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Polity & Governance

What Is the Next Phase for Rural Women Entrepreneurship?

Source: The Hindu

Relevance: GS Paper II (Governance, Social Justice)

Important Keywords

Prelims

- DAY-NRLM, Self-Help Groups (SHGs), Cluster Level Federations (CLFs), Village Organisations (VOs), Lakhpati Didi, SHG–Bank Linkage Programme, Direct Benefit Transfer (DBT),Kudumbashree, Jeevika, Village Prosperity and Resilience Plan (VPRP), SIDBI

Mains

- Rural Women Entrepreneurship, Women-Led Development, Financial Inclusion,
- Community-Based Organisations, Institutional Autonomy, Social Audit, Credit Deepening, Innovative Financing, Livelihood Diversification, Market Linkages, Convergence of Schemes, Inclusive Growth, Grassroots Empowerment

Why in News?

The Deendayal Antyodaya Yojana–National Rural Livelihoods Mission (DAY-NRLM) is due for re-appraisal for the next financial cycle (2026–27 to 2030–31). With over 10 crore rural households, 91 lakh Self-Help Groups, and 2 crore Lakhpati Didis, the programme has reached a scale where the focus is shifting from mobilisation to enterprise expansion, institutional autonomy, innovative financing, and market integration, making the next phase critical for rural women entrepreneurship.

Scale and Achievements of DAY-NRLM

DAY-NRLM has organised rural women into:

- 91 lakh SHGs
- 5.35 lakh Village Organisations (VOs)
- 33,558 Cluster Level Federations (CLFs)

These institutions have collectively leveraged over **₹11 lakh crore in bank credit**, with **NPAs at a low 1.7%**, reflecting strong financial discipline. Importantly, the number of **'Lakhpati Didis'**—women earning over ₹1 lakh annually—has crossed **two crore**, indicating a shift from subsistence to income-generating activities.

The next step: A Kudumbashree kiosk at Ranni- Perunad that markets and sells forest produce harvested by the Malaipandaram tribal community in Kerala in 2025. FILE PHOTO

Political and Social Empowerment of Rural Women

Beyond economic outcomes, SHGs have enhanced women's **political visibility and bargaining power**. States are increasingly routing **unattached Direct Benefit Transfers (DBTs)** directly to women, such as:

- Ladli Laxmi Yojana (Madhya Pradesh)
- Maiya Samman Yojana (Jharkhand)
- Ladki Bahin Yojana (Maharashtra)
- Mukhyamantri Mahila Rozgar Yojana (Bihar)

These initiatives strengthen women's control over financial resources and can act as catalysts for entrepreneurship in the next phase of DAY-NRLM.

Deendayal Antyodaya Yojana – National Rural Livelihoods Mission (DAY-NRLM)

- Flagship poverty alleviation programme of the Ministry of Rural Development
- Aim: Reduce rural poverty through self-employment, skilled wage employment and sustainable livelihoods
- Implemented as a **centrally sponsored scheme** (Centre–State funding)
- **Launched:** 2010 (as NRLM) by restructuring **SGSY**
- **Renamed:** 2016 as DAY-NRLM
- One of the world's largest livelihood missions

Core Objectives

- Mobilise rural poor households into **Self-Help Groups (SHGs)**
- Enable access to formal credit, livelihoods and entitlements
- Promote **women-led institutions** and community ownership
- Ensure **sustained income enhancement** to move households out of poverty

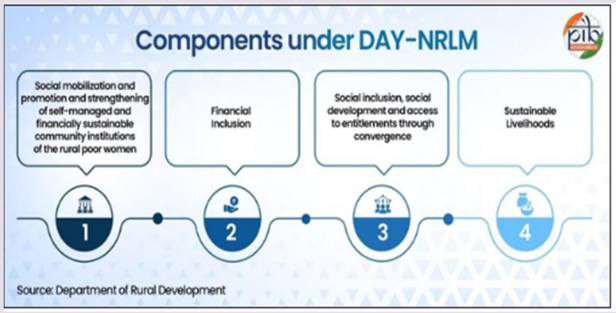
Four Core Components

1. Social Mobilisation & Institution Building
   - SHGs → Village Organisations (VOs) → Cluster Level Federations (CLFs)
2. Financial Inclusion
   - SHG–Bank linkage, collateral-free loans, interest subvention
3. Sustainable Livelihoods
   - Farm, non-farm and off-farm activities
4. Social Inclusion & Convergence
   - Access to welfare schemes, health, nutrition, sanitation, gender justice

Women Empowerment Architecture

Community Resource Persons (CRPs):

- **Krishi Sakhi** – Sustainable agriculture, extension services
- **Pashu Sakhi** – Livestock health & productivity
- **Bank Sakhi / BC Sakhi** – Financial inclusion, credit linkage
- **Bima Sakhi** – Insurance coverage
- **47,952 Bank Sakhis** deployed nationwide



Strengthening CLFs: The Institutional Pivot

CLFs form the **lynchpin of the SHG ecosystem**, anchoring programme activities at the sub-block level. However, concerns have emerged that many CLFs have become overly dependent on government functionaries, undermining community ownership. The next phase must focus

on:

- Revitalising CLFs as autonomous, community-owned institutions
- Reducing administrative overreach
- Replicating successful models such as **Kudumbashree (Kerala)** and **Jeevika (Bihar)**

Strong CLFs are essential for scaling enterprises, managing funds, and negotiating with markets and banks.

Financial Governance and Use of Idle Funds

Community institutions have received large capitalisation support—about **₹56.69 lakh crore**—leading to concerns over idle funds and misuse. To address this:

- **Social audits** and **statutory audits** must be institutionalised
- Transparent community-led monitoring systems should be strengthened
- Flexible, need-based **savings and loan products** should replace uniform lending norms

The goal should be equitable development alongside revenue generation by CLFs.

Credit Deepening and Individual Entrepreneurship

While SHG-bank linkage has expanded credit access, many members find loan sizes inadequate for enterprise expansion. Scaling up requires:

- Transition from group loans to **individual credit**
- Creation of individual credit histories and CIBIL scores for SHG members
- Greater role for CLFs in facilitating and guaranteeing individual loans

Such measures can enhance bank confidence and unlock higher credit flows for rural women entrepreneurs.

Moving Beyond Debt: Innovative Financing Models

With economic diversification, DAY-NRLM must evolve beyond debt-based financing. Future strategies should explore:

- Equity, venture capital, and blended finance
- Partnerships with **SIDBI**, NBFCs, and neo-banks
- Customised financial products tailored to rural women's enterprise needs

This shift is critical for nurturing growth-oriented and scalable enterprises.

Convergence and Coordinated Livelihood Planning

Livelihood interventions under DAY-NRLM often operate in silos. To maximise impact:

- Annual State-level Livelihood Action Plans should be prepared
- Village Prosperity and Resilience Plans (VPRPs) should guide bottom-up planning
- CLFs should evolve into business clinics or livelihood hubs

Institutional convergence with schemes of agriculture, animal husbandry, and food processing departments should be formalised, potentially through a **Convergence Cell at NITI Aayog**.

Marketing: The Weakest Link

Lack of market access remains the biggest constraint for SHG enterprises. Addressing this requires:

- A dedicated **marketing vertical** under the National Mission
- Focus on branding, packaging, pricing, quality, and logistics

- Development of CLF-based logistics hubs
- Creation of professional, market-facing agencies at State/UT level

Effective marketing is essential to convert production into sustainable incomes.

Human Resources and Institutional Maturity

Given rising expectations from community institutions, deployment of professionals in finance, marketing, and enterprise development is necessary. However, capacity building must respect:

- Varied maturity levels of CLFs
- The organic pace of community institutions

External support should empower, not overwhelm, grassroots organisations.

Conclusion:

DAY-NRLM has successfully mobilised rural women at an unprecedented scale. The next phase must focus on **institutional autonomy, enterprise scaling, innovative finance, convergence, and market integration**. If CLFs are strengthened as genuine community-owned business institutions, rural women can transition from beneficiaries to **entrepreneurs and market leaders**, redefining inclusive growth in India.

Transforming India into a Global Biopharma Hub

Source: **PIB**

Relevance: GS Paper II (Governance & Health Policy)

Important Keywords

Prelims

- Biopharma SHAKTI, Union Budget 2026–27, Biologics, Biosimilars, National Biopharma Mission (NBM), Innovate in India (i3), BIRAC, Department of Biotechnology (DBT), CDSCO, NIPERs, Genome India Programme, ZyCoV-D, Production Linked Incentive (PLI) Scheme,

Mains

- Global Biopharma Hub, Pharmaceutical Value Chain Upgradation, Health Security, Innovation-driven Growth, Regulatory Credibility, Clinical Trial Ecosystem, Technology Transfer, Bio-entrepreneurship, Import Substitution, Supply Chain Resilience.

Why in News?

The Union Budget 2026–27 has announced **Biopharma SHAKTI**, a ₹10,000 crore initiative aimed at strengthening India's biologics and biosimilars ecosystem, signalling a strategic shift from generic drug manufacturing to high-value, innovation-driven biopharmaceuticals.

Background: Why Biopharma Is Strategically Important

Biopharma refers to the development and manufacture of medicines using **living biological systems** such as human or animal cells, bacteria, fungi and microbes. Unlike traditional chemical drugs, biopharmaceuticals are **complex, targeted, and high-value therapies**.

Examples include:

- Vaccines
- Monoclonal antibodies
- Biosimilars
- Recombinant insulin
- Gene and cell therapies
- Therapeutic proteins

The global healthcare landscape is witnessing:

- Rising **non-communicable diseases** (cancer, diabetes, autoimmune disorders)
- Increased reliance on biologics and biosimilars
- Rapid expansion of the $1.1 trillion global pharmaceutical market

This makes biopharma central to health security, economic growth, innovation, and strategic autonomy.

Union Budget 2026–27: Biopharma SHAKTI Initiative

Key Budget Announcements

Biopharma SHAKTI

- Outlay: ₹10,000 crore (5 years)
- Objective: Strengthen end-to-end ecosystem for biologics and biosimilars
- Reduce import dependence and enhance global supply chain integration

Human Resource Development

- Establishment of **3 new NIPERs**
- Upgradation of 7 existing NIPERs
- Creation of specialised talent in biopharma R&D, manufacturing and regulation

Clinical Research Expansion

- Development of 1,000+ accredited clinical trial sites
- Enables large-scale, ethical, and globally compliant trials

Regulatory Strengthening

- Capacity enhancement of **CDSCO** with specialised scientific manpower
- Faster approvals aligned with global regulatory standards

Why This Matters

The Budget integrates **manufacturing scale, skilled manpower, clinical research, and regulatory credibility** into a single framework. This signals a clear intent to move India:

- From generic drug leadership
- To a high-quality, innovation-driven biopharma powerhouse

It strengthens domestic access to advanced therapies while positioning India as a trusted global supplier.

Government Initiatives to Strengthen India's Biopharma Sector

National Biopharma Mission (NBM) – "Innovate in India (i3)"

Launched in May 2017, the National Biopharma Mission (NBM) is a flagship initiative aimed at transforming India into a $100-billion global biotech industry and capturing 5% of the global pharmaceutical market.

- **Outlay:** ₹1,500 crore
- **Funding:** Co-funded by the **World Bank**
- **Implementing Agency:** Biotechnology Industry Research Assistance Council

(BIRAC)

- **Nodal Ministry:** Department of Biotechnology

Focus Areas

- Vaccines (HPV, Dengue)
- Biosimilars (Cancer, Diabetes, Rheumatoid Arthritis)
- Bio-therapeutics
- Diagnostics and medical devices

Key Achievements

- 101 projects supported involving 150+ organisations and 30 MSMEs
- 1,000+ jobs created, including 304 scientists
- Establishment of **clinical trial sites** with a database of **8 lakh volunteers**
- Integration with the **Genome India Programme** (10,000 genome sequencing)
- Support to development of **ZyCoV-D**, the world's first DNA-based COVID-19 vaccine

NBM as a Catalyst of India's Health Innovation Ecosystem

NBM has played a crucial role in **translating scientific research into affordable healthcare solutions**, nurturing a new generation of biotech entrepreneurs.

- Voxel Grids Innovations Pvt. Ltd. (Bengaluru)
  - Developed India's first indigenous **MRI scanner** comparable to global standards
  - Funded ₹12.4 crore by BIRAC
  - Deployed in cancer hospitals in Mumbai and Assam
- Levim Lifetech Pvt. Ltd. (Chennai)
  - Developed India's first **biosimilar of Liraglutide** for Type-2 diabetes
  - Priced at one-third of imported versions
  - 85% clinical trial costs supported under NBM

Additional outcomes:

- ~10,000 biotech start-ups supported since 2014
- 100+ bio-incubation centres established
- 7 Regional Technology Transfer Offices
- 850+ IP filings and 120 technology transfers
- 7,000+ professionals trained, including 45% women

BIRAC-Led Biotech Innovation Support

Established in **2012**, BIRAC acts as the **innovation financing and incubation backbone** of India's biotech ecosystem.

Key Schemes

- Biotechnology Ignition Grant (BIG):
  - Up to ₹50 lakh for early-stage start-ups (1,000+ innovators supported)
- SEED Fund:
  - ₹30 lakh equity support for proof-of-concept
- LEAP Fund:
  - ₹100 lakh for commercialisation-ready technologies

जनCARE – Amrit Grand Challenge:

- 89 digital health innovations in AI, ML, telemedicine, blockchain
- Focus on Tier-II, Tier-III cities and rural areas

Manufacturing and Industrial Strengthening Measures

To reduce import dependence and strengthen domestic supply chains, the government has launched:

- Production Linked Incentive (PLI) Scheme for Pharmaceuticals
- Strengthening of Pharmaceutical Industry (SPI) Scheme
- Bulk Drug Parks Scheme

Key Objectives

- Boost manufacturing capacity
- Reduce dependence on imported **APIs and intermediates**
- Upgrade MSMEs to **WHO-GMP standards**
- Create **common infrastructure** in pharma clusters
- Improve export competitiveness and supply chain resilience

Promotion of Research and Innovation in Pharma-MedTech (PRIP)

Launched in **2023** with an outlay of **₹5,000 crore**, the PRIP scheme aims to build an **innovation-driven Pharma-MedTech ecosystem**.

- Supports:
  - New drugs and biosimilars
  - Precision medicine
  - Complex generics
  - Advanced medical devices
- Promotes industry–academia collaboration
- Establishes Centres of Excellence at NIPERs

BioE3 Policy and Bio-RIDE Scheme

BioE3 Policy (Approved August 2024)

Biotechnology for Economy, Environment and Employment

Strategic Sectors

- Precision biotherapeutics
- Biobased chemicals and enzymes
- Functional foods and smart proteins
- Climate-resilient agriculture
- Carbon capture and utilisation
- Marine and space biotechnology

Bio-RIDE Scheme (Launched September 2024)

- **Outlay:** ₹9,197 crore (15th Finance Commission period)
- Merged DBT umbrella schemes
- Added Biomanufacturing and Biofoundry component

Three Pillars

1. Biotechnology R&D
2. Industrial & Entrepreneurship Development
3. Biomanufacturing and Biofoundry

Conclusion

India's biopharma strategy reflects a **deliberate and integrated policy approach**—linking research, innovation, manufacturing, entrepreneurship and regulation. As the country's disease profile shifts toward **chronic and non-communicable diseases**, access to **biologic therapies** becomes central to both health outcomes and economic growth.

The **Biopharma SHAKTI** initiative announced in **Union Budget 2026–27**, with an outlay of **₹10,000 crore**, builds upon this foundation by strengthening workforce capacity, clinical research infrastructure and regulatory efficiency. Together, these initiatives position India to emerge not just as the "pharmacy of the world", but as a **global biopharma innovation and manufacturing hub**.

16th Finance Commission Report (2026–31)

Source: The Hindu

Relevance: GS Paper: II – Centre–State Relations, Constitutional Bodies, Cooperative Federalism

Important Keywords for Prelims and Mains

For Prelims:

- 16th Finance Commission, Tax Devolution, Cess, Surcharge, Total Fertility Rate, Fiscal deficit.

For Mains:

- Recommendations of the 16th Finance Commission, Tax Devolution its significance and its Constitutional Mandates, Evolution and role of Finance Commissions in Indian federalism.

Why in News?

- The **16th Finance Commission**, chaired by **Arvind Panagariya**, has submitted its recommendations for the award period **2026–2031**.
- The report was presented in Parliament along with the **Union Budget 2026–27**.
- It signals a structural shift from entitlement-based transfers toward a performance and compliance-driven fiscal federal framework.

Overview of the Report

- States' share in central taxes remains **41%**, continuing the arrangement of the **15th Finance Commission**.
- Fiscal transfers are increasingly tied to **performance indicators and compliance norms**.
- A new parameter — **contribution to GDP** — has been introduced.
- Strong emphasis has been placed on:
  - Fiscal prudence
  - Transparency
  - Reduction of off-budget liabilities
  - Rationalisation of subsidies

However, concerns have emerged regarding:

- Reduced untied funds
- Equity in inter-state distribution
- Fiscal autonomy of states, particularly southern and economically weaker regions.

Key Recommendations of the 16th Finance Commission

1. Tax Devolution

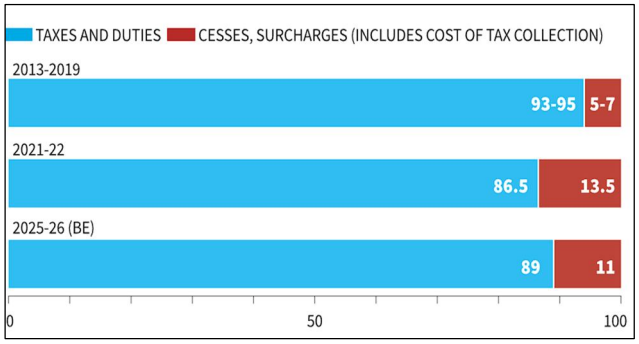
Vertical Devolution

- Refers to the proportion of the Union's **divisible tax pool** allocated to states.
- Retained at **41%**, unchanged from the previous commission.
- The divisible pool **excludes:**
  - Cesses
  - Surcharges
  - Collection charges

This retention has sparked debate because states had demanded an increase to **50%** citing expanding responsibilities.

Horizontal Devolution

Determines how the 41% share is distributed among states.



Revised Criteria and Weightage

Criterion	Weight
Income Distance	42.5%
Population (2011 Census)	17.5%
Demographic Performance	10%
Area	10%
Forest & Ecology	10%
Contribution to GDP	10%

Major Change:

- The earlier **tax and fiscal effort** parameter has been removed.
- Economic output is now directly rewarded.

Understanding the Devolution Criteria

Income Distance

- Measures the gap between a state's per capita GSDP and that of the top three high-income states.
- Lower-income states receive greater allocations, promoting **inter-state equity**.

Population (2011 Census)

- Reflects expenditure needs arising from population size.

Demographic Performance

- Based on population growth between **1971–2011** rather than Total Fertility Rate.

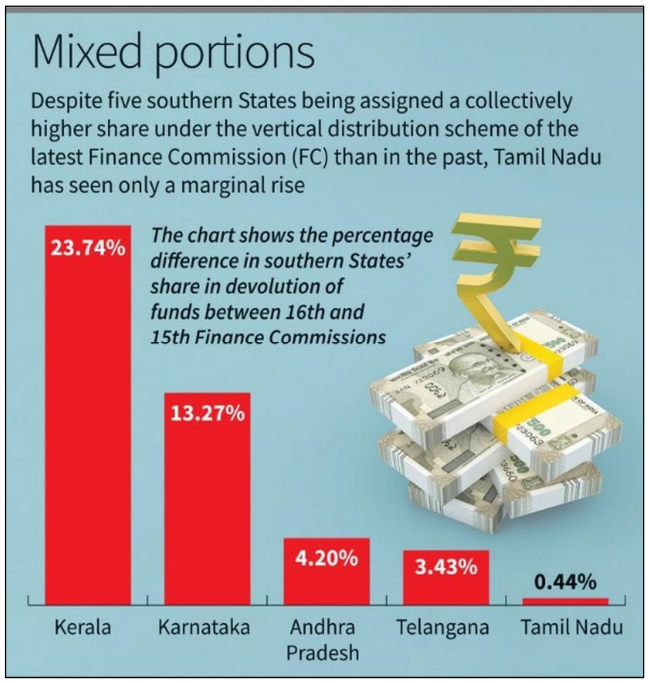
- Rewards states that successfully controlled population growth.

Forest & Ecology

- Allocation considers:
  - Share in national forest area
  - Increase in forest cover (2015–2023)
- Unlike earlier commissions, **open forests are included**.

Contribution to GDP

- Newly introduced indicator.
- Recognises states that significantly support national economic output.



Grants-in-Aid

Total recommended grants: **₹9.47 lakh crore**
Local Body Grants – ₹8 lakh crore

- Rural local bodies: **₹4.4 lakh crore**
- Urban local bodies: **₹3.6 lakh crore**

Entry Conditions

States must ensure:

1. Constitutionally compliant local bodies
2. Public disclosure of audited accounts
3. Timely formation of State Finance Commissions

Structure

- 80% Basic Grants
  - 50% untied
  - 50% tied to sanitation, waste, and water management
- 20% Performance Grants
  - Linked to local outcomes and state-level reforms

Additional Urban Measures

- **Urbanisation Premium:** ₹10,000 crore (one-time)
  - Supports integration of peri-urban villages.
- Special Infrastructure Grants: ₹56,100 crore
  - For wastewater systems in cities with populations between **10–40 lakh**.

Disaster Management Grants

- Total allocation: **₹2,04,401 crore**
- Cost sharing:
  - **90:10** → North-Eastern & Himalayan states
  - **75:25** → Other states
- Centre's contribution: **₹1,55,916 crore**

Discontinued Grants

The Commission has removed:

- Revenue deficit grants
- Sector-specific grants
- State-specific grants

(This marks a departure from earlier redistributive support mechanisms.)

Other Major Recommendations

Fiscal Roadmap

- Centre to reduce fiscal deficit to **3.5% of**

GDP by 2030–31.

- States' fiscal deficit capped at **3% of GSDP**.
- Off-budget borrowings must be discontinued and incorporated into official debt.

Combined debt is projected to decline from **77.3% (2026–27)** to **73.1% (2030–31)**.

Power Sector Reforms

- States encouraged to privatise DISCOMs.
- Legacy debts to be transferred to a **Special Purpose Vehicle**.
- Repayment allowed via the Special Assistance Scheme for Capital Investment after privatisation.

Subsidy Rationalisation

- States urged to:
  - Introduce exclusion criteria
  - Stop off-budget financing
  - Ensure uniform disclosure

Trends:

- Cash transfer schemes form 20.2% of subsidy spending (2025–26), up from 3% (2018–19).
- Large-group transfers alone constitute **47.4%**.

The expansion is attributed to the success of the **JAM Trinity**, which made direct transfers administratively easier.

Public Sector Enterprise Reform

- Closure recommended for **308 inactive SPSEs**.
- Loss-making enterprises (3 of 4 years) must be reviewed for:
  - Closure
  - Privatisation
  - Strategic retention

Transparency in Tax Data

- Union government should publish **CAG-certified net tax proceeds** annually under **Article 279**.
- This improves clarity regarding the divisible pool.

Major Concerns

1. Stagnant Vertical Devolution

- States sought **50%**, but allocation remains at **41%**.
- Growing use of cesses and surcharges reduces untied fiscal space.

Leads to vertical fiscal imbalance.

2. Changes in Horizontal Formula

- Reduced weight for income distance weakens redistribution.
- Population and GDP criteria favour industrialised states.

Example:

- Tamil Nadu's share:
  - 15th FC → **4.079%**
  - 16th FC → **4.097%**
  - Increase → Only **0.44%**

Southern states argue this penalises their success in population control.

3. Declining Incentives for Demographic Performance

- Commission warns of "aging before becoming rich."
- Gradual reduction in rewards raises concerns about fairness.

4. Removal of Revenue Deficit Grants

- Hill and special-category states argue deficits are structurally unavoidable.

5. Fiscal Constraints

- Strict deficit limits may compress infrastructure and welfare spending.

6. Over-Centralisation

- Expansion of tied grants reduces states' policy flexibility.
- Risks converting states into implementing arms of the Union.

Measures to Strengthen Fiscal Federalism

Elasticity-Linked Transfers

- Link part of devolution to revenue buoyancy.

Floor Guarantee

- Ensure no state's nominal share falls below previous levels.

Empowering State Finance Commissions

- Provide matching grants for states implementing SFC recommendations.

Cap on Cesses and Surcharges

- Consider limiting them to ~10% of Gross Tax Revenue.

Revitalise the Inter-State Council

- Use Article 263 for real-time fiscal dialogue.

Conclusion

The 16th Finance Commission represents a transition toward a **compliance-oriented fiscal regime**, rewarding economic productivity and ecological stewardship while enforcing fiscal discipline. Its long-term success hinges on balancing efficiency with equity and ensuring that vulnerable states are not left behind in India's evolving federal structure.

PMO Declares Questions on PM CARES and Other Funds Not Admissible in Lok Sabha

Source: The Indian Express, PIB

Relevance: **GS Paper II – Polity & Governance (Parliamentary Procedures, Accountability, Transparency)**

Important Keywords for Prelims and Mains

For Prelims

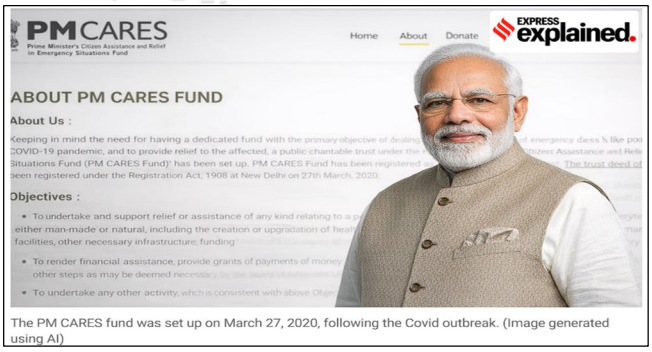
- PM CARES Fund, Prime Minister's National Relief Fund (PMNRF), National Defence Fund (NDF), Rule 41 of Lok Sabha, Consolidated Fund of India, Public Charitable Trust, Article 12 (Definition of State), RTI Act.

For Mains

- Transparency vs executive discretion, Parliamentary oversight and accountability, Status of public charitable trusts linked to government, Ethical governance and public fund management.

Why in News?

The Prime Minister's Office (PMO) informed the Lok Sabha Secretariat that **questions regarding PM CARES Fund, PMNRF, and the National Defence Fund are not admissible** under parliamentary rules, as these funds are based on voluntary contributions and are not financed through the Consolidated Fund of India.



The PM CARES fund was set up on March 27, 2020, following the Covid outbreak. (Image generated using AI)

About the Three Funds

PM CARES Fund

- Established: **March 27, 2020**, during the COVID-19 pandemic.
- Nature: Public charitable trust.
- Objective: Provide relief during emergencies and distress situations.
- Balance (2022–23): Approximately ₹6,283.7 crore.

Prime Minister's National Relief Fund (PMNRF)

- Established: **1948** to assist displaced persons after Partition.
- Current Use: Relief for victims of natural disasters, accidents, and riots.

National Defence Fund (NDF)

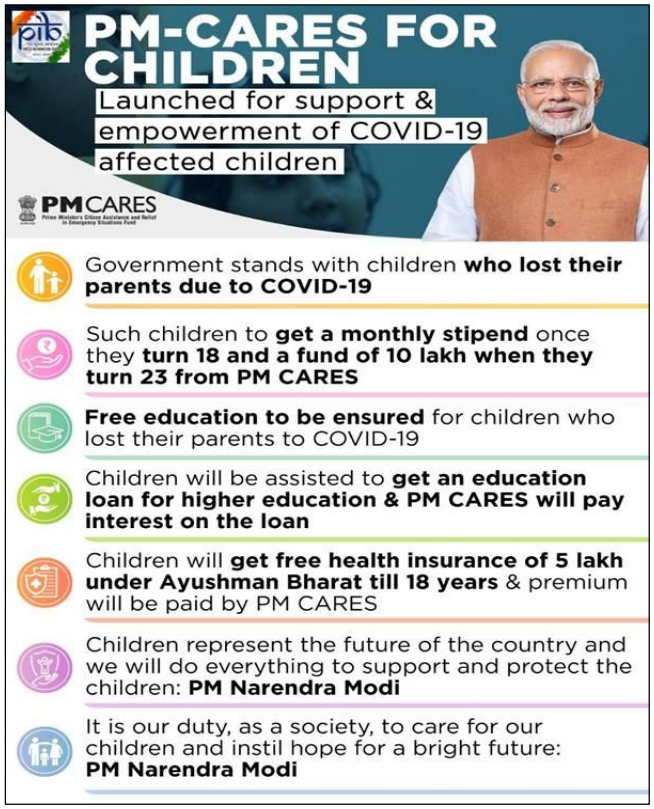
- Purpose: Welfare of armed forces personnel and dependents.
- Administered by an executive committee chaired by the Prime Minister.

Rules Cited by PMO

The PMO invoked **Rule 41(2)** of the Rules of Procedure and Conduct of Business in Lok Sabha:

- **Rule 41(2)(viii):** Questions cannot relate to matters not primarily the concern of the Government of India.
- **Rule 41(2)(xvii):** Questions cannot address bodies not primarily accountable to the Government.

Since these funds rely entirely on voluntary donations and are not funded by government revenue, they fall outside routine parliamentary scrutiny.

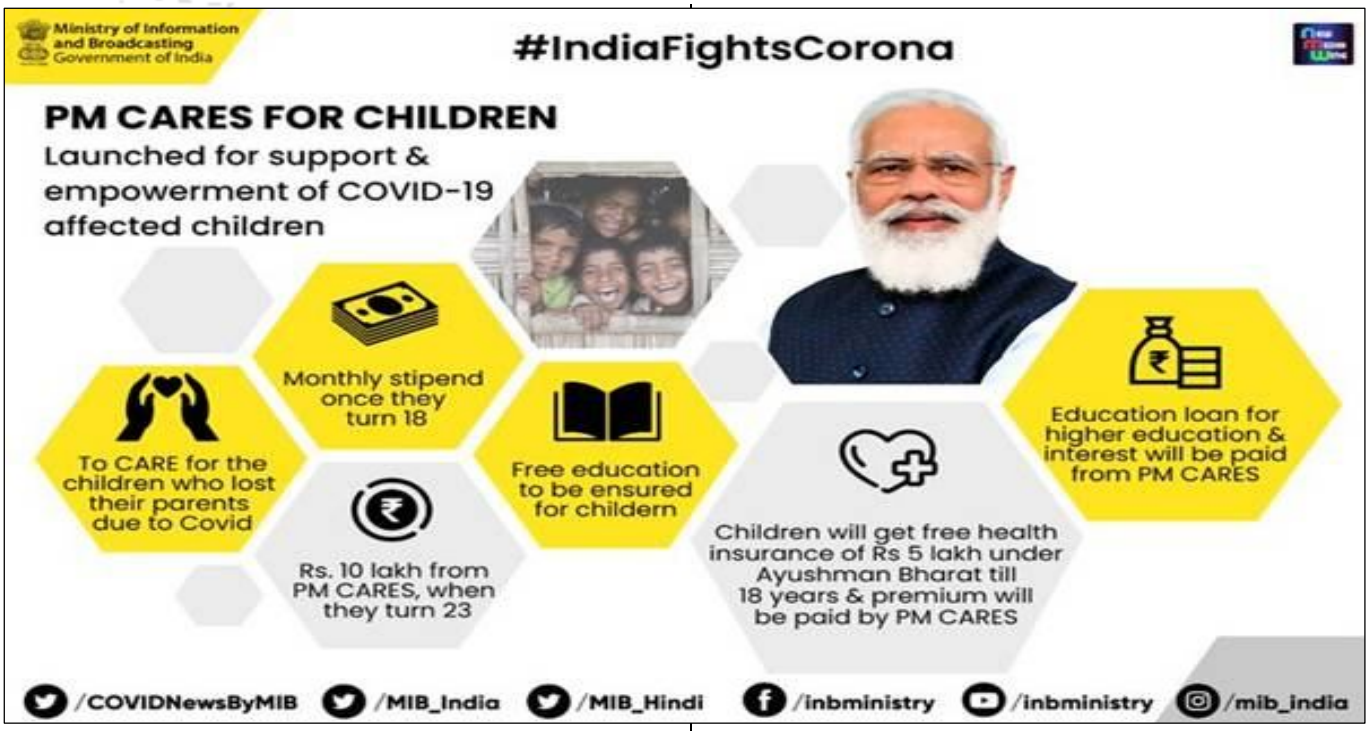


CONTRIBUTIONS TO THE FUND

(In Rs crore)

Year	Voluntary	Foreign
2019-20	3,076.85	0.39
2020-21	7,183.77	494.93
2021-22	1,896.76	40.12
2022-23	909.64	2.57
Total	13,067.02	538.01

Source: pmcares.gov.in



Government's Legal Position

- PM CARES is not constituted under the Constitution or any statute.
- It is neither owned nor controlled by the government.
- Therefore, it is not a "public authority" under the RTI Act.

Supreme Court's View (2020)

- Refused to transfer PM CARES funds to the National Disaster Response Fund (NDRF).
- Held that both funds serve **distinct purposes**.
- Noted that **CAG audit applies to NDRF**, while PM CARES, being a charitable trust, does not require such audit.

Key Constitutional and Governance Issues

- Raises debate on parliamentary accountability.
- Tests the boundary between public institutions and private trusts linked to public office.
- Connects to Article 12 discussions on whether such entities qualify as "State."

Significance

- Clarifies procedural limits of parliamentary questioning.
- Reinforces the legal distinction between government funds and charitable trusts.
- Highlights evolving governance mechanisms during emergencies.

Concerns

- Reduced legislative scrutiny may affect perceptions of transparency.
- Public donations create expectations of accountability.
- Ambiguity over institutional status can trigger legal debates.

Way Forward

- Consider voluntary disclosure standards for high-profile public trusts.
- Strengthen audit transparency without compromising legal structure.
- Clarify regulatory frameworks for quasi-public funds.
- Enhance communication to maintain public trust.

No-Confidence Motion Against Om Birla

Source: Indian Express

Relevance: GS Paper – 2: Parliament, State Legislature, Executive, Representation of People's Act

Important Keywords for Prelims and Mains

For Prelims:

- Coalition government, Speaker and a Deputy Speaker, simple majority, adjournments, no-confidence and censure motions, Business Advisory Committee, the General Purposes Committee and the Rules Committee, rights and privileges

For Mains:

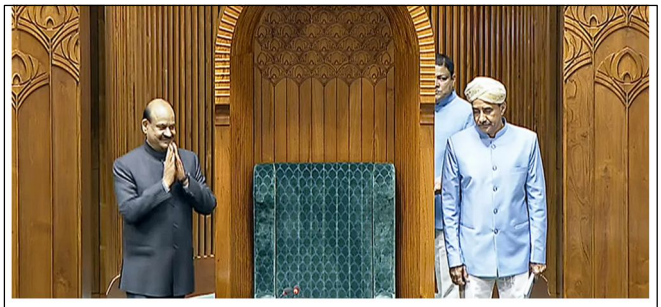
- Key facts about the speaker in India, Role of Speaker in Coalition Government

What is the current issue?

- The **Opposition moved a no-confidence motion** against Lok Sabha Speaker **Om Birla** on **February 10, 2026**.
- Reasons cited include:
  - Not allowing **Leader of Opposition Rahul Gandhi** to quote or speak about **former Army Chief Gen MM Naravane's unpublished memoir**.
  - The Speaker's statement suggesting **Prime Minister Narendra Modi could have been attacked inside the House**.
- Lok Sabha sources say the motion will now be **examined and processed as per rules**.

Can the Lok Sabha Speaker be removed?

- **Yes**, the Lok Sabha Speaker **can be removed**.
- This provision **does not apply to the Rajya Sabha Chairman**.
- The removal process is provided under **Article 94(c) of the Constitution of India**.

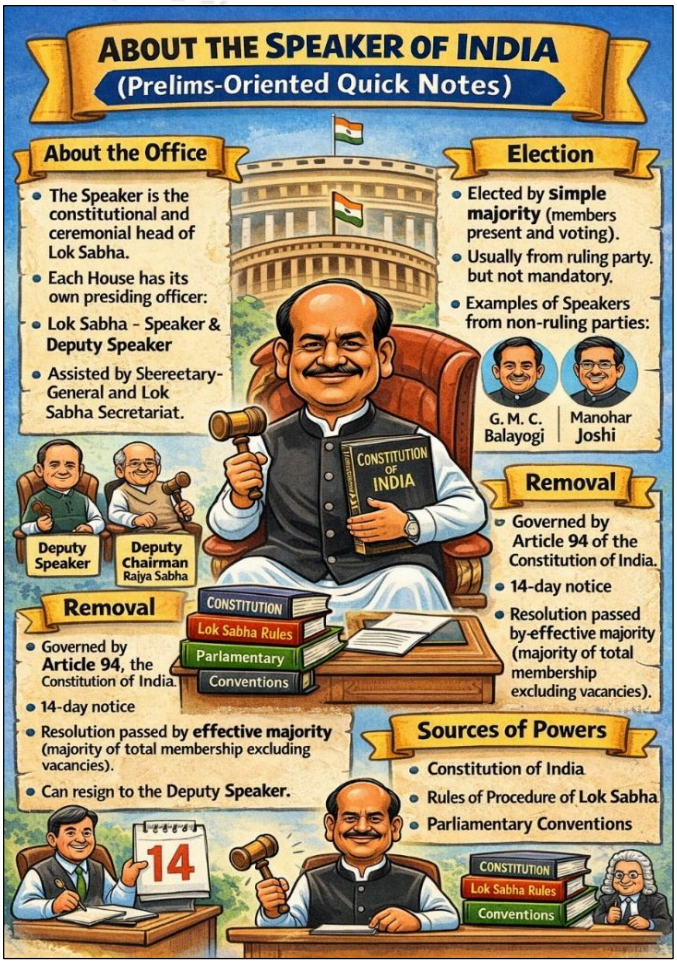


Lok Sabha Speaker Om Birla during the Budget Session, in New Delhi on Monday. (Sansad TV/ANI Video Grab)

Constitutional basis (Article 94)

Under **Article 94**, a Speaker or Deputy Speaker vacates office if:

- **94(a):** They cease to be a member of the Lok Sabha.
- **94(b):** They resign by submitting a written resignation.
- **94(c):** They are removed by a **resolution passed by a majority of all the then members of the Lok Sabha**.
- Removal requires a **special and stringent procedure**.



