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A. Polity & Governance

1. **Trace the evolution of environmental jurisprudence in India. In recent years, has the judiciary diluted its role as the guardian of environmental rights in the recent years? Substantiate. (15M, 250 Words)**

Environmental jurisprudence in India represents one of the most significant examples of judicial innovation, where courts expanded constitutional rights to address ecological degradation. By reading environmental protection into the **Right to Life under Article 21**, the judiciary emerged as a key institution balancing development with sustainability.

Evolution of environmental jurisprudence in India:

1. **Constitutional Foundation:** The Indian Constitution provides a robust ecological framework:
 - **Article 21:** Interpreted to include the right to a clean and healthy environment.
 - **Article 48A:** Mandates the State to protect and improve the environment.
 - **Article 51A(g):** Imposes a duty on citizens to safeguard nature.

Together, these provisions enabled courts to constitutionalise environmental protection.
2. **Judicial Activism and Doctrinal Expansion (1980s–1990s):** The Supreme Court adopted an activist role to address regulatory failures:
 - **Rural Litigation & Entitlement Kendra (1988):** Recognised environmental health as part of Article 21.
 - **M.C. Mehta v. Union of India (1987):** Introduced **Absolute Liability** for hazardous industries.
 - **Vellore Citizens Welfare Forum (1996):** Embedded the **Precautionary Principle** and **Polluter Pays Principle** into Indian law.
 - **T.N. Godavarman (1996):** Expanded the definition of forests beyond statutory records.

This phase firmly established courts as custodians of ecological justice.

Judiciary as the guardian of environmental rights:

Thus judiciary,

1. Prioritised **prevention over mitigation**.
2. Applied **Public Trust Doctrine**, holding natural resources in trust for the people (*M.C. Mehta v. Kamal Nath*).
3. Recognised **inter-generational equity**, protecting the rights of future generations.
4. Environmental protection was treated as a **non-negotiable constitutional obligation**.

Dilution in recent times:

1. **Shift in Judicial Philosophy:** There is a visible transition from strict precaution to development-friendly balancing, where ecological risks are accepted based on mitigation assurances.
2. **Weakening of Environmental Impact Assessment (EIA):**
 - Judicial acceptance of **post-facto environmental clearances** undermines deterrence.
 - Dilution of public hearings and sectoral exemptions reduces procedural safeguards.
3. **Narrow Technical Interpretations:** In recent **Aravalli Hills cases, 2024–25**, ecological protection was restricted using limited legal definitions, disregarding hydrological and biodiversity functions.
4. **Project-Centric Clearances:**
 - **Char Dham Highway Project:** Strategic considerations outweighed Himalayan fragility, resulting in landslides and river disturbances.
 - **Mangrove clearances in Mumbai:** Compensatory plantations accepted despite loss of mature ecosystems.

Implications of Judicial retreat:

1. Erosion of **Article 21's** environmental content.
2. Dilution of the **Public Trust Doctrine**, enabling commodification of nature.
3. Potential violation of **Article 14**, due to selective regulatory leniency.
4. Environmental protection becomes **conditional**, increasing long-term climate and disaster risks.

Way Forward:

1. **Re-anchoring Judicial Philosophy:** Restore primacy of precaution, prevention, and inter-generational equity in judicial reasoning.
2. **Strengthening Environmental Impact Assessment:** Prohibit routine post-facto clearances and ensure robust, participatory, and science-based EIAs.
3. **Reinforcing the Public Trust Doctrine:** Treat forests, wetlands, coastlines, and biodiversity as inalienable public assets, not compensable commodities.
4. **Science-Based Environmental Thresholds:** Judicial decisions must rely on ecological functionality, not narrow statutory definitions.
6. **Legislative Backing:** Enact an umbrella Climate Change Law, as indicated in *M.K. Ranjitsinh v. Union of India*, to guide courts and regulators.

Conclusion:

Environmental jurisprudence is the **constitutional conscience of development**. As held in *M.C. Mehta v. Kamal Nath*, natural resources are held in trust for the people and future generations. Sustainable development demands not judicial retreat but renewed constitutional vigilance.

'+1' Value Addition:

- **Over 40% of India's biodiversity hotspots** lie outside protected areas, making judicial oversight critical.
- India has lost **30% of its natural wetlands** since **1990**, often due to regulatory dilution.
- **European Court of Human Rights, 2024** upheld citizens' climate lawsuit against governments signifying rights-based climate adjudication.
- India has lost **30% of natural ecosystems** since **1990** as per the UNEP.

2. **"The Anti-Defection Law was enacted to ensure political stability, but over time it has raised serious concerns regarding legislative autonomy and democratic accountability." Examine the working of the Anti-Defection Law in India and suggest reforms to address its shortcomings. (15M, 250 Words)**

The Anti-Defection Law was inserted into the Constitution through the **52nd Constitutional Amendment Act, 1985**, adding the **Tenth Schedule**, to curb rampant political defections that destabilised governments in the 1960s–70s.

Significance of the Anti-Defection law:

1. **Political instability:** Between **1967–1971**, over **50% of elected legislators** in some states defected at least once, leading to frequent government collapses.
2. **'Aaya Ram–Gaya Ram' politics:** Haryana MLA **Gaya Lal** changed parties three times in a single day.
3. **Curbing horse-trading:** Defections were often driven by ministerial inducements and monetary benefits.
4. **Protecting electoral mandate:** Voters elect parties, not individuals acting opportunistically.
5. **Strengthening executive governance:** Prevents legislative sabotage of elected governments.

Key provisions of the Anti-Defection law:

1. **Grounds of disqualification:** Voluntarily giving up party membership and voting or abstaining against the party whip.
2. **Independent members:** Disqualified if they join a party post-election.
3. **Nominated members:** Disqualified if they join a party after six months.
4. **Merger exception:** Valid only if supported by **two-thirds of legislators**.
5. **Decision-making authority:** **Speaker/Chairman** of the House (quasi-judicial role).

Judicial Safeguards:

1. **Kihoto Hollohan v. Zachillhu (1992):** Upheld constitutionality of the Tenth Schedule and declared Speaker's decision **subject to judicial review**.
2. **Ravi S. Naik v. Union of India (1994):** "Voluntarily giving up membership" includes **conduct**, not only resignation.
3. **Keisham Meghachandra Singh v. Speaker, Manipur (2020):** Directed Speakers to decide disqualification petitions within **three months**.

Anti-Defection Law dilutes legislative autonomy and democratic accountability:

1. **Suppression of Legislative Dissent:**
 - MPs/MLAs cannot vote against party lines even on policy issues.
 - Reduces Parliament to a numbers game, weakening deliberation.
2. **Partisan Role of the Speaker:**
 - Speaker often belongs to the ruling party and delays in disqualification alter political outcomes.
 - For E.g., Manipur Assembly (2017–2020) disqualification delays affected government stability.
3. **Mass Defections via Merger Clause:** Two-thirds rule enables engineered bulk defections as seen in multiple state assemblies. E.g., Shiv Sena and NCP split and merger in Maharashtra.
4. **Weakening Representative Democracy:** Legislators prioritise party commands over constituency interests and voters lose the benefit of independent judgment.

Way Forward:

1. **Independent Adjudication:** Transfer decision-making from Speaker to Election Commission, or independent tribunal (as suggested by 2nd ARC, Law Commission).
2. **Restricting Use of Whips:** Allow whips only for Confidence / no-confidence motions, Money Bills and Constitutional amendments.
3. **Time-Bound Decisions:** Statutory enforcement of 3-month deadline for defection cases.
4. **Revisiting Merger Provisions:** Prevent misuse of two-thirds rule for political engineering.
5. **Restoring Legislative Autonomy:** Balance party discipline with freedom of speech of legislators (Articles 105 & 194) and constituency representation.

Conclusion:

As Dr. B.R. Ambedkar cautioned, constitutional morality cannot be enforced solely by law. Reforms that preserve stability while restoring legislative independence are essential for the health of India's parliamentary democracy.

'+1' Value Addition:

- 91st CAA, 2003 significantly reduced incentives for defection by capping ministerial posts.
- Supreme Court observed that Speakers cannot be the "sole and final arbiters" in defection disputes.
- India's experience shows that stability without deliberation risks executive dominance.
- In UK, USA, Canada, Australia, no anti-defection law and legislators can vote against party positions.

3. The reorganisation of states in post-independence India has played a crucial role in balancing unity and diversity. Critically examine with suitable examples. (15M, 250 Words)

The reorganisation of states, beginning with the **Andhra State Act, 1953** and institutionalised through the **States Reorganisation Act, 1956**, marked a defining phase in India's nation-building. By recognising linguistic and regional aspirations within the constitutional framework of **Article 3**, India adopted a flexible federal model that strengthened rather than weakened national unity.

Significance of State Reorganisation:

1. Strengthening National Integration:

- Linguistic accommodation prevented alienation and separatism. For example, Formation of **Andhra Pradesh (1953)** after Potti Sreeramulu's fast.
- India avoided large-scale ethnic fragmentation unlike several post-colonial states.

2. Deepening Cooperative Federalism:

- The **7th Constitutional Amendment Act, 1956** abolished Part A, B, C categories and standardised the federal structure.
- Article 3 gives Parliament flexibility to reorganise states without constitutional rigidity which strengthened cooperative federalism.
- For example, **Telangana** created through parliamentary process despite political contestation.

3. Improving administrative efficiency:

- Smaller states enhanced governance in geographically challenging areas.
- For e.g., **Uttarakhand (2000)** improved hill-area administration and **Chhattisgarh (2000)** enabled focused tribal and mineral development.

4. Addressing ethnic aspirations:

- **Nagaland, 1963** and **Mizoram, 1987** emerged from insurgency contexts.
- The **Mizoram Peace Accord, 1986** transformed a conflict region into a stable state.
- Special provisions under **Article 371A & 371F** also safeguarded cultural autonomy.

5. Promoting linguistic and cultural identity:

- Article **350A** ensured mother-tongue education for linguistic minorities.
- Kerala formation in 1956 unified Malayalam speakers while a separate Gujarat state consolidated Gujarati identity. It strengthened participatory democracy at regional levels.

6. Facilitating targeted economic development:

- Jharkhand enabled focused tribal welfare and mineral-based planning.
- Himachal Pradesh achieved high human development indicators after statehood in 1971.
- Post-2000 states showed improved GSDP growth during early years.

Key concerns associated with state reorganisation:

1. Proliferation of identity-based demands:

- Ongoing demands for **Vidarbha, Gorkhaland, Bodoland, Bundelkhand** etc. Show the risk of competitive regionalism and fragmentation politics.
- Statehood movements may escalate into agitation and instability.

