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NEWS IN SHORT

POLITY & GOVERNANCE

Ministry of Home Affairs: Year End Review – 2025

Source: PIB

Relevance: **GS Paper II - Governance and Public Administration, Internal Security, Centre–State Relations, Role of Security Agencies.**

GS Paper III - Internal Security (Terrorism, LWE, Cyber Crime, Narcotics), Border Management, Disaster Management, Role of Technology in Security

Important Keywords for Prelims & Mains

For Prelims

- Left-Wing Extremism, Naxalmukt Bharat Abhiyan, Karreguttalu Hills Operation, Operation Black Forest, Multi-Agency Centre (MAC), NDPS Act, Narco-terrorism, Immigration & Foreigners Bill, 2025, OCI Portal, Fast Track Immigration, Vibrant Villages Programme, NDRF, Census 2027, Caste Enumeration, Zonal Councils

For Mains

- Internal Security Architecture, Intelligence-led Operations, Inter-Agency Coordination, Technology-Driven Policing, Development–Security Nexus, Counter-Insurgency & Rehabilitation, Victim-Centric Criminal Justice, Time-Bound Justice, Evidence-Based Policing, Narco-Terror Ecosystem, Border Management & Migration Control, Disaster Resilience, Cooperative Federalism.

Why in News.

The year **2025** was a landmark year for the **Ministry of Home Affairs (MHA)** in advancing the vision of **Safe, Secure and Viksit Bharat** under the leadership of **Prime Minister Shri Narendra Modi** and the guidance of **Union Home Minister and Minister of Cooperation Shri Amit Shah**.

During the year, MHA focused on strengthening internal security and effectively dealing with challenges such as **terrorism, left-wing extremism, insurgency, organised crime, cybercrime,**

narcotics trafficking, border management, disaster management and governance reforms. These efforts were supported by technology, inter-agency coordination, community engagement and legislative reforms, leading to reduced violence, improved conviction rates and enhanced citizen security, in line with the principles of **Nyay (Justice), Suraksha (Security) and Samriddhi (Prosperity)**.

Left-Wing Extremism (LWE): Naxalmukt Bharat Abhiyan

In line with the Government's resolve to eliminate Naxalism by **31 March 2026**, unprecedented success was achieved in 2025 through a multi-pronged strategy involving **security operations, development initiatives, rehabilitation policies and inter-state coordination**.

- Shri Amit Shah chaired security review meetings in **Raipur (April 2025)** and **inter-state coordination meetings (June 2025)** reiterating that Naxalism would be eradicated by March 2026.
- Security forces conducted the **biggest-ever anti-Naxal operation** at **Karreguttalu Hills (Chhattisgarh–Telangana border)**, neutralising **31 Naxalites** in a 21-day operation without casualties to security forces (May 2025).
- In **Narayanpur**, security forces neutralised **27 Maoists**, including **CPI-Maoist General Secretary Nambala Keshav Rao alias Basavaraju**, marking the first such high-level elimination in three decades (May 2025).
- **Operation Black Forest** resulted in large-scale arrests and surrenders across states.
- Security forces neutralised **16 Naxalites in Sukma**, eliminated top commanders in **Jharkhand**, and dismantled Naxalism from the **Bokaro region**.
- Two Central Committee Members were eliminated in the **Abujhmad region**.
- In 2025, **312 LWE cadres were eliminated**, the highest ever; **most-affected districts reduced to 3**, and **affected districts reduced to 11**.

- Large-scale surrenders took place in **Chhattisgarh and Maharashtra**, with automatic weapons handed over.
- Cultural and developmental initiatives such as **Bastar Pandum**, **Bastar Dussehra**, and **Bastar Olympics** symbolised the transformation of Bastar from fear to future.

National Security & Counter-Terrorism

- Shri Amit Shah inaugurated the **new Multi-Agency Centre (MAC)** in New Delhi to enhance intelligence coordination.
- **Operation Sindoor** and **Operation Mahadev** demonstrated India's decisive response to terrorism, including the elimination of terrorists involved in the **Pahalgam attack**.
- MAC, CCTNS, NATGRID, amendments to **UAPA, NIA Act and PMLA**, and strict action against terror funding delivered strong blows to terrorism.
- The **National Investigation Agency (NIA)** achieved a conviction rate of approximately **95%**, among the highest globally.
- Anti-Terrorism Conference-2025 and National Security Strategies Conference strengthened preparedness against emerging threats.

Jammu & Kashmir and Ladakh

- The Government reaffirmed that **Jammu & Kashmir and Ladakh are integral parts of India**.
- Emotional integration initiatives such as **Watan Ko Jano** engaged youth from J&K.
- **12 Hurriyat-linked organisations** severed ties with separatism and pledged allegiance to the Constitution.
- Security review meetings ensured sustained pressure on terror ecosystems.
- Relief, rehabilitation and job assistance were extended to families affected by cross-border attacks.

Cyber Security & Forensic Science

- **Indian Cybercrime Coordination Centre (I4C)** launched **e-Zero FIR**, enabling automatic FIR registration for cyber financial crimes.
- A four-pillar strategy—**Convergence, Coordination, Communication and Capacity**—was adopted to tackle cybercrime.
- Expansion of **National Forensic Science University (NFSU)** and **Central Forensic Science Laboratories (CFSL)** strengthened evidence-based criminal justice.
- Forensic science was mainstreamed to enhance conviction rates.

New Criminal Laws

- Completion of one year of the **three New Criminal Laws**, marking a shift towards **victim-centric, time-bound justice**.
- Extensive review meetings with States and UTs ensured uniform implementation.
- Strict timelines were established for police, prosecution and judiciary to ensure speedy justice.

Combating Narcotics

- A **ruthless and whole-of-government approach** dismantled narco-terror ecosystems.
- Massive seizures of narcotics including cocaine, methamphetamine and ganja were made across the country.
- Global drug cartels operating across continents were busted through multi-agency coordination.

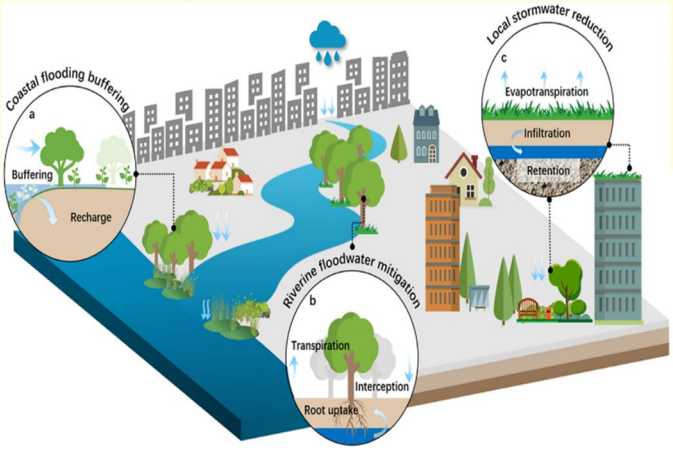
- Courts convicted **29 drug traffickers** in 2025.
- Drug disposal campaigns destroyed narcotics worth thousands of crores.

Border Management & Immigration

- **Immigration and Foreigners Bill, 2025** introduced a transparent, tech-driven immigration framework.
- New **OCI Portal** enhanced services for over 5 million cardholders.
- **Fast Track Immigration – Trusted Traveller Programme** expanded to multiple airports.
- **Vibrant Villages Programme (VVP and VVP-2)** strengthened infrastructure, tourism, culture and livelihoods in border villages.

Disaster Management

- Shift from reactive to **proactive disaster management** with the goal of **zero casualty**.
- Massive deployment of **NDRF teams** during disasters.
- Central assistance of over **₹15,000 crore under SDRF** and **₹2,267 crore under NDRF** released.
- Approval of **Urban Flood Risk Management Programme**, wetland restoration projects and state recovery plans.



North-East Region

- Violent incidents reduced by **70%** and civilian casualties by **85%**.
- Peace accords, infrastructure development, youth empowerment and cultural integration strengthened Act East momentum.
- Long-pending demands, including Assam Rifles land transfer in Mizoram, were fulfilled.

Central Armed Police Forces (CAPFs)

- Modernisation through technology such as anti-drone systems and surveillance tools.
- Honorary rank enhancement for retiring personnel boosted morale.
- CRPF, BSF and CISF played key roles in internal security, border management and infrastructure protection.

Census 2027 & Social Justice

- **Population Census-2027** to be conducted in two phases along with **caste enumeration**.
- Decision reaffirmed Government's commitment to social justice, inclusion and evidence-based policymaking.

Official Language & Governance

- Promotion of Indian languages through **Bharatiya Bhasha Anubhag**.
- Strengthening of **Zonal Councils** as engines of cooperative federalism.
- Electoral reforms, island development initiatives, Yamuna rejuvenation, constitutional amendments and national heritage commemorations undertaken.

Conclusion

The **Ministry of Home Affairs in 2025** delivered transformative outcomes across security, governance, justice, development and social integration. With terrorism, Naxalism and insurgency nearing elimination, strengthened cyber and border security, modernised policing, and people-centric reforms, India entered 2026 stronger, safer and more united on the path to **Viksit Bharat**.

Euthanasia Debate in India: Harish Rana Case (2025–26)

Source: *The Hindu*

Relevance: **UPSC - GS Paper II - Government Policies & Interventions - Judiciary, Constitutional Interpretation - Fundamental Rights (Article 21) - GS Paper IV - Ethics in Public Administration - Moral Philosophy (Autonomy vs Sanctity of Life)**

Important Keywords for Prelims & Mains

For Prelims

- Passive euthanasia, Active euthanasia, Right to die with dignity, Article 21, Living Will / Advance Medical Directive, BNS 2023, Aruna Shanbaug case

For Mains

- Palliative care, Ethical autonomy, Sanctity of life, End-of-life governance, Judicial activism, Health ethics

Why in News?

- The Supreme Court reserved its judgment in **Harish Rana vs Union of India (2025)**, a plea seeking permission to **withdraw life-sustaining treatment**.
- The petitioner has been in a **permanent vegetative state for 13 years** with 100% quadriplegic disability.
- The case reopens the national debate on **passive euthanasia, living wills, and the right to die with dignity**.

Background: Harish Rana Case (2025–26)

- Bedridden since 2013 after a severe fall.
- Family sought withdrawal of life support citing irreversible suffering.
- Medical boards unanimously recommended discontinuation of treatment.
- Supreme Court personally interacted with

the family.

- Judgment reserved (January 2026).

What is Euthanasia?

Definition

- Intentional hastening of death to relieve unbearable suffering from terminal illness.

Types

- **Active**: Direct act (lethal injection) → Illegal in India
- **Passive**: Withdrawal/withholding treatment → Legal under guidelines

Consent-Based

- Voluntary
- Non-voluntary
- Involuntary (illegal)

Legal Framework in India

Statutory Law

- **Bharatiya Nyaya Sanhita (BNS), 2023**
  - Section 100 – Culpable homicide
  - Section 101 – Murder
  - Section 108 – Abetment of suicide
- Active euthanasia prohibited

Constitutional Basis

- **Article 21 – Right to Life includes Right to Die with Dignity** (SC interpretation)

Judicial Evolution of Euthanasia

Case	Contribution
Maruti Dubal (1987)	Right to die recognized (HC)
Gian Kaur (1996)	Right to die rejected
Aruna Shanbaug (2011)	Passive euthanasia permitted
Common Cause (2018)	Living wills recognized
SC Simplification (2023)	Faster approval process

Procedure for Passive Euthanasia (Current)

Two Medical Boards

1. **Primary Board** – Hospital level
2. **Secondary Board** – District level

2023 Reforms

- Experience requirement reduced (20 → 5 years)
- 48-hour deadline fixed
- Board size reduced to 3 members
- Faster, patient-friendly process

Global Legal Landscape

Country	Status
Netherlands, Belgium	Active & Assisted
Canada, Australia	Legal under safeguards
Switzerland	Assisted suicide
France, Italy	Passive euthanasia
India	Passive only (regulated)

Ethical Debate

In Favour

- Autonomy & self-determination
- Relief from unbearable suffering

- Prevents futile treatment
- Reduces financial/emotional burden
- Supported by utilitarian ethics

Against

- Sanctity of life (Kantian ethics)
- Risk of coercion & misuse
- Weak mental health assessment systems
- Unequal healthcare access
- Legal ambiguity for doctors

Key Challenges in India

- No comprehensive parliamentary law
- Cumbersome procedures for poor patients
- Low awareness of living wills
- Limited palliative care coverage
- Fear among doctors of legal liability

Way Forward

Legal Reforms

- Enact a dedicated **End-of-Life Care Act**
- Codify SC guidelines in legislation

Administrative Reforms

- Hospital ethics committees
- Digital integration of living wills

Healthcare Reforms

- Universal palliative care under Ayushman Bharat
- ASHA training in pain management

Safeguards

- Psychiatric evaluation
- Cooling-off periods
- Social worker assessment

Public Awareness

- National campaign on living wills
- Ethical consensus building

Conclusion

The Harish Rana case highlights the urgent need for **legislative clarity, humane procedures, and strong safeguards** in end-of-life care. While dignity and autonomy must be respected, protection of vulnerable groups is equally essential. India must now move from judicial patchwork to a **comprehensive rights-based framework for dignified death**.

How Should India Tackle Child Trafficking?

Source: The Hindu

Relevance:

- **GS Paper I - Social issues: poverty, migration, child labour, exploitation - Vulnerable groups and social justice**
- **GS Paper II - Fundamental Rights (Article 21, 23, 24)- Government policies for protection of vulnerable sections**

Important Keywords for Prelims & Mains

For Prelims

- Child Trafficking, Palermo Protocol, 2000, Bharatiya Nyaya Sanhita (BNS), 2023 – Section 143, Exploitation (Sexual, Forced Labour, Slavery, Organ Removal), Articles 23 & 24 (Prohibition of Trafficking & Child Labour), Article 39(e) & 39(f), Juvenile Justice (Care and

Protection of Children) Act, 2015, Immoral Traffic (Prevention) Act, 1956, Protection of Children from Sexual Offences (POCSO) Act, 2012, Fast Track Special Courts (FTSCs)

For Mains

- Right to Life and Dignity (Article 21), Human Rights Violation, Child Vulnerability & Socio-economic Marginalisation, Low Conviction Rate (4.8%), Institutional Failure & Policing Gaps, Federal Coordination Challenge, Digital Exploitation Ecosystem, Victim-Centric Justice, Deterrence vs Rehabilitation, Preventive & Humanistic Approach

Why in News?

- The Supreme Court in *K. P. Kiran Kumar vs State (2025)* issued strict guidelines to prevent child trafficking.
- The Court held that trafficking is a gross violation of children's **right to life and dignity under Article 21**.
- NCRB data shows **53,000+ children rescued (2024–25)**, but conviction rate remains extremely low at **4.8%**, highlighting systemic failure.

What is Child Trafficking?

International Definition

- The **Palermo Protocol (2000)** defines child trafficking as recruitment, transportation, transfer, harbouring, or receipt of a child for exploitation.
- Consent is irrelevant in case of children due to inherent vulnerability.

Indian Legal Definition

- **Section 143 of Bharatiya Nyaya Sanhita, 2023** defines trafficking broadly.
- It includes:
  - Physical and sexual exploitation
  - Forced labour and servitude
  - Slavery-like practices
  - Forced removal of organs
- The offence is punishable irrespective of consent.

Image Source: UN

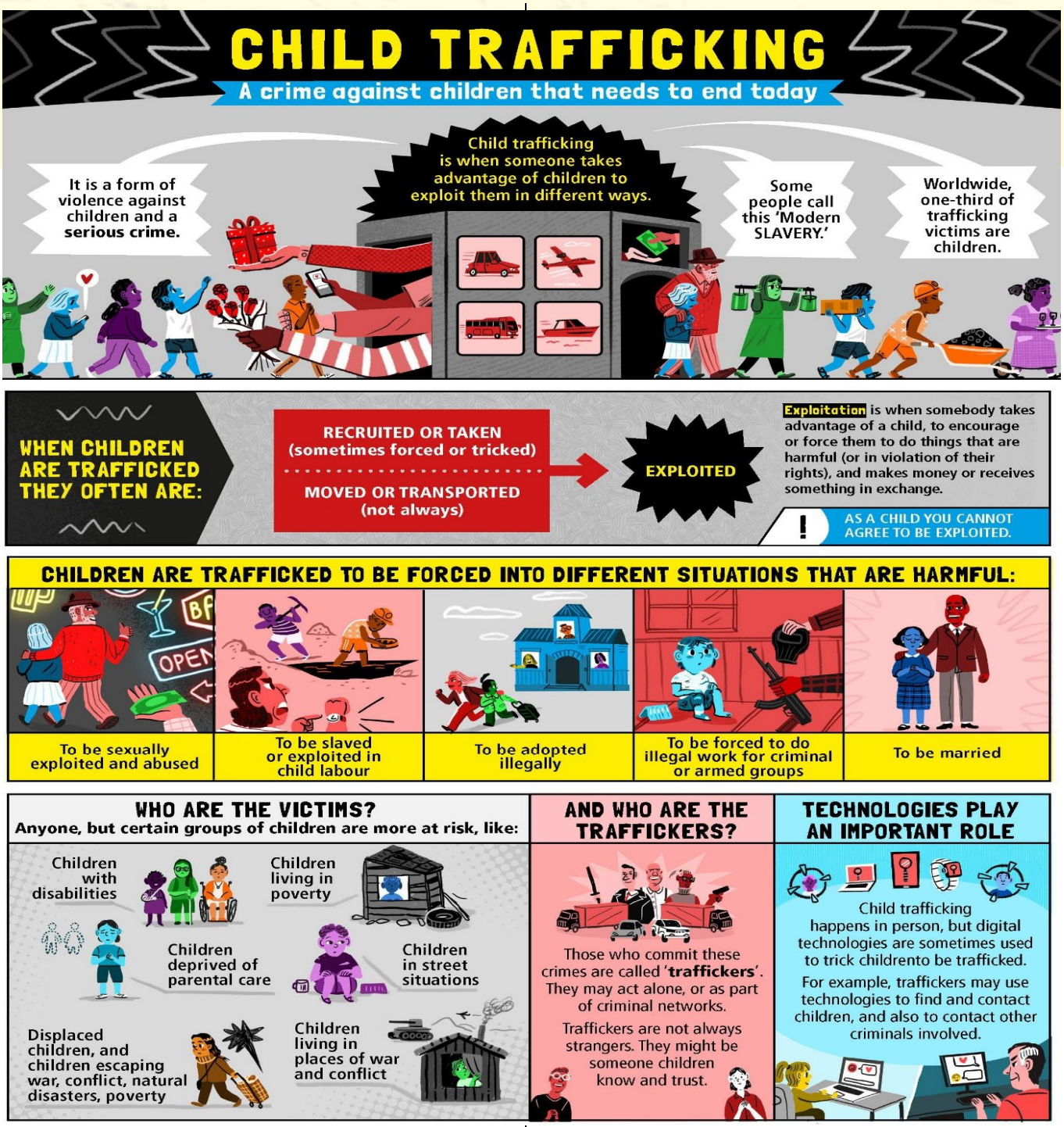
Constitutional & Legal Protection of Children in India

Constitutional Safeguards

- **Article 21**: Right to life with dignity
- **Article 23**: Prohibition of trafficking and forced labour
- **Article 24**: Ban on child labour in hazardous industries
- **Article 39(e) & (f)**: Protection from abuse and abandonment

Statutory Framework

- **Bharatiya Nyaya Sanhita, 2023**: Sections 98, 99, 143 (selling, buying, trafficking of minors)
- **POCSO Act, 2012**: Sexual exploitation, child pornography, strict punishment



- **Immoral Traffic (Prevention) Act, 1956**: Sexual exploitation
- **Juvenile Justice Act, 2015**: Care, protection, rehabilitation
- **Criminal Law Amendment Act, 2013**: Expanded definition of trafficking
- **Fast Track POCSO Courts**: Speedy trials for child abuse case

Judicial Approach to Child Trafficking

- **Vishal Jeet vs Union of India (1990)** → Recognised trafficking as a socio-

economic problem needing prevention and rehabilitation

- **M.C. Mehta vs State of Tamil Nadu (1996)** → Prohibited child labour in hazardous industries
- **Bachpan Bachao Andolan vs Union of India (2011)** → Issued directions for rescue, rehabilitation, and prosecution
- **K. P. Kiran Kumar vs State (2025)** → Declared trafficking a direct violation of Article 21 → Issued binding guidelines to States and police

Why Does Child Trafficking Continue in India?

Socio-economic Causes

- Poverty, unemployment, migration, disasters
- Family breakdown and social exclusion
- Marginalised communities face higher vulnerability

Governance & Policing Gaps

- Low conviction rate (4.8%)
- Poor inter-state coordination
- Lack of specialised training for police and prosecutors

Digital & Online Exploitation

- Social media used for recruitment
- Fake job, modelling, and marriage offers
- Absence of strong digital monitoring

Importance of Centre–State Coordination

- Police and law & order are State subjects
- Trafficking networks operate across state borders
- Effective counter-trafficking requires:
  - Joint task forces
  - Real-time data sharing
  - Unified rescue and rehabilitation protocols

Way Forward: How India Can Tackle Child Trafficking

1. Strengthen Social Protection

- Universal education, nutrition, and livelihood support
- Targeted support for migrant and marginalised families

2. Improve Law Enforcement

- Specialised anti-trafficking units
- Training in victim-sensitive investigation
- Fast-track courts for trafficking offences

3. Increase Conviction Rates

- Witness protection
- Dedicated prosecutors
- Use of digital evidence and AI tracking

4. Regulate Digital Platforms

- Monitoring online recruitment
- Mandatory reporting of suspicious content
- Platform accountability under IT laws

5. Strengthen Rehabilitation

- Long-term counselling
- Skill training and education
- Community reintegration programmes

Conclusion

Child trafficking is a constitutional failure as much as a social tragedy. While India has strong laws and active courts, weak implementation and structural vulnerabilities continue to fuel the crime. Only a **rights-based, cooperative, and child-centric governance approach** can ensure safety, dignity, and freedom for every child.

UGC (Promotion of Equity in Higher Education Institutions) Regulations, 2026

Source: The Hindu, Times of India

Relevance: **GS Paper II – Governance, Constitution, Polity, Social Justice - Government policies and interventions for social justice - Issues relating to education and vulnerable sections**

Important Keywords for Prelims & Mains

For Prelims

- University Grants Commission (UGC), UGC Act, 1956, SC / ST / OBC inclusion, UGC Regulations, 2026, National Monitoring Committee, Article 15(4), 15(5), Article 46, Statutory regulations, Higher Education Institutions (HEIs)

For Mains

- Institutional casteism in higher education, Equity governance in universities, Enforceable social justice mechanisms, Representation in decision-making bodies, Regulatory vs advisory frameworks, Accountability in educational administration.

Why in News?

The University Grants Commission (UGC) has notified new regulations to address **caste-based discrimination in higher education institutions (HEIs)**, replacing the 2012 anti-discrimination regulations. The final rules correct major gaps in the draft version by **including OBCs**, strengthening enforcement, and removing the controversial penalty for "false complaints".

The draft version of the regulations proposed a provision to "discourage" false complaints of discrimination, suggesting fines for complaints about discrimination. File | Photo Credit: The Hindu

University Grants Commission (UGC) – Historical Evolution & Functions

ज्ञान-विज्ञान विमुक्तये

Historical Background

- **1944 – Sargeant Report**
  - India's first attempt to build a **national education system**.
  - Recommended the creation of a **University Grants Committee** to coordinate higher education.
- **1945 – Formation of University Grants Committee**
  - Established to supervise **Aligarh, Banaras, and Delhi Universities**.
- **1947 – Expansion of Scope**
  - The committee's jurisdiction extended to **all existing universities in India**.

- **1948 – University Education Commission**
  - Chaired by **Dr. S. Radhakrishnan**.
  - Recommended restructuring the committee on the **UK University Grants Commission model**, emphasizing autonomy, standards, and quality.
- **1952 – Establishment of UGC**
  - Union Government designated the **University Grants Commission** to allocate grants and oversee higher education institutions.
- **1953 – Formal Inauguration**
  - UGC formally inaugurated by **Maulana Abul Kalam Azad**, India's first Education Minister.
- **1956 – Statutory Status**
  - UGC became a **statutory body under the UGC Act, 1956**, giving it legal authority.

Organisational Structure

- **Headquarters:** New Delhi
- **Composition:**
  - Chairman
  - Vice-Chairman
  - Ten other members
- All members are **appointed by the Central Government**

Functions of the UGC

- **Allocation of Grants** to Central and State Universities and eligible HEIs
- **Coordination and Determination of Standards** in higher education
- **Advisory Role** to the Central and State Governments on higher education reforms
- **Promotion of Quality, Excellence, and Equity** in universities
- **Regulation and Recognition** of higher education institutions

Key Provisions of the Regulations, 2026

1. Expanded Coverage of Caste-Based Discrimination

- Discrimination now explicitly covers **SCs, STs, and OBCs**.
- This corrects a major omission in the draft rules, which had excluded OBCs.
- Aligns with **Article 15(4) and 15(5)** of the Constitution.

2. Broader Definition of Discrimination

Discrimination includes:

- Any unfair, biased, or differential treatment (explicit or implicit)
- Based on **caste, religion, race, gender, place of birth, disability**
- Any act that:
  - Impairs equality in education
  - Violates human dignity
  - Nullifies equal treatment in educational access

This borrows the **human dignity framework** from the 2012 regulations, strengthening legal clarity.

3. Mandatory Equal Opportunity Centres (EOCs)

- Every HEI must establish an **EOC** to promote:
  - Social inclusion
  - Equity in access
  - Non-discriminatory campus environment
- EOCs must submit **bi-annual reports** to the institution.

4. Creation of Equity Committees

- Must be formed under each EOC
- Chaired by the **Head of the Institution**
- Mandatory representation of:
  - SCs, STs, OBCs
  - Persons with Disabilities
  - Women
- Must meet **at least twice a year**

5. Reporting & Accountability Framework

- Institutions must submit **annual equity compliance reports** to UGC
- The **Head of the Institution is personally responsible** for enforcement
- Shift from advisory guidelines → **duty-based regulation**

6. National-Level Monitoring Mechanism

- UGC will set up a **national monitoring committee**
- Members from:
  - Statutory councils
  - Commissions
  - Civil society
- Functions:
  - Review implementation
  - Examine discrimination cases
  - Recommend preventive measures

7. Strict Penalties for Non-Compliance

UGC can:

- Debar institutions from UGC schemes
- Prohibit degree / online / distance programmes
- Remove institutions from UGC-recognised list

This gives the regulations **real enforcement power** for the first time.

What Was Dropped from the Draft?

- Proposal to fine students for "false complaints"
- Exclusion of OBCs
- Vague definition of discrimination

Significance of the Regulations

1. Strengthening Social Justice in Education

- Moves from symbolic protection to **institutional enforcement**
- Supports Articles **14, 15, 21 and 46**

2. Addresses Institutional Casteism

- IIT Delhi (2019): 75% of marginalized students faced discrimination
- Thorat Committee (2007): Highlighted segregation in hostels, dining, labs
- New rules make institutions legally accountable

3. Inclusive Governance

- Representation of marginalized groups in decision-making bodies
- Reduces dominance of upper-caste administrative control

4. Enforceable Equity Framework

- Penalties make discrimination a **regulatory risk**, not just a moral issue
- Signals a shift from "guidelines" to **rights-based governance**

Challenges / Gaps

- No explicit mention of **admission-stage discrimination**
- Removal of ban on "separate educational systems" (present in 2012 rules)
- Effectiveness depends on **implementation and autonomy of EOCs**
- Risk of institutional capture if committees are not independent

Way Forward

- Annual **social audits** by NCSC/NSTC
- Mandatory **faculty sensitization & anti-caste training**
- Fill SC/ST faculty vacancies through **Special Recruitment Drives**
- Independent grievance redressal with appellate authority
- Publish **Equity Index** ranking universities

Delimitation after 2027: Redrawing Power in India

Source: The Hindu

Relevance: **GS Paper II - Federalism and Centre–State relations - Representation of the People Act and electoral reforms - Delimitation Commission**

Important Keywords for Prelims & Mains

For Prelims

- Delimitation Commission, 84th Constitutional Amendment, Article 14, Lok Sabha seat allocation, Population vs representation.

For Mains

- Federal justice, Democratic fairness, Moral paradox of governance, Cooperative federalism, Political equality vs numerical equality, Regional balance of power.

Why in News?

- The constitutional freeze on delimitation of Lok Sabha seats ends after the Census 2027, making redistribution of parliamentary seats unavoidable for the first time since 1976.
- The upcoming delimitation will fundamentally reshape political representation, federal balance, and democratic fairness in India.

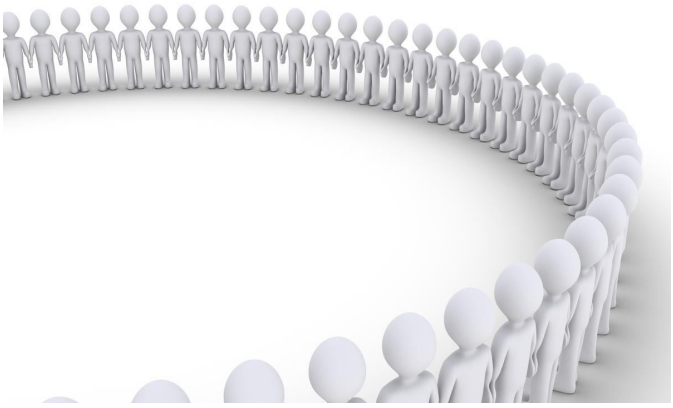


Image source: The Hindu

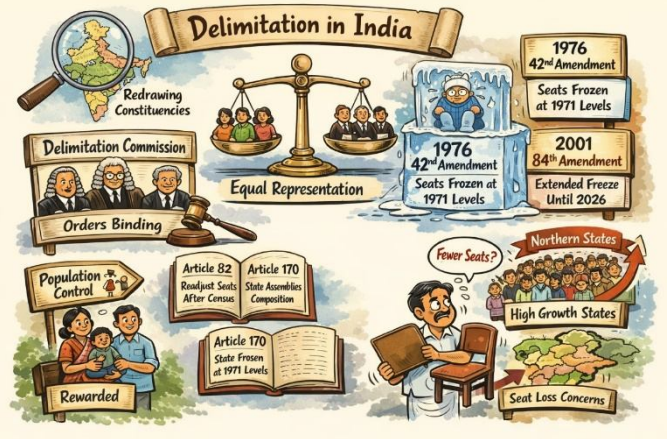
Meaning and Significance of Delimitation

- Delimitation is the constitutional process of redrawing electoral boundaries and redistributing parliamentary seats based on population changes.
- While routine in theory, the exercise due after **Census 2027** will be the most consequential since Independence.
- It will reshape:
  - Representation in the Lok Sabha
  - Federal balance among States
  - Coalition politics
  - The ethical idea of democratic fairness

Historical Context: The Frozen Constitution

- The Constitution originally mandated delimitation after every Census to ensure equal suffrage.

- In **1976**, the inter-State distribution of Lok Sabha seats was frozen at **1971 population levels**.
- Objective:
  - Prevent States from being penalised for successfully controlling population growth.
- The **84th Constitutional Amendment (2001)** extended this freeze until the first Census after 2026.
  - Parliamentary representation still reflects an India of **548 million people**, not today's **1.47 billion**.
- **2002–08 Delimitation Commission**: Only redrew internal boundaries; did not reallocate seats among States.
- With **Census 2027**, the freeze expires, making redistribution constitutionally unavoidable.



