (CT) operations.
- Crisis-response functions, such as rapid mobilisation for natural disasters.

This makes them uniquely positioned to integrate women into frontline-adjacent tasks without the formal induction of women into regular infantry battalions, which remains under consideration.

c. What Has Changed: Structured Entry of Women Soldiers

i. Recruitment Policy Reform

- Starting 2025–26, selected Home & Hearth Battalions will recruit all-women sections of about 10 personnel each.
- This pilot-scale intake maintains operational caution while signalling institutional readiness for gender diversification.

ii. Phased Implementation

- A typical battalion has 750–1,000 soldiers; the entry of small all-women sections allows commanders to evaluate accommodation, training, cohesion and deployment patterns.
- Lessons from this controlled phase will shape future expansion.

d. Why This Decision Matters

i. Breaking the Infantry Barrier in a Realistic, Workable Manner

While the regular infantry, mechanised forces and armoured corps remain closed to women, this decision:

- Introduces women to patrol, search, checkpoint and engagement duties in a controlled CI/CT environment.
- Serves as the first operational bridge towards deeper integration into combat/support roles.

It marks a significant recalibration of gender norms in the military without compromising operational prudence.

ii. Enhancing Operational Effectiveness

Women strengthen operational outcomes in distinct ways:

- Engagement with local women, essential for intelligence-gathering and culturally sensitive security operations.
- Improved effectiveness in search operations, especially in female-majority spaces.
- Strengthened community confidence, particularly in conflict-affected societies where women soldiers appear more approachable.
- Valuable during humanitarian and disaster-relief missions, where women improve outreach and support services.

iii. Alignment with Global Military Trends

The move situates India within a global pattern of carefully phased gender integration:

- Countries like the US, UK, Canada, Israel have long deployed women in frontline or near-frontline roles.
- India's incremental and context-sensitive approach mirrors best practices in militaries transitioning from gender-exclusion norms.

e. Challenges and Structural Adjustments Required

i. Training and Operational Preparedness

- Training must remain gender-neutral and standards-based, ensuring that women meet the physical, tactical and situational demands of CI/CT tasks.
- Exposure to stress, terrain complexity, extreme climate and high-risk encounters requires robust preparatory frameworks.

ii. Infrastructure and Logistics

- Forward bases need upgrades in:
    - Accommodation and sanitation
    - Privacy-sensitive yet operationally flexible arrangements
    - Uniforms, equipment and protective gear tailored for women
- Mixed-gender deployment necessitates standard operating protocols that maintain discipline and operational tempo.

iii. Institutional Culture and Leadership Adaptation

- Units long accustomed to all-male environments must adjust norms, expectations and professional conduct.
- Leadership must ensure:
    - Bias-free integration
    - Clear grievance redressal
    - Prevention of exclusionary subcultures

Institutional confidence-building is as important as infrastructure.

f. Way Forward: Making Gender Integration Durable and Effective

i. Strengthening Training and Field Preparedness

- High-intensity physical training, weapons proficiency, and movement in built-up areas (MUB operations) must be rigorously imparted.
- Special modules on operating in insurgency-prone environments can prepare women soldiers for unique mission requirements.

ii. Infrastructure Modernisation

- Upgrading forward bases, transit camps, and company operating bases is essential.
- Proper sanitation and privacy arrangements must be integrated without compromising quick mobilisation.

iii. Phased Expansion Based on Ground Feedback

- The pilot phase should generate actionable insights regarding:
    - Deployment patterns
    - Operational impact
    - Team cohesion
    - Local community engagement
- Expansion must be evidence-driven, not symbolic.

iv. Strengthening Institutional Culture

- Gender-sensitisation programmes for officers and troops.
- Leadership training for managing mixed-gender sections.
- Clear policies on discipline, safety, fairness and mutual respect.

Conclusion

The induction of women into the Territorial Army's Home & Hearth Battalions signals a structural and cultural shift in India's defence posture. It provides women with their first meaningful entry point into infantry-like roles, enhances operational effectiveness in sensitive regions, and aligns India with evolving global norms on gender and security.