2. Economic viability issues:

- Smaller states may lack revenue base and depend heavily on central transfers. Also, the risk of administrative duplication increasing costs
- For example, Several North-Eastern states have high fiscal deficits and low own-tax revenue.

3. Politicisation of statehood movements:

- Risk of short-term political gains overriding long-term governance considerations.
- Telangana movement in the 2000s witnessed prolonged political mobilisation.

4. Inter-state disputes:

- Boundary and capital disputes such as Chandigarh between Punjab and Haryana.
- River water conflicts intensified after bifurcation as seen Krishna water dispute post-Telangana.

Conclusion:

State reorganisation in India reflects a dynamic and accommodative federalism that balances unity with diversity. As B.R. Ambedkar envisioned, India's federation remains "indestructible," but its strength lies in its ability to adapt responsibly to regional aspirations.

'+1' Value Addition:

- India had 14 states and 6 UTs in 1956 while today it has 28 states and 8 UTs.
- Himachal Pradesh achieved literacy rate above 80%, attributed partly to manageable administrative scale.
- North-Eastern States Reorganisation Act, 1971 significantly reduced insurgency intensity over decades.
- Article 371 (A–J) reflects asymmetric federalism accommodating regional diversity.

4. The Indian Judiciary's Essential Religious Practices (ERP) doctrine has sought to balance religious freedom with constitutional morality. In this context, examine the evolution of judicial intervention in religious issues in India. (10M, 150 Words)

The Constitution of India guarantees religious freedom under **Articles 25 and 26**, while simultaneously subjecting it to public order, morality, health, and other Fundamental Rights. To reconcile denominational autonomy with constitutional supremacy, the Supreme Court evolved the **Essential Religious Practices (ERP) doctrine** in *Shirur Mutt* (1954).

ERP doctrine balances religious freedom with constitutional morality:**1. Distinction between faith and administration:**

- The ERP doctrine first distinguishes between what is genuinely religious and what is secular or administrative in nature.
- In *Shirur Mutt* (1954), the Court held that essential religious practices are protected, but secular aspects, such as financial administration of temples can be regulated by the State.

2. Protecting Core and excluding superstitions:

- In *Durgah Committee* (1961), the Court clarified that only practices integral to a religion are protected, and superstitious or extraneous accretions do not enjoy constitutional immunity.
- By filtering out non-essential customs, the doctrine prevents religion from being used to legitimise irrational or socially harmful practices.

3. Social reform within constitutional boundaries:

- The ERP doctrine has been invoked to facilitate reform when practices conflict with equality and dignity.
- In *Shayara Bano* (2017), Triple Talaq was held not essential to Islam and therefore unconstitutional.

4. Subordinating religious autonomy to constitutional morality:

- In *Sabarimala case*, 2018, the Court held that even an essential practice cannot survive if it violates fundamental rights such as equality.
- Thus, constitutional morality acts as the ultimate yardstick, placing the Constitution above denominational claims.

Evolution of judicial intervention in religious issues:

1. **Pre-Constitutional Phase: civil rights and access:**
 - Before independence, religious disputes were addressed largely through a civil rights lens.
 - In *Sankaralinga Nadan v. Raja Rajeswara Dorai* (1908), the Privy Council adjudicated caste-based temple entry restrictions.
2. **Foundational Phase: birth of the ERP doctrine, 1950s-60s:**
 - With the Constitution in force, courts assumed a more active interpretative role.
 - In *Shirur Mutt* (1954), the Supreme Court formally articulated the ERP test. Soon after, *Durgah Committee* (1961) refined the doctrine by limiting protection to integral practices.
3. **Rationalisation Phase: narrowing essentiality, 1990s-2000s:**
 - In cases such as *Ismail Faruqui* (1995) and *Ananda Marga* (2004), the Court tightened the standard, holding that a practice is essential only if its absence fundamentally alters the religion.
 - This phase reflected judicial caution and doctrinal consolidation.
4. **Transformative constitutional phase: Primacy of equality, 2010s:**
 - The 2010s witnessed a rights-centric shift. In *Shayara Bano* (2017) and *Sabarimala* (2018), the Court prioritised equality and dignity over religious autonomy.
 - Judicial intervention became more reformist, aligning religious adjudication with transformative constitutionalism.
5. **Contemporary rebalancing: Respecting denominational autonomy, 2020s:**
 - Recent High Court decisions such as *P. Navin Kumar* (2024), *Thiruparankundram Deepathoon* (2026), and *Kanchipuram Varadaraja Perumal* (2026) show greater sensitivity to sectarian rights under Article 26.
 - These rulings signal an effort to prevent excessive administrative or judicial intrusion into long-standing rituals.

Conclusion:

The ERP doctrine represents a uniquely Indian constitutional experiment in reconciling faith with reform. The evolution of the ERP doctrine reflects India's attempt to harmonise religious pluralism with constitutional supremacy, ensuring that faith flourishes, but never beyond the limits of equality and dignity.

'+1' Value Addition:

- Tamil Nadu HR&CE Department administers **44,000+ temples** show the scale of state oversight
- Unlike U.S. separationism, India follows **Positive Secularism** model emphasising "principled equidistance".
- **Law Commission, 2018**, favoured "reform from within" communities over externally imposed uniformity.

5. **Urban Local Bodies (ULBs) in India face persistent structural, financial, and functional challenges that undermine effective decentralised governance. In this context, evaluate how the 16th Finance Commission's recommendations seek to address these gaps. (15M, 250 Words)**

India's urban population is projected to reach **41% by 2031**, with cities generating over **60% of GDP**. Yet Urban Local Bodies (ULBs), constitutionally empowered under the **74th Constitutional Amendment**, remain fiscally and functionally constrained.

Major challenges in Urban local governance:

1. **Financial Constraints:** ULBs suffer from chronic revenue weakness as only **32% of revenues** are internally generated, with heavy dependence on state and Union transfers.

2. **Mismatch:** There exists a **42% gap between resources and expenditure**. Property tax realisation stands at just **56% of demand** and contributes barely **10–11% of municipal revenues** in many states.
3. **Incomplete functional devolution:** Although the 74th Amendment listed **18 functions**, studies show only **4 functions** are fully devolved in practice.
4. **Capacity deficits:** ULBs face an average **35 - 37% vacancy rate** in sanctioned posts while in 16 states, municipalities lack independent recruitment powers.
5. **Governance issues:** Rising bureaucratic interference and political capture cripple effective governance. Delayed State Finance Commissions (SFCs) further weaken fiscal predictability.
6. **Planning gaps:** Census 2011 recorded **31% urban population**, but the latest World Bank estimates show that **54% of Indian population live in urban areas**, indicating discrepancies.

Role of the 16th Finance commission in addressing these challenges:

1. **Enhanced fiscal support:**
 - Raised urban share of local body grants to **45% from 36% under 15th FC**.
 - Recommended **₹3.56 lakh crore** for ULBs which is more than double the previous allocation of ₹1.55 lakh crore.
2. **Alignment with urbanisation trends:**
 - The higher allocation anticipates rising urbanisation (projected to be **41% by 2031**).
 - It provides a financial cushion in case Census 2027 reflects a higher urban growth of more than 40%, preventing under-preparedness.
3. **Predictability in transfers:** By maintaining **41% vertical devolution to states** and refining horizontal criteria (including contribution to GDP at 10%), the Commission attempts to balance equity with performance.
4. **Incentivising urban governance reform:** Larger unconditional and tied grants encourage better property tax reforms, improved service delivery, and strengthening grassroots infrastructure (water, sanitation, waste management).
5. **Correcting fiscal imbalance:** Urban share has progressively increased from **19% in 10th FC to 45% in 16th FC**, acknowledging structural economic transformation.

Further measures needed:

1. **Deepen functional devolution:**
 - States must fully operationalise the **18 functions under the 74th Constitutional Amendment**.
 - Reduce overlap with parastatal agencies and activate District Planning Committees to ensure genuine decentralisation.
2. **Strengthen own-source revenues:**
 - Reform property tax systems through GIS mapping, digital assessment, and better enforcement.
 - Expand user charges and explore municipal bonds to reduce overdependence on transfers.
3. **Build administrative capacity:** Invest in urban cadre development, and enhancing training in urban planning, finance, and project management.
4. **Improve Urban governance systems:** Integrate digital governance platforms, and link grants to measurable performance indicators for transparency and accountability.

Conclusion:

The 16th Finance Commission strengthens the financial backbone of urban local governance, but true decentralisation will depend on functional autonomy, institutional capacity, and accountable urban planning.

'+1' Value Addition:

- Urban areas contribute **over 60% of India's GDP** but receive historically lower fiscal priority.
- ULB staffing vacancy averages **35 - 37%** nationwide.
- 16th FC allocation to ULBs is nearly **15 times higher** than 13th FC grants.
- Property tax realisation remains at **56% of assessed demand**, indicating reform potential.
- Urban local bodies face a **42% fiscal resource gap**, constraining service delivery.

B. Economy**6. Examine the impact of the global headwinds on Indian economy. Also, explore the opportunities such geo-economic disruptions create. (15M, 250 Words)**

India is the world's **fifth-largest economy**, yet it remains deeply integrated with global trade, capital flows, energy markets and supply chains. In the post-pandemic era, rising **protectionism, geopolitical conflicts and geo-economic fragmentation** have reshaped the global economic order.

Key challenges facing the Indian economy amid global headwinds:

1. **Adverse Global Trade Environment:**
 - Rising protectionism and tariff escalation have constrained market access. India's export growth fell to **3.9% in Q4 FY24** from **7.4% in the previous quarter**.
 - Reports of steep tariff threats by the US and debates over EU's **CBAM** raise costs for Indian exporters in textiles, steel and engineering goods.
2. **Commodity Price Shocks:** Global energy and food price volatility has intensified inflationary pressures.
 - Imported inflation surged from **1.3% in June 2024** to **31.1% in Feb 2025**, driven by oils, metals and fertilisers.
 - With India importing nearly **80% of its crude oil**, external shocks directly affect inflation and fiscal balance.
3. **Supply Chain Disruptions:** Geopolitical conflicts have disrupted major shipping routes. Red Sea disruptions increased freight costs and delivery delays, raising input costs for Indian manufacturers.
4. **Currency Pressure:** Tight global monetary conditions have impacted capital flows. The rupee depreciated to a record **₹88.36 per US dollar**, increasing external debt servicing costs and import bills.
5. **Declining FDI Inflows:** Global uncertainty has dampened investment sentiment. Net FDI inflows dropped sharply to **\$35 million in May 2025**, from **\$2.2 billion a year earlier**, constraining infrastructure and manufacturing expansion.