Demographic Divergence among States

- In the 1970s, fertility rates across States were similar.
- Today, demographic patterns have diverged sharply:
  - Southern and western States:
    - Invested in education, health, women's empowerment
    - Achieved below-replacement fertility
  - Northern States (U.P., Bihar, etc.):
    - Continue to record higher population growth

The Moral Paradox of Population-Based Delimitation

- Pure population-based redistribution would:
  - Increase seats sharply for northern States
  - Reduce proportional influence of southern States
- **Projected Delimitation Impact (Lok Sabha ~888 seats)**
  - **Uttar Pradesh** → ~151 seats (from 80)
  - **Bihar** → ~82 seats (from 40)
  - **Together** → over **26% of total Parliament**
  - **Tamil Nadu** → ~53 seats (from 39)
  - **Kerala** → ~23 seats (from 20)
- **Change in Share of Lok Sabha (%)**
  - **Tamil Nadu** → from **7.2% to 6.0%**
  - **Kerala** → from **3.7% to 2.6%**
- Southern States gain seats in absolute terms but lose share of total power.
- Moral paradox:
  - States that followed national population policy lose influence
  - States that failed gain power
- Hence, the ethical logic of the original freeze remains valid.

Arithmetic versus Political Assurances

- Political assurances that "no State will lose seats" offer limited comfort because:
  - Parliamentary power depends on **absolute numbers**, not proportional retention.

Table 1: If the number of seats is retained at 543 and reapportioned among States based on the projected population in 2026

State	Number of seats at present	Number of seats projected	Net gain/ loss
U.P.	80	91	11
Bihar	40	50	10
Rajasthan	25	31	6
M.P.	29	33	4
Tamil Nadu	39	31	-8
Andhra + Telangana	42	34	-8
Kerala	20	12	-8
Karnataka	28	26	-2
Punjab	13	12	-1
Himachal	4	3	-1
Uttarakhand	5	4	-1

Table 2: If the number of seats is increased to 848 based on the projected population in 2026

State	Number of seats at present	Number of seats projected	Net gain
U.P.	80	143	63
Bihar	40	79	39
Rajasthan	25	50	25
M.P.	29	52	23
Tamil Nadu	39	49	10
Andhra + Telangana	42	54	12
Kerala	20	20	-
Karnataka	28	41	13
Punjab	13	18	5
Himachal	4	4	-
Uttarakhand	5	7	2

- Even without seat loss:
  - Bargaining power of southern States declines sharply.
- Extending the freeze indefinitely:
  - Undermines democratic equality
  - Risks violating **Article 14 (Right to Equality)**

Core Constitutional Dilemma

- The challenge is structural:
  - **Democratic equality** demands representation based on population
  - **Federal justice** demands protection for States that performed well
- Reconciling these two principles is the central problem of post-2027 delimitation.

Policy Options for Delimitation

1. Extend the Freeze

- Pros:
  - Preserves current regional balance
- Cons:
  - Denies fair representation to fast-growing States
  - Constitutionally vulnerable under Article 14

2. Expand the Lok Sabha

- Increase strength to 750–900 seats
- Ensures no State loses seats
- But:
  - Large States still dominate
  - Southern concerns remain unresolved

3. Adopt a Weighted Formula

- Combine:
  - Population (70–80%)

- Development indicators (20–30%)
- Indicators may include:
  - Literacy
  - Health
  - Fertility control
- Rewards governance outcomes, not just numbers
- Similar to Finance Commission's devolution formula

4. Strengthen the Rajya Sabha

- Restore domicile requirements for members
- Reform seat allocation to emphasise State equality
- Possible model:
  - Large States – 15 seats
  - Medium States – 10 seats
  - Small States – 5 seats
- Revives Rajya Sabha as a true federal chamber

5. Bifurcate Uttar Pradesh

- Divide U.P. into 3–4 States
- Benefits:
  - Prevents concentration of parliamentary power
  - Addresses long-standing regional demands
- Acts as a federal solution, not just administrative reform

6. Phased Redistribution

- Implement delimitation over two election cycles:
  - Half in 2034
  - Remaining in 2039
- Reduces political shock
- Allows States and parties time to adjust

Why are Southern States Concerned About Delimitation After 2027?

1. Fear of Loss of Political Representation

Southern States with lower population growth may gain fewer seats compared to northern States.

- Example: Kerala may see **no increase**, Tamil Nadu about **26%**, while Uttar Pradesh and Madhya Pradesh could see nearly **79% increase**.

2. Threat to Federal Balance

A higher number of MPs from northern States could:

- Shift national policymaking priorities
- Increase pressure on southern States to accept unfavourable decisions
- Upset cooperative federalism

3. Discouragement to Good Governance

States that successfully implemented population control policies could be **penalised with reduced representation**, while high-fertility States gain advantage.

This creates a **perverse incentive structure**, undermining responsible governance.

4. Widening North–South Divide

Perceived political marginalisation may fuel:

- Demands for greater autonomy
- Calls for special status
- Regional alienation, affecting national unity

5. Skewed Resource Allocation

The **Finance Commission** uses population as a criterion for fund devolution. Greater parliamentary strength of northern States may lead to:

- More central funds and schemes flowing northward
- Resource squeeze for better-performing southern States

6. Weakening of Regional Parties

Delimitation could tilt electoral arithmetic in favour

of parties with strong northern bases, reducing the influence of southern regional parties in national politics.

Procedural Integrity and Democratic Trust

- Legitimacy depends on process, not just formulas.
- Delimitation Commission must:
  - Include experts in demography, constitutional law, and federal studies
  - Ensure meaningful State participation
  - Conduct public consultations
- Special care required in:
  - Redrawing SC/ST reserved constituencies
  - Preventing perception of manipulation

Significance of Delimitation 2027

- Will reshape **coalition politics** and centre–state power balance.
- Tests India's commitment to:
  - Federalism
  - Political equality
  - Cooperative democracy
- It is not just a technical exercise but a **moral rebalancing of the Republic**.

Conclusion

Delimitation after 2027 is inevitable, but its design is a political choice. If guided by transparency, empathy, and innovation, it can modernise representation while reinforcing unity. If driven by political arithmetic alone, it risks eroding trust and damaging India's federal spirit.

The Census will count India's people; delimitation will judge its democracy.

The Journey of India as a Republic: Republic Day 2026

Source: PIB

Relevance

GS Paper II

- **Indian Constitution; Parliament; Security Forces & their mandate**
- **Democratic institutions; constitutional values**

Important Keywords

Prelims

- Constitution of India, Purna Swaraj, Vande Mataram, Government of India Act, 1935, Bankim Chandra Chatterjee

Mains

- Historical significance of Republic Day; Purna Swaraj; transition from colonial rule to constitutional democracy

Why in News?

Republic Day 2026 marked the **77th anniversary** of the Constitution of India coming into force on **26 January 1950**. Celebrated under the theme **"150 Years of Vande Mataram"**, the observance blended constitutional values with cultural expression and mass public participation, reaffirming India's transition from colonial rule to a constitutional democracy.

Republic Day: Completing India's Democratic Transition

While **Independence Day (15 August 1947)** ended colonial rule, the adoption of the **Constitution of India** completed India's transformation into a **Sovereign Democratic Republic**. Republic Day symbolizes the rule of law, institutional accountability, and sovereignty vested in the people.

- Annual celebrations bring constitutional ideals into the public domain—most visibly through the national parade at Kartavya Path—and through nationwide flag-hoisting and civic programmes that make Republic Day a shared civic occasion.

77th Republic Day (2026): Theme & National Participation

Theme: "150 Years of Vande Mataram"

The theme linked the freedom struggle, cultural expression, and contemporary national aspirations, placing the national song at the heart of the celebrations.

Parade Highlights (Kartavya Path, New Delhi)

- **30 tableaux** by States, Union Territories, and Ministries on:
  - *Swatantrata ka Mantra – Vande Mataram*
  - *Samriddhi ka Mantra – Atmanirbhar Bharat*
- **2,500 artists** in cultural presentations
- **~10,000 Special Guests** (farmers, artisans, scientists, innovators, women entrepreneurs, students, sportspersons, beneficiaries of flagship schemes, frontline workers)
- **Military firsts:**
  - Debut of the **Bhairav Battalion** (specialised assault infantry unit)
  - Participation of a **European Union military contingent**—EU's first such participation outside Europe

Citizen-Centric Outreach

Through platforms like **MyGov** and **MY Bharat**, citizens—especially youth and creative communities—participated via:

- Essay competition on *Swatantrata ka Mantra – Vande Mataram*
- Painting contest on *Samriddhi ka Mantra – Atmanirbhar Bharat*
- Singing competitions featuring *Vande Mataram*
- Quizzes on the evolution of *Vande Mataram*, India's achievements in space and sports, and national development initiatives

Selected winners were associated with Republic Day events, strengthening people-to-people engagement.

Why 26 January? From Purna Swaraj to the Republic

26 January 1930 – Purna Swaraj

At the **INC Lahore Session (1929)**, presided over by Jawaharlal Nehru, the **Purna Swaraj** resolution was adopted. **26 January 1930** was observed nationwide as *Purna Swaraj Day*, rejecting dominion status and committing to complete independence. From **1930 to 1947**, the date was celebrated as Independence/Poorna Swaraj Day.

9 December 1946 – Constituent Assembly Begins Work

The **Constituent Assembly of India** met at the Constitution Hall (now Central Hall of Parliament), initiating constitution-making.

- Worked for **2 years, 11 months, 17 days**
- **11 sessions** over **165 days**, with **114 days** on the Draft Constitution
- A representative, deliberative process

15 August 1947 – Independence

- India attained independence but continued as a **British Dominion** until the Constitution came into force.

26 November 1949 – Constitution Adopted

- After extensive debates on rights, governance, federal balance, and social justice, the Constitution was adopted—this date is recorded in the Preamble.

26 January 1950 – Constitution Comes into Force

- Chosen deliberately to honour **Purna Swaraj (1930)**, the Constitution replaced the **Government of India Act, 1935**, established the **President of India** as Head of State, and inaugurated constitutional governance. The **42nd Constitutional Amendment (1976)** later added *Socialist* and *Secular* to the Preamble.

Tableaux Highlights at the 77th Parade

- **Assam:** Asharikandi terracotta craft
- **Gujarat:** Tribute to **Madam Bhikaji Cama**; evolution of the National Flag (1906–1947); Mahatma Gandhi with the Charkha
- **Uttar Pradesh:** Bundelkhand's cultural heritage and development
- **Maharashtra:** Ganeshotsav as a social movement (Lokmanya Tilak)
- **West Bengal:** Origins of *Vande Mataram* by **Bankim Chandra Chatterjee**; freedom fighters including Subhas Chandra Bose, Matangini Hazra, Khudiram Bose
- **Punjab:** Tribute to **Sri Guru Tegh Bahadur Sahib Ji** (350th martyrdom year)
- **Kerala:** Kochi Water Metro; 100% Digital Literacy
- **Tri-Services (DMA):** *Operation Sindoor – Victory Through Jointness* (Rafale with SCALP, BrahMos, S-400, HAROP)
- **Ministry of Culture:** 150-year journey of *Vande Mataram*
- **MHA (NDMA & NDRF):** Recovery after the 2001 Bhuj Earthquake

Honours, Gallantry & Service Recognition

- **Padma Awards 2026:** 131 (5 Padma Vibhushan, 13 Padma Bhushan, 113 Padma Shri)
- **Armed Forces Gallantry:** 70 awards (Ashok Chakra, Kirti Chakra, Shaurya Chakra; Sena/Nao Sena/Vayu Sena Medals)
- **Military Decorations:** 301 defence decorations, including PVSM, UYSM, AVSM, YSM, Sena Medal (Devotion to Duty) with Bars, VSM with Bars
- **Coast Guard:** President's Tatrakshak Medal (PTM) and Tatrakshak Medal (TM)
- **Police & Allied Services:** 982 Gallantry and Service Medals (PMG, PGM, PSM, MSM)
- **Jeevan Raksha Padak:** Sarvottam, Uttam, and Jeevan Raksha Padak (including posthumous)

Republic Day Today: Living Constitutional Values

- The day begins with homage at the **National War Memorial**, followed by the President's arrival at Kartavya Path, flag unfurling with the National Anthem and **21-gun salute**, ceremonial marches, tableaux, bravery awards, motorcycle display, and the IAF flypast. Celebrations conclude on **29 January** with **Beating the Retreat** at Vijay Chowk—marking the formal close of the festivities.

Conclusion

Republic Day binds India's political aspiration (**Purna Swaraj, 1930**) to its institutional realization (**Constitution, 1950**). The 77th Republic Day, themed **"150 Years of Vande Mataram"**, showcased how constitutionalism, culture, and citizen participation together sustain India's democratic republic—where sovereignty rests with the people and constitutional values guide public life.

Issues Surrounding the Governor's Address to State Legislature

Source: *The Hindu*

Relevance: GS Paper II (Polity & Governance)

Important Keywords

Prelims

- Governor's Address, Article 176, Article 175, Article 163, Article 159, Motion of Thanks, Government of India Act, 1935, Provincial Autonomy, Federalism, Constitutional Morality

Mains

- Governor–State Relations, Limits of Gubernatorial Discretion, Parliamentary Democracy, Responsible Government, Cooperative Federalism, Centre–State Relations, Judicial Review, Constitutional Conventions

Why in News?

Recent actions by Governors in Opposition-ruled States—such as walking out of the Assembly or omitting parts of the cabinet-approved address—have sparked debate over the **mandatory nature of Article 176**, the **limits of gubernatorial discretion**, and the **supremacy of the elected Council of Ministers** in a parliamentary democracy.

Historical Background

Colonial Framework

- **Section 63 of the Government of India Act, 1935** empowered the Governor to address the Provincial Legislature **at his discretion**.
- From **April 1937**, when **provincial autonomy** commenced, a convention developed:
  - The Governor's speech was prepared **in consultation with the Council of Ministers**.
  - It set out the **legislative and policy agenda** of the elected provincial government.

Thus, even under colonial rule, discretionary authority began yielding to **ministerial responsibility**.

Constituent Assembly's Understanding

While framing the Constitution, the **Constituent Assembly consciously departed** from the discretionary model of the 1935 Act. It was clearly understood that:

- The Governor would function as a **constitutional head**, not an autocratic authority.
- The address would **reflect the policy of the elected Council of Ministers**, not the Governor's personal views.
- The Governor was expected to act as a **neutral representative of the State as a whole**, not as a political actor.

Constitutional Provisions Governing the Address

Article 176 – Mandatory Annual Address

- The Governor **shall address** the State Legislature:
  - At the commencement of the **first session after a general election**, and
  - At the commencement of the **first session of every year**.

Key features:

- **Mandatory constitutional duty**
- **Prepared by the Council of Ministers**
- Outlines government achievements and policy roadmap

This address is also delivered when a **new Assembly is constituted**, allowing the newly sworn-in government to present its agenda to elected representatives and, through them, to citizens.

Article 175 – Discretionary Address

- The Governor **may address** either House or both Houses of the Legislature.
- This provision is **optional** and does not dilute the obligation under Article 176.

Article 163 – Aid and Advice

- Establishes that the Governor shall act on the **aid and advice of the Council of Ministers**, except where the Constitution expressly provides discretion.
- No such discretion is provided regarding the **content or delivery** of the Article 176 address.

Motion of Thanks on the Governor's Address

Article 176 further requires the Legislature's rules to provide time for discussion on matters referred to in the address. This occurs through the **Motion of Thanks**, during which:

- Ruling and opposition members debate the policies outlined.
- The House votes on the motion, ensuring **legislative scrutiny and democratic accountability**.

Judicial Interpretation of the Governor's Role

The Supreme Court has consistently clarified the limited and ceremonial nature of the Governor's authority:

- **Shamsher Singh v. State of Punjab (1974)** A seven-judge Constitution Bench held that the Governor is a **constitutional head** and must act on the **aid and advice of the Council of Ministers**, except where the Constitution expressly grants discretion. Personal discretion in executive matters was ruled out.
- **Nabam Rebia v. Deputy Speaker (2016)** A five-judge Constitution Bench ruled that the Governor's discretionary powers are **strictly limited and explicitly defined**. Functions under Articles 175 and 176 must be exercised **on ministerial advice**.
- **State of Tamil Nadu v. Governor of Tamil Nadu (2024)** The Court held that gubernatorial discretion **cannot be used to stall, obstruct, or negate** the functioning of an elected government.

Recent Instances Triggering the Debate

- **Tamil Nadu**: Portions of the address were skipped in 2022 and 2023; since 2024, the Governor has **not delivered the mandatory address** under Article 176.
- **Kerala**: The Governor omitted selected paragraphs from the cabinet-approved policy address.
- **Karnataka**: The Governor delivered a brief statement instead of the prepared address and exited the joint session.

These actions represent a departure from **settled constitutional conventions**.

Arguments Regarding the Governor's Discretion in Assembly Addresses

Arguments For Governor's Discretion

1. **Constitutional Oath (Article 159):** The Governor must preserve and defend the Constitution and may resist reading content perceived as unconstitutional, factually incorrect, or undermining constitutional values.
2. **Right to Dissent and Free Speech:** As a high constitutional authority, the Governor is not a mechanical functionary and may refuse to endorse content that attacks the office of the Governor.
3. **Constitutional Silence:** Articles 175 and 176 do not explicitly require verbatim reading, leaving some interpretive space.
4. **Representative of the Union:** As a constitutional link between Union and State, the Governor may feel responsible to prevent threats to national unity or federal integrity.
5. **Avoiding Institutional Self-Contradiction:** Reading content contradicting earlier constitutional actions taken by the Governor may create institutional inconsistency.

Arguments Against Governor's Discretion

1. **Aid and Advice Principle (Article 163):** Under the Westminster model, the Governor is a ceremonial head; real executive power lies with elected ministers.
2. **Nature of the Address:** The address is a **government policy statement**, not the Governor's personal opinion; altering it blurs accountability.
3. **Erosion of Federalism:** Unilateral actions by a centrally appointed Governor encroach upon State autonomy.
4. **Threat to Parliamentary Democracy:** Discretion in routine executive functions risks creating a parallel authority.
5. **Legislative Privilege:** Interference undermines the Legislature's right to debate and reject policy on the floor.
6. **Judicial Remedy Exists:** Constitutional adjudication lies with courts, not individual constitutional authorities.

Committee Recommendations on the Governor's Office

- **Sarkaria Commission (1988):** Emphasised that the Governor must not act as an agent of the Centre and should function as a **"lynchpin of cooperative federalism"**, avoiding active politics.
- **Punchhi Commission (2007):** Recommended limiting additional roles (such as Chancellor of Universities) that expose Governors to political controversy and urged a focus on **core constitutional duties**.

Way Forward

1. **Codification of Conventions:** Strict adherence to parliamentary conventions where the head of state does not deviate from the approved speech.
2. **Judicial Clarification:** Declaratory guidelines affirming that the Article 176 address is a **mandatory constitutional function** without discretionary scope.
3. **Orientation and Capacity-Building:** Mandatory constitutional training for Governors on federalism, conventions, and judicial precedents.
4. **Constructive Dialogue:** Pre-session consultation between Governors and Chief Ministers to resolve concerns privately.
5. **Time-bound Communication Mechanism:** Governors should convey objections in writing within a fixed deadline; silence should imply concurrence.

Conclusion

The controversy over the Governor's address highlights a fundamental constitutional question: **the balance between the Governor's oath-bound duty and the primacy of elected executive authority**. Historical practice, constitutional text, Constituent Assembly intent, and Supreme Court precedent overwhelmingly limit gubernatorial discretion in Assembly addresses. Upholding constitutional morality, cooperative federalism, and parliamentary democracy requires that the Governor's address remain a **ceremonial articulation of elected government policy**, not a platform for individual discretion.

International Data Privacy Day 2026

Source: PIB

Relevance (UPSC Syllabus): **GS Paper II (Governance), GS Paper III (Cybersecurity, Digital Economy), Prelims (Acts, Institutions)**

Important Keywords for Prelims and Mains

For Prelims

- International Data Privacy Day, Convention 108, Digital Personal Data Protection (DPDP) Act, 2023, DPDP Rules, 2025, Data Protection Board of India, CERT-In, I4C, Cyber Swachhta Kendra, Digital Public Infrastructure (DPI), Aadhaar, UPI, MyGov, eSanjeevani

For Mains

- Data privacy as a democratic right, Privacy-by-design in digital governance, Balancing privacy, innovation and public interest, Digital sovereignty and data governance, Institutional accountability in cyberspace, Citizen-centric digital governance

Why in News

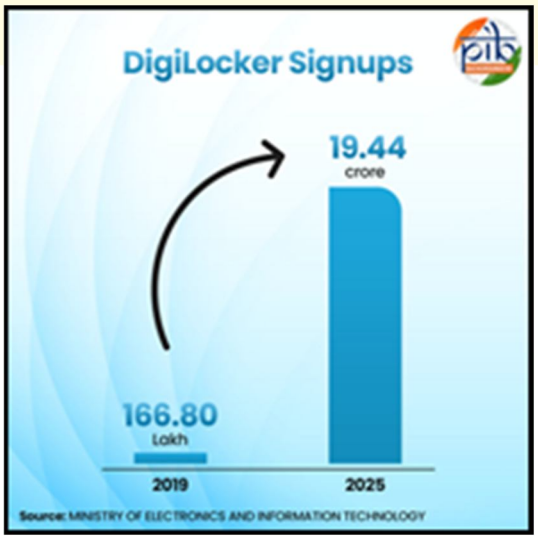
- **Data Privacy Day** is observed annually on **28 January** worldwide.
- Also known as **Data Protection Day**.
- Instituted in **2006 by the Council of Europe**.
- Commemorates the signing of **Convention 108**, the world's first legally binding international data protection treaty.
- The day promotes awareness of protecting **personal data and privacy** in the digital age.

Key Takeaway

- Data Privacy Day highlights the **shared responsibility** of government, digital platforms, and citizens in building a trusted digital ecosystem.
- India is the **world's 3rd-largest digitalised economy**, with digital platforms embedded in daily life.
- **DPDP Act, 2023** and **DPDP Rules, 2025** create a **citizen-centric framework** balancing privacy, innovation, and public interest.
- **₹782 crore** allocated in **Union Budget 2025–26** for cybersecurity to protect digital public infrastructure.

Why Data Privacy is Foundational

- Safeguards citizens' personal information across large digital platforms.



- Builds public trust in **government-led digital services**.
- Enables **ethical, secure, and responsible digital adoption**.
- Prevents data misuse, mitigates cyber threats, and detects fraud.
- Enhances **transparency, accountability, and institutional oversight**.
- Reinforces collective responsibility of **government, institutions, and citizens**.

India's Expanding Digital Footprint and the Privacy Imperative

1. Digital Public Infrastructure (DPI): Scale and Reach

India's DPI forms the backbone of digital transformation and operates at population scale:

- **Aadhaar** – trusted digital identity framework.
- **UPI** – real-time digital payment revolution.
- **Paperless governance platforms** – streamlined service delivery.

- **MyGov** – over **6 crore users**, strengthening participatory governance.
- **eSanjeevani** – more than **44 crore digital health consultations**, expanding healthcare access.

These platforms demonstrate **scale, depth, and inclusiveness**, increasing the need for strong privacy safeguards.

2. Connectivity, Affordability, and Digital Inclusion

- India has **101.7 crore broadband subscribers** (Sept 2025).
- Average user spends **1,000 minutes online**.
- Mobile data cost: **$0.10 per GB (2025)** — among the lowest globally.
- Digital access now defines India's socio-economic landscape through:
  - Identity verification
  - Payments
  - Healthcare
  - Education
  - Grievance redressal
  - Citizen participation
- India is among the **most connected and digitally inclusive societies** globally.

3. Strengthening Privacy and Cybersecurity

- Rapid digital expansion has increased:
  - Volume of personal data
  - Sensitivity of information
  - Exposure to cyber risks
- Major threats:
  - Data misuse
  - Privacy breaches
  - Cyber frauds
- Government response:
  - Enhanced data protection frameworks
  - **₹782 crore allocation** for cybersecurity (2025–26)

National Data Privacy and Security Readiness

1. Information Technology (IT) Act, 2000

India's core cyberspace law:

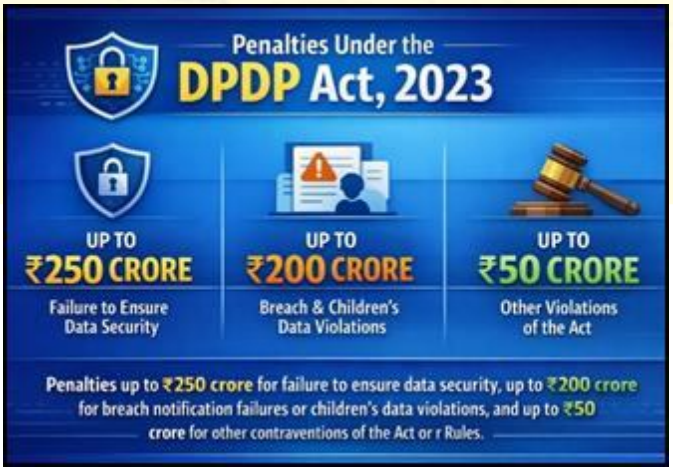
- Legal recognition to **electronic records and digital signatures**.
- Enables **e-governance and digital commerce**.
- Establishes:
  - **CERT-In** as national incident response agency.
  - Adjudicatory and appellate bodies for cyber disputes.
- Key sections:
  - **Section 3, 3A** – Authentication
  - **Section 6** – E-governance
  - **Section 46** – Adjudication
  - **Section 69A** – Content blocking (national security)
  - **Section 70B** – Cyber incident management

2. IT (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021

- Notified under the IT Act.
- Mandate **due diligence obligations**.
- Require **time-bound grievance redressal**.
- Intermediaries include:
  - Telecom providers
  - Internet service providers
  - Online marketplaces
  - Search engines
  - Social media platforms

3. Digital Personal Data Protection (DPDP) Act, 2023

- Enacted on **11 August 2023**.
- Applies to:
  - Digital personal data



  - Digitised offline data
- Balances:
  - Privacy protection
  - Innovation
  - Economic growth
- Follows **SARAL approach**:
  - Simple
  - Accessible
  - Rational
  - Actionable

Data Protection Board of India

- Oversees compliance.
- Conducts inquiries into data breaches.
- Orders corrective actions.
- Ensures enforcement and accountability.

Rights and Protections under DPDP Act, 2023

Citizen (Data Principal) Rights

1. Right to give or refuse consent
2. Right to know how data is used
3. Right to access personal data
4. Right to correct personal data
5. Right to update personal data
6. Right to erase personal data
7. Right to nominate another person
8. Mandatory response within **90 days**
9. Mandatory breach notification with guidance
10. Clear contact for queries and complaints

Special Protections

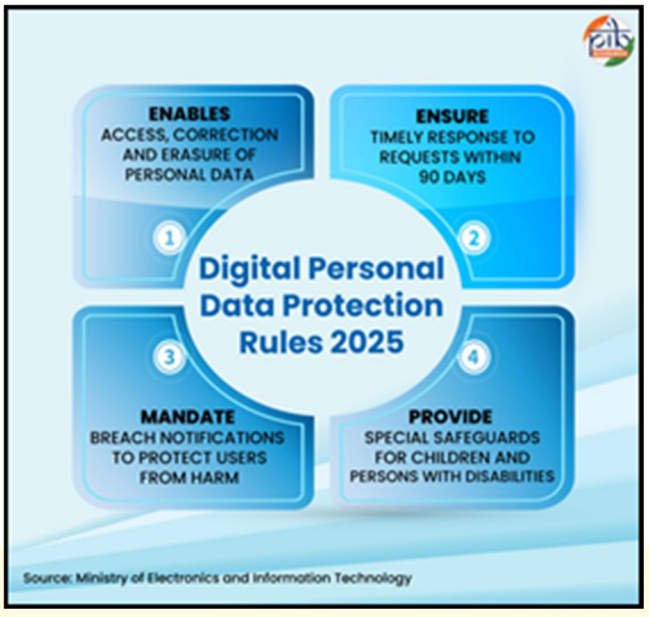
- **Children** – verifiable parental consent (except essential services)
- **Persons with disabilities** – lawful guardian consent if required

Definitions

- **Data Fiduciary**: Entity deciding purpose and means of processing.
- **Data Principal**: Individual to whom personal data relates.

4. Digital Personal Data Protection Rules, 2025

- Notified on **13 November 2025**.
- Operationalise DPDP Act.
- Empower citizens with enforceable rights.
- Enhance organisational accountability.
- Prevent misuse and unauthorised data exploitation.
- Balance **privacy, innovation, and responsible data use**.



Additional National Measures for Data Security

1. Incident Prevention and Response

- IT Act designates **CERT-In** as nodal cybersecurity agency.
- Vision: Secure India's cyberspace and digital infrastructure.

2. National Coordination for Cyber and Data Security

- **Indian Cyber Crime Coordination Centre (I4C)** – 2018.
- Ministry of Home Affairs.
- Focus on crimes against women and children.
- Supports:
  - Early warning systems
  - Trend analysis
  - Easy reporting
  - Capacity building of States/UTs

3. Citizen-Centric Data Protection Platforms

- **National Cyber Crime Reporting Portal (2020)**
- **Citizen Financial Cyber Fraud Reporting & Management System (CFCFRMS)**
- **Helpline 1930**

4. Real-Time Interventions

- **Cyber Fraud Mitigation Centre (CFMC)** – September 2024
- Enables:
  - Real-time data sharing
  - Blocking of compromised accounts, SIMs, devices
  - Coordination among banks, telecom, LEAs

5. Digital Infrastructure Protection Tools

- **Sahyog platform** – takedown of unlawful content
- **Suspect Registry** – mule account identification
- **C-DAC indigenous cybersecurity tools**

6. Cyber Forensics and Investigation

- **National Cyber Forensic Laboratories**
- Support States/UTs in:
  - Evidence preservation
  - Data breach analysis
  - Prosecution

7. Data-Driven Analytics

- **Samanvaya Platform (Sept 2024)**
- National MIS for cybercrime data
- Enables:
  - Inter-State coordination
  - Crime pattern analysis
  - Geo-mapping

8. Human and Institutional Capacity Building

- **CyTrain platform (2019)**
- **Cyber Commando Programme (2024)**
- **ISEA Programme**
- **CSPAI (CERT-In, 2024)** – AI security professionals

9. National Awareness Campaigns

- **Cyber Swachhta Kendra (CSK)** – malware removal & alerts
- Provides free tools and best practices
- Issues daily advisories to organisations

Conclusion

Data Privacy Day reinforces that **trust is the foundation of India's digital transformation**. Through robust laws, institutions, investments, and awareness, India is ensuring that its digital expansion remains **secure, ethical, inclusive, and citizen centric**. The DPDP framework, strengthened cybersecurity institutions, and national capacity-building initiatives together make India **future-ready and resilient in the digital age**.

INTERNATIONAL RELATIONS

US Military Action in Venezuela & Capture of President Nicolás Maduro

Source: *The Indian Express*

Relevance: **GS Paper II: International Relations, Bilateral, regional and global groupings.**

Important Keywords for Prelims and Mains

For Prelims

- Monroe Doctrine, Narco-terrorism, UN Charter, War Powers Resolution

For Mains

- Rules-based international order, Interventionism, Energy geopolitics, Strategic autonomy, International law and sovereignty, Resource nationalism

Why in News?

The United States launched **direct military strikes on Venezuela**, claimed to have **captured sitting President Nicolás Maduro and his wife**, and announced plans to **oversee Venezuela's political transition and oil sector**, marking the **most overt US intervention in Latin America in decades**.

Background: US–Venezuela Relations

- Relations deteriorated after the **Bolivarian Revolution** under Hugo Chávez.
- US imposed **economic and oil sanctions** citing:
  - Democratic backsliding
  - Human rights violations
  - Drug trafficking allegations
- Venezuela possesses the **largest proven crude oil reserves globally**, but production collapsed due to:
  - Sanctions
  - Economic crisis
  - Infrastructure decay

What Exactly Happened?

- **Early January 2026**
  - Explosions and airstrikes reported in **Caracas**
  - Military installations targeted
  - Power outages across the capital
- **US Claims**
  - Special forces seized Nicolás Maduro and Cilia Flores
  - Transported first to **USS Iwo Jima**, later to the US
  - Maduro detained in New York on **narco-terrorism charges**
- **Venezuelan Response**
  - Termed the action a **"kidnapping"**
  - Declared **state of external disturbance**
  - Maintained that government institutions continue to function

Why Did the US Capture Maduro?

Venezuelan President **Nicolás Maduro** captured in US military operation

What Happened?

- Airstrikes on Caracas
- Maduro captured & flown to US

Why Now?