Success will depend on three pillars:

- Rigorous and gender-neutral training,
- Modernised infrastructure, and
- Institutional commitment to professional inclusion.

If executed with strategic patience and organisational sensitivity, this reform could become a blueprint for broader gender integration across the Armed Forces—strengthening both national security and India's commitment to equal opportunity.

4. The Mahe-Class ASW Shallow Water Craft: Strengthening India's Littoral Defence Architecture

a. Introduction

India's maritime security environment is undergoing rapid transformation, particularly in its congested and strategically sensitive littoral zones. While the Indian Navy has invested heavily in blue-water platforms—destroyers, frigates, and submarines—shallow coastal waters remain a persistent vulnerability, as larger platforms cannot manoeuvre or detect effectively in such constrained environments.

The Mahe-class Anti-Submarine Warfare (ASW) Shallow Water Craft, led by INS Mahe and built by Cochin Shipyard Limited, represents India's first purpose-built response to this gap. Designed to detect, track, classify and neutralise stealthy diesel-electric submarines operating close to the coastline, this class marks an important evolution in India's coastal defence and fleet rationalisation strategy.

b. Why India Needed Specialised Shallow-Water ASW Platforms

India's 7,500 km coastline hosts major ports, naval bases, offshore energy installations, shipyards, island territories, and dense maritime trade corridors. Modern diesel-electric submarines—especially those using Air Independent Propulsion (AIP)—can exploit the acoustically complex shallow waters to evade detection.

Large warships face structural constraints in these zones:

- Limited room for manoeuvre
- Reduced sonar effectiveness
- Higher risk of grounding or collision

This environment necessitates smaller, agile vessels equipped with shallow-water optimised sensors and weapons—a gap the Mahe-class is specifically designed to fill.

c. Core Capabilities of the Mahe-Class

i. Design for Littoral Operations

- Length of ~78 metres and beam of ~11 metres.
- Shallow draught (~2.5 metres) enables operations where large warships cannot safely enter.
- Compact size enhances concealment and manoeuvrability during ASW missions.

ii. Speed, Endurance and Patrolling Capacity

- Capable of reaching ~25 knots, ensuring rapid response to submarine contacts.
- Designed for sustained coastal patrols, enabling continuous underwater surveillance along high-risk corridors.

iii. Advanced Underwater Detection Suite

- Equipped with hull-mounted sonars and sensors tuned for shallow-water acoustics, which differ significantly from deep-sea sonar behaviour.
- Allows detection of extremely quiet diesel-electric submarines that often mask their noise within littoral clutter.

iv. ASW Weapons

- Carries ASW rockets and lightweight torpedoes, enabling quick engagement after detection.
- Weapon loadout complements the sonar suite to create a complete kill-chain capability within the littoral zone.

v. Integrated Maritime Domain Awareness

- Modern communication suites ensure seamless coordination with:
    - Maritime patrol aircraft
    - Helicopters
    - Coastal radar chains
    - Other naval platforms

This strengthens the Navy's ability to maintain a common operational picture.

vi. High Indigenous Content

The class reflects significant progress toward self-reliant defence manufacturing, involving:

- Cochin Shipyard Limited (construction)
- Garden Reach Shipbuilders and Engineers (parallel builds)
- DRDO laboratories
- A wide network of MSMEs supplying subsystems

This improves sustainability, reduces import dependence, and enhances long-term lifecycle support.

d. The Wider Procurement Programme and Fleet Modernisation

The Mahe-class emerges from a 2013 programme to build 16 shallow-water ASW craft, one of India's largest coastal warfare acquisitions.

i. Production Split

- Eight vessels at Cochin Shipyard Limited
- Eight vessels at Garden Reach Shipbuilders and Engineers (GRSE), Kolkata

This parallel construction accelerates induction and supports distributed shipbuilding capacity.