Constitutional Provisions Related to Speaker/Deputy Speaker

- **Article 93/178:** Appointment of the Speaker and Deputy Speaker of the Lok Sabha/ Legislative Assembly.
- **Article 94/179:** Vacation/resignation/removal from the offices of Speaker and Deputy Speaker of the Lok Sabha/Legislative Assembly.
- **Article 95/180:** Power of the Deputy Speaker or other person(s) to perform the duties of the office of or to act as the Speaker of the Lok Sabha/Legislative Assembly.
- **Article 96/181:** The Speaker or the Deputy Speaker not to preside while a resolution for his removal from office is under consideration.
- **Article 97/186:** Salaries and allowances of the Speaker and Deputy Speaker.

Judicial Provisions Related to Speaker / Deputy Speaker

- **Kihoto Hollohan vs Zachillhu (1993):** Speaker's decisions under the Tenth Schedule are **not final** and are **subject to judicial review** on grounds like **malafide, perversity, or constitutional violation**.
- **Nabam Rebia vs Deputy Speaker (2016):** A Speaker **cannot decide disqualification petitions** under the anti-defection law **while a removal notice against them is pending**.
- **Keisham Meghachandra Singh vs Speaker, Manipur LA (2020):** Disqualification pleas must be decided **within three months**, except in **extraordinary circumstances**.
- **Subhash Desai vs Principal Secretary, Governor of Maharashtra (2023):** Speaker directed to **set a clear timeline** for deciding disqualification petitions; undue delay **undermines democracy**.

Process For Removal of Lok Sabha Speaker

- Article 94(c) allows a Speaker to be removed by a resolution of the House.
- A member must give at least 14 days' written notice to move a resolution for removal.
- The motion must be backed by at least 50 MPs to be admitted for discussion.
- The Speaker cannot preside over the House while the motion is pending, but may attend and defend himself, as per Article 96.
- The resolution must pass by a majority of all members of the Lok Sabha (effective

majority).

- If passed, the Speaker is removed immediately but remains an MP. If rejected, the Speaker continues in office.
- Since the notice has the required signatures, the motion can be taken up after the 14-day notice period. The Budget Session is in recess after February 13.

Who can initiate the removal process?

- **Any Lok Sabha member** can give notice.
- Notice must be:
  - **In writing**
  - Submitted to the **Secretary-General of the Lok Sabha**
- The notice may be given **jointly by two or more members**.

Mandatory notice period

- A resolution for removal **cannot be moved unless at least 14 days' prior notice** is given.
- After receiving notice:
  - A **motion for leave** to move the resolution is listed in the **List of Business**.
  - The date fixed must be **any day after 14 days** from receipt of notice.

Minimum support required (critical condition)

- At the time of seeking leave:
  - **At least 50 members must stand up in support** of the motion.
  - This establishes that the House's **quorum requirement is met**.

What happens if 50 or more MPs rise?

- The presiding officer declares that **"leave has been granted"**.
- The resolution is scheduled for discussion:
  - **Within 10 days** of leave being granted.
  - It is included in the **List of Business**.

What happens if fewer than 50 MPs rise?

- The presiding officer declares that the member:
  - **"Has not the leave of the House"**
- The motion **fails immediately** and goes no further.

Rules governing the process

- Governed by **Rules 200 to 203** of the:
  - *Rules of Procedure and Conduct of Business in Lok Sabha*
- Additional guideline under **Rule 200A**:
  - The resolution must:
    - Be **specific in charges**
    - Be **clearly and precisely worded**
    - **Not include**:
      - Arguments
      - Inferences
      - Irony or sarcasm
      - Imputations
      - Defamatory statements

Debate rules once motion is admitted

- Members who submitted the motion:
  - **Cannot speak immediately after admission**
- On the scheduled discussion day:
  - Movers may speak **only if allowed by the presiding officer**
  - Speaking time is capped at **15 minutes**
- Discussion must be:
  - **Strictly confined to the charges** mentioned in the resolution

Role and rights of the Speaker during the motion

- The Speaker:
  - **Does not vacate office** during discussion
  - Has the **right to speak and participate** in proceedings
  - Has the **right to vote in the first instance**
  - **Cannot exercise a casting vote** in case of a tie

What if the Lok Sabha is dissolved?

- Even after dissolution:
  - The Speaker **continues in office**
  - Vacates the post **only immediately before the first meeting of the next Lok Sabha**

Has this happened before?

Yes — **three times in Indian parliamentary history**:

1. **1954** – Against **GV Mavalankar** (first Lok Sabha Speaker)
2. **1966** – Against **Hukam Singh**
3. **1987** – Against **Balram Jakhar**

None of the Speakers were removed as a result of these motions.

Conclusion

- Removing a Lok Sabha Speaker is **constitutionally possible but politically difficult**.
- It requires:
  - Prior notice
  - Procedural compliance
  - Minimum MP support
  - Majority of **all existing members**, not just those present
- Historically, **no Speaker has ever been removed** through this process.

The Need for Diversity in the Judiciary

Source: The Hindu

Relevance: **GS Paper II – Polity (Judiciary, Constitutional Amendments, Judicial Appointments, Access to Justice)**

Important Keywords

Prelims:

- Article 124, Article 217, Article 130, Collegium System, First Judges Case (1981), Second Judges Case (1993), Third Judges Case (1998), 99th Constitutional Amendment Act, National Judicial Appointments Commission (NJAC), Basic Structure Doctrine.

Mains:

- Judicial Independence, Social Diversity in Judiciary, Judicial Accountability, Access to Justice, Regional Benches of Supreme Court.

Why in News?

A private member Bill has been introduced by **P. Wilson**, senior advocate and Rajya Sabha MP of the **Dravida Munnetra Kazhagam (DMK)**.

The Bill seeks to:

- Amend the Constitution to bring diversity in judicial appointments.
- Establish regional benches of the Supreme Court.

What Does the Constitution Provide?

The Constitution lays down the formal framework for judicial appointments:

Article 124

- Judges of the Supreme Court are appointed by the President after consulting the Chief Justice of India (CJI).

Article 217

Judges of a High Court are appointed by the President after consulting:

- The Chief Justice of India,
- The Chief Justice of the concerned High Court,
- The Governor of the State.

Article 130

- The seat of the Supreme Court shall be in Delhi or such other place(s) as appointed by the CJI with the approval of the Central Government.

Why Was the Collegium System Introduced?

Until the 1980s, judges were appointed by the government after consultation with the judiciary, as per the constitutional text.

First Judges Case (1981)

The Supreme Court upheld the primacy of the executive in judicial appointments, reasoning that the executive is accountable to the people.

However, concerns arose regarding the need to:

- Maintain judicial independence.
- Insulate appointments from political favouritism.

Second Judges Case (1993)

The Supreme Court created the collegium system for judicial appointments.

Third Judges Case (1998)

The Court reaffirmed and clarified the collegium system.

Composition of Collegium

- For Supreme Court appointments:
  - CJI + four senior-most judges of the Supreme Court.
- For High Court appointments:
  - CJI + two senior-most judges.

The collegium:

- Initiates proposals for appointments.
- Sends recommendations to the Central Government.
- The Centre may return a recommendation once.
- If the collegium reiterates it, the appointment must be made.

Merits and Drawbacks

The collegium system:

- Ensured independence of the judiciary from the executive.

However, it faces criticism for:

- Lack of transparency.
- Lack of accountability.
- Alleged nepotism, where kith and kin of sitting judges are favoured.

Why Was the NJAC Struck Down?

To address concerns over transparency, Parliament enacted the 99th Constitutional Amendment in 2014, creating the National Judicial Appointments Commission (NJAC).

Composition of NJAC

- CJI
- Two senior judges
- Union Law Minister
- Two eminent persons

However, in 2015, the Supreme Court struck down the NJAC.

Reason:

- It violated the basic structure of the Constitution, particularly the independence of the judiciary.
- As a result, the collegium system continues.

What Does the Private Member Bill Propose?

1. Social Diversity in Appointments

Although the collegium emphasises merit, it does not reflect the social diversity of India.

Data between 2018 and 2024 shows:

- Around 20% of judges appointed to higher judiciary belonged to SC, ST and OBC categories.
- Women constitute less than 15%.
- Religious minorities constitute less than 5%.

The Bill mandates:

- Due representation to SC, ST, OBC, religious minorities and women.
- Representation proportional to their population.
- Application to both Supreme Court and High Courts.

2. Timeline for Appointments

- The Central Government must notify collegium recommendations within 90 days.

Regional Benches of the Supreme Court

Present Situation

- The Supreme Court sits only in Delhi.
- Access for common citizens from distant regions is difficult.
- More than 90,000 cases are pending as of January 2026.

Proposal Under the Bill

Regional benches to be set up in:

- New Delhi
- Kolkata
- Mumbai
- Chennai

These regional benches:

- Will exercise full jurisdiction of the Supreme Court.
- Constitutional matters will remain with the main Constitution Bench in Delhi.

This aims to improve access and address pendency.

What Can Be the Way Forward?

On Diversity

- The primary responsibility lies with the judiciary through the collegium process.
- The Bill could provide a constitutional directive for inclusivity.
- Long-term reform could involve reviving NJAC with a broader composition.
- Representation from legislature, Bar Council and academia may be included.
- Models from South Africa and the U.K. may be considered.
- Suitable representation for SC, ST, OBC, minorities and women must be ensured.

On Regional Benches

- Parliamentary Committees and the Law Commission have earlier recommended regional benches.
- They can be established under existing constitutional provisions.
- The Court may consider starting with one

regional bench and expand in a time-bound manner.

Conclusion

The debate over diversity in judicial appointments and the establishment of regional benches highlights two structural concerns: representation and access. While judicial independence remains foundational, enhancing social inclusivity and geographical accessibility can strengthen public confidence in the judiciary. The proposed Bill seeks to constitutionally anchor these objectives while leaving room for institutional reform.

India's Expanding Drone Ecosystem: Transforming Governance, Agriculture and National Security

Source: PIB

Relevance: **GS Paper II – Governance; GS Paper III – Science & Technology,**

Important Keywords

Prelims:

- Drone Ecosystem, Drone Rules 2021, Digital Sky Platform, eGCA, Remote Pilot Certificate (RPC), Unique Identification Number (UIN), Green Zone Airspace, Production Linked Incentive (PLI), GST on Drones (5%), Namo Drone Didi Scheme, SVAMITVA Scheme, NHAI Drone Monitoring, NECTAR, RPTO (Remote Pilot Training Organisation), NIDAR, SwaYaan Programme

Mains:

- Digital Governance, Precision Agriculture, Land Reforms through Drone Mapping, Infrastructure Monitoring, Disaster Response Technology, Border Surveillance, Drone-as-a-Service (DaaS), Regulatory Liberalisation, Indigenous Manufacturing, Skill Development in Unmanned Aerial Systems, Technological Self-Reliance, Innovation-Driven Public Service Delivery

Why in News?

Recent government data highlights the rapid expansion of India's regulated drone ecosystem, transforming governance, agriculture, infrastructure monitoring and national security through structured policy reforms and digital platforms.

Transformation of Public Service Delivery through Drone Technologies

- Drone technology has emerged as a powerful enabler of efficient, transparent, and responsive governance in India. Integrated into flagship schemes such as SVAMITVA and PMFBY, drones are enhancing precision in land surveys, crop assessment, infrastructure monitoring, disaster response, railway supervision, and defence operations. Their deployment is not only improving service delivery but also accelerating innovation across multiple sectors.

1. Agriculture and Farmer Services

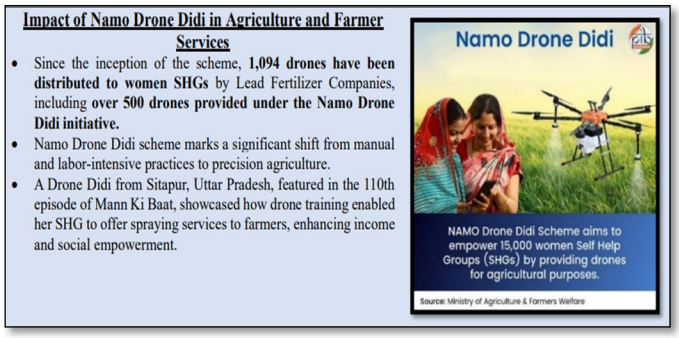
The **Namo Drone Didi Scheme (November 2023)** aims to provide drones to Women Self Help Groups (SHGs) to promote precision agriculture.

Key Objectives:

- Improve farm efficiency
- Increase crop productivity
- Reduce input costs
- Generate sustainable livelihoods for women

Impact:

- 1,094 drones distributed to women SHGs (500+ under Namo Drone Didi).
- Transition from labour-intensive spraying to precision agriculture.
- A SHG member from Sitapur, Uttar Pradesh, highlighted in the 110th episode of Mann Ki Baat, demonstrated income enhancement through drone-based spraying services.

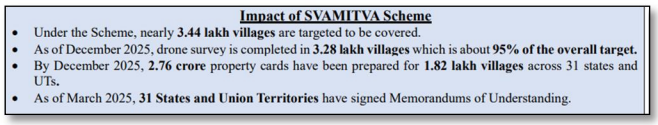


2. Land Mapping – SVAMITVA Scheme

Launched in April 2020 by the Ministry of Panchayati Raj with Survey of India and State Governments.

Purpose:

- Drone-based mapping of rural abadi areas
- Settlement of land disputes
- Improved access to institutional credit



3. Highway Development – NHAI

The National Highways Authority of India mandates monthly drone video monitoring of highway projects.

- Footage uploaded for month-to-month comparison.
- Used for progress tracking and quality verification.
- Stored in Data Lake for dispute resolution in tribunals and courts.

4. Disaster Management and Emergency Response

The North East Centre for Technology Application and Reach (NECTAR) has developed long-endurance drones capable of carrying heavy equipment.

- Used during floods and landslides.
- Provide real-time aerial visuals.
- Improve coordination of search and rescue operations.

5. Railway Drone Monitoring

The Ministry of Railways has directed all zones to deploy drones for track and infrastructure inspection.

- West Central Railway pioneered drone-based inspections.
- Enhances monitoring of hard-to-reach areas.
- Improves maintenance efficiency.

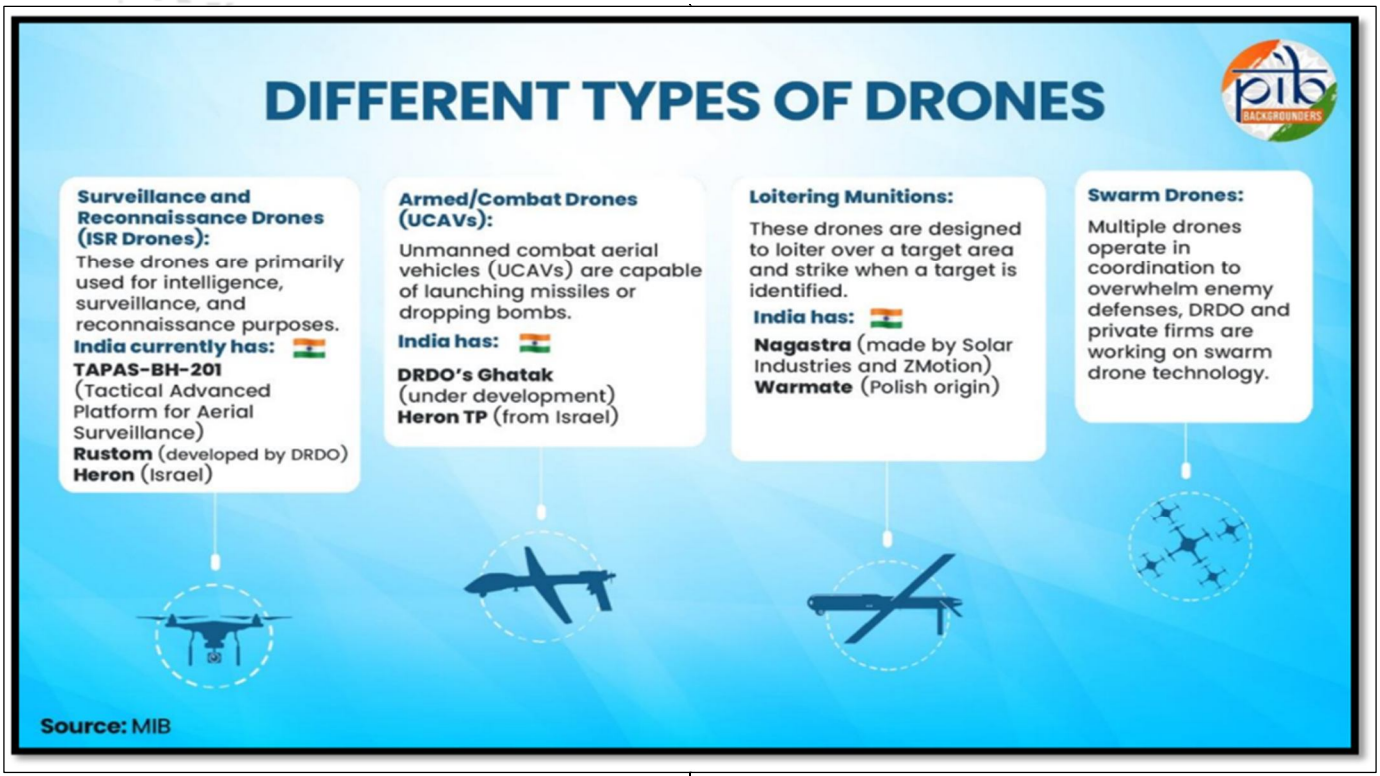
Do you know?

The Railway Protection Force (RPF) has adopted drones for security surveillance in rail yards, station premises, and along railway tracks. These drones provide real-time tracking, video streaming, and aerial monitoring, supporting crowd management and anti-trespass operations.

6. Drones in Defence

Drones support border surveillance, intelligence gathering, and precision operations.

- Used in Operation SINDOOR for accurate targeting.
- Integrated with radar networks and air defence systems.
- Strengthen protection of critical infrastructure and rapid response capabilities.



Accelerating Drone Adoption in India through Policy, Programs and Reforms

The Government of India has established a comprehensive regulatory and financial framework to accelerate drone adoption and strengthen domestic manufacturing. Through progressive reforms, simplified compliance mechanisms, and targeted incentives, India has built a structured ecosystem that promotes innovation, ease of doing business, and technological self-reliance.

1. Drone Rules, 2021 (Amended 2022 & 2023)

The Drone Rules, 2021 significantly liberalised India's drone regulatory framework.

Key Reforms:

- Forms reduced from 25 to 5.
- Approval requirements reduced from 72 to 4.
- Fees rationalised and delinked from drone size.
- Civilian drones permitted up to 500 kg.
- Nearly 90% of Indian airspace declared Green Zone (up to 400 feet).
- Traditional pilot licence replaced by DGCA-issued Remote Pilot Certificate.
- Passport requirement removed; government-issued ID sufficient.

These reforms lowered entry barriers, encouraged rural and commercial adoption, and strengthened Drone-as-a-Service (DaaS) models.

2. Production Linked Incentive (PLI) Scheme

The PLI scheme for drones and components has an outlay of ₹120 crore.

Objectives:

- Promote domestic manufacturing.
- Support start-ups and MSMEs.
- Scale up production capacity.
- Reduce import dependence.

3. GST Rationalisation

In September 2025, GST on drones was reduced to

5%, replacing earlier rates of 18% and 28%.

Impact:

- Lower cost of drone procurement.
- Boost to commercial and personal usage.
- Reduced training costs due to GST applicability on simulators.
- Strengthened skill development ecosystem.

4. Digital Sky Platform & eGCA

Digital Sky acts as a single-window system for drone regulation.

Migration to eGCA:

- Registration
- Remote Pilot Certification
- Type Certification
- RPTO authorisation

Operational services such as flight planning and airspace maps remain integrated with Digital Sky.

Key Achievements (Feb 2026):

- 38,575 drones registered (UIN issued).
- 39,890 Remote Pilot Certificates issued.
- 244 DGCA-approved Remote Pilot Training Organisations.

5. Ecosystem Development & Capacity Building

Promotional Platforms:

- Bharat Drone Shakti
- Bharat Drone Mahotsav
- Drone International Expo

These promote indigenous innovation and Drone-as-a-Service models.

Skill & Innovation Initiatives:

- DGCA-approved RPTO expansion.
- SwaYaan Programme: 857+ activities, 26,000+ participants, 337 collaborations.
- NIDAR Innovation Challenge: ₹40 lakh prize pool; supports autonomous drone R&D and incubation.

Conclusion

Through liberalised Drone Rules, manufacturing incentives, GST rationalisation, digital regulatory platforms, and large-scale skill development initiatives, India has created a comprehensive drone ecosystem. These reforms are accelerating adoption across commercial, industrial, and governance sectors while fostering a self-reliant and future-ready unmanned aerial systems industry.

Why Has Eastern Nagaland Got Autonomy?

Source : The Hindu

Relevance:

- **GS II: Federalism, Devolution of Powers, Special Constitutional Provisions, North-East Governance**
- **GS III: Internal Security & Border Management (Myanmar Border)**

Important Keywords

Prelims:

- Frontier Nagaland Territorial Authority (FNTA), Eastern Nagaland Peoples' Organisation (ENPO), Article 371(A), Article 371(C), Tripartite Agreement (Feb 5, 2026), Devolutionary Autonomy, Hill Areas Committee, Myanmar Border Buffer Zone.

Mains:

- Asymmetric Federalism, Territorial Authority Model, Devolution of Administrative & Financial Powers, Identity

Politics in North-East, Security–Development Nexus, Constitutional Innovation, Centre–State Negotiations

Why in News?

- On **February 5, 2026**, the Centre signed a **tripartite agreement** with the Nagaland Government and the **Eastern Nagaland Peoples' Organisation (ENPO)** to form the **Frontier Nagaland Territorial Authority (FNTA)**.
- The FNTA is an experiment in **"devolutionary autonomy"**.
- It grants a high degree of **administrative and financial autonomy** to six relatively "backward" eastern districts — **Kiphire, Longleng, Mon, Noklak, Shamator, and Tuensang**.

Background

- The demand for greater autonomy was spearheaded by the **Eastern Nagaland Peoples' Organisation (ENPO)**.
- ENPO formally conveyed its demand for a separate "Frontier Nagaland" State in **2010**.
- The roots of the demand lie in British-era policies that left eastern hills largely unadministered.
- After Nagaland became a State in 1963, eight Naga tribes in the eastern districts felt politically and economically marginalised.
- This perceived developmental imbalance evolved into a sustained movement for statehood.

ENPO's Core Demand

- Creation of a **separate State** carved out of Nagaland.
- Allegation of administrative dominance by western Naga tribes.
- Demand based on political neglect and economic backwardness.
- Movement intensified due to developmental differential between eastern and western districts.

Why Did the Centre Accept the Demand?

1. Political Pressure

- Earlier attempts such as a ₹500-crore package and standard operating procedures failed.
- In 2024, ENPO called for a **Lok Sabha election boycott**, showing significant leverage.

2. Strategic Compulsion

- Eastern Nagaland shares a sensitive border with Myanmar.
- Region acts as a buffer zone with presence of armed groups across porous borders.
- Prolonged unrest posed a national security risk.

3. Stabilisation Objective

- FNTA seen as a pacifying mechanism.
- Addresses aspirations without redrawing State boundaries.

Frontier Nagaland Territorial Authority (FNTA): Powers & Provisions

1. Semi-Autonomous Governance

- Establishment of a **mini-Secretariat** in eastern Nagaland.
- Headed by a senior officer to decentralise administration.

2. Financial & Administrative Devolution

- Development funds allocated proportionally based on population and area.
- Ministry of Home Affairs to fund initial establishment costs.

3. Legislative & Executive Authority

- FNTA to exercise powers over **46 specified subjects**, including:
  - Land use
  - Agriculture
  - Rural development
  - Infrastructure

4. Constitutional Safeguards

- Article 371(A) remains intact.
- Customary laws and Naga identity preserved.

Can FNTA Model Address the Kuki-Zo Demand in Manipur?

Structural Similarity

- Similar to Hill Areas Committee under Article 371(C).
- Shows possibility of territorial authority as middle path.

Key Differences

- Nagaland negotiations were peaceful and had cooperation of State government.
- Manipur faces active ethnic tensions and trust deficit.
- Meitei-dominated government opposes administrative separation.
- Overlapping territorial claims (e.g., NSCN) complicate replication.

Thus, applying FNTA model in Manipur would be more complex.

Significance

1. Example of **asymmetric federalism** in India.
2. Balances autonomy without creating a new State.
3. Enhances border stability with Myanmar.
4. Demonstrates constitutional flexibility in managing regional aspirations.
5. Strengthens Centre–State negotiation framework.

Challenges

1. Effective implementation of 46-subject authority.
2. Avoiding administrative overlap with Nagaland Government.
3. Financial sustainability of FNTA.
4. Managing expectations of other autonomy movements.
5. Preventing competitive identity politics.

Conclusion

The creation of the FNTA represents a constitutional middle path between full statehood and district-level administration. By granting devolutionary autonomy while preserving Article 371(A), the Centre seeks to address long-standing grievances, ensure frontier stability, and uphold federal balance. The long-term success of this model will depend on effective governance and political cooperation.

Balancing Faith, Dignity and Constitutional Rights: The Sabarimala Review and Religious Freedom

Source: The Hindu

Relevance: GS Paper II – Polity and Governance (Fundamental Rights, Supreme Court Judgments, Religious Freedom, Constitutional Morality)

Important Keywords for Prelims and Mains

For Prelims

- Sabarimala Temple, Lord Ayyappa, Rule 3(b) Kerala Hindu Places of Public Worship Rules 1965, Indian Young Lawyers Association vs State of Kerala (2018), Articles 14, 25, and 26, Freedom of Religion, Religious Denomination, Essential Religious Practices Doctrine, Supreme Court Review Petition, Constitutional Morality, Gender Equality, Fundamental Rights, Secularism.

For Mains

- Sabarimala Temple Entry Case, Indian Young Lawyers Association vs State of Kerala (2018), Essential Religious Practices (ERP) Doctrine, Anti-Exclusion Test, Constitutional Morality, Religious Autonomy vs Fundamental Rights, Justice D.Y. Chandrachud's Anti-Exclusion Test, Justice Indu Malhotra's Dissent, Freedom of Religion Jurisprudence, Constitutional Supremacy, Gender Justice, Religious Freedom vs Equality, Articles 14, 25 and 26, Religious Denomination, Secular Constitutional Framework.

Why in News?

The Supreme Court of India is set to hear the final arguments in the review petitions related to the **Sabarimala Temple entry case (Indian Young Lawyers Association vs State of Kerala, 2018)**.

The review will determine the constitutional principles governing the balance between:

- Religious autonomy
- Gender equality
- Individual dignity
- Constitutional morality

The outcome will not only affect the Sabarimala dispute but also influence other religious freedom cases involving exclusion and religious practices.

'The principles the Court lays down will have a bearing not only on the Sabarimala dispute but also on a host of other controversies as well' | Photo Credit: The Hindu

Background of the Sabarimala Case

Traditional Practice

The Sabarimala Temple, dedicated to Lord Ayyappa, traditionally barred women aged **10 to 50 years** from entering the temple.

This restriction was based on:

- The celibate nature of Lord Ayyappa (Naishtika Brahmachari)
- Long-standing religious customs
- Rule 3(b) of the Kerala Hindu Places of Public Worship (Authorisation of Entry) Rules, 1965

Devotees wait to climb the holy 18 steps to have darshan of Lord Ayyappa after the opening of the Sabarimala temple on November 15.

- *The Hindu*

Supreme Court Judgment (2018)

In September 2018, a five-judge Bench of the Supreme Court of India delivered its verdict.

Majority Judgment (4:1)

The Court ruled that:

- Devotees of Lord Ayyappa do not constitute a separate religious denomination.
- The exclusion of women violated their fundamental right to freedom of religion.
- Rule 3(b) was unconstitutional.
- Gender discrimination in temple entry violates constitutional guarantees.

The majority emphasized:

- Equality (Article 14)
- Freedom of religion (Article 25)
- Non-discrimination
- Constitutional supremacy

Dissenting Opinion – Justice Indu Malhotra

Justice Indu Malhotra presented a contrasting view.

Key arguments:

- Religious practices must be harmonised with constitutional rights.
- Courts should respect long-standing religious customs.
- The exclusion of women was an essential religious practice.
- Courts should not interfere in matters of faith unless there is clear constitutional violation.

Her dissent highlighted the importance of religious autonomy.

Constitutional Framework: Freedom of Religion

The Constitution guarantees religious freedom under:

- Article 25 – Freedom of religion to individuals
- Article 26 – Rights of religious denominations

However, these rights are subject to:

- Public order
- Morality
- Health
- Other fundamental rights such as equality and dignity

This creates tension between:

- Religious autonomy
- Individual fundamental rights

Essential Religious Practices (ERP) Doctrine

Meaning

- The Essential Religious Practices (ERP) test allows courts to decide whether a religious practice is essential to a religion.
- If essential → Constitution protects it
  If not essential → State can regulate or restrict it

Origin of ERP Doctrine

- Established in the case:
- Sastri Yagnapurushadji vs Muldas Bhudardas Vaishya
- The Court interpreted religious texts to determine essential religious practices.

Criticism of ERP Doctrine

The ERP doctrine has several limitations:

- Courts are forced to interpret religious doctrines.
- Judges become arbiters of theology.
- Lack of objective criteria.
- It does not resolve conflicts between religious practices and human dignity.

It risks allowing exclusionary practices to continue.

Anti-Exclusion Test: A New Constitutional Approach

To overcome the limitations of ERP doctrine, Justice D. Y. Chandrachud proposed the Anti-Exclusion Test.

Meaning of Anti-Exclusion Test

- The Anti-Exclusion Test focuses on constitutional impact rather than religious essentiality.

It asks:

- Does the practice exclude individuals?
- Does exclusion violate dignity?
- Does exclusion deny equal access?

If yes → The practice is unconstitutional.

Key Features

- Religious groups retain autonomy in matters of doctrine.
- Courts do not decide what is essential to religion.
- Courts intervene only when exclusion violates constitutional rights.

This shifts focus from: Essentiality of practice → Constitutional impact of practice.

Broader Constitutional Implications

The principles developed in the Sabarimala case will affect other cases involving religious exclusion, such as:

- Excommunication practices in Dawoodi Bohra community
- Rights of Parsi women marrying outside religion
- Access to religious institutions

These cases raise questions about:

- Religious autonomy
- Equality
- Individual dignity

Key Difference: ERP vs Anti-Exclusion Test

Essential Religious Practices Test	Anti-Exclusion Test
Focus on religious essentiality	Focus on constitutional impact
Courts interpret religious doctrine	Courts assess constitutional harm
Protects essential religious practices	Protects dignity and equality
Theological approach	Constitutional approach

Religion and Constitutional Morality

The Indian Constitution follows principled secularism.

This means:

- Religion is protected.
- But religious practices must comply with constitutional values.

Key constitutional principles include:

- Equality
- Liberty
- Dignity
- Non-discrimination

The Constitution prioritizes individual dignity over discriminatory customs.

Constitutional Balance: Faith vs Fundamental Rights

The Constitution recognizes both:

- Rights of religious communities
- Rights of individuals

However, when religious practices violate dignity or equality, constitutional values prevail.

The individual remains the basic unit of constitutional protection.

Significance of the Sabarimala Review

The review will decide:

- Scope of religious freedom
- Limits of religious autonomy
- Role of courts in religious matters
- Balance between faith and fundamental rights

The judgment will shape India's religious freedom jurisprudence for decades.

Conclusion

The Sabarimala case represents a major constitutional debate between religious freedom and individual rights.

The essential religious practices doctrine has faced criticism for allowing courts to interpret theology.

The anti-exclusion test offers a more constitutional approach by focusing on dignity and equality.

The Supreme Court's final ruling will define how India balances religious autonomy with constitutional morality, ensuring that faith remains protected while preventing discrimination.

International Relations

India–US Trade Deal 2026: Tariff Reduction to 18%

Source: Indian Express

Relevance: GS Paper II – International Relations; GS Paper III – Economy (External Sector, Trade Agreements)

Important Keywords for Prelims and Mains

For Prelims

- Reciprocal Tariffs, Punitive Duties, Bilateral Trade Agreement (BTA), Friendshoring, Generalised System of Preferences (GSP), Sanitary and Phytosanitary (SPS) Standards, Initiative on Critical and Emerging Technology (iCET).

For Mains

- Strategic trade partnerships in a multipolar world, Trade policy and geopolitical alignment, Strategic autonomy vs economic interdependence, Supply chain diversification, Energy security and trade diplomacy, Protectionism vs free trade.

Why in News?

- The United States has reduced tariffs on Indian goods to **18%**, down from an effective rate of nearly **50%** that included punitive duties.
- The move signals a **de-escalation of trade tensions** and reinforces India's position as a key strategic partner of the US in the Indo-Pacific region.
- The agreement is viewed as part of a broader geopolitical and economic alignment amid shifting global supply chains.

Key Highlights of the India–US Trade Deal

Tariff Rationalisation

- The US lowered the reciprocal tariff from 25% to 18%.
- The additional **25% punitive duty** imposed in August 2025 over India's Russian oil purchases has been removed.
- Effective tariff burden reduced from ~50% to **18%**, restoring export competitiveness.

India's Commitments

- **Energy Shift:** India is expected to significantly reduce dependence on Russian crude and increase imports from the US and potentially Venezuela.
- **Market Access:** India may reduce tariffs and non-tariff barriers on American goods, possibly to near zero in select sectors.
- **Large Procurement:** India could purchase up to **USD 500 billion** worth of US energy, agriculture, coal, and technology products.
- **Buy American Orientation:** Stronger preference for US suppliers in large industrial and government procurements.

Background: Evolution of Tariffs

- **"Tariff King" Narrative:** The US has historically criticised India's high import duties.
- **Mid-2025:** US imposed a **25% reciprocal tariff** matching India's average tariffs.
- **August 2025:** Another **25% punitive duty** added due to India's continued purchase of Russian oil.
- India's Pre-Deal Measures:
  - Duty reductions on select imports (e.g., heavy motorcycles, bourbon whisky)
  - Passage of the Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act,

2025, opening the nuclear sector to private participation.

- These steps helped thaw trade tensions.

India–US Trade Relations: Key Facts

- **Bilateral trade (FY25):** USD **132 billion** (up from USD 119.71 billion in FY24)
- **India's trade surplus:** USD 40.82 billion
- Major US exports to India:
  - Mineral fuels and oils
  - Nuclear reactors and machinery
  - Electrical equipment
- Major Indian exports to the US:
  - Electrical machinery
  - Pharmaceuticals
  - Gems and jewellery
  - Iron and steel products
- The US is the 3rd largest investor in India with cumulative FDI of USD 70.65 billion (2000–2025).

Strategic Framework

- **US–India COMPACT (2025):** Catalyzing Opportunities for Military Partnership, Accelerated Commerce & Technology.
- **Mission 500:** Target to expand bilateral trade to **USD 500 billion by 2030**.
- Negotiations underway for a Bilateral Trade Agreement (BTA).

Significance of Tariff Reduction

For India

- **Boost to Exports:** Textiles, pharmaceuticals, gems, and engineering goods gain competitiveness.
- **Competitive Edge:** Lower tariff than Vietnam and Bangladesh (~20%) and far below China (30–35%).
- **Economic Stability:** Reduces trade-war uncertainty, potentially stabilising the rupee and encouraging FDI.
- **Friendshoring Opportunity:** Positions India as an alternative manufacturing hub for supply chains shifting from China.

For the United States

- **Energy Exports:** India's rising import dependence (88.2% in FY25) makes it a major long-term buyer.
- **Nuclear & Defence Access:** Enabled by the SHANTI Act, facilitating US participation in India's nuclear sector.
- Technology Expansion: Supports collaboration under the Initiative on Critical and Emerging Technology (iCET).
- **Digital Infrastructure:** Tax holidays for foreign data centres benefit major US tech firms investing in AI infrastructure.

Challenges Associated with the Trade Deal

Strategic Autonomy Concerns

- Reducing Russian oil imports may strain India's long-standing strategic partnership with Moscow.
- Tests India's multi-alignment foreign policy.