Opportunities from Geo-economic disruptions:

1. **Supply-Chain Diversification (China+1):** Global firms are seeking alternatives to single-country dependence. Electronics and semiconductor investments under **Make in India** and **PLI** position India as a viable manufacturing hub.
2. **Digital Economy Leadership:**
 - India's IT-BPM sector is projected to reach **USD 350 billion by 2026**, contributing nearly **10% of GDP**.
 - Platforms like **UPI and Aadhaar** are emerging as global digital public infrastructure models.
3. **Energy Transition Advantage:**
 - India's installed renewable capacity reached **220 GW by March 2025**.
 - Green hydrogen and battery storage offer export opportunities in a low-carbon global economy.

4. **Defence self-reliance:** Defence exports grew **34-fold** between FY14 and FY25, reflecting rising global trust.
5. **Semiconductor Manufacturing:** Under SEMICON India, ₹76,000 crore has been committed to building a domestic chip ecosystem.

Measures to enhance India's economic resilience:

1. **Diversified Trade Architecture:** Reduce overdependence on the US and EU by expanding trade with Africa, Latin America and ASEAN, supported by FTAs like India-UAE CEPA.
2. **Strengthening Domestic Manufacturing:** Deepen local value addition in electronics, APIs and energy equipment through PLI and Atmanirbhar Bharat, reducing import vulnerability.
3. **Energy and Food Security:** Accelerate renewable energy deployment, expand strategic oil reserves and modernise agri-logistics to cushion external shocks.
4. **Technological Sovereignty:** Build indigenous capacity in AI, semiconductors, 5G/6G and cybersecurity, reducing dependence on geopolitically sensitive technologies.
5. **Rupee Internationalisation:** Promote rupee-denominated trade settlements such as in energy imports, to reduce dollar dependence and enhance monetary autonomy.

Conclusion:

The challenge is not merely to withstand these headwinds, but to **convert disruption into strategic advantage**. In doing so, India can evolve from a **rule-taker to a rule-shaper** in the emerging geo-economic order.

'+1' Value-Addition:

- **33% of India's merchandise exports** go to the US and EU, increasing exposure to protectionist shocks.
- **Red Sea disruptions** pushed Asia-Europe freight rates up **2–3×** in 2025, raising costs for Indian exporters.
- India imports **80% of crude oil**. Every \$10 rise in oil prices widens the CAD by **0.3% of GDP**.
- **FPI outflows of around ₹1.7 lakh crore** during global risk-off phases underline financial exposure.
- **Apple/Foxconn/Pegatron's expansion** in India shows re-routing of global manufacturing from China.

7. **The Four Labour Codes represent the most comprehensive labour reform in independent India. Examine their significance in balancing worker welfare and economic flexibility. Also discuss the key challenges in their effective implementation. (15M, 250 Words)**

The nationwide rollout of the Four Labour Codes marks a structural transformation of India's labour governance by consolidating **29 fragmented laws** into four unified codes. With implementation beginning in November 2025, these reforms aim to modernise labour regulation, expand social security, and enhance ease of doing business in a rapidly evolving economy.

Significance of the Four Labour Codes:

1. **Simplification & ease of compliance:**
 - Single registration, single licence, single return system.
 - Unified definition of "wages" reduces litigation.
 - Raises layoff threshold from **100 to 300 workers**, providing flexibility to MSMEs.
 - Helps India improve its **Ease of Doing Business** competitiveness.

2. Universal wage protection:

- Minimum wages extended to all workers which benefits 50 crore workforce.
- Introduction of **National Floor Wage** to reduce inter-state wage disparities.
- Mandatory timely wage payments and digital wage slips increase transparency.
- Promotes “equal pay for equal work” and prohibits gender wage discrimination.

3. Expansion of Social Security:

- First-time recognition of **gig & platform workers** benefitting 7.7 million workers.
- Aadhaar-linked portability via national portal (e-Shram database already has 29+ crore registrations).
- Expanded EPFO & ESIC coverage across sectors and regions.
- Leads to expansion of social security coverage from 19% in 2015 to 64% in 2025.

4. Investment Boost:

- Fixed-Term Employment (FTE) ensures parity in wages & gratuity after one year.
- Encourages formal hiring over informal contracting.
- It boosts manufacturing under **Make in India** & PLI schemes.

5. Workplace Safety:

- OSH Code extends safety norms to establishments with 10+ workers.
- Free annual health check-ups for workers aged 40+.
- Women allowed night shifts with safety safeguards.
- Expanded definition of interstate migrant workers.

Key challenges in implementation:**1. Informality dominance:**

- 80–90% of India’s workforce remains informal.
- Only 25% currently contribute to formal social security schemes.
- Thus, legal entitlements risk remaining symbolic without formalisation.

2. Dilution of job security:

- Raising layoff threshold to 300 workers may weaken bargaining power.
- For e.g., Rajasthan’s earlier reform saw increased contract hiring at the cost fixed jobs.

3. Enforcement deficit:

- India’s labour inspector-to-worker ratio remains low while digital compliance is also weak at state level.
- Variation in rule notification across states creates federal asymmetry.

4. Gig worker ambiguity:

- Aggregator contribution mechanisms are not uniformly defined.
- Sustainability of welfare funds is uncertain without stable financing.

5. Federal coordination gaps: States like Gujarat, Karnataka, UP notified rules early while others lagged. Such uneven implementation may create regulatory arbitrage.**Way forward:**

1. **Link flexibility with protection:** Mandate reskilling funds alongside 300-worker threshold.
2. **Strengthen inspection architecture** via digital inspections & AI-based compliance.
3. **Tripartite oversight councils** consisting of worker - employer - state.
4. **Targeted informal worker onboarding** via e-Shram integration.
5. Clear guidelines for gig-worker co-contribution fund mechanism.

Conclusion:

The Four Labour Codes attempt to recalibrate India's labour regime from rigid, fragmented regulation to a unified, growth-oriented yet welfare-sensitive framework. These codes can support **formalisation, industrial growth, and inclusive development**, strengthening India's trajectory toward a resilient and competitive labour ecosystem.

'+1' Value Addition:

- India has over 50 crore workers, second-largest labour force globally.
- Germany's Kurzarbeit model cited as balancing flexibility with worker protection.
- Tamil Nadu's tripartite boards offer an example of social dialogue mechanisms.
- Rajasthan's Gig Workers Welfare Fund allocated ₹200 crore as pilot support.

8. "State-led capital expenditure is a key driver to sustain India's growth momentum." Examine the trends in states' capital expenditure and also elucidate the challenges in sustaining this momentum. (10M, 150 Words)

State-led capital expenditure (capex) spending on infrastructure such as roads, irrigation, power, health, and urban development has become a critical pillar of India's post-pandemic recovery. Unlike revenue expenditure, capex enhances long-term productive capacity and crowds in private investment. Given that states account for nearly **two-thirds of total public capex**, their fiscal strategy significantly shapes India's growth trajectory.

Trends in State's capital expenditure:

1. **Strong Capex expansion:**
 - Combined capex and loans & advances of **28 states doubled to ₹8.4 trillion**, growing at a **CAGR of 18.5%**.
 - In 2025-26 (Apr-Dec), capex grew **25.7% in Q3**, signalling revival after a weak first half.
2. **Central support as catalyst:**
 - **GST compensation loans (₹2.6 trillion in FY21-22)** provided fiscal breathing space.
 - **50-year interest-free capex loans worth ₹3.7 trillion (FY21-FY25)** incentivized asset creation.
3. **Reform incentives:**
 - Additional borrowing of **0.5-1.1% of GSDP** allowed under Union relaxations and 15th Finance Commission.
 - Power sector reform-linked borrowing enabled states to access **₹1.3 trillion extra (FY22-FY25)**.
4. **Divergence across states:**
 - States like **Maharashtra and Gujarat** maintained **capex-to-GSDP ratios above 3.5%**.
 - States with higher **Tax-to-GSDP ratios of more than 8%** such as Karnataka and Tamil Nadu financed welfare without breaching the **3% fiscal deficit norm**.

Challenges in sustaining this momentum:

1. **Revenue slowdown:**
 - Combined revenues of 18 major states grew only **7.7% (Apr - Dec 2025 - 26)** vs **22% budgeted**.
 - State GST growth moderated to **3.3%**, further constraining fiscal space.
2. **Rising welfare commitments:**
 - Cash transfers to women surged from **₹120 billion (FY23)** to **₹1.5 trillion (FY26)**, a **1,150% increase**.
 - High revenue expenditure leaves less than **20% of receipts** for discretionary development.

3. **Debt burden:** States like Punjab and Rajasthan (Debt-to-GSDP of more than 30%) spend over 20% of revenue receipts on interest payments.
4. **End of capex loan window:** Possible phasing out of ₹1.3 trillion annual capex support may create a funding vacuum. With near ending of GST compensation, revenue uncertainty persists.
5. **Execution bottlenecks:** Cost overruns in irrigation and road projects average 15–20%, reducing value-for-money.

Reforms needed:

1. **Institutionalising capex:** Institutionalize capex support as a formula-based mechanism under the 16th Finance Commission.
2. **Performance-linked borrowing flexibility:** Shift toward performance-linked borrowing limits (3–4% of GSDP) based on debt sustainability.
3. **Rationalising revenue expenditure:** Expand non-tax revenues and rationalize welfare with sunset clauses.
4. **Strengthening project execution capacity:** Improve project identification, monitoring, and implementation efficiency through universal adoption of PFMS and real-time expenditure tracking.

Conclusion:

Robust and well-managed state capital expenditure is central to sustaining India's growth momentum. The 16th Finance Commission's recommendations will be pivotal in shaping this trajectory.

'+1' Value Addition:

- States account for nearly 60–65% of total public capital expenditure in India - making their fiscal stance decisive for overall growth.
- RBI estimates capital expenditure has a multiplier of 2.45, significantly higher than revenue expenditure (0.99).
- States received ₹2.6 trillion as GST compensation loans (FY21–22), which prevented fiscal contraction during the pandemic.
- Centre extended ₹3.7 trillion (FY21–FY25) in 50-year interest-free loans, directly incentivising infrastructure creation.

9. Examine the significance of critical minerals for India. What challenges persist in building a resilient domestic value chain? What are the policy measures undertaken to secure the same? (10M, 150 Words)

Critical minerals such as lithium, cobalt, nickel, graphite and rare earth elements (REEs) are indispensable for clean energy technologies, advanced electronics, defence systems and digital infrastructure. Recognising their strategic importance, India notified a list of 30 critical minerals (2023) and launched the National Critical Mineral Mission (NCMM) with an allocation of ₹16,300 crore, signalling a shift from resource management to mineral security as a core national strategy.