ii. Replacing the Ageing Abhay-Class

The new class will replace the Abhay-class corvettes (based on Soviet Pauk designs), many of which are nearing the end of operational life. This transition:

- Standardises technology
- Improves reliability
- Brings coherence to coastal ASW doctrine

e. Strategic Significance

i. Securing High-Value Coastal Assets

The Mahe-class strengthens protection for:

- Port infrastructure

- Offshore oil and gas platforms
- Undersea communication cables
- Naval harbours
- Commercial sea-lanes

Enhanced surveillance improves deterrence against covert submarine activity by adversaries.

ii. Countering Modern Submarine Threats

Diesel-electric submarines are among the quietest and hardest to detect. Their ability to exploit shallow waters makes them key tools of grey-zone competition. The Mahe-class provides:

- Persistent monitoring
- Rapid reaction
- Precise, targeted ASW capability

iii. Optimal Deployment of Larger Combatants

By assigning shallow-water duties to the Mahe-class:

- Frigates and destroyers are freed for blue-water and expeditionary roles.
- The Navy enhances overall force optimisation and operational flexibility.

iv. Boosting Indigenous Naval Capability

The project advances national goals of:

- Defence industrialisation
- Technology absorption
- Skill development in shipbuilding
- High-value employment generation

v. Strengthening India's Posture in the Indian Ocean

Improved coastal ASW coverage enhances maritime domain awareness and contributes to India's role as a regional security provider. This is increasingly important amid contested waters, expanding submarine inventories of neighbouring states, and intensifying Indo-Pacific competition.

Conclusion

The Mahe-class ASW Shallow Water Craft marks a significant enhancement to India's naval architecture. It brings together shallow-water manoeuvrability, modern sonar systems, lethal ASW weapons, and high indigenous content to fill a long-standing capability gap.

By securing critical littoral zones and freeing larger combatants for deep-sea operations, the class strengthens the Navy's readiness for evolving submarine threats. As part of a broader fleet-modernisation effort, the Mahe-class contributes meaningfully to India's maritime security strategy and reinforces its position as a stabilising force in the Indian Ocean Region.

GS Paper III: Disaster Management

1. India's High Vulnerability in the Climate Risk Index (CRI)

a. Introduction

India's consistently high placement in the Climate Risk Index (CRI) — a metric developed by Germanwatch using three decades of extreme weather data — highlights a stark reality: climate-linked disasters have become both systemic and structurally embedded in India's development trajectory. Even as early warning systems and disaster response capacity have improved, the scale, frequency and economic cost of climate extremes continue to rise. The CRI underscores this long-term vulnerability by focusing not on isolated events, but on cumulative human and economic impacts, revealing deeper resilience gaps in India's governance, planning and resource management.

b. What the Climate Risk Index Measures

The CRI evaluates long-term climate vulnerability using two pillars:

i. Human Impact

- Mortality and injuries
- Displacement
- Population affected

ii. Economic Losses

- Damage to housing, infrastructure, agriculture and livelihoods
- Impact on public finances and reconstruction needs

Because the CRI draws on multi-decadal data, it reveals structural exposure and institutional weaknesses, not just disaster-year anomalies.

c. India's Ranking: What the Numbers Reveal

Across three decades, India has ranked ninth among the world's most climate-affected countries — a reflection of both the scale of hazards and the degree of social and economic disruption.