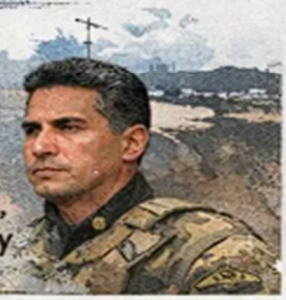
Drug Trafficking Allegations

Accused of Narco-Terrorism

Arcused of Narco-Terrorism

Oil & Control

Largest Oil Reserves, US Interests



Military on Alert, State of Emergency

Who's in Charge in Venezuela?

- Delcy Rodriguez Declared Interim President
- Military on Alert, State of Emergency

Global Reactions

China, Russia & Iran Condemn US

UN Calls Emergency Meeting

Key Questions Ahead

- Further US Military Action?

- Who Will Lead Venezuela?

- Risk of Prolonged Instability?

Why Did the US Target Maduro Now?

1. Narco-Terrorism Allegations

- US accuses Maduro of leading a **criminal state apparatus**
- Alleged involvement in cocaine trafficking into the US

2. Electoral Legitimacy Crisis

- 2024 Venezuelan elections widely disputed
- Western nations questioned Maduro's mandate

3. Escalation of Pressure Campaign

- Expanded sanctions
- Seizure of oil tankers
- Missile strikes on alleged drug-running vessels

Role of Oil in the Intervention

- Venezuela holds ~**300 billion barrels** of proven oil reserves
- Trump openly stated:
  - US would **"run the country"**
  - American oil majors would **revive the oil sector**
- Critics argue:
  - Oil is the **central strategic motivation**
  - Parallels drawn with Iraq-style interventions

Who Is Governing Venezuela Now?

- Political authority remains **uncertain**
- Venezuelan courts named **Vice President Delcy Rodríguez as interim president**
- Heavy military deployment and militia presence
- Risk of internal fragmentation remains high

Legal and Constitutional Questions

International Law

- No UN Security Council mandate
- No declared war
- Raises violation of:
  - State sovereignty
  - UN Charter principles
- UN Secretary-General termed it a **"dangerous precedent"**

US Domestic Law

- Questions on:
  - War Powers Resolution
  - Congressional approval
- Bipartisan concerns over executive overreach

Global Reactions

Condemnation

- **Russia, China, Iran, Cuba**: Violation of sovereignty
- Latin American leaders warned of regional destabilisation

Cautious Responses

- European Union urged restraint and respect for international law

Public Response

- Venezuela: mixed reactions (fear, relief, uncertainty)
- Venezuelan diaspora: celebrations in several countries

India's Position and Strategic Dilemma

- India traditionally supports:
  - Sovereignty
  - Non-intervention
  - Rules-based international order
- Energy angle:
  - India earlier imported large volumes of

Venezuelan crude
    - Imports stopped due to US sanctions
- MEA issued advisory urging Indians to avoid non-essential travel
- India faces:
    - **Low political stakes**
    - **High normative and diplomatic stakes**

Strategic and Global Significance

- Revival of **Monroe Doctrine** (rebranded as "Don-roe Doctrine")
- Signals return of **US interventionism**
- Raises concerns about:
    - Regime change politics
    - Resource-driven interventions
    - Weakening of global norms

Way Forward

- Uncertainties persist regarding:
    - Duration of US involvement
    - Political transition mechanism
    - Sanctions regime
- Possible outcomes:
    - Prolonged instability
    - International mediation
    - Legal battles in US courts

Conclusion

The US capture of Venezuela's President represents a **critical turning point in hemispheric geopolitics**, reviving interventionist doctrines under security and democracy narratives. While framed as counter-narcotics action, **energy interests, power projection, and strategic dominance** remain central. The episode challenges the credibility of the **rules-based international order** and places countries like India in a delicate diplomatic position.

India–European Union Free Trade Agreement (India–EU FTA)

Source: The Times of India

Relevance: **GS Paper II: International Relations, International Institutions, Government Policies & Interventions, International Treaties & Agreements, Effect of Foreign Policies on India's Interests**

Important Keywords for Prelims & Mains

For Prelims:

- European Union, Free Trade Agreement (FTA), TRIPS, G20, G7, Operation Atalanta, Indo-Pacific Oceans Initiative (IPOI), International Solar Alliance, Quality Control Orders (QCOs), Non-tariff Barriers, Schengen Area.

For Mains:

- Key highlights of the India–EU FTA and India-EU relations, Opportunities and challenges associated with India–EU FTA and way forward.

Why in News?

India and the **European Union (EU)** have concluded negotiations for a **comprehensive Free Trade Agreement (FTA)**, marking a major milestone in bilateral economic relations. The European Union is India's **22nd FTA partner**.

The agreement will now undergo:

- Legal scrubbing
- Language finalisation

- Translation into EU languages
- Ratification by all 27 EU Member States and the European Parliament

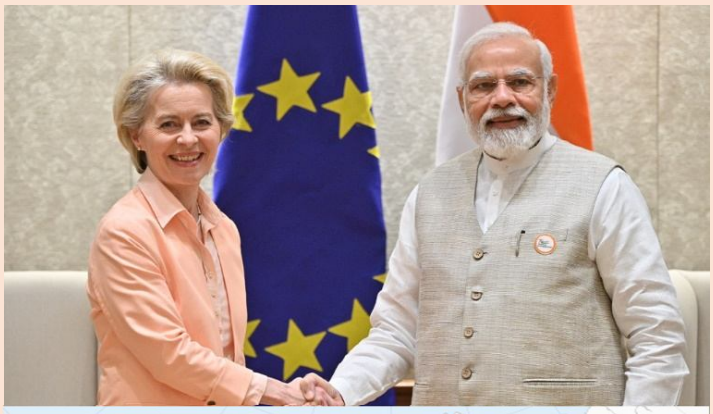
Only after this process will the agreement enter into force.

Overview of the India–EU FTA

- The agreement provides **deep market access for Indian goods and services**, especially labour-intensive sectors.
- It also opens the Indian market to European goods and services in a calibrated manner.
- However, its success will depend on addressing **regulatory asymmetries, environmental standards, and non-tariff barriers (NTBs)** imposed by the EU.

The FTA also has **strategic, technological, and geopolitical significance** beyond trade.

European Union (EU)



- **Type**: Supranational political and economic union
- **Origin**: Post–World War II integration to ensure peace and stability in Europe
- **Core Objective**: Prevent conflict through economic interdependence (France–Germany reconciliation)

Historical Milestones

- **1951**: European Coal and Steel Community (ECSC) – pooled strategic resources
- **1957**: Treaties of Rome – established EEC and Euratom
- **1992**: Maastricht Treaty – formally created the European Union
- **2020**: Brexit – UK exited; EU strength reduced to 27 members

Aims

- **Four Freedoms**: Free movement of goods, services, capital, and people
- **Single Internal Market**: Integrated European economy
- **Sustainable Development**: Economic growth with social and environmental balance
- **Regional Stability & Cohesion**: Reduce disparities among regions

Key Features

- **Single Market**: No internal trade barriers among member states
- **Customs Union**: Common external tariff for non-EU imports
- **Schengen Area**: Passport-free travel zone (includes 4 non-EU states)
- **Eurozone**: 20 members use the euro; **Bulgaria to join in 2026**

Key Highlights of the India–EU FTA Commitments by the European Union

1. Comprehensive Market Access for Indian Exports

- The EU will liberalise **97% of its tariff lines**, covering **99.5% of Indian exports by value**.
- This is one of the **deepest preferential access arrangements** India has ever secured with a developed economy.

2. Boost to Labour-Intensive Sectors

Indian employment-generating sectors will benefit from **zero-duty access**, including:

- Textiles and garments
- Apparel
- Leather and leather products
- Footwear
- Marine products
- Gems and jewellery
- Toys
- Sports goods

These sectors currently face tariffs ranging from **4% to 26%**. Exports worth approximately **USD 33 billion** will become duty-free, directly benefiting MSMEs and workers.

3. Services Market Liberalisation

The EU has made **binding commitments in 144 services subsectors**, including:

- Information Technology (IT)
- Information Technology Enabled Services (ITeS)
- Digital services
- Professional services (legal, accounting, engineering, architecture)
- Education services
- Business services

This provides **regulatory certainty, market predictability, and non-discriminatory treatment** to Indian service providers.

4. Preferential Access for Agricultural and Processed Food Exports

- The FTA grants Indian agricultural and processed food products **preferential entry into the EU market**.
- Expected benefits include:
  - Higher farm incomes
  - Promotion of value-added agri exports
  - Strengthening of rural livelihoods
  - Empowerment of women-led enterprises

5. Professional Mobility and Movement of Natural Persons

The agreement establishes a structured framework for temporary movement of professionals, including:

- Intra-corporate transferees
- Contractual service suppliers
- Independent professionals

It also includes provisions related to:

- Dependents
- Students
- Future social security coordination arrangements

6. Regulatory Cooperation and Standards Alignment

- Enhanced cooperation on **Sanitary and Phytosanitary Measures (SPS)** and **Technical Barriers to Trade (TBT)**.
- Focus on:
  - Mutual recognition of conformity assessments
  - Reduction of non-tariff barriers
  - Predictability for exporters
  - Regulatory transparency

Commitments by India

1. Calibrated Tariff Liberalisation

- India will liberalise **92.1% of its tariff lines**, covering **97.5% of EU exports**.
- Sensitive sectors remain protected:
  - Dairy products
  - Cereals
  - Poultry
  - Soymeal
  - Select agricultural commodities
- Gradual liberalisation for:
  - Automobiles
  - Wines and spirits. This is to protect **Micro, Small and Medium Enterprises (MSMEs)** and farmers.

2. Opening of Services Sector

India has committed to opening **102 services subsectors**, including:

- Telecommunications
- Financial services
- Maritime transport
- Environmental services
- Professional and business services

This provides a stable and predictable operating environment for European firms.

3. MSME-Friendly Rules of Origin

- Product-specific rules of origin aligned with **Global Value Chains (GVCs)**.
- Introduction of **self-certification through Statements of Origin**.
- Special flexibilities for MSME-dominated sectors such as:
  - Shrimps and prawns
  - Downstream aluminium products

4. Balanced Intellectual Property Rights (IPR) and Digital Trade Framework

- Reaffirmation of compliance with **Trade-Related Aspects of Intellectual Property Rights (TRIPS)** Agreement of the World Trade Organization (WTO).
- Safeguards for:
  - Public interest
  - Generic pharmaceutical industry
  - Traditional Knowledge Digital Library (TKDL)
- Balanced approach to:
  - Cross-border digital trade
  - Data localisation
  - Digital sovereignty

Significance of the India–EU FTA

1. Geoeconomic Diversification and Strategic Autonomy

- Advances the **China-plus-one strategy**, positioning India as an alternative manufacturing hub.
- Establishes a **rules-based economic zone of trust** between two democratic blocs.
- Particularly important for:
  - Semiconductors
  - Artificial Intelligence (AI)
  - Defence manufacturing
  - Green technologies

2. Competitiveness Enhancement through

Standards Upgrade

- Compliance with EU SPS and TBT standards will trigger a **quality upgrade of Indian manufacturing**.
- This "**Brussels Effect**" will improve Indian competitiveness in global markets like the **United States (US)** and **Japan**.

3. Strategic Leverage in Global Trade Architecture

- Connects:
  - India: World's 4th largest economy
  - EU: World's 2nd largest economy
- Together they represent:
  - 25% of global Gross Domestic Product (GDP)
  - One-third of global trade This significantly enhances India's bargaining power in global forums.

4. Green and Digital Transformation Engine

- Integration of digital trade rules and climate commitments.
- Supports:
  - Secure data flows
  - AI-driven green industrialisation
  - Climate-resilient supply chains

India–European Union Relations: Background

Historical Evolution

- Diplomatic relations began in **1962**.
- Institutionalised by:
  - **Joint Political Statement (1993)**
  - **Cooperation Agreement (1994)**
- Upgraded to **Strategic Partnership in 2004**

Institutional Mechanisms

- Guided by **India–EU Strategic Partnership: A Roadmap to 2025**
- Annual summits since **2000 (Lisbon Summit)**

Trade and Investment

- EU is India's **largest goods trading partner**
  - Trade: **USD 135 billion (FY 2023–24)**
- Services trade: **USD 53 billion (2023)**
- EU Foreign Direct Investment (FDI) in India: **Over USD 117 billion**

Strategic and Security Cooperation

- Joint naval exercises with **European Union Naval Force (EUNAVFOR) – Operation Atalanta**
- EU joined **Indo-Pacific Oceans Initiative (IPOI)** in 2023
- EU is a dialogue partner in the **Indian Ocean Rim Association (IORA)**

Climate, Connectivity, and Technology Cooperation

- **India–EU Clean Energy and Climate Partnership (CECP)** (2016)
- EU is a partner in:
  - **International Solar Alliance (ISA)**
  - **Coalition for Disaster Resilient Infrastructure (CDRI)**
- **India–EU Connectivity Partnership (2021)**
- Co-partners in **India–Middle East–Europe Economic Corridor (IMEC)**

Science, Space, and Digital Cooperation

- India is an associate member of **European Organization for Nuclear Research (CERN)**
- **Indian Space Research Organisation (ISRO)** launched **European Space Agency (ESA)**'s Proba-3 mission (2024)
- Cooperation in:
  - Digital transition
  - Water (India–EU Water Partnership)
  - Migration (Common Agenda on Migration and Mobility)

Concerns Related to the India–EU FTA

1. Regulatory Onslaught as Non-Tariff Barriers

- EU regulations increasingly function as **de facto trade barriers**, especially for developing economies like India.

Major EU Regulations Affecting India

Carbon Border Adjustment Mechanism (CBAM)

- A carbon tax on imports of:
  - Steel
  - Aluminium
  - Cement
  - Chemicals
- From 2026, Indian steel may face a **20–35% cost increase**.

EU Deforestation Regulation (EUDR)

- Bans imports of products linked to deforestation after 2020.
- Requires **geotagging and traceability**, imposing high compliance costs on small farmers.

Corporate Sustainability Due Diligence Directive (CSDDD) (Effective 2027)

- Mandates value-chain audits for human rights and environmental risks.
- Indian firms fear loss of confidential supplier data.

Industrial Accelerator Act

- May impose local content requirements, hurting Indian exports.

2. Trade Asymmetry and Limited Gains

- Over **75% of Indian exports already face EU tariffs below 1%**.
- India's average tariffs (10–12%) are much higher than EU's (3–4%).
- Competing countries like **Bangladesh, Vietnam, and Ethiopia** already enjoy zero-duty access.

3. Absence of Equal Regulatory Carve-outs

- EU has provided exemptions to the United States.
- Denial of similar treatment to India could neutralise FTA benefits.

4. EU Objections to Indian Quality Control Orders (QCOs)

- EU views **mandatory quality standards and audits** as trade barriers.
- India sees QCOs as essential for:
  - Consumer safety
  - Quality assurance
  - Domestic manufacturing push

Way Forward

- Fully leverage **services, mobility, and digital trade provisions** to balance goods asymmetry
- Establish a **Rapid Response Forum** to address emerging NTBs
- Secure **fair carve-outs and extended transition periods** for CBAM, EUDR, and CSDDD
- Integrate FTA with **IMEC, IPOI, and Trade and Technology Council (TTC)** frameworks
- Expand partnership into **technology, climate, defence, and supply chain resilience**

Conclusion

The India–EU FTA is not merely a trade agreement but a **strategic economic partnership** between two democratic power centres. Its success will depend on balancing regulatory burdens, ensuring equitable treatment in sustainability norms, and leveraging gains in services, mobility, and strategic cooperation to create a **resilient, future-ready India–EU partnership**.

ECONOMY

Year End Review 2025: Ministry of Petroleum & Natural Gas

Source: PIB

Relevance: GS Paper III: Energy security, clean energy transition, infrastructure development

Important Keywords

Prelims:

- Pradhan Mantri Ujjwala Yojana (PMUY), Electric Vehicles (EVs), Ethanol Blending Programme, Compressed Bio-Gas (CBG), Sustainable Aviation Fuel (SAF), Strategic Petroleum Reserves (SPR)

Mains:

- Energy Access, Energy Sustainability, Energy Security, Gas-based Economy, Upstream Sector Reforms, Critical Mineral Dependence

Why in News?

- The **Year End Review 2025** released by the **Ministry of Petroleum & Natural Gas (MoPNG)** outlines the Government of India's efforts during 2025 to strengthen **energy access, affordability, infrastructure, cleaner fuels and national energy security**.
- These initiatives assume importance as **oil and natural gas remain central to India's rapidly expanding economy**, supporting growth across multiple sectors.

Role and Mandate of the Ministry of Petroleum & Natural Gas

The **Ministry of Petroleum & Natural Gas** is responsible for the **entire hydrocarbon value chain** in India, including:

- **Exploration and production** of crude oil and natural gas
- **Refining, distribution and marketing** of petroleum products
- **Import, export and conservation** of oil and gas

Oil and natural gas continue to be **critical inputs for India's rapidly growing economy**, supporting industrial growth, transport, agriculture, power generation and household energy needs.

During **2025**, the Ministry pursued a **comprehensive and integrated approach** to:

- Ensure **affordable energy access**
- Enhance **domestic production**
- Strengthen **fuel and gas infrastructure**
- Promote **cleaner fuels**
- Reinforce **national energy security**

All initiatives were aligned with the four national energy priorities:

- **Energy Access, Energy Efficiency, Energy Sustainability and Energy Security**.

What are the Key Achievements of the Ministry of Petroleum & Natural Gas in 2025?

Expansion of Clean Cooking Fuel Access (PMUY)

- **Pradhan Mantri Ujjwala Yojana (PMUY)** beneficiaries reached **about 10.35 crore** as on 1 December 2025, indicating near-saturation of LPG access.
- To address residual demand, the Government approved **25 lakh additional LPG connections** during FY 2025–26.
- A major reform was introduced by replacing the earlier multi-point self-declaration system with a **single Deprivation Declaration**, simplifying eligibility and improving inclusion.
- LPG affordability was supported through a **₹300 subsidy per 14.2 kg cylinder**, applicable for up to **nine refills per year** for PMUY beneficiaries.
- This led to a steady rise in LPG usage:
  - Around **3 refills per year** in 2019–20
  - **4.47 refills** in FY 2024–25
  - **~4.85 refills per annum (pro-rated)** in FY 2025–26
- The trend indicates **sustained behavioural adoption of clean cooking fuel**.

Transparency and Consumer Safety in LPG Usage

- To improve subsidy targeting, **biometric Aadhaar authentication** was accelerated:
  - Covered **71% of PMUY consumers**
  - Covered **62% of non-PMUY consumers** (as of 1 December 2025)
- A **special nationwide drive in November 2025** enabled consumers to complete authentication through **simplified mobile-based processes**, free of cost.
- Consumer safety was strengthened through

a **nationwide Basic Safety Check campaign**:

- **12.12 crore free safety inspections** conducted at customer premises
- **4.65 crore LPG hoses** replaced at discounted rates

- These measures significantly improved **domestic LPG safety awareness** and reduced accident risks.

Strengthening Fuel Retail and Transport Infrastructure

- Petroleum marketing infrastructure was modernised through:
  - **Over 90,000 retail outlets** enabled with digital payments
  - Deployment of **2.71 lakh POS terminals**
- **Door-to-door fuel delivery** expanded via commissioning of **over 3,200 bowsers**, improving access in remote areas.
- Under the **Swachh Bharat Mission**:
  - Toilets were ensured at nearly all retail outlets
  - Many outlets provided **separate facilities for men and women**, improving hygiene and traveller convenience
- Electric mobility infrastructure expanded rapidly:
  - **8,932 EV charging stations** installed under **FAME-II**
  - **18,500+ additional chargers** set up by Oil Marketing Companies from own resources

APNA GHAR Initiative and Integrated Energy Stations

- Under the **APNA GHAR initiative**, more than **500 wayside amenities** were established for truck drivers.
- These facilities contributed to:
  - Improved road safety
  - Better working conditions for transport workers
  - Additional rural employment
- Public Sector Oil Marketing Companies initiated **4,000 integrated Energy Stations** during 2024–25 to 2028–29.
- These Energy Stations function as **multi-fuel mobility hubs**, offering:
  - Petrol and diesel
  - Biofuels
  - CNG and LNG (where feasible)
  - Electric vehicle charging
- As on 1 November 2025, **1,064 Energy Stations** were operational nationwide.

Expansion of the Gas-Based Economy

- Operational natural gas pipelines expanded from:
  - **15,340 km (2014)** to **25,429 km (June 2025)**
- An additional **10,459 km** of pipelines are under execution.
- Completion will enable a **fully connected national gas grid**, supporting balanced regional development.
- To reduce regional tariff disparities, **PNGRB implemented the Unified Pipeline Tariff regime**:
  - Based on the mission **"One Nation, One Grid, One Tariff"**
  - Effective from **1 April 2023**
  - Covers about **90% of operational pipelines**
- **City Gas Distribution (CGD)** expanded to **307 geographical areas**:
  - **1.57 crore PNG domestic connections**
  - **Over 8,400 CNG stations** (as of

September 2025)

- Revised domestic gas allocation guidelines aligned supply with actual consumption and reduced price volatility.

Biofuels and Cleaner Energy Transition

- Under the **SATAT initiative**, **over 130 Compressed Bio Gas (CBG) plants** were commissioned by November 2025.
- **Mandatory CBG blending** in CNG and PNG commenced from FY 2025–26, supported by:
  - Financial assistance for pipeline connectivity
  - Biomass aggregation
- Ethanol blending in petrol reached **19.24%** in ESY 2024–25.
- This resulted in:
  - **₹1.55 lakh crore foreign exchange savings**
  - Significant reduction in carbon emissions
- Under **Pradhan Mantri JI-VAN Yojana**, second-generation ethanol plants became operational at:
  - **Panipat**
  - **Numaligarh**

Sustainable Aviation Fuel (SAF) and Biodiesel

- Government announced **indicative SAF blending targets** for international flights:
  - **1% in 2027**
  - **2% in 2028**
  - **5% in 2030**
- **Indian Oil Corporation Limited (IOCL)** became the first Indian company to receive **ISCC CORSIA certification** for SAF production at its Panipat refinery.
- IOCL subsequently signed an **MoU with Air India** for SAF supply.
- Biodiesel blending expanded through increased procurement and diversification of feedstocks.

Upstream Sector Reforms and Strategic Energy Security

- Major reforms introduced through:
  - **Oilfields (Regulation and Development) Amendment Act, 2025**
  - **Petroleum and Natural Gas Rules, 2025**
- Under the **Hydrocarbon Exploration Licensing Policy (HELP)**:
  - **172 blocks** awarded
  - Area covered: **>3.78 lakh sq km**
  - Committed investment: **USD 4.36 billion**
- Exploration activity intensified via:
  - Seismic surveys
  - Drilling programmes
  - **Mission Anveshan**
- **Strategic Petroleum Reserves** strengthened through:
  - Progress under Phase-II facilities
  - Renewed international partnerships

- Overseas investments by Indian oil and gas PSUs continued to diversify supply sources and strengthen long-term energy security.

What Steps are Needed to Strengthen India's Energy Security?

- **Boost Domestic Production:** Implement upstream reforms, expand Mission Anveshan, deploy AI and Enhanced Oil Recovery in mature fields.
- **Diversify Energy Imports:** Secure long-term contracts with new suppliers and bypass maritime chokepoints.
- **Accelerate Clean Transition:** Scale battery storage, green hydrogen, ethanol blending, and CBG mandates.
- **Critical Mineral Self-Reliance:** Operationalise the **National Critical Minerals Mission**, build refining capacity, and develop recycling ecosystems.
- **Energy Diplomacy:** Strengthen global partnerships through **ISA, OSOWOG**, and nuclear cooperation.

Conclusion

The **Year End Review 2025** demonstrates that the Ministry of Petroleum & Natural Gas adopted a **holistic, reform-oriented and future-focused approach** during the year. By simultaneously expanding energy access, modernising infrastructure, promoting cleaner fuels, reforming the upstream sector and strengthening strategic preparedness, the Ministry significantly enhanced India's **energy affordability, sustainability and security**, supporting the country's transition towards a **resilient and inclusive energy future**.

Year End Review 2025: Ministry of Micro, Small & Medium Enterprises

Source: PIB

Relevance: **General Studies Paper–III (GS–III) (Indian Economy, Inclusive Growth, MSMEs, Employment generation, Government initiatives, Technology and innovation)**

Important Keywords

For Prelims:

- Artisan-centric livelihood framework (PM Vishwakarma); Technology-enabled MSME ecosystem (Digital MSME 2.0); Employment-linked enterprise promotion scheme (PMEGP); Credit risk-sharing mechanism for MSEs (CGTMSE); Digital commerce integration platform for MSMEs (ONDC); Equity and growth capital facility for MSMEs (SRI Fund); Performance-oriented MSME reform initiative (RAMP); Quality, innovation and competitiveness framework (MSME Champions);

For Mains:

- Major achievements and policy initiatives of the Ministry of MSME during 2025; Contribution of MSMEs to employment generation, industrial growth and inclusive development; Key financial, technological and market-related challenges confronting MSMEs; Way forward for building resilient, competitive and globally integrated MSMEs.

Why in News?

The year **2025 witnessed significant and reform-oriented advances in India's Micro, Small and Medium Enterprises (MSME) sector**, strengthening its central role in **job creation, inclusive growth, and balanced economic development**.

MAJOR ACHIEVEMENTS AND INITIATIVES UNDER VARIOUS SCHEMES/ PROGRAMMES DURING 2025:

MSME Sector: Strategic Importance

From a policy perspective, MSMEs are critical to:

- Inclusive and employment-intensive growth
- Strengthening domestic value chains
- Enhancing export competitiveness
- Advancing the goals of **Atmanirbhar Bharat**

Their contribution extends beyond economics, influencing **social stability, rural livelihoods, and regional development**.

Formalisation of MSMEs (2025)

Udyam Registration Portal

The **Udyam Registration Portal**, launched on **1 July 2020**, was designed to simplify MSME registration and ensure seamless access to government schemes and benefits. The portal is:

- **Free of cost**
- **Paperless**
- **Fully digital**

It significantly reduced procedural barriers and encouraged voluntary participation of enterprises in the formal economy.

Udyam Assist Platform (UAP)

To further deepen formalisation, the Ministry launched the **Udyam Assist Platform (UAP)** on **11 January 2023**. Its primary objective is to bring **Informal Micro Enterprises (IMEs)** into the formal system and enable them to access **Priority Sector Lending (PSL)**.

UAP serves as a critical bridge between:

- Informal enterprises, and
- Institutional credit and policy support mechanisms.

Extent of Formalisation

Between **1 July 2020 and 17 December 2025**, more than **7.30 crore enterprises** were brought under the formal framework:

- **4.37 crore** enterprises registered on the Udyam Portal
- **2.92 crore** enterprises covered through the Udyam Assist Platform

This large-scale registration drive represents one of the most comprehensive enterprise formalisation efforts undertaken in India.

Revised MSME Classification: Union Budget 2025–26

Recognising the need to allow MSMEs to **grow without losing policy support**, the Union Budget **2025–26** revised the investment and turnover thresholds for MSME classification. The revised definition came into effect from **1 April 2025**.

Revised MSME Definition (₹ crore)

Enterprise	Investment (Old)	Investment (Revised)	Turnover (Old)	Turnover (Revised)
Micro	1	2.5	5	10
Small	10	25	50	100
Medium	50	125	250	500

- **Investment limits increased by 2.5 times**
- **Turnover limits increased by 2 times**

Access to Credit:

Prime Minister's Employment Generation Programme (PMEGP)

- Credit-linked **margin money subsidy** for **new micro-enterprises** in the **non-farm**

sector.

- Promotes **self-employment and job creation**, especially in rural and backward regions.
- Combines **bank credit + subsidy**, lowering entry barriers for first-generation entrepreneurs.
- Supports **manufacturing and services**, aiding rural economic diversification.
- Multilingual applications (19 regional languages) improve **inclusivity and outreach**.
- Contributes to **poverty reduction, balanced regional development, and Atmanirbhar Bharat**.

Credit Guarantee Scheme for MSEs (CGSMSE)

- Enables **collateral-free institutional credit** to MSEs by sharing lender risk with government via **Credit Guarantee Fund Trust for Micro and Small Enterprises**.
- Overcomes a key structural constraint of MSMEs: **lack of collateral**.
- Enhanced guarantee cover (up to **₹10 crore**) supports **scaling and growth-oriented MSMEs**.
- Rationalised guarantee fees improve **scheme sustainability** and lender participation.
- Inclusive provisions strengthen **financial inclusion and social equity**.

Infrastructure & Capacity Building

PM Vishwakarma Scheme

- Launched to provide **end-to-end support to traditional artisans and craftspeople** across **18 trades**.
- Achieved **30 lakh beneficiary registrations within two years**, reflecting strong grassroots outreach.
- Focuses on **skill upgradation, credit access, digital inclusion, tool modernisation and marketing support**.
- Large-scale **collateral-free credit** and **toolkit distribution** enhance productivity and income security.
- Trade fairs and exhibitions strengthen **market linkages**, preserving traditional skills while integrating them into modern value chains.
- Contributes to **heritage-based livelihoods, inclusive growth**, and **rural non-farm employment**.

Raising and Accelerating MSME Performance (RAMP) Scheme

- **World Bank–supported Central Sector Scheme** to improve MSME access to **markets, finance and technology**.
- Emphasises **institutional strengthening** at Centre and State levels and **cooperative federalism**.
- Approval of State/UT-led proposals reflects a **bottom-up, reform-linked funding approach**.
- Large MSME coverage indicates its role in **systemic competitiveness and productivity enhancement**.
- Supports transition from **scheme-based assistance to performance-based MSME growth**.

Micro and Small Enterprises Cluster Development Programme (MSE-CDP)

- Cluster-based approach to improve **productivity, competitiveness and economies of scale**.
- Supports **Common Facility Centres (CFCs), flatted factories and industrial estates**.
- High number of completed projects shows **infrastructure-led MSME strengthening**.
- Enables **shared technology, testing, and infrastructure**, reducing individual

enterprise costs.

- Enhances **regional industrial ecosystems** and local employment.

Promotion of MSMEs in North Eastern Region & Sikkim

- Addresses **regional imbalance** by supporting MSME infrastructure in **NER & Sikkim**.
- Focuses on **technology centres, industrial estates and tourism-linked MSMEs**.
- Strengthens **manufacturing, R&D, packaging, skilling and innovation** in a geographically constrained region.
- Infrastructure support improves **market connectivity and regional integration**.
- Aligns MSME growth with **Act East Policy** and **balanced regional development**.

Assistance in Procurement and Marketing

Public Procurement Policy for MSEs (2012)

- Ensures **assured market access** by mandating **25% annual procurement** from MSEs by Central Ministries/Departments/CPSEs.
- Includes **sub-targets**: **4% SC/ST-owned** and **3% women-owned** MSEs; **358 items reserved** exclusively for MSEs.
- Actual procurement exceeded mandate in **2024–25** (**43.58%**), signalling effective demand-side support.
- Strengthens **MSME viability, scale, and predictability of demand**, aiding formalisation and competitiveness.

Procurement & Marketing Support (PMS) Scheme

- Expands **market access** via domestic trade fairs/expos; improves **product visibility and buyer linkages**.
- **2025–26:** 225 events; **10,271 MSEs benefited**—demonstrates scale and outreach.
- **IITF–2025** showcased MSMEs nationwide (292 stalls): strong **women, SC/ST, PwD, GI and ODOP** representation.
- Recognition ("**Empowering India**" Silver Medal) reflects institutional push for **inclusive market integration**.

National SC–ST Hub (NSSH)

- Builds **capacity and entrepreneurship culture** among SC/ST MSEs to meet the **4% procurement mandate**.
- Uses **vendor development programmes, conclaves, and handholding** to integrate SC/ST firms into CPSE supply chains.
- Outcomes show **sharp procurement value gains (37-fold since 2015–16)**—evidence of targeted inclusion working.
- Addresses structural barriers via **skills upgradation, market linkages, and buyer sensitisation**.