Significance of Critical minerals for India:

1. **Energy transition goals:** India targets 500 GW of non-fossil fuel capacity by 2030 and Net Zero by 2070. Lithium and cobalt are central to EV batteries and energy storage.
2. **Industrial competitiveness:**
 - Gallium, germanium and silicon are critical for semiconductors and electronics.
 - India's PLI schemes cover at least seven sectors dependent on critical minerals, including electronics, solar PV, telecom, and Advanced Chemistry Cell batteries.

3. Strengthening national security:

- China controls about **90% of global rare earth processing** and 40% of cobalt, lithium and REE refining capacity (IEA data).
- Overdependence exposes India to geopolitical coercion and supply disruptions.

4. Infrastructure Imperative:

- India has 37.37 billion tonnes of coking coal reserves, yet imports rose from 51.2 MT (2020–21) to 57.58 MT (2024–25).
- Nearly 95% of steel industry requirement is import-dependent. Classifying coking coal as a critical mineral strengthens industrial resilience.

Challenges persist in building a resilient domestic value chain:

1. **Exploration deficit:** Mineral discovery timelines often exceed **10–15 years**. Limited deep-seated exploration and geological mapping gaps hinder exploration.
2. **Processing constraints:** India lacks high-purity refining capacity for lithium and REEs. Most processing is concentrated in China.
3. **Import dependence:** Top 3 mining and refining countries dominate global supply as per IEA data. Market concentration further increases vulnerability.
4. **Weak domestic recycling infrastructure:** Limited recovery rates for lithium, cobalt and REEs. Absence of large-scale battery recycling plants hindering infrastructure improvement.

Policy measures needed:**1. National Critical Mineral Mission (NCMM):**

- With ₹16,300 crore allocation, focus is on exploration, processing, overseas asset acquisition and R&D.
- It supports building domestic capacity across value chain.

2. Regulatory reforms:

- MMDR Amendment Act (2021) enabled private participation in exploration.
- Strengthening of NMET and opening exploration to junior miners.

3. Overseas asset acquisition: Khanij Bidesh India Ltd (KABIL) pursuing lithium blocks in Argentina and Australia to reduce concentration risk.**4. Downstream manufacturing push:**

- PLI schemes incentivise domestic production of solar modules, EV batteries, telecom equipment.
- The aim is to move from raw extraction to advanced manufacturing.

Conclusion:

In the era of clean energy and technological competition, critical mineral security is not merely an economic necessity but a strategic imperative for India's sustainable growth and geopolitical resilience.

'+1' Value Addition:

- IEA projects mineral demand for clean energy technologies could rise **4 - 6 times by 2040**.
- 69 globally critical minerals were benchmarked before finalising India's 30-mineral list.
- China dominates **90% rare earth processing**, creating strategic chokepoints.
- Recycling could meet up to **20 - 30% of lithium demand globally by 2040** as per the IEA estimates.

C. International Relations

10. Examine the nature and extent of Indian cultural influence in Southeast Asia with suitable examples. (10M, 150 words)

India's cultural influence in Southeast Asia evolved over centuries through **peaceful processes of trade, religion, migration, and intellectual exchange**, rather than military expansion. This interaction led to the **Indianisation of Southeast Asia**, producing enduring civilisational linkages visible in religion, polity, art, language, and social institutions.

Channels of Cultural Transmission:

1. **Maritime Trade Networks:** Indian merchants used Bay of Bengal - Straits of Malacca routes from the early centuries CE, facilitating not just trade but cultural diffusion. Ports became centres of settlement, temples, and learning.
2. **Migration and Settlements:** Indian traders, Brahmanas, monks, and artisans settled in Southeast Asia, forming cultural elites that advised local rulers.
3. **Religion and Philosophy:**
 - **Hinduism** (Shaivism, Vaishnavism) spread through royal patronage.
 - **Buddhism** spread via missionaries (e.g., Ashokan missions to Myanmar).
 - Concept of **Dharma, Karma, and Kingship** influenced state formation.

Political and Dynastic Influence:

1. **Kamboja (Cambodia):**
 - Founded in the 6th century CE.
 - Shaiva rulers patronised Sanskrit learning and temple culture.
 - **Angkor Wat temple of 12th century** depicts Ramayana and Mahabharata scenes.
2. **Champa (Vietnam):**
 - Hindu rulers promoted Shaivism and Vaishnavism.
 - Became a centre for Vedic and Dharmashastra learning.
3. **Indonesia (Srivijaya & later kingdoms):**
 - Yupa inscriptions of King Mulavarman show Vedic rituals and Brahmanical influence.

Language and Literature:

1. **Sanskrit** emerged as the language of administration and inscriptions.
2. Indian epics were adapted locally which can be seen in Ramayana becoming Reamker (Cambodia), Ramakien (Thailand), Kakawin Ramayana (Indonesia).
3. Indic concepts shaped legal and moral systems.

Art and Architecture:

1. Temple architecture in South-East Asia was inspired by **Gupta – Pallava – Chola styles**.
2. Indian iconography of Shiva, Vishnu, Buddha widely adopted. Examples Prambanan and Borobudur (Indonesia), and My Son temples (Vietnam).

Continuity into the Medieval Period:

1. Indian settlements and cultural exchanges continued till the **13th century CE**.
2. Chola naval expeditions under **Rajendra Chola I** strengthened Saiva Siddhanta influence.
3. Cultural links survived political change, showing **deep-rooted assimilation**.

Conclusion:

The spread of Indian culture in Southeast Asia was a dialogic and adaptive process, not a one-way imposition. Indian ideas blended with local traditions to create distinct Southeast Asian identities. India's civilisational diplomacy under the Act East Policy, further reaffirms India's role as a cultural bridge across Asia.

'+1' Value Additions:

- **Angkor Wat** is the world's largest religious monument and originally dedicated to Vishnu.
- **Over 1,000 Sanskrit inscriptions** found across Cambodia and Indonesia.
- **ASI-MEA restorations:** My Son (Vietnam), Vat Phou (Laos), Ta Prohm (Cambodia).
- **Veal Kantel inscription (Cambodia)** mentions recitation of Ramayana and Puranas.
- **Devanika inscription (Laos)** refers to Kurukshetra as *Dharmakshetra* outside India.
- India shaped Southeast Asia not by the sword, but by scripture, sea routes, and shared civilisation.

11. The proposed India-US Interim Trade Agreement (ITA) marks a strategic recalibration of bilateral economic relations. Critically examine. (10M, 150 Words)

India and the US agreed on a Framework for an Interim Trade Agreement (ITA) in 2026 to deliver early trade gains while negotiating a full Bilateral Trade Agreement (BTA). It aims to deliver early harvest gains while paving the way for a comprehensive Bilateral Trade Agreement (BTA).

Key Features of the India-US ITA:

1. **Tariff rationalisation:**
 - India to **reduce/eliminate tariffs** on US industrial goods and selected agri-food items such as nuts, fruits, soybean oil, wine, and spirits.
 - US reduced effective tariffs on Indian exports from **50% to 18%**, restoring competitiveness.
2. **Non-tariff barrier (NTB) easing:**
 - India to address licensing delays, standards-related barriers, especially in **medical devices, ICT, agri-products**.
3. **Sectoral concessions:**
 - US removed tariffs on **generic pharmaceuticals, gems & diamonds, aircraft parts**.
 - Preferential quota for Indian **auto parts** at lower tariffs.
4. **Strategic purchase commitment:**
 - India pledged to buy **\$500 billion of US goods over 5 years** (energy, aircraft, tech, coking coal).

Deal enables recalibration of bilateral economic relations:

1. **Export revival:** Labour-intensive sectors (textiles, leather, gems) regain price edge vs competitors like **Vietnam & Bangladesh (19–20% tariffs)**.
2. **Supply-chain resilience:** Reinforces India's role in **"China+1"** strategy and trusted value chains.
3. **Energy & technology alignment:** Shift toward US energy supplies; deeper cooperation in **GPUs, aviation, nuclear, data centres**.
4. **Macroeconomic stability:** Reduced trade uncertainty helped **stabilise the rupee** and boosted equity markets (Sensex/Nifty).

Key Challenges:

1. **Agricultural sensitivities:** Fear of subsidised US imports affecting Indian farmers; farmer unions (e.g., **SKM**) opposed concessions.
2. **Strategic autonomy:** Reduced Russian oil imports may strain India-Russia defence ties (e.g., **S-400 spares**).

3. **MSME pressure:** Near-zero tariffs on US machinery risk undercutting domestic manufacturers.
4. **Non-tariff hurdles:** Strict US SPS/TBT standards continue to restrict Indian agri and seafood exports.
5. **Import bill risk:** Higher-priced US energy could widen **Current Account Deficit** (India imports **88%** of oil).

Way Forward:

1. **Calibrated liberalisation:** Phase tariff cuts; ring-fence sensitive sectors (dairy, staples).
2. **MSME transition package:** Technology upgradation, credit, and skilling to compete with imports.
3. **Robust SPS/TBT mechanism:** Joint committee to prevent disguised protectionism.
4. **Diversification strategy:** Parallel FTAs (EU, UK, Gulf) to avoid over-dependence.
5. **Institutional safeguards:** Clear dispute resolution and monitoring for ITA implementation.

Conclusion:

The ITA is **more strategic than transactional**, aligning trade with geopolitics and supply-chain resilience. It aims at converting interim gains into a **credible, equitable BTA**. Done right, it can anchor India as a **trusted manufacturing and technology partner**; done hastily, it risks **asymmetric exposure**.

'+1' Value-Addition:

- India-US bilateral trade reached **USD 191 billion (2023)**, making the US India's largest trading partner.
- Indian textile exports to the US fell **20% in 2025** after tariffs peaked near **50%**.
- India imports **88% of crude oil**; discounted Russian oil saved **USD 25–30 billion (2022–24)**.
- US FDI into Indian manufacturing rose **22% in FY24** amid supply-chain de-risking.
- India supplies **40% of generic drugs** consumed in the US, thus tariff relief has public-health gains.

- 12. India-UAE relations have evolved from transactional energy ties to a comprehensive strategic partnership marked by growing economic and geopolitical convergence. Examine. Are there any hindrances to the relationship? (15M, 250 Words)**

India-UAE relations have undergone a structural transformation over the past decade, particularly after the signing of the **Comprehensive Economic Partnership Agreement (CEPA), 2022**. With bilateral trade crossing **\$100 billion in FY 2024–25** and a revised target of **\$200 billion by 2032**, the partnership today reflects deep economic integration, strategic trust, and geopolitical alignment in West Asia.