Scale and Frequency

- 430+ major extreme weather events, among the highest globally
- Recurrent floods, cyclones, droughts, heatwaves, landslides

Human Impact

- ~80,000 deaths in 30 years
- Large vulnerable populations in hazard-prone regions intensify losses

Economic Impact

- USD 170 billion in cumulative losses
- Major damage to agriculture, coastal infrastructure, transport networks, housing, and urban systems

d. Why India Is So Vulnerable: Structural and Developmental Factors

i. Geographic Diversity of Hazards

India faces every major climate hazard, often simultaneously:

- Cyclones on the east coast
- Himalayan landslides
- Floods in major river basins
- Heatwaves across northern plains
- Droughts in semi-arid regions

This multidimensional exposure makes nationwide resilience challenging.

ii. High Population Concentration in Risk Zones

- Coastal megacities (Mumbai, Chennai, Kolkata)
- Urban settlements on floodplains
- Rapidly expanding Himalayan towns

Urban sprawl into ecologically fragile zones multiplies disaster risk.

iii. Dependence on Climate-Sensitive Agriculture

- ~50% of India's workforce depends on monsoon-driven agriculture
- Rainfall variability: direct impact on food security, incomes, and rural stability

iv. Rapid, Unplanned Urbanisation

- Poor drainage and shrinking wetlands means heightened flood risk
- Heat islands intensify exposure to rising temperatures
- Infrastructure not designed for climate extremes

e. Major Events That Drove India's High CRI Ranking

Cyclones

- Gujarat (1998), Odisha Super Cyclone (1999), Hudhud (2014), Amphan (2020)
- Heavy casualties and long-term infrastructure damage

Floods

- Uttarakhand (2013), Kerala (2018)
- Intense rainfall events magnified by land-use changes and weakened natural buffers

Heatwaves

- Temperatures nearing 50°C
- Longer and earlier heatwave seasons affecting wider geographies

f. Interpreting the CRI: What It Means for India

i. Progress Is Real – Fewer Deaths

- Cyclone early warning systems have drastically cut casualties
- NDMA, IMD and state disaster forces have improved coordination

ii. But Economic Losses Are Rising

- More infrastructure at risk

- Higher-value assets destroyed
- Growth corridors increasingly affected

iii. Climate Extremes Are Intensifying

Global warming leading to:

- More intense rainfall bursts
- Stronger cyclones
- Longer droughts
- Record-breaking heatwaves

iv. Development Models Must Adapt

Climate resilience must become a core planning principle, not an afterthought.

g. What India Must Do: A Strategic Adaptation Agenda

i. Build Climate-Resilient Infrastructure

- Drainage redesign in cities
- Flood-resilient roads, bridges and housing
- Heat-resilient building materials
- Coastal protection (mangroves, breakwaters, dune restoration)

ii. Strengthen Forecasting & Community Preparedness

- Hyper-local weather prediction
- Mobile alerts and digital communication systems
- Community training for evacuation and first response

iii. Transform Agriculture for Climate Resilience

- Drought-tolerant seeds
- Micro-irrigation, rainwater harvesting
- Diversified cropping systems
- Weather-indexed insurance coverage

iv. Adopt Nature-Based Solutions

- Restore wetlands and river floodplains
- Expand mangroves and coastal vegetation
- Increase green cover in cities
  These natural buffers are cost-effective and improve ecosystem stability.

v. Expand Climate Finance & Institutional Capacity

- Dedicated state adaptation funds
- Climate-sensitive planning across Smart Cities, AMRUT, PMAY, MGNREGA, Jal Shakti Mission
- Climate budgeting and vulnerability mapping at district and city levels

Conclusion

India's high standing in the Climate Risk Index reflects a deeply structural challenge: rising climate extremes intersecting with dense populations, fragile ecosystems, and rapid development. While India has significantly improved early warning and disaster response capacities, the scale of economic loss, ecological disruption and human exposure remains substantial.

A paradigm shift is now essential — from reactive disaster response to anticipatory, resilience-focused development. Climate-resilient infrastructure, nature-based solutions, advanced forecasting, diversified agriculture and stronger institutional systems together form the backbone of India's adaptation strategy.

As climate risks intensify, India's long-term development, urbanisation and food security will increasingly depend on how effectively it mainstreams resilience into every tier of governance.