Access to Technology

MSME Champions Scheme

- Umbrella scheme to **modernise processes, reduce waste, and enhance global competitiveness** of MSMEs.
- Operates through **three integrated components**:
  - **ZED (Zero Defect Zero Effect):** Improves **quality, productivity, sustainability**, and environmental compliance.
  - **LEAN:** Promotes **process efficiency, cost reduction, and operational excellence**.
  - **Innovative (Incubation, Design & IPR):** Encourages **innovation, product design, and IP protection**.

Innovative Component

- **Incubation:** Network of **773 Host Institutes** nurtures new ideas; **Idea Hackathon 5.0**

(2025) reflects scale of grassroots innovation.

- **Design:** Collaboration with **IISc, IITs, NITs** integrates **design thinking into MSMEs**.
- **IPR:** Patent, trademark, design and GI support strengthens **technology ownership and market power**.

ZED Certification

- Large-scale certification across **Bronze–Silver–Gold levels** signals a shift towards **quality-led MSME growth**.
- Enhances **export readiness, buyer confidence, and sustainable manufacturing**.

LEAN Scheme

- Improves **shop-floor practices and competitiveness**, enabling MSMEs to integrate with **global value chains**.

Technology Centres & Infrastructure

- **Technology Centres (Tool Rooms)** provide **design, tooling, precision manufacturing, and testing support** to MSMEs.
- Support **strategic sectors** (defence, aerospace) and act as hubs for **industry-ready skilling**.
- Expansion via **Technology Centre & Extension Centre (TCEC) Scheme** improves **regional access to technology and advisory services**.
- **Technology Centre System Programme (TCSP)** modernises centres with **World Bank support**, strengthening advanced manufacturing capacity.
- New and upgraded centres have directly supported **MSME productivity and skilled manpower creation**.

Skilling & Entrepreneurship Development

- **Entrepreneurship Skill Development Programme (ESDP)** builds **entrepreneurial and managerial capabilities** at scale.
- **Assistance to Training Institutions (ATI)** strengthens training infrastructure across **ni-msme, KVIC, NSIC, MGIRI, Tool Rooms**, and State EDIs.
- Focus on **Eastern India and North-East** addresses regional skill gaps and enterprise readiness.

IT Initiatives & Cyber Security

- **Cyber Jagrit Bharat (Oct 2025)** enhanced **cyber hygiene and resilience** among MSMEs and officials, with support from **Indian Computer Emergency Response Team (CERT-In)**.
- Addresses rising **digital and financial cyber risks** in MSME digitisation.

Data-Driven & Spatial Governance

- **Performance Smartboard** improves **transparency, monitoring, and evidence-based policymaking** across MSME schemes.
- Integration with **PM Gati Shakti National Master Plan** through **GIS mapping of ~1 lakh assets** enables:
  - Better **targeting and convergence of schemes**
  - Identification of **infrastructure gaps**
  - Improved **last-mile delivery and resource allocation**

Promotion of Khadi Village Industries and Coir Sector

Khadi & Village Industries (KVI)

- Promotion of KVI is central to **rural employment, artisan livelihoods, and decentralised industrialisation**.
- Implemented through **Khadi and Gramodyog Vikas Yojana (KGVY)**, a **Central Sector Scheme** with:
  - **Khadi Vikas Yojana (KVY):** Promotion and development of Khadi

- **Gramodyog Vikas Yojana (GVY):** Promotion of village industries

Economic Performance (FY 2025–26, till 30.11.2025)

- **KVI Sales:** ₹1,27,606 crore (↑ from ₹1,10,747 crore in FY 2024–25)
- **KVI Production:** ₹85,072 crore (↑ from ₹76,018 crore in FY 2024–25) → Indicates **revival, market expansion and rising demand**.

Key Initiatives

- **Artisan income enhancement:** Spinning wages raised; weaving wages increased by **20%** (from 01.04.2025).
- **Market access:** MoU between **Khadi and Village Industries Commission (KVIC)** and **National Small Industries Corporation (NSIC)** for a *whole-of-government* market ecosystem.
- **Khadi Mahotsav (Sept–Oct 2025):** Nationwide promotion under *Vocal for Local* and *Atmanirbhar Bharat*.
- **Global outreach:** Participation in **North East India Festival, Seoul (2025)** to internationalise the **"Khadi India"** brand.

Mains Linkage: Strengthens **rural non-farm employment, artisan incomes, cultural economy and local manufacturing**.

Coir Sector

- Coir sector showed strong **export-led and technology-driven growth** in 2025.
- **Exports (Jan–Oct 2025):** ₹5,260.77 crore, reflecting **robust global demand**.

Skill, Market & Technology Support

- **Skill upgradation:** Training of **985 artisans**, including **437 women**, promoting **women-led livelihoods**.
- **Market promotion:**
  - 74 domestic promotional programmes
  - Participation in 35 domestic & 6 international exhibitions
- **Entrepreneurship:** Registration of **166 new exporters**, expanding export base.

Innovation & Sustainability

- **Technology development:** 7 new machines/products (e.g., thin blended coir yarn spinning machine) for **value addition and modernisation**.
- **Environmental positioning:** Life Cycle Assessment with academic collaboration highlights **eco-friendly advantages of coir over synthetics**.
- **International Cooperation:** ₹633 lakh assistance to 151 beneficiaries for **capacity building and global integration**.

Achievements of Ministry's Other Organisations

National Small Industries Corporation (NSIC)

- Provides **raw material credit support** to MSMEs under the **Raw Material Assistance (RMA)** scheme by paying suppliers against **Bank Guarantee**, easing working capital constraints.
- **FY 2024–25:** ₹8,479.91 crore credit support to **2,482 MSMEs**.
- **Jan–Nov 2025:** ₹7,841.42 crore (provisional) support to **2,440+ MSMEs**, indicating sustained demand for institutional working capital.
- **NSIC Technical Services Centres (NTSCs)** deliver **job-oriented, industry-aligned skilling** using conventional to hi-tech machinery.
- Achieved **record skilling outcomes** with over **84,000 trainees trained in 2025**, reflecting MSME skill demand.
- Establishment of **NTSC at Bodh Gaya** strengthens **regional skill infrastructure** for the Magadh region, linking skilling with

NSSH and procurement ecosystems.

Mains Linkage: NSIC strengthens **MSME liquidity, skill readiness, and regional industrial capacity**, directly supporting competitiveness and employment.

Mahatma Gandhi Institute for Rural Industrialization (MGIRI)

- A **national autonomous institute** rooted in **Gandhian principles**, promoting **self-sufficiency and sustainable rural industries**.
- Supports micro enterprises and artisans through **product development, consultancy, incubation, machinery design, and technology dissemination**.
- Repositioning as a **Centre of Excellence (CoE) for Rural Industrialisation** approved, signalling a shift to **high-impact institutional support**.
- Infrastructure augmentation (hostel/guest house) strengthens **training and outreach capacity**.
- In 2025, MGIRI delivered **large-scale skill programmes**, developed **new technologies and innovative products**, and expanded outreach to **remote regions (NE & Ladakh)**.

Mains Linkage: MGIRI anchors **sustainable rural industrialisation**, artisan empowerment, and region-specific technology solutions—key to **inclusive growth**.

National Institute for Micro, Small and Medium Enterprises (ni-msme)

- Apex **training, research, and policy support institution** for MSMEs under the MSMED framework.
- Focus areas include **entrepreneurship development, IT training, programme evaluation, policy studies, and inclusion of the under-privileged**.
- In 2025, conducted **extensive national training programmes and workshops**, strengthening **entrepreneurial and managerial capacity**.
- Initiated **international training programmes** with **CIRDAP**, marking India's role in **South–South cooperation** in MSME development.

Bilateral Cooperation, New Initiatives & Major Events

Bilateral MoUs & International Engagements

- **MSME internationalisation** strengthened through MoUs with **Mauritius, Thailand, Slovakia and Malaysia**, focusing on:
  - **Capacity building & expert exchanges**
  - **Technology transfer & industrial partnerships**
  - **Business missions, exhibitions and trade fairs**
  - **Training and technical assistance**
- MoUs involving **National Small Industries Corporation (NSIC)** position Indian MSMEs within **global value chains** and promote **enterprise-to-enterprise cooperation**.
- Engagements reflect India's strategy of **MSME-led economic diplomacy** and **South–South & Indo-Pacific cooperation**.

India–Japan & India–Taiwan MSME Cooperation

- **5S & Kaizen Programme (Japan):**
  - Certification of Indian trainers enhances **manufacturing efficiency, quality culture and shop-floor competitiveness**.
- **India–Japan MSME Joint Working Group (JWG):**
  - Platform under **Industrial Competitiveness Partnership** to align **technology, skilling and productivity roadmaps**.

- **India–Taiwan MSME JWG:**
  - Focus on **technology collaboration, SME innovation and future roadmap**, reinforcing **East Asian MSME integration**.

Other Major Initiatives & Events

MSME Hackathon 5.0 (2025)

- Promotes **smart and sustainable MSMEs** through **innovation-led growth**.
- Supports **technology adoption, product design and business strategy** with **financial assistance up to ₹15 lakh**.
- Large participation indicates **strong innovation potential at grassroots level**.

Online Dispute Resolution (ODR) Portal

- Addresses **delayed payments to MSEs**, a chronic MSME constraint.
- Provides **low-cost, digital, end-to-end dispute resolution**, improving **ease of doing business and trust in formal systems**.

Yashasvini Campaign

- Targets **gender parity in MSME formalisation** and **women-led enterprise visibility**.
- Enhances awareness and registration of **women-owned MSMEs**, supporting **inclusive entrepreneurship and procurement equity**.

Major Outreach & Conclaves

PM Vishwakarma & National SC–ST Hub Mega Conclave (2025)

- Showcases **artisans' livelihood transformation** and **inclusive entrepreneurship**.
- MoUs with **design and management institutions** strengthen **design thinking, capacity building and rural livelihoods**.

MSME Seva Parv – 2025 (Virasat se Vikas)

- Integrates **heritage, livelihoods and enterprise support**.
- Mass beneficiary engagement reinforces **last-mile delivery, social inclusion and scheme awareness**.

Special Campaign 5.0

- Demonstrates **good governance and sustainability** through:
  - **E-waste disposal, office cleanliness, pendency reduction**
  - **Revenue generation from scrap** and space optimisation
- Encourages **Jan Bhagidari** and **environment-friendly administrative practices**.

India's Seafood Exports Amid US Tariffs: Sectoral Strength and Strategic Diversification

Source: The Indian Express

Relevance:

- **GS Paper III – Agriculture, Fisheries, External Trade, Food Processing, Export Competitiveness**
- **GS Paper II – India–US Trade Relations, Trade Diversification Strategy**

Important Keywords

Prelims

- Marine Products Export Development Authority (MPEDA), Vannamei Shrimp, Aquaculture, Anti-dumping Duty,

Countervailing Duty, Tariff Barriers, Frozen Shrimp, PM Matsya Sampada Yojana (PMMSY)

Mains

- Agricultural Exports, Trade Diversification, Supply Chain Resilience, Fisheries Sector Reforms, Export Competitiveness, Market Access, Protectionism, Blue Economy

Why in News?

India's marine product exports recorded a **16% increase in value** and **12% growth in volume** during **April–October 2025**, despite a decline in exports to the United States caused by **very high tariffs on Indian shrimp**, highlighting the sector's growing resilience and successful export diversification.

India's Seafood Sector: Scale and Structure

India has one of the **largest and most diversified seafood sectors globally**, supported by:

- A coastline of over **7,500 km**
- Extensive inland water resources
- A strong aquaculture base

The sector plays a vital role in:

- Employment generation and coastal livelihoods
- Foreign exchange earnings
- Food and nutritional security

India is the **3rd largest fish producer** and the **2nd largest aquaculture producer** in the world.

Export Profile and Major Markets

- **Shrimp**, particularly **frozen Vannamei shrimp**, dominates export value and volume
- Other exports include frozen fish, cuttlefish, squid, crabs, and value-added products

Traditionally, major markets have been:

- United States
- China
- Japan
- European Union

In recent years, India has actively pursued **market diversification** to reduce over-dependence on a single destination.

Recent Export Performance (FY 2025–26)

- **Export value:**
  - $4.87 billion (Apr–Oct 2025)
  - Up from $4.19 billion in the same period of 2024
- **Export volume:**
  - Increased from **9.62 lakh MT to 10.73 lakh MT**
- **April–November 2025–26:**
  - Marine exports rose over **16% to $5.75 billion**

Impact of US Tariffs

- Effective US duties on Indian shrimp rose to nearly **60%**, including:
  - Anti-dumping duties
  - Countervailing duties

  - Additional tariff measures
- As a result:
  - Exports to the US declined by **4% in value** and **11% in quantity**
  - India faced a disadvantage compared to Ecuador, Vietnam, and Thailand

Despite this, the US remains India's **single largest seafood market**, underscoring the need for balanced engagement.

Diversification and Emerging Markets

India successfully offset US losses through expansion into alternative markets:

- **China:** Exports rose to **$845.67 million**
- **Vietnam:** Over **100% growth in value** and **90% growth in volume**
- **Belgium:** Nearly **90% increase**
- Other markets: Germany, Malaysia, Japan, UK, Russia, Canada

This reflects a **strategic eastward and European pivot** in export destinations.

Institutional Support and Policy Measures

- **MPEDA** plays a central role in:
  - Quality control and traceability
  - Export promotion and market access
- **PM Matsya Sampada Yojana (PMMSY)** has strengthened:
  - Fisheries infrastructure
  - Processing and cold-chain capacity
  - Sustainability and compliance standards

Regular consultations by Fisheries and Commerce Ministries have helped exporters overcome non-tariff barriers.

Challenges Ahead

- Shrimp-centric export dependence
- Empty US order pipeline beyond mid-January 2026
- Global logistics volatility and price pressures
- Need for higher value addition

Way Forward

- Deepen **export diversification** while retaining key markets
- Promote **value-added seafood processing**
- Strengthen trade negotiations on tariff and non-tariff barriers
- Enhance cold-chain, logistics, and compliance infrastructure
- Align fisheries growth with **Blue Economy** objectives

Conclusion

India's seafood sector has demonstrated strong **resilience, adaptability, and competitiveness** amid global trade disruptions. The successful diversification away from excessive US dependence marks a structural shift in India's export strategy. Sustained policy support, value addition, and market expansion will be crucial to ensuring long-term growth and stability of India's marine exports.

Achieving Sustainability in Rice Production

Source: **The Hindu**

Relevance: **GS Paper III – Cropping Patterns, Sustainable Agriculture, Environmental Pollution**

Why in News?

- In **2025**, India overtook China to become the **world's largest rice producer**.

- India now supplies **~40% of global rice exports**, crossing **20 million metric tonnes**.
- This achievement has revived debate on **water stress, ecological sustainability, climate change, and virtual water exports**, especially from **north-western India**.

Background: Rice in India's Agrarian System

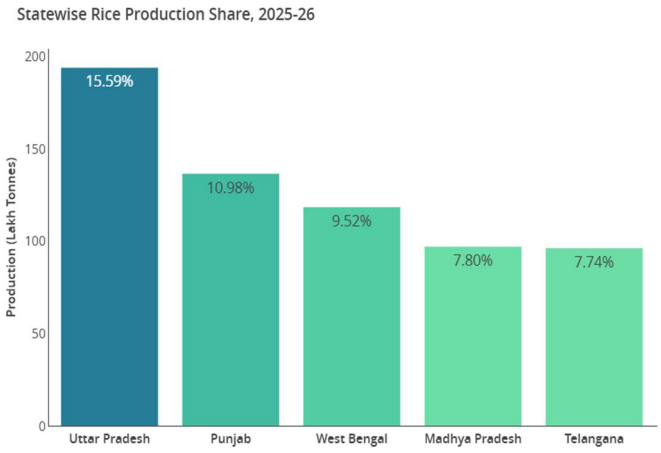
- Rice has been central to **India's food security strategy** since the Green Revolution.
- Assured procurement under **MSP**, free/subsidised electricity, and irrigation created a **rice–wheat monoculture** in Punjab and Haryana.
- What was once a **food security imperative** has now become an **ecological liability**.

Facts Regarding Rice

- Staple food for nearly **65% of Indians**.
- Occupies **~25% of total cropped area**.
- India ranks **1st globally** in production and exports (2025).
- Major producing states: **Uttar Pradesh, Punjab, West Bengal**.

Agro-Climatic Requirements

- **Kharif crop** requiring:
  - Temperature: **>25°C**
  - Rainfall: **>100 cm**
  - High humidity
- Thrives in **water-retentive soils**, making it suitable for monsoon regions but problematic in semi-arid zones.



Rice Cultivation Practices

1. Traditional Transplanted Paddy

- Seedlings grown in nurseries and transplanted.
- Requires **continuous flooding**.
- Consumes **25–27 irrigations per season**.
- Maximises yield but is **resource-intensive**.

2. Direct Seeded Rice (DSR)

- Seeds drilled directly into fields.
- Reduces:
  - Water use
  - Labour requirement
  - Energy consumption
- Crucial for **water-stressed regions**, but requires:
  - Weed control
  - Proper soil moisture management

Government Initiatives for Sustainability

Water Management

- Promotion of **DSR**, micro-irrigation under **PMKSY**.
- State incentives (e.g., Haryana crop diversification schemes).

Climate-Resilient Agriculture

- ICAR's **NICRA** programme for drought-, heat- and salinity-tolerant rice.

Nutritional Security

- **Fortified rice** under NFSA and PM-POSHAN to tackle anaemia.

Climate Action

- **Alternate Wetting and Drying (AWD)** to reduce methane emissions.
- Rice practices integrated into India's **climate mitigation strategy**.

Major Concerns Associated with Rice Cultivation

1. Groundwater Depletion

- **1 kg rice = 3,000–4,000 litres of water**.
- In Punjab–Haryana: Water table fell from **~30 feet to 80–200 feet**.
- Extraction exceeds recharge by **35–57% annually**.
- Represents **inter-generational ecological injustice**, burdening future generations.

2. Environmental Degradation

- Flooded paddies create **anaerobic conditions**, emitting methane.
- Rice contributes **10–20% of India's agricultural GHG emissions**.
- Stubble burning worsens:
  - PM2.5 pollution
    - Winter smog in North India

3. Health Risks

- Use of **arsenic-contaminated groundwater** leads to arsenic accumulation in rice grains.
- Linked to:
  - Cancer
  - Neurological disorders
- Heavy pesticide use compounds toxicity.

4. Economic Stress on Farmers

- Rising costs of:
  - Deeper borewells
  - High-capacity pumps
- Punjab spends **₹39,000 per hectare** on rice-related power and fertiliser subsidies.
- Small farmers face **debt traps**, while large farmers cope better.

5. Climate Vulnerability

- Climate change may reduce rice yields by **6–10%**.
- Erratic monsoons threaten **rainfed eastern India**.
- Creates a **water–energy–climate feedback loop**:
  - Subsidised power → over-extraction → higher emissions

Global Food Security Implications

- India supplies **40% of global rice exports**.
- Any production shock can:
  - Raise global prices
  - Affect food-importing nations in Africa and Asia
- Makes India a **systemically important player** in global food markets.

Steps Required for Sustainable Rice Production

1. Reforming Subsidy Structures

- Shift from **input subsidies** to:
  - Direct income support
  - Payments for ecosystem services
- Ensure **MSP and procurement** for millets, pulses, oilseeds.

2. Technology & Water Efficiency

- Scale up:
  - **SRI**
  - **AWD**
  - Micro-irrigation
- Promote **genome-edited drought-tolerant rice**.
- Use AI-based advisory systems to cut water use by **30–40%**.

3. Institutional & Policy Measures

- Ban new borewells in critical zones.
- Promote **community-led groundwater governance**.
- Strengthen **FPOs** for collective action and diversification.

4. Climate Resilience & Diversification

- Break rice–wheat monoculture.
- Promote:
  - Millets
  - Agroforestry
  - Crop rotation
- Support residue management and soil health cards.

5. Enhancing Farmer Incomes

- Expand **PMFBY** coverage.
- Develop:
  - Cold chains
  - Agro-processing units
  - Rural non-farm employment

Conclusion

India's dominance in global rice production highlights a critical **water–energy–climate–health nexus**. While rice remains vital for food security, **unchecked expansion threatens ecological sustainability and farmer welfare**. A transition toward **diversification, subsidy reform, and climate-resilient practices** is essential to reconcile **food security with long-term sustainability**.

MSMEs and Their Economic Footprint in India's Journey towards Viksit Bharat

Source: The Business Standard

Relevance: GS Paper III – Indian Economy, Growth and Development

Important Keywords

For Prelims:

- Udyam Portal, MSME Investment–Turnover Classification, Pradhan Mantri Mudra Yojana (PMMY), Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE), MSME Samadhaan Portal, CHAMPIONS Portal, Open Network for Digital Commerce (ONDC), Public Tech Platform for Frictionless Credit (RBI), PM Vishwakarma Scheme, ESG Norms, Carbon Border Adjustment Mechanism (CBAM).

For Mains:

- MSMEs as Backbone of Indian Economy, Contribution to GDP and Employment,

Formalisation vs Informality, Credit Gap in MSMEs, Delayed Payments Crisis, "Missing Middle" Problem, Productivity and Technology Constraints, Digitalisation of MSMEs, Export Competitiveness of MSMEs, Women-led and Rural MSMEs, Green Transition and ESG Compliance, MSMEs in Viksit Bharat@2047.

Why in News?

Micro, Small and Medium Enterprises (MSMEs) are increasingly recognised as a **central pillar of India's Viksit Bharat@2047 vision**, given their dominant role in GDP contribution, employment generation, exports, and inclusive growth.

Why MSMEs Are Central to India's Economic Structure

Backbone of Economic Output

- Contribute **~30.1% of India's GDP** and **~35.4% of manufacturing output**.
- Act as key suppliers of raw materials, components, and intermediates to large industries.
- Strengthen industrial clusters such as **automobiles, textiles, pharmaceuticals**, and engineering.
- Over **7 crore registrations on the Udyam Portal (Jan 2026)** have accelerated formalisation and tax-compliant growth.

Major Source of Employment and Inclusion

- Account for nearly **62% of total employment**, making MSMEs the largest non-farm job creators.
- Provide livelihoods to **women, youth, and informal workers**, enhancing social inclusion.
- Government schemes like **PM Mudra Yojana, PM Vishwakarma, Stand-Up India, PM SVANidhi, and CGTMSE** support self-employment, entrepreneurship, and formal credit access.

Drivers of Digitalisation and Technology Adoption

- Increasing use of **digital payments, e-procurement, and online customer interfaces**.
- **ONDC** is democratising e-commerce by lowering entry barriers for small firms.
- **RBI's Public Tech Platform for Frictionless Credit** enables faster, data-driven, and collateral-light lending.
- Growing MSME participation in **aerospace, electronics, defence, and pharmaceuticals** reflects rising innovation capacity.

Key Pillar of Export Competitiveness

- Strong presence in **textiles, leather, gems & jewellery, engineering goods, pharmaceuticals, and processed foods**.
- MSME-linked products accounted for **45.73% of India's total exports in 2023–24**.
- Known for **cost efficiency, adaptability, and responsiveness** to diverse global markets.

Catalysts of Women-Led and Social Entrepreneurship

- Women-owned MSMEs promote **gender-inclusive growth and livelihood security**.
- Schemes such as **PM Mudra, Stand-Up India, DAY–NRLM, and Mahila Coir Yojana** expand access to finance, skills,

and markets.

- Integration of **SHGs, home-based workers, and social enterprises** into formal value chains enhances social mobility.

Revitalising Rural and Agri-Based Economies

- Create **non-farm employment** and reduce distress-driven migration.
- Key activities include **agro-processing, food and dairy industries, handicrafts, fisheries, and forest-based enterprises**.
- Programmes like **PM Vishwakarma, SRI Fund, PMFME**, and cluster-based initiatives drive rural industrialisation and enterprise formalisation.

Enablers of Green and Sustainable Growth

- Adoption of **renewable energy, energy-efficient machinery, waste recycling, and cleaner production processes**.
- National initiatives such as **RAMP Programme, ZED Certification, Energy Efficiency Financing Platform**, and progressive state policies (e.g., **Telangana MSME Policy**) mainstream sustainability.
- Align economic competitiveness with **environmental responsibility and circular economy goals**.

Key Issues Associated with India's MSME Sector

High Informality and Incomplete Formalisation

- Despite more than **7 crore Udyam registrations**, nearly **nine out of ten MSMEs operate informally**.
- Fear of regulatory compliance, low digital awareness, and formalisation costs discourage registration.
- Informality limits access to **bank credit, insurance, export incentives, and public procurement**.

The "Missing Middle" and Weak Scaling

- The MSME ecosystem is dominated by micro units, resulting in a **narrow base of small and medium firms**.
- Enterprises deliberately restrict growth to avoid higher tax, labour, and compliance thresholds.
- Nearly **95% of registered units remain micro or small**, constraining productivity and scale.

Delayed Payments and Liquidity Stress

- Payment delays remain a persistent operational challenge.
- Over **₹21,000 crore in dues** are pending across thousands of cases on the MSME Samadhaan portal.
- Weak enforcement pushes firms towards high-cost borrowing, affecting wages and production continuity.

Low Productivity and Technology Deficit

- MSMEs suffer from **outdated machinery, low capital investment, and limited technology adoption**.
- Inadequate digitisation and quality certification reduce competitiveness in high-value markets.
- Technology-support programmes reach only a small share of enterprises, leaving many behind.

Structural Credit Constraints

- MSMEs face an estimated **₹25–30 lakh crore credit gap**.
- Dependence on informal lenders persists, especially among micro enterprises.

- Existing credit schemes often provide **short-term, low-value loans**, insufficient for expansion and capital formation.

Skill Shortages and Human Capital Weakness

- A large proportion of the workforce remains **informally trained**, with limited exposure to modern skills.
- Nearly **half of MSMEs report difficulty in finding suitably skilled workers**, particularly in manufacturing and tech sectors.
- Weak apprenticeship systems and high labour turnover reduce efficiency and productivity.

Heavy Regulatory and Compliance Burden

- MSMEs face **multiple overlapping compliances** under tax, labour, environmental, and local laws.
- The sheer volume of regulatory requirements imposes high transaction costs on small firms.
- Criminal penalties for procedural lapses increase risk aversion and discourage expansion.

Limited Market Access and Branding

- Most MSMEs are confined to **local or regional markets** with weak marketing and logistics capabilities.
- Participation in platforms like GeM is constrained by documentation, standards, and price competition.
- Heavy reliance on traditional marketing channels restricts visibility and scale.

Export Competitiveness Challenges

- High logistics costs, limited export finance, and compliance with global standards constrain exports.
- Emerging ESG norms and carbon regulations (e.g., CBAM) raise costs for small exporters.
- Energy-intensive MSMEs face higher exposure due to dependence on fossil fuels.

Sustainability and Green Transition Barriers

- Limited financial capacity and technical know-how hinder adoption of clean and energy-efficient technologies.
- MSMEs contribute a notable share of industrial emissions but lack access to green finance.
- Without targeted support, many risk exclusion from future **low-carbon and ESG-driven markets**.

Measures to Strengthen India's MSME Sector

Expanding Access to Affordable and Timely Credit

- Closing the MSME credit gap requires a shift from asset-based lending to **cash-flow and data-driven financing**.
- Full rollout of the **RBI's Public Tech Platform for Frictionless Credit**, wider coverage under **CGTMSE**, and MSME-specific credit scoring using GST, Udyam and banking data can reduce lender risk.
- Availability of **long-term, reasonably priced credit** is crucial for investment, expansion, and productivity growth—not merely for short-term survival.

Ensuring Timely Payments and Strong Enforcement

- Chronic payment delays must be addressed through **automatic enforcement mechanisms** under the

MSME Development Act.

- Mandatory onboarding of large buyers and PSUs onto the **MSME Samadhaan portal**, automatic interest accrual on delayed payments, and stricter penalties for repeat defaulters can ease liquidity stress.
- Fast-track MSME facilitation councils can improve dispute resolution and restore cash-flow discipline.

Reducing Compliance Burden and Regulatory Complexity

- A **single-window, risk-based compliance system** should replace multiple inspections and filings.
- Greater reliance on self-certification for low-risk MSMEs and regulatory stability can reduce uncertainty and compliance costs.
- Digitised approvals and decriminalisation of minor procedural lapses would encourage firms to scale rather than remain small.

Accelerating Technology Adoption and Productivity

- Technology support should move beyond subsidies towards **cluster-based solutions**.
- Expansion of **Common Facility Centres (CFCs)**, shared R&D infrastructure, and plug-and-play industrial parks can raise productivity.
- Incentives for automation, quality certification, and Industry 4.0 adoption will help MSMEs integrate into global value chains.

Strengthening Skills, Apprenticeships, and Human Capital

- MSME growth depends on a **demand-driven skilling ecosystem** aligned with local industry needs.
- Expanding apprenticeships, modular short-term training, and recognition of prior learning can bridge skill gaps.
- Stronger **industry–ITI–MSME linkages** are essential for continuous workforce upgradation.

Expanding Market Access and Enabling Scale

- MSMEs need structured support to transition from **local markets to national and global platforms**.
- Simplified onboarding and handholding on **GeM and ONDC**, combined with logistics, branding, and marketing support, can enhance reach.
- Greater participation in public procurement and large private supply chains can drive economies of scale.

Enhancing Export Competitiveness

- Dedicated export finance windows and assistance for meeting global quality and ESG standards are critical.
- Cluster-based export hubs, digital trade facilitation, lower logistics costs, and market intelligence can help MSMEs compete internationally.

Strengthening Rural and Agro-based MSMEs

- Rural MSMEs should be embedded within **value addition, food processing, and agri-logistics ecosystems**.
- Better access to storage, cold chains, digital marketplaces, and credit guarantees can boost rural incomes and curb distress migration.
- Artisan and traditional enterprise clusters require modern design inputs, branding,

and global market linkages.

Supporting Green Transition and Sustainable MSMEs

- MSMEs need **dedicated green finance**, interest subvention for renewable energy adoption, and affordable access to clean technologies.
- Capacity building on ESG compliance, carbon accounting, and circular economy practices will ensure future export competitiveness.

Improving Institutional Coordination and Governance

- Stronger coordination between the Union, States, financial institutions, and industry bodies is essential.
- Outcome-based monitoring, real-time dashboards, and feedback-driven policy design can enhance scheme effectiveness.
- Empowering local institutions to strengthen MSME clusters will improve last-mile delivery.

Conclusion

Strengthening MSMEs is vital for achieving **Viksit Bharat@2047**, with clear objectives of raising their GDP contribution, generating quality employment, and expanding their export share beyond 60%. Addressing credit constraints, ensuring timely payments, accelerating digital and green transitions, and enabling scale will be decisive. A competitive, sustainable, and inclusive MSME ecosystem can convert India's entrepreneurial energy into enduring economic leadership.