Key Areas of growing convergence:

1. **Economic & Trade Integration:**
 - CEPA eliminated or reduced duties on nearly 90% of tariff lines, institutionalising market access and accelerating trade growth.
 - The UAE has emerged as India's third-largest trading partner and a key FDI source, with investments exceeding \$22 billion since 2000.
2. **Energy Partnership:**
 - Energy ties have matured beyond transactional oil imports, with long-term LNG agreements such as the 10-year pact between HPCL and ADNOC.
 - Simultaneously, cooperation in green hydrogen, renewable energy, and Small Modular Reactors reflects alignment in energy transition goals.

3. Defence Cooperation:

- The signing of a Letter of Intent for a Strategic Defence Partnership in 2026 signals movement toward defence industrial collaboration and interoperability.
- Joint exercises such as Desert Cyclone demonstrate growing operational coordination in maritime and air domains.
- The UAE's de-hyphenation of India from Pakistan, evident in inviting India as Guest of Honour to the OIC in 2019, underscores geopolitical convergence.

4. Geoeconomics:

- The India–Middle East–Europe Economic Corridor (IMEC) positions the UAE as India's gateway to West Asia and Europe.
- Investments by DP World and commitments toward Dholera Special Investment Region illustrate a transition from portfolio flows to greenfield asset creation.

5. Digital Integration:

- Integration of UPI with AANI and RuPay with JAYWAN has reduced remittance costs for the 3.5 million-strong Indian diaspora.
- Collaboration between C-DAC and UAE's G42 for supercomputing clusters reflects movement toward high-end technological interdependence.

Major hindrances in the relationship:**1. Structural Trade Imbalance:**

- Despite trade expansion, India faces a trade deficit of approximately \$26 billion due to heavy energy imports.
- Concerns also persist regarding re-export of third-country goods through UAE free zones.

2. Geopolitical Vulnerability of IMEC:

- Regional instability, particularly the Israel–Gaza conflict, has stalled parts of the IMEC corridor.
- This exposes the fragility of connectivity projects dependent on West Asian geopolitical stability.

3. Energy Transition Paradox:

- India must deepen hydrocarbon imports for immediate energy security even while pursuing long-term decarbonisation goals (Net Zero 2070).
- This dual-track approach creates tension between fossil fuel dependency and green partnership ambitions.

4. Diaspora Concerns: The UAE's 8% Emiratisation mandate for firms may impact Indian white-collar employment.**5. Strategic Hedging with China:** The UAE's engagement with Chinese technology and infrastructure firms, including Huawei, introduces a strategic dilemma for India.**Conclusion:**

India–UAE relations have evolved into a multidimensional strategic partnership encompassing trade, energy transition, defence, fintech, and connectivity. If both nations institutionalise dispute-resolution mechanisms, strengthen local currency settlement systems, and operationalise green and digital corridors, the partnership can become a model of resilient South - West Asian integration in a multipolar world.

'+1' Value Addition:

- Bilateral trade crossed \$100 billion in FY 2024–25.
- Target of \$200 billion trade by 2032.
- Indian diaspora in UAE: 3.5 million.
- Trade deficit: \$26 billion mainly energy driven.
- 10-year LNG agreement between HPCL and ADNOC signed in 2026.

- 13. India-Israel relations have largely overcome the ideological hesitations and geopolitical constraints of the past. However, their future trajectory will depend on how effectively both countries navigate emerging regional and global challenges. Discuss. (15M, 250 Words)**

India recognised Israel in 1950 but established full diplomatic relations only in 1992, constrained by Cold War alignments, Non-Aligned Movement commitments, and energy dependence on the Arab world. Over the last three decades, however, the relationship has transformed into a **multi-sectoral strategic partnership**, with bilateral trade crossing **\$10.1 billion** and Israel emerging as one of India's top defence suppliers.

Overcoming Ideological and geopolitical hesitations:

1. **From ideological distance to strategic engagement:**
 - During the Cold War, India's pro-Palestinian position and NAM orientation delayed full diplomatic ties despite recognising Israel in 1950.
 - The establishment of diplomatic relations in 1992 marked a decisive shift toward interest-based foreign policy.
2. **Institutionalising Cooperation:**
 - Israel has remained among India's top three arms suppliers for over two decades as per SIPRI.
 - Inductions include **Phalcon AWACS, Heron UAVs, and Barak-8 missile systems** making defence cooperation became the backbone of bilateral trust.
3. **De-hyphenation:**
 - PM Modi's 2017 visit, first by an Indian PM, symbolised policy de-hyphenation.
 - India now engages Israel and Palestine on separate tracks while reiterating support for a **two-state solution**.
4. **Diversification:** The partnership expanded beyond defence into innovation-led growth, seen in the establishment of the **India-Israel Industrial R&D and Technological Innovation Fund (I4F)**.

Emerging regional and global challenges:

Despite progress, future evolution is contingent upon managing several constraints.

1. **Regional Instability:**
 - October 2023 Hamas attack and Israel's Gaza operations intensified regional volatility.
 - Thus, balancing ties with Israel and maintaining credibility in the Arab world remains delicate.
2. **Arab world factor:** Perceived tilt toward Israel could affect diaspora and energy interests as over **8 million Indians** reside in Gulf countries, remitting more than **\$100 billion** annually.
3. **Iran Factor:**
 - Escalation between Israel and Iran could complicate India's regional balancing.
 - India's strategic investment in **Chabahar Port** may face difficulties as Israel views Iran as an existential threat.
4. **China's expanding footprint:** Israeli tech engagement with China may raise security sensitivities for India. China is Israel's largest trading partner in Asia with over **\$25 billion trade**.
5. **Stalled economic integration:** Proposed **India-Israel FTA** remains unresolved while the trade basket still heavily dominated by diamonds and defence.

Navigating these challenges for the future:

1. **Deepening collaboration:**
 - Expand cooperation in semiconductors, AI, quantum tech, green hydrogen.
 - Leverage Israel's start-up ecosystem to complement India's scale.

2. **Strengthening strategic autonomy:** Continue de-hyphenation while upholding two-state solution by maintaining balanced engagement with Israel, Palestine, Gulf states, and Iran.
3. **Expanding economic engagement:** Conclude FTA negotiations and diversify trade beyond defence and gems into high-value sectors.
4. **Enhancing people-to-people ties:** As approximately 85,000 Jews of Indian origin reside in Israel, academic, cultural, and innovation exchanges can deepen societal connect.

Conclusion:

India - Israel ties have matured into a strategic partnership, but their future resilience will hinge on balancing innovation-driven cooperation with complex West Asian geopolitics.

'+1' Value Addition:

- Israel has remained among India's top three defence suppliers for over two decades.
- India was the first non-Arab state to recognise the PLO.
- The India-Israel Joint Working Group on Counter-Terrorism is one of India's longest-standing structured CT mechanisms.
- The Barak-8 (MR-SAM) missile system is a joint DRDO-Israel Aerospace Industries project.
- India's 2021 abstention at UNHRC on Gaza probe reflects strategic autonomy rather than bloc alignment.

D. Environment, Ecology and Disaster Management

14. **"Wetlands are increasingly being recognised as national public goods rather than wastelands." In this context, explain how India is safeguarding its wetlands. What are the further measures required?**
(15M, 250 Words)

Wetlands are among the most productive ecosystems on Earth, acting as a critical interface between land and water. India, with over 27,000 wetlands covering about 18.4% of its geographical area, depends heavily on these ecosystems for water security, biodiversity conservation, disaster mitigation and livelihoods.

Importance of Wetlands:

Ecological significance:

1. Act as **natural flood buffers**, reducing runoff and moderating extreme rainfall events.
2. Enable **groundwater recharge**, nutrient cycling and water purification.
3. Support rich **biodiversity**, including migratory birds, fish and amphibians.
4. Function as major **carbon sinks**, aiding climate change mitigation.

Economic and social significance:

1. Support **livelihoods** through fisheries, agriculture (paddy cultivation), tourism and handicrafts.
2. Serve as genetic reservoirs for crops such as rice.
3. Promote **eco-tourism** and sustainable development.
4. Provide cost-effective **nature-based solutions** compared to grey infrastructure.

India's efforts to safeguard its Wetlands:

1. Legal and Regulatory Measures:

- **Wetlands (Conservation and Management) Rules, 2017:**
 - Provide a framework for **identification, notification and protection** of wetlands.
 - Restrict activities such as reclamation, solid waste dumping and permanent construction.
- **Coastal Regulation Zone (CRZ) norms:** Protect mangroves, estuaries, lagoons and coastal wetlands from unregulated development.

2. **Policy interventions:**
 - **National Plan for Conservation of Aquatic Ecosystems (NPCA):**
 - Integrates conservation of wetlands and lakes.
 - Focuses on restoration, biodiversity conservation and community participation.
 - **National Wetland Inventory and Mapping:** Use of **remote sensing** and **GIS** for systematic mapping and monitoring.
3. **International Commitments:**
 - **Ramsar Convention (1971):**
 - India has designated multiple **Ramsar Sites**, committing to their *wise use*.
 - Ramsar recognition enhances visibility, funding access and scientific management.
4. **Nature-Based Solutions:**
 - Promotion of **mangroves, floodplains and urban wetlands** as buffers against floods, cyclones and storm surges.
 - Integration of wetlands into **climate adaptation and disaster risk reduction strategies**.

Further measures required:

1. **Shift to Ecosystem-Based Governance:**
 - Move beyond cosmetic “**beautification**” projects to restoring **ecological functionality**.
 - Adopt **catchment- and landscape-level planning**, addressing upstream-downstream linkages.
2. **Strengthen Institutional Capacity:**
 - Address shortages of trained professionals in **hydrology, ecology, GIS and environmental law**.
 - Improve coordination across departments such as water, urban development, environment, and fisheries.
3. **Ensure Hydrological Integrity:**
 - Protect natural **inflow and outflow channels** of wetlands.
 - Prevent infrastructure projects (roads, embankments, canals) that disrupt water regimes.
4. **Pollution Control and Waste Management:**
 - Ensure **only treated sewage and effluents** enter wetlands.
 - Prevent wetlands from becoming **dumping grounds for solid waste**.
5. **Technology-Driven Monitoring:**
 - Use **satellite imagery, drones and time-series data** for real-time monitoring of encroachments and degradation.
 - Link monitoring outcomes to **enforcement and accountability**.
6. **Strengthen Community Stewardship:**
 - Empower local communities as **co-managers** of wetlands.
 - Promote sustainable livelihoods (fisheries, eco-tourism) aligned with conservation goals.