GS Paper IV: Ethics, Integrity and Aptitude

1. Assisted Dying and the Idea of a Good Death: Ethical, Legal, and Societal Dimensions

a. Introduction

As medical science prolongs life far beyond what was previously possible, societies around the world are confronting a profound question: should individuals have some degree of choice in the manner and timing of their own dying? The debate arises not from a disregard for life, but from a growing recognition that end-of-life suffering—marked by chronic illness, loss of autonomy, and diminishing dignity—can become intolerable.

This shifts focus from the traditional concern with living well to an equally significant concern: what constitutes a "good death"—one that is peaceful, voluntary, conscious, free from undue suffering, and aligned with personal dignity and values. Assisted dying emerges as one of the most contested but unavoidable components of this debate.

b. Meaning and Scope of Assisted Dying

i. Definition

Assisted dying refers to a medical process in which a physician provides a mentally competent adult with the means to intentionally end their life under controlled, regulated conditions. It is typically sought when:

- A terminal illness causes unbearable suffering, or
- An irreversible loss of autonomy—relating to memory, mobility, or cognition—severely compromises dignity and quality of life.

ii. Distinction from Suicide and Passive Euthanasia

- **Suicide** is a private act without medical involvement.
- **Passive euthanasia**, already recognised in India, involves allowing death to occur naturally by withdrawing life-sustaining treatment under strict legal safeguards.
- **Assisted dying** is an *active* medical intervention with explicit, voluntary consent.

This distinction is central to evaluating the moral and legal boundaries of end-of-life choices.

c. Why Assisted Dying Is Globally Debated

i. Ethical Tensions Between Autonomy and Protection

Proponents argue that autonomy is meaningful only if individuals retain the right to make deeply personal decisions about their own bodies—especially when illness erodes independence and causes profound suffering. Respecting agency, they contend, is part of a compassionate society's moral duty.

Opponents caution that autonomy is fragile in the context of terminal illness. Choices may be shaped by loneliness, financial burdens, social neglect, or inadequate care. A model that appears to empower individuals may, in practice, expose vulnerable groups to subtle coercion.

ii. Slippery Slope Concerns

Many worry that once assisted dying is permitted in narrow scenarios, the criteria may gradually expand—potentially covering chronic disability, psychological distress, or social suffering. This raises broader fears about normalising death as a solution to hardship.

iii. The Sanctity-of-Life Perspective

Religious and cultural traditions emphasise the inherent value of life, cautioning against deliberate actions that end it. These views remain influential in shaping public opinion and legislative restraint.

d. Global and Indian Legal Landscape

i. International Practices

A limited but growing group of jurisdictions—including the Netherlands, Canada, Switzerland, Spain, New Zealand, Australia, and several U.S. states—permit assisted dying with stringent safeguards. Evidence from these countries shows:

- It accounts for a small proportion of total deaths.
- Usage is cautious and heavily regulated.
- Safeguards are periodically reviewed and strengthened.

ii. Indian Position

India remains conservative on assisted dying.

- Assisted dying is illegal.
- Passive euthanasia is permitted under strict judicial guidelines (Aruna Shanbaug, *Common Cause*).

India's caution is shaped by:

- Strong cultural norms emphasising care and familial responsibility,
- Limited palliative care infrastructure,
- Concerns that social inequality and weak elder-care systems could compromise genuine consent.

e. Core Ethical Challenges

i. Autonomy vs. Vulnerability

Chronic illnesses such as dementia progressively erode decision-making capacity. Determining when consent is informed and voluntary—especially for neurodegenerative conditions—is ethically complex.

ii. Nature and Sources of Suffering

Assisted dying inquiries often reveal suffering rooted not only in illness but also in:

- Loneliness
- Insufficient caregiving support
- Economic distress
- Emotional abandonment

Distinguishing medical suffering from social suffering is difficult yet essential.

iii. The Idea of a "Good Death"

The concept varies by individual and culture. For some, a good death involves:

- Minimal physical pain
- Preservation of dignity

- Conscious closure with loved ones
- Avoiding prolonged medical intervention

For others, the sanctity of life or religious teachings inform their view of what constitutes an ethical end.

iv. Determining Ethical Boundaries

Should assisted dying apply only to terminal illness?
To irreversible loss of autonomy?
To unbearable, intractable suffering?