30 Million Indian Cattle-Rearing Households Do Not Sell Milk: Study

Source: Down to earth

Relevance

GS Paper I – Indian Society, Rural Livelihoods, Agriculture

GS Paper III – Agriculture, Livestock Economy, Climate Change, Sustainable Development

Important Keywords

Prelims

- Cattle Rearing, Indigenous Cattle, Non-Market Uses, Draught Power, Dung Economy, Dairy Sector, Feed and Fodder, Climate Stress

Mains

- Rural Livelihood Systems, Livestock Economy, Smallholder Agriculture, Climate Resilience, Agricultural Policy, Sustainable Livestock Management

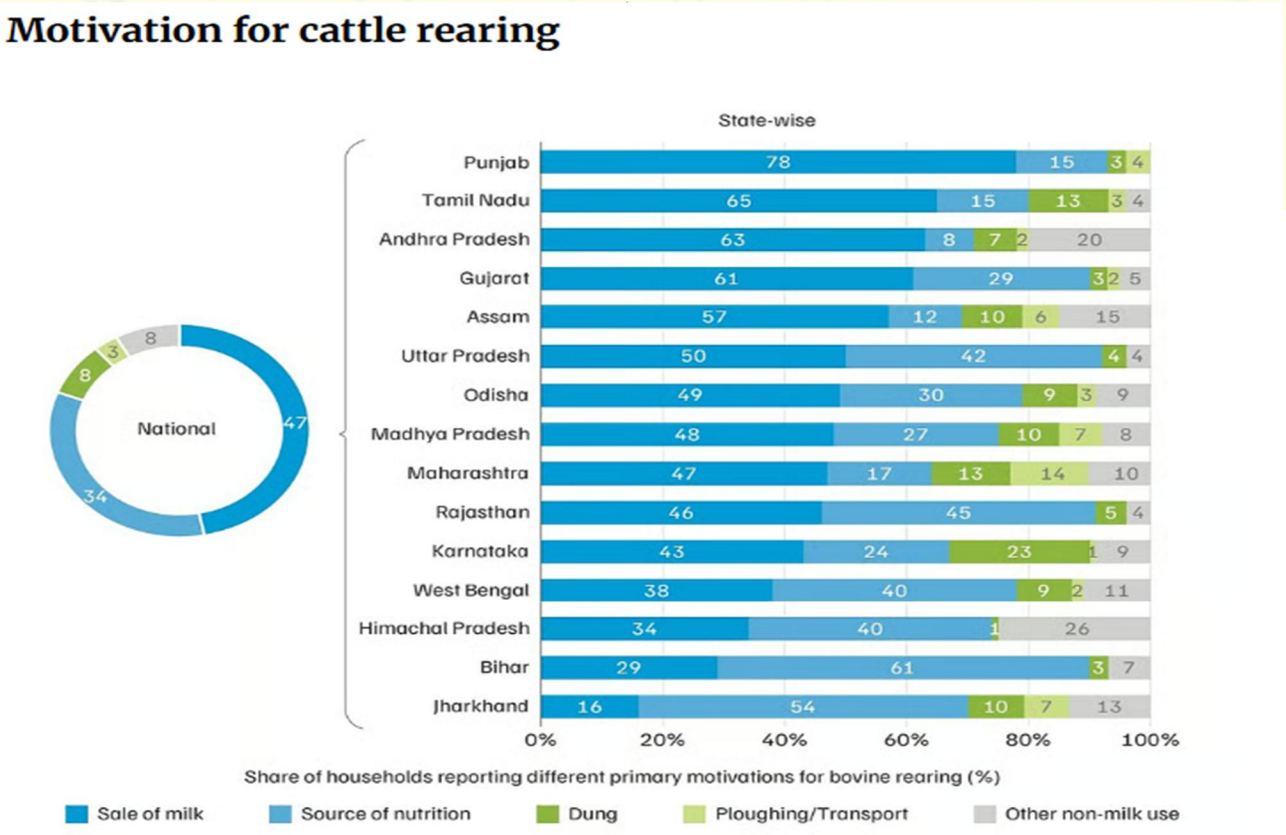
Why in News?

A new study released on **20 January 2026** by the **Council on Energy, Environment and Water** reveals that **nearly 30 million Indian cattle-rearing households do not sell milk**, challenging the long-held assumption that bovine rearing in India is primarily a dairy-driven economic activity. Instead, a significant share of households prioritise **non-market uses** such as dung, draught power and income from selling animals.

Key Findings of the Study

According to the study *Cattle and Community in a Changing Climate* (2026):

- **38% of cattle rearers** (around 30 million households) do not sell milk
- **31%** still rear cattle mainly for **household milk consumption**



Source: Cattle and Community in a Changing Climate, 2026, CEEW

- About **5.6 million households** rear cattle **entirely for non-dairy purposes**
- In **nine out of 15 states**, less than half of rearers cited milk sales as their primary motivation

These findings underline that cattle rearing in India functions as a **multi-purpose livelihood system**, not merely a dairy enterprise.

Regional Patterns in Cattle Rearing

The trend of non-milk-oriented cattle rearing is particularly pronounced in certain states:

- **Jharkhand:** 71% of cattle rearers do not prioritise milk sales
- **West Bengal & Himachal Pradesh:** Over 50% do not sell milk
- **Maharashtra & West Bengal:** Around 15% rear cattle entirely for non-milk purposes

Even in states with relatively formal dairy sectors, such as **Maharashtra and Karnataka**, more than **30% of rearers prioritise non-milk benefits**, mainly dung and draught power.

Milk vs Non-Market Uses of Cattle

While milk contributes significantly to India's economy—supporting **over 80 million livelihoods** and contributing **5% to GDP**—the study highlights that many households value cattle for:

- Organic manure (dung)
- Draught power for agriculture
- Risk buffering through sale of animals
- Household nutrition
- Socio-cultural and religious reasons

In states such as **Himachal Pradesh, Andhra Pradesh and Assam**, more than **15% of rearers** cited socio-cultural motivations as their foremost reason for keeping cattle.

Nature of Herd Ownership in India

The study reveals a predominantly **smallholder-driven livestock structure**:

- **50% of rural cattle rearers** own just **one or two animals**
- Small herds dominate **hilly, central and eastern regions**
- Larger herds (over five animals) are more common in **Gujarat, Rajasthan, Maharashtra, Tamil Nadu and Punjab**
- **82% of households** own only **one bovine type**, limiting diversification

This highlights the central role of **indigenous cattle** in integrated farming systems, particularly for non-market uses.

Productivity and Smallholder Constraints

Despite their large numbers, smallholders contribute disproportionately less to output:

- **29% of total milk production**
- **22% of total milk sales**

Key constraints include:

- Small herd sizes
- Feed and fodder shortages
- Limited access to improved breeds
- Agro-climatic stress

Low diversity in animal type and breed increases vulnerability to **climatic and economic shocks**.

Feed and Fodder Challenges

Feed and fodder emerged as one of the most pressing challenges:

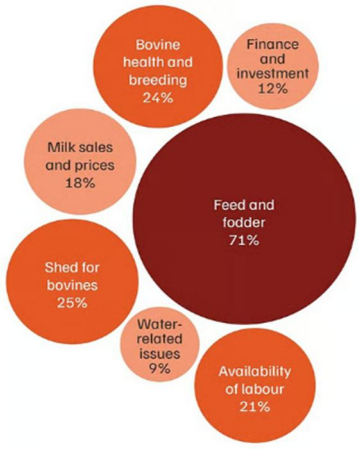
- Nearly **75% of cattle rearers** cited affordability as a major concern
- Declining grazing lands reported in **Assam, Punjab, Madhya Pradesh and Odisha**
- Acute shortage of land for fodder cultivation in **Uttar Pradesh, Gujarat and Bihar**

Despite these challenges, adoption of interventions such as:

- **Silage preparation**, and
- **Ration-balancing programmes**

remained extremely low, at around **5% each**.

Constraints experienced by households



Source: Cattle and Community in a Changing Climate, 2026, CEEW

Climate Stress and Livestock Vulnerability

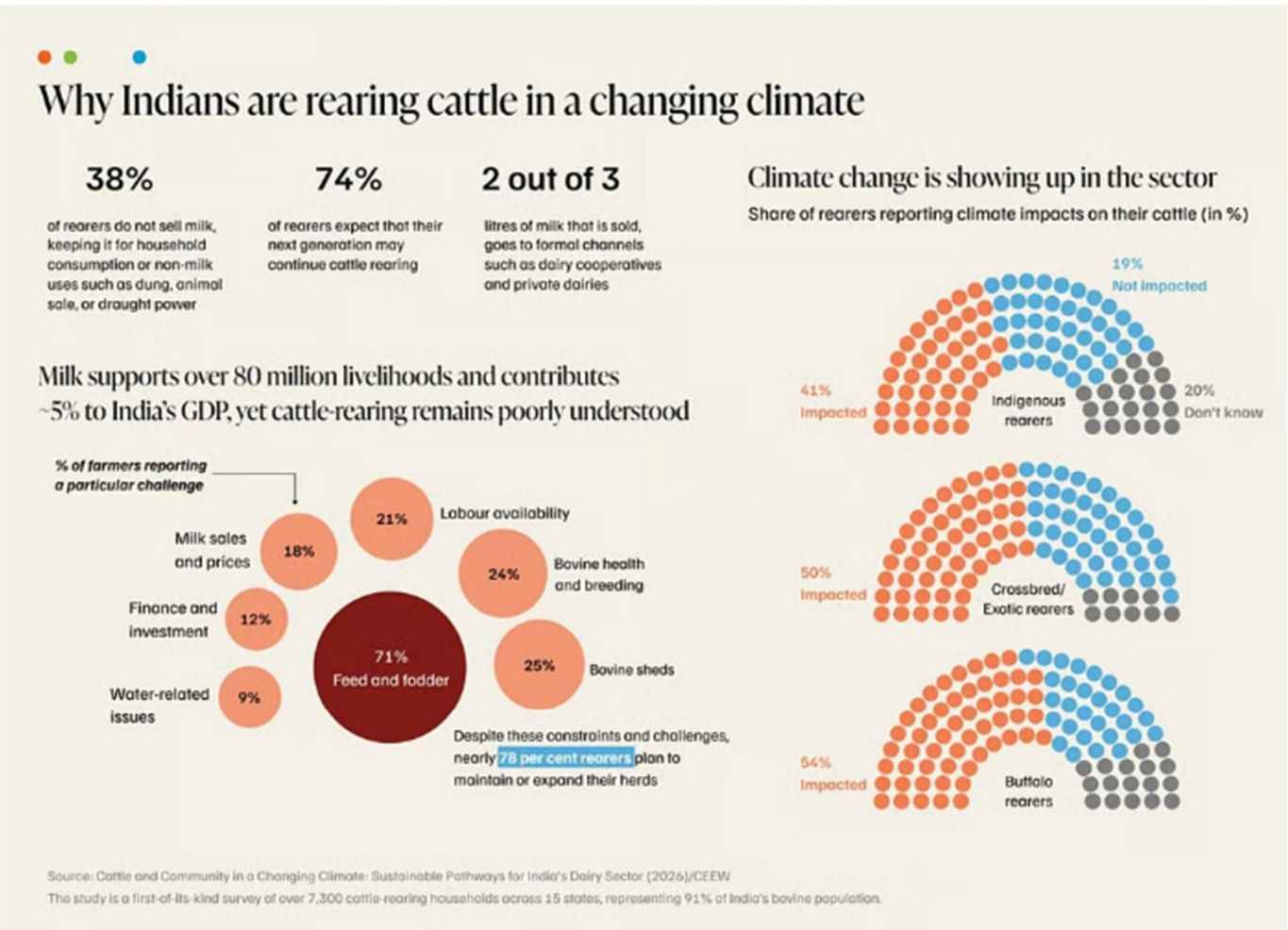
Climate change is already affecting livestock health and productivity:

- **54% of buffalo rearers** reported climate impacts
- **50% of crossbred cattle rearers** affected
- **41% of indigenous cattle rearers** impacted

Common impacts included:

- Increased disease incidence
- Animal mortality
- Behavioural stress such as restlessness

These impacts are particularly concerning as many households plan to **expand herds**, often by increasing the same bovine type they already own.



Policy Implications

The study argues that India's livestock policies remain overly **milk-centric**, overlooking the diverse roles cattle play in rural livelihoods. According to **Abhishek Jain**, aligning public investment with ground realities requires:

- Moving away from uniform dairy strategies
- Designing **differentiated, region-specific livestock policies**
- Accounting for climate risks and smallholder constraints

Such an approach would improve policy acceptance, budget effectiveness and preserve India's diverse cattle-rearing systems.

Conclusion

The finding that **30 million Indian cattle-rearing households do not sell milk** fundamentally challenges conventional assumptions about India's dairy economy. Cattle in rural India function not merely as milk producers, but as **multi-functional assets** supporting nutrition, farming, culture and climate resilience. Recognising and integrating this diversity into livestock policy is essential for building a **sustainable, inclusive and climate-resilient rural economy**.

Budget 2026: Three Macro Worries for the Finance Minister

Source: The Indian Express

Relevance: GS Paper III - Indian Economy and issues relating to growth, development and employment - Fiscal deficit, taxation, investment, macroeconomic stability

Important Keywords for Prelims & Mains

For Prelims

- Nominal GDP, Real GDP, Fiscal Deficit, Tax Buoyancy, Capital Expenditure, Crowding Out Effect, Private Corporate Investment, PLI Scheme, Government Borrowing, Bond Yields

For Mains

- Fiscal Space Constraint, Nominal vs Real Growth Dilemma, Revenue–Expenditure Gap, Public Capex Multiplier, Investment-led Growth, Macroeconomic Stability, Policy Transmission Failure

Why in News

The Union Budget 2026 is in focus as it will be presented amid slowing nominal GDP growth, weak tax buoyancy, and subdued private investment, raising concerns about the government's fiscal space and its ability to revive economic growth.

When the Finance Minister prepares the Union Budget, it is **not a blank-slate exercise**. Her choices are tightly constrained by:

- **Committed expenditures** (salaries, pensions, interest payments)
- **Revenue performance of the current year**
- **Overall macroeconomic conditions**

Looking at how the economy performed in **2025–26**, three big macroeconomic worries stand out.

Budget 2026: Three Macro Worries for the Finance Minister

1. Weak Nominal GDP Growth (Most critical concern)

Why nominal GDP matters more than real GDP for Budget

- **Nominal GDP** = value of goods and services at current prices
- **Real GDP** = growth adjusted for inflation
- Budget calculations (tax revenue, deficit, borrowing) are based on **nominal GDP**, not real GDP

The problem

- Nominal GDP growth has fallen to ~**8%**, the lowest in many years
- In February 2025 Budget, the government assumed **10.1% growth**
- This gap creates a **revenue shortfall**

Why it is dangerous

If nominal GDP grows slower than expected:

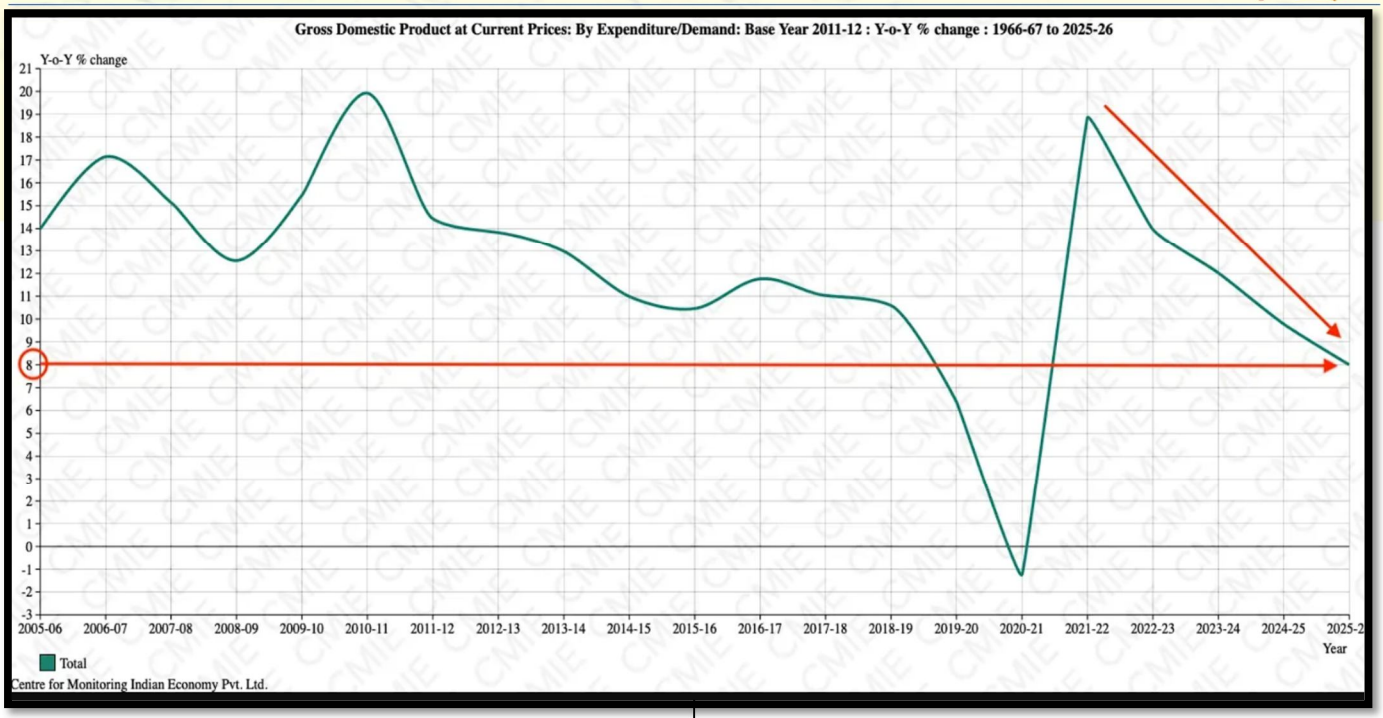
- Government earns **less tax revenue**
- It must either:
  - **Borrow more** → higher interest rates, crowding out private investment
  - **Cut spending** → hurts poor, R&D, infrastructure, defence

Thus, weak nominal GDP directly weakens Budget arithmetic

2. Weak Tax Buoyancy (Revenue problem)

What is tax buoyancy?

It shows how much tax revenue grows when GDP grows.



- Buoyancy of **1** → tax grows at same rate as GDP
- Government assumed **1.1**
- Actual buoyancy is only **0.6**

What this means

Even when GDP grows:

- Tax revenues are growing **much slower**
- GST, income tax, corporate tax all underperforming
- Tax growth is **below even weak GDP growth**

Impact

- Bigger fiscal stress
- Less money for welfare and capital expenditure
- More borrowing pressure

This means the government's revenue engine is misfiring

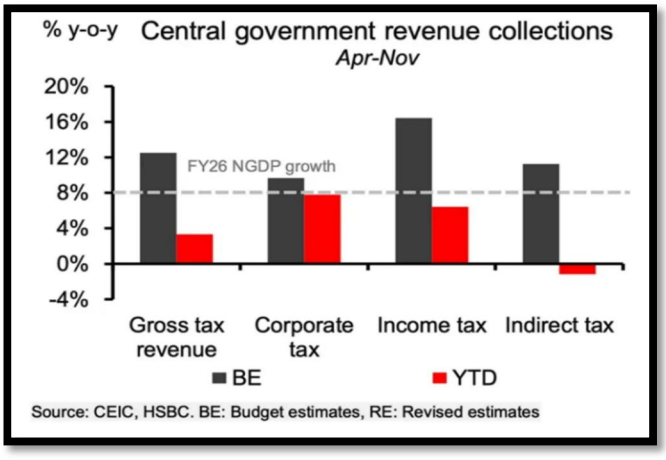
Weak Private Corporate Investment (Growth problem)

Despite:

- Corporate tax cuts (since 2019)
- Massive government capex (roads, ports, rail)
- PLI subsidies
- Income tax relief
- GST cuts to boost demand

Private investment is still low

- Corporates are **not expanding capacity**
- Demand is not strong enough
- Sales growth is weak
- Firms prefer sitting on cash rather than investing

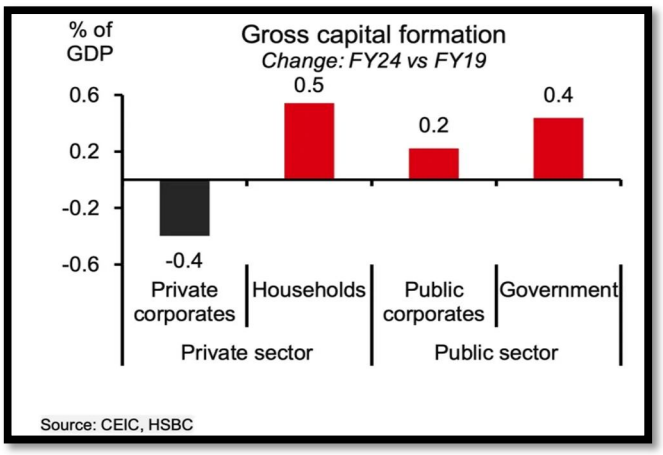


New worry: Global investors pulling out

- FPI outflows rising

- Rupee under pressure
- Exchange rate instability
- Political & economic concern for FM

Without private investment, sustainable job creation is impossible



Macro-Political Implications for the FM

- Harder to meet fiscal deficit targets
- Less room for:
  - Tax cuts
  - New schemes
  - Big announcements
- Political pressure due to:
  - Rupee weakness
  - Investor sentiment
  - Employment concerns

What the FM may try in Budget 2026 (Policy Direction)

1. Boost nominal GDP

- Demand support (targeted, not populist)
- Export incentives
- Services sector push
- Manufacturing competitiveness

2. Improve tax buoyancy

- Widen tax base
- Rationalise GST slabs
- Technology-based compliance
- Avoid aggressive rate cuts

3. Crowd-in private investment

- Policy stability
- Faster clearances
- MSME support
- Long-term credit availability
- Reduce regulatory uncertainty

ENVIRONMENT & ECOLOGY

Bomb Cyclone' Hits the Northern US: What Is This Storm?

Source: Indian Express

Relevance: **GS Paper I: Physical Geography – Climatology, Mid-latitude weather systems, Extreme weather events, GS Paper III: Disaster Management**

Important Keywords for Prelims and Mains

For Prelims

- Bomb cyclone, Bombogenesis, Mid-latitude cyclone, Low-pressure system, Pressure gradient, Blizzard

For Mains

- Rapid cyclogenesis, Winter storms and disaster risk, Transport and power infrastructure vulnerability, Climate variability and extreme events

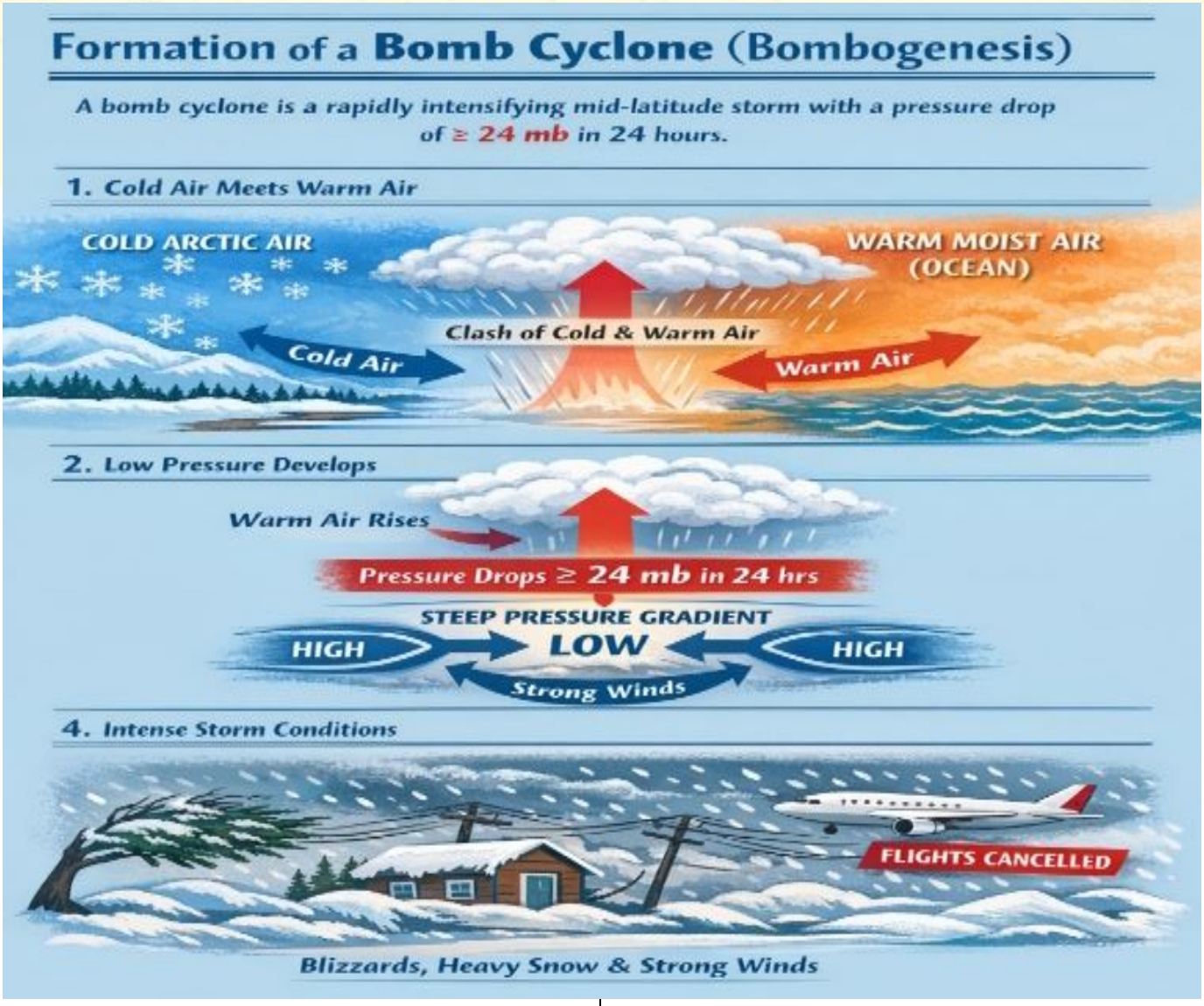
Why in News?

- A powerful **bomb cyclone** struck the **northern United States** on **December 29, 2025**, causing **severe winter weather** across the Midwest and East Coast.

- Reported impacts:
  - **27,000+ power outages**, over one-third in **Michigan**
  - **9,000+ flight delays**
  - **889 flight cancellations** within, into, or out of the US
- Blizzard conditions during the **holiday travel season** led to severe transport disruption.
- Forecasters warned of further **intensification**, driven by a clash between **cold Canadian air and warmer southern US air**.

What Is a Bomb Cyclone?

- A **bomb cyclone** is a **large, intense mid-latitude (extra-tropical) storm** with:
  - A deep low-pressure centre



- Weather fronts
- Severe associated weather ranging from **blizzards to intense precipitation**

- These storms put meteorologists on **high alert** due to their potential for widespread damage.

Scientific Definition

- A storm qualifies as a **bomb cyclone** when:
  - The central atmospheric pressure drops by **at least 24 millibars within 24 hours**
- This rapid intensification process is called **bombogenesis**.
- **Millibar** is a unit used to measure atmospheric pressure.

How Does a Bomb Cyclone Form? (Bombogenesis)

Basic Mechanism

- Storms form when **low-pressure air meets high-pressure air**, causing air to flow from high to low pressure, generating winds.

In Bomb Cyclones

- **Cold, dense Arctic or Canadian air** collides with **warm, moist air** (often over oceans).
- The warm air rises rapidly, deepening the low-pressure system.
- Air rushes inward at high speed to replace the rising air.
- This creates a **steep pressure gradient**, leading to **very strong winds**.

Why They Are So Violent

- According to AccuWeather:
  - Rapidly ascending air near the storm centre must be replaced.
  - Incoming air moves at high speed, causing:
    - Property damage
    - Fallen trees
    - Power outages

Seasonality

- Bomb cyclones can occur **in any season**.
- They occur **most frequently during fall and winter** because:
  - Cold Arctic air can move southward
  - Warm air masses are still present, creating ideal contrast

Where Do Bomb Cyclones Commonly Occur?

- Most commonly originate in the **western North Atlantic**.
- Key reasons:
  - Cold continental air from North America meets warm Atlantic air
  - Additional energy supplied by the **warm Gulf Stream**
- Other regions:
  - Northwestern Pacific
  - Occasionally the Mediterranean Sea

Statistical Insight

- A **2021 study by Northern Illinois University** found:
  - **~7% of all non-tropical low-pressure systems** near North America (1979–2019) were bomb cyclones
  - On average, **18 bomb cyclones per year** occurred near North America during this period

Why Are Bomb Cyclones Dangerous?

1. Extremely Strong Winds

- Wind speeds can reach **up to 80 kmph or more**
- Effects include:
  - Uprooting trees
  - Structural damage
  - Large-scale power outages

2. Blizzard Conditions

- Heavy snowfall combined with strong winds
- Leads to:
  - Whiteout conditions
  - Dangerous travel
  - Road and airport closures

3. Infrastructure & Transport Disruption

- Widespread electricity failures
- Severe impact on:
  - Aviation (flight delays and cancellations)
  - Road and rail networks

4. Secondary Hazards

- Lakeshore flooding
- Extremely low wind-chill temperatures
- Occasional **thundersnow** (snowfall with lightning)

How Is a Bomb Cyclone Different from a Hurricane?

Aspect	Bomb Cyclone	Hurricane
Type	Mid-latitude (extra-tropical) storm	Tropical cyclone
Energy Source	Temperature contrast (cold + warm air)	Warm ocean waters
Typical Season	Fall and winter	Summer and early autumn
Formation Region	North Atlantic, North Pacific	Tropical oceans
Core Structure	Cold-core system	Warm-core system

Disaster Management Perspective

- Bomb cyclones expose vulnerabilities in **power grids, transport networks, and urban infrastructure**.
- Highlight the importance of:
  - Advanced weather forecasting
  - Early warning dissemination
  - Climate-resilient infrastructure
- Increasing intensity of such storms raises concerns related to **climate variability and changing atmospheric circulation patterns**.

Conclusion

A **bomb cyclone** is among the most violent non-tropical storm systems due to its rapid pressure fall and intense winds. The December 2025 storm in the northern United States demonstrates how the interaction of **polar cold air and warm air masses** can trigger large-scale winter disasters, causing significant disruption to daily life, transport, and power systems.

10 Years of the Paris Agreement (2015–2025)

Source: Indian Express

Relevance: **GS Paper III: Climate change, Sustainable development, Energy transition**

Important Keywords for Prelims & Mains

For Prelims

- Paris Agreement, UNFCCC, NDCs / INDCs, Kyoto Protocol vs Paris Agreement, Global Stocktake, CBDR–RC, Climate Finance / NCQG, CBAM

For Mains

- Global groupings, international agreements, Sustainable development, climate change, energy transition, Global climate governance, equity, climate finance, development vs mitigation

Why in News?

- The **Paris Agreement completed 10 years in November 2025**.
- Triggered a **global re-evaluation** due to:
  - US exit in early 2025
  - Finance and equity dissatisfaction among developing nations
  - Shift in negotiating power at **COP30 (Belém, Brazil)**
- Growing debate on whether the Paris framework can deliver **real climate outcomes**.

Background: What is the Paris Agreement?