Conclusion:

Wetlands are not wastelands but natural capital central to achieving SDG-6 (Clean Water and Sanitation), SDG-13 (Climate Action), SDG-14 & 15 (Life Below Water and on Land).

‘+1’ Value-Addition:

- **64% of world’s wetlands have disappeared since 1900**
- **East Kolkata Wetlands** naturally treat **750 MLD of sewage**, saving the city ₹200 crore annually in treatment costs.
- **Mangroves reduce cyclone damage by 30–50% while Odisha’s mangrove restoration** helped limit losses during **Cyclone Fani**.
- Wetlands store **up to 30% of global soil carbon** despite covering less than 10% of land area.

15. Examine the relevance of Carbon Capture, Utilisation and Storage (CCUS) for India's net-zero pathway. Also discuss the challenges and the strategy India should adopt. (10M, 150 Words)

Carbon Capture, Utilisation and Storage (CCUS) refers to technologies that capture carbon dioxide emissions from industrial sources, transport them, and either utilise or store them in geological formations. With India committing to **Net Zero emissions by 2070**, CCUS is gaining policy attention as a transition tool for decarbonising hard-to-abate sectors.

Relevance of CCUS for India:

1. **Decarbonising Hard-to-Abate Sectors:**
 - Industries like cement and steel contribute significantly to emissions.
 - Cement alone accounts for nearly **7% of global CO₂ emissions**.
 - Renewable energy transition alone cannot eliminate process emissions.
2. **Maintaining Industrial Competitiveness:** Mechanisms such as the **EU Carbon Border Adjustment Mechanism (CBAM)** penalise carbon-intensive exports. CCUS can help Indian industries remain globally competitive.
3. **Supporting Energy Transition:**
 - Allows continued use of fossil fuels during transition phases.
 - Enables production of low-carbon hydrogen and cleaner electricity.
4. **Emerging Global Climate Tool:**
 - Around **45 CCUS facilities globally capture nearly 50 million tonnes of CO₂ annually**.
 - Global requirement is estimated at **1 billion tonnes capture capacity by 2030**.

India's Current Status:

1. India has launched **CCU testbeds in the cement sector** under PPP models.
2. National Centres of Excellence established at **IIT Bombay and JNCASR Bengaluru**.
3. Budgetary support of **₹20,000 crore** allocated for CCUS deployment.
4. Pilot projects underway by companies such as **Tata Steel, NTPC, ONGC, and Dalmia Cement**.

Challenges associated with CCUS:

1. **High Economic Costs:** CCS-based electricity may cost **almost twice as much as renewable energy with storage**.
2. **Limited Capture Efficiency:** Many projects capture only about **50% CO₂**, far below effective mitigation levels.
3. **Fossil Fuel Lock-in Risk:** Nearly **80% of CCUS projects globally are linked to enhanced oil recovery**, which prolongs fossil fuel usage.
4. **Infrastructure Constraints:** India lacks mapped geological storage reservoirs and CO₂ transport infrastructure.
5. **Environmental Risks:** Potential leakage from storage sites can undermine emission reduction efforts.

Strategy India should adopt:

1. **Selective Deployment:** Use CCUS mainly for hard-to-abate sectors such as steel, cement, and chemicals.
2. **Prioritise Renewable Energy:** Expand solar, wind, green hydrogen, and electrification as primary decarbonisation pathways.
3. **Develop Storage Atlas:** ONGC and GSI should map potential storage sites such as **depleted oil fields like Bombay High**.
4. **Promote R&D:** Invest in Direct Air Capture (DAC) and Bioenergy with CCS (BECCS) and leverage international climate finance and partnerships.
5. **Pilot-Based Scaling:** Begin with small, high-efficiency demonstration projects before large-scale deployment.

Conclusion:

CCUS can serve as a complementary climate technology and is essential for India to achieve sustainable industrial decarbonisation while aligning with global climate commitments and the **1.5°C pathway**.

‘+1’ Value Addition:

- CCUS may contribute **15% of global emission reduction by 2070** as per IEA estimates.
- Current global CCUS captures only **50 MT CO₂/year** vs **1 GT needed by 2030**.
- India launched **5 CCU testbeds in cement sector** to convert CO₂ into construction materials.
- **Bombay High** identified as a potential large-scale CO₂ geological storage site.
- CCUS increases energy use by **10–40%**, raising cost and efficiency concerns.

16. Examine the role of the National Green Tribunal (NGT) in strengthening India's environmental governance framework. To what extent has it succeeded in fulfilling its statutory mandate of ensuring effective and expeditious environmental justice? (15M, 250 Words)

The **National Green Tribunal (NGT)**, established under the National Green Tribunal Act, 2010, represents India's institutional response to the growing complexity of environmental disputes. It operationalises constitutional mandates under **Article 21 (Right to Life)** and **Article 48A (Protection of Environment)** by providing a specialised and time-bound mechanism for environmental justice.

Role of NGT in strengthening environmental governance:**1. Institutionalising environmental adjudication:**

- The NGT provides a dedicated forum for environmental disputes under seven key environmental laws, including the Environment Protection Act, 1986 and Air & Water Acts.
- For example, by 2014, NGT achieved a disposal rate of nearly **60%**, significantly faster than regular courts.

2. Strengthening environmental accountability:

- The NGT has operationalised core environmental principles such as **polluter pays principle, precautionary principle and sustainable development**
- For example, in the **Art of Living Case (2016)**, it ordered **₹5 crore** fine for damage to Yamuna floodplains.

3. Protection of ecologically sensitive areas:

- The Tribunal has taken proactive steps in biodiversity and ecological conservation.
- For example, in **Save Mon Federation Case (2013)**, it suspended hydro project in Arunachal Pradesh to protect the Black-Necked Crane.

4. Urban environmental governance:

- The NGT has significantly intervened in pollution control and urban ecological crises.
- For example, ban on open burning of waste (2012) and directions for sewage treatment plants in Ganga Pollution Case (2017).

5. Access to environmental justice:

- Setting up of regional benches (New Delhi, Bhopal, Pune, Kolkata, Chennai) and circuit benches improve accessibility.
- Suo motu powers of NGT allow proactive environmental intervention, reducing the burden on High Courts and Supreme Court.

However, there are significant limitations:

1. **Jurisdictional Constraints:** NGT cannot hear cases under Wildlife Protection Act, 1972 and Forest Rights Act, 2006. This creates fragmentation in environmental adjudication.

2. **Capacity constraints:** As of September 2024, only 6 judicial members against sanctioned strength of 20. Limited benches further delay case disposal. For e.g., over 88,400 environmental cases pending in courts.
3. **Enforcement challenges:** Orders depend on state agencies for implementation while weak monitoring of compliance reduces impact.
4. **Infrastructure Constraints:** Inadequate funding affects expert recruitment and digitalisation making six-month disposal target often difficult to achieve.

Way Forward:

1. **Expand jurisdiction:** Bring Wildlife Protection Act and Forest Rights Act within NGT's ambit to create integrated environmental adjudication.
2. **Capacity building:**
 - Ensure full sanctioned strength of judicial and expert members.
 - Establish additional regional benches in high-litigation states.
3. **Strengthen enforcement mechanism:**
 - Create a National Environmental Compliance Monitoring Authority linked to NGT orders.
 - Mandate periodic compliance reporting by state governments.
4. **Environmental Compensation Framework:** Develop a scientific formula for calculating environmental damages using GIS and environmental valuation techniques.

Conclusion:

The NGT has significantly advanced India's environmental governance framework. It needs to further evolve from an activist tribunal into a fully empowered environmental guardian.

'+1' Value Addition:

- **Rat-hole Mining Ban (2014):** NGT banned rat-hole coal mining in Meghalaya citing environmental damage and worker deaths.
- **Alaknanda Hydro Case (2014):** Directed compensation in Uttarakhand floods and reinforced corporate environmental liability.
- **Open Waste Burning Ban (2012):** Prohibited burning of waste nationwide, strengthening solid waste management enforcement.
- **Ganga Pollution Orders (2017):** Directed installation of STPs and regulation of industrial discharge under river rejuvenation efforts.

17. **India's widening climate adaptation gap threatens its development trajectory. Examine the structural weaknesses in India's current adaptation framework. How can a unified Climate Physical Risk (CPR) framework strengthen India's climate resilience? (10M, 150 Words)**

India faces acute climate exposure, with over 80% of its land area vulnerable to climate hazards and nearly 90% of its population living in risk-prone districts as per the World Bank. Yet adaptation spending remains around \$13 billion annually - barely 10% of estimated requirements.

Structural weaknesses in India's adaptation framework:

1. **Institutional fragmentation:**
 - Agencies such as NDMA, IMD, MoEFCC and state bodies function in silos, leading to duplication and reactive relief-based responses.
 - For example, Assam witnesses annual floods but basin-level floodplain planning remains limited.

2. **Inconsistent risk methodologies**
 - Different institutions use varied timelines and models for risk projections, leading to non-comparable data and weak planning integration.
 - For example, Infrastructure projects often lack standardized climate stress testing aggravating urban flooding events like **Chennai (2021)**.
3. **Underinvestment relative to risk**
 - At **2°C warming**, India's adaptation costs may exceed **\$200 billion annually**, yet fiscal prioritization remains low.
 - UNEP notes global adaptation finance is far below required levels, limiting developing countries' preparedness.
4. **Weak integration:** Climate risks are insufficiently embedded in capital budgeting, urban master plans, and industrial corridors.

Role of a Unified Climate Physical Risk (CPR) framework:

A unified CPR framework can transform India's adaptation strategy from fragmented and reactive to systemic and growth-aligned.

1. **Standardized risk assessment across sectors:**
 - A CPR framework using IPCC's **hazard-exposure-vulnerability model (AR6)** would harmonize methodologies across ministries.
 - It enables comparable district-level risk mapping, improving prioritization of investments in heat-prone and flood-prone regions.
2. **Evidence-based infrastructure planning:**
 - Mandatory CPR screening for major public infrastructure projects would ensure resilience at the design stage.
 - For e.g., coastal areas could incorporate future rainfall and sea-level projections, reducing post-disaster reconstruction costs.
3. **Efficient resource allocation:**
 - Unified risk metrics would direct adaptation finance towards high-risk districts
 - McKinsey estimates that investments in adaptation can yield **7x returns in avoided damages**.
4. **Strengthening financial stability:**
 - A CPR-based disclosure framework aligned with RBI and global ESG norms would improve transparency of climate risks in banking and infrastructure lending.
 - It reduces stranded asset risk in sectors like power, transport, and coastal real estate.
5. **Shift from proactive resilience:**
 - CPR-driven early warning and predictive analytics enable anticipatory governance rather than disaster relief.
 - For e.g., Ahmedabad's **Heat Action Plan (2013)** reduced heat mortality through early warnings and cool-roof interventions.