Different countries draw these boundaries differently, reflecting their moral and social frameworks.

f. Why the Debate Will Intensify in India

i. Demographic Ageing

India's population of elderly citizens is growing faster than its care infrastructure. Neurodegenerative diseases like Alzheimer's and Parkinson's are rising, increasing demand for long-term and end-of-life care.

ii. Shrinking Families and Care Constraints

Joint family support systems are weakening. Elderly individuals often face care shortages, financial strain, and emotional isolation.

iii. Weak Palliative Care and Mental Health Infrastructure

India's palliative care coverage remains limited. Without adequate support, individuals may seek assisted dying not due to unbearable pain but due to unmet psychosocial needs—a scenario society must guard against.

g. A Humane and Responsible Way Forward

i. Strengthening Palliative and Hospice Care

A compassionate response requires ensuring that no one chooses death because basic end-of-life suffering is untreated. Strengthening palliative services, pain management, and caregiver support is foundational.

ii. Initiating a Broad and Inclusive National Dialogue

A constructive debate must involve:

- Medical professionals
- Courts and legal scholars
- Ethicists
- Civil society and religious leaders
- Caregivers and patient families

Such dialogue can clarify values, acknowledge concerns, and build societal consensus.

iii. Safeguards for Any Future Legal Consideration

If India ever considers assisted dying:

- Multiple medical opinions
- Assessments by psychiatrists
- Proof of informed and voluntary consent

- Waiting periods and written directives
- Special protection for patients with cognitive decline
- Independent oversight bodies

must be mandatory and transparent.

iv. Strengthening Elder Care and Social Support

A society must ensure that individuals do not feel compelled toward extreme choices due to neglect, loneliness, or financial hardship. Strengthening elder-care services, social safety nets, and mental health support is essential.

Conclusion

The debate on assisted dying compels societies to confront essential questions about autonomy, dignity, care, and responsibility. While modern medicine has extended life, it has also created new dilemmas regarding the quality of that life, especially in its final stages.

For India, the challenge is twofold: upholding dignity in life and compassion at the end of life. As demographic ageing accelerates, a mature, inclusive, ethically grounded conversation will be vital. The goal is not to normalise death as an option, but to ensure that every individual can live—and eventually die—with dignity, care, and respect.

Reader's Note — About This Current Affairs Monthly Compilation

Dear Aspirant,

This document is part of the PrepAlpine Current Affairs Series — designed to bring clarity, structure, and precision to your UPSC learning.

While every effort has been made to balance depth with brevity, please keep the following in mind:

1. Orientation & Purpose

This compilation is curated primarily from the UPSC Mains perspective — with emphasis on conceptual clarity, analytical depth, and interlinkages across GS papers.

However, the PrepAlpine team is simultaneously developing a dedicated Prelims-focused Current Affairs Series, designed for:

- factual coverage
- data recall
- Prelims-style MCQs
- objective pattern analysis

This Prelims Edition will be released separately as a standalone publication.

2. Content Length

Some sections may feel shorter or longer depending on topic relevance and news density.
To fit your personal preference, you may freely resize or summarize sections using any LLM tool (ChatGPT, Gemini, Claude, etc.) at your convenience.

3. Format Flexibility

The formatting combines:

- paragraphs
- lists
- tables
- visual cues

—all optimised for retention.

If you prefer a specific style (lists → paras, paras → tables, etc.), feel free to convert using any free LLM.

4. Suggest Topics for Coverage

If you feel any important theme is missing or under-covered, simply post it in the "Suggestions" channel on our Discord server.

Our content team regularly reviews inputs and includes relevant suggestions in upcoming Monthly Current Affairs Modules.

Together, these resources embody the PrepAlpine vision:

Better Content. Smarter Mentorship. Intelligent Preparation.