Transactional Diplomacy

- Reciprocal tariff matching suggests a **quid-pro-quo approach**, where strategic concessions may require economic payback.

Risk of Chinese Retaliation

- China has warned of consequences as India strengthens US ties.
- India remains dependent on China for **rare earths and pharmaceutical APIs**, making supply chains vulnerable.

Regional Disadvantages

- Some competitors still enjoy benefits under the **Generalised System of Preferences (GSP)**, withdrawn from India in 2019.

Domestic Economic Risks

- Opening dairy and poultry sectors to subsidised US imports could trigger farmer distress.
- Switching from discounted Russian oil may increase India's **current account deficit**.

Regulatory Barriers

- US **Sanitary and Phytosanitary (SPS)** standards remain obstacles for Indian exports.
- Potential pressure to align intellectual property laws could raise healthcare costs.

Digital Trade Issues

- Debate over data localisation vs free flow of data continues.
- Possible friction with India's data protection framework.

How India Can Leverage the Trade Pivot

- **Balance Energy Security:** Accelerate renewable energy, green hydrogen, and nuclear expansion.
- **Diversify Export Markets:** Fast-track FTAs with Gulf and East Asian nations to reduce overdependence on the US.
- **Protect Domestic Sectors:** Use product-specific safeguards instead of blanket tariff reductions.
- **Strengthen Manufacturing:** Move from assembly to deep manufacturing under Make in India.
- **Promote Innovation:** Collaborate in AI, semiconductors, and space technologies while retaining public-interest safeguards in pharmaceuticals.
- **Support Farmers:** Focus on value-added agricultural exports rather than raw commodities.

Conclusion

The reduction of US tariffs to 18% provides India with a crucial **strategic window** to enhance export competitiveness and attract global supply chains. However, the long-term success of this partnership depends on balancing economic gains with strategic autonomy, safeguarding domestic industries, and building a resilient manufacturing base aligned with the vision of **Viksit Bharat**.

Oil and Beyond: With Russia, India Has to Balance Old Ties and New Realities

Source: The Indian Express

Relevance: GS Paper II (International Relations)

Important Keywords

Prelims

- India–US Trade, India–Russia Relations, Russian Oil Imports, Ukraine War, Sanctions Regime, Trade Surplus, Trade Deficit, Initiative on Critical and Emerging Technology (iCET), Indo-Pacific Strategy, Strategic Petroleum Reserves (SPR), Atmanirbhar Bharat, Quad, BRICS, China+1 Strategy, Current Account Deficit (CAD)

Mains

- Strategic Autonomy, Multi-Alignment in Foreign Policy, Energy Security and Diversification, Defence Indigenisation, Geopolitical Balancing, Economic Statecraft, Russia–China Nexus, Supply Chain Resilience, Weaponisation of Trade and Tariffs, Technology-Led Growth, Indo-Pacific Geopolitics, Global Value Chains, Global South Leadership

Why in News?

US President Donald Trump's claim that India has "agreed to stop buying Russian oil" under the India–US trade understanding has placed New Delhi in a diplomatically sensitive position. India must now balance its long-standing strategic partnership with Russia against increasing economic, trade, and geopolitical pressure from the United States, particularly in the context of the Ukraine war and Indo-Pacific realignments.

Evolution of India–Russia Strategic Partnership: From Cold War Alignment to Contemporary Geopolitics

Cold War Convergence (1950–1991)

- The Soviet Union consistently backed India on core sovereignty issues, including **Kashmir and Goa**.
- Moscow stayed neutral during the **1962 Sino-Indian war** and brokered the **Tashkent Agreement (1965)** after the India–Pakistan conflict.
- Amid the **1971 Bangladesh Liberation War** and a US–Pakistan–China alignment, India signed the **Treaty of Peace, Friendship and Cooperation** with the USSR, which functioned as a de facto security assurance against external intervention.
- The USSR emerged as India's principal defence supplier (about **70%** of equipment) and a major economic partner via the **rupee–rouble trade mechanism**.

Post-Soviet Recalibration (1991–1999)

- The USSR's dissolution coincided with India's balance-of-payments crisis.
- Russia pivoted towards Western integration and phased out concessional arms pricing.
- India undertook **LPG reforms** and broadened strategic engagement with the **US and Israel**, marking a period of relative drift in ties.

Consolidation as a Strategic Partnership (2000–2021)

- The 2000 Declaration on Strategic Partnership institutionalised cooperation, upgraded in 2010 to a Special and Privileged Strategic Partnership.
- Collaboration expanded from arms purchases to **co-development** (e.g., **BrahMos missile**) and **energy investments** (notably **Sakhalin**).
- The **Kudankulam Nuclear Power Plant** became a flagship of civil nuclear cooperation, with Russia then the only country constructing reactors in India.

Economic Engagement (Recent Years)

- Bilateral trade reached **USD 68.7 billion in FY 2024–25**, driven largely by Indian energy imports and skewed in Russia's favour.
- Targets include USD 100 billion trade by 2030 and USD 50 billion in mutual investments by 2025.
- India exports pharmaceuticals, chemicals, iron & steel, marine products; imports include crude oil, petroleum products, fertilisers, coking coal, sunflower oil, and precious metals.

Defence as the Bedrock

- Defence cooperation remains central, anchored by the **2021–2031 military-technical cooperation agreement**.
- Joint exercises such as **INDRA** and **Zapad-2025** enhance operational interoperability.

Impact of the Ukraine War

- Western sanctions led India to source **discounted Russian oil**, sharply increasing its share in India's imports and pushing trade to record highs.
- The US contends these purchases indirectly support the war and imposed **punitive tariffs**, later eased with monitoring and snap-back provisions.
- Washington now seeks to displace Russia as a key supplier by promoting **US crude, LNG**, and alternatives like **Venezuelan oil**.

Strategic Significance of India–US Trade vis-à-vis India–Russia Trade

Scale and Structure of Trade

- India–US Trade
  - The United States is India's largest trading partner, with total trade of about **USD 128 billion**.
  - India runs a **trade surplus** with the US, led by high-value merchandise exports and a strong services sector.
  - As a major source of **Foreign Direct Investment (FDI)**, the US supports India's startups, technology ecosystem, and infrastructure, generating a long-term *wealth-multiplier* effect.
  - Through the **Initiative on Critical and Emerging Technology (iCET)**, bilateral engagement is shifting from commodity trade to cooperation in advanced technologies, defence innovation, semiconductors, and space—key to India's **Viksit Bharat @2047** vision.

India–Russia Trade

- Bilateral trade stood at **USD 68.72 billion in 2024–25**, but is sharply imbalanced.
- India's imports (USD 63.84 billion), largely crude oil and energy products, far exceed exports (USD 4.88 billion).
- The relationship remains largely **transactional**, centred on commodities (oil, fertilisers) and legacy defence spares, with limited spillovers into India's broader civilian economy.

Geopolitical and Strategic Implications

- Advantages of the US Economic Partnership
  - Deeper trade and investment ties with the US complement India's **Indo-Pacific strategy**.
  - Economic interdependence functions as an implicit *security buffer*, increasing US stakes in India's stability amid China's assertiveness.
  - With global firms adopting a **"China + 1"** strategy, the US is critical for

integrating India into resilient global value chains.

- Strategic Constraints of the Russia Relationship
  - Western sanctions have pushed Russia into growing economic dependence on China.
  - Excessive reliance on Russia risks indirectly exposing Indian supply chains to **Chinese leverage and coercion**.

Energy Security Dimension

- The US tariff threat underscored Washington's willingness to **weaponise market access**.
- This has nudged India to diversify energy sourcing by increasing purchases from the **US and Venezuela**, even at higher costs, to reduce overdependence on Russian oil and strengthen long-term energy resilience

Challenges for India in the India–US–Russia Strategic Triangle

Russia–China Convergence

- A sanctions-hit Russia is becoming increasingly dependent on China, reducing its strategic autonomy.
- This weakens Moscow's ability or willingness to back India in forums like the UNSC or remain neutral during a Sino-Indian crisis.

Defence Dependence and Security Risks

- Nearly **60% of India's military platforms** (Su-30 MKI, T-90 tanks, S-400 systems) are of Russian origin.
- As India deepens ties with the US, Russia may slow or deprioritise supply of critical spares, upgrades, and maintenance.
- Russia has historically shared sensitive technologies (e.g., nuclear submarines, hypersonic systems) that Western partners deny; alienating Moscow could foreclose this channel.
- Rapid diversification away from Russian equipment is strategically essential but operationally difficult due to higher costs, restrictive end-use conditions, and the need for new training and doctrines—posing short-term readiness risks, especially along sensitive borders.

Economic and Energy Constraints

- Discounted Russian crude helped contain inflation; alternatives like US or Venezuelan oil are costlier.
- Higher freight costs from the Americas raise the landed price of crude compared to Russia or the Middle East.
- Indian refineries are optimised for **medium-sour Urals crude**; shifting to light-sweet or heavy grades requires technical recalibration, downtime, and efficiency losses.
- Increased import costs could push up fuel prices, fuel inflation, and widen the **Current Account Deficit (CAD)**.

Credibility as Global South Leader

- India's Global South leadership is anchored in sovereignty, strategic autonomy, and development-centric diplomacy.
- Prolonged ambiguity or perceived alignment in great-power rivalries risks diluting India's normative influence and moral authority on global platform

Policy Options for Balancing Competing Partnerships

- **Accelerated Defence Indigenisation**: Under *Atmanirbhar Bharat*, India should localise production of spares and ammunition for Russian-origin platforms while progressively sourcing advanced systems from the US, France, and Israel. The goal should be to reduce Russian dependence to **below 30%** over the next decade.
- **Energy Diversification through a Portfolio Approach**: India must diversify crude sourcing across West Africa, Iraq, the Americas, and the Middle East, while expanding **Strategic Petroleum Reserves** to buffer against supply disruptions.
- **Economic Risk Insulation**: Expanding FTAs (notably with the EU), strengthening rupee-based trade mechanisms, and building domestic capacity in APIs, green energy, and critical manufacturing can reduce exposure to external economic coercion.
- **Leveraging Multilateral Platforms:** India should use **Quad** cooperation to balance China in the maritime domain, while engaging **BRICS** to retain leverage with Russia and prevent excessive China–Russia convergence.

Conclusion

India's strategic calculus demands **simultaneous engagement**, not exclusive alignment. The US is indispensable for India's growth, technology access, and global economic integration, while Russia remains critical for defence stability and affordable energy during the transition phase. Managing this balance through diversification, indigenisation, and calibrated diplomacy will define India's external strategy in an increasingly fragmented world order.

India - Malaysia Joint Statement on the occasion of the Official visit by Prime minister of India to Malaysia

Source: PIB

Relevance: **Prelims: International relations, groupings, agreements, defence exercises, Indo-Pacific. GS Paper II: Bilateral relations, Act East Policy, ASEAN, Indo-Pacific, multilateral cooperation.**

Important Keywords for Prelims and Mains

For Prelims:

- Harimau Shakti Exercise, ADMM-Plus, International Solar Alliance (ISA), Indo-Pacific Oceans Initiative (IPOI), ASEAN Outlook on Indo-Pacific (AOIP), UNCLOS 1982, International Big Cat Alliance (IBCA)

For Mains:

- Comprehensive Strategic Partnership (CSP), Malaysia–India Comprehensive Economic Cooperation Agreement (MICECA), ASEAN–India Trade in Goods Agreement (AITIGA), Malaysia–India Digital Council (MIDC)

Why in News

- At the invitation of Prime Minister of Malaysia, His Excellency, Dato' Seri Anwar Ibrahim, His Excellency, Shri Narendra

Modi, Prime Minister of the Republic of India, undertook an official visit to Malaysia from 7 to 8 February 2026.


Indian Prime Minister Narendra Modi, left, and Malaysian Prime Minister Anwar Ibrahim hold hands during a news conference in Putrajaya, Malaysia, on February 8, 2026 [Hasnoor Hussain/AFP]

- The visit reaffirmed the India–Malaysia Comprehensive Strategic Partnership (CSP).
- Diplomatic ties date back to **1957**, rooted in civilizational links, shared democratic values, and strong people-to-people connections.
- Leaders held wide-ranging discussions covering political, economic, defence, digital, cultural, and global issues.
- Several bilateral agreements and institutional cooperation documents were exchanged.

Background

- Diplomatic relations established: 1957
- Comprehensive Strategic Partnership: August 2024
- Relationship rooted in civilisational links, shared democratic values, and a large Indian diaspora in Malaysia.

Political Cooperation

- Emphasis on **regular high-level visits** and sustained diplomatic engagement.
- Foreign Office Consultations (FOC) and Joint Commission Meetings (JCM) identified as key dialogue mechanisms.
- Encouraged stronger **parliamentary exchanges** to deepen institutional ties.
- Noted recent parliamentary visits between both countries.

Trade and Investment

- Recognised India as a major global economic partner.
- Agreed to enhance trade facilitation and expand cooperation in:
  - Semiconductors
  - Digital economy
  - Industrial collaboration
- Highlighted importance of:
  - Malaysia-India Comprehensive Economic Cooperation Agreement (MICECA)
  - ASEAN-India Trade in Goods Agreement (AITIGA) — currently under review.
- Promoted investments in priority sectors:
  - Infrastructure
  - Renewable energy
  - Advanced manufacturing
  - Healthcare
  - Artificial Intelligence
  - Fintech and startups
  - Green technologies
- Welcomed the **10th India–Malaysia CEO Forum** (Kuala Lumpur).
- Encouraged **local currency settlement** using Indian Rupee and Malaysian Ringgit.
- Agreed to strengthen air and maritime connectivity.

Food Security and Agriculture

- Commitment to resilient and sustainable **food supply chains**.
- Malaysia reaffirmed its role as a reliable supplier of sustainable palm oil.
- Agreed on:
  - Collaboration in oil palm cultivation
  - Development of palm oil value chains
  - Timely resolution of market-access issues.

Digital and Financial Cooperation

- Formalised the **Malaysia–India Digital Council (MIDC)** to advance cooperation in:
  - Fintech
  - Cybersecurity
  - Artificial Intelligence
  - Digital Public Infrastructure
  - Emerging technologies
- Welcomed payment linkage between **NPCI International** and **PayNet Malaysia** for:
  - Low-cost remittances
  - Seamless digital payments
  - Improved business and tourism transactions.

Energy and Semiconductor Cooperation

- Acknowledged Malaysian firms' role in India's **renewable energy and green hydrogen** sectors.
- Identified strong potential in **large-scale solar projects**.
- Reiterated support for the **International Solar Alliance**.

Semiconductors:

- Agreed to strengthen the semiconductor value chain through:
  - Technological innovation
  - Workforce development
  - Supply chain resilience
- Welcomed partnerships between academic and industry bodies of both countries.

Defence and Security

- Noted a **robust defence partnership** involving exercises, training, and industry collaboration.
- Welcomed outcomes of the Malaysia-India Defence Cooperation Committee.

- India and Malaysia to co-chair the **Counter-Terrorism Working Group (2024–2027)** under ADMM-Plus.

Military Engagements:

- Conducted joint exercise **Harimau Shakti (Dec 2025)**.
- Expanded maritime cooperation through naval visits and exercises such as:
  - Samudra Laksamana
  - MILAN
  - ASEAN-India Maritime Exercise

Counter-terrorism:

- Strong condemnation of terrorism, including cross-border terrorism.
- Commitment to:
  - Counter radicalisation
  - Prevent terror financing
  - Stop misuse of emerging technologies
- Cooperation to continue at forums like the **United Nations** and **Financial Action Task Force**.

Education and Skill Development

- Encouraged student and faculty exchanges under:
  - ITEC
  - Malaysia Technical Cooperation Programme
- Invited Malaysian students to join India's **Study in India** initiative.
- Strengthened cooperation in Technical and Vocational Education and Training (TVET).

Culture, Tourism and People-to-People Ties

- Agreed to streamline mobility of professionals and workers.
- Tourism recognised as a key pillar of bilateral relations.

Initiatives:

- Visit Malaysia 2026 campaign.
- Incredible India campaign.
- Visa liberalisation to boost travel.
- Welcomed establishment of the **Thiruvalluvar Chair and Centre** at Universiti Malaya and announced scholarships for Malaysian students.
- Agreed to further enhance **civil aviation cooperation**.

Healthcare Cooperation

- Reaffirmed partnership in:
  - Affordable healthcare
  - Traditional medicine
  - Drug regulation
  - Nursing services
- Progress toward deploying **Traditional Indian Medicine experts** in Malaysia.
- Noted MoU between India's Central Council for Research in Homeopathy and the University of Cyberjaya.

Sustainable Development and Disaster Management

- Commitment to biodiversity conservation through the **International Big Cat Alliance**.
- Agreed to strengthen disaster cooperation via training, joint exercises, and knowledge sharing under NDMA-level MoU.
- Recognised the role of the **Coalition for Disaster Resilient Infrastructure** in global resilience.

Regional and Multilateral Cooperation

- Emphasised peaceful dispute resolution and respect for international law, including **UNCLOS 1982**.
- Malaysia welcomed India's **BRICS**

Chairmanship (2026) and supported India's bid for permanent membership in a reformed **UN Security Council**.

- Reaffirmed commitment to:
  - ASEAN unity and centrality
  - A free, open, rules-based Indo-Pacific
  - Alignment between ASEAN Outlook on the Indo-Pacific and India's Indo-Pacific Oceans Initiative.

Major Agreements and Outcomes

- MoUs signed on:
  - Combating corruption
  - Disaster management
  - Social security for Indian citizens in Malaysia
  - Audio-visual co-production
- Exchanges of notes on cooperation in:
  - Semiconductors
  - Healthcare
  - National security
  - Vocational training
- Renewal of UN Peacekeeping cooperation MoU noted.

Conclusion

- Prime Minister Modi thanked Malaysia for its warm hospitality and invited Prime Minister Anwar Ibrahim to visit India soon.
- The visit marked a significant step toward deepening strategic, economic, and regional cooperation.

India–U.S. Bilateral Trade Agreement: Transforming India's Export Competitiveness

Source: PIB

Relevance:

- **Prelims: Trade agreements, tariffs, Section 232, TRQs, digital trade, semiconductor supply chains**
- **GS Paper II: Bilateral relations, trade diplomacy, economic partnerships**
- **GS Paper III: External sector, manufacturing, digital economy, supply chains**

Important Keywords for Prelims and Mains

For Prelims

- India–US Trade Agreement, Reciprocal Tariffs, Section 232, Tariff Rate Quota (TRQ), Digital Trade, Semiconductor Supply Chains, Strategic Technology, Conformity Assessment, Current Account Deficit, Global Value Chains

For Mains

- Export Competitiveness, Economic Statecraft, Technology Partnerships, Supply Chain Resilience, Trade Facilitation, Manufacturing Growth, Strategic Autonomy, Digital Economy, Energy-Technology Nexus

Why in News?

- India and the United States have concluded a **Bilateral Trade Agreement** that significantly reduces tariffs on Indian

exports.

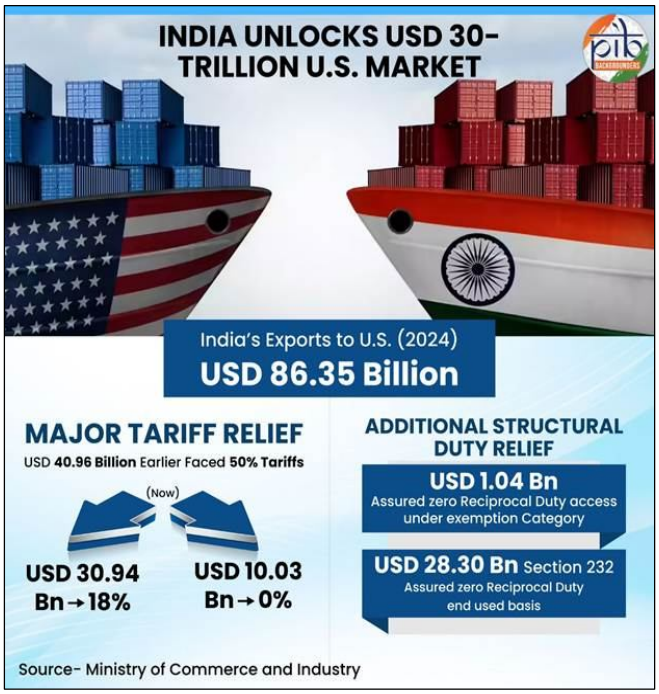
- The agreement provides **preferential access to a USD 30-trillion U.S. market**, strengthening India's export-led growth strategy.
- It combines **tariff rationalisation, digital cooperation, and technology partnerships** while safeguarding sensitive domestic sectors such as agriculture and MSMEs.

Key Takeaways

- India secured preferential access to a **USD 30 trillion U.S. market**.
- Tariffs on textiles and apparel reduced from **50% to 18%**, while silk gets **0% duty** in a USD 113 billion market.
- Machinery tariffs reduced to **18%**, opening opportunities in a USD 477 billion market.
- **USD 1.36 billion** of Indian agricultural exports receive zero additional U.S. duty.
- Products such as spices, tea, coffee, fruits, nuts and processed foods gain zero-duty treatment.
- Highly sensitive sectors including dairy, meat, poultry and cereals remain fully protected.

What India Gets

- 18% competitive rate on **USD 900 billion** worth of U.S. global imports.
- Zero duty on **USD 150 billion** worth of imports.
- No additional duty on **USD 720 billion** worth of imports.
- Continued exemption on **USD 350 billion** worth of imports.
- Preferential treatment on **232 tariffs**.



How Tariff Changes Benefit Indian Exports

Reciprocal Tariff Relief

Reciprocal tariffs were previously as high as **50%**, impacting **USD 40.96 billion** of exports.

- **USD 30.94 billion:** Tariffs reduced from 50% to **18%**.
- **USD 10.03 billion:** Tariffs reduced from 50% to **zero**.

This ensures a large share of Indian goods will enter the U.S. at significantly lower costs, improving price competitiveness.

Exemption Category

- Zero additional reciprocal duty on **USD 1.04 billion** of exports.
- Agricultural products worth **USD 1.035 billion** assured zero tariff, providing stability for exporters.

Section 232 (End-Use Basis)

- Zero reciprocal duty for **USD 28.30 billion** of exports.

- Additional duties that could reach 50% have been eliminated.

Structural Competitive Advantage

The agreement creates a tariff differential in favour of India. Competing suppliers such as China (35%), Vietnam (20%), Bangladesh (20%), Malaysia (19%) and others continue to face higher tariffs, strengthening India's relative positioning and expanding export opportunities.

Sectoral Gains

Textiles & Apparels

Tariffs reduced from **50% to 18%**, while silk gains **0% duty** access in a USD 113 billion market. Major beneficiaries include garments, carpets, cotton and man-made textiles, bed linen, curtains, yarn and blankets. The agreement is expected to boost production clusters, support job creation and reinforce India's role in global textile value chains.

Leather & Footwear

- Tariffs reduced from **50% to 18%**.
- Access improved in a **USD 42 billion** market.
- Benefiting products: finished leather, footwear and components.

Given the labour-intensive nature of the industry, expanded market access is likely to support manufacturing growth and employment, particularly among MSMEs.

Gems & Jewellery

- Tariffs reduced from **50% to 18%**.
- **0% duty** secured for diamonds, platinum and coins (USD 29 billion market).
- Benefiting exports include cut and polished diamonds, lab-grown diamonds, coloured gemstones and precious metal articles.

Home Décor

Tariffs reduced from **50% to 18%**, opening a USD 52 billion market. Products such as furniture, cushions, quilts and lamps benefit. Additionally, seats, chandeliers and illuminated signs receive **0% duty** covering a USD 13 billion market.

Toys

- Tariffs reduced from **50% to 18%**.
- Access to a **USD 18 billion** market improves.
- MSMEs expected to scale production and integrate into global supply chains.

Machinery and Parts (Excluding Aircraft Parts)

Tariffs reduced from **50% to 18%**, enhancing access to a USD 477 billion market. With current exports at USD 2.35 billion, the revised tariff structure strengthens competitiveness and supports India's manufacturing ambitions.

Agriculture: Expanding Opportunities While Safeguarding Farmers

India maintains a **USD 1.3 billion agricultural trade surplus**, with exports at USD 3.4 billion and imports at USD 2.1 billion.

Zero Duty Access

Exports worth **USD 1.36 billion** will face zero additional duty. Key products include:

- Spices
- Tea and coffee
- Coconut products
- Nuts (cashew, areca, Brazil nuts)
- Fruits and vegetables (mango, banana, kiwi, papaya)
- Bakery and cocoa products
- Sesame and poppy seeds
- Processed foods such as fruit pulp, juices and jams

Within this, products valued at **USD 1.035 billion** are assured zero reciprocal tariff.

Calibrated Market Opening

Market access is structured using multiple mechanisms:

- Immediate duty elimination
- Phased elimination (up to 10 years)
- Tariff reduction
- Margin of preference
- Tariff rate quotas

Fully Protected Sectors

Highly sensitive sectors remain protected, including:

- Dairy and poultry
- Meat and GM foods
- Millets, maize and cereals
- Pulses and oilseeds
- Certain fruits
- Animal feed products
- Honey, starch, ethanol and tobacco

Selective tariff reductions and quotas ensure domestic producers remain safeguarded while allowing limited imports.

Zero-Duty Access for Industrial Exports (USD 38 Billion)

Zero additional duty applies to several categories:

- Aircraft parts
- Machinery and components
- Generic drugs and pharmaceutical ingredients
- Elementary auto parts
- Diamonds and platinum
- Chemicals and instruments
- Paper, plastics, wood articles and natural rubber

Non-Agriculture Market Opening with Safeguards

Market access for industrial goods is structured strictly on product sensitivity through immediate elimination, phased reduction and quota-based access.

- Automobiles liberalised via quotas and duty reductions.
- Medical devices placed under long, staggered phasing schedules.
- Precious metals managed through quota-based tariff lowering.

These safeguards ensure liberalisation strengthens competitiveness without harming domestic manufacturing or employment.

Strengthening Trade Facilitation and Quality Ecosystems

The agreement advances trade facilitation by addressing non-tariff barriers while preserving India's regulatory rights.

Key benefits include:

- Recognition of conformity assessments to reduce double testing.
- Alignment with international standards.
- Lower compliance costs for exporters.
- Deeper integration into global value chains, including the EU, UK and Japan.

ICT, Semiconductors and Digital India

The agreement strengthens India's digital backbone by facilitating access to advanced semiconductor chips, server components and critical technology inputs required for expanding data centres and supporting the Digital India initiative. Streamlined licensing improves transparency, reduces administrative friction and enhances supply chain efficiency while preserving national security safeguards.

Health and Medical Infrastructure

Improved access to high-end diagnostic and surgical equipment will help scale advanced healthcare infrastructure, enhance affordability and accessibility, and improve patient outcomes.

India–U.S. Digital Trade Partnership

- Global digitally delivered services exports rose from **USD 4.35 trillion (2023) to USD 4.78 trillion (2024)**.
- India's digital exports reached **USD 0.28 trillion**, growing 10.3% year-on-year.
- India ranks **5th in exports** and **11th in imports**, while the U.S. ranks first in both.

A structured digital trade framework reduces regulatory uncertainty, lowers compliance friction and enables smoother cross-border service delivery. It is expected to boost SME participation, encourage U.S. investment and accelerate growth in AI, fintech, cloud computing and health-tech sectors.

Consumer Welfare

The agreement enables calibrated access to select imports that bridge demand gaps without disrupting domestic supply.

Key categories include:

- Tree nuts
- Fresh and processed fruits (berries)
- Premium oils

- Processed foods
- Wine and beverages
- Pet food
- Frozen fish such as salmon and cod

Limited access ensures imports supplement rather than replace domestic production, contributing to price stability and greater variety.

Intermediate Goods Strengthening Manufacturing

Access is facilitated for critical inputs that power India's export engine, including rough diamonds, specialty chemicals, APIs, semiconductor wafers, electronic components, carbon fibres, precision tools, aerospace components, battery materials and fertilizer inputs. This supports value-added manufacturing and strengthens India's role in global supply chains.

High Technology Imports

The agreement supports technological advancement through access to:

- Advanced medical devices
- AI chips and high-performance processors
- Semiconductor manufacturing equipment
- Cloud and telecom infrastructure
- Cybersecurity hardware
- Clean energy technologies
- Biotechnology and quantum research equipment
- Satellite and space components
- Advanced laboratory and testing equipment

A Forward-Looking Strategic Partnership

The India–U.S. Bilateral Trade Agreement represents a transformative step in strengthening economic ties between two major global economies. By unlocking access to a USD 30 trillion market, rationalising tariffs, securing zero-duty benefits and reinforcing digital and strategic technology cooperation, the framework enhances India's global trade positioning while safeguarding farmers, MSMEs and domestic industry. It balances growth with protection, competitiveness with resilience and expansion with national interest, positioning India for sustained economic progress.

India–Greece Defence Cooperation: Expanding a Strategic Maritime Partnership

Source: Indian express

Relevance: GS Paper II – International Relations

Important Keywords for Prelims and Mains

Prelims

- India–Greece Strategic Partnership, Joint Declaration of Intent (JDoI), Information Fusion Centre–Indian Ocean Region (IFC-IOR), India–Middle East–Europe Economic Corridor (IMEC), Indo-Pacific Oceans Initiative (IPOI)

Mains

- Defence Industrial Cooperation, Maritime Security Architecture, Geopolitical Balancing in the Mediterranean, Turkey–Pakistan Axis, Multi-Alignment in Foreign Policy

Why in News?

India and Greece signed a **Joint Declaration of Intent (JDoI)** to enhance defence industrial cooperation following bilateral talks between Defence Minister Rajnath Singh and his Greek counterpart Nikolaos-Georgios Dendias in New Delhi.

- The agreement marks the beginning of a structured five-year roadmap to deepen military, industrial, and maritime collaboration between the two nations.

Key Developments

- Signing of a **Joint Declaration of Intent** to strengthen defence industrial cooperation.
- Exchange of a **Bilateral Military Cooperation Plan for 2026**.
- Announcement of positioning a **Greek International Liaison Officer at the Information Fusion Centre–Indian Ocean Region (IFC-IOR), Gurugram**.
- Commitment to expand defence production linkages under:
  - India's **Aatmanirbhar Bharat**
  - Greece's defence modernisation programme under **Agenda 2030**.

Both countries reiterated that their relationship is anchored in shared values of **peace, stability, freedom of navigation, and mutual respect**.

Evolution of India–Greece Relations

1. Historical Linkages (Ancient Period)

- Relations date back nearly **2,500 years**.
- Alexander's campaign in 326 BCE reached northwestern India.
- The Mauryan period saw the Greek ambassador **Megasthenes** at Chandragupta Maurya's court.
- The **Gandhara school of art** reflected Indo-Greek cultural synthesis.
- Trade exchanges existed between ancient Indian kingdoms and Hellenistic regions.

2. Strategic Partnership (Modern Era)

- Bilateral ties elevated to a **Strategic Partnership in August 2023**.
- Greece supports:
  - India's stand on **Kashmir**
  - India's bid for a **permanent seat in the UNSC**
- India supports Greece's stance on the **Cyprus issue**, advocating a bi-zonal, bi-communal federation under UNSC resolutions.

Strategic Significance of India–Greece Cooperation

1. Defence and Maritime Cooperation

- Strengthens defence industrial collaboration.
- Enhances interoperability through structured military engagement.
- IFC-IOR liaison improves maritime domain awareness.

- Both nations support a **rules-based international order**.

2. Gateway to Europe

- Greece's location in the **Eastern Mediterranean** makes it a strategic gateway.
- Greek ports like **Piraeus** could become entry points for Indian goods under the **India-Middle East-Europe Economic Corridor (IMEC)**.
- Greece controls nearly **20% of global shipping tonnage**, offering logistical advantages.

3. Geopolitical Balancing

- Acts as a counterweight to the **Turkey–Pakistan axis**.
- Turkey's defence cooperation with Pakistan enhances the geopolitical value of India–Greece alignment.
- Expands India's strategic footprint from the **Indo-Pacific to the Mediterranean**.
- Supports convergence between:
  - India's **Indo-Pacific Oceans Initiative (IPOI)**
  - Mediterranean maritime security architecture.

Challenges in India–Greece Relations

1. Limited Economic Engagement

- Bilateral trade stands at approximately **USD 2 billion**.
- Trade remains concentrated in primary commodities.
- Limited high-value technological or services cooperation.

2. Connectivity Constraints

- Absence of direct shipping lines increases logistics costs.
- Heavy reliance on trans-shipment routes.

3. The China Factor

- Port of Piraeus is majority-owned by China's **COSCO Shipping**.
- Raises concerns over strategic supply-chain vulnerabilities.
- Creates a long-term geopolitical dilemma for India's European connectivity strategy.

4. Institutional Gaps

- Lack of a structured **2+2 Dialogue mechanism**.
- Limited foreign policy coordination frameworks.
- Need for stronger institutional continuity.

Way Forward: Strengthening the Partnership

1. Operationalising IMEC

- Accelerate corridor implementation.
- Establish Greece as a principal European entry point for Indian trade.

2. Green Maritime Cooperation

- Develop green shipping corridors.
- Collaborate in hydrogen and ammonia-based maritime fuels.

3. Labour Mobility Cooperation

- Implement Migration and Mobility Partnership Agreement.
- Address Greece's labour shortage through legal skilled migration channels.

4. Strategic Grouping

- Consider a minilateral framework involving:
  - India
  - Greece
  - Cyprus
  - Israel (or France)

- Focus on energy security and joint naval patrols.

5. Digital Connectivity

- Collaborate on submarine cable systems to bypass chokepoints like Suez.

Conclusion

India–Greece relations are transitioning from historical goodwill to a structured strategic partnership anchored in defence, maritime security, and connectivity.

While defence cooperation and geopolitical alignment are strengthening rapidly, economic depth and institutional mechanisms require further consolidation.

If effectively leveraged, the partnership can emerge as a vital bridge linking the **Indo-Pacific with Europe**, enhancing India's role as a balancing power in an evolving multipolar world.

India–France Upgrade to Special Global Strategic Partnership (2026)

Source: *The Indian Express*

Relevance: **Prelims - TRISHNA satellite-nH125 helicopter project - GS II – International Relations - India–France relations**

Important Keywords for Prelims and Mains

For Prelims

- Special Global Strategic Partnership, Horizon 2047 Roadmap, India–France Year of Innovation, H125 Helicopter (Tata-Airbus), Rafale Cooperation, BEL–Safran Joint Venture, Indo-French Innovation Network, Multipolar World, Technology Sovereignty.

For Mains

- Indo-French Centre for AI in Health, Digital Science & Technology Centre, TRISHNA Satellite (ISRO-CNES), Strategic Autonomy, Indo-Pacific Cooperation, Third Way AI Governance, Double Tax Avoidance Agreement (DTAA) Amendment, Defence Co-production, Make in India, Atmanirbhar Bharat.

Why in News?

- India and France elevated bilateral relations to a **"Special Global Strategic Partnership"** after talks between Prime Minister **Narendra Modi** and French President **Emmanuel Macron** (February 2026).
- The visit resulted in **21 major agreements/outcomes** spanning defence, AI, technology, critical minerals, innovation, health, and skilling cooperation.
- Macron's visit coincided with participation in the **India AI Impact Summit 2026**.

Prime Minister Narendra Modi welcomes French President Emmanuel Macron during the latter's visit to Mumbai. (@narendramodi/X via PTI Photo)

Image source: Indian Express

Background

- During French President **Emmanuel Macron's** visit to India (February 2026), talks with Prime Minister **Narendra Modi** led to the elevation of bilateral relations from a **Strategic Partnership** to a **Special Global Strategic Partnership**.
- The discussions produced **21 major outcomes** spanning defence, technology, innovation, critical minerals, AI, health, space, and economic cooperation.
- The move reflects deepening cooperation amid **uncertain global geopolitics** and growing India–Europe engagement.

Key Highlights / Outcomes

1. Institutional Upgrade

- Relationship elevated to **Special Global Strategic Partnership**, signalling deeper and long-term cooperation.
- Creation of an **Annual Foreign Ministers' Dialogue** to review implementation.
- Alignment with the **Horizon 2047 Roadmap** for long-term collaboration.

2. Defence & Aerospace Cooperation

- Shift from **buyer–seller model to co-production and joint development**.
- Renewal of defence cooperation agreement.
- **BEL–Safran joint venture** to manufacture **HAMMER missiles** in India.
- Reciprocal deployment of officers between Indian and French armed forces.
- Expansion of cooperation on **Rafale aircraft and submarine technologies**.
- Inauguration of **Airbus H125 helicopter final assembly line** in Karnataka:
  - First delivery expected in 2027.
  - Boosts *Make in India* and *Atmanirbhar Bharat*.
  - Export potential for global markets.

3. Technology, Innovation & AI Cooperation

- Launch of:
  - **Indo-French Centre for AI in Health** (AIIMS, New Delhi).
  - **Indo-French Centre for Digital Science and Technology**.
  - **India–France Innovation Network**.
- Formation of **Joint Advanced Technology Development Group** on critical and emerging technologies.
- Promotion of ethical AI governance — a **"third way"** between US corporate dominance and Chinese state control.

4. Critical Minerals & Advanced Materials

- Joint Declaration on cooperation in **critical minerals and metals supply chains**.
- Aim:
  - Reduce supply vulnerabilities.
  - Support clean energy and semiconductor ecosystems.
  - Strengthen technological sovereignty.