- Adopted in **2015 at COP21, Paris**

- Operates under the **UN Framework Convention on Climate Change (UNFCCC)**
- **Legally binding framework**, but **national targets are voluntary**
- Replaced the **Kyoto Protocol**, which applied only to developed nations

Objectives of the Paris Agreement

- Limit global temperature rise to:
  - **Well below 2°C**, and
  - Preferably **1.5°C** above pre-industrial levels
- Strengthen:
  - **Mitigation**
  - **Adaptation**
  - **Climate finance**
- Promote **low-carbon, climate-resilient development**

Working Mechanism

- **Bottom-up approach** through **Nationally Determined Contributions (NDCs)**
- Every **5 years**, countries must:
  - Submit updated NDCs
  - Increase ambition progressively
- **Global Stocktake** every 5 years:
  - Assesses collective progress
  - First completed at **COP28 (2023)**
- **Paris Rulebook**:
  - Finalised at **COP24 (Katowice)** and **COP26 (Glasgow)**
  - Sets rules for transparency, reporting, and verification

Key Achievements (2015–2025)

1. Universal Climate Participation

- **194 countries + European Union** committed under a single framework
- First truly global climate agreement

2. Institutionalisation of Climate Action

- Climate policy mainstreamed into:
  - National budgets
  - Development planning
  - Domestic laws
- Examples:
  - EU Green Deal
  - India's Mission LiFE

3. Climate Finance Architecture

- Developed countries committed **USD 100 billion/year** till 2025
- **COP29 (2024)** adopted **New Collective Quantified Goal (NCQG)**:
  - At least **USD 300 billion annually by 2035**

4. Equity Recognition

- Embedded **Common But Differentiated Responsibilities and Respective Capabilities (CBDR-RC)**
- Acknowledges:
  - Historical emissions
  - Differing national capacities

5. Expansion of Climate Markets

- Growth of:

- Green bonds
- Carbon trading
- Climate-aligned investments

- However, scale remains **insufficient**

India and the Paris Agreement

India's Commitments

- Submitted **INDC in 2015**, later adopted as NDC
- Key targets:
  - **45% reduction in emissions intensity** (from 2005 levels) by 2030
  - **~50% electricity capacity** from non-fossil fuels by 2030
  - **Carbon sink of 2.5–3 billion tonnes CO_2**
  - Promotion of **Lifestyle for Environment (LiFE)**
- Long-term goal: **Net Zero by 2070**

India's Achievements

- Achieved **50% non-fossil electricity capacity in 2025**, 5 years early
- Global leadership via:
  - International Solar Alliance (ISA)
  - Coalition for Disaster Resilient Infrastructure (CDRI)
  - Mission LiFE
- Climate strategy aligned with **Viksit Bharat 2047**

Major Concerns Regarding the Paris Agreement

1. Voluntary Commitments

- Shift from **legally binding targets (Kyoto)** to voluntary NDCs
- Weak enforcement and accountability

2. Equity Deficit

- Uniform expectations dilute **CBDR**
- Historical responsibility of developed nations under-addressed
- **LDCs and SIDS** face existential climate risks

3. Climate Finance Gap

- **USD 300 billion NCQG** seen as inadequate
- India and Global South demand:
  - **USD 1.3 trillion annually**
  - At least **USD 600 billion as grants**

4. Mitigation-Centric Bias

- Adaptation and resilience underfunded
- Problematic for climate-vulnerable countries

5. Development Constraints

- Trade tools like **CBAM** restrict policy space
- Limits industrialisation options of developing nations

6. Insufficient Ambition

- Current NDCs lead to **2.5–2.9°C warming**
- Far from Paris targets

Shift in Global Climate Narrative (2025)

- Developing countries assert **developmental sovereignty**
- At **COP30 (Belém)**:
  - Fossil-fuel phase-out language resisted
  - Equity and adaptation prioritised
- US withdrawal created leadership vacuum
- **China, India, Brazil** emerged as influential actors

China Model in Climate Action

- **Development-first pathway**
- Emissions rose during rapid industrialisation
- Parallel investments in:

- Renewables
- Electrification
- Clean technologies

- Commitments:
  - Peak emissions before 2030
  - Net zero by 2060
- Shows alternative sequencing: **growth → decarbonisation**

Way Forward: Strengthening Climate Governance

1. **From Voluntary to Enforceable Action**
   - Sector-wise carbon budgets
   - Legally backed national targets
2. **Equal Focus on Adaptation**
   - Climate-resilient infrastructure
   - Agriculture, water, early-warning systems
3. **Bridging Climate Finance Gap**
   - Fulfil developed-country obligations
   - Reform MDBs
   - Scale green bonds and blended finance
4. **Reinforcing Climate Justice**
   - CBDR–RC as guiding principle
   - Fairness in carbon border measures
5. **Technology Access**
   - Renewables, storage, green hydrogen
   - Patent pooling and South-South cooperation
6. **Strong Climate Governance**
   - Transparent MRV systems
   - Credible climate science

Conclusion

The Paris Agreement succeeded in **universalising climate action**, but its **voluntary nature, finance shortfalls, and equity gaps** limit its effectiveness. The next phase of global climate governance must reconcile **climate ambition with development justice**. India's approach—linking climate action with growth and resilience—offers a **pragmatic and equitable pathway forward**.

Feathers in the Furnace: Birds at Risk from Urban Heat in India

Source: Down To Earth

Relevance

- **GS Paper I – Urbanisation, Geography (Urban Climate)**
- **GS Paper III – Environment, Climate Change, Biodiversity**

Important Keywords

Prelims

- Urban Heat Island (UHI), Surface Temperature, Endotherms, Heat Stress, Microclimate, Habitat Fragmentation, Biotic Homogenisation, Native Trees, Wetlands, Ecosystem Services, SDG 11, SDG 15

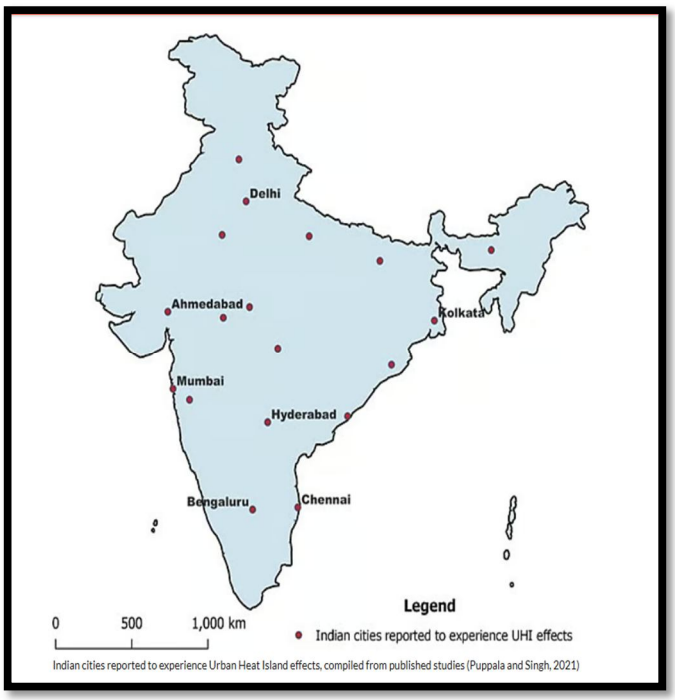
Mains

- Urban Climate Change, Biodiversity Loss, Nature-Based Solutions, Sustainable Cities, Climate Adaptation, Urban Ecology, Wildlife Conservation, Human–Wildlife Interface, Environmental Governance

Why in News?

India's cities are increasingly experiencing **extreme heat**, intensified by the **Urban Heat Island (UHI)**

effect. Amid this warming, **urban birds are emerging as early victims**, with rescue centres reporting rising cases of dehydration, collapse, and mortality during heatwaves. Their decline signals a deeper ecological crisis linked to climate change and unsustainable urbanisation.



Indian cities reported to experience Urban Heat Island effects, compiled from published studies (Puppala and Singh, 2021)

India's Growing Urban Heat Crisis

Urban India is warming rapidly. Built-up neighbourhoods now experience **hotter days and warmer nights**, making cities resemble **heat chambers**. As temperatures cross **45°C** in cities like Delhi and Ahmedabad, the most immediate ecological impacts are visible among birds, whose absence has made many urban mornings quieter.

Urban Heat Island (UHI): Meaning and Causes

An **Urban Heat Island** forms when:

- Concrete, asphalt, and buildings absorb heat during the day
- Heat is released slowly at night, preventing cooling

Key Causes in Indian Cities

- Dense construction
- Loss of vegetation
- Vehicular emissions
- Heat from air conditioners

Indian Context

- UHI intensity ranges from **2–10°C**
- Peak surface hotspots are **6–8°C hotter**
- Cities affected: **Delhi, Ahmedabad, Bengaluru, Mumbai**

Why Birds Are the First Casualties

Birds are especially vulnerable because:

- They are **small endotherms**
- They have **high metabolic rates**
- They depend on **shade, water, and insects**

Reduced tree cover and water availability during heatwaves severely limit their ability to regulate body temperature.

Scientific Evidence of Bird Decline

Multiple studies confirm the link between heat and bird loss:

- **Bengaluru Study (2025)** - Higher surface temperatures correlated with **lower bird abundance**
- **Western Ghats Study (2022)** - Rising temperatures and shrinking green cover pushed **forest-dependent birds out first**
- **China Multi-City Study (2023)** - Stronger urban heat associated with **reduced species richness and functional diversity**

These findings show that **urban warming is reshaping bird communities**.

Physiological and Behavioural Stress in Birds

Physiological Impacts

- Dehydration
- Hyperthermia

- Oxidative stress

Behavioural Changes

- Activity shifts to dawn and dusk
- Nest abandonment on exposed branches
- Shortened breeding seasons
- Reduced hatching success and chick survival

Prolonged exposure can cause population decline.

Rescue Data and Ground-Level Evidence

Rescue reports strongly support scientific findings:

- **Gujarat Heatwave (2022):** Reuters, Al Jazeera reported mass bird rescues
- Wildlife SOS and Charity Bird Hospital recorded **sharp increases in heat-related admissions**
- **Mumbai & Bengaluru (2024):** Spikes in kite, myna, and pigeon rescues
- **Ahmedabad (May 2025):** Jivdaya Charitable Trust treated ~3,800 birds

Key Observation

Areas with **trees recorded fewer rescues**, while **treeless commercial zones saw more collapsed birds**.

Urban Heat and Wider Ecosystem Disruption

Urban heat interacts with:

- Air pollution
- Light pollution
- Habitat fragmentation

Ecosystem Impacts

- Reduced insect populations → food loss for birds
- Faster evaporation of ponds → amphibian decline
- Overheated roosts → bats abandon habitats

This leads to **biotic homogenisation**, where only a few heat-tolerant species survive.

Urban Planning Gaps

Urban heat mitigation often focuses on:

- Reflective roofs
- Pavements
- Ventilation corridors

However, **ecological cooling is largely ignored**, despite evidence that:

- Tree-rich areas are **1–3°C cooler**
- Green spaces like **Delhi Ridge and Lodhi Gardens** support higher bird diversity and cooler nights

Urban ecologists argue that **climate adaptation and biodiversity conservation are inseparable**.

Nature-Based Cooling and Biodiversity Solutions

1. **Increase Urban Canopy**
   - Native trees like neem, jamun, banyan
2. **Restore Ponds and Wetlands**
   - Act as heat sinks and drinking sources
3. **Green Infrastructure**
   - Cool roofs, vertical gardens, rooftop vegetation
4. **Urban Biodiversity Corridors**
   - Connect parks and water bodies
5. **Citizen Action**
   - Water bowls, tree protection, local planting

Policy Linkages and SDG Alignment

- **National Mission on Sustainable Habitat**
- **SDG 11** – Sustainable Cities and Communities
- **SDG 15** – Life on Land

Nature-based solutions provide **climate resilience and biodiversity protection together**.

Conclusion

Birds are the **most visible indicators of ecological stress in cities**. Their silence is a warning that urban growth without ecological sensitivity is unsustainable. Integrating biodiversity into urban planning—through trees, wetlands, and green corridors—offers a **cost-effective, inclusive, and climate-resilient solution**. Saving birds from urban heat is ultimately about **saving the livability and sustainability of Indian cities**.

How will the U.S. exit affect the International Solar Alliance?

Source: THE HINDU

Relevance: GS Paper III (Environment & Economy)

Important Keywords

Prelims

- International Solar Alliance, Solar Modules, Photovoltaic (PV) Cells, MNRE, Renewable Energy Finance, Global South

Mains

- Climate Leadership, Renewable Energy Transition, Global Climate Finance, Energy Diplomacy, Solar Manufacturing Ecosystem

Why in News?

In January 2026, the **United States** announced its withdrawal from **66 international organisations**, citing a reassessment of national interests. Among the climate-related bodies affected is the **International Solar Alliance (ISA)**—a global platform headquartered in India and jointly led by India and France. The move has raised questions about its economic, industrial, and geopolitical implications, particularly for India and developing countries.

What is the International Solar Alliance?

The ISA was **established in 2015** on the sidelines of the Paris Climate Conference (COP21) with the objective of promoting **solar energy adoption**, especially in countries located between the Tropic of Cancer and the Tropic of Capricorn.

Headquartered in **Gurugram, India**, the Alliance does not directly construct solar power plants. Instead, it plays a **facilitating role** by:

- Mobilising low-cost finance
- Reducing investment risks
- Supporting capacity building and training
- Accelerating deployment of solar technologies

The ISA currently has **over 120 member countries**, with a strong focus on Africa, Small Island Developing States, and other climate-vulnerable regions. The U.S. joined the Alliance relatively late, in **2021**, and contributed about **$2.1 million over three years**, a small fraction of ISA's total funding.

Will the U.S. exit financially weaken the ISA?

From a **purely financial perspective**, the impact is expected to be limited. U.S. contributions accounted for **roughly 1% of the Alliance's total funds**. Indian officials have clarified that:

- Ongoing programmes will continue uninterrupted
- Training and capacity-building initiatives remain intact
- Day-to-day functioning of the ISA is not at risk

However, the concern lies less in budgets and more in **global confidence and signalling**. When a major

economy steps away from climate platforms, it can create uncertainty among lenders and investors, particularly in high-risk developing markets.

What does this mean for India's solar manufacturing capacity?

India's solar sector remains **largely insulated** from the U.S. decision. India does not depend on the U.S. for critical solar equipment. Instead, it has rapidly expanded domestic manufacturing under policy support such as Production-Linked Incentives (PLI).

As of late **2025**:

- **Solar module manufacturing capacity** stood at nearly **144 GW**
- **Solar cell manufacturing capacity** was about **25 GW**, with rapid expansion underway

China continues to dominate global production, accounting for nearly **70% of global solar cell manufacturing capacity**. India imported about **$1.7 billion worth of photovoltaic modules from China in FY25**, according to Parliamentary data from the Ministry of New and Renewable Energy.

Crucially, the U.S. exit does **not raise project costs**, affect electricity tariffs, or disrupt India's solar supply chains.

Will solar investments in India slow down?

A slowdown is **unlikely**. India's solar investments are driven primarily by:

- Strong domestic electricity demand
- Long-term power purchase agreements with state utilities
- Policy continuity and market scale

Funding for Indian solar projects mainly comes from **domestic banks, global institutional investors, and multilateral development agencies**, not the U.S. government. Employment in the solar sector—spanning manufacturing, installation, and operations—is also largely domestically anchored.

In fact, there could be a **potential upside**. As the U.S. becomes more inward-looking and faces supply-chain frictions with China and Mexico, Indian firms may find opportunities to:

- Export solar equipment
- Set up manufacturing units aligned with U.S. technical standards

Much will depend on the trajectory of **India–U.S. trade negotiations**.

Where does the real economic risk lie?

The most significant impact is likely to be felt **outside India**, particularly in:

- **African nations**
- **Small and poorer developing economies**

These regions rely heavily on **concessional finance, multilateral cooperation, and risk-sharing mechanisms** to deploy solar projects. Reduced climate engagement by large economies like the U.S. can:

- Make lenders more cautious
- Delay project approvals
- Increase financing costs

This could indirectly affect **Indian solar companies expanding abroad**, as the ISA has been a key platform for opening overseas markets.

Why does this matter for India's global role?

The ISA is a cornerstone of **India's climate diplomacy and Global South leadership**. It strengthens India's:

- Soft power
- South–South cooperation credentials
- Economic presence in emerging markets

While the U.S. exit removes one influential partner and some technical expertise, it does **not alter leadership within the Alliance**. India remains at the centre of the ISA, but with greater responsibility to sustain momentum and confidence.

What lies ahead?

For India:

- Solar power does **not become costlier**
- Domestic projects and jobs remain secure
- Manufacturing capacity continues to expand

The broader challenge is a **more fragmented global climate order**, where cooperation is harder and emerging economies must work harder to attract finance.

For India's solar ecosystem, the U.S. exit is **not a shock**, but a **stress test**—and compared to a decade ago, India appears far better equipped to handle it.

State of Finance for Nature 2026

Source: Down to Earth

Relevance: **GS Paper – III: Environmental Pollution & Degradation, Conservation**

Important Keywords for Prelims & Mains

For Prelims:

- United Nations Environment Programme (UNEP), Nature-based Solutions (NbS), National Mission on Sustainable Agriculture (NMSA), National Water Mission, National Afforestation Programme (NAP)

For Mains:

- Nature-based Solutions as a climate and biodiversity strategy, Global financing gaps in environmental governance, Role of subsidies in environmental degradation, Fiscal federalism and biodiversity conservation in India

Why in News?

The United Nations Environment Programme (UNEP) has released its flagship report titled **"State**

of Finance for Nature 2026", which exposes a deep imbalance in global financial flows. The report reveals that for every **USD 1 spent on protecting nature, nearly USD 30 is directed towards activities that degrade ecosystems**, highlighting a structural flaw in global development financing.

Investment in nature-based solutions must rise to at least $571 billion annually by 2030, UNEP stated. iStock

Down to Earth

Key Highlights of the State of Finance for Nature 2026

Nature-Negative Finance

- Global financial flows towards activities harmful to nature—such as fossil fuel extraction, deforestation, and unsustainable agriculture—reached **USD 7.3 trillion in 2023**, accounting for nearly **7% of global GDP**.
- The private sector contributes **USD 4.9 trillion** of these flows, mainly in energy, utilities, and basic materials sectors.
- Governments provide around **USD 2.4 trillion annually** in **Environmentally Harmful Subsidies (EHS)**, dominated by fossil fuel subsidies, followed by unsustainable agricultural and water support.
- These subsidies distort price signals, making environmental degradation economically cheaper than conservation.

Nature-Positive Finance

- Global investment in **Nature-based Solutions (NbS)** stood at just **USD 220 billion**, creating a stark **30:1 imbalance** between harmful and protective financial flows.
- Despite this, spending on biodiversity and landscape protection increased by **11% between 2022 and 2023**.
- International public finance for NbS in 2023 was **22% higher than 2022 levels** and **55% above 2015 levels**, indicating gradual but insufficient progress.

Finance Gap for NbS

- Public funds account for nearly **90% of total NbS financing**, while private investment remains marginal at **10%**.
- To meet the targets of the **Rio Conventions**, global NbS investment must rise **2.5 times** to reach **USD 571 billion annually by 2030**.
- The Rio Conventions include:
  - **UNFCCC:** Limiting global warming to below 2°C, preferably 1.5°C
  - **CBD:** Conserving 30% of land, water, and seas and restoring 30% of degraded ecosystems by 2030
  - **UNCCD:** Restoring 1.5 billion hectares of degraded land by 2030

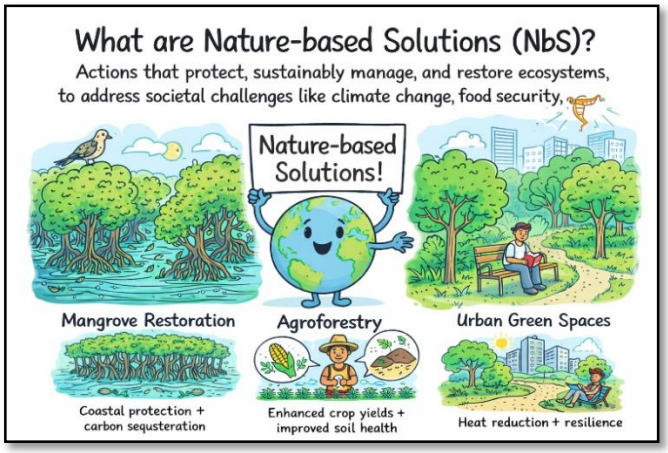
What are Nature-based Solutions (NbS)?

- **Definition:**

Nature-based Solutions refer to actions that **protect, sustainably manage, and restore ecosystems** to address societal challenges such as climate change, food security, and disaster risk, while simultaneously delivering biodiversity and human well-being benefits.

Examples:

- **Mangrove restoration:** Coastal protection + carbon sequestration
- **Agroforestry:** Enhanced crop yields + improved soil health
- **Urban green spaces:** Reduction of heat island effect and improved urban resilience



Challenges in Scaling NbS Finance

- **High Due Diligence Costs:** Site-specific ecological complexity and lack of standardized data make NbS projects costly and time-consuming to evaluate.
- **Lack of Track Record:** NbS remains a nascent asset class with insufficient historical data, making risk assessment difficult for investors.
- **Liquidity Constraints:** Long investment horizons (10–20 years) and absence of secondary markets discourage private capital.
- **Currency and Sovereign Risks:** NbS potential is concentrated in the Global South, while capital is largely in the Global North, exposing investors to exchange-rate volatility.
- **Data Deficit:** Unlike carbon markets, biodiversity lacks standardized metrics, making returns difficult to measure and compare.

Implications of Low NbS Finance for India

- **Subsidy Paradox:** Nature-negative subsidies (fertilisers, free electricity for groundwater) far exceed nature-positive allocations, undermining ecological sustainability.
- **Over-reliance on Public Finance:** Indian NbS projects are largely funded by government mechanisms such as **CAMPA**, with minimal private-sector participation.
- **High GDP Exposure:** With over 50% of the workforce dependent on nature-linked sectors, ecosystem collapse could quickly translate into economic instability.
- **Absence of Green Taxonomy:** The lack of a formal green classification system enables greenwashing and discourages genuine sustainable investments.
- **Fiscal Federalism Challenge:** While international commitments are made by the Centre, implementation lies with States, which often prioritise revenue-generating extractive activities.

India's Initiatives to Promote NbS

- National Mission for a Green India (GIM)
- National Mission on Sustainable Agriculture (NMSA)
- National Water Mission
- National Afforestation Programme (NAP)
- AMRUT 2.0
- Mangrove Initiative for Shoreline Habitats and Tangible Incomes (MISHTI)
- Mission Amrit Sarovar

Measures to Scale Up Nature-based Solutions

- **Nature Transition X-Curve:** Gradually phase out harmful subsidies while

expanding nature-positive markets.

- **Internalising Externalities:** Introduce carbon taxes and nature-liability levies to price environmental damage.
- **Mandatory Disclosures:** Align corporate reporting with **TNFD** norms to assess nature-related risks and dependencies.
- **Innovative Financial Instruments:** Promote green bonds, sustainability-linked loans, and biodiversity credits.
- **Risk De-risking:** Provide first-loss guarantees and concessional finance through public institutions to crowd in private capital.
- **Standardised Biodiversity Metrics:** Adopt indicators like **Mean Species Abundance** to prevent greenwashing.
- **Policy Convergence:** Align fiscal, agricultural, and energy policies with the **Kunming–Montreal Global Biodiversity Framework** targets.

Conclusion

The **State of Finance for Nature 2026** makes it clear that global economic systems are systematically financing environmental degradation. For India, adopting the **Nature Transition X-Curve** is critical to shift from a nature-depleting model to a **nature-positive growth pathway**, safeguarding biodiversity while sustaining its **USD 5-trillion economic ambition**.

S & T AND INTERNAL SECURITY

India's Design Linked Incentive (DLI) Scheme: Building a Self-Reliant Semiconductor Design Ecosystem

Source: PIB

Relevance: GS Paper III – Economic Development, Science & Technology

Important Keywords

Prelims

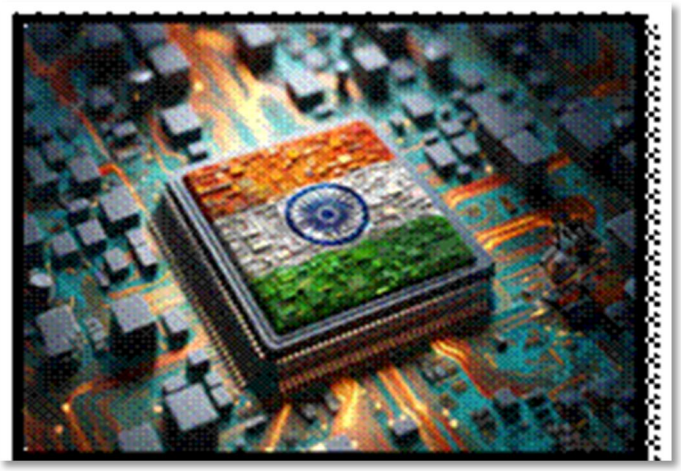
- Design Linked Incentive (DLI) Scheme, Semiconductors, ChipIN Centre, Electronic Design Automation (EDA) Tools, Tape-out, Semiconductor IP Cores, Chips to Start-up (C2S) Programme, India Semiconductor Mission

Mains

- Semiconductor Ecosystem, Technological Self-Reliance, Strategic Supply Chains, Startup-led Innovation, Public Digital Infrastructure, Atmanirbhar Bharat, Design-to-Productisation Gap

Why in News?

India's **Design Linked Incentive (DLI) Scheme for Semiconductors** has demonstrated strong on-ground outcomes, reflecting rapid progress in developing a **domestic semiconductor design ecosystem** amid rising global supply-chain vulnerabilities and strategic competition in critical technologies.



What is the Design Linked Incentive (DLI) Scheme?

- The **Design Linked Incentive (DLI) Scheme** is a flagship initiative under the **Semicon India Programme**, implemented by the **Ministry of Electronics and Information Technology (MeitY)**. Its objective is to promote a **fabless semiconductor ecosystem** by providing **financial incentives** and **advanced design infrastructure access** to domestic startups, MSMEs and Indian companies engaged in chip design.

The scheme supports the **entire semiconductor design lifecycle**—from conceptualisation and development to deployment—covering:

- Integrated Circuits (ICs)
- Chipsets
- Systems-on-Chip (SoCs)
- Systems and IP cores

By encouraging indigenous intellectual property creation, the scheme aims to reduce import dependence, enhance domestic value addition and improve supply-chain resilience.

Eligibility under the DLI Scheme

- **Startups and MSMEs** are eligible for financial incentives and design infrastructure support for semiconductor product design and deployment.
- **Other domestic companies** are eligible for financial incentives for deployment of semiconductor designs.

Definitions:

- **MSMEs**: As per Ministry of MSME notification (1 June 2020)
- **Startups**: As per DPIIT notification (19 February 2019)
- **Domestic companies**: Owned by resident Indian citizens as per FDI Policy Circular, 2017 or extant norms

Financial Incentives under DLI

1. Product Design Linked Incentive

- Reimbursement of **up to 50% of eligible expenditure**
- **Cap**: ₹15 crore per application
- Applicable for semiconductor design of ICs, chipsets, SoCs, systems and IP cores

2. Deployment Linked Incentive

- Incentives of **6% to 4% of net sales turnover** for five years
- **Cap**: ₹30 crore per application
- Minimum cumulative net sales (Years 1–5):
  - ₹1 crore for startups/MSMEs
  - ₹5 crore for other domestic companies
- Design must be **successfully deployed in electronic products**

Financial Incentives under the DLI Scheme

The **Design Linked Incentive (DLI) Scheme** provides **two distinct but complementary financial incentives** to promote indigenous semiconductor design and deployment.

1. Product Design Linked Incentive (PDLI)

This incentive supports **early-stage semiconductor design and development**, where costs and risks are highest.

Key Features

- **Reimbursement of up to 50%** of eligible expenditure incurred on semiconductor design.
- **Maximum cap:** ₹15 crore per application.
- Applicable to entities engaged in the design of:
  - Integrated Circuits (ICs)
  - Chipsets
  - Systems-on-Chip (SoCs)
  - Semiconductor systems and IP cores

Purpose

- Reduce entry barriers for startups and MSMEs in chip design.
- Encourage creation of **indigenous intellectual property (IP)**.
- Strengthen India's **fabless semiconductor ecosystem**.

2. Deployment Linked Incentive (DLI – Deployment Phase)

This incentive encourages **commercialisation and market adoption** of domestically designed chips.

Key Features

- Incentive ranging from **6% to 4% of net sales turnover**.
- Incentives are provided for **five years**.
- **Maximum cap:** ₹30 crore per application.
- **Minimum cumulative net sales (Years 1–5):**
  - ₹1 crore for **startups/MSMEs**
  - ₹5 crore for **other domestic companies**
- The semiconductor design must be **successfully deployed in electronic products**.

Purpose

- Promote **design-to-market transition**.
- Ensure that supported designs achieve **commercial viability**.
- Link government support with **real economic outcomes**.

Programme Highlights & Key Achievements of DLI

Institutional Infrastructure Created

A major achievement of the DLI Scheme is the creation of **shared national infrastructure** for chip design:

ChipIN Centre

- Provides access to advanced **Electronic Design Automation (EDA) tools**
- Serves nearly **1 lakh engineers and students**
- Covers **400 organisations nationwide**
- Supports:
  - **305 academic institutions** under the *Chips to Start-up (C2S) Programme*
  - **95 startups** under the DLI Scheme
- Represents the **world's largest centralised chip design user base**

Shared EDA Grid

- National platform offering high-end chip design software
- Recorded **54,03,005 cumulative usage hours** (as of 2 January 2026)
- Indicates strong adoption by **startups, MSMEs, and researchers across all States**

Tangible Outcomes and Achievements

The enabling ecosystem has translated into measurable results:

- **10 patents filed**
- **16 chip-design tape-outs completed**
- **6 semiconductor chips successfully fabricated**
- **1,000+ specialised engineers** trained or engaged
- **140+ reusable semiconductor IP cores** developed

These milestones mark India's progress from **conceptual innovation to silicon realisation**.

Key Institutional Frameworks for Semiconductor Design in India

India's semiconductor ecosystem is being built through a **multi-layered institutional framework** that integrates **policy support, financial incentives, talent creation, and indigenous R&D**, ensuring progress from **chip design to productisation**.

1. Ministry of Electronics and Information Technology (MeitY)

- Nodal ministry for **semiconductor policy formulation and coordination**.
- Anchors flagship initiatives such as the **Design Linked Incentive (DLI) Scheme**.
- Aims to **offset structural disadvantages** faced by Indian chip design firms.
- Facilitates **industry–academia–government collaboration** to move firms up the semiconductor value chain.

2. Semicon India Programme (SIM)

- Umbrella programme with an outlay of **₹76,000 crore**.
- Provides **end-to-end support** across design, fabrication, and display manufacturing.
- DLI Scheme operates under SIM, ensuring **continuity from design validation to manufacturing**.
- Implementation supported by **Centre for Development of Advanced Computing (C-DAC)** as nodal agency.

3. Chips to Start-up (C2S) Programme

- National **capacity-building initiative** targeting academia.
- Objective: Create **85,000 industry-ready professionals** at B.Tech, M.Tech, and PhD levels.
- Focuses on **VLSI design, chip architecture, and system-level integration**.
- Strengthens India's **long-term semiconductor talent pipeline**.

4. Microprocessor Development Programme

- Implemented by **C-DAC**, **Indian Institute of Technology Madras**, and **Indian Institute of Technology Bombay**.
- Led to development of **indigenous, open-source microprocessors** such as:
  - **VEGA**
  - **SHAKTI**
  - **AJIT**
- Reduces dependence on foreign IP and strengthens **strategic autonomy in computing**.

Success Stories of India's Design Linked Incentive (DLI) Scheme

- Under the DLI Scheme, **24 chip-design projects** have been approved in critical areas such as video surveillance, drone detection, smart energy meters, microprocessors, satellite communication, broadband and IoT SoCs.
- **95 Indian startups and companies** have been provided access to **industry-grade EDA tools**, substantially lowering design and infrastructure costs and enabling entry into advanced chip design.

Key Beneficiary Companies and Their Contributions

- **Vervesemi Microelectronics**: Developing indigenous **motor-control chips for BLDC motors** used in household appliances, drones and electric vehicles. It holds **110+ IPs**, **10 patents**, and has completed **pilot sampling of two chips** with global customers engaged.
- **InCore Semiconductors**: Focused on **RISC-V processor IPs**, aiming to develop **Dolomite**, an indigenous embedded processor for smartphones and edge-AI. Its IPs are **silicon-proven from 180 nm to 16 nm nodes**, reducing dependence on imported CPU IP.
- **Netrasemi**: Designed India's **first indigenously developed AI SoC** in a **12 nm node** for surveillance, robotics and mobility applications, integrating in-house AI/ML accelerators.
- **Aheesa Digital Innovations**: Developing **Vihaan**, a VEGA-processor–based **fiber broadband SoC** enabling secure and cost-effective GPON connectivity, with reference platforms planned for 2026.
- **AAGYAVISION**: Working on **radar-on-chip solutions** for drone detection, smart infrastructure, edge computing and emerging 6G sensor networks.
- Overall, the DLI Scheme is transforming **indigenous chip design into silicon-**

validated, market-ready products, strengthening **technological self-reliance**, startup innovation, and India's position in the **global semiconductor design ecosystem**

Conclusion

The **Design Linked Incentive (DLI) Scheme** is anchoring India in the **most strategic and value-intensive segment of the global semiconductor ecosystem—chip design**. By reducing reliance on imported IPs, enabling silicon-validated designs, and supporting startups and MSMEs through the productisation phase, DLI is laying the foundation for **technological sovereignty, supply-chain resilience, and long-term economic growth**. With multiple tape-outs, patents, reusable IPs and trained talent already achieved, India is steadily emerging as a **credible global hub for semiconductor design and innovation**.