Conclusion:

A unified Climate Physical Risk framework can convert India's climate vulnerability into an opportunity for resilient, risk-informed economic development.

'+1' Value Addition:

- Between 2000 - 2019, India lost over **\$79.5 billion due to climate-related disasters (UNDRR)**.
- The ILO estimates India could lose **5.8% of total working hours by 2030** due to heat stress - equivalent to **34 million jobs**.
- Odisha's cyclone preparedness (post-1999 super cyclone reforms) reduced cyclone mortality drastically
- As per the World Bank, India may see **40 million internal climate migrants by 2050**.

E. Science and Technology

18. India is witnessing an Artificial Intelligence (AI) revolution driven by rapid adoption, expanding digital infrastructure and policy push. Discuss the key drivers of India's AI revolution and the major challenges it faces. Also, discuss the role of IndiaAI Mission in addressing the challenges. (15M, 250 Words)

India is undergoing a rapid AI-led transformation, positioning itself as a key player in the global AI ecosystem. With strong digital public infrastructure (DPI), a vibrant startup ecosystem and proactive policy push, India's AI revolution aligns with the vision of Viksit Bharat 2047.

Key drivers of India's AI revolution:

1. **Expanding Digital Public Infrastructure (DPI):**
 - AI integration with Aadhaar, UPI, DigiLocker improving governance delivery.
 - AI-based crowd management in railways such as MuleHunter.AI (RBI) detecting mule bank accounts.
 - 820+ million internet users creating large-scale data ecosystem.
2. **Strong Talent & Skill Base:**
 - India ranks 1st in Global AI Skill Penetration as per the Stanford AI Index 2024.
 - AI talent growth of 263% since 2016 with a 14× rise in AI-skilled workforce during 2016-23.
3. **Vibrant Innovation Ecosystem:**
 - 3rd largest startup ecosystem globally and has 520 tech incubators.
 - GenAI startup funding grew to USD 51 million in FY2025 as per NASSCOM.
4. **Sectoral Adoption:**
 - 87% enterprises using AI as per the NASSCOM AI Adoption Index.
 - Strongest adoption in BFSI, healthcare, retail, automotive (60% AI value contribution).
5. **Indigenous AI Initiatives:**
 - **BharatGen:** Government-funded multilingual multimodal LLM.
 - **Sarvam-1:** 2B parameter model supporting 10+ Indian languages.
 - **BHASHINI:** AI-based language translation platform.
 - **AI Kosha** providing non-personal datasets for innovation.

Key challenges in India's AI revolution:

1. **Import Dependency:**
 - Heavy reliance on imported GPUs and semiconductor supply chains.
 - Limited domestic chip fabrication capacity.
2. **Privacy Risks:**
 - Need strict compliance with DPDP Act, 2023.
 - Risks of bias, algorithmic opacity, and misuse (deepfakes, misinformation).
3. **Digital Divide:**
 - Urban-rural disparity in AI adoption.
 - Skilling gaps beyond metropolitan clusters.
4. **Regulatory Balancing:**
 - Avoiding over-regulation while ensuring accountability.
 - Managing AI risks in cybersecurity and financial fraud.
5. **Global Competition:**
 - US-China dominance in foundational models.
 - High R&D investment barriers compared to global AI leaders.

Role of IndiaAI Mission in addressing these challenges:

The IndiaAI Mission, implemented under MeitY, aims to build sovereign and inclusive AI capacity.

1. Strengthening Compute Infrastructure:

- Expansion of high-end computing with 38,000 GPUs.
- Open GPU marketplace for startups, researchers and students.

2. Indigenous foundation models:

- Development of BharatGen and sovereign LLM ecosystem.
- Promoting multilingual AI to address linguistic diversity.

3. National Data Infrastructure:

- AIKosh / IndiaAI Dataset Platform providing anonymised, high-quality datasets.
- Facilitating secure data access for startups and academia.

4. Capacity Building:

- Five National AI Skilling Centres.
- AI Competency Framework for government officials.
- NEP 2020 integration of AI education.

5. Centres of Excellence (CoEs):

- AI CoEs in Healthcare, Agriculture, Sustainable Cities.
- ₹500 crore allocation (Budget 2025) for AI CoE in Education.

6. Responsible AI Governance:

- Balanced regulatory approach under IT Act 2000 and DPDP Act 2023.
- Hosting Global INDIAai Summit 2024 & AI Impact Summit 2026 to shape global norms.

Conclusion:

India's AI revolution is distinguished not merely by technological ambition but by its focus on scale, inclusivity, and public-good orientation. India can transition from being a large AI talent supplier to a global AI solutions leader, shaping responsible AI governance for the world.

'+1' Value Addition:

- 1,800+ Global Capability Centres (GCCs), including 500+ AI-focused centres.
- 78% of SMBs using AI reported revenue growth.
- India's tech sector projected to exceed USD 280 billion revenue, employing 6+ million people.
- AI-driven crop advisory pilots in Maharashtra improved yield efficiency by 10–15%.
- AI-based TB screening tools (e.g., Qure.ai) used in national health missions for early detection.

19. Artificial Intelligence (AI) is emerging as a transformative force in Indian agriculture.” Examine its role in revolutionising Indian agriculture. Also analyse the key challenges in its adoption. (15M, 250 Words)

Agriculture contributes nearly 18% to India's GDP and supports about 45 - 50% of the workforce, making it central to food security and rural livelihoods. With rising climate risks, fragmented landholdings, and market inefficiencies, **Artificial Intelligence (AI)** is emerging as a key enabler of precision, productivity, and profitability in Indian agriculture.

Role of AI in revolutionising Indian agriculture:**1. Precision Agriculture:**

- AI integrates **satellite imagery, drones, IoT sensors, and GPS data** to deliver farm-level advisories enabling **targeted irrigation and fertiliser application**, reducing input costs.
- AI-driven farm mechanisation improves labour efficiency amid rural labour shortages.
- For example, ICAR's IoT-based irrigation systems automate water use based on real-time soil moisture data.

2. Climate-Smart Agriculture:

- AI analyses historical and real-time climate data to predict rainfall variability and temperature changes.
- It supports adaptive cropping patterns and irrigation planning besides providing early warnings for extreme weather events.
- For e.g., AI-powered advisories under the **National Pest Surveillance System** enable preventive action against climate-induced pest outbreaks.

3. Soil health enhancement:

- Deep learning models analyse soil data from remote sensing and field samples.
- AI supports the **Soil Health Card Scheme** through better soil diagnostics enabling optimal fertiliser use, reducing environmental degradation.
- For example, Nationwide **Soil Resource Mapping by SLUSI** strengthens AI-based soil profiling.

4. Market intelligence information:

- AI-driven predictive analytics leverage data from platforms like **e-NAM** and **AGMARKET**.
- AI forecasts price trends and demand patterns reducing distress sales and improves farmer bargaining power.
- For example, AI tools assess mandi-level data to recommend optimal sale timing.

5. Productivity enhancement:

- **YES-TECH, CROPIC, and WINDS** improve yield estimation under PMFBY while **AgriStack** creates digital IDs linked to land records for targeted service delivery.
- For e.g., Budget 2026-27 launched **Bharat-VISTAAR** to integrate AgriStack with AI systems for a unified digital interface.

Challenges in AI adoption:

- 1. Fragmented Landholdings:** 86% of farmers are small and marginal while average landholding size is just 1.08 hectares, limiting scale economies for AI-based mechanisation.
- 2. Digital & Infrastructure Gaps:** Out of 5.97 lakh inhabited villages, around 25,000+ villages lack mobile and internet connectivity, restricting access to AI platforms.
- 3. High Implementation Costs:** Lack access to affordable credit and risk capital deter implementation. For e.g., despite agri-tech growth, India's AI-in-agriculture market was only **USD 1.7 billion in 2023**, reflecting limited penetration.
- 4. Data Gaps:** AI relies on high-quality historical and real-time data. Without robust datasets, predictive accuracy declines, affecting advisories.
- 5. Skill & Awareness Deficit:** Limited digital literacy among farmers restricts effective usage as only a small proportion of farmers regularly use digital agricultural advisories.

Way forward:

- 1. Strengthen digital data ecosystem:** Operationalise **AgriStack** and **IDEA (India Digital Ecosystem for Agriculture)** for seamless data integration.
- 2. Improve rural connectivity:** Expand **BharatNet** and **PM-WANI** to bridge the digital divide.
- 3. Promote region-specific AI innovation:** Leverage **National AI Centres of Excellence** to develop customised agro-climatic models.
- 4. Capacity building & skilling:** Expand training under **NeGPA** and **FutureSkills PRIME** and promote **Hybrid Agricultural Intelligence (HAI)**, combining AI with indigenous knowledge.
- 5. Financial incentives:** Provide subsidised loans and incentives under the **Digital Agriculture Mission (2021-25)** for startups and farmer producer organisations (FPOs).

Conclusion:

AI has the potential to shift Indian agriculture from input-intensive to intelligence-driven farming by enhancing productivity, sustainability, and profitability. By aligning with India's Digital Public Infrastructure model, AI can become a cornerstone of a **climate-resilient and income-secure agricultural transformation**.

'+1' Value Addition:

- **Microsoft-ICRISAT, Telangana:** AI-based sowing advisories increased groundnut yields by 10–30% without increasing input cost.
- **NITI Aayog (AI in Agriculture Report):** Precision agriculture can improve productivity by 15 - 20% and reduce input costs by 10–15%.
- **PMFBY - YES-TECH:** Use of AI, drones, and satellite imagery for yield estimation has reduced claim settlement delays.
- **AI Agriculture Market Projection:** Expected to grow from USD 1.7 billion (2023) to USD 4.7 billion by 2028, at 23%+ CAGR, reflecting rapid adoption.

20. "The New Delhi Declaration on AI marks a shift from safety-centric discourse to democratised and development-oriented AI governance." Examine its significance for global AI governance and assess its implications for India. (15M, 250 Words)

The AI Impact Summit 2026 in New Delhi culminated in the signing of the **New Delhi Declaration by 88 countries and international organisations**, including the United States and China. Unlike earlier AI summits that focused predominantly on existential safety risks, the Delhi Declaration marks a calibrated shift toward democratised access, development orientation, and inclusive AI growth - particularly for the Global South.