5. Space & Climate Cooperation

- Progress on **TRISHNA satellite mission** (ISRO–CNES collaboration).
- Focus on thermal infrared observation for climate monitoring and environmental research.

6. Economic & Investment Cooperation

- Amendment of **Double Taxation Avoidance Agreement (DTAA)** protocol.
- Enhanced investment climate and business mobility.
- Startup ecosystem cooperation between **T-Hub (India)** and **Nord France**.
- Strengthening industrial and innovation partnerships.

7. Health, Science & Skilling

- Agreements on infectious disease and global health research.
- Establishment of:
  - **Indo-French Centre for Metabolic Health Sciences**.
  - **National Centre of Excellence for Skilling in Aeronautics**.
- Workforce development in advanced manufacturing sectors.

8. Renewable Energy & Sustainability

- Renewal of cooperation between India's MNRE and France on renewable energy.
- Collaboration in energy transition and sustainable agriculture systems.

9. Counter-Terrorism & Strategic Values

- Reaffirmation of cooperation against terrorism.
- Shared commitment to:
  - Rule of law
  - Strategic autonomy
  - Sovereign equality
  - Open Indo-Pacific order.

Strategic Significance for India

1. Strengthening Strategic Autonomy

- Diversifies partnerships beyond dependence on any single power.
- Enables India to engage a **geopolitically assertive Europe**.

2. India's European Pivot

- Europe increasingly viewed as:
  - Technology partner
  - Economic balancer
  - Indo-Pacific security collaborator.

3. Defence Self-Reliance

- Technology transfer and local manufacturing enhance indigenous capability.

4. AI & Technology Governance

- India and France emerging as **middle-power norm-setters** in ethical AI governance.

5. Indo-Pacific Cooperation

- Maritime security collaboration strengthens regional stability.

Geopolitical Context

- Occurs amid:
  - US strategic recalibration.
  - Rising China–West competition.
  - Growing importance of middle powers.
- Reflects emergence of a **"multipolar West"**, where Europe acts independently within global politics.

Challenges

- US and China dominance in technology and capital.
- European economic slowdown.
- Defence technology transfer restrictions.

- Limited AI ecosystem scale compared to major powers.

Way Forward

- Expand joint defence R&D and co-production.
- Institutionalise AI regulatory cooperation.
- Deepen Indo-Pacific maritime partnerships.
- Accelerate India–EU trade and energy cooperation.
- Build coalitions on climate and digital governance.

Conclusion

The upgrade to a **Special Global Strategic Partnership** marks a structural transformation in India–France relations. Beyond bilateral cooperation, it reflects India's evolving geopolitical strategy — building diversified partnerships, strengthening technological sovereignty, and shaping a more resilient multipolar global order. The India–France axis is emerging as a key pillar of India's global engagement.

Pax Silica Alliance and India

Source: The Hindu

Relevance: **Pax Silica, Rare Earth Elements (REEs), Critical Minerals, GS Paper II: India–U.S. relations, Strategic Autonomy, Geopolitics of Technology**

Important Keywords for Prelims and Mains

For Prelims

- Pax Silica Declaration, Rare Earth Elements (REEs), Export Control Regulations, India Semiconductor Mission, IndiaAI Mission

For Mains

- Weaponised Dependency, De-risking vs Decoupling, Strategic Autonomy, Trusted Ecosystems, Technological Sovereignty, China+1 Strategy

Why in News?

- India signed an agreement on **February 20, 2026** to join the **U.S.-led Pax Silica coalition** during the AI Impact Summit.

- The alliance aims to build secure supply chains for **critical minerals, semiconductors, AI infrastructure, and logistics**.
- It seeks to counter disruptions caused by China's dominance in Rare Earth processing.

Background

- Launched in **December 2025** at the inaugural Pax Silica Summit in Washington D.C.

U.S. Ambassador to India Sergio Gor (third from left), along side Union Minister Ashwini Vaishnaw at the signing of agreement initiating India into the Pax Silica. Photo: X/@PTI_News

- "Pax" = peace; "Silica" = essential chip-making compound.
- Objective: Secure end-to-end supply chain — from raw minerals → chip manufacturing → AI systems.
- Comes amid:
  - China restricting REE exports.
  - Global supply shocks during COVID-19.
  - Overconcentration of supply chains in one country.

India earlier participated in:

- Supply Chain Resilience Initiative (India–Japan–Australia, 2021)
- Quad Critical Minerals Initiative (2025)

Initially not invited, India later received formal invitation from U.S. Ambassador Sergio Gor.

Major Participants

Core members include:

- United States, Japan, South Korea, Australia, United Kingdom, Israel, Singapore, UAE, Qatar, Greece.

Observers at inaugural summit:

- Canada, European Union, OECD, Taiwan

India is:

- First major developing country
- First non-U.S. ally strategic partner

Why Pax Silica Emerged?

1. **China's dominance in REE processing**
   - Sole major refiner of rare earth magnets.
   - Used export restrictions as leverage.
2. **Weaponised Economic Interdependence**
   - Example: Restrictions after U.S. tariff policies.
   - Disruption to India's automobile and electronics sectors.
3. **Pandemic Lessons**
   - Overconcentrated supply chains are vulnerable.
4. **Need for Secure AI Infrastructure**
   - Semiconductors power AI, defence systems, and digital economy.

Importance of Pax Silica for India

1. Industrial Boost

- Complements:
  - India Semiconductor Mission
  - IndiaAI Mission
  - National Critical Minerals Mission

2. Supply Chain Diversification

- Reduces exposure to Chinese supply shocks.

3. Talent Advantage

- Large pool of technically trained engineers.
- Growing AI start-up ecosystem.
- Possible return of U.S.-trained engineers due to visa changes.

4. Manufacturing Hub Potential

- India's demand can justify alternative supply chains.
- Engineering talent + assembly capacity can shift global centre of gravity.

5. Investment Attraction

- Micron and Tata semiconductor investments.
- Collaboration with Israel, Japan, Singapore.

6. Global Standard Setting

- Influence on AI governance and export control norms.

Trade & Economic Context

- Coincided with **India–U.S. interim trade framework**.
- India reduced tariffs on U.S. industrial and agricultural goods.
- U.S. reduced tariffs on Indian goods to 18%.

- U.S. removed 25% punitive tariff on India's Russian oil purchases.
- U.S. hosted Critical Minerals Ministerial (Feb 4, 2026) with 55 delegations.

Strategic Significance

1. Secures long-term access to minerals and chip technology.
2. Strengthens India's technological sovereignty.
3. Enhances India's role in a democratic tech coalition.
4. Positions India as alternative to China in manufacturing.
5. Supports "China+1" diversification strategy.

Geopolitical Context

- Rising U.S.–China rivalry.
- China's leverage through REE export control.
- Emergence of two likely parallel supply chains:
  - China-led
  - Pax Silica-led
- India balancing strategic autonomy with closer U.S. alignment.

Challenges / Risks

1. **Chinese Retaliation**
   - Trade friction
   - Slower market access
   - Restrictions on upstream inputs (minerals, APIs)
2. **Strategic Autonomy Concerns**
   - Risk of rigid alliance expectations.
   - Export control guardrails.
3. **Domestic Policy Constraints**
   - India may prefer subsidies and protection for domestic firms.
   - Potential friction with high-income Pax Silica members.
4. **Compliance Burden**
   - Smaller Indian firms may face strict security audits and higher costs.
5. **Expectation Gap**
   - India is neither a U.S. ally nor high-income country.
   - Policy nuance may differ from Western partners.

Road Ahead

- Expand domestic mineral processing capacity.
- Invest in semiconductor fabs and R&D.
- Maintain balanced diplomacy with China.
- Negotiate flexible export-control frameworks.
- Build AI governance aligned with domestic priorities.
- Ensure alliance translates into real manufacturing ecosystems.

Conclusion

India's entry into Pax Silica represents a high-stakes technological alignment aimed at securing critical supply chains and shaping the future of AI-driven growth. While the alliance strengthens economic security and global standing, it also tests India's strategic autonomy and ability to manage geopolitical pressures. The ultimate success of Pax Silica depends on whether it evolves into a tangible, resilient supply-chain network rather than remaining a declaratory coalition.

How India and Canada Mended Their Frayed Ties

Source: India Express

Relevance: GS Paper II – International Relations

Important Keywords

Prelims

- Mark Carney Visit (2026), Nijjar Assassination Allegations (2023), Diplomatic Expulsion & Withdrawal of High Commissioners, Comprehensive Economic Partnership Agreement (CEPA), G7 Summit Outreach (2025), Five Eyes Alliance, Joint Working Group on Counter-Terrorism (1997),

Mains

- Diplomatic Reset & Strategic Stabilisation, Law Enforcement vs Political Dispute Approach, Institutional Firewalls in Bilateral Relations, Diaspora Politics & Khalistan Issue, Transnational Crime Mechanism (NSA Framework), Trade Diversification Strategy, Energy Security & Critical Minerals Partnership, Education Diplomacy & Student Mobility (3.92 lakh students), Geopolitical Convergence (G7–Five Eyes–G20), India–Canada–Australia Trilateral Technology Partnership

Why in News?

Canadian Prime Minister Mark Carney's visit to India in February–March 2026 marks a major turning point in India–Canada relations. His arrival signals efforts by both countries to restore diplomatic, economic, and strategic engagement after a serious diplomatic crisis that strained bilateral ties since 2023.

Carney's visit includes meetings with Prime Minister Narendra Modi in Mumbai and New Delhi, reflecting renewed high-level political dialogue and cooperation.

Background: Diplomatic Crisis in 2023

India–Canada relations deteriorated sharply in September 2023 following allegations made by then Canadian Prime Minister Justin Trudeau.

The Nijjar Assassination Allegations

- Justin Trudeau alleged in the Canadian Parliament that Indian government agents may have been involved in the killing of Khalistani separatist Hardeep Nijjar in British Columbia in June 2023.
- Trudeau also raised the issue with Prime Minister Narendra Modi during the G20 Summit.

India strongly rejected the allegations and described them as "absurd and motivated."

Diplomatic Escalation and Consequences

The allegations triggered a major diplomatic confrontation between the two countries.

Key developments included:

- Expulsion of diplomats by both countries
- Withdrawal of High Commissioners
- Closure of consulates and reduction in diplomatic engagement
- Suspension and restrictions in visa services

These measures are usually seen in situations of war or severe diplomatic breakdown.

India also accused Canada of providing a safe haven to extremists and separatist groups.

Impact of Diplomatic Crisis

The diplomatic crisis affected multiple dimensions of bilateral relations.

Political Impact

- Breakdown of diplomatic dialogue
- Suspension of high-level visits

Economic Impact

- Slowdown in economic cooperation
- Uncertainty in trade negotiations

People-to-People Impact

- Visa restrictions affected students and migrants
- Educational and cultural exchanges were disrupted

Diplomatic Recovery Under Prime Minister Mark Carney

The process of normalization began after political leadership changes in Canada.

Leadership Transition

- Justin Trudeau stepped down in January 2025
- Mark Carney became Prime Minister in March 2025
- His government adopted a pragmatic approach to restore relations

Carney treated the Nijjar case as a law enforcement issue rather than a political dispute, enabling diplomatic engagement to resume.

Diplomatic Initiatives to Restore Relations

Several diplomatic steps were taken to rebuild trust and cooperation.

High-Level Political Engagement

- Carney invited Prime Minister Modi to the G7 Summit outreach meeting in Canada in June 2025.
- The meeting was described as positive and constructive.

Both leaders agreed to take steps to restore stability in bilateral relations.

Restoration of Diplomatic Representation

Key diplomatic normalization measures included:

- Return of High Commissioners to respective capitals
- Reinstatement of diplomats
- Removal of visa restrictions
- Resumption of diplomatic and security dialogue

Creation of New Security Dialogue Mechanism

To prevent security issues from affecting broader relations, both countries established a new framework under their National Security Advisors. This framework focuses on addressing:

- Transnational crimes
- Extremism-related concerns
- Security cooperation

This mechanism allows security issues to be handled separately from economic and diplomatic relations.

Trade and Economic Cooperation

Economic relations remain one of the strongest pillars of bilateral engagement.

Trade Volume and Economic Partnership

- Bilateral trade reached $30.8 billion in 2024.
- India is Canada's seventh-largest trading partner.

Both countries have launched negotiations for a Comprehensive Economic Partnership Agreement (CEPA) to increase bilateral trade to $70 billion by 2030.

India-Canada bilateral trade

	Goods trade		Services Trade	
	2024	2025 (Jan-Nov)	2024	2025 (Jan-Sept)
Exports ($ bn)	4.14	4.1	3.15	1.61
Imports ($ bn)	4.84	3.06	11.07	7.75
Total Bilateral Trade($ bn)	**8.98**	**7.16**	**14.22**	**9.36**

Major Exports and Imports

India's exports to Canada include:

- Pharmaceutical products
- Machinery and mechanical appliances
- Electronic goods
- Iron and steel
- Organic chemicals
- Gems and jewellery
- Textile products

Canada's exports to India include:

- Pulses
- Fertilizers such as potash
- Minerals and natural resources

Investment Relations

Canada is an important investor in India.

- Canada is the 17th largest foreign investor in India.
- Canadian investment in India totals $4.18 billion between 2000 and 2025.

Investment sectors include:

- Infrastructure
- Renewable energy
- Technology
- Financial services

Security and Defence Cooperation

India and Canada cooperate on global security issues through institutional frameworks.

Key Security Cooperation Mechanisms

- Joint Working Group on Counter-Terrorism (established 1997)
- Countering Terrorism and Violent Extremism Framework (2018)

Regular meetings between National Security Advisors help strengthen security coordination.

Energy Cooperation

Energy cooperation is a major component of bilateral relations.

Canada supplies important resources to India, including:

- Crude oil
- Natural gas
- Liquefied Natural Gas (LNG)
- Critical minerals

This cooperation helps India strengthen its:

- Energy security
- Industrial development
- Clean energy transition

Educational Cooperation and Student Mobility

Education is a key pillar of people-to-people relations.

- Over 3.92 lakh Indian students were studying in Canada as of December 2024.
- Indian students form the largest international student group in Canada.

Educational cooperation includes:

- Academic exchange programmes
- Joint research collaborations
- Institutional partnerships

Role of Indian Diaspora in Canada

Canada has one of the largest Indian diaspora populations in the world.

- Over 1.8 million Canadians are of Indian origin

- Around 1 million Non-Resident Indians live in Canada

The diaspora contributes to:

- Economic growth
- Cultural exchange
- Strengthening bilateral relations

However, a small minority of pro-Khalistan groups influenced political tensions in recent years.

Geopolitical Significance of Canada for India

Canada is an important global strategic partner.

Canada is a member of:

- G7 group of major economies
- Five Eyes intelligence alliance

Both groups include key strategic partners of India such as:

- USA
- UK
- Australia
- Japan

India, Canada, and Australia have also launched a trilateral technology partnership to strengthen cooperation in:

- Critical technologies
- Supply chain resilience
- Innovation

Strategic Importance of Diplomatic Reset

The normalization of India–Canada relations is important for several reasons.

Economic Importance

- Expands trade and investment opportunities
- Supports economic growth

Strategic Importance

- Strengthens geopolitical cooperation
- Enhances security coordination

Technological Importance

- Supports innovation and technology collaboration

Educational and Cultural Importance

- Strengthens people-to-people relations

Conclusion

India–Canada relations experienced a serious diplomatic crisis in 2023 due to political allegations and diplomatic tensions. However, leadership changes in Canada and sustained diplomatic engagement helped restore bilateral cooperation. Prime Minister Mark Carney's visit to India marks an important step in rebuilding trust and strengthening political, economic, and strategic relations. Both countries recognize the importance of their partnership in addressing global economic, technological, and geopolitical challenges, and the restoration of relations is expected to strengthen long-term

ECONOMY

UNION BUDGET Summary (2026–2027)

Source: PIB

Relevance: **GS Paper III: Indian Economy and Planning, Budget, Growth, Development and Employment, Infrastructure, Manufacturing, MSMEs, Energy Security, Logistics, Investment**

Important Keywords for Prelims and Mains

For Prelims

- Union Budget 2026–27, Yuva Shakti, Kartavya Bhawan, Biopharma Shakti, National Fibre Scheme, City Economic Regions, Dedicated Freight Corridor, National Waterway Number Five, Khelo India Mission, Bharat Vistaar.

For Mains

- Youth-led growth strategy, Manufacturing-led economic transformation, Infrastructure as growth multiplier, Energy security and resilience, Inclusive development and regional balance, Fiscal consolidation with growth.

WHY IN NEWS

The Union Budget for the year 2026–2027 is a Yuva Shakti-driven Budget. Presented by the Union Minister for Finance and Corporate Affairs, Smt. Nirmala Sitharaman.

Overall Theme and Context

- The Union Budget for the year 2026–2027 is a **Yuva Shakti-driven Budget**.
- It emphasizes the Government's **Sankalp**, meaning firm resolve, to focus on:
  - The poor
  - The underprivileged
  - The disadvantaged sections of society
- This is the first Union Budget prepared in

Kartavya Bhawan.

- The Budget is inspired by **three Kartavya**, meaning duties.

The Three Kartavya of the Budget

First Kartavya

- To accelerate and sustain economic growth.
- This will be achieved by:
  - Enhancing productivity
  - Enhancing competitiveness
  - Building resilience against volatile global economic dynamics

Second Kartavya

- To fulfil the aspirations of the people.
- To **build the capacity of citizens**, making them strong partners in India's journey towards prosperity.

Third Kartavya

- Aligned with the vision of **Sabka Sath, Sabka Vikas**.
- To ensure that:
  - Every family
  - Every community
  - Every region
  - Every sector has access to resources, amenities and opportunities for meaningful participation in national development.

Broader Economic Backdrop

- India will continue to take confident steps towards **Viksit Bharat**, balancing ambition with inclusion.
- As a growing economy with expanding trade and capital requirements, India must:
  - Remain deeply integrated with global markets
  - Export more goods and services
  - Attract stable and long-term investment
- The country is facing:
  - Disruptions in global trade and multilateralism
  - Disruptions in access to resources and supply chains
  - Rapid technological transformation of production systems
  - Increasing pressure on water, energy and critical minerals

Government Reforms Since 2025

- Following the Prime Minister's announcement on Independence Day in 2025:
  - More than **three hundred and fifty reforms** have been rolled out.
- These include:
  - Simplification of the Goods and Services Tax
  - Notification of Labour Codes
  - Rationalisation of mandatory Quality Control Orders

- High-level committees have been formed.
- The Central Government is working with State Governments to:
  - Deregulate sectors
  - Reduce compliance requirements

FIRST KARTAVYA: ACCELERATING AND SUSTAINING ECONOMIC GROWTH

Six Key Intervention Areas

1. Scaling up manufacturing in seven strategic and frontier sectors
2. Rejuvenating legacy industrial sectors
3. Creating Champion Micro, Small and Medium Enterprises
4. Delivering a strong push to infrastructure
5. Ensuring long-term energy security and stability
6. Developing City Economic Regions

BIOPHARMA SECTOR

- Biopharma Shakti will be established with an outlay of ten thousand crore rupees.
- Objective:
  - To build an ecosystem for domestic production of biologics and biosimilars over the next five years.
- Key components:
  - Establishment of a biopharma-focused network
  - Setting up three new National Institutes of Pharmaceutical Education and Research
  - Upgrading seven existing National Institutes of Pharmaceutical Education and Research
  - Creation of a network of more than one thousand accredited clinical trial sites
  - Strengthening of the Central Drugs Standard Control Organisation
    - Dedicated scientific review cadre
    - Specialists to meet global approval standards and timelines

Textile Sector: Integrated Programme

Five Sub-Parts

1. National Fibre Scheme
   - Self-reliance in:
     - Silk
     - Wool
     - Jute
     - Man-made fibres
     - New-age fibres
2. Textile Expansion and Employment Scheme
   - Modernisation of traditional textile clusters
   - Capital support for:
     - Machinery
     - Technology upgradation
     - Common testing and certification centres
3. National Handloom and Handicraft Programme
   - Integration and strengthening of existing schemes
   - Targeted support for weavers and artisans
4. Textile Ecology Initiative
   - Promotion of globally competitive and sustainable textiles and apparel
5. Samarth Version Two
   - Modernisation of textile skilling ecosystem
   - Collaboration with industry and academic institutions

MICRO, SMALL AND MEDIUM ENTERPRISES

- Recognised as a vital engine of economic growth.

- A dedicated ten thousand crore rupees Small and Medium Enterprise Growth Fund proposed.
- Objective:
  - To create future champion enterprises
  - Incentives based on select performance criteria

PUBLIC CAPITAL EXPENDITURE

- Public capital expenditure increased from:
  - Two lakh crore rupees in the year two thousand fourteen to two thousand fifteen
  - To eleven lakh twenty thousand crore rupees in the Budget Estimate of two thousand twenty-five to twenty-six
- Proposed increase to **twelve lakh twenty thousand crore rupees** in the year two thousand twenty-six to twenty-seven.

LOGISTICS AND TRANSPORT INFRASTRUCTURE

Freight and Waterways

- Dedicated Freight Corridor connecting:
  - Dankuni in the eastern region
  - Surat in the western region
- Operationalisation of **twenty new National Waterways** over five years
- Starting with National Waterway Number Five in Odisha
  - Connecting Talcher and Angul mineral regions
  - Linking Kalinga Nagar industrial centres
  - Connecting to Paradeep and Dhamra ports
- Training institutes to be established as Regional Centres of Excellence for manpower development

CITY ECONOMIC REGIONS

- Mapping of city economic regions based on growth drivers.
- Allocation of five thousand crore rupees per City Economic Region over five years.
- Implementation through:
  - Challenge mode
  - Reform-cum-results-based financing mechanism

HIGH-SPEED RAIL CORRIDORS

Seven high-speed rail corridors to promote environmentally sustainable passenger systems:

1. Mumbai to Pune
2. Pune to Hyderabad
3. Hyderabad to Bengaluru
4. Hyderabad to Chennai
5. Chennai to Bengaluru
6. Delhi to Varanasi
7. Varanasi to Siliguri

SECOND KARTAVYA: FULFILLING ASPIRATIONS AND BUILDING CAPACITY

- Nearly **twenty-five crore individuals** have exited multidimensional poverty due to sustained government efforts.

MEDICAL TOURISM AND HEALTHCARE

- Scheme to establish **five Regional Medical Hubs** in partnership with the private sector.
- Each hub will include:
  - Medical facilities
  - Educational institutions
  - Research facilities
  - Ayurveda, Yoga, Unani, Siddha and Homeopathy centres
  - Medical Value Tourism Facilitation Centres
  - Diagnostics, post-care and rehabilitation infrastructure
- Employment generation for doctors and allied health professionals

VETERINARY SECTOR

- Loan-linked capital subsidy scheme proposed.
- Objective:
  - To scale up availability of veterinary professionals by more than **twenty thousand**.
- Support for:
  - Veterinary colleges
  - Para-veterinary colleges
  - Veterinary hospitals
  - Diagnostic laboratories
  - Breeding facilities in the private sector

CREATIVE ECONOMY

- Support to Indian Institute of Creative Technologies, Mumbai.
- Establishment of Animation, Visual Effects, Gaming and Comics Content Creator Laboratories in:
  - Fifteen thousand secondary schools
  - Five hundred colleges

GIRLS' EDUCATION

- One girls' hostel to be established in **every district**.
- Focus on Higher Education Science, Technology, Engineering and Mathematics institutions.
- Support through viability gap funding and capital assistance.

TOURISM AND HOSPITALITY SKILLS

- National Institute of Hospitality to be established by upgrading the National Council for Hotel Management and Catering Technology.
- Pilot scheme to upskill ten thousand tourist guides.
- Coverage:
  - Twenty tourist sites
  - Twelve-week standardised training
  - Hybrid mode
  - Collaboration with an Indian Institute of Management

SPORTS SECTOR

- Launch of Khelo India Mission.
- Objective:
  - Transform the sports sector over the next decade.
- Focus areas:
  - Integrated talent development pathway
  - Coach and support staff development

- Sports science and technology integration
- Competitions and leagues
- Sports infrastructure development

THIRD KARTAVYA: SABKA SATH, SABKA VIKAS

Agriculture

- **Bharat Vistaar**, a multilingual digital tool.
- Integration of:
  - Agricultural data portals
  - Indian Council of Agricultural Research practices
- Objective:
  - Increase productivity
  - Improve decision-making
  - Reduce risk through customised advisories

Women and Self-Help Groups

- Self-Help Entrepreneur Marts
- Community-owned retail outlets at cluster level federations
- Enhanced and innovative financing

Mental Health

- Establishment of second National Institute of Mental Health and Neurosciences
- Upgradation of mental health institutes at Ranchi and Tezpur as regional apex institutions

Purvodaya and North-East

- Integrated East Coast Industrial Corridor with node at Durgapur
- Five tourism destinations in Purvodaya States
- Provision of four thousand electric buses
- Scheme for development of Buddhist circuits in:
  - Arunachal Pradesh
  - Sikkim
  - Assam
  - Manipur
  - Mizoram
  - Tripura

FISCAL CONSOLIDATION

- Debt to Gross Domestic Product ratio:
  - Fifty-six-point one percent in Revised Estimates two thousand twenty-five to twenty-six
  - Fifty-five-point six percent in Budget Estimates two thousand twenty-six to twenty-seven
- Fiscal deficit:
  - Four-point four percent of Gross Domestic Product in Revised Estimates two thousand twenty-five to twenty-six
  - Four-point three percent of Gross Domestic Product in Budget Estimates two thousand twenty-six to twenty-seven

DIRECT TAXATION

- New Income Tax Act, two thousand twenty-five effective from April two thousand twenty-six.
- Simplified income tax rules and redesigned forms to be notified.
- Reduction in Tax Collected at Source:
  - Overseas tour packages reduced to two percent
  - Education and medical remittances under Liberalised Remittance Scheme reduced to two percent
- One-time six-month foreign asset disclosure scheme for specified categories
- Integration of assessment and penalty proceedings
- Decriminalisation of minor tax offences

COOPERATIVES

- Deduction extended to cattle feed and cotton seed.
- Inter-cooperative dividend income deduction.
- Three-year exemption for notified national cooperative federations.

SUPPORT TO INFORMATION TECHNOLOGY SERVICES

- Single category of Information Technology Services.
- Common safe harbour margin of fifteen-point five percent.
- Threshold raised to two thousand crore rupees.
- Automated approval and five-year continuity.

ATTRACTING GLOBAL INVESTMENT

- Tax holiday till year two thousand forty-seven for foreign cloud service providers using Indian data centres.
- Exemption from Minimum Alternate Tax for non-residents on presumptive taxation.
- Five-year income tax exemption for global experts under notified schemes.

INDIRECT TAXATION AND CUSTOMS

- Duty exemptions for:
  - Lithium-ion battery manufacturing capital goods
  - Critical mineral processing equipment
  - Seventeen medicines
- Tariff on personal imports reduced from twenty percent to ten percent.
- Warehouse operator-centric customs framework.
- Single digital window for cargo clearance.
- Removal of value cap on courier exports.

Conclusion

The Union Budget 2026–27 represents a **strategic shift from welfare-led expenditure to youth-driven, capacity-building growth**, anchored in fiscal prudence and inclusive development. By aligning economic acceleration with **Sabka Sath, Sabka Vikas**, the Budget lays a comprehensive foundation for India's journey towards **Viksit Bharat** in an uncertain global environment.

How will Budget Boosts and EU Access Remake AYUSH Beyond India?

Source: The Hindu

Relevance: GS Paper III (Economy & Science & Technology): Knowledge economy, exports, MSMEs, innovation, soft power

Important Keywords for Prelims and Mains

Prelims

- AYUSH, National AYUSH Mission (NAM), All India Institute of Ayurveda, WHO Global Traditional Medicine Centre, Jamnagar, Bharat-VISTAAR, India–EU Free Trade Agreement (FTA)

Mains

- Traditional Medicine as Soft Power, Evidence-based Healthcare, Regulatory, Harmonisation, Global Market Access, Medicinal Plant Supply Chain,

Why in News?

- The **Union Budget 2026–27** significantly enhanced financial allocations for the AYUSH sector.
- The **India–European Union Free Trade Agreement (FTA)** has eased market access for Indian AYUSH practitioners and products in Europe.
- Together, these developments indicate a policy shift to transform AYUSH from a **welfare-oriented domestic health system** into a **globally competitive economic sector**.

Understanding AYUSH in India

- AYUSH stands for Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy.
- The sector operates under the **Ministry of AYUSH**, established in 2014.
- Integration with public healthcare is primarily achieved through the **National AYUSH Mission (NAM)** and co-location of AYUSH services in PHCs, CHCs and district hospitals.
- Institutional support includes:
  - Institutes of National Importance (e.g., All India Institute of Ayurveda, New Delhi)
  - Research councils such as the Central Council for Research in Ayurvedic Sciences
  - Regulatory bodies like the National Commission for Indian System of Medicine and National Commission for Homoeopathy
  - Drug standardisation through the Pharmacopoeia Commission for Indian Medicine and Homoeopathy

Budgetary Boost to AYUSH (2026–27)

Rising Financial Allocations

- ₹4,408 crore in 2026–27
- ₹3,992 crore in 2025–26
- ₹2,122 crore in 2020–21

This trend reflects a **long-term policy commitment** to mainstream AYUSH within India's healthcare and economic framework.

Key Budget Announcements

- **Three new All India Institutes of Ayurveda:**
  - Envisioned as AIIMS-like centres combining patient care, research and medical education.
- **Upgradation of the WHO Global Traditional Medicine Centre, Jamnagar:**
  - Positions India as a global leader in setting standards for traditional medicine.
- **66% increase in funding for the National AYUSH Mission:**
  - Modernisation of hospitals and dispensaries
  - Preventive healthcare focus
  - Co-location with modern medical facilities
- **Upgradation of AYUSH pharmacies and**

drug-testing laboratories:
    - Addresses quality control and international compliance.
- **Bharat-VISTAAR (AI-based assistant):**
    - Supports medicinal plant farmers with real-time guidance on crop quality, market prices and export certification.

India–EU FTA: Expanding Global Access

Professional Mobility

- In EU countries without specific traditional medicine regulations, Indian AYUSH practitioners can practice using Indian qualifications.

Business and Investment Opportunities

- Legal certainty for Indian firms to establish:
    - Wellness centres
    - Ayurvedic clinics
    - Traditional medicine services across all 27 EU member states.

Trade Facilitation

- Mutual recognition of certain laboratory test results and safety certifications.
- Reduces duplication, cost and delays in exporting AYUSH products.

Protection of Traditional Knowledge

- Recognition of India's **Traditional Knowledge Digital Library (TKDL)** helps prevent biopiracy and wrongful patent claims.

Economic and Strategic Significance

- AYUSH sector estimated to be worth **$26.5 billion (₹2.3 lakh crore)** in 2026.
- Startups and MSMEs contribute nearly 80% of the sector's value.
- Strengthens:
    - Export-led growth
    - Rural livelihoods through medicinal plant cultivation
    - India's soft power and health diplomacy.

Concerns and Criticisms

Scientific Validation

- Critics, including the Indian Medical Association, argue many AYUSH therapies lack **randomised controlled trials** and robust empirical evidence.

Safety Issues

- Reports of **heavy metals (lead, mercury)** in some formulations have triggered international health advisories.

Mixopathy Debate

- Blurring of boundaries between AYUSH and allopathy, including:
    - Surgical training for Ayurveda postgraduates
    - Prescription of allopathic medicines
- Has led to protests, legal challenges and concerns over patient safety and antibiotic resistance.

What Does the Boost Mean for AYUSH?

- Signals a shift from:
    - Welfare-adjacent healthcare → Regulated, standardised, export-oriented industry
- New institutions and regulatory upgrades aim to recast AYUSH as **scientific and accountable**, not lineage-based.
- Global exposure will increase scrutiny, pushing higher standards of evidence, safety and governance.

Conclusion

The combined impact of enhanced Budget support and expanded EU market access marks a decisive transition for AYUSH. From a primarily domestic cultural health system, AYUSH is being repositioned as a global economic and diplomatic asset. While the reforms promise growth, exports and soft power, they also demand stronger evidence, regulation and accountability. Ultimately, the success of this transformation will depend on India's ability to balance **tradition with science** and **heritage with global credibility**.

A Reckoning for India's Aviation Sector

Source: The Hindu

Relevance: **GS Paper III (Infrastructure, Transport, Economic Development, Regulatory Framework)**

Important Keywords for Prelims and Mains

Prelims

- FDTL norms, DGCA, ATF, UDAN scheme, Aviation Turbine Fuel, Duopoly, NOC (No Objection Certificate), Pilot-to-Aircraft Ratio, Commercial Pilot Licence (CPL), Market Concentration

Mains

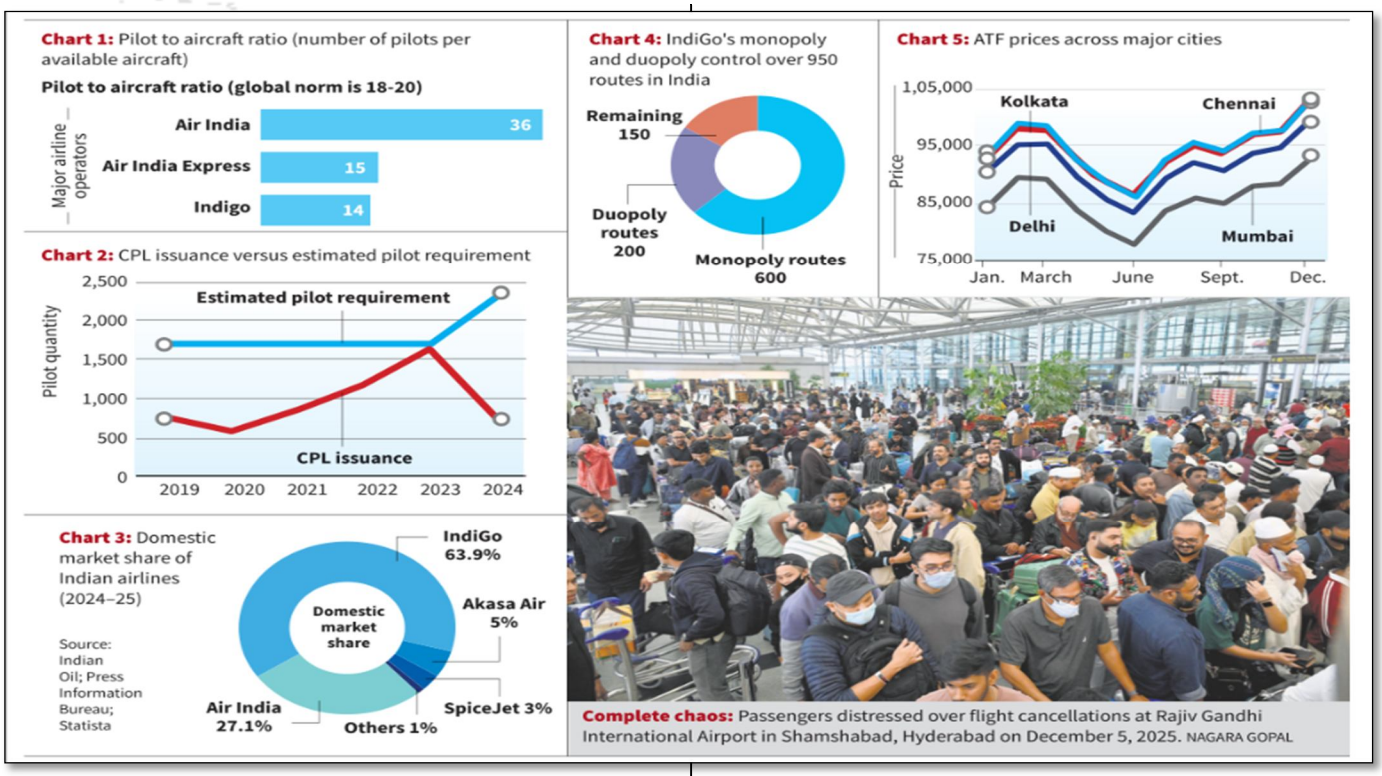
- Infrastructure Stress, Regulatory Capacity, Aviation Safety Oversight, Market Concentration Risk, Economic Viability of Airlines, Transport Infrastructure, Public Policy Reform, Crisis Management vs Structural Reform, Regional Connectivity, Cost Volatility

Why in News?

India's civil aviation sector has faced a turbulent year marked by safety incidents, large-scale flight disruptions, pilot shortages, and declining profitability at major carriers. With new regional airlines entering the market and domestic air traffic expanding rapidly, structural weaknesses in the system have come under sharp scrutiny.

India's Aviation Boom: Growth with Fragility

- India is the third-largest domestic aviation market in the world.
- Operates 840+ aircraft and carries 350+ million passengers annually.
- Rapid expansion has increased connectivity but also **strained system capacity**.
- The June 2025 Ahmedabad crash highlighted serious safety concerns.
- The December 2025 IndiGo mass disruptions exposed operational weaknesses.
- These events were not isolated incidents but signs of **deeper structural stress**.
- Initial perception of airline-specific failure evolved into recognition of **sector-wide vulnerabilities**.
- Key issues include:
  - Pilot shortages
  - Regulatory bottlenecks
  - High aircraft utilisation
  - Limited spare capacity
- Tighter operational norms (e.g., duty time regulations) are increasing pressure on airlines.