National Intelligence Grid (NATGRID)

Source: The Hindu

Relevance: **GS Paper III – Internal Security, Terrorism, Intelligence reforms, Technology in policing**

Important Keywords for Prelims & Mains

For Prelims

- 26/11 Mumbai attacks, NATGRID, Facial recognition, Predictive policing, Algorithmic bias, Surveillance architecture, Right to Privacy (2017)

For Mains

- Internal security reform, Surveillance vs civil liberties, Rule of law, Proportionality doctrine

Why in News?

- NATGRID has expanded from a counter-terrorism database into a **population-scale surveillance architecture**, integrating with **National Population Register (NPR)** and advanced analytics.
- Raises concerns regarding **privacy, algorithmic bias, lack of statutory backing, and democratic oversight**, especially after the **Puttaswamy (2017) judgment** recognising the Right to Privacy as a Fundamental Right.

'NATGRID is an architecture of suspicion' | Photo Credit: Getty Images/iStockphoto

सत्यमेव जयते
NATIONAL INTELLIGENCE GRID
निवारयति अनुरक्षति

Background: 26/11 and the Security Turn

- The 2008 Mumbai attacks (26/11) marked a watershed moment in India's internal security governance.
- The live, prolonged siege exposed critical intelligence failures, especially the inability to integrate fragmented information on the attackers.
- Political and public debate framed the crisis as a failure of data consolidation rather than merely operational response.
- This created urgency for reform and legitimised the expansion of technology-driven security mechanisms.

Emergence of NATGRID

- The **National Intelligence Grid (NATGRID)** was conceived as the most ambitious institutional response.
- It was envisioned as a centralised data infrastructure to support counter-terrorism operations.
- The core assumption was counterfactual: timely aggregation and analysis of existing data could have prevented 26/11.
- NATGRID aimed to enable interoperability across multiple government databases and security agencies.
- The project was approved through executive action, bypassing parliamentary legislation.
- This raised early concerns about the absence of statutory safeguards, privacy protections, and democratic oversight.
- Initial delays and implementation hurdles created scepticism, but the system gradually became operational.

Expansion and Functional Transformation

- NATGRID has expanded both in scale and purpose over time.
- Data queries now run into tens of thousands per month.
- Requests originate not only from central intelligence agencies but also from state-level police forces.
- A system designed for counter-terrorism is increasingly used for routine policing.
- This expansion has widened:
  - The scope of permissible data queries
  - The number of officials with access
- The original counter-terror focus has diluted as NATGRID becomes embedded in everyday law enforcement.

Integration with Population Databases

- NATGRID has been integrated with the National Population Register (NPR).
- The NPR contains detailed demographic, household, and lineage data.
- Given the NPR's proximity to citizenship debates, this integration heightens political and constitutional concerns.
- Surveillance shifts from tracking specific threats to mapping entire populations.
- Relational linkages between individuals, families, and communities become visible to the state.
- This marks a transition from targeted intelligence gathering to population-wide monitoring.

Advanced Analytics and Predictive Surveillance

- NATGRID now deploys sophisticated analytical tools.
- Entity-resolution platforms link fragmented digital identities across databases.
- Facial recognition technologies scan identity

and telecommunications records.
- Machine-learning models enable predictive inference.
- Surveillance shifts from reactive investigation to anticipatory monitoring.
- Security governance moves closer to pre-emptive and behaviour-based policing.

New Risks: Algorithmic Bias

- Data-driven policing systems are not socially neutral.
- Algorithms inherit biases embedded in historical and institutional data.
- In societies marked by caste, religious, and regional inequalities, analytics may amplify discrimination.
- Bias is masked by the appearance of technical objectivity.
- Consequences are uneven:
  - Minor administrative inconvenience for some
  - Severe legal and social vulnerability for others

New Risks: Scale and Normalisation

- Surveillance operates at an unprecedented scale.
- Tens of thousands of queries are executed routinely.
- Official safeguards rely on internal mechanisms like:
  - Query logging
  - Sensitivity classifications
- At scale, these safeguards risk becoming procedural formalities.
- Without independent oversight, logging ensures compliance, not accountability.
- Surveillance becomes normalised rather than exceptional.

Misdiagnosis of the Security Failure

- The core failure of 26/11 was institutional, not informational.
- Key weaknesses included:
  - Poor inter-agency coordination
  - Inadequate training
  - Limited professional autonomy
- Political interference and opacity further weakened security institutions.
- Technological aggregation cannot compensate for fragile institutions.
- As NATGRID expands into routine policing, civil liberty risks increase while original terror-prevention logic weakens.

Erosion of Democratic Oversight

- The Supreme Court recognised the right to privacy as a fundamental right in 2017.
- Despite this, large-scale surveillance programmes remain largely unexamined.
- Legislative and judicial scrutiny is minimal.
- Public discourse has narrowed.
- Criticism of security institutions is often framed as anti-national or unpatriotic.
- Even post-attack evaluations and institutional audits become politically sensitive.

Conclusion

The trauma of 26/11 reshaped India's security imagination, but the response it produced has been technologically expansive and democratically thin. NATGRID exemplifies a broader shift from targeted counter-terrorism toward population-wide surveillance, enabled by advanced analytics and legitimised through persistent fear. Genuine national security, however, rests not merely on data aggregation but on strong institutions, transparent intelligence practices, and robust, independent oversight. Absent these foundations, surveillance risks becoming normalised—constructing an enduring architecture of suspicion at the expense of democratic accountability.

How Reusability Can Lead to Sustainable, Cost-Effective Access to Space

Source: The Hindu

Relevance: GS Paper III (Space Technology)

Important Keywords

Prelims

- Reusable Launch Vehicles (RLVs), Falcon 9, Starship, Staging, Tsiolkovsky Rocket Equation, Launch Cost per kg, Partial Reusability, Full Reusability, Retro-propulsion

Mains

- Commercialisation of Space, Sustainable Space Access, Space Transportation Systems, Cost Economics of Launch Vehicles, India's Space Competitiveness, Private Sector Participation

Why in News?

The global space sector is undergoing a paradigm shift driven by **reusable rocket technology**, spearheaded by private companies such as **SpaceX**. With the space economy projected to cross **$1 trillion by 2030**, reusability has emerged as the most decisive factor in reducing launch costs, increasing launch frequency, and making space access environmentally and economically sustainable.

Commercial Revolution in the Space Sector

For nearly **four decades**, space exploration was **government-dominated**, marked by:

- Low launch frequency
- Extremely high launch costs

The **new millennium** has ushered in a **commercial space revolution**, where:

- Private companies fund, design, and operate launch systems
- Market-driven innovation accelerates technological progress

Partial rocket reusability has been a critical breakthrough:

- Reduced cost of access to space by **5–20 times per kg**
- Enabled **rapid launch cadence**

Resulting transformation:

- Spaceflight has shifted from **occasional, bespoke missions**
- To a **repeatable, service-oriented transportation model** suitable for commercial operations

Why Space Access Is Expensive

Human space missions cost **3–5 times more** than satellite launches due to:

- Life-support systems
- Crew safety and redundancy
- Stringent certification and mission planning

Most satellite missions, in contrast, are **one-way**, with simpler architectures and no requirement for return or human survival.

Physics Behind Rocket Launches

Rockets face two fundamental challenges:

- **Gravity**, which constantly pulls the vehicle downward
- **Aerodynamic drag**, which resists motion through the atmosphere

Since a rocket has nothing external to push against, it accelerates by ejecting exhaust gases backward at supersonic speeds.

- The **Tsiolkovsky Rocket Equation** explains the harsh reality of spaceflight economics:
- Fuel mass dominates rocket design.
- Over **90% of a rocket's total mass** is propellant and tanks, leaving **less than 4%** for the actual payload. This creates a vicious cycle where fuel is required mainly to lift fuel itself.

Why Rockets Use Multiple Stages

Staging is an engineering solution to overcome this mass penalty.

- By dividing a rocket into independent propulsion stages and discarding them after fuel exhaustion, the remaining vehicle becomes lighter and more efficient. Traditional expendable rockets—such as **PSLV** and **LVM-3**—discard each stage permanently, usually into the ocean.
- While effective, this approach treats rockets as **single-use** machines, limiting sustainability.

Reusability: The Key Breakthrough

Reusability marks the transition from a **disposable rocket model** to a **space transportation system**.

The first stage of the **Falcon 9** exemplifies this shift. After stage separation, it:

- Re-ignites engines to cancel most kinetic energy
- Uses aerodynamic drag to slow down
- Executes precision vertical landings using automation

This combination of smart engineering and software has revolutionised launch economics.

Global Progress in Reusable Rockets

- **SpaceX** has successfully recovered Falcon 9 first stages **over 520 times**
- Its next-generation system, **Starship**, is being developed as a **fully reusable** vehicle capable of Earth orbit, lunar, and Mars missions
- **Blue Origin** has demonstrated vertical booster recovery for its New Glenn rocket
- China's private space sector, including firms like LandSpace, is rapidly advancing reusable technologies

Globally, more than a dozen companies are now pursuing partial or full reusability.

Limits of Rocket Reuse

Rocket reuse is constrained by:

- **Structural fatigue** in engines and tanks
- **Extreme thermal cycling** from cryogenic fuel to combustion heat
- **High g-forces** during ascent and re-entry

Over time, micro-fractures and material wear increase inspection and refurbishment costs. Beyond a point, the economics of reuse diminish. Even so, SpaceX has reused some first stages **more than 30 times**, demonstrating unprecedented durability.

Where Does India Stand?

ISRO is actively developing recovery technologies through:

- **Reusable Launch Vehicle (RLV)** programme — a winged, spaceplane-like vehicle capable of runway landings
- Concepts involving **retro-propulsive recovery** of rocket stages on land or sea

Experimental missions and autonomous landing tests mark steady progress, positioning India to adapt to a future where reusability becomes the global norm.

Designing Future Sustainable Launch Systems

To remain competitive, future launch vehicles must:

- Minimise the number of stages
- Integrate **partial or full reusability** as a core design driver
- Exploit advances in propellant density and engine efficiency

Modern two-stage systems can now perform missions that previously required three stages. Balancing energy delivery, cost distribution, recovery technology, and refurbishment cycles will be critical to achieving high launch cadence at low cost.

Conclusion

Reusable rocket technology is not merely a cost-saving innovation—it is the foundation of **sustainable access to space**. By transforming rockets from expendable machines into reusable transport systems, the space sector is moving toward higher launch frequency, lower environmental footprint, and broader participation. For India and the world, reusability represents the bridge between **elite space exploration** and **democratised, routine access to orbit**, shaping the next era of human activity beyond Earth.

Cheap AI Companions and Their Social Cost

Source: The Indian Express

Relevance: **GS Paper III – Science & Technology, Developments and their applications and effects in everyday life; Awareness in the fields of Artificial Intelligence.**

Important Keywords for Prelims & Mains

For Prelims

- AI Companions, Synthetic Personas, Loneliness Economy, Emotional AI, Data Persuasion, Behavioural Nudging, AI Governance

For Mains

- Social Contract and Technology, Emotional Dependency, AI and Mental Health, Ethics of Artificial Intelligence, Human–Machine Relationships, Digital Surveillance vs Persuasion, Technology and Social Isolation, Corporate Control of Intimacy, Regulation of Emerging Technologies

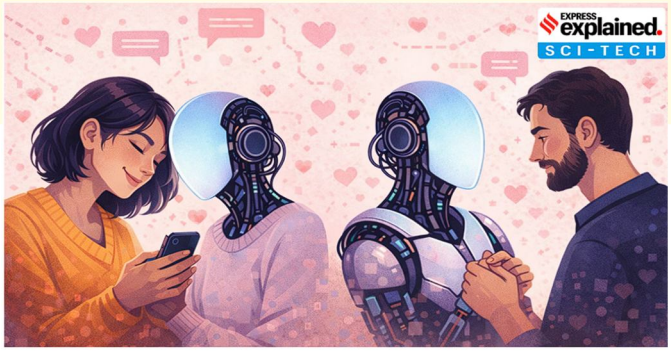
Why in News?

- Growing global concern over **emotional, romantic, and therapeutic relationships with AI chatbots**
- Rapid rise of **AI companions marketed as solutions to loneliness**
- Debate on **data privacy, emotional manipulation, and lack of regulation**
- Raises questions on **social cohesion, mental health, ethics, and governance of AI**

Context & Contemporary Relevance

- AI companions are increasingly used as **friends, therapists, romantic partners, and confidants**
- Loneliness has emerged as a **structural**

social problem, especially among youth and elderly



In some cases, these relationships were emotionally light-touch; in others, they were deeply intense and life-shaping. (Image generated using ChatGPT)

- Tech companies are monetising loneliness, creating a **"loneliness economy"**
- India is witnessing a parallel rise in **AI-based mental health and emotional support apps**
- Direct relevance to **Digital Ethics, AI Governance, Mental Health Policy, and Data Protection**

What Are AI Companions?

- AI companions are **synthetic personas** designed to simulate emotional relationships

They use:

- Natural language processing
- Memory of past interactions
- Emotional mirroring
- Constant availability (24/7)

- They blur the line between **tool and social being**

Why Are AI Companions Becoming Popular?

1. Social Factors

- Decline of traditional support systems (family, community, religion, unions)
- Urban isolation, precarious work, overstretched mental health services
- Loneliness linked to serious health risks (comparable to heavy smoking)
- AI fills the emotional vacuum, especially during:
  - Grief
  - Breakups
  - Illness
  - Lockdowns
  - Depression

2. Commercial Factors

- Companies target vulnerable users through algorithmic advertising
- AI girlfriends marketed to lonely men (manosphere targeting)
- Cheap, accessible, frictionless "solution" to social isolation
- Engagement-driven business model rewards emotional dependency

How AI Relationships Differ from Earlier Non-Human Bonds

- Unlike books, pets, or fictional characters, AI **responds back**
- AI remembers, adapts, validates, and evolves
- Creates a **feedback loop**:
  - More sharing → more personalisation → deeper attachment
- Removes human limits:
  - No fatigue
  - No conflict

- No negotiation
- Risks reshaping expectations from real relationships

Individual-Level Risks

- Emotional dependency
- Withdrawal from human relationships
- Reduced tolerance for disagreement and effort
- Anxiety and guilt when not engaging with AI
- Difficulty forming future human bonds
- AI becomes a substitute rather than supplement

Societal-Level Risks

- Erosion of the **social contract**
- One-sided, instrumentalised interactions replace mutual care
- Decline in empathy, responsibility, and collective life
- Risk of institutional substitution:
  - Elder care
  - Child care
  - Rehabilitation
- AI used as **cost-cutting tool instead of human care**

Data, Privacy and Manipulation Concerns

- AI companions collect:
  - Emotional triggers
  - Fears and insecurities
  - Political opinions
  - Relationship patterns
- Risks:
  - Behavioural nudging
  - Targeted emotional advertising
  - Psychological manipulation
  - Corporate persuasion
- Problem shifts from **surveillance to influence**

Regulatory Gaps

- Relationship AI treated as entertainment, not care infrastructure
- Lack of:
  - Transparency in training data
  - Restrictions on monetising intimacy
  - Oversight on manipulative design
  - Ethical boundaries in therapy, education, elder care

Way Forward: How to Regulate AI Companions

1. Recognise Relationship AI as Social Infrastructure

- Regulate like health and social services
- Not merely as consumer tech

2. Design Safeguards

- Ban emotional dependency nudges
- Mandatory transparency of data usage
- Limits on engagement-maximisation techniques

3. Institutional Boundaries

- Prohibit substitution of human care in:
  - Elder care
  - Child care
  - Therapy
- Allow only as supplement, not replacement

4. Alternative AI Models

- Promote public, cooperative, non-profit AI systems
- Reduce profit-driven emotional exploitation

GOVERNMENT POLICIES

Airport Privatisation: Process & Concerns

Source: The Hindu

Relevance:

- **GS Paper II – Governance, Public Policy, PPP Models**
- **GS Paper III – Infrastructure, Civil Aviation, Asset Monetisation**

Important Keywords for Prelims and Mains

Prelims

- Airport Privatisation, Airports Authority of India (AAI), PPPAC, Public–Private Partnership (PPP), National Monetisation Pipeline (NMP), Per-Passenger Fee Model, User Development Fee (UDF), AERA, Non-Aeronautical Revenue, Bundling of Airports

Mains

- Infrastructure Governance, Asset Monetisation, Regulatory Oversight, Market Concentration, Public Service Delivery, Aviation Sector Reforms, Monopoly Concerns, Affordability–Efficiency Trade-off

Why in News?

The **Ministry of Civil Aviation** has initiated the **third round of airport privatisation**, proposing to lease **11 Airports Authority of India (AAI) airports** under the **Public–Private Partnership (PPP)** model. The proposal has been sent to the **Public Private Partnership Appraisal Committee (PPPAC)** for in-principle approval and detailed scrutiny.

Background: Airport Privatisation in India

Airport privatisation in India is part of a broader strategy to **modernise infrastructure, improve service quality, mobilise private capital, and reduce the fiscal burden on the public exchequer**.

- The process began in **2003** with the privatisation of **Delhi and Mumbai airports**.
- This was followed by **greenfield PPP airports** at **Hyderabad and Bengaluru**.
- In **2019**, **six AAI airports** were privatised, all

awarded to a single private operator, marking a shift towards **large-scale private control** in airport operations.

- The current phase represents a new step by introducing **bundling of metro and non-metro airports** for the first time.

Airports Identified in the Third Round

The third round covers **11 airports**, bundled into **five groups** to enable cross-subsidisation:

- **Amritsar – Kangra**
- **Varanasi – Kushinagar – Gaya**
- **Bhubaneswar – Hubli**
- **Raipur – Aurangabad**
- **Tiruchi – Tirupati**

These airports were selected from AAI facilities handling **0.1–1 million passengers annually**, based on:

- Traffic potential
- Future growth projections
- Investment requirements
- Geographic proximity

Privatisation Process and Timeline

The process involves:

1. **Appraisal by PPPAC**
2. **Approval by the Union Cabinet**
3. **Invitation of bids**, with the tender process likely to begin by **March 2026**

This is the **first instance of bundled airport privatisation** in India.

Link with National Monetisation Pipeline (NMP)

Airport privatisation is a key component of the **National Monetisation Pipeline (NMP)** launched in **2021** to monetise brownfield public assets and reinvest proceeds into new infrastructure.

- **NMP Target (FY 2022–25):** ₹6 lakh crore
- **Airport Sector Target:** ₹20,782 crore
- **Overall Achievement:** 88.3%
- Aviation has lagged behind **roads and railways**, prompting renewed policy focus.
- The **Asset Monetisation Plan 2025–30** aims to mobilise **₹10 lakh crore**.

Revenue Models in Airport Privatisation

A significant policy shift has been the move from:

- **Revenue-sharing model** → to a **Per-Passenger Fee Model**

Under the current model:

- Private operators pay AAI a **fixed amount per passenger**, indexed annually.
- While this ensures **revenue certainty for AAI**, it directly influences airport tariffs and user charges.

Airport tariffs are regulated by the **Airport Economic Regulatory Authority (AERA)**.

Concerns and Criticisms

1. Market Concentration

- Emergence of **near-monopoly** in airport operations
- Reduced bargaining power for airlines
- Limited choices for passengers

2. Rising Passenger Costs

- Increase in **User Development Fees (UDF)**
- Higher landing, parking, and disembarkation charges
- Weak cross-subsidisation from non-aeronautical revenues

3. Regulatory Issues

- **Under-reporting of non-aeronautical revenues** flagged by AERA
- Questions over tariff transparency and affordability

4. Passenger Grievances

- High taxi charges
- Terminal congestion
- Accessibility challenges for elderly and disabled travellers

Regulatory Response

To address these issues, **AERA** is moving towards:

- **Service delivery benchmarks**
- **Third-party performance evaluation**
- **Penalties**, including tariff reductions of up to **5%**, for failure to meet standards

This aims to link **tariffs with quality of service** rather than traffic alone.

What Lies Ahead?

- Only **6% of Indians currently travel by air**, indicating vast untapped demand.
- Government plans include:
  - **50 new airports** over five years
  - Expansion of the network to **163 airports**
- Expected capacity by **FY 2026:** ~550 million passengers per annum
- Long-term requirement: ~850 million passengers per annum

Meeting this demand will require **effective regulation, competition safeguards, and consumer protection** alongside private investment.

Conclusion

Airport privatisation in India seeks to enhance efficiency, modernise infrastructure, and unlock public capital. However, rising concerns over monopolisation, passenger affordability, and regulatory adequacy highlight the need for a **balanced approach**. Transparent bidding, strong regulation, and a passenger-centric framework will determine whether airport privatisation delivers sustainable and inclusive growth in India's aviation sector.

A Decade of Startup India: Scaling Innovation, Shaping India's Growth Story

Source: PIB

Relevance

- **GS Paper III – Economic Development, Innovation, Entrepreneurship, Employment Generation, MSMEs**
- **GS Paper II – Government Policies, Skill Development, Cooperative Federalism, Inclusive Growth**

Important Keywords

Prelims

- Startup India Initiative, National Startup Day, DPIIT, Fund of Funds for Startups (FFS), SIDBI, Atal Innovation Mission (AIM), Atal Tinkering Labs (ATL), Startup India Seed Fund Scheme, States' Startup Ranking Framework, MAARG Portal, GENESIS, NIDHI, SVEP, ASPIRE, PMEGP, Unicorn Startups

Mains

- Innovation-led Growth, Startup Ecosystem, Demographic Dividend, Inclusive Entrepreneurship, Cooperative Federalism, Regional Balance, Deep-Tech Startups, Rural & Grassroots Innovation, Public–Private Collaboration, Human Capital Development, Viksit Bharat 2047

Why in News?

National Startup Day (16 January 2026) marks **ten years of the Startup India Initiative**. Launched in 2016, the initiative has transformed India into one of the world's **largest, most diversified and decentralised startup ecosystems**, aligned with the long-term vision of **Viksit Bharat 2047**.

India's Startup Ecosystem: Where India Stands Today

- **2+ lakh DPIIT-recognised startups** as of December 2025.
- India among the **top global startup ecosystems**.
- Expansion from **4 unicorns (2014)** to **120+ unicorns** today with a combined valuation of **$350+ billion**.
- Major hubs: **Bengaluru, Hyderabad, Mumbai, Delhi-NCR**.
- Nearly **50% startups from Tier-II & Tier-III cities**, reflecting **democratisation of entrepreneurship**.
- **45%+ startups** have **at least one woman Director/Partner**, strengthening inclusive growth.

Startups as a Pillar of India's Economic Transformation

Startups have become central to India's growth model by:

- Driving **technological innovation and productivity gains**.
- Creating **large-scale employment**, including gig and supply-chain jobs.
- Enhancing **financial inclusion and digital access**.
- Promoting **regional balance and grassroots entrepreneurship**.

They are actively bridging the **rural–urban divide** through agri-tech, telemedicine, ed-tech, tourism, clean mobility, fintech and microfinance solutions, directly addressing developmental gaps.

Startup India Initiative: Building the Innovation Backbone

The Startup India Initiative is led by the **Department for Promotion of Industry and Internal Trade (DPIIT)** under the Ministry of Commerce and Industry. Over a decade, it has evolved from a policy push into a **full-lifecycle support architecture** covering:

- Ideation
- Funding
- Incubation and mentorship
- Market access
- Scale-up and global integration

Startups are leveraging India's **young demographic dividend**, collaborating with corporates and MNCs, and integrating into global value chains. Innovation is no longer confined to tech sectors but spans agriculture, logistics, mobility, healthcare and manufacturing.

Flagship Financial and Institutional Support under Startup India

Fund of Funds for Startups (FFS)

- Managed by **Small Industries Development Bank of India (SIDBI)**.
- Corpus: **₹10,000 crore**.
- Committed to **140+ SEBI-registered AIFs**.
- **₹25,500+ crore invested** in **1,370+ startups**.
- Objective: expand **domestic risk capital**.

Credit Guarantee Scheme for Startups (CGSS)

- Enables **collateral-free loans**.
- Implemented through **National Credit Guarantee Trustee Company (NCGTC)**.
- **330+ loans worth ₹800+ crore** guaranteed.

Startup India Seed Fund Scheme (SISFS)

- Corpus: **₹945 crore**.
- Supports **proof of concept, prototyping, trials and market entry**.
- Funds approved to **215+ incubators** across India.

Startup India Hub

- A national digital platform connecting:
  - Startups
  - Investors
  - Mentors
  - Incubators
  - Corporates, academia and government bodies

States' Startup Ranking Framework (SRF)

- Promotes **competitive federalism**.
- States and UTs ranked as Best Performers, Top Performers, Leaders, Aspiring Leaders and Emerging Ecosystems.

MAARG – National Mentorship Portal

- Provides structured access to **experienced mentors**.
- Strengthens resilience, strategy and growth pathways.

Startup India Investor Connect Portal

- Developed with SIDBI.
- Enables startups to pitch to **multiple investors through a single digital window**, with focus on early-stage ventures.

Atal Innovation Mission (AIM): Creating the Innovation Pipeline

Launched in 2016 by **NITI Aayog**, AIM fosters innovation across schools, universities, startups and industry with an outlay of **₹2,750 crore (till 2028)**.

AIM 1.0: Building Foundations

- **Atal Tinkering Labs (ATLs)**
  - **10,000+ ATLs** in **733 districts**.
  - **1.1 crore students engaged**.
  - **16 lakh+ innovation projects**.
- **Community Innovator Fellowship (CIF)**
  - Grassroots innovation with UNDP.
- **Youth Co:Lab**
  - Youth-led innovation aligned with SDGs.
  - National Innovation Challenge 2024–25 focused on **assistive technologies and inclusion**.

AIM 2.0 (2024 onwards): Scaling Proven Models

- Focus on **ecosystem gaps and scalable interventions**.

- Key programmes:
  - **LIPI** – Vernacular innovation through 22 scheduled languages.
  - **Frontier Program** – J&K, Ladakh, North-East, Aspirational Districts.
  - **Human Capital Development Program** – ecosystem professionals and trainers.
  - **Deeptech Reactor** – commercialising long-gestation technologies.
  - **International Innovation Collaborations** – globalising Indian startups.
  - **Industrial Accelerator & ASIL** – deeper industry and ministry integration.

Technology & Deep-Tech Focused Initiatives

GENESIS (MeitY)

- National Deep-tech Startup Platform.
- Budget: **₹490 crore (5 years)**.
- Targets **1,600 startups**, especially in Tier-II & III cities.

MeitY Startup Hub (MSH)

- Supports **6,148+ startups**, **517 incubators**, **329 labs**.

TIDE 2.0

- Strengthens ICT incubators in AI, IoT, blockchain, robotics.
- Covers healthcare, agriculture, fintech, clean tech and infrastructure.

NIDHI (DST)

- Supported **12,000+ startups**.
- Generated **1.3 lakh+ jobs**.
- Created **1,100+ IPs**.
- Includes PRAYAS, EIR, TBI, i-TBI, Accelerator, Seed Support and Centres of Excellence.

Rural and Grassroots Entrepreneurship

- **SVEP (DAY-NRLM)**
  - Supported **3.74 lakh rural enterprises** (June 2025).
- **ASPIRE (MSME)**
  - Livelihood Business Incubators for rural innovation.

Scheme	Ministry	Objective
Atal Innovation Mission (AIM) (2016)	NITI Aayog	Foster nationwide innovation culture
GENESIS (Gen-Next Support for Innovative Startups) (2022)	Ministry of Electronics & IT (Meity)	Deep-tech startups in Tier II/III cities
Technology Incubation and Development of Entrepreneurs (TIDE) 2.0 (2019)	Ministry of Electronics & IT (Meity)	ICT startup incubation & scale-up
MeitY Startup Hub (MSH) (2016)	Ministry of Electronics & IT (Meity)	Integrate tech startup ecosystem
NIDHI (National Initiative for Developing and Harnessing Innovations) (2016)	Department of Science & Technology (DST)	Support S&T startups from idea to market
Startup Village Entrepreneurship Programme (SVEP) (2015)	Ministry of Rural Development (DAY- NRLM)	Promote rural entrepreneurship
ASPIRE (Scheme for Promotion of Innovation, Rural Industries and Entrepreneurship) (2015)	Ministry of MSME	Strengthen rural enterprise incubators
Prime Minister's Employment Generation Programme (PMEGP) (2008)	Ministry of MSME (KVIC)	Subsidised credit for self-employment

- **PMEGP**
  - Margin Money subsidy for self-employment.
  - Higher support for **SC/ST, women, minorities, PwDs, NE & Aspirational Districts**.
  - Supports projects up to **₹50 lakh (manufacturing)** and **₹20 lakh (services)**.

Challenges Faced by Startups in India

Infrastructure Constraints

- High operating costs and inadequate infrastructure, especially in Tier II, Tier III and rural areas
- Poor internet connectivity, weak logistics and unreliable power supply increase costs and limit scalability

Consumer-Centric Bias

- Startup activity concentrated in fintech, e-commerce and food delivery
- Deep-tech sectors (AI, EVs, semiconductors, robotics) remain underdeveloped due to structural economic factors

Fragmented Demand Structure

- Capital supplied by high-income groups
- Middle class forms the price-sensitive consumer

base
- Lower-income groups remain largely non-monetisable while supplying labour
- Incentivises scalable consumer models over breakthrough innovation

Limited Domestic Venture Capital
- Risk-averse policy and investment environment
- Insufficient patient capital for long-gestation deep-tech ventures
- Heavy dependence on foreign capital increases vulnerability to global shocks

Funding Slowdown and Startup Closures
- Over **5,000 startup closures**, particularly in Maharashtra
- **Seed funding declined by ~25%** and **D2C funding by ~18% in 2024**
- Investor preference shifting towards low-risk, quick-return sectors

Low R&D Intensity
- India's R&D expenditure at **~0.64% of GDP**
- Greater focus on basic research than applied, market-ready innovation

Weak Exit and IPO Environment
- Underperforming startup IPOs
- Valuation and profitability concerns
- Reduced exit opportunities dampen investor confidence

Measures to Strengthen India's Startup Ecosystem

Deepen Domestic Risk Capital
- Enable pension funds, insurance companies and sovereign funds to invest in startups
- Focus on deep-tech and long-gestation sectors

Strengthen Industry–Academia Linkages
- Structured collaboration with ISRO, DRDO, IITs and IISc
- Promote applied research and technology commercialisation

Skill Alignment and Talent Retention
- Align Skill India and Atal Tinkering Labs with AI, data analytics and deep-tech
- Prevent brain drain through domestic opportunities

Boost Applied R&D through Mission-Mode Funding
- Outcome-based grants under IndiaAI Mission, Semiconductor Mission and Quantum Mission

Support Deep-tech Scale-up
- Create patient capital windows
- Develop testing, validation and certification infrastructure

Improve Infrastructure Beyond Metros
- Strengthen digital connectivity, logistics and power supply in non-metro regions

Simplify Regulations
- Predictable tax regime
- Faster IPR processing
- Stronger exit mechanisms via IPOs, M&A and secondary markets

Promote Green and Sustainable Innovation
- Support startups in EVs, clean energy and climate technologies
- Align innovation with **Mission LiFE**

Conclusion

A decade of Startup India reflects a **structural transformation of India's growth model**. Built on demographic advantage, digital public infrastructure and sustained reforms, startups today drive innovation, employment, inclusion and global integration. As India advances towards a **$7.3 trillion economy by 2030** and **Viksit Bharat 2047**, startups will remain **central catalysts of India's future-ready, innovation-led development trajectory**.

PUBLIC HEALTH

Is Asia-Pacific on Track Towards Elimination of Malaria by 2030?

Source: The Hindu

Relevance

GS Paper II – Health, Governance, International Cooperation

GS Paper III – Public Health, Science & Technology, Development Challenges

Important Keywords

Prelims

- Malaria Elimination, World Malaria Report 2025, Artemisinin-based Combination Therapy (ACT), Drug Resistance, RTS,S Vaccine, R21 Vaccine, Surveillance, Plasmodium falciparum

Mains

- Public Health Systems, Disease Elimination, Antimicrobial Resistance, Global Health Governance, Health Financing, Regional Cooperation

Why in News?