Shift from safety-centric to democratised & development-oriented AI governance:

- 1. From Risk Containment to Democratic Diffusion:**
 - Earlier summits at Bletchley 2023, Seoul 2024 prioritised AI safety and frontier risk mitigation.
 - The Delhi Declaration emphasises "democratic diffusion of AI", ensuring broader access to AI resources.
- 2. From elite tech governance to global south inclusion:**
 - Explicit recognition of language diversity and local innovation needs aligns AI governance with development justice principles.
 - The declaration aims to reduce concentration of AI power among a few tech corporations and advanced economies.
- 3. From control-centric regulation to capacity building:**
 - It introduces AI Workforce Development Playbook and Reskilling Principles focussing on human capital and skilling rather than regulation.
 - It aims to promote institutional mechanisms like Global AI Impact Commons.
- 4. From national security lens to social & economic impact:** The declaration positions AI as a tool for economic growth and social empowerment emphasising on AI for healthcare, agriculture, education, and public services.

Significance for Global AI governance:

- 1. Broad-based multilateral consensus:** 88 signatories including US, China, France, UK, Australia shows wider participation compared to Paris summit. It strengthens cooperative multilateralism in AI governance.

2. **Institutionalisation of collaborative platforms:** Creation of global AI Impact commons and international network of AI for science institutions shows the shift beyond dialogue to structured knowledge-sharing mechanisms.
3. **Balancing sovereignty with cooperation:** Framework is voluntary and non-binding, respecting national laws and avoiding over-centralised global AI authority. It enables plural models of AI governance.
4. **Normative reframing of AI debate:** Establishes development-oriented AI as a legitimate global governance objective.

Implications for India:

1. **Strategic Leadership in the Global South:**
 - Positions India as a bridge between developed and developing AI ecosystems.
 - Reinforces India's narrative of inclusive and human-centric AI governance.
2. **Strengthening digital sovereignty:**
 - Supports India AI Mission and indigenous LLM development such as Sarvam AI.
 - It also encourages domestic compute capacity expansion and data centre investments.
3. **Economic gains:** Google's \$15 billion AI investment and Yotta's \$2 billion data centre expansion signal significant investment gains.
4. **Strategic supply chain positioning:** India's participation in the US-led Pax Silica initiative diversifies semiconductor and critical mineral supply chains enhances technological autonomy in AI hardware ecosystems.
5. **Norm-setting role:** Building on India's G20 presidency experience, the summit establishes India as a rule-shaper, not merely a rule-taker.

Conclusion:

The New Delhi Declaration reframes AI governance from risk containment to inclusive technological empowerment, positioning India at the centre of the emerging global AI order. The focus should now be on converting voluntary commitments into durable institutional and technological gains.

'+1' value addition:

- 40% of global AI R&D spending is concentrated in US & China as per the UNCTAD report.
- AI may add \$15.7 trillion to global GDP by 2030 as per the PwC projections.
- Frontier models require tens of thousands of advanced GPUs, making compute access strategic.
- India's data centre capacity projected to more than double by 2026–27, strengthening AI compute ecosystem.

F. Society & Social Justice

21. **Should children be prohibited from using social media? Give your arguments in the context of the growing demands of social media ban for children. What measures can India adopt to ensure child safety in the digital ecosystem. (15M, 250 Words)**

The exponential growth of social media has transformed childhood experiences, but it has also exposed children to risks such as cyberbullying, addiction, and online exploitation. Recent child tragedies linked to screen overuse have renewed demands for **blanket social media bans for minors**, as seen in Australia's under-16 ban proposal.

Need for banning social media for children:**1. Mental and Cognitive Health Risks:**

- Studies link excessive social media use with anxiety, depression, ADHD-like symptoms, and reduced attention spans.
- Children aged 10–15 spend 4–6 hours daily online, increasing compulsive behaviour by 30–40% due to engagement-driven algorithms.

2. Online Safety Threats:

- Exposure to cyberbullying, sexual predators, violent and self-harm content.
- NCRB data shows child-related cyber offences rose over 400% during 2019–2023 in India.

3. Physical and Social Development Concerns:

- Sedentary lifestyles, sleep disruption, eating disorders.
- Reduced face-to-face interaction and emotional regulation.

4. Algorithmic Manipulation:

- Platforms optimise for attention, not child well-being.
- Personalised feeds make disengagement difficult.

Social media bans are ineffective:**1. Technically Ineffective:**

- Easily bypassed via VPNs, proxies, encrypted apps.
- After UK age-control rollout, VPN usage rose 1,800%.

2. Privacy and Surveillance Risks:

- Age-verification via IDs or biometrics risks data breaches.
- Facial age-estimation tools show 25–35% inaccuracy for minors.

3. Pushing Children into Unsafe Spaces:

- Bans drive children to unregulated platforms or dark web spaces, increasing harm.

4. Exclusion Concerns:

- Disproportionately affects girls, LGBTQIA+ youth, rural and marginalised children
- Restricts freedom of expression and access to information.

5. Misdiagnosing the Problem:

- Social media amplifies existing social issues such as patriarchy, isolation, and stigma rather than creating them.
- For example, India has 733+ million internet users, yet 57% women lack access. Thus, bans worsen digital inequality.

Measures that India can adopt:**1. Child-Centric Digital Governance:**

- Redesign platforms around child safety by design.
- Mandatory age-appropriate interfaces like UK's Age-Appropriate Design Code.

2. Platform Accountability and Regulation:

- Shift burden from children to Big Tech.
- Penalise algorithmic amplification of harmful content and dark-pattern engagement strategies.
- Enact a Digital Competition Law.

3. Privacy-Preserving Age Assurance:

- Use layered age-assurance systems like device-level checks, behavioural signals and optional ID verification
- Avoid single-point biometric solutions.

4. Strengthening Redressal Mechanisms:

- Cyber-trained nodal officers in state police.
- Expand POCSO e-Box, panic-button tools.
- Faster grievance redressal timelines.

5. **Digital Literacy and Mental Health Support:**
 - Integrate cyber-safety curricula in schools.
 - Parental counselling and screen-time management.
 - For example, Kerala's Digital De-Addiction (D-DAD) centres.
6. **Parental Involvement:**
 - Joint parent-child accounts.
 - Screen-time tools like Google Family Link.
 - Community-based awareness programmes.

Conclusion:

As societies transition from “open access” to “safe access”, India must build a privacy-preserving, child-first digital ecosystem that safeguards children without excluding them from the empowering potential of the digital world. “The solution to digital harm is not digital silence, but digital responsibility.”

‘+1’ Value Addition:

- Nature Human Behaviour says Adolescent brains are neurologically more vulnerable to algorithmic reward loops.
- UNICEF (2021): Blanket social-media bans may violate CRC principles - best interests, participation, and access to information.
- Instagram Teen Safety, 2023 shows “Quiet mode” and nudges reduced teen screen time by 20% without bans.
- OECD points out that over-regulation can cut youth digital skill formation by 15–20%.
- Karnataka Cyber Hygiene Curriculum resulted in 30% fall in cyber-bullying complaints in pilot districts.

G. Internal Security

- 22. India continues to face complex and evolving terrorist threats across multiple domains. How vulnerable is India to contemporary terrorist challenges? Examine the role of the National Counter-Terrorism Policy and Strategy - ‘PRAHAAR’ in addressing these vulnerabilities. (15M, 250 Words)**

According to the Global Terrorism Index (GTI) 2024, India continues to figure among countries significantly impacted by terrorism, reflecting persistent security challenges. In this context, the National Counter-Terrorism Policy and Strategy - ‘PRAHAAR’ institutionalises a comprehensive, multi-domain framework to address these vulnerabilities.

Vulnerability of India to terrorist threats:

1. **Cross-border sponsored terrorism:**
 - Porous borders, hostile neighbourhood, and use of non-state actors as instruments of state policy.
 - Terror outfits such as Lashkar-e-Taiba (LeT) and Jaish-e-Mohammed (JeM) terror attacks in Punjab and J&K.
2. **Hybrid terrorism:**
 - Rapid digitalisation without commensurate cyber-security depth across all states led to increased use of encrypted messaging apps, dark web, and crypto wallets for recruitment and funding.
 - For e.g., India faced over 1.3 million cyber incidents in 2023 as per CERT-In data.
3. **Radicalisation:**
 - Social media platforms are increasingly being used for propaganda, recruitment, and lone-wolf radicalisation.
 - For e.g., ISIS-inspired modules detected in states like Kerala, Maharashtra and Karnataka in recent years.

4. Critical infrastructure exposure:

- India's expanding economy increases exposure of power grids, ports, aviation, railways, atomic and space sectors.
- For e.g., Mumbai 26/11 demonstrated economic and psychological costs of urban terror.

Role of PRAHAAR in addressing these vulnerabilities:**1. Intelligence-led preventive architecture:**

- Strengthens **Multi Agency Centre (MAC)** and **Joint Task Force on Intelligence (JTFI)** for real-time intelligence sharing.
- Focus on disruption of **Over Ground Workers (OGWs)** and **terror-financing networks** marks a shift in approach from reactive response to proactive prevention.

2. Multi-domain security framework:

- It focuses on capacity building for protection of critical sectors including defence, space and atomic energy.
- Border guarding forces equipped with surveillance and drone-detection technologies helps in addressing drone-enabled cross-border infiltration.

3. Tech-integrated counter-terror strategy:

- The policy focuses on countering misuse of **ICT, encryption, crypto-financing and dark web operations**.
- It strengthens cyber disruption capabilities through coordinated law enforcement response.

4. Human Rights-based approach:

- Anchored in **UAPA 1967**, **Bharatiya Nyaya Sanhita 2023**, and **PMLA 2002** it explicitly states terrorism is not linked to any religion or ethnicity.
- It provides for judicial safeguards and multi-tier appeal mechanisms.

5. Whole-of-society approach:

- Engagement of community leaders, NGOs, psychologists and civil society helps in addressing socio-economic vulnerabilities.
- Prison de-radicalisation programmes and youth outreach initiatives target root causes and prevents recruitment pipelines.

6. International cooperation: Continued advocacy for **Comprehensive Convention on International Terrorism (CCIT)** at the UN helps in tackling transnational terrorism.**Conclusion:**

PRAHAAR provides a comprehensive, intelligence-driven and rule-of-law anchored framework to mitigate these risks in a technologically complex security environment. Further need is for sustained capacity building, inter-agency coordination, and international cooperation in an era of hybrid and asymmetric warfare.

'+1' Value Addition:

- **Over 300 drone sightings/interceptions reported in Punjab border region during 2022–24**, highlight emerging threat pattern.
- **UNSCR 1373 obligations** align with India's emphasis on denying safe havens and funding.
- **Global Terrorism Index, 2024** notes decline in overall fatalities in India but persistence of sub-national terror risks.
- **NIA conviction rate** has reportedly remained above 90% in recent years - strengthening deterrence.