Complete chaos: Passengers distressed over flight cancellations at Rajiv Gandhi International Airport in Shamshabad, Hyderabad on December 5, 2025. NAGARA GOPAL

- Peak travel seasons may further expose **systemic fragility**.
- Core warning: Rapid growth without parallel institutional strengthening risks long-term instability.

The Pilot Bottleneck: A Structural Weakness

The December disruption highlighted a severe **pilot-to-aircraft mismatch**.

- IndiGo operated over **360 aircraft with around 5,038 pilots**, translating to a ratio of roughly **14 pilots per aircraft**, below the global benchmark of **18–20 pilots** for fatigue-mitigated operations.
- Implementation of revised **Flight Duty Time Limitation (FDTL)** norms — reducing night duties and increasing mandatory rest — rendered existing schedules unsustainable.
- India requires an estimated 7,000 pilots (2024–26) and potentially 25,000–30,000 over the next decade.
- Between 2020 and 2024, only about **5,700 Commercial Pilot Licences (CPLs)** were issued.
- Training bottlenecks, simulator shortages, high costs, and regulatory delays have constrained supply. Airlines have resorted to foreign pilots, but these remain temporary and expensive stopgaps.
- Compounding the issue is regulatory capacity. Nearly **half of DGCA's sanctioned technical posts remain vacant**, weakening oversight in a rapidly expanding sector.

The Duopoly Problem: Concentration Risk

India's domestic aviation market is highly concentrated:

- IndiGo controls ~63–65%

- Air India group holds ~27–28%
- Together, they account for nearly **90% of the domestic market**

IndiGo operates as the sole carrier on approximately **60% of domestic routes**. Disruptions at such a dominant carrier do not merely shift passengers to competitors; they eliminate connectivity altogether.

- This concentration transforms operational stress at one airline into a **systemic risk affecting national connectivity and fare stability**.

New Regional Entrants: Opportunity or Risk?

In December 2025, the government issued No Objection Certificates (NOCs) to:

- **Shankh Air** (Noida region)
- **Al Hind Air** (Kochi-based regional network)
- **FlyExpress** (Telangana low-cost operator)

These entrants aim to strengthen regional connectivity under the **UDAN scheme**, which has operationalised 625 routes and 85 airports.

UDAN Scheme (Ude Desh ka Aam Nagrik)

1. Launch & Vision

- **Launched:** 21 October 2016
- **First Flight:** Shimla–Delhi (27 April 2017)
- **Objective:** Enhance regional air connectivity and make air travel affordable for the common citizen.
- Tagline idea: *"Hawai chappal to hawai jahaz"* – democratization of aviation.

2. Key Objectives

- Operationalise unserved & underserved airports
- Make flying **affordable** through fare caps and subsidies
- Promote balanced regional development
- Boost tourism, trade, healthcare access
- Encourage private sector participation

3. Major Achievements (2016–2025)

- 625 routes operationalised
- 90 airports connected
  - 15 heliports
  - 2 water aerodromes
- 1.49+ crore passengers benefited
- 3 lakh+ UDAN flights operated
- Airport network expanded from **74 (2014) to 159 (2024)**
- ₹4,023.37 crore disbursed under **Viability Gap Funding (VGF)**
- 2024: 102 new routes launched (including 20 in Northeast)

4. Key Components

- **Viability Gap Funding (VGF):** Financial support to airlines
- **Airfare Cap:** Affordable ticket pricing
- **Collaborative Federal Model:** Centre–States–AAI–Private operators

5. Incentives Framework

For Airlines

- Financial subsidy (VGF)
- Code-sharing flexibility

For Airport Operators

- Waiver of landing & parking charges
- No TNLC charges by AAI
- Discounted RNFC

For State Governments

- VAT on ATF reduced to 1% or less (for 10 years)
- Reduced charges on security, fire, and utilities

For Centre

- Excise duty on ATF capped at **2% (first 3 years)**

- However, India's aviation history shows repeated failures — Kingfisher, Jet Airways,

Go First, TruJet — driven by high ATF costs, weak demand, poor management, and infrastructure constraints.

- Without structural reforms, new entrants may simply redistribute fragility rather than enhance resilience.

Fuel Costs and Financial Strain

- Aviation Turbine Fuel (ATF), linked to global crude prices and the U.S. dollar, remains a persistent cost pressure. High volatility exposes airlines to external shocks, affecting ticket prices and profitability.
- Despite record passenger numbers, profits at major carriers have plunged, suggesting growth without financial cushioning.

Safety Concerns and Regulatory Gaps

By late 2025, DGCA had issued **19 safety violation notices**, citing:

- Breaches of FDTL norms
- Lapses in quality assurance
- Unauthorised cockpit access
- Expired emergency equipment

Globally, airlines maintain **20–25% spare crew capacity** to absorb shocks. Indian carriers operate at near-total utilisation, allowing minor disruptions to cascade across networks.

- This pattern reflects a shift from proactive regulation to reactive crisis management.

Directorate General of Civil Aviation (DGCA)

- Institutional Status: An attached office of the Ministry of Civil Aviation.
- Role:
  - The **regulatory body** in the field of Civil Aviation in India.
  - Primarily deals with **aviation safety issues**.
- Key Responsibilities:
  - Regulation of **air transport services** (to/from/within India).
  - Enforcement of civil aviation regulations.
  - Ensuring air safety and airworthiness standards.
  - Coordination of regulatory functions with the International Civil Aviation Organisation (ICAO).
- Headquarters: Located in **New Delhi**.
- Administrative Presence:
  - Has **regional offices** in various parts of India.

The Way Forward: Systemic Reform

India's aviation sector requires structural correction rather than episodic fixes:

1. Expand pilot training capacity and simulator infrastructure
2. Fill DGCA vacancies to strengthen oversight
3. Improve Tier-2 and Tier-3 airport infrastructure
4. Consider ATF tax rationalisation and hedging mechanisms
5. Encourage measured de-concentration without over-fragmentation

With domestic demand projected to reach **715 million passengers by 2030**, failure to address systemic weaknesses could convert growth into recurring instability.

Conclusion

India's aviation sector stands at a crossroads. Rapid expansion has propelled it into global prominence, but operational overstretch, regulatory gaps, pilot shortages, and high market concentration threaten sustainability.

- The December disruptions were not

aberrations but early warnings. Without structural reforms in manpower, regulation, cost management, and market design, India's aviation success story risks becoming a cycle of recurring crises borne ultimately by passengers.

Union Budget 2026 – Do Government Budget Priorities Align with India's Economic Needs?

Source: *The Indian Express*

Relevance: **Prelims: Budget allocation trends, Fiscal deficit and interest payments, GS III – Indian Economy & Public Finance**

Important Keywords for Prelims and Mains

For Prelims

- Union Budget 2026 • Budget Allocation Share • Fiscal Deficit • Interest Payments • CMIE Data • Infrastructure Spending • Roads & Railways Allocation • MSME Contribution • Health Ministry Allocation • Skill Development Ministry • Public Expenditure Trends • Debt Servicing • Social Sector Spending

For Mains

- Infrastructure-led Growth • Human Capital Investment • Inclusive Growth • Public Finance Priorities • AI Disruption & Labour Market • Self-Reliance vs Trade Liberalisation • Employment Generation • Fiscal Sustainability • Social Sector Underinvestment • Structural Transformation • Economic Resilience • Developmental State Priorities • Productivity vs Welfare Balance

Why in News?

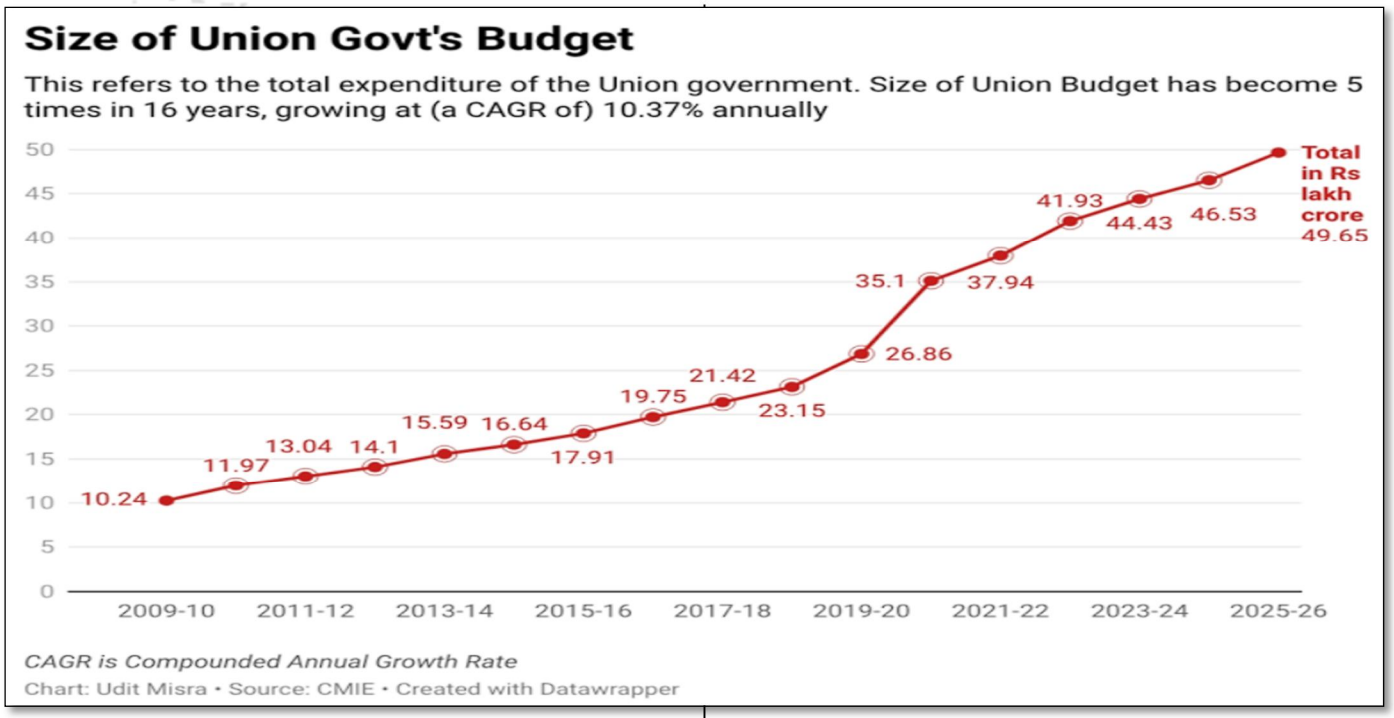
- After the presentation of **Union Budget 2026**, debate has emerged regarding whether government spending priorities match India's evolving economic challenges.
- Major developments such as the **India–US trade negotiations**, rapid rise of **Artificial Intelligence (AI)**, and changing global geopolitics have shifted focus toward evaluating Budget allocations and policy preparedness.
- Analysis of ministry-wise expenditure shares reveals the government's real policy priorities.

Background Context

- Many previous Budgets were overtaken by major economic shocks:
  - **2019:** Corporate tax cut altered fiscal math.
  - **2020:** COVID lockdown and recession.
  - **2021:** Severe pandemic wave.
  - **2022:** Russia–Ukraine war triggered inflation.
  - **2024:** General election altered policy priorities.
  - **2025:** US tariff policies created uncertainty.
- Budget planning increasingly faces unpredictable global and technological disruptions.

Core Policy Question

Whether India's public expenditure priorities



adequately prepare the economy for:

- AI-driven structural change,
- Trade liberalisation pressures,
- Employment generation,
- Skill shortages,
- Healthcare inequality,
- Environmental and social challenges.

India's Policy Dilemma

India is simultaneously:

- Promoting **self-reliance (Atmanirbhar Bharat)**, and
- Expanding **Free Trade Agreements (FTAs)**.

This creates tension between protection and global competition while AI introduces further uncertainty.

Method of Analysis

- Focus is on **share of ministries in total budget spending**, not absolute expenditure.
- Relative share indicates **true policy priority**.
- Data analysed from **2009 onwards** using CMIE Economic Outlook database.

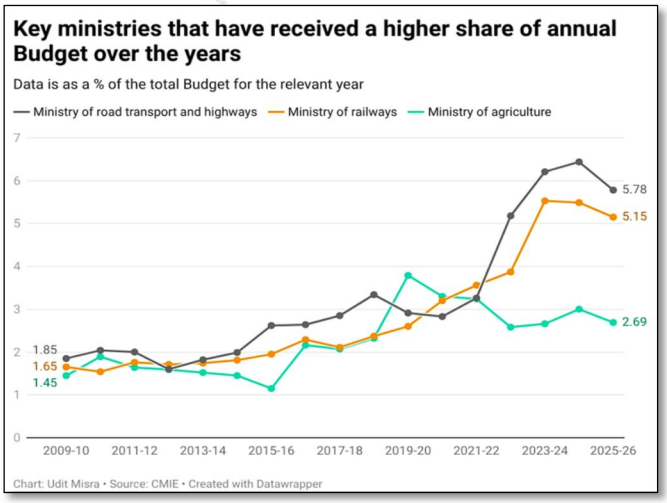
Key Findings from Budget Allocation Trends

1. Overall Budget Growth

- Union Budget size grew at an average **10.4% annually since 2009**.
- Most ministries receive higher funds in absolute terms.
- Policy priority determined by **change in expenditure share**.

2. Infrastructure Gets Highest Priority

- Ministries of **Road Transport and Railways** saw sharp increase in share post-pandemic.
- Combined share rose:
  - From **less than 4% (2009)**
  - To nearly **11% of total spending**.
- Objective:
  - Improve connectivity,
  - Reduce logistics costs,
  - Boost economic efficiency.

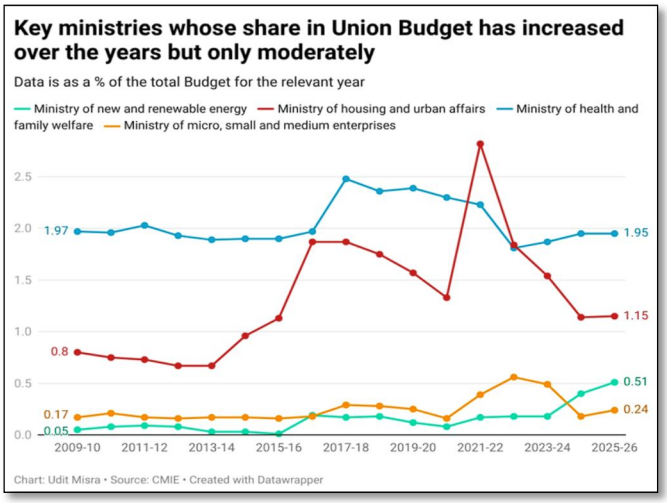


3. Agriculture Spending

- Share increased gradually but not dramatically.
- Indicates continued but moderate priority toward rural economy.

4. MSME Sector – Major Mismatch

- Receives only **0.24% of total Budget spending**.
- Contradiction because:
  - Second-largest employer after agriculture.
  - Contributes ~30% of GDP.
  - Accounts for over 45% of exports.
- Gap between policy rhetoric ("Champion MSMEs") and actual spending.

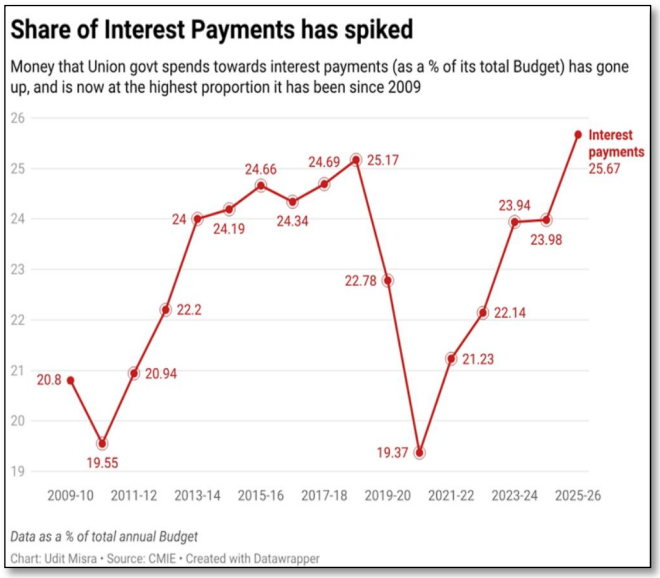


5. Health & Family Welfare

- Allocation share stagnant over long term.
- Declined after peak in **2017–18**.
- Concern due to:
  - Largest global population,
  - Unequal healthcare access.

6. Rising Interest Payment Burden

- Interest payments sharply increased.
- Around **1 in every 4 rupees** spent by government goes toward debt interest.
- Indicates:
  - Growing repayment pressure despite fiscal deficit management.

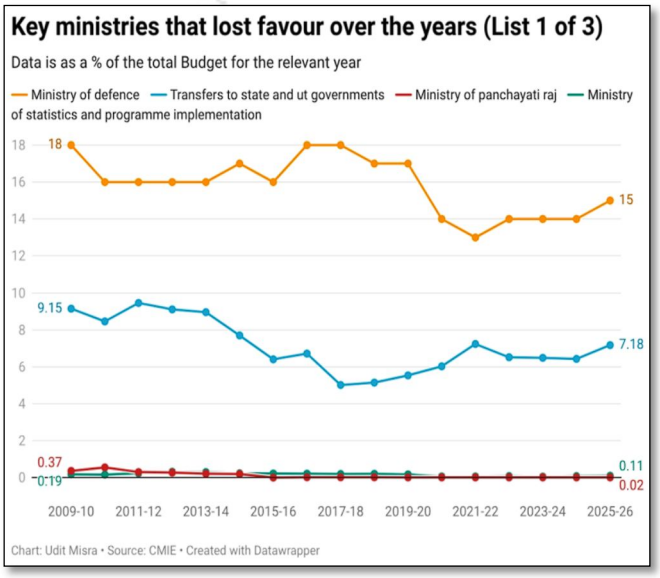


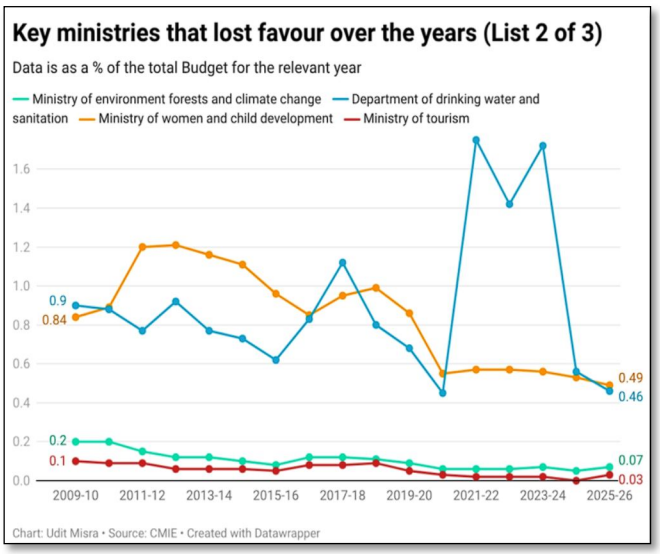
7. Declining Priority Ministries

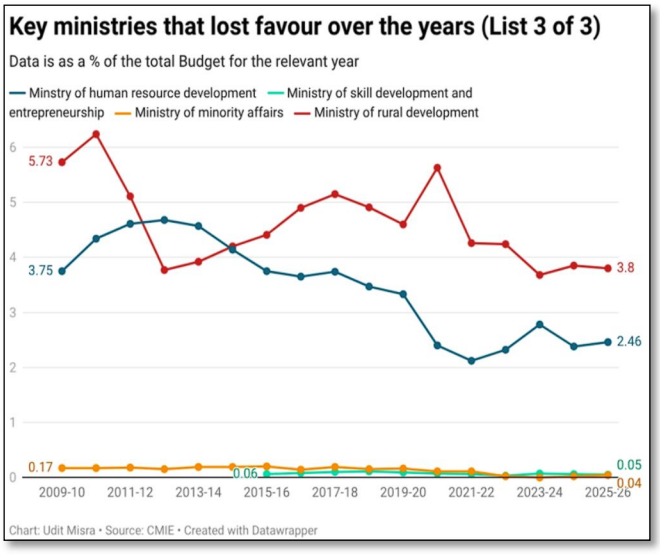
Reduced relative allocations to:

- Defence (share lower than past levels)
- Panchayati Raj
- Statistics & Data systems
- Drinking Water & Sanitation
- Women & Child Development
- Tourism sector (share nearly vanished)

Possible long-term developmental consequences.







8. AI Era Preparedness Concerns

- Skill Development Ministry share declined:
  - **0.06% → 0.05%**
- Education spending share also declining.
- Raises concerns about workforce readiness for AI-led transformation.

Economic Interpretation

Budget trends suggest:

- Strong investment in **physical infrastructure**.
- Relatively weaker investment in **human capital**.

Echoes economist **John Kenneth Galbraith's** warning:

Governments often overinvest in things and underinvest in people.

Broader Economic Implications

- Infrastructure growth may improve productivity.
- Weak human capital investment may limit long-term growth.
- AI and global competition could worsen inequality without skill upgrades.
- Rising interest burden may crowd out developmental spending.

Environment - Ecology & DM

Himalaya–Karakoram Glacial Flood Risks Poorly Assessed: Study Warns

Source: Down-to-earth

Relevance: GS Paper III – Environment, Climate Change, Disaster Management

Important Keywords for Prelims and Mains

Prelims

- Glacial Lake Outburst Flood (GLOF), Himalaya–Karakoram Region, Moraine-Dammed Lakes, Ice-Dammed Lakes, Supraglacial Lakes, Elevation-Dependent Warming, Glacier Retreat, Cryosphere, Third Pole, Flash Floods, Early Warning Systems (EWS)

Mains

- Climate Change and Mountain Hazards, Himalayan Ecology, Disaster Risk Reduction (DRR), Climate-Induced Disasters, Vulnerability of Mountain Communities, Cryosphere Monitoring, Adaptation and Resilience, Role of Remote Sensing, Transboundary Disaster Risks, Sustainable Development in Himalayan Region

Why in News?

A recent study published in *npj Natural Hazards* (January 2026) warns that **glacial lake outburst flood (GLOF) risks in the Himalaya–Karakoram region are poorly assessed and weakly monitored**, despite rapid climate-driven expansion of glacial lakes. Nearly **one million people living downstream** face potential flood threats due to inadequate research, monitoring and early-warning systems.

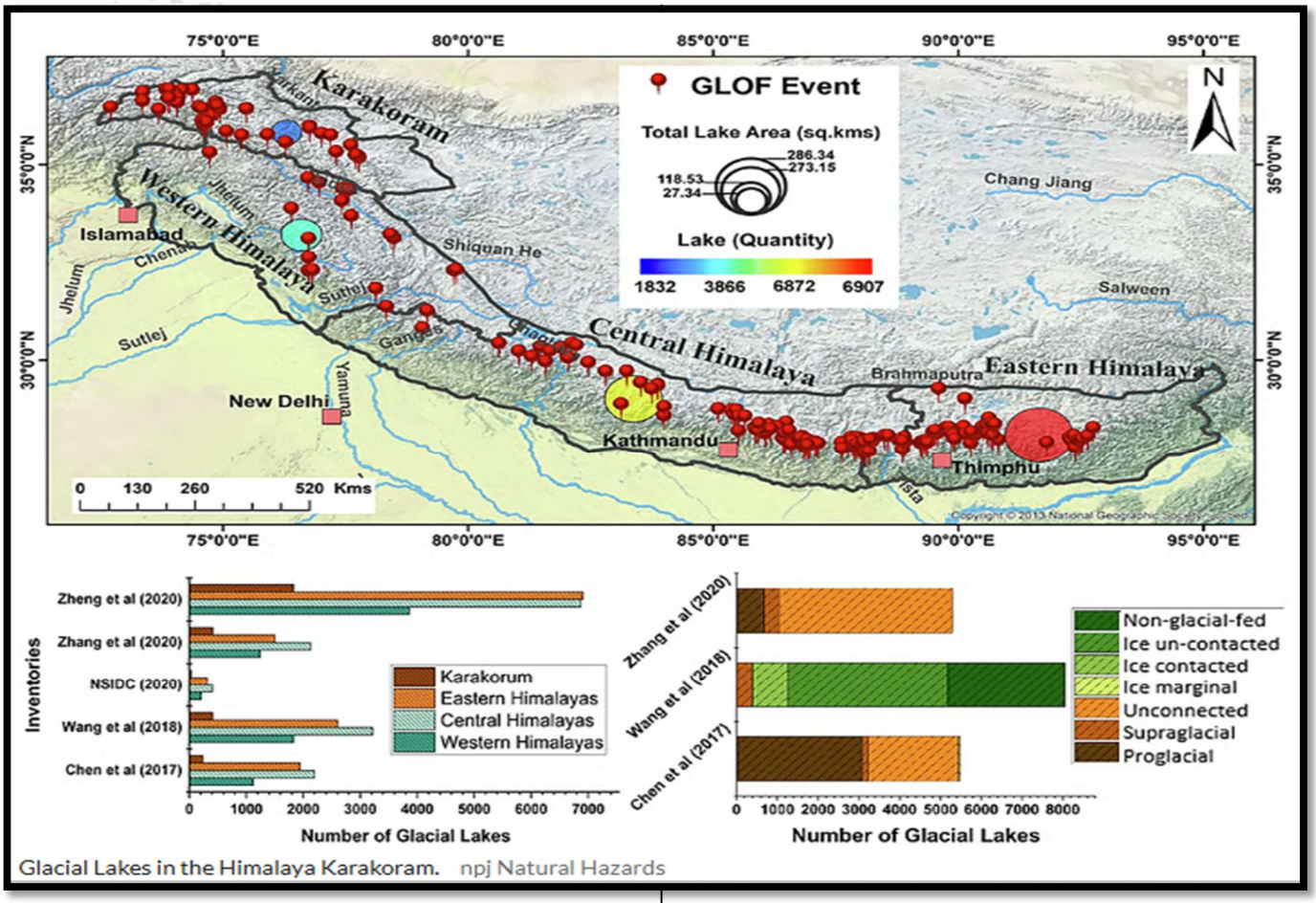
What are Glacial Lake Outburst Floods (GLOFs)?

A **Glacial Lake Outburst Flood (GLOF)** occurs when a natural dam holding a glacial lake collapses, releasing a sudden surge of water downstream.

- These floods often carry **debris, rocks, soil and ice**, amplifying destruction.
- Types of glacial lakes:
  - **Moraine-dammed lakes** – blocked by loose rock and debris.
  - **Ice-dammed lakes** – restrained primarily by ice.
  - **Supraglacial lakes** – form on glacier surfaces and can drain suddenly during rapid melting.

Rising GLOF Events in the Himalaya–Karakoram Region

The study documents **388 GLOF events** across the



Glacial Lakes in the Himalaya Karakoram. npj Natural Hazards

region so far:

- **Karakoram**: 196 events
- Central Himalayas: 99 events
- Eastern Himalayas: 72 events
- Western Himalayas: 21 events

By lake type:

- Moraine-dammed lakes: **163 events**
- Ice-dammed lakes: **144 events**
- Supraglacial lakes: ~**50 events**

By country:

- **Pakistan**: 131 events
- **China**: 123 events
- **India**: 59 events
- **Nepal**: 54 events

India's Experience with GLOFs

India has witnessed some of the **deadliest GLOF disasters**:

- **Uttarakhand (2013)**: Failure of the Chorabari glacial lake triggered floods and landslides, killing nearly **5,000 people**.
- **Sikkim (2023)**: Collapse of a glacial lake wall killed **55 people** and caused massive infrastructure damage.

These events highlight India's high vulnerability to glacial hazards.

Climate Change, Warming and Expanding Glacial Lakes

Climate change is intensifying GLOF risks due to **elevation-dependent warming**, where higher altitudes warm faster.

Since **1990**:

- Number of glacial lakes increased by **53%**
- Total lake area increased by **51%**
- Total lake volume increased by **48%**

Glaciers ending in lakes are retreating **faster than land-terminating glaciers**, creating a feedback loop that accelerates lake growth and instability.

Research Gaps and Monitoring Deficiencies

Despite rising risks, research and preparedness have not kept pace:

- Limited **social vulnerability assessments** for downstream communities.
- Inadequate studies on future GLOF frequency under climate change.
- Poor coverage of early-warning systems (EWS).
- Heavy reliance on **remote sensing**, with limited ground-based observations.
- Lack of standardised definitions and size thresholds for glacial lakes.
- Most datasets are **static**, failing to capture seasonal changes, rapid lake evolution and short-lived but dangerous lakes.

These gaps reduce the effectiveness of risk assessment and disaster preparedness.

Why the Himalayas are Hard to Study

- Rugged terrain and harsh climate restrict **field-based research**.
- Satellite data often suffers from coarse spatial and temporal resolution.
- Variations in lake classification (moraine, supraglacial, ice-contact) lead to **inconsistent datasets** across regions.

Way Forward

- Develop region-specific, integrated GLOF risk assessments.
- Strengthen **ground-based monitoring** and high-resolution mapping.
- Expand **early-warning systems** and disaster preparedness in vulnerable areas.
- Incorporate social vulnerability and community-based adaptation.
- Improve **cross-border cooperation** in the Himalaya–Karakoram region.

Conclusion

The Himalaya–Karakoram region is entering a phase of heightened glacial flood risk due to climate change, expanding glacial lakes and insufficient monitoring. Without urgent improvements in research, data integration and early-warning mechanisms, GLOFs could become one of the most dangerous climate-induced disasters for mountain communities in South Asia.

Saving India's Wetlands: Tradition, Ecology and Governance

Source: The Hindu

Relevance: **GS Paper III: Environment, Conservation, Water Security, Disaster Management, Climate Change.**

Important Keywords for Prelims and Mains

For Prelims

- World Wetlands Day 2026, Theme: *Wetlands and traditional knowledge*, Ramsar Sites (98), MISHTI Scheme, Amrit Dharohar, Wetland City Accreditation (WCA), Montreux Record, Central Asian Flyway (CAF), Wetland Mitras.

For Mains

- Ecological functionality vs. Beautification,

Watershed-scale governance, Blue Carbon Sinks, Nature-based Solutions (NbS), Sponge City framework, Hydro-social fabric, Wise-use principle, Ground Truthing.

Why in News

On **2 February 2026**, the world observed **World Wetlands Day 2026** under the theme *"Wetlands and traditional knowledge: Celebrating cultural heritage"*. For India, this theme is deeply resonant. Across regions and centuries, communities have evolved livelihood systems around wetlands that balanced ecology and economy, embedding conservation within culture. However, despite strong policy frameworks and international commitments, wetlands remain among India's most threatened ecosystems, demanding urgent, coordinated, and people-centric action.

- Reflecting growing policy recognition, India expanded its Ramsar sites from **26 in 2014 to 98 in 2026**, covering **1,384,140 hectares**, the highest in Asia, signalling a shift towards sustainability-oriented and community-integrated wetland governance.

'Although the benefits and services of wetlands abound, they remain among the most threatened ecosystems'. File | Photo Credit: The Hindu

The Hindu

India's Civilisational Bond with Wetlands

Traditional Knowledge and Community Stewardship

- Wetlands in India are not isolated ecosystems but part of lived cultural landscapes
- **Tamil Nadu**: Ancient tank (kulam) systems formed cascading irrigation networks supporting paddy cultivation and groundwater recharge
- **Wayanad (Kerala)**: Shallow wells called *kenis*, built over 200 years ago, supply drinking water and support rituals and festivals
- **Srikakulam (Andhra Pradesh)**: Wetlands sustain traditional fishing practices and seasonal livelihoods
- Across India, wetlands function simultaneously as:
  - Ecological systems
  - Economic assets
  - Cultural heritage sites
  - Social wellbeing anchors

Insight: Traditional practices inherently safeguarded wetlands through collective ownership, seasonal use, and respect for hydrological rhythms.

Kenis of Kerala

Why Wetlands Matter for India

1. Water Security and Flood Regulation

- Wetlands act as natural sponges:
  - Absorb excess rainfall
  - Release water gradually during dry periods
- Recharge aquifers and stabilise urban water supply
- Critical under climate-induced erratic rainfall
- **Example**: Bhoj Wetlands (Bhopal) buffer monsoon floods and supply drinking water

2. Climate Action and Carbon Sequestration

- Mangroves and peatlands are powerful **blue carbon sinks**
- Sequester carbon **10–50 times faster** than terrestrial forests
- Support India's NDCs and net-zero target (2070)
- **Example**: MISHTI Scheme targets restoration of **540 sq km of mangroves**, with **~4.5 million tonnes** sequestration potential

3. Livelihoods and Economic Value

- Support fisheries, wetland agriculture (makhana, rice), grazing, eco-tourism
- Provide livelihoods to millions of marginalised communities
- **Amrit Dharohar Scheme (2023)** links conservation with green jobs
- **Data**: Kole Wetlands (Kerala) valued at **USD 54 million** annually from paddy and flood control

4. Pollution Control and Wastewater Treatment

- Wetlands act as "nature's kidneys":
  - Filter nutrients, heavy metals, sediments
  - Reduce biochemical oxygen demand (BOD)
- **Example**: East Kolkata Wetlands save **₹4,680 million per year** by naturally treating sewage

5. Biodiversity and Migratory Corridors

- Wetlands are biodiversity hotspots and ecological indicators
- India lies on the Central Asian Flyway (CAF)
- Support millions of migratory birds
- **Examples**: Pallikaranai, Pulicat Lake, Keoladeo, Khijadia, Hokersar

6. Coastal Defence and Disaster Risk Reduction

- Mangroves, lagoons and mudflats act as bio-shields
- Reduce cyclone impact, storm surges, shoreline erosion
- **Example**: Bhitarkanika mangroves reduced damage during Cyclone Dana (2024)

7. Groundwater Recharge and Agrarian Sustainability

- Act as percolation zones sustaining groundwater-dependent agriculture
- Prevent soil salinisation and desertification
- **Example**: Kole Wetlands—below sea level, highly productive rice ecosystem

8. Geo-Strategic and National Security Significance

- High-altitude wetlands regulate glacial meltwater
- Reduce risk of Glacial Lake Outburst Floods (GLOFs)
- Support military logistics near sensitive border areas
- **Example**: Tso Kar Wetland Complex (Ladakh) designated as Ramsar site to secure freshwater resources

9. Cultural Heritage and Community Stewardship

- Wetlands embedded in India's hydro-social and religious traditions
- Sacred status promotes community-led protection and voluntary labour (Shramdaan)
- Higher success rate than purely bureaucratic conservation
- Examples:
  - Renuka Lake (Himachal Pradesh) protected through religious norms
  - Mission Amrit Sarovar rejuvenated **68,000+ water bodies** by January 2025

Measures Taken for Wetland Conservation in India

1. Amrit Dharohar Scheme – Livelihood Integration

- Converts wetlands into high-value ecological assets
- Promotes low-impact nature tourism
- First-phase priority sites: Sultanpur, Sirpur, Yashwant Sagar, Bhitarkanika, Chilika
- Training programmes:
  - Alternative Livelihood Programme (ALP)
  - Paryatan Navik Certificate (PNC)

2. Wetland City Accreditation (WCA)

- Based on the Ramsar Convention
- Integrates wetlands into urban master plans as flood buffers
- Forces alignment of zoning laws with wetland protection
- **Examples**: Indore and Udaipur became India's first WCA cities (January 2025)

3. Mission Sahbhagita and Wetland Mitras

- Citizen-science and community monitoring approach
- Creates a decentralised vigilance system against encroachment and pollution
- Achievements:
  - 2 million people sensitised
  - 80,000 wetlands surveyed
  - 6,200 wetland health cards prepared
  - 18,000 Wetland Mitras registered

4. Green Credit Programme (GCP)

- Market-based financing mechanism for wetland restoration
- Corporates earn tradable credits for ecological rejuvenation
- Reduces fiscal burden on the government
- **Since 2023**: Credits allowed for mangrove restoration

5. Wetland Health Cards and Geospatial Monitoring

- Integrate ISRO satellite data with field indicators
- Monitor turbidity, dissolved oxygen, and ecological stress
- Enable early warning and preventive action
- Shift governance from reactive to proactive management

6. Expansion of Ramsar Network

- Strategic internationalisation of wetland protection
- Invokes treaty obligations and global scrutiny
- **Status**: 98 Ramsar sites (2026), highest in Asia

7. Legal Ground-Truthing of Small Wetlands

- Supreme Court mandated physical verification
- Addresses neglect of wetlands below 2.25 hectares
- Extends Public Trust Doctrine to village ponds
- Outcome:

- 170,000 wetlands ground-truthed
- 100,000 wetlands boundary-demarcated

8. Revised NPCA Guidelines

- Shift from water-body centric to catchment-scale management
- Mandatory Framework Management Plans
- Focus on controlling siltation and pollution at source

Challenges in Wetland Conservation

1. Urban Encroachment and "Concrete Creep"

- Wetlands classified as "wastelands" in revenue records
- Conversion into real estate reduces flood buffering
- **Example**: Pallikaranai marsh (Chennai) shrunk by 90% in 30 years

2. Pollution and Eutrophication

- Unchecked sewage and industrial effluents
- Causes oxygen depletion and dead zones
- **Example**: Migratory bird numbers at Harike declined by 12% (2021–2023)

3. Weak Governance and Legal Gaps

- Fragmented institutional responsibility
- Delays in notification by State Wetland Authorities
- **SC Intervention (2017)**: ₹50,000 penalty for failure to prepare inventories

4. Siltation and Hydrological Disruption

- Dams and canals cut off natural flows
- Leads to terrestrialisation of wetlands
- **Example**: Wular Lake losing water-holding capacity

5. Invasive Alien Species

- Water hyacinth, African catfish displace native species
- Block sunlight and degrade habitat
- Threaten wetlands covering **58.2 million hectares**

6. Climate Change Impacts

- Drying of seasonal wetlands
- Phenological mismatch for migratory birds
- **Data**: India has lost nearly **one-third of its wetlands** in three decades

7. Microplastics and Chemical Pollution

- Accumulation of endocrine-disrupting chemicals
- Bioaccumulation through food chains
- Risks to human health and livelihoods

8. Livelihood–Conservation Conflict

- Top-down protection ignores traditional usufruct rights
- Resistance from local communities
- **Example**: Protests at Deepor Beel (Assam), 2021

Measures Needed

- Catchment-scale "source-to-sink" treatment and afforestation
- Full operationalisation of Green Credit Programme
- Adoption of constructed wetlands for sewage treatment
- Strict ground-truthing and geo-tagging of all wetlands
- Integration of sponge-city principles in urban planning
- Agro-ecological buffer zones around wetlands
- Scientific removal and utilisation of invasive species
- Equitable benefit-sharing and community participation

Conclusion

Wetlands are not ecological luxuries but critical natural infrastructure that underpins India's water security, climate resilience, biodiversity, and livelihoods. Their degradation transforms climate risks into developmental disasters such as floods, food insecurity, and livelihood loss. A decisive shift towards community-led, science-based, and catchment-scale governance—anchored in Mission LiFE—is essential. Protecting wetlands today is an investment in sustainable development, disaster resilience, and intergenerational equity.

New Solid Waste Management Rules Notified; To Come into Force from April 1, 2026

Source: PIB

Relevance: GS Paper II (Governance): GS Paper III (Environment):

Important Keywords for Prelims and Mains

Prelims

- Solid Waste Management Rules, 2026
- Four-Stream Waste Segregation
- Bulk Waste Generators (BWGs)
- Polluter Pays Principle
- Refuse-Derived Fuel (RDF)

Mains

- Circular Economy–Based Waste Governance
- Extended Bulk Waste Generator Responsibility (EBWGR)
- Decentralised Urban Environmental Governance
- Digital Monitoring & Regulatory Accountability
- Landfill Minimisation & Legacy Waste Remediation

Why in News

The Union Ministry of Environment, Forest and Climate Change has notified the **Solid Waste Management (SWM) Rules, 2026**, which will come into force from **1 April 2026**, replacing the SWM Rules, 2016. The new framework introduces **four-stream waste segregation, extended responsibility for bulk waste generators, deterrence-based enforcement, digital monitoring, restrictions on landfilling, and mandatory energy recovery from high-calorific waste**, signalling a decisive policy shift towards a **circular economy–based waste governance model**.

Around 1.85 lakh tonnes of waste are generated daily across the country. (Amit Mehra)

Rationale Behind the New Rules: India's Waste Crisis

India faces a severe solid waste management challenge:

- Annual waste generation: over 620 lakh tonnes

- Daily generation: ~1.85 lakh tonnes
- Daily processing: only 1.14 lakh tonnes
- Daily landfilling: nearly 40,000 tonnes

Despite the SWM Rules, 2016, poor segregation, weak accountability of bulk generators, and landfill dependence have resulted in **garbage mountains, methane emissions, groundwater contamination, and public health risks**. The 2026 Rules aim to correct these structural deficiencies by **reducing landfill dependence, strengthening accountability, and treating waste as a resource**.

Key Policy Shifts under SWM Rules, 2026

1. Waste Hierarchy and Four-Way Segregation

The 2026 Rules formally introduce a waste hierarchy prioritising: Prevention → Reduction → Reuse → Recycling → Recovery → Disposal (last resort).

To operationalise this hierarchy, **four-way segregation at source** has been made mandatory:

- **Wet waste:** biodegradable household waste
- **Dry waste:** recyclable materials (plastic, paper, metal, glass)
- **Sanitary waste:** sanitary napkins, tampons, condoms
- **Special-care waste:** medicines, paint cans, bulbs, tube lights

Urban local bodies must provide enabling infrastructure such as **green, blue and red bins**, especially in public spaces, addressing a major implementation gap of the 2016 Rules.

2. Enhanced Responsibility of Bulk Waste Generators

A central governance reform is the introduction of **Extended Bulk Waste Generator Responsibility (EBWGR)**.

Bulk waste generators—defined as entities with:

- Built-up area ≥ 20,000 sq m, or
- Water consumption ≥ 40,000 litres/day, or
- Waste generation ≥ 100 kg/day

These include residential societies, gated communities, malls, hotels, institutions, government establishments, and large townships.

New obligations include:

- Mandatory four-way segregation
- On-site wet waste processing (preferred)
- Registration on a centralised portal
- Certification-based compliance replacing self-declaration
- Annual waste accounting and reporting

Given that bulk generators account for nearly **30% of total solid waste**, this reform reduces pressure on ULBs and promotes **decentralised waste management**.

3. Polluter Pays Principle and Deterrence-Based Regulation

Unlike the advisory nature of earlier rules, the 2026 framework operationalises the **Polluter Pays Principle** through:

- Environmental compensation for non-registration, false reporting, forged documents
- Higher landfill fees for unsegregated waste
- Financial disincentives for landfill use

The **CPCB will frame guidelines**, while SPCBs and local bodies will enforce penalties—marking a shift from **voluntary compliance to regulatory deterrence**.

4. Digitalisation and Centralised Monitoring

A **centralised online portal** will track the entire waste lifecycle:

- Generation
- Collection
- Transportation
- Processing
- Disposal
- Biomining and bioremediation of legacy dumpsites

Mandatory registration applies to **ULBs, bulk generators, waste processors, transporters, waste**

pickers, railways, airports and SEZs. Online reporting and mandatory audits address data opacity and weak oversight under the 2016 regime.

Landfills: From Default Option to Last Resort

The 2026 Rules aim to **end landfill dependency**:

- Landfills restricted strictly to non-recyclable, non-energy-recoverable and inert waste
- Higher fees for unsegregated waste discourage dumping

Legacy Waste Remediation

- Mapping of all legacy dumpsites by **31 October 2026**
- Time-bound biomining and bioremediation
- Quarterly progress reporting via the online portal

This directly targets India's long-standing landfill mountains and land contamination issues.

Energy Recovery and Industrial Responsibility

Waste with **calorific value ≥ 1,500 kcal/kg** must be diverted for energy recovery through:

- Refuse-Derived Fuel (RDF)
- Co-processing in cement and thermal power plants

Industries are mandated to progressively replace fossil fuels with RDF:

- 6% initially
- 15% within six years

This links waste management with energy transition, climate mitigation, and circular economy goals.

Governance Significance and Federal Dimensions

The Rules redefine roles across governance levels:

- **ULBs:** frontline implementation and by-law framing
- **SPCBs/CPCB:** regulation, monitoring and enforcement
- District Collectors: landfill oversight
- **Bulk generators:** decentralised responsibility

Special provisions for **hilly areas and islands**, including tourist user fees and decentralised processing, reflect **ecological sensitivity and environmental justice**.

Implementation Challenges

- Capacity constraints of ULBs and SPCBs
- Behavioural resistance to segregation at source
- Financial stress in urban governance
- Integration of informal waste pickers into formal systems

Way Forward

- Strengthen ULB capacity and fiscal support
- Institutionalise Behaviour Change Communication (BCC)
- Formal inclusion of waste pickers
- Monetise waste through RDF markets and carbon credits
- Promote cooperative federalism in waste governance

Conclusion

The Solid Waste Management Rules, 2026 represent a **paradigm shift from landfill-centric sanitation to accountability-driven environmental governance**. By embedding circular economy principles, extended responsibility, digital oversight and economic deterrence, the rules aim to address India's waste crisis at its roots. Their success, however, will ultimately depend on **institutional capacity, citizen participation and effective inter-governmental coordination**, making implementation—not intent—the true test of reform.

NDMA Guidelines for Disaster Victim Identification (DVI)

Source: The Indian Express

Relevance: GS Paper III – Disaster Management

Important Keywords for Prelims and Mains

For Prelims

- National Disaster Management Authority (NDMA), Disaster Victim Identification (DVI), Mass Fatality Incidents, National Dental Data Registry, Interpol DVI Standards.

For Mains

- Scientific Disaster Response, Humanitarian Forensics, Institutional Preparedness, Dignity of the Dead, Disaster Governance, Role of Technology in Disaster Management, Coordination in Multi-Agency Response.

National Disaster Management Authority

Why in News?

The National Disaster Management Authority (NDMA) has released India's first-ever national guidelines and Standard Operating Procedures (SOPs) for Disaster Victim Identification (DVI) to ensure scientific identification and dignified handover of human remains during mass fatality events.

Background and Need

- Triggered by major disasters such as the Air India crash (Ahmedabad), Sangareddy chemical explosion, Uttarakhand flash floods, bridge collapse, and Delhi car bomb blast.
- Earlier gaps included:
  - Lack of SOPs
  - Shortage of trained forensic personnel
  - Poor coordination among agencies
  - Infrastructure deficits such as mortuaries and cold storage
- Emphasizes the **humanitarian and legal responsibility** of providing closure to families.

Scene outside a post-mortem room in Ahmedabad, following the Air India plane crash in June last year. (File Photo)

Indian Express

Key Provisions of the NDMA DVI Guidelines

1. Four-Stage Scientific Identification Process


Institutional Framework for Disaster Management in India
DM ACT, 2005
Disaster Management Act, 2005
1990s Disaster Management Cell under Ministry of Agriculture
• Orissa Super Cyclone (1999)
Bhuj Earthquake (2001)
• Shifted under Ministry of Home Affairs (2002)
DM ACT
NDMA
NATIONAL LEVEL
• Holistic Disaster Preparedness Approach
NATIONAL LEVEL
NDMA
NATIONAL EXECUTIVE COMMITTEE
RELIEF SUPPLIES
NAGGLER PLAN
UNION HOME SECRETARY
STATE LEVEL
SDMAs
STATE EXECUTIVE COMMITTEES
CHIEF SECRETARY
STATE DISASTER MANAGEMENT (SDMAs)
Chief Minister
PRIME MINISTER
DISTRICT DISASTER MANAGEMENT (DDMAs)
District Magistrate
CHIEF SECRETARY
DISTRICT LEVEL
NDRF
NATIONAL DISASTER RESPONSE FORCE
NDRF
STATE DISASTER RESPONSE FORCE
SDRF
Laws & Policy Framework
DM Act 2005
NPDM, 2009
PLAN, 2018
PM'S 10-Point Agende

The guidelines prescribe a structured protocol to ensure accuracy and prevent mix-ups:

- **Systematic Recovery:** Methodical retrieval of human remains from disaster locations.
- **Post-Mortem Data Collection:** Recording fingerprints, DNA samples, dental structures, and physical identifiers.
- **Ante-Mortem Data Collection:** Gathering medical records, dental history, and physical descriptions from families.
- **Reconciliation:** Scientific matching of ante-mortem and post-mortem data before confirming identity and releasing remains.

2. Integration of Advanced Forensic Techniques

The guidelines emphasize modern forensic science to improve identification rates.

- **National Dental Data Registry:** Creation of a centralized dental database since teeth and jaws often survive extreme conditions and provide reliable identification markers.
- **Forensic Odontology and Archaeology:** These fields enable identification even months or years after disasters, especially when remains are buried or degraded.
- **Avoidance of Mass Autopsies:** Physical autopsies for every victim are discouraged in large-scale fatality events to improve efficiency without compromising scientific standards.

3. Humanitarian and Rights-Based Approach

The framework promotes the concept of "humanitarian forensics," ensuring that disaster response respects cultural practices and community customs. It also mandates emotional support and psychological counselling for affected families, acknowledging that disaster management must balance scientific precision with compassion.

4. Institutional and Implementation Measures

NDMA plans to operationalize the guidelines nationwide through structural reforms.

- Establishment of specialized forensic teams ideally in every state.
- Targeted training of experts across forensic disciplines.
- Creation of clear organizational hierarchies to improve coordination among local, state, and central agencies.
- Adoption of global best practices from INTERPOL, tailored to India's disaster risk profile shaped by climate change, rapid urbanization, and industrial hazards.

Significance

The guidelines mark a major shift toward a scientific and institutionalized disaster response system.

- Strengthen disaster governance and preparedness.
- Integrate science, technology, ethics, and humanitarian values into response mechanisms.
- Uphold the dignity of the deceased while protecting the rights of families.
- Enable faster legal closure, including issuance of death certificates and compensation.
- Address India-specific vulnerabilities such as climate-induced disasters and urban accidents.

Challenges in Disaster Victim Identification

- **Rapid Decomposition:** High humidity and temperatures accelerate body deterioration, making visual identification difficult.
- **Condition of Remains:** Bodies may be

charred, fragmented, or commingled after explosions or fires.
- **Displacement:** Floods and landslides can carry bodies far from the incident site.
- **Infrastructure Deficits:** Shortage of mortuary spaces, cold-chain transport, and storage facilities.
- **Coordination Gaps:** Presence of multiple agencies without unified command can lead to confusion.
- **Data Limitations:** Lack of centralized biometric databases complicates matching unidentified bodies with missing persons.

Measures to Further Strengthen DVI

- **Pre-Disaster Data Repository:** Linking health records such as the Ayushman Bharat Health Account (ABHA) with optional biometric markers like dental scans or implant serial numbers could enable quicker identification.
- **Digital Forensics:** Use of smartwatches, mobile phones, biometric locks, and AI-based facial reconstruction to support rapid preliminary identification.
- **Portable DNA Labs:** Deploying rapid DNA machines at disaster sites can drastically reduce waiting time for families.
- **Tamper-Proof Records:** Blockchain-based chain-of-custody systems can ensure transparency and legal credibility of forensic data.
- **International DVI Cooperation:** Pre-signed treaties with neighboring countries and major tourism partners would allow instant sharing of biometric and DNA data during cross-border disasters.

Conclusion

The NDMA's Disaster Victim Identification guidelines represent a historic paradigm shift toward a technologically advanced, scientifically robust, and humanitarian disaster management framework. By institutionalizing standardized protocols such as the National Dental Data Registry and strengthening forensic capacity, India enhances its preparedness while ensuring dignity for the deceased and providing timely legal and emotional closure for affected families.

A Case Against the SHANTI Act

Source: The Hindu

Relevance: **GS Paper II (Governance & Regulatory Framework), GS Paper III (Energy, Infrastructure, Disaster Management)**

Important Keywords for Prelims and Mains

Prelims

- SHANTI Act, Civil Liability for Nuclear Damage Act (CLNDA) 2010, Nuclear Fission, Supplier Indemnity, Right of Recourse, Liability Cap, Special Drawing Rights (SDR), Atomic Energy Act 1962, Atomic Energy Regulatory Board (AERB), Small Modular Reactors (SMRs)

Mains

- Nuclear Liability Regime, No-Fault Liability, Absolute Liability Principle, Moral Hazard, Regulatory Independence, Private Sector Participation in Nuclear

Energy, Energy Security vs Public Safety, Disaster Compensation Framework, International Nuclear Conventions, Governance and Accountability in Hazardous Industries

Why in News?

Parliament recently passed the **SHANTI Act**, which opens India's nuclear power sector to private participation and significantly amends the liability framework under the **Civil Liability for Nuclear Damage Act (CLNDA), 2010**. The changes — particularly on supplier indemnity and liability caps — have triggered debate on safety, accountability, and economic feasibility.

What is Nuclear Energy?

Nuclear energy is the use of controlled atomic reactions to produce power. At its core, it relies on splitting atoms in a process called fission, which releases large amounts of heat. This heat is then used to generate electricity without producing greenhouse gases. Globally, nuclear energy is valued as a clean, dependable source that complements renewable options like solar and wind.

Salient Provisions of the Act

1. Participation of the Private Sector

The Act allows private entities — including companies, joint ventures, or any person specifically authorised by the Central Government — to engage in India's nuclear energy sector.

They may undertake activities such as:

- Operation of nuclear power plants and generation of electricity
- Manufacturing of nuclear equipment
- Fabrication of nuclear fuel, including conversion processes
- Refining and enrichment of Uranium-235 up to a prescribed limit
- Production, handling, processing, or disposal of other notified radioactive substances

However, any activity involving radiation exposure requires prior safety clearance from the designated regulatory authority.

2. Activities Reserved for the Central Government

Strategically sensitive components of the nuclear fuel cycle remain under the exclusive control of the Central Government or its wholly owned entities.

These include:

- Enrichment of radioactive materials beyond specified limits
- Management and disposal of spent nuclear fuel
- Other critical fuel-cycle operations deemed

sensitive

This ensures national security and strategic oversight.

3. Statutory Status to the Atomic Energy Regulatory Board (AERB)

The Act grants statutory backing to the **Atomic Energy Regulatory Board (AERB)** to enhance its autonomy and regulatory authority.

- Originally constituted in 1983 under the Atomic Energy Act
- Now accountable to Parliament rather than functioning solely under executive control
- Responsible for nuclear safety, radiation protection, emergency response planning, and quality assurance in civilian nuclear facilities

This provision strengthens institutional independence in nuclear regulation.

4. Introduction of a New Civil Liability Framework

The legislation establishes a structured and graded liability mechanism for nuclear operators.

Liability Limits:

- ₹3,000 crore for large nuclear power plants
- ₹1,500 crore for medium-sized plants
- ₹100 crore for Small Modular Reactors (SMRs)

Any liability exceeding these limits will be covered by the Government through a dedicated Nuclear Liability Fund.

Importantly, the Act eliminates supplier liability, unlike the Civil Liability for Nuclear Damage Act, 2010 (CLNDA), which allowed claims against suppliers for defective equipment.

5. Regulation of Non-Power Nuclear Applications

The Act also regulates the peaceful use of nuclear and radiation technologies in:

- Healthcare
- Agriculture
- Industry
- Scientific research
- Other civilian applications

This ensures safety compliance beyond electricity generation.

6. Licensing and Safety Regulation

A comprehensive framework is introduced for:

- Granting licences
- Suspending licences
- Cancelling licences
- Issuing safety authorisations

Limited exemptions may be provided for research, development, and innovation activities under defined conditions.

7. Acquisition Powers of the Central Government

- The Central Government is vested with exclusive rights to acquire assets or facilities in specific circumstances related to nuclear activities, ensuring strategic control where required.

8. Dispute Resolution Framework

The Act establishes:

• Atomic Energy Redressal Advisory Council

To facilitate settlement of disputes relating to nuclear operations.

- **Nuclear Damage Claims Commission:** To adjudicate cases involving major nuclear damage and ensure timely compensation.

9. Territorial Scope of Compensation

- Compensation provisions extend to nuclear damage occurring outside India if the incident originates within Indian territory, subject to prescribed conditions.

10. Appellate Mechanism

- Appeals against decisions under the Act will lie before the Appellate Tribunal for Electricity (constituted under the Electricity Act, 2003).

Evolution of India's Nuclear Legal Framework

India's nuclear energy programme has evolved through key legislative milestones aimed at ensuring the **peaceful use of atomic energy**, while maintaining strong state oversight and public safety. Over time, these laws have reflected India's increasing institutional capacity and strategic confidence in managing nuclear technology.

Atomic Energy Act, 1962

- Replaced the Atomic Energy Act of 1948.
- Established the legal foundation for India's nuclear programme.
- Empowered the Central Government to regulate atomic energy strictly for peaceful purposes.
- Ensured state control over research, development, production, and use of nuclear materials.

Amendments to the Atomic Energy Act (1986, 1987, 2015)

- Gradually broadened participation in nuclear power generation beyond direct Central Government control.
- Enabled government-owned companies and joint ventures to engage in nuclear energy production.

- Reflected India's objective to expand nuclear capacity while retaining strategic and regulatory oversight.

Civil Liability for Nuclear Damage Act (CLNDA), 2010

- Introduced a **no-fault liability framework** for nuclear accidents.
- Clearly defined responsibility for compensation in case of nuclear damage.
- Strengthened public confidence by embedding principles of safety, accountability, and victim compensation into the nuclear regime.

Why Supplier Indemnity Is Controversial

Historical nuclear disasters show that **design defects** often contribute to catastrophic accidents:

- **Fukushima (2011):** Flaws in containment design worsened the disaster.
- **Chernobyl (1986):** Reactor design deficiencies were central to the accident.
- **Three Mile Island (1979):** Control room design flaws and supplier communication failures were identified.

Despite such precedents, the SHANTI Act shields suppliers from civil and criminal liability in India. Critics argue that this lacks scientific and ethical justification.

- International pressure — particularly from U.S. suppliers — reportedly influenced India to align liability norms with global conventions favourable to equipment manufacturers.

Liability Cap vs. Potential Damage

The liability ceiling under the Act is about **₹3,900 crore**, while:

- Fukushima's estimated cost may reach ₹46 lakh crore.
- Chernobyl-related losses in Belarus alone were about ₹21 lakh crore.

Thus, the cap is roughly **one thousand times lower** than potential damage. Even with supplementary international compensation mechanisms, total payouts may not exceed 1% of actual losses in a worst-case scenario.

Moral Hazard and Safety Concerns

Capping liability and indemnifying suppliers may create **moral hazard** — reducing incentives to invest in safety.

Additionally:

- The Act exempts operators from liability for accidents caused by "grave natural disasters," even though Fukushima was triggered by a tsunami.
- This weakens India's earlier "absolute liability" principle for hazardous industries.

Nuclear Energy's Limited Role in India

- Nuclear power contributes only about **3% of India's electricity generation**.
- Targets have consistently been missed:
  - 10 GW by 2000 → achieved only 2.86 GW
  - 20 GW by 2020 → achieved 6.78 GW
- High capital costs and safety concerns remain systemic obstacles.
- Proposed Small Modular Reactors (SMRs) are largely untested and expensive.
- The new 100 GW by 2047 target appears ambitious and potentially unrealistic.

Economic Implications

Nuclear reactors present significant commercial opportunities. For example, two AP1000 reactors in the U.S. cost around $18 billion each.

The SHANTI Act creates a framework in which:

- Private Indian and multinational corporations can enter the nuclear market.
- Liability risks are significantly reduced for suppliers and operators.
- Regulatory oversight may be constrained.

Conclusion

The SHANTI Act represents a structural shift in India's nuclear energy policy. While it aims to attract private investment and expand capacity, critics argue that supplier indemnity, liability caps, and regulatory dilution may compromise safety and accountability.

Given nuclear energy's modest contribution to India's power mix and past capacity shortfalls, the debate centres on whether the economic benefits justify the potential risks to public safety and environmental security.

NGT Approved Great Nicobar Project

Source: The Indian Express

Relevance:

- **GS Paper II: Governance, Environmental Regulation, Tribal Rights, Strategic Affairs**
- **GS Paper III: Infrastructure, Environment & Biodiversity, Disaster Management, Maritime Security**

Important Keywords for Prelims and Mains

Prelims

- Great Nicobar Island (GNI), National Green Tribunal (NGT), Island Coastal Regulation Zone (ICRZ), International Container Transhipment Terminal (ICTT), Galathea Bay, Campbell Bay National Park, Great Nicobar Biosphere Reserve, Shompen, Nicobarese, AAJVS, UNCLOS

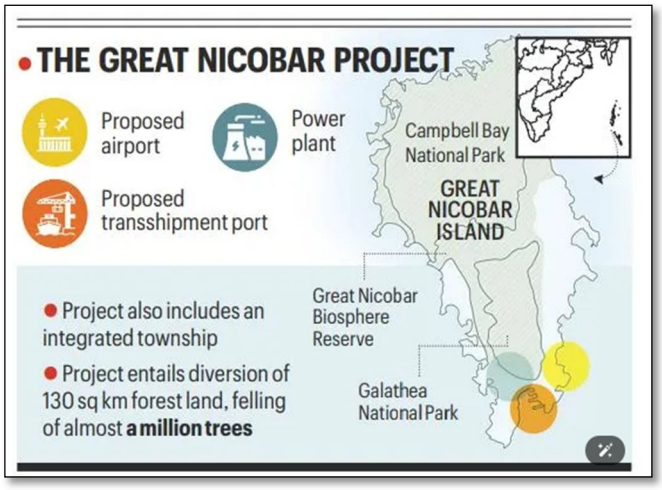
Mains

- Sustainable Development, Strategic Infrastructure, Maritime Security, Indo-Pacific Strategy, Biodiversity Hotspot, Tribal Safeguards, Compensatory Afforestation, Coastal Regulation, Ecological Governance

Why in News?

The **National Green Tribunal (NGT)** has upheld the environmental clearance granted to the **₹80,000–81,000 crore Great Nicobar Island Project**, stating that there were "adequate safeguards" and no "good ground" to interfere.

The tribunal also recognised the **strategic importance** of the project, marking a significant development in the debate between national security objectives and environmental protection.



What is the Great Nicobar Project?

- **Background:** The **Great Nicobar Island (GNI) Project**, conceptualised by **NITI Aayog** and launched in 2021, is a large-scale infrastructure initiative designed to transform the southernmost island of the **Andaman and Nicobar Islands** into a major **strategic and economic hub**. The project aligns with **India's Maritime Vision 2030** and the broader **Amrit Kaal Vision 2047**.
- **Project Scope:** Development is planned across **Galathea Bay, Pemmaya Bay, and Nanjappa Bay**. Owing to its strategic location—nearly equidistant from **Colombo (Sri Lanka), Port Klang (Malaysia), and Singapore**—the island occupies a central position in **regional maritime trade routes**.
- **Major Infrastructure Components:**
  - **International Container Transshipment Terminal (ICTT):** Intended to position Great Nicobar as a key node in the **regional and global shipping network** by facilitating cargo transshipment.
  - **Greenfield International Airport:** Aimed at boosting **civilian connectivity and tourism**, while also offering **dual-use defence capabilities**.
  - **Greenfield Township:** Planned to accommodate the **anticipated population growth and associated economic activities**.
  - **Gas and Solar-Based Power Plant:** Designed to fulfil the **energy demands** of the proposed infrastructure.
- **Tribal Safeguards:** The project mandates **consultations with tribal welfare institutions**, including the **Andaman Adim Janjati Vikas Samiti (AAJVS)** and the **Ministry of Tribal Affairs**, in accordance with the **Jarawa (2004)** and **Shompen (2015) Policies**. Additionally, consultation with the **National Commission for Scheduled Tribes (NCST)** under **Article 338A(9)** ensures protection of tribal rights and interests.
- **Environmental Measures:** The proposal incorporates **eight wildlife corridors** to ensure safe movement of fauna. As part of mitigation efforts, **compensatory afforestation** for trees cleared under the project is planned in **Haryana**, given that the island already maintains over **75% forest cover**.

Strategic Importance of the Great Nicobar Project

- **Control Over Key Maritime Gateways:** Great Nicobar lies close to the **Malacca, Sunda, and Lombok Straits**, which are among the busiest sea lanes connecting the **Indian and Pacific Oceans**. This geographical advantage enables India to oversee vital maritime routes that carry a significant portion of global trade and energy supplies.
  - Its proximity to **Sabang Port (Indonesia)** and the proposed **Kra Canal (Thailand)** further elevates its importance within the broader **Indo-Pacific strategic landscape**.

- **Strengthening Maritime Surveillance Capabilities:**
  The project enhances India's **Maritime Domain Awareness (MDA)** by improving its ability to monitor naval activity in the **Indian Ocean Region (IOR)**. This is particularly relevant amid **China's expanding naval presence** and the reported military infrastructure development on **Myanmar's Coco Islands**, located near India's Andaman & Nicobar chain.
- **Forward Defence Positioning:**
  The Andaman and Nicobar Islands function as India's **strategic maritime outpost**, sharing sea boundaries with **Myanmar, Thailand, Indonesia, and Bangladesh**.
  - This positioning strengthens India's control over its vast **Exclusive Economic Zone (EEZ)** and continental shelf rights as provided under the **UNCLOS, 1982**.
- **Enhanced Military Preparedness and Deterrence:**
  Development under the project allows for the stationing of **larger naval platforms, advanced aircraft, missile systems, and additional troops**, thereby reinforcing India's **deterrence capability** and operational readiness in the Indo-Pacific theatre.
- **Reducing Dependence on Foreign Ports:**
  The proposed **International Container Transshipment Terminal (ICTT)** aims to minimise India's reliance on external ports such as **Singapore and Colombo** for cargo transshipment, thereby integrating India more firmly into **global maritime trade networks**.

Concerns Associated with the Great Nicobar Project

1. Impact on Indigenous Communities

- The project raises fears of displacement of the **Nicobarese tribal community**, whose ancestral lands were already severely affected by the **2004 Indian Ocean tsunami**.
- The proposed development may disrupt traditional habitation patterns, livelihoods, and cultural identity rooted in the island ecosystem.

2. Environmental and Ecological Risks

Large-Scale Deforestation:

- Approximately **130 sq km of primary tropical rainforest** (around 15% of the island's land area) is proposed for diversion.
- The scale of tree felling could exceed **10 million trees**, threatening a fragile island ecosystem.

Threat to Biodiversity:

- The project site overlaps with critical habitats, including areas once part of the **Galathea Bay Wildlife Sanctuary**, known for **leatherback sea turtle nesting**.
- Denotification of protected zones has intensified conservation concerns.

Alleged ICRZ Violations:

- Petitions have claimed that nearly **700 hectares** fall within prohibited zones under the **Island Coastal Regulation Zone (ICRZ) Notification, 2019**, where development is restricted.

Compensatory Afforestation Concerns:

- Forest diversion is proposed to be offset through afforestation in **Haryana and Madhya Pradesh**, which critics argue cannot substitute the ecological complexity of Nicobar's endemic rainforest biodiversity.

3. Geological and Disaster Vulnerability

- The island's substratum—comprising **sandstone, limestone, shale, and volcanic formations**—is highly seismic.

- The region is prone to **earthquakes, liquefaction, and tsunamis**, raising questions about long-term infrastructural stability.

4. Legal and Procedural Issues

- The **Shekhar Singh Commission (2002)** had recommended a strict ban on tree felling in tribal reserves and national parks, along with prior afforestation requirements.
- Concerns persist regarding compliance with these earlier judicial safeguards.

Measures to Ensure Long-Term Sustainability

1. Ecological Safeguards

- Explore innovative legal approaches such as granting **legal personhood status** to the Great Nicobar ecosystem to prioritise ecological integrity.
- Establish continuous ecological monitoring for **coastal erosion, carbon emissions, biodiversity health, and soil stability**, with adaptive mitigation measures.

2. Protection of Tribal Rights

- Develop culturally sensitive rehabilitation frameworks reflecting **pre-tsunami habitation patterns**.
- Ensure mandatory consultation and participation of **Tribal Councils** in decision-making, in line with the **Forest Rights Act, 2006**.

3. Institutional Transparency

- Constitute an **independent multi-stakeholder oversight body** including environmental scientists, tribal representatives, and government officials to monitor compliance with safeguards.

4. Sustainable Development Pathways

- Promote **green employment avenues** such as renewable energy, sustainable tourism, and low-impact maritime activities.
- Align development with India's **biodiversity conservation goals and climate commitments**.

Conclusion

The National Green Tribunal's clearance of the Great Nicobar Project reflects an attempt to reconcile strategic imperatives with environmental safeguards. However, the true test lies in implementation. Robust ecological protection, meaningful tribal consultation, and transparent institutional oversight are essential to ensure that national development does not result in irreversible ecological and cultural loss.

Elephant Crisis in Central India: Habitat Loss, Migration, and Rising Human–Elephant Conflict

Source : Indian Express

Relevance: GS Paper III – Environment & Ecology

Important Keywords

Prelims

- Asian Elephant (Elephas maximus), Human–Elephant Conflict (HEC), Habitat fragmentation, Elephant corridors, Jangalmahal landscape, Hasdeo Arand forests, Dalma elephant range, Elephant

migration vs dispersal, Linear infrastructure impact, Mining-induced habitat loss

Mains

- Human–wildlife conflict management, Habitat fragmentation and biodiversity loss, Landscape-level conservation, Development vs conservation debate, Forest degradation impacts, Climate change and wildlife migration, Compensation policy for wildlife conflict victims, Sustainable land-use planning

Why in News?

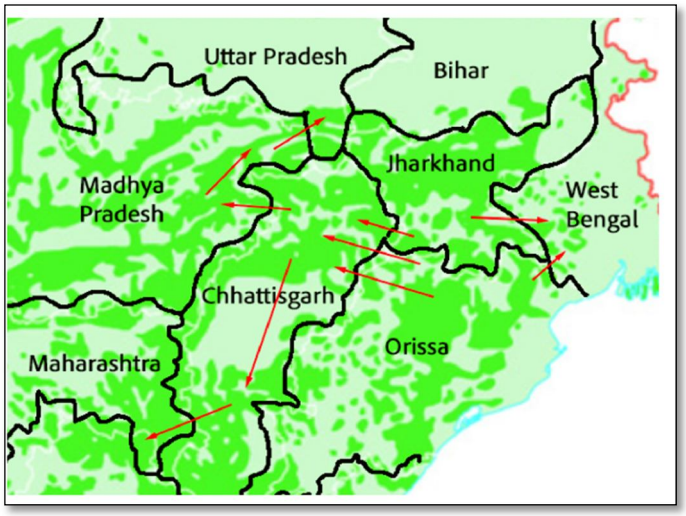
Recent elephant attacks in Jharkhand, West Bengal, and Odisha have resulted in multiple deaths, prompting authorities to declare an **"elephant emergency."** The crisis reflects a growing pattern of human–elephant conflict in central India driven by habitat loss, mining, and forest fragmentation.

Key Facts and Data

- India has **22,446 elephants**, but **less than 8% of elephants cause nearly 50% of conflict casualties**.
- Central India (West Bengal, Chhattisgarh, MP, Maharashtra) historically had negligible elephant populations before the 1980s.
- Elephant populations in these regions increased due to migration from Jharkhand and Odisha.
- Crop-dependent elephants now rely heavily on agricultural lands for survival.

Shift from Migration to Immigration

- Historically, elephant movements in India were **seasonal migrations**, driven by rainfall patterns and availability of natural forage. These migrations were part of natural ecological cycles, allowing elephants to move between habitats without permanently settling in human-dominated landscapes.
- However, since the **1980s, this pattern has shifted from seasonal migration to permanent immigration**, due to multiple environmental and human-induced disruptions.



Key Causes of Migration Disruption

Severe Droughts (El Niño Events)

- Major droughts during **1982–83 and 1986–87** reduced water and food availability.
- Forest ecosystems in Jharkhand and Odisha became unsuitable for sustaining elephant populations.

Mining Expansion and Habitat Destruction

- Rapid **mining** expansion in:
  - Singhbhum forests (Jharkhand)
  - Keonjhar and Sundargarh forests (Odisha)
- Mining led to **permanent** habitat loss and

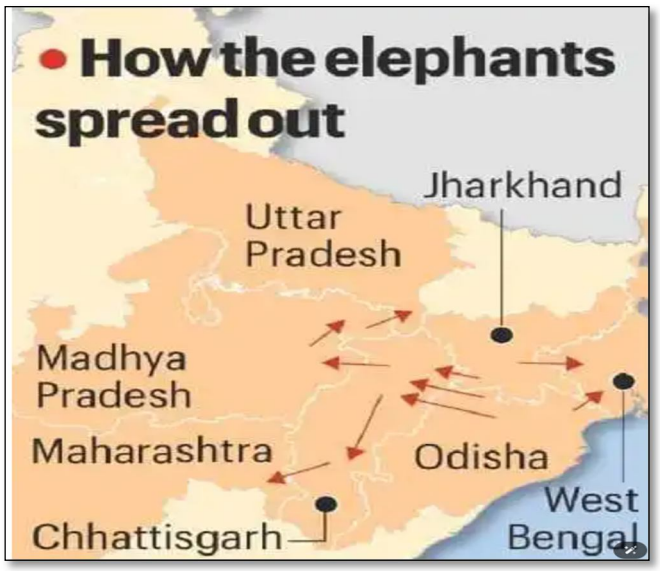
fragmentation.

Reservoir Construction and Submergence of Forests

- Large **dams** such as the **Rengali Dam (1985)** submerged extensive riverine forest habitats.
- These **forests** were critical feeding and migration areas for elephants.

Linear Infrastructure and Fragmentation

- **Expansion** of roads, railways, and industrial infrastructure blocked traditional elephant corridors.
- This prevented elephants from returning to their original habitats.



Spread of Elephants in Central India

Eastward Expansion (West Bengal)

- First movement recorded in 1986 from Dalma forests (Jharkhand).
- Now approximately **200 elephants permanently reside in Jangalmahal region**.
- Crop raids and breeding confirm permanent settlement.

Westward Expansion (Chhattisgarh)

- Elephants from Odisha migrated into Surguja, Surajpur, and Hasdeo Arand forests.
- Conflict intensified due to permanent elephant settlement.

Expansion into Madhya Pradesh

- Elephants entered Bandhavgarh and Sanjay-Dubri reserves.
- Human deaths doubled between 2016 and 2021.

Expansion into Maharashtra

- Elephants moved into Gadchiroli and Tadoba-Andhari landscape.
- Conflict incidents and human fatalities increased.

Ecological and Behavioural Impacts

Shift from Migration to Permanent Settlement

- Elephants previously migrated seasonally.
- Habitat loss has forced permanent dispersal into agricultural landscapes.

Crop Dependency

- High-nutrient crops increase reproduction rates.
- New generations of elephants rely on crops rather than forests.

Habitat Unsuitability

- Central India lacks year-round water and fodder.
- Forest fragmentation prevents natural migration.

Government and Policy Response

The 2025 elephant population report recommended:

- Uniform compensation policy for conflict victims.

- Landscape-level conservation strategies.
- Habitat restoration initiatives.
- Measures to reduce human–elephant interface.

Forest departments have begun:

- Joint forest management
- Fodder regeneration programmes
- Corridor restoration efforts

Significance

Biodiversity Conservation

- Elephants are keystone species and ecosystem engineers.

Ecological Balance

- Help maintain forest ecosystems and biodiversity.

Indicator of Forest Health

- Elephant migration patterns reflect ecosystem stress.

Challenges

- Habitat restoration requires 20–40 years.
- Increasing elephant population in degraded habitats.
- Expansion of mining and infrastructure.
- Rising human casualties and crop losses.
- Inter-state coordination challenges.

Way Forward

Habitat Restoration

- Restore forest corridors and habitats.

Landscape-Level Planning

- Integrate conservation with development planning.

Conflict Mitigation

- Early warning systems and barriers.
- Community-based conservation.

Compensation and Livelihood Support

- Strengthen compensation schemes.
- Promote alternative livelihoods.

Conclusion

The elephant crisis in central India reflects the consequences of habitat loss and development pressures. Long-term conservation requires habitat restoration, landscape-level planning, and conflict mitigation to ensure coexistence between humans and elephants.

Science & Technology

Rethinking Battery Strategy in India: The Case for Sodium-Ion Technology

Source: THE HINDU

Relevance: (GS Paper III – Science & Technology)

Important Keywords for Prelims and Mains

Prelims

- Lithium-ion batteries, Sodium-ion batteries, Advanced Chemistry Cells, Production Linked Incentive (PLI), Energy density, Critical minerals, Battery Energy Storage Systems

Mains

- Energy security, Critical mineral dependency, Supply chain resilience, Clean energy transition, Strategic autonomy, Manufacturing ecosystem, Alternative battery technology

Why in News?

India's rapid expansion in electric mobility and renewable energy storage has intensified dependence on lithium-ion batteries. However, structural vulnerabilities linked to critical mineral dependence, import reliance, and geopolitical risks have prompted calls to diversify battery technologies. Sodium-ion batteries are emerging as a viable alternative capable of strengthening India's long-term energy security and industrial resilience.

Batteries as the Backbone of Modern Economies

Batteries today underpin a wide range of applications—from consumer electronics and electric vehicles to grid-scale energy storage and household appliances. As energy systems shift towards renewables, batteries are no longer auxiliary technologies but foundational infrastructure critical to economic growth, energy security, and decarbonisation.

Lithium-Ion Batteries: Dominant but Not Ideal

Lithium-ion batteries dominate global markets due to:

- High energy density
- Long cycle life
- Low self-discharge

Decades of investment have led to large-scale manufacturing capacity and sharp cost reductions, with prices falling from about $1,100 per kWh in the early 2010s to nearly $108 per kWh by 2025.

However, this dominance masks key structural challenges:

- Dependence on critical minerals such as lithium, cobalt, nickel and graphite

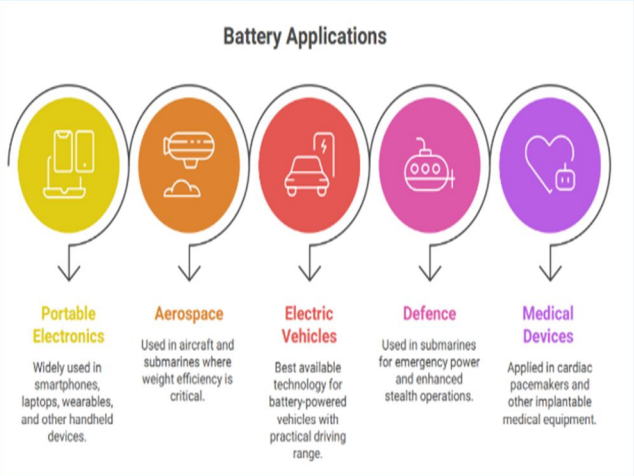
- Geographical concentration of mineral reserves and refining capacity
- Exposure to price volatility and geopolitical risks

As global demand accelerates, these vulnerabilities are likely to intensify.

Lithium-ion Battery: Structure

- A **lithium-ion battery** consists of the following main components:
  - Anode (negative electrode)
  - Cathode (positive electrode)
  - Electrolyte
  - Separator
  - **Two current collectors** (positive and negative)

Cathode



- Typically made of **lithium metal oxides**, such as:
  - Lithium Cobalt Oxide ($LiCoO_2$)
  - Lithium Manganese Oxide ($LiMn_2O_4$)
  - Lithium Iron Phosphate ($LiFePO_4$)
- The **choice of cathode material** determines key performance characteristics like energy density, voltage and stability.

Anode

- Usually composed of **graphite**
- **During discharge:** lithium ions move from the **anode to the cathode** through the electrolyte.
- During charging: lithium ions move back from the cathode to the anode.

Electrolyte

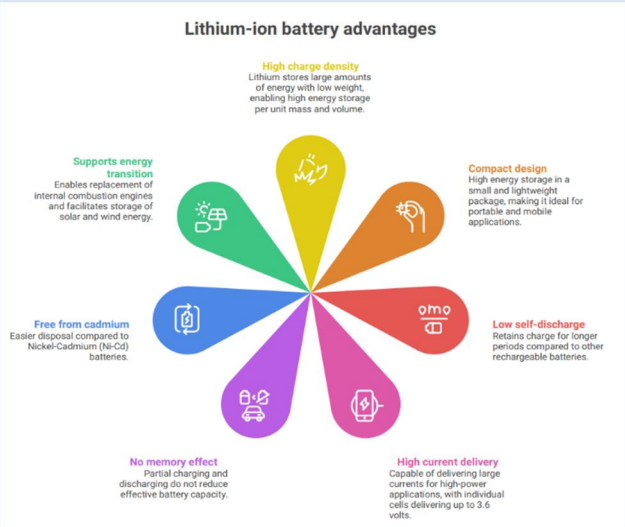
- Acts as a **conductive medium** that allows the movement of lithium ions between the anode and cathode.
- Typically consists of a lithium salt dissolved in a solvent.

Separator

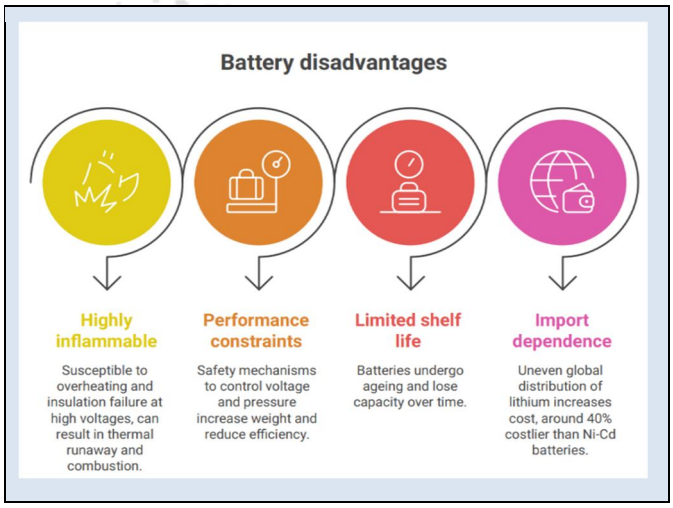
- A **permeable membrane** placed between the anode and cathode.
- Prevents **short circuits** while allowing lithium ions to pass through.

Rechargeability

- Lithium-ion batteries are **rechargeable**.
- They can be recharged **hundreds to thousands of times**, depending on:



  - Battery chemistry
  - Usage conditions such as **overcharging** or **undercharging**



India's Battery Manufacturing Ambitions and Constraints

India has sought to build domestic battery capacity through initiatives such as the **PLI scheme for Advanced Chemistry Cells (2021)**, under which around **40 GWh** of capacity has been allocated. Yet, actual deployment remains limited, with only about **1 GWh commissioned** so far.

More critically:

- Domestic lithium reserves remain limited and unproven
- Processing, cathode–anode manufacturing, and separator ecosystems are underdeveloped
- Import dependence for lithium-ion batteries is likely to persist

This underscores the need for parallel investment in alternative battery technologies.

Sodium-Ion Batteries: Performance Perspective

Sodium-ion batteries exhibit lower specific energy than lithium-ion batteries due to sodium's higher atomic mass. However, this gap is often overstated.

Key points:

- Layered oxide sodium-ion chemistries already outperform polyanionic and Prussian blue analogues
- Energy density is approaching that of lithium iron phosphate (LFP) batteries
- Ongoing material and cell-level optimisation is expected to further narrow the gap
- Laboratory and pilot-scale research suggest even greater future potential

Safety Advantage of Sodium-Ion Technology

Safety is a major strength of sodium-ion batteries:

- Lower peak temperature rise during thermal runaway compared to lithium-ion cells
- No classification as "Dangerous Goods" for transport

Lithium-ion batteries require:

- Shipment at ≤30% state of charge
- Strict handling due to copper current collectors and short-circuit risks

Sodium-ion batteries:

- Use aluminium current collectors on both electrodes
- Can be safely stored and transported at zero volts
- Reduce logistics costs and handling risks

Manufacturing Compatibility and Material Security

Sodium-ion batteries offer strong industrial advantages:

- Compatible with existing lithium-ion manufacturing lines with minor modifications
- Lower capital barriers for adoption
- Reduced exposure to critical mineral supply

chains

Material advantages include:

- Sodium derived from abundant resources such as soda ash
- Elimination of several critical minerals
- Use of aluminium instead of copper, reducing cost and weight

These features enhance supply chain resilience and strategic autonomy.

Why Sodium-Ion Batteries Matter for India

Globally:

- ~70 GWh sodium-ion manufacturing capacity operational by 2025
- Expected to scale to ~400 GWh by 2030
- Projected to undercut lithium-ion battery costs by 2035

For India, sodium-ion batteries:

- Reduce dependence on imported critical minerals
- Improve safety and logistics
- Strengthen energy security
- Support long-term clean energy goals

Policy and Ecosystem Recommendations

To mainstream sodium-ion technology:

- Extend upstream manufacturing support to include sodium-ion chemistries
- Design future PLI frameworks for flexible multi-chemistry production
- Update standards, safety codes, and certification frameworks
- Encourage EV manufacturers to approve sodium-ion platforms
- Support R&D, demonstration projects, and early deployment in:
  - Grid storage
  - Two- and three-wheeler EVs
  - Stationary applications

Conclusion

India's energy transition requires resilience as much as scale. While lithium-ion batteries will continue to play a role, their material and geopolitical constraints demand diversification. Sodium-ion batteries offer a safer, resource-secure, and manufacturing-compatible alternative. By aligning industrial policy, regulation, and market incentives, India can build a future-ready battery ecosystem where sodium-ion technology strengthens energy security and strategic autonomy.

AgriStack – Digital Public Infrastructure for Agriculture

Source: PIB

Relevance: **GS Paper III – Agriculture, GS Paper III – Science & Technology (Digital Public Infrastructure)**

Important Keywords for Prelims and Mains

For Prelims:

- Digital Agriculture Mission, AgriStack components, Farmer Registry, Crop Sown Registry, Geo-referenced village maps, AI in agriculture

For Mains:

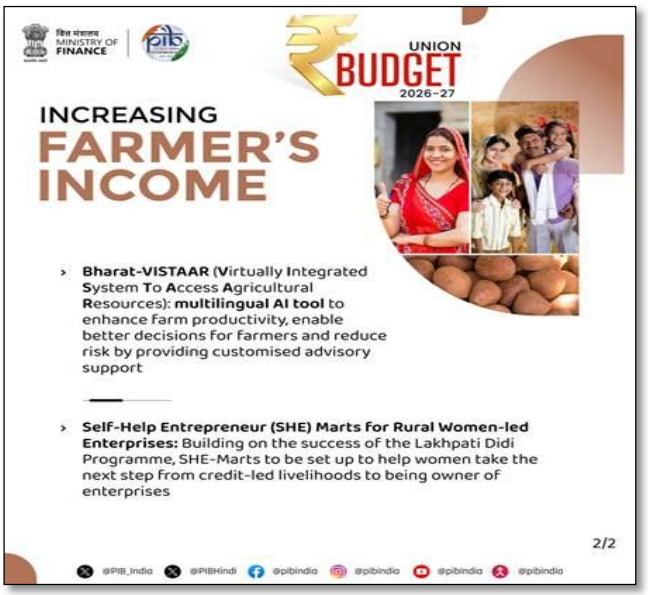
- Inclusive growth, governance, DBT reforms

Why in News?

- In the **Union Budget 2026**, Finance Minister Nirmala Sitharaman described **AgriStack** as "one of the next UPI" initiatives, highlighting its transformational potential for Indian agriculture.
- She announced **Bharat-VISTAAR (Virtually Integrated System to Access Agricultural Resources)** – a multilingual AI platform that will integrate AgriStack portals with agricultural best-practice packages developed by Indian Council of Agricultural Research.
- The government plans to phase-wise connect AgriStack with major schemes such as **Direct Benefit Transfer (DBT)** and **Minimum Support Price (MSP)** procurement to improve efficiency and transparency.

What is AgriStack?

- **AgriStack** is a **Digital Public Infrastructure (DPI)** for India's agriculture sector.
- It was launched in **2024** under the **Digital Agriculture Mission**.
- Its goal is to **consolidate farmer and agricultural data** onto a single digital platform.
- The system aims to:
  - Improve farm productivity
  - Enable data-driven decision-making
  - Provide customised advisory services
  - Reduce risks for farmers



Why is it called the "next UPI"?

- Like **Unified Payments Interface (UPI)** transformed digital payments, AgriStack aims to **digitally transform agriculture**.
- It will connect farmers with:
  - Government schemes
  - Financial services
  - Insurance
  - Procurement systems
  - Advisory platforms

Three Foundational Registries of AgriStack

1. Farmer Registry

- Provides each farmer with a **unique digital Farmer ID** (similar to Aadhaar).

- Linked to:
  - Land records
  - Crops grown
  - Livestock ownership
  - Demographic & family details
  - Benefits and schemes availed
- Target: **11 crore farmers** (about **8.62 crore already created**).
- Reduces paperwork and minimizes physical visits to offices.

2.Crop Sown Registry

- Contains **season-wise data on crops planted**.
- Data collected through **mobile-based digital crop surveys**.
- Target: **30 crore farm plots across 604 districts by Kharif 2026**.
- Over **70% coverage** already in several states.

3.Geo-referenced Village Maps

- Maps land records with **precise geographic coordinates** (latitude & longitude).
- **5.4 lakh villages** mapped so far out of **6.75 lakh**.
- Target completion: **March 2027**.

How AgriStack Will Help Farmers

- Integration with major services such as:
  - **Direct Benefit Transfer (DBT)**
  - **Minimum Support Price (MSP) procurement**
  - Fertiliser distribution
  - Crop loans
  - Insurance
  - Storage
  - Advisory services

Expected benefits:

- Faster approvals
- Leak-proof subsidy transfers
- Reduced documentation
- Better access to credit and insurance
- More equitable fertiliser distribution

Other Outcomes of Digital Agriculture Initiatives

1. Digital Crop Survey (DCS)

- Provides **plot-level crop visibility**.
- Helps estimate sowing patterns across seasons.
- Supports **evidence-based planning** for:
  - Procurement
  - Input supply
  - Logistics
- **Kharif 2025:** Conducted in **604 districts**, covering **28.5+ crore plots**.

State-Level Success Examples

Maharashtra

- Used AgriStack for:
  - Scheme delivery
  - Disaster relief
  - AI-based advisory
  - Credit access
- **₹14,000+ crore transferred** to **89 lakh farmers** for crop losses.

Chhattisgarh

- Institutionalized Farmer ID + DCS for **MSP-based paddy procurement**.
- Covered **32+ lakh farmers** in one season.
- Improved:
  - Transparency
  - Crop verification
  - Timeliness of payments

2. Krishi Decision Support System

- Geo-spatial platform integrating:
  - Satellite imagery

- Weather data
- Soil data
- Crop data

- Uses GIS to support **agricultural planning and decision-making**.
- Provides **targeted advisories** on crops, soil, and weather.

3. Kisan e-Mitra

- Voice-based **AI chatbot** for farmer queries (initially PM-KISAN).
- Supports **11 regional languages**.
- Handles **8,000+ queries daily**.
- **95 lakh+ queries answered** so far.

4. National Pest Surveillance System

- Uses **AI & Machine Learning** to detect pest infestations.
- Enables **timely intervention** to reduce crop losses.
- Used by **10,000+ extension workers**.
- Covers **65 crops and 400+ pests**.
- Farmers can upload pest images for guidance.

5. Namo Drone Didi

- Central Sector Scheme to provide **15,000 drones** to Women SHGs.
- Outlay: **₹1,261 crore (2023–26)**.
- Goals:
  - Promote advanced agricultural technology
  - Improve crop yield
  - Reduce operational costs
  - Empower rural women
- **500 drones already distributed.**
- Study shows:
  - Diversified SHG activities
  - Improved farm practices
  - Increased income opportunities

6.Seed Authenticity Traceability & Holistic Inventory (SATHI)

- Digital platform for:
  - Seed production
  - Quality certification
  - Distribution
  - Traceability
- Establishes a **National Seed Grid** integrating all seed stakeholders into one system.

Current Use Cases

- Farmer ID used for registration under **PM-KISAN**.
- Some states use it for **Pradhan Mantri Fasal Bima Yojana (crop insurance)** enrollment.
- Pilot projects have enabled:
  - Faster MSP procurement
  - Streamlined fertiliser supply
  - KCC loan disbursement
-

Proposal for an Indian Scientific Service (ISS)

Source: The Hindu

Relevance: GS III: Science & Technology in governance, environmental governance, disaster management, public health policy

Important Keywords for Prelims and Mains

For Prelims

- Indian Scientific Service (ISS), Civil Services

structure, Central Civil Services (Conduct) Rules, 1964, Evidence-based policymaking

For Mains

- Scientific governance, Indian Scientific Service (ISS), Generalist Civil Service, Scientific Cadre, Evidence-Based Policymaking, Scientific Integrity, Administrative vs Technical Governance, Scientific Independence, Regulatory Science, Climate Governance, Technology Governance

Why in News?

- A proposal has been made to create an **Indian Scientific Service (ISS)** — a dedicated scientific cadre within government.
- The idea highlights the growing need for **scientific expertise in policymaking** as governance increasingly deals with technology, climate change, health, and environmental challenges.

The ISS could function as a permanent, all-India scientific cadre working alongside existing civil services' | Photo Credit: Getty Images/iStockphoto

- *Image Source:* ***The Hindu***

Background

- After Independence, India prioritised **administrative stability and national integration**.
- Governance relied on **generalist civil servants** (IAS-type system) to manage diverse administrative challenges.
- This system ensured:
  - Institutional continuity
  - Uniform laws and governance
  - Political and territorial integration.

However, **21st-century governance problems are fundamentally different**.

Changing Nature of Governance

Earlier challenges:

- Revenue administration
- Law and order
- Institutional coordination

Present challenges:

- Climate change and environmental protection
- Public health and pandemics
- Artificial intelligence and emerging technologies
- Disaster management
- Nuclear and biotechnology regulation
- Ocean and water resource management

These require **specialised scientific knowledge**, not administrative experience alone.

Administrator–Scientist Paradox

Administrators	Scientists
Selected through competitive exams	Developed through long research and peer review
Trained for coordination & implementation	Trained for inquiry & evidence evaluation
Hierarchical decision-making	Independent questioning & experimentation
Clear career structure	Limited institutional framework

Result:

- Scientists work under **administrative rules designed for generalists**.
- Scientific expertise often remains **advisory rather than integral** to policymaking.

Problems with Existing System

- Scientists governed by **Central Civil Services (Conduct) Rules, 1964**.
- Administrative culture emphasises:
  - Discipline
  - Neutrality
  - Hierarchy

But science requires:

- Questioning assumptions
- Recording uncertainty
- Presenting evidence even if it challenges policy.

Consequences:

- Scientific inputs used mainly during crises.
- Limited documentation of risks.
- Reduced institutional authority of scientists.
- Science becomes symbolic rather than decision-shaping.

International Practices

Countries with dedicated scientific governance systems:

- United States
- United Kingdom
- France
- Germany
- Japan

Features:

- Scientific integrity protections
- Transparent documentation of advice
- Protection from political interference
- Evidence-based policymaking while elected leaders retain final authority.

What is the Indian Scientific Service (ISS)?

A proposed **permanent All-India scientific cadre** working alongside civil services.

Key Features:

- National-level recruitment with peer evaluation.
- Scientists embedded within ministries and regulatory bodies.
- Separate service rules suited to scientific work.
- Institutional protection for professional independence.
- Clear distinction between:
  - Scientific advice
  - Political decision-making.

Proposed ISS Structure (Illustrative Cadres)

- Indian Environmental & Ecological Service
- Indian Climate & Atmospheric Service
- Indian Water & Hydrological Service
- Indian Marine & Ocean Service
- Indian Public Health & Biomedical Service
- Indian Disaster Risk & Resilience Service
- Indian Energy & Resources Service
- Indian Science & Technology Policy Service
- Indian Agricultural & Food Systems Service
- Indian Regulatory Science Service

Expected Benefits

- Evidence-based policymaking
- Better risk assessment and long-term planning
- Stronger environmental and climate governance
- Improved disaster preparedness
- Greater scientific transparency
- Enhanced public trust in policy decisions.

Significance for India

- Supports India's ambitions in:
  - Climate leadership
  - Technological innovation
  - Public health security
  - Sustainable development.
- Moves governance from **reactive science use → continuous scientific integration**.

Conclusion

- India's generalist civil service successfully ensured post-Independence stability.
- Modern governance now requires **institutionalised scientific reasoning alongside administrative efficiency**.
- The **Indian Scientific Service** would complement — not replace — existing civil services.
- Integrating scientific expertise into governance can strengthen accountability, improve policy quality, and build long-term national resilience.

Single Genome-Editing Strategy Can Help Treat Multiple Disorders

Source: The Hindu

Relevance: **Facts for Prelims - Genome editing technologies - Types of genetic mutations, GS Paper III – Science & Technology, Advances in genetic engineering, Precision medicine and rare disease treatment**

Safety considerations in genome editing

Important Keywords for Prelims and Mains

For Prelims:

- Nonsense mutation, Premature stop codon (TAG), Genome editing, Prime editing, pegRNA (Prime-editing guide RNA), tRNA (Transfer RNA), PERT (Prime-Editing-mediated Readthrough of Premature Termination codons)

For Mains:

- Mutation-class therapy vs disease-specific therapy, Precision medicine approach, Repurposing cellular machinery for treatment, Efficiency comparison of genome-editing methods,

Why in News

A study published in *Nature* reports a **single genome-editing strategy** capable of treating multiple genetic diseases caused by **nonsense mutations**. Researchers from the Broad Institute, Harvard University, and the University of Minnesota developed a method using **prime editing** to restore protein production across different disorders.

*Image source: **The Hindu***

Background: Genetic Disorders and

Nonsense Mutations

- Genetic disorders often arise from small DNA sequence errors.
- Many diseases such as **cystic fibrosis, Batten disease, and Tay-Sachs disease** occur due to faulty protein production.
- A common error is the **nonsense mutation**:
  - A single incorrect DNA change introduces a **premature stop signal (stop codon)**.
  - Protein synthesis stops early.
  - Leads to incomplete or non-functional proteins.
- Nonsense mutations account for **about one-quarter (25%) of disease-causing genetic changes**.

Current Problem

- Each mutation halts protein formation at a different point.
- Therefore, **separate therapies** must be designed and approved individually.
- This makes treatment development **slow, complex, and expensive**.

Key Breakthrough

Instead of correcting each mutation separately, researchers developed a strategy called:

PERT – Prime-Editing-Mediated Readthrough of Premature Termination Codons

- Converts a cell's own gene machinery into a tool that overrides faulty stop signals.
- Enables cells to **ignore incorrect instructions** and complete protein production.

Understanding Protein Production (Biological Basis)

1. DNA is transcribed into **messenger RNA (mRNA)**.
2. mRNA contains three-letter genetic codes called **codons**.
3. **Transfer RNA (tRNA)** reads codons and delivers matching amino acids.
4. Ribosomes join amino acids to form proteins.

- Human cells contain **hundreds of tRNA genes**, many redundant.
- Altering some tRNAs is generally harmless, making them suitable therapeutic targets.

Repurposing tRNA Genes

Researchers used genome editing to modify tRNAs so they:

- Recognize premature stop signals.
- Insert amino acids instead of stopping translation.
- Allow full-length protein production.

Earlier attempts used natural suppressor tRNAs but faced issues:

- Safety concerns
- Poor durability
- Insufficient efficiency

Prime Editing Approach

- Uses a specialised molecule called **prime-editing guide RNA (pegRNA)**.
- Guides editing machinery to a precise DNA location.
- Inserts required genetic templates without cutting DNA aggressively.

Key Achievement

- Demonstrated that a **human tRNA gene** can be rewritten to produce suppressor tRNA at safe natural levels.
- Edited cells bypassed premature stop codons while maintaining normal protein production.

Finding Effective Candidates

- Human cells contain **418 tRNA genes**.
- Researchers screened them to identify suitable candidates.
- Four tRNAs — for:
  - leucine
  - arginine
  - tyrosine
  - serine, showed promise in suppressing the common stop codon **TAG**.

Optimization

- Thousands of engineered variants were created by:
  - Adjusting DNA sequences
  - Making structural modifications
- Result: more stable and efficient suppressor tRNAs.

Engineering and Screening

- Over **17,000 configurations** were tested.
- Scientists identified a highly efficient prime-editing enzyme named **PE6c**.
- Combined with an additional guide RNA strategy called **PE3**:
  - Encourages cellular DNA repair machinery to adopt edits.

Efficiency and Safety

- Editing efficiency reached **60–80%** in cultured human cells.
- Much higher than traditional gene insertion methods such as:
  - Homology-Directed Repair (HDR): typically, **10–20% or lower**.

Safety Observations

- No disruption to:
  - Overall cellular activity
  - Normal protein production
- Edited system distinguished between:
  - Faulty stop signals (ignored)
  - Natural stop signals (respected)

Disease Models Tested

Technique evaluated in mouse models of diseases caused by premature stop codons:

- **Batten disease**
- **Tay-Sachs disease**
- **Niemann-Pick C1 disease**

Results in Mice

- Delivery achieved using **AAV9 viral vector**, a common gene-therapy carrier.
- Converted natural mouse tRNA into suppressor tRNA inside living animals.

Observations

- Restoration of missing proteins.
- Enzyme activity increased significantly.
- In Hurler syndrome mouse model:
  - Protein activity restored to **1.7% of normal levels**.
  - Improvement seen in brain, heart, and liver.
- Improved cellular pathology.
- No signs of toxicity observed.

Scientific Significance

- Demonstrates engineered tRNA can restore protein function across multiple diseases.
- Moves gene therapy toward **mutation-class treatment** instead of disease-specific therapy.
- Could benefit many rare genetic disorders simultaneously.

Expert Views

- Strong laboratory evidence shows

engineered tRNA restores protein function.
- Considered an important advance in genome engineering.
- However, challenges remain:
  - Efficient delivery methods
  - Long-term safety
  - Performance across different tissues

Clinical Outlook

- Early clinical success of base editing (targeting TAG stop codons) shows feasibility.
- Viral delivery systems can reach editing sites effectively.
- PERT shows promise but requires further clinical validation before human treatment.

Why This Matters

- Reduces need for designing individual gene therapies.
- Could dramatically lower treatment cost and development time.
- Advances precision medicine and rare disease treatment.
- Represents next-generation genome editing beyond conventional CRISPR approaches.

Conclusion

The study demonstrates that prime-editing–based engineered tRNA technology (PERT) can bypass premature stop signals caused by nonsense mutations and restore normal protein production. Instead of creating separate treatments for each genetic disease, a single genome-editing platform may treat multiple disorders, marking a major step toward scalable and cost-effective gene therapy, though clinical delivery and long-term safety remain key challenges.

India-AI Impact Summit 2026

Source: PIB

Relevance: **Facts for Prelims, GS Paper III: Science & Technology (AI applications)**

Important Keywords for Prelims and Mains

For Prelims

- India–AI Impact Summit 2026, IndiaAI Mission, Digital India, Global South AI cooperation, Three Sutras & Seven Chakras, AI for ALL / AI by HER / YUVAi, AI Compendium.

For Mains

- AI Compute Infrastructure, Indigenous AI Models, Bharat Mandapam, Digital Public Infrastructure (DPI), Inclusive AI, Safe & Trusted AI, Democratizing AI Resources

Why in News?

- Prime Minister **Narendra Modi** inaugurated the **India AI Impact Expo** on **16 February 2026** at **Bharat Mandapam, New Delhi**.
- India hosted the **India–AI Impact Summit 2026**, the **first global AI summit in the Global South**.
- The summit focuses on **responsible, inclusive, and development-oriented Artificial Intelligence** aligned with **Viksit**

Bharat@2047.

- Participation included **20+ Heads of State, 60 Ministers, and 500+ global AI leaders**.

Key Takeaways

- Over **20 Heads of State, 60 Ministers, and 500 Global AI Leaders** Gather in New Delhi for AI Impact Summit 2026.
- **AI Impact Summit** anchored in **3 foundational pillars**, or **'Sutras': People, Planet and Progress**.
- The India AI Impact Expo is expected to feature **over 300 exhibitors, from 30 Countries, across more than 10 thematic pavilions.**

Significance of AI for India

AI is a transformative technology capable of accelerating economic growth, strengthening governance, and improving citizens' quality of life based on the principles of **People, Planet, and Progress**.

1. People

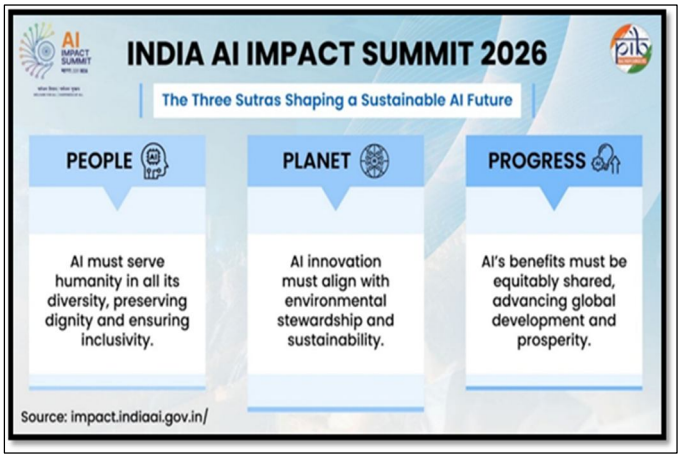
- Expands healthcare access through telemedicine and AI diagnostics.
- Enables personalized education using adaptive learning systems.
- Strengthens financial security through AI-based fraud detection.

2. Planet

- Supports sustainable agriculture through crop prediction and precision farming.
- Enables drone-based monitoring and resource optimization.

3. Progress

- Improves governance through language translation and automation.
- Enhances service delivery and digital efficiency across sectors.



Sector-wise Applications of AI

AI in Healthcare

- Remote diagnostics and portable testing tools improve rural healthcare access.
- AI-powered telemedicine connects patients with doctors.
- Medical image analysis assists early detection of TB, cancer, and other diseases.
- Predictive analytics enables disease outbreak forecasting.
- AI-driven drug discovery and personalized treatment improve affordability and outcomes.

AI in Agriculture & Rural Economy

- Weather prediction and pest monitoring

guide farmers through mobile advisories.
- Drone and satellite data improve crop monitoring and yield forecasting.
- Market prediction models help farmers make informed decisions.
- Platforms like **Mossum GPT** and **Kisan E-Mitra** deliver localized advisories in regional languages.

AI in Education

- Personalized learning platforms adapt to student capabilities.
- AI translation removes language barriers in education.
- AI tutoring systems provide continuous learning support.
- Platforms such as **DIKSHA** deliver accessible digital learning content.

AI in Finance & Commerce

- AI detects fraud and secures digital transactions.
- Credit scoring expands financial inclusion.
- Banking chatbots provide round-the-clock services.
- Personalized financial products improve customer experience.

AI in Governance & Public Services

- AI translation of court judgments enhances access to justice.
- Smart city systems optimize traffic, waste, and safety management.
- Automation reduces delays in government services.
- AI improves judicial case management and transparency.

Government Initiatives Supporting AI Ecosystem

- **IndiaAI Mission** for AI development and innovation.
- Expansion of AI compute infrastructure.
- Promotion of indigenous AI models.
- Nationwide skilling and capacity-building programmes.
- Integration with Digital India for large-scale adoption.

Foundational Framework: Three Sutras & Seven Chakras

The Summit follows a people-centric and impact-oriented AI framework based on guiding principles called **Sutras**, operationalised through **Seven Chakras** representing areas of global cooperation.

Seven Chakras

1. **Human Capital** – AI skilling and workforce readiness.
2. **Inclusion for Social Empowerment** – Citizen-centric AI solutions and last-mile

delivery.

3. **Safe and Trusted AI** – Governance frameworks and ethical AI deployment.
4. **Resilience, Innovation & Efficiency** – Sustainable and environmentally responsible AI.
5. **Science** – AI-driven research and scientific collaboration.
6. **Democratizing AI Resources** – Equitable access to datasets, compute, and infrastructure.
7. **AI for Economic Growth & Social Good** – Inclusive economic development through AI.

AI Impact Events at the Summit

Pre-Summit Events

- Consultations involving governments, academia, industry, and civil society.

Regional AI Conferences

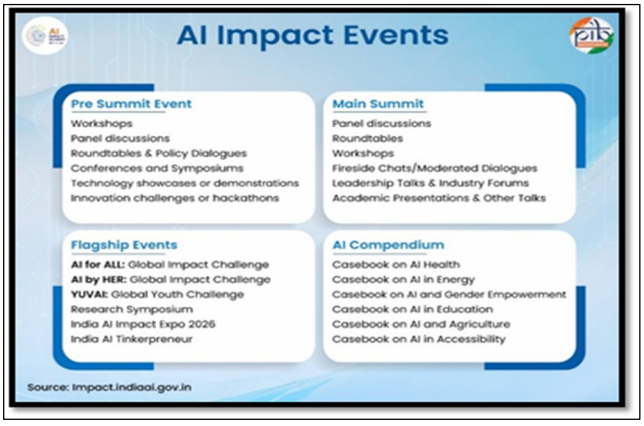
- Conducted across eight states between Oct 2025–Jan 2026.
- Identified regional AI needs, policy inputs, and capacity gaps.

Main Summit

- Organized around the Seven Chakras.
- Received over 700 global proposals.

AI Compendium

- Released as a knowledge resource documenting real-world AI application.



Flagship Global Impact Challenges

1. AI for ALL

- Identifies scalable AI solutions across sectors.
- Implemented with Startup India and Digital India Bhashini.
- Awards up to ₹2.5 crore.

2. AI by HER

- Promotes women-led AI innovation.
- Supported by NITI Aayog's Women Entrepreneurship Platform.

3. YUVAi Challenge

- Encourages youth innovators (13–21 years).
- Implemented with MyBharat and NIELIT.
- Awards worth up to ₹85 lakh.

Over **4,650 applications from 60+ countries** were received, with 70 finalists selected.

4. Research Symposium

- Academic platform with IIIT Hyderabad as knowledge partner.
- Received ~250 research submissions from Global South countries.
- Focus areas: AI governance, safety, research collaboration, and compute access.

5. India AI Impact Expo

- Organized by MeitY with STPI.
- Spread over 70,000 sq. metres.
- Showcases large-scale AI deployment and investment opportunities.

6. India AI Tinkerpreneur

- National bootcamp for Classes 6–12 students.
- Builds AI and entrepreneurial skills through mentorship and hands-on learning.

Key Institutional Frameworks

Ministry of Electronics and IT (MeitY)

- Provides policy leadership and coordination.

IndiaAI Mission

- Drives AI infrastructure, datasets, and innovation ecosystem.

Software Technology Parks of India (STPI)

- Supports startups, incubation, and industry linkages.

Digital India Initiative

- Provides digital public infrastructure enabling AI adoption at scale.

Expected Outcomes

- Practical deployment of AI across sectors.
- Strengthened governance and regulatory frameworks.
- Assessment of regional AI readiness.
- Workforce reskilling and capacity building.
- Enhanced collaboration among government, academia, startups, and industry.
- Expansion of responsible and inclusive AI ecosystem.

Conclusion

The India–AI Impact Summit 2026 marks a significant step in positioning India as a global hub for responsible and development-oriented artificial intelligence. By promoting collaboration, innovation, and ethical AI deployment, the Summit aims to accelerate inclusive economic growth, strengthen governance systems, and advance India's vision of a digitally empowered and technology-driven

Internal Security

India Releases First Anti-Terror Policy – PRAHAAR

Source: The Hindu

Relevance (UPSC): **Mains: GS Paper III: Terrorism, Cyber Security, Organised Crime–Terror Nexus, Emerging Technologies & Security.**

Important Keywords for Prelims and Mains

For Prelims

- PRAHAAR, Zero Tolerance Policy, CBRNED, Sleeper Cells, Whole-of-Society Approach, Counter-Radicalisation.

For Mains

- Sponsored Terrorism, Intelligence-Led Prevention, Cyber Warfare, Drone-Based Terrorism, Standardised Anti-Terror Structure, Transnational Terrorism.

Why in News?

The Ministry of Home Affairs (MHA) released India's **first-ever national counter-terrorism policy titled "PRAHAAR"** on February 23, 2026. The policy provides a comprehensive framework to combat terrorism, including cyber-attacks by criminal hackers and nation-states, and cross-border sponsored terror activities.

The policy said that India faces terrorist threats on all three fronts — water, land and air — and capacities have been developed to protect the critical sectors of the Indian economy. Representational file image. | Photo Credit: The Hindu

Background

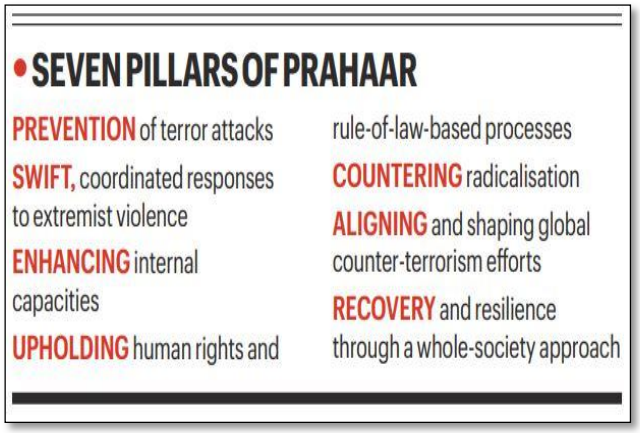
- Announcement for drafting a National Counter Terrorism Policy was made in November 2024.
- A National Policy and Action Plan for Left Wing Extremism (LWE) had been introduced in 2015.
- The April 22, 2025 Pahalgam terror incident accelerated coordination between the National Investigation Agency (NIA) and State anti-terror units.
- Growing misuse of encryption, social media, dark web, and crypto wallets by terror groups necessitated a modernised approach.

Key Provisions of PRAHAAR

1. Seven-Pillar Framework

The policy is structured around:

- Prevention
- Response
- Aggregating internal capacities
- Human rights and rule-of-law-based processes
- Countering radicalisation
- Alignment with global efforts
- Recovery and resilience through a whole-of-society approach



2. Zero Tolerance Doctrine

- Criminalisation of all terrorist acts.
- Denial of funds, weapons, safe havens to terrorists and supporters.
- No justification for violence under any pretext.

3. Multi-Domain Threat Recognition

India faces threats across:

- **Land** – infiltration, sleeper cells
- **Air** – drone-assisted smuggling/attacks
- **Water** – maritime infiltration

Critical sectors protected:

- Power, Railways, Aviation, Ports
- Defence, Space, Atomic Energy

4. Technology and Cyber Dimension

The policy recognises:

- Cyber-attacks by criminal hackers and hostile nation-states
- Use of social media and instant messaging apps for recruitment and propaganda
- Anonymous funding through crypto wallets
- Encryption and dark web usage
- Misuse of drones and robotics
- Risks involving **CBRNED (Chemical, Biological, Radiological, Nuclear, Explosive, Digital)** materials

5. Counter-Radicalisation Strategy

- Graded police response depending on radicalisation level.
- Engagement of NGOs, moderate religious leaders, psychologists.
- Prison de-radicalisation programmes.
- Multi-stakeholder rehabilitation approach.

6. Legal and Institutional Strengthening

- Inclusion of legal experts from FIR stage to prosecution.
- Standardisation of anti-terror structures across States.
- Enhanced coordination between intelligence agencies and State units.

7. International Cooperation

- Recognises transnational nature of terrorism.
- Calls for regional and global coordination.
- Subtle reference to state-sponsored terrorism without naming specific countries.

Emerging Threat Landscape Highlighted

- Sponsored terrorism from across the border.
- Global terror outfits such as Al-Qaeda and ISIS targeting India.
- Organised crime–terror nexus.
- Drone-based attacks in Punjab and Jammu & Kashmir.
- Digital anonymity shielding extremist

networks.

Significance

1. First Unified National Counter-Terror Doctrine
2. Integration of Cyber & Physical Security Frameworks
3. Protection of Critical Infrastructure
4. Community-Centric Prevention Model
5. Standardised Federal Response

Challenges

- Encryption limiting surveillance capability.
- Balancing human rights with enhanced security measures.
- Rapid evolution of terror technologies.
- Interstate coordination complexity.
- Cross-border safe havens beyond domestic jurisdiction.

Way Forward

- Strengthen AI-based intelligence analytics.
- Upgrade cyber forensics and counter-UAV capabilities.
- Regular review and updating of the policy.
- Enhance international intelligence-sharing.
- Capacity building of State police forces.

Conclusion

PRAHAAR marks a comprehensive shift towards intelligence-led, technology-integrated counter-terrorism. By combining prevention, legal reform, cyber preparedness, and community engagement, it aims to build a resilient national security architecture capable of responding to evolving hybrid threats.

Art & Culture

Karnataka's Lesser-Known Hoysala Monuments: A Legacy in Stone

Source: THE HINDU

Relevance: (GS Paper I – Art & Culture)

Important Keywords for Prelims and Mains

Prelims:

- Vesara Style, Soapstone (Chloritic Schist), Stellate (Star-Shaped) Jagati, Trikuta / Panchakuta Plan, Belur–Halebidu–Somanathapura, Sacred Ensembles of the Hoysalas (UNESCO 2023)

Mains:

- Medieval Temple Architecture, Religious Pluralism (Shaiva–Vaishnava–Jain), Sculptural Narrative Friezes, Regional Architectural Identity, Hydraulic Architecture (Hulikere Kalyani), Heritage Conservation & UNESCO Recognition

Why in News?

A number of relatively lesser-known Hoysala-era temples dating from the 11th to 13th centuries in Karnataka are receiving renewed scholarly and public attention for their intricate soapstone craftsmanship and distinctive star-shaped architectural plans.

Historical Background

- The **Hoysala dynasty** flourished between the **11th and 14th centuries CE** in present-day Karnataka.
- The early Hoysala rulers were initially feudatories of the **Western Chalukyas**, but gradually emerged as an independent power.
- Their political and cultural centres included **Belur (Velapuri)** and later **Halebidu (Dwarasamudra)**.
- The dynasty reached its zenith under rulers such as **Vishnuvardhana, Veera Ballala II, and Vira Someshwara**, who expanded territorial control and patronised large-scale temple construction.
- The period witnessed remarkable growth in **temple architecture, sculpture, trade networks, and urban centres** across regions such as Hassan, Mandya, Mysuru and surrounding areas.
- The Hoysalas promoted **religious pluralism**, supporting Shaivism, Vaishnavism, and Jainism, reflected in the construction of both temples and basadis.
- Their architectural style evolved into a

distinctive **Vesara tradition**, blending northern (Nagara) and southern (Dravida) elements.

- By the early 14th century, the Hoysala kingdom gradually declined following invasions and political shifts, eventually giving way to the rise of the **Vijayanagara Empire**.

Defining Features of Hoysala Architecture

Hoysala builders preferred **chloritic schist (soapstone)**, a material soft enough to allow intricate carving when freshly quarried and capable of hardening over time. This enabled artisans to sculpt extremely fine details such as ornaments, curls of hair, and even fingernails with remarkable precision.

Innovative Ground Plans

Temple layouts evolved into multiple structural types:

- **Ekakuta** – Single sanctum
- **Dvikuta** – Two shrines
- **Trikuta** – Three shrines
- **Chatushkuta / Panchakuta** – Four or five shrines

Many of these were constructed on elevated **stellate (star-shaped) platforms**, known as jagati. This geometry created multiple projections and recesses, greatly increasing surface area for decorative sculptural work.

Narrative Sculpture

The outer walls serve as continuous narrative panels, depicting:

- Rows of elephants, cavalry, and mythical creatures
- Celestial dancers (madanikas)
- Scenes of divine combat and mythological symbolism

The overall emphasis lies in layered ornamentation, both externally and within pillared halls.

Shikhara Form

The superstructures above sanctums are articulated through horizontal mouldings and rhythmic tiers, creating a structured yet ornate vertical composition.

Important Yet Under-Recognised Monuments

Koravangala Temple Cluster

Koravangala, once a flourishing Hoysala centre, contains three temples attributed to three brothers:

- **Nageshwara and Govindeshwara Temples (c. 1160 CE)** – Represent an earlier stage of stylistic development, showing relative restraint in ornamentation.
- **Bucheshwara Temple (1173 CE)** – Built in honour of King Veera Ballala II, this shrine demonstrates mature craftsmanship, dense sculptural detailing, and a refined star-shaped base.

Hoysala Dynasty

- **Period:** Flourished between the **11th and 14th centuries CE**.
- **Initial Status:** Began as **feudatories of the Western Chalukyas of Kalyana** before emerging as an independent power.
- **Founder:** Established by **Nripa Kama II**, who initially served as a vassal under the Western Chalukyas.
- **Capital:**
  - Initially at **Belur** (11th century).
  - Later shifted to **Dwarasamudra (modern Halebidu)**.
- **Territorial Extent:** Controlled large parts

of **present-day Karnataka and parts of Tamil Nadu** for over three centuries.

- **Important Rulers:**
  - **Vishnuvardhana (Bittideva)**
  - **Veera Ballala II**
  - **Veera Ballala III**
- **Vishnuvardhana:**
  - Considered one of the greatest Hoysala rulers.
  - Expanded the kingdom significantly.
  - Patronised large-scale temple construction.
  - Initially a **Jain**, later converted to **Vaishnavism** under the influence of **Ramanuja**.
- **Architectural Style:** Developed the distinct **Hoysala (Vesara) style**, blending Nagara and Dravida elements.
- **UNESCO Tag (2023):** Chennakeshava (Belur), Hoysaleswara (Halebidu) and Keshava (Somanathapura) inscribed as **"Sacred Ensembles of the Hoysalas."**

Lakshminarasimha Temple (c. 1250 CE), Javagal

- Constructed during the reign of Vira Someshwara, this trikuta temple is known for its polished pillars and graceful elephant friezes. Javagal itself was an important commercial hub during the medieval period.

Lakshmidevi Temple (1114 CE), Doddagaddavalli

- Among the earliest surviving Hoysala temples, this structure was commissioned by the merchant Sahaja Devi.

Notable features include:

- A rare four-shrine configuration dedicated to Lakshmi, Shiva, Vishnu and Kali
- A distinctive Mahakali sanctum guarded by skeletal betalas
- Architectural simplicity compared to later Hoysala exuberance, indicating an experimental phase

Panchalingeshwara Temple, Mandya

- This 13th-century shrine presents a rare **Panchakuta** plan, consisting of five east-facing Shiva sanctums aligned in a row and connected by a shared pillared hall.

Jain Basadi Complex, Halebidu

- Located near the ornate Hoysaleswara Temple, the Jain shrines of Parshvanatha (1133 CE), Shantinatha (1192 CE) and Adinatha exhibit architectural restraint. Their cleaner lines and uncluttered interiors contrast sharply with the decorative richness of Hoysala Hindu temples, reflecting Jain spiritual ideals of simplicity and contemplation.

Hulikere Kalyani (12th Century)

- The Hulikere stepwell stands as a fine example of Hoysala hydraulic architecture. Built below ground level with symmetrical stairways on all four sides, it integrates shrines symbolically associated with zodiac signs and nakshatras. This structure demonstrates the dynasty's ability to blend cosmological symbolism with functional water management.

Celebrated Monuments of the Hoysala Period

- **Hoysaleswara Temple, Halebidu** – A monumental Shaiva temple renowned for narrative friezes and layered sculptural panels.
- **Chennakeshava Temple, Belur –** Dedicated to Vishnu and commissioned by King Vishnuvardhana.
- **Keshava Temple, Somanathapura –** A 13th-century trikuta Vaishnava temple known for elaborate carvings.
- **Veera Narayana Temple –** Distinguished by its expansive mandapa and rows of intricately carved elephants.

UNESCO Recognition

- In 2023, the Chennakeshava Temple (Belur), Hoysaleswara Temple (Halebidu) and Keshava Temple (Somanathapura) were collectively inscribed as a UNESCO World Heritage Site under the title **"Sacred Ensembles of the Hoysalas."**

Conclusion

The lesser-known Hoysala temples scattered across Karnataka reveal a broader architectural narrative beyond the well-known monuments of Belur and Halebidu. From star-shaped platforms and narrative friezes to Jain austerity and stepwell design, these monuments demonstrate the technical sophistication and artistic ambition of the Hoysala period.

- Together, they offer a vivid glimpse into a medieval kingdom where architecture, devotion and sculpture were intricately intertwined — leaving behind a legacy that continues to shape India's cultural heritage.

Public Health

The Quiet Crisis of Adolescent Mental Health in India

Source: The Hindu

Relevance: GS Paper II: Issues relating to development and management of Social Sector/Health. GS Paper III: Human Resource Development; Role of technology in everyday life; Social impact of digitalisation.

Important Keywords for Prelims and Mains

For Prelims

- Adolescent Mental Health, Comorbidity, Internet Addiction, Neuroplasticity, Trauma-Informed Parenting.

For Mains

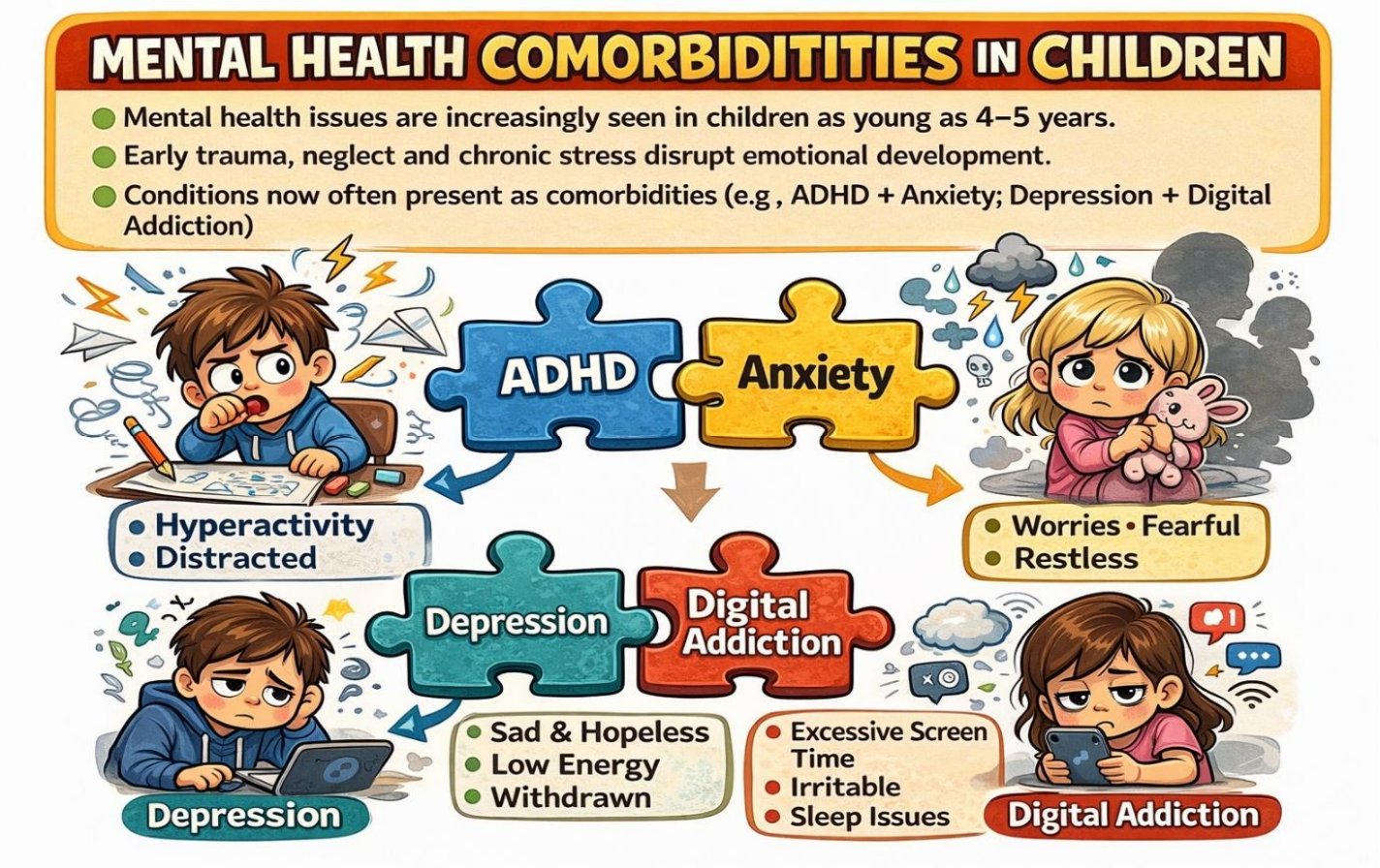
- Digital Ecosystem & Mental Health, School-Based Screening, De-stigmatisation, Preventive Mental Health, Whole-of-Society Approach, Social Media Regulation.

Why in News?

- The tragic deaths of three adolescent girls in Ghaziabad triggered public concern over youth mental health.
- Experts warn this is not an isolated incident but reflects a **growing crisis in child and adolescent mental health in India**, exacerbated by digital overexposure and inadequate systemic response.

Background & Context

- Mental health issues are increasingly seen in children as young as **4–5 years**.
- Early trauma, neglect and chronic stress disrupt emotional development.
- Conditions now often present as **comorbidities** (e.g., attention deficit



hyperactivity disorder (ADHD) + anxiety; depression + digital addiction).

- Traditionally viewed as "adult issues," these problems remain under-recognised in children.

Extent of the Problem

- According to the **National Mental Health Survey**:
  - **7–10% of adolescents** have diagnosable mental health conditions.
  - **5–7% of school-aged children** have ADHD.
- India has **fewer than 10,000 psychiatrists** for a population exceeding 1.4 billion.
- Only a small fraction specialise in child and adolescent psychiatry.
- Shortages also exist in clinical psychologists and psychiatric social workers.

This highlights a severe **treatment gap**.

Digital Dimension of the Crisis

- Over **800 million Internet users** in India, including millions of children.
- COVID-19 accelerated screen dependence for education and recreation.
- Boundaries between school, social interaction, and entertainment blurred.

WHO Guidelines (2019)

- Warned against excessive screen exposure.
- Linked to:
  - Sleep disruption
  - Poor attention span

- Emotional dysregulation

While screen use does not cause ADHD or autism, it can:

- Exacerbate symptoms
- Delay diagnosis
- Replace essential human interaction during neuroplastic development stages

Role of Families and Community

- Parents are the **first mental health buffer**.
- Trauma-informed parenting includes:
  - Listening without judgement
  - Monitoring mood/sleep changes
  - Early help-seeking

Support Systems

- Parent support groups reduce isolation.
- Adolescent peer-support groups build resilience.
- Community-based approaches are more effective than isolated clinical interventions.

Schools as a Critical Gap

- Academic performance dominates institutional priorities.
- Emotional regulation and stress management receive limited structured attention.
- Examination pressure intensifies distress.

Needed Reforms

- Routine emotional wellbeing sessions.
- Teacher training for early identification.
- Integration of mental wellbeing into curriculum.

Policy Context & Government Initiatives

The issue has been recognised in:

- India's **Economic Survey 2025–26** (highlighting youth mental health).
- **National Mental Health Programme (NMHP)**.
- **Ayushman Bharat – Health & Wellness Centres**.
- **Tele-MANAS tele-mental health initiative**.

Some States are considering regulation of adolescent social media use, inspired by models in Australia, France and South Korea.

Challenges

1. Persistent stigma around mental illness.
2. Delayed help-seeking until crisis stage.
3. Digital addiction and unregulated social media environment.
4. Workforce shortages in child psychiatry.
5. Urban–rural mental health access divide.

Way Forward

1. Routine **school-based mental health screening**.
2. Clear **digital use guidelines in schools**.
3. Expand Tele-MANAS and community counselling centres.
4. Earmarked funding for child mental health.
5. Structured training for teachers and paediatricians.
6. Promote balanced digital literacy rather than punitive restrictions.
7. De-stigmatise mental health conversations nationally.

Conclusion

India's adolescent mental health crisis is a silent public health emergency. Without coordinated action involving families, schools, health systems, and policymakers, the long-term social and economic costs will be profound. Mental wellbeing must be recognised as foundational to human capital development and national progress.

Zimbabwe rolls out Lenacapavir; Science confirms HIV capsid is a strong drug target despite resistance

Source : Down To Earth

Relevance: GS II: Health, Social sector; Role of international organisations (WHO, UNAIDS, Global Fund)

Important Keywords

Prelims

- Lenacapavir, PrEP, PEP, ART, HIV capsid, Reverse transcriptase, Protease, Integrase, FDA (June 18, 2025), WHO early access, Global Fund, UNAIDS 95-95-95, Combination prevention

Mains

- Long-acting injectables, Adherence & stigma, Combination prevention strategy, Structural biology drug targets, Resistance "fitness cost", Sub-Saharan Africa HIV burden, 2030 AIDS-free target

Why in News?

- **Zimbabwe** began rolling out **Lenacapavir**, the **first twice-yearly injectable PrEP** for HIV, making it an early adopter globally (launch on **Feb 19, 2026**).
- A new study shows that to escape **lenacapavir**, HIV must mutate the **capsid** in ways that **damage its own fitness**, reaffirming capsid as a strong drug target.

Background

- HIV drug history shows **monotherapy fails** due to rapid mutation and resistance.
- **1987 (4 years after HIV identified as the cause of AIDS):** zidovudine (AZT) targeted **reverse transcriptase**, but HIV quickly evolved resistance due to copying "mistakes" during RNA→DNA conversion.
- This led to **combination antiretroviral therapy** targeting multiple viral proteins (reverse transcriptase, protease, integrase) — focusing on viral regions that are "**must keep**" for survival.

What is Lenacapavir?

What it is

- **First twice-yearly injectable PrEP**: two doses per year for HIV prevention.
- A long-acting alternative to daily pills, useful for people facing:
  - adherence difficulties
  - stigma
  - limited access to healthcare

- Developed by scientists at **Gilead Sciences**.

How it works as a long-acting drug (science detail)

- FDA approved (June 18, 2025) the world's first **capsid-based HIV inhibitor**.
- Injected **under the skin of the abdomen** once every six months, forming a **slow-release reservoir** that steadily releases drug into bloodstream.
- In trials, it showed **100% effectiveness in preventing HIV infection** in high-risk individuals (not a cure; described as "next best thing to a vaccine" in popular science coverage).

What it is NOT

- **Not a vaccine**
- **Not for HIV-positive persons** (PrEP is strictly for those who test HIV-negative)
- **Does not replace**: condoms, oral PrEP, other injectables, abstinence, faithfulness, etc.
- **Does not replace ART** for people living with HIV

Zimbabwe Rollout:

Where & when

- Rollout began **Feb 19, 2026** in **Epworth**, a **shanty settlement ~20 km south of Harare**.

Scale

- Started with **46,000 doses**.
- Targets **46,000+ high-risk people** across **24 sites nationwide**.

Funding

- Funded by the **U.S. government** and the **Global Fund**.

WHO early access

- Zimbabwe is among **nine countries selected by WHO** for early receipt of this next-generation prevention injection.

Priority groups

- Adolescent girls and young women
- Sex workers
- Homosexual communities
- Pregnant and breastfeeding women
- Others facing high social/economic vulnerability

Combination Prevention Strategy (Zimbabwe's model)

Zimbabwe emphasised **lenacapavir complements, not replaces**, existing tools.

Principle

- **No "magic bullet"** can end HIV. A **combination** of proven interventions is needed.

Behavioural interventions (explicit list)

- Abstinence
- Monogamy / being faithful
- Reducing concurrent sexual partnerships

Biomedical interventions (explicit list)

- HIV testing and counselling
- Treatment (ART)
- Proper and consistent condom use
- Management of STIs
- **PEP**
- **PrEP**

Zimbabwe's PrEP toolkit (WHO-

recommended options adopted)

- Oral PrEP (2016)
- Dapivirine vaginal ring (2021)
- Long-acting injectable cabotegravir (2024)
- **Lenacapavir (2026)** Zimbabwe notes it has progressively adopted **all four WHO-recommended PrEP options**.

Community messaging & misconception risk

- **Bernard Madzima** (National AIDS Council CEO): important for young women, who may lack power to negotiate condom use.
- **Rev. Maxwell Kapachawo** (activist pastor, openly HIV+ since 2005): warned misconceptions could make some people on **ART** wrongly default, thinking lenacapavir replaces daily treatment.

HIV Science Link: Why the Capsid Target Matters (Despite Resistance)

Why capsid became a target

- **1999 Science paper** explained capsid folding into a unique protective 3D shape.
- Later, most capsid mutations were found to make HIV non-infectious → capsid is **essential and fragile**.

Resistance finding

- In treatment settings, resistance mutations appeared mainly when lenacapavir was **effectively acting alone** (without other fully active drugs).
- In proper combination therapy, suppression largely held.
- Lab-engineered resistant viruses often replicated at only **20–30**% of normal levels even without drug → escaping lenacapavir damages the capsid and weakens HIV.

Implication

- Capsid is a **high-constraint** target: HIV **cannot afford to change it too much**.
- Opens door to:
  - new capsid-focused drugs
  - exploring protective shells of other viruses as drug targets
- Also highlights: breakthroughs often come from **persistence**, not sudden inspiration (solubility issue turned into long-acting advantage).

Broader Sub-Saharan Context

- HIV/AIDS has killed **44+ million** since early 1980s.
- Of **~41 million** people living with HIV globally, **~27 million** are in **Sub-Saharan Africa** (**~67%**), despite the region having **~12%** of global population.
- Global new infections declined **33%+ since 2005**, but the region still faces:
  - **~700,000** new infections annually
  - **~300,000** AIDS-related deaths annually
- Young women (15–24) bear disproportionate burden.

Significance

1. **Adherence revolution:** Two injections/year reduces pill fatigue and missed doses.
2. **Stigma reduction:** More private than daily pills.
3. **Choice-based prevention:** Expands PrEP options within combination prevention.
4. **Targets high-risk groups effectively:** especially adolescent girls/young women.
5. **Science reassurance:** capsid targeting remains strong because resistance weakens HIV.
6. **2030 goal support:** strengthens path to

ending AIDS as public health threat.

Challenges/Concerns

1. **Misconceptions:** PrEP vs ART confusion may cause ART default (needs communication).
2. **Testing requirement:** PrEP must be given only to HIV-negative persons → strong screening + follow-up essential.
3. **Funding sustainability:** reliance on external support (U.S. + Global Fund).
4. **Delivery capacity:** scale-up beyond 24 sites, supply chain, trained workforce.
5. **Resistance risk in treatment misuse:** "acting solo" lesson underscores need for correct regimens.

Conclusion

Zimbabwe's early roll-out of lenacapavir shows how long-acting prevention can align with real-life barriers like adherence and stigma. Simultaneously, scientific evidence confirms that the HIV capsid is an excellent drug target: even when resistance emerges, it comes at a heavy cost to the virus. Together, these developments strengthen the case for long-acting, capsid-targeted strategies within a combination prevention framework to accelerate progress toward an AIDS-free future.

India set to launch free nationwide HPV vaccination for adolescent girls

Source: The Hindu

Relevance: GS Paper II – Health / Social Sector (Govt policies & interventions, public health)
GS Paper III – S&T / Biotechnology (vaccines, disease prevention, health tech platforms)

Important Keywords for Prelims and Mains

For Prelims

- HPV (Human Papillomavirus), Cervical cancer, Gardasil (quadrivalent), HPV 16 & 18 (high-risk), HPV 6 & 11 (low-risk), Single-dose schedule, Voluntary & free vaccination, Gavi Vaccine Alliance, CDSCO, NTAGI, Cold chain, AEFI (Adverse Events Following Immunisation), Ayushman Arogya Mandir, U-WIN platform, Pap smear, HPV DNA test, WHO 90–70–90 targets.

For Mains

- Cervical cancer elimination strategy, Preventive healthcare, Vaccine equity, Adolescent health, Screening + vaccination integration, Behavioural/biomedical/structural interventions, Health system preparedness, Digital health governance (U-WIN), Public communication & vaccine hesitancy, Global health partnerships (Gavi), SDG 3.3, Women's health burden reduction.

Why in News?

- **Union Health Ministry** is set to launch a **nationwide HPV vaccination programme** for **girls aged 14 years**.
- Vaccination will be **voluntary and free of cost**, to ensure **equitable access** across socio-economic groups.
- India will use **Gardasil (quadrivalent HPV**

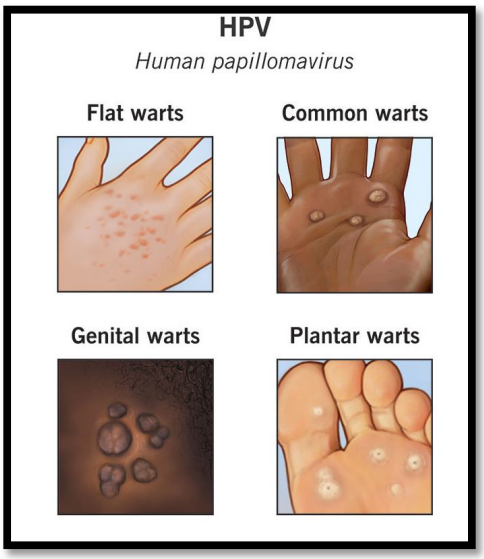
vaccine) and is adopting a **single-dose regimen** (with an **optional delayed second dose after 3–5 years**, as per the notes you shared).

- The programme is grounded in **NTAGI recommendations**, national disease burden evidence, and global best practices.

Background

- Cervical cancer is **largely preventable** through **HPV vaccination + early screening**, yet continues to impose a heavy burden on women and families.
- India aims to align with global commitments to **eliminate cervical cancer as a public health problem**.

Key Facts of the HPV Vaccination Drive (India)



1) Target group & coverage

- **Target:** Girls aged **14 years** (chosen because preventive benefit is highest **before potential exposure**).
- **Nature: Voluntary + free** nationwide programme.

2) Vaccine used

- **Gardasil (quadrivalent)** protects against:
  - **HPV 16 & 18** → major cause of **cervical cancer**
  - **HPV 6 & 11** → associated with **genital warts/low-risk disease**

3) Regimen and evidence

- **Single-dose**: "Global and Indian scientific evidence" indicates **robust and durable protection** when given at recommended age.
- Vaccine is **non-live → does not cause HPV infection**.
- Safety record: supported by **500 million+ doses globally since 2006**.
- Effectiveness: evidence of **93–100%** effectiveness against cervical cancer caused by vaccine-covered HPV types.

4) Procurement & quality assurance

- India secured supplies through a **transparent, globally supported procurement mechanism**.
- Under partnership with **Gavi, the Vaccine Alliance**, **Gardasil** (approved by India's drug regulator) is being procured with **stringent quality + cold chain standards**.
- Note you provided: **Cervavac (indigenous vaccine)** is **not yet WHO-approved** for the programme.

The Hindu

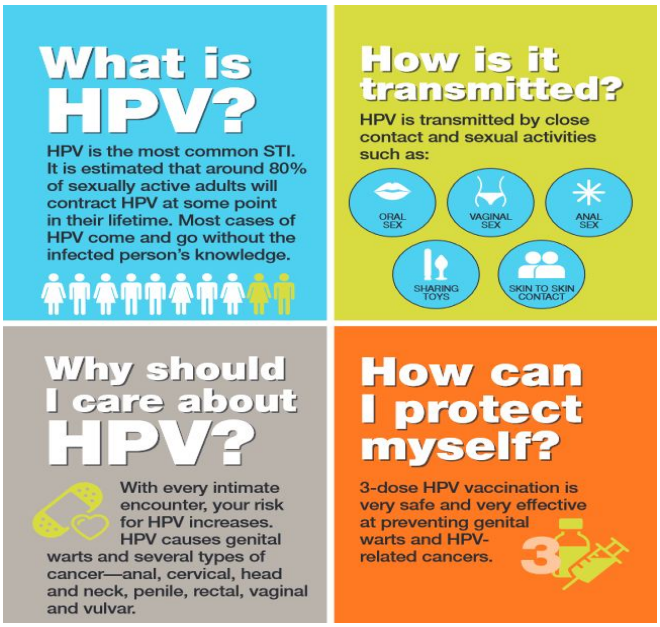
Implementation & Safety

Vaccination sites (only govt facilities)

- **Ayushman Arogya Mandirs (PHCs)**
- **Community Health Centres (CHCs)**
- **Sub-District & District Hospitals**
- **Government Medical Colleges**

Safety protocols

- Sessions conducted in presence of **trained medical officers** + skilled teams
- **Post-vaccination observation** and readiness to manage **rare adverse events**
- All sites linked to **24×7 government health facilities** for immediate support
- Programme style note you provided: conducted as a **special campaign on designated immunisation days**, not routine UIP, and tracked through **U-WIN** for rapid coverage.

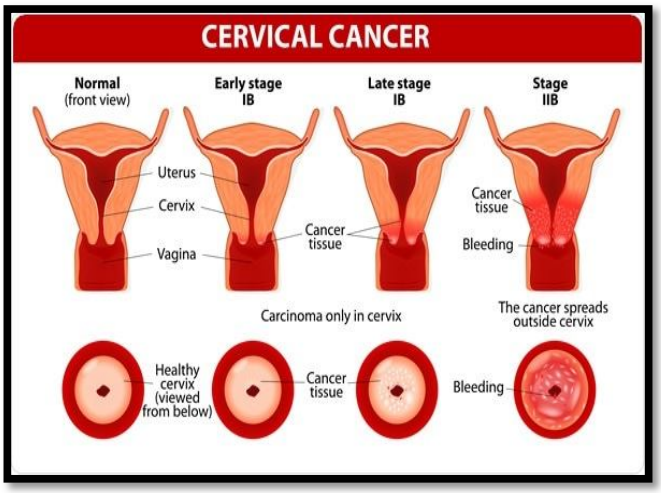


HPV Basics

- HPV: **non-enveloped, double-stranded DNA viruses** (Papillomaviridae), infect epithelial cells.
- Most infections are asymptomatic; about **90% clear within 1–2 years** via immune response.
- **High-risk (oncogenic)**: HPV 16, 18 → cancers
- **Low-risk**: HPV 6, 11 → warts
- Transmission: mainly **intimate skin-to-skin contact**, commonly sexual activity.
- Prevention toolkit (besides vaccine): **condom use**, **voluntary male circumcision**, **smoking cessation**, safe sexual practices.

Cervical Cancer Burden (India)

- **2nd most common cancer among women in India**
- **~80,000 new cases** and **42,000+ deaths annually**
- Persistent high-risk HPV infection causes **nearly all cervical cancers**; in India, **HPV 16 & 18 account for >80%** of cases (as per your input).



HPV Vaccine is NOT a "Free Pass"

- Vaccine protects against **common high-risk strains**, but **not all cancer-causing HPV types**.
- Therefore, **screening must continue**:
  - Pap smear (cytology) detects **early**

abnormal cell changes
    - Recommended screening begins at **21 years**; and after **30**, Pap + HPV DNA testing may be combined as per medical guidance.
- Vaccination after sexual debut still benefits, but **cannot clear existing infections** → screening becomes even more important.

Global Context

- **90+ countries** are implementing **single-dose HPV schedules** to improve coverage and affordability.
- Several countries show reductions in **HPV infection**, **pre-cancerous lesions**, and **cervical cancer incidence** after widespread vaccination.
- WHO cervical cancer elimination targets (WHA 73.2) by 2030:
    - **90%** girls vaccinated by age 15
    - **70%** women screened (35 & 45 years)
    - **90%** treated if disease detected
- WHO response framework (2022–2030) also ties into broader STI control, and a 2021 WHO resolution on oral health includes measures addressing mouth/throat cancers (as per your notes).

Significance

- **Women's health protection**: prevents HPV infection before progression to cancer.
- **Equity**: free vaccination across all States/UTs reduces socio-economic gaps.
- **Public health impact**: potential major fall in cervical cancer burden over time.
- **Systems strengthening**: cold chain, trained staff, safety linkage to 24×7 facilities, and **digital tracking (U-WIN)** improve programme quality.

Challenges

- **Awareness + myths** (vaccine hesitancy; misunderstanding that screening is unnecessary)
- Ensuring **high coverage** in hard-to-reach areas
- **Cold chain + session quality** at scale
- Integrating vaccination with **screening rollout**, because screening uptake is low in India (as your provided background hints)

Way Forward

- Strong IEC campaign: "**Vaccine + screening together**"
- School/community mobilisation for adolescent coverage
- Strengthen screening services and referral pathways
- Use U-WIN for follow-up, AEFI reporting, and coverage gaps
- Continue evaluating indigenous options like **Cervavac** as approvals evolve

Conclusion

India's free, voluntary national HPV vaccination programme for 14-year-old girls is a major preventive health step to reduce cervical cancer. Its success will depend on achieving high coverage, maintaining cold-chain and safety standards, and ensuring that vaccination is paired with sustained cervical cancer screening.