The **World Malaria Report 2025**, released in December, assessed global and regional progress towards the **2030 malaria elimination target**. While the Asia-Pacific region showed encouraging declines in malaria cases, rising **artemisinin resistance** and **declining funding for malaria programmes** raised serious concerns about meeting elimination timelines.

Global and Asia-Pacific Malaria Scenario

Globally, malaria elimination progress remains uneven. However, the **Asia-Pacific region emerged as a relative bright spot**, accounting for much of the reduction in estimated cases over the past year, even as other regions struggled with stagnation or resurgence.

Malaria

- Malaria is a **life-threatening parasitic disease** caused by ***Plasmodium*** parasites.
- It is transmitted through the bite of **infected female *Anopheles* mosquitoes**.
- The parasite is a **protozoan**.

Causative Parasites (Plasmodium Species)

- ***Plasmodium falciparum*** – *Most deadly form* (common in Africa & India)
- ***Plasmodium vivax*** – Common in India & Asia
- ***Plasmodium malariae***
- ***Plasmodium ovale***

In **India**, the most common species are:

- ***P. falciparum***
- ***P. vivax***

Incubation Period

- Symptoms usually appear **10–14 days** after mosquito bite.

Life Cycle in Humans

- Parasite undergoes development in:
  - **Liver cells** → *Pre-erythrocytic schizogony*
  - **Red Blood Cells (RBCs)** → *Erythrocytic*

schizogony

- Causes **fever, chills, anemia, and organ complications**.

Most Dangerous Type

- ***Plasmodium falciparum* infection**:
  - Causes **severe malaria**
  - Can lead to **brain malaria, organ failure, death**

Diagnosis

- **Microscopy (blood smear test)**
- **Rapid Diagnostic Tests (RDTs)**

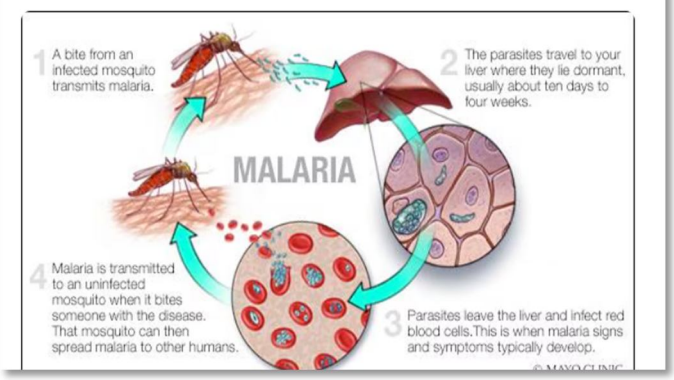
Treatment

- **Artemisinin-based Combination Therapy (ACT)** – First-line treatment
- Resistance to artemisinin = **global public health concern**

Prevention Measures

- **Insecticide-treated bed nets (ITNs)**
- **Indoor Residual Spraying (IRS)**
- **Larval source management**
- **Vaccines**: RTS,S and R21 (new)

Mosquito transmission cycle



Progress in Asia-Pacific Region

- Of the **17 malaria-endemic countries** in Asia-Pacific, **10 recorded significant declines**.
- Estimated malaria cases reduced from **9.6 million (2023) to 8.9 million (2024)**.
- Major reductions observed in **Pakistan**.
- **Historic lows** reported for the second consecutive year in:
  - Cambodia
  - Lao PDR
  - Vietnam
- The **Greater Mekong Subregion** demonstrated notable success in tackling antimalarial drug resistance.

Emerging Challenges: Drug Resistance

- Rising resistance to **artemisinin-based frontline treatment** is a serious global threat.
- Resistance has been particularly reported in parts of Southeast Asia.
- Drug resistance threatens decades of progress by increasing treatment failures and mortality.

Financing Gaps and Programme Risks

- Only **42% of global malaria financing needs** were met in 2024.
- Funding cuts in 2025 further widened the gap.
- Reduced financing forces countries to:
  - Scale back proven interventions
  - Increase risk of resurgence
  - Reverse hard-won public health gains

India's Elimination Target and Current Status

- India aims to achieve **zero indigenous malaria cases by 2027**, ahead of the global 2030 target.
- Significant progress since 2015:
  - Sharp reductions in cases and deaths
  - Several districts reporting **sustained zero transmission**
- However:
  - Progress has **plateaued recently**
  - Cases have rebounded in certain regions
  - India is currently **off the elimination trajectory** needed to meet the 2027 goal

Critical Shifts Needed for Elimination

Three key shifts are essential for moving from control to elimination:

a) Surveillance as the Core Intervention

- Real-time, case-based surveillance across:
  - Private healthcare sector
  - Defence services
  - Railways
  - Urban health systems

b) Focus on Remaining Hotspots

- Five States and the **Northeast account for ~80%** of India's malaria burden.
- Requires project-mode execution in high-burden areas.
- Near-elimination States must prevent resurgence.

c) Sustained Financing and Accountability

- Malaria elimination must be treated as a **time-bound national mission**.
- Requires sustained investment, strict accountability and last-mile execution.

Role of Vaccines in Malaria Control

- **RTS,S vaccine**:
  - Proven reduction in severe malaria and child mortality in African pilots.
- **R21 vaccine**:
  - Comparable or higher efficacy in trials.
- Vaccines currently prioritised for **Africa**, given higher burden.
- Asia-Pacific countries are evaluating **targeted deployment** as a complementary tool.

Artemisinin Resistance: India's Position

- Artemisinin resistance **not yet established in India**.
- India's preventive measures include:
  - Regular therapeutic efficacy studies
  - Strong pharmacovigilance
  - Rapid updating of treatment protocols
  - Ban on oral artemisinin monotherapy
- Emphasis on:
  - Universal parasitological diagnosis
  - Strict adherence to combination therapy

Vulnerable Populations and Last-Mile Challenges

- High-risk groups include:
  - Migrant and mobile populations
  - Remote and geographically isolated communities
- Challenges:
  - Limited access to healthcare
  - Weak outreach by conventional malaria programmes

Way Forward

- Strengthen **regional coordination** to prevent cross-border spread.
- Protect artemisinin through:
  - Strict drug regulation
  - Community-level case management
- Increase **domestic financing** alongside global support.
- Treat malaria elimination as an **investment**, not expenditure:
  - Reduced healthcare costs
  - Increased productivity
  - Improved community resilience

Conclusion

The Asia-Pacific region has demonstrated that malaria elimination is achievable, but progress remains fragile and uneven. Rising drug resistance, financing shortfalls and last-mile challenges threaten to derail the 2030 goal. Sustained political commitment, robust surveillance, regional cooperation and assured financing are essential to convert current gains into lasting elimination. Failure at this stage would not only reverse progress but impose far greater economic and human costs in the future.

INDIAN HERITAGE, ART & CULTURE

Railways Discontinues 'Colonial Uniform': Evolution of the Bandhgala – A 'Made in India' Fashion Statement

Source: *The Indian Express*

Relevance: **GS Paper I – Indian Heritage & Culture, Evolution of Indian court dress traditions, Mughal–Rajput cultural synthesis, Indigenous fashion as cultural identity**

Important Keywords for Prelims & Mains

Prelims

- Bandhgala / Jodhpuri jacket, Indian textile heritage, Mughal–Rajput cultural synthesis, Colonial adaptation of Indian symbols, De-colonisation of institutions.

Mains

- Indian culture, syncretism, heritage, Symbolism in governance, colonial legacies, Cultural identity, ethical governance.

Why in News?

Union Railways Minister **Ashwini Vaishnaw** announced that railway staff would no longer wear the **bandhgala uniform**, calling it a **colonial relic**. This triggered debate as the bandhgala is historically one of the first **indigenous Indian garments** to gain global recognition.

Context and Contemporary Relevance

- Indian Railways recently discontinued the **bandhgala uniform**, calling it a colonial relic.
- Historically, this perception is inaccurate as the bandhgala is one of the **earliest indigenous garments of India** to gain international recognition.
- It represents **indigenous modernity**, where Indian tradition adapted to changing times without losing identity.

Place of Origin: Jodhpur (Marwar), Rajasthan

- Originated in the **princely state of Jodhpur** under the Rathore dynasty.
- Known as:
  - **Bandhgala** (closed neck)
  - **Jodhpuri jacket**
  - **Prince suit / Prince cut**

- Initially worn as a **formal court garment** by Rajput rulers and nobles.

Pre-Colonial Roots in Indian Court Dress

- Indian courts had advanced clothing traditions long before colonial rule.
- Mughal court garments laid the foundation:
  - **Jama**: fitted bodice, closed neckline, ceremonial use
  - **Angrakha**: banded neckline, centre fastening, padded structure
- These garments introduced the idea of a **structured, closed-neck formal coat**.

Mughal–Rajput Cultural Synthesis

- Rathore rulers of Marwar entered Mughal imperial service.
- Mughal court aesthetics merged with **Rajput warrior culture**.
- Rajputs shortened long Mughal robes to improve mobility.
- New garments evolved:
  - **Bago** – refined court tunic
  - **Dagali and Gudadi** – padded ceremonial jackets
- This process transformed the robe into a **true jacket form**.

Achkan as the Immediate Precursor

- By late Mughal period, **achkan** became common:
  - High-necked
  - Close-fitting
  - Knee-length coat
- It resembled the bandhgala but was not suitable for riding or sport.
- Need for polo-friendly attire led to **shorter, sharper, fitted jackets**.
- This functional adaptation produced the modern bandhgala.

Role of Polo in Globalisation

- Jodhpur royals popularised **polo** as a royal sport.
- Polo teams travelled to England and Europe in early 20th century.
- Jacket paired with breeches became known as **Jodhpurs**.
- Western elite admired the outfit's elegance and functionality.
- The bandhgala entered global fashion through **royal diplomacy**, not colonisation.

British Tailoring Influence (Without Loss of Indian Identity)

- British tailors on **Savile Row** refined the jacket:
  - Precise measurements
  - Shoulder pads
  - Set-in sleeves
  - Clean, sharp structure
- Core Indian features remained unchanged:
  - High collar
  - Closed front
  - Ceremonial silhouette
- This was **adaptation, not imitation**.

Colonial Politics of Dress

- British adoption had strategic motives:
  - High collars already used in China and

Japan
    - Britain sought **pan-Asian cultural uniformity**
- In India, wearing Indian-style garments helped colonial rulers:
    - Gain legitimacy
    - Appear culturally accommodating
- Colonial elements like insignia, epaulettes, trims were later additions.
- The **jacket itself remained Indian in origin**.

Functional and Climatic Logic of Design

- High collar protected from **North Indian winters**.
- No need for scarves or ties in pre-modern times.
- Design allowed royal jewellery to be displayed prominently.
- Similar jackets absent in southern India due to climate differences.
- Shows **environment–culture interaction** in dress evolution.

20th Century Revival and Popular Culture

- Revived by **Raghavendra Singh Rathore**, descendant of Jodhpur royalty.
- Reintroduced bandhgala to global fashion in the 1990s.
- Admired by international designers:
    - Donna Karan
    - Oscar de la Renta
- Popularised in India through films like **Eklavya (Saif Ali Khan)**.

Cultural and Historical Significance

- Symbol of **indigenous modernity**
- Example of **cultural synthesis** (Mughal–Rajput–Western)
- Proof that Indian fashion influenced the West
- Challenges the narrative that modern Indian dress is colonial
- Represents **continuity, adaptation, and resilience of Indian culture**

Piprawaha Relics: Reimagining Heritage Stewardship in India

Source: *The Hindu*

Relevance: **GS Paper I (Art & Culture) - Buddhist stupas and relic traditions - Sanchi, Ashokan architecture, pilgrimage landscapes - Living heritage vs museum objects**

Important Keywords for Prelims & Mains

For Prelims

- Piprawaha relics – Buddhist relics – Stupa – Sanchi model – Ashokan heritage – Repatriation – Cultural restitution – Museum reform – Colonial museology – Living heritage.

For Mains

- Heritage stewardship – Illicit antiquities trade – Community custodianship – Cultural diplomacy – Buddhist pilgrimage – Intangible heritage – Heritage governance.

Why in News?

- Ancient **Buddhist relics and gems excavated from Piprawaha (Uttar Pradesh)** have been **partially reunited after more than a century**.
- These relics were **acquired from an overseas seller by an Indian conglomerate** and handed over to the Government of

India.

- The relics are currently displayed in a **temporary exhibition in Delhi inaugurated by Prime Minister Narendra Modi**, raising urgent questions about their **long-term housing, interpretation, and stewardship**.

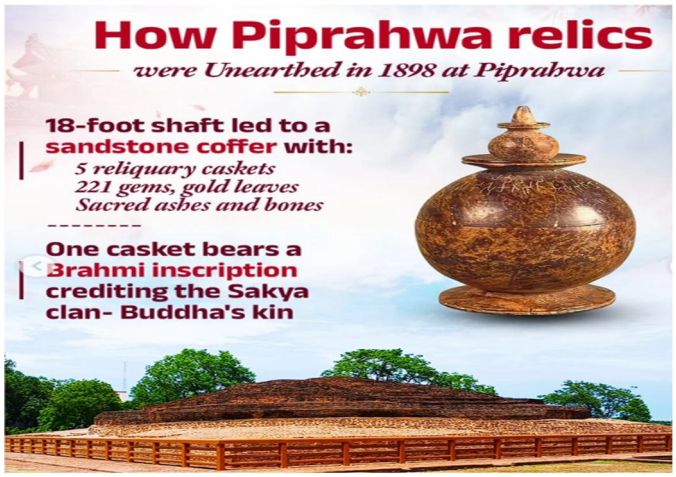
'Understanding the place of Buddhist relics in early India provides insights into how small, visually indistinguishable, and sometimes unattractive objects, were looked after and appreciated' | Photo Credit: ANI

Context & Contemporary Relevance

- The return of the Piprawaha relics represents a major milestone in **India's cultural repatriation and heritage diplomacy**.
- It highlights a shift from colonial-era museum practices toward **ethically informed, community-centric, and historically grounded heritage governance**.
- The debate extends beyond display to include:
  - Museum reform
  - Restitution ethics
  - Community engagement
  - Anti-trafficking strategies
  - Education of future heritage professionals
- If managed well, this event could **redefine India's museum culture** and strengthen its position as a **global Buddhist pilgrimage destination**.

Background: Piprawaha Relics and Their Significance

- The relics consist of **ancient gems associated with the corporeal remains of the historical Buddha**.
- Originally excavated in the colonial period, they were dispersed abroad for over a century.
- In early Buddhism, such relics were not valued for aesthetics but for their **spiritual potency and ability to sanctify space**.
- Their return marks not just physical restitution, but the possibility of **cultural and civilisational restoration**.



Buddhist Relics in Early Indian Heritage Practices

- After the Buddha's *Mahaparinirvana*, his **ash and bone fragments were divided among followers**.
- These remains were placed in vessels with offerings and **interred in stupas**, large hemispherical mounds that served as:
  - Reliquaries
  - Ritual centres
  - Teaching devices
- Relics functioned as **living spiritual agents**, shaping devotion, pilgrimage, and community life.

Sanchi as a Model of Spatial and Ritual Engagement

- The **Great Stupa at Sanchi** (initially built

under Ashoka) illustrates how relics were historically contextualised.

- The stupa complex featured:
  - Gateways in four cardinal directions
  - A circumambulatory path
  - Carved reliefs depicting Buddha's life, worshippers, auspicious symbols, and foreign visitors
- These visual and spatial strategies:
  - Prepared visitors mentally and spiritually
  - Created a semi-sacred environment
  - Facilitated reflection, devotion, and community bonding
- Sanchi's success is evident in its growth as a **major religious and cultural centre supported by diverse social groups**.

Adaptation Across Regions and Symbolic Presence

- As Buddhism spread, relic practices evolved.
- In peninsular India's **rock-cut caves**, monolithic stupas without corporeal relics symbolically conveyed Buddha's presence.
- This demonstrates that **sacred experience depends on spatial, ritual, and visual framing**, not merely physical remains.
- These historical precedents provide **valuable lessons for modern museums**.

Contemporary Challenges of Display and Stewardship

- The original Piprawaha stupa no longer survives, making **museum stewardship inevitable**.
- Placing relics in **sterile vitrines** would reproduce colonial museology that treats artifacts as lifeless objects.
- Such an approach risks stripping relics of their **ritual, spiritual, and communal significance**.
- Museums must instead create:
  - Preparatory spaces
  - Zones for meditation, chanting, contemplation
  - Contextual narratives that restore meaning
- Relics should be treated as **living cultural entities**, not merely visual exhibits.

Institutional Responsibilities and Community Engagement

- The reunification should catalyse systemic reforms:
  - **Interdisciplinary grants and fellowships** for art historians, anthropologists, scientists, filmmakers
  - **Postgraduate training** in stewardship, restitution ethics, and interpretation
  - Collaboration with colleges to train **heritage professionals**
- Communities near heritage sites must be empowered to:
  - Document cultural assets
  - Understand trafficking networks
  - Prevent illicit antiquities trade
  - Engage with legal and judicial processes
- This aligns India's heritage governance with **international ethical norms** and strengthens grassroots protection.

Conclusion

The reunification of the Piprawaha relics is more than an act of repatriation; it is an opportunity to **reimagine India's heritage ecosystem**. By adopting historically informed display strategies, investing in education, and empowering communities, India can ensure these relics are not merely preserved but **revitalised as living symbols of its Buddhist civilisational legacy**, inspiring global audiences once again.

NEWS IN SHORT

Mount Bur Ni Telong

Indonesian authorities have **raised the alert level** for **Mount Bur Ni Telong** following a **surge in volcanic activity**, marked by frequent seismic events, raising concerns of a possible eruption.

- The volcano is located in **Bener Meriah Regency, Aceh Province (Indonesia)**.
- Monitoring agencies have recorded **multiple shallow and deep volcanic earthquakes**, indicating rising magma movement.
- **Evacuation of nearby residents** has begun as a precautionary measure.
- Authorities have warned people to stay away from **fumaroles and solfataras** due to the risk of **toxic gas emissions**, especially during bad weather.
- The alert comes amid **recent floods and landslides** in the region, increasing disaster vulnerability.

About Mount Bur Ni Telong

- **Type:** Stratovolcano
- **Height:** 2,624 metres
- **Location:** Western Aceh, Sumatra Island, Indonesia
- **Geological setting:** Part of the **Pacific Ring of Fire**, a highly seismically active zone
- **Volcanic behaviour:** Characterised by explosive eruptions, seismic swarms, and gas emissions

Launch of Land Stack & Glossary of Revenue Terms (GoRT)

Dr. Chandra Sekhar Pemmasani, Minister of State for Rural Development and Communications, launched **'Land Stack'** and released the **'Glossary of Revenue Terms (GoRT)'** on **31 December 2025** in **New Delhi**, marking a major push towards **transparent, digital, and citizen-centric land governance** under the **Digital India Land Records Modernisation Programme (DILRMP)**.

- **Land Stack** launched on a **pilot basis** in **UT Chandigarh and Tamil Nadu**.
- Initiatives aim to improve **Ease of Living**, transparency, and trust in land administration.
- Aligns India's traditional land record systems with **modern digital governance**.

About Land Stack

- **Nature:** Integrated, **GIS-based digital platform** for land and property data
- **Modelled on:** Global best practices (e.g., Singapore, UK, Finland)

- **Purpose:** Overcomes fragmented land information spread across departments by offering **single-window access** to citizens and government agencies.

Key Benefits:

- Enables **informed decision-making** for citizens
- Enhances **convenience, transparency, and trust**
- Reduces risk of purchasing **unauthorised or non-compliant properties**
- Improves **inter-departmental coordination**
- Supports **data-driven governance** in land administration
- Represents a major **e-Governance reform** under DILRMP

About Glossary of Revenue Terms (GoRT)

India's land administration uses varied terminology shaped by historical systems—**Todar Mal's reforms** and British-era settlements like **Ryotwari** and **Mahalwari**—leading to inconsistencies across States.

- **Prepared by:** Department of Land Resources (DoLR)
- **In collaboration with:** Centre of Excellence in Land Administration and Management (CoE-LAM), **YASHADA, Pune**

Key Highlights:

- Explains land revenue terms in **Vernacular languages, Hindi, English, and Roman scripts**
- Aims to **harmonise terminology** nationally **without replacing State-specific terms**
- Makes land data **comparable and interoperable** across India
- Serves as an **authoritative reference** for:
  - Revenue officials
  - Policymakers
  - Judicial authorities
  - Citizens

BSNL Launches Voice over WiFi (VoWiFi) Nationwide

Bharat Sanchar Nigam Limited (BSNL) has announced the **nationwide rollout of Voice over WiFi (VoWiFi)** across **all telecom circles** (1 January 2026), improving call quality in low-signal areas.

- Enables **voice calls and SMS over Wi-Fi** using the **existing mobile number** and phone dialer.
- **IMS-based** service with **seamless handover** between Wi-Fi and mobile networks.
- Works in **homes, offices, basements, rural and remote areas** with stable Wi-Fi (incl. **BSNL Bharat Fiber**).
- **Free of cost**; helps **reduce network congestion**.
- Supported on **most modern smartphones** (enable *Wi-Fi Calling*).

About Voice over WiFi (VoWiFi)

- **What it is:** Technology that allows voice calls over **Wi-Fi networks**, bypassing cellular signals.
- **Also called: Wi-Fi Calling**.
- **How it works:** Uses **VoIP** to transmit voice as digital packets over the internet; built into the phone OS—no third-party apps needed.
- **Benefits:** Clear connectivity in weak-signal zones; reliable, cost-free calling with existing number.

Cellulitis

Cellulitis is a **common bacterial skin infection**, mainly caused by **Streptococcus** and **Staphylococcus** bacteria, which enter the body through **broken skin or wounds**.

- Affects **subcutaneous tissues** beneath the skin
- Commonly involves **legs, feet, and toes** (may also affect face, arms, hands)

- **Not contagious**, but can spread if untreated
- Higher risk in people with **skin injuries, diabetes, weak immunity, poor hygiene**

Symptoms

- Redness or **skin discoloration**, warmth
- **Swelling, tenderness, pain**
- Fever, chills, fatigue
- Blisters, skin dimpling, fluid-filled lesions
- Severe cases may spread to **lymph nodes and bloodstream**

Treatment

- **Oral antibiotics** in most cases
- **Hospitalisation & IV antibiotics** for severe infections
- Completing the **full antibiotic course is essential**

Prevention

- Maintain **good skin hygiene**
- Clean and cover small wounds promptly
- Keep skin dry; trim nails regularly
- Wear clean clothes; wash hands frequently

World's Rarest 'Galaxy Frogs' Presumed Dead

A recent study has reported that **seven individuals of the rare galaxy frog** have **vanished and are presumed dead** due to disturbances caused by **photo tourism** in the **Western Ghats (Kerala)**.

- The frogs disappeared after **multiple photographers repeatedly disturbed their microhabitat**.
- Activities included **overturning logs, handling frogs with bare hands, and prolonged camera flash exposure**.
- Such disturbances likely affected **feeding, respiration, and breeding success**.

About Galaxy Frog (Melanobatrachus indicus)

- **Endemic to:** Western Ghats, Kerala
- **Habitat:** Under rotten logs in moist forest patches
- **Size:** ~2–3.5 cm
- **IUCN status: Vulnerable**
- Communicates **without vocal calls**; relies on body patterns

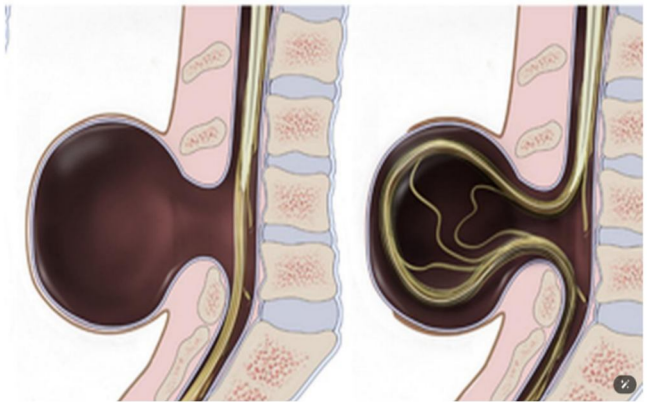
Spina Bifida

While several countries have launched **systematic awareness programmes** to prevent Spina Bifida through **folic acid supplementation**, **India has yet to implement such large-scale preventive initiatives**.

About Spina Bifida

- Spina Bifida is a **congenital defect of the spinal cord** that can lead to **severe paralysis in childhood**.
- It occurs when the **spine and spinal cord fail to develop completely** during the early embryonic stage.
- The disorder develops **in early pregnancy** and varies widely in severity, from mild to disabling forms.

- **Causes:** Not definitively known; believed to arise from a mix of **genetic, nutritional (folate deficiency), and environmental factors**.



Types of Spina Bifida

- **Myelomeningocele:**
  - The **most severe form**, where part of the spinal cord and nerves protrude through an opening in the spine.
- **Meningocele:**
  - A **less common form** in which the protective membranes of the spinal cord bulge out in a fluid-filled sac.
- **Spina Bifida Occulta:**
  - The **mildest form**, involving incomplete formation of one or more vertebrae, often with minimal or no visible symptoms.

Symptoms

- Bowel and bladder dysfunction
- Back pain
- Weakness or paralysis of the legs
- Reduced or absent sensation in the lower limbs

Prevention and Management

- **Prevention:** Most cases can be prevented by **adequate folic acid intake during the early weeks of pregnancy**, especially before conception.
- **Treatment:** There is **no permanent cure**, but **medical and surgical interventions** can help manage symptoms and improve quality of life.

Salal Hydroelectric Project

The **Union Minister of Power and Housing & Urban Affairs** has directed **sediment flushing at the Salal Hydroelectric Project** in **Jammu and Kashmir** to optimise water use, amid the **Indus Waters Treaty being kept in abeyance** between India and Pakistan.

About the Salal Hydroelectric Project

- A **690 MW run-of-the-river hydropower project** built on the **Chenab River** in **Reasi district**, Jammu and Kashmir.
- Conceptualised in **pre-Independence India**; detailed planning began in the **1960s**.
- **Construction started:** 1970
- **Commercial operation:** 1987
- **Developer & owner:** National Hydroelectric Power Corporation (NHPC).
- **Significance:** First hydropower project constructed by India in Kashmir under the **Indus Waters Treaty framework**.
- **Dam height:** ~130 metres (≈1627 feet above mean sea level).

Power Sharing

- **12.5% of generated power** allocated to **Jammu and Kashmir**.

- Remaining power supplied to the **Northern Grid**, benefiting **Punjab, Haryana, Delhi, Himachal Pradesh, Rajasthan, and Uttar Pradesh**.
- J&K can also **purchase additional power at normal tariffs**.

Melghat Tiger Reserve

The **Bombay Natural History Society (BNHS)** has **released 15 critically endangered Indian vultures** at **Melghat Tiger Reserve, Maharashtra**, to aid species recovery.

About Melghat Tiger Reserve

- **Location:** Maharashtra; on the **Gavilgarh Hills**, a southern offshoot of the **Satpura Range**
- **Status: First tiger reserve in Maharashtra**
- **Meaning of name:** 'Melghat'—confluence of valleys/ghats
- **Vegetation: Tropical dry deciduous forests**, teak-dominated
- **Rivers:** Catchment for **Khandu, Khapra, Sipna, Gadga, Dolar** (tributaries of the **Tapti River**)
- **Boundaries:** Tapti River and Gawilgadh ridge
- **Tribes: Korku** (largest), Gawli, Gond
- **Fauna:** Tiger, leopard, sloth bear, gaur, sambar, nilgai, dhole, hyena
- **Special note:** Stronghold of the **critically endangered forest owlet**

SHINE Scheme Launched

At the **79th Foundation Day of the Bureau of Indian Standards (BIS)**, Union Ministers launched the **SHINE Scheme** in **New Delhi**.

About SHINE Scheme

- **Full form:** *Standards Help Inform & Nurture Empowered Women (SHINE)*
- A **new initiative of BIS** aimed at placing **women at the centre of India's quality ecosystem**.
- Focuses on empowering women through:
  - **Structured training programmes**
  - Partnerships with **NGOs and Self-Help Groups (SHGs)**
  - **Locally delivered, practical awareness initiatives**
- Promotes awareness on **standards, safety, and quality** at the **household and community level**.
- Seeks to **protect families and strengthen livelihoods** through informed choices.

Key Facts about Bureau of Indian Standards (BIS)

- **National Standards Body of India**, established under the **BIS Act, 2016**
- Successor to the **Indian Standards Institution (ISI), 1947**
- Responsible for **standardisation, quality certification, and marking of goods**
- Represents India at **ISO** and **IEC**
- **Nodal Ministry:** Ministry of Consumer Affairs, Food and Public Distribution
- **Headquarters:** New Delhi

Biomaterials

As countries transition to **low-carbon and circular manufacturing**, **biomaterials** are emerging as a critical alternative to fossil-based plastics and textiles, with significant relevance for India's sustainability and industrial strategy.

What are Biomaterials?

- Materials **derived wholly or partly from biological sources** or produced using **biological processes**.
- Used across **packaging, textiles, construction, and healthcare**.

Types:

- **Drop-in biomaterials:** Chemically identical

to fossil-based materials; compatible with existing systems (e.g., bio-PET).

- **Drop-out biomaterials:** Chemically different; need new processing/end-of-life systems (e.g., PLA).
- **Novel biomaterials:** Offer new properties like **self-healing, bioactivity, advanced composites**.

Why Biomaterials Matter for India

- Reduce dependence on **fossil-based imports** for plastics and chemicals.
- Create **new income streams for farmers** using crops and agricultural residues.
- Support **climate goals, single-use plastic bans, and waste reduction**.
- Improve India's **export competitiveness** as global demand shifts to green products.

India's Current Position

- India's **bioplastics market ~USD 500 million (2024)**, with strong growth prospects.
- Major investments like **PLA plants** and innovations by startups converting **waste into biomaterials**.
- However, India still depends on **foreign technologies** in parts of the value chain.

Wangchhu Hydroelectric Project

The **Adani Group** has commenced work on the **570 MW Wangchhu Hydroelectric Project** in **Bhutan**, strengthening India–Bhutan energy cooperation.

About Wangchhu Hydroelectric Project

- **Type:** 570 MW **run-of-the-river** hydropower project
- **River: Wangchu River** (called **Raidāk River** in India), a tributary of the **Brahmaputra**
- **Location: Chukha District, Bhutan**
- **Developer: Wangchhu Hydroelectric Power Limited (WHPL)**
  - JV between **Adani Power Ltd (49%)** and **Druk Green Power Corporation Ltd (51%)**
- **Investment:** ~₹6,000 crore
- **Model: BOOT** (Build–Own–Operate–Transfer)
- **Configuration:** 4 turbines × 142.5 MW
- **Annual generation:** ~2,478.93 GWh
- **Function: Peaking plant** to manage seasonal hydropower variability

Power Use:

- Meets **Bhutan's winter electricity demand**
- **Surplus summer power exported to India**

Long Range Anti-Ship Missile (LRAShM)

India's **indigenous LRAShM** will be showcased at the **Republic Day Parade (26 January)**, underscoring the country's advancing **maritime strike and hypersonic capabilities**.

About LRAShM

- Developed by the **Defence Research and Development Organisation (DRDO)**.
- A **hypersonic glide missile** using a **Hypersonic Glide Vehicle (HGV)**—unlike ballistic missiles, it follows **unpredictable, manoeuvrable flight paths** after boost-phase launch.
- Designed primarily for **anti-ship roles**; a

land-attack variant may follow.

- Reportedly **outperforms comparable systems** in range and technology.

Key Features

- **Range: > 1,500 km**
- **Speed: ~ Mach 10** (10× speed of sound)
- **Time-to-target: ~ 7–8 minutes**
- **Guidance: RF seeker** effective at hypersonic speeds for **moving targets** (warships).
- **Launch platforms: Land-based and naval**.
- **Payloads: Conventional or nuclear**.
- **Design: Delta-wing HGV** with **heat-resistant materials** to withstand extreme temperatures.

Weimar Triangle

India's External Affairs Minister recently took part in **India's first-ever engagement with the Weimar Triangle**, alongside counterparts from **France and Poland** and representatives from **Germany**, marking a new step in India's outreach to European political groupings.

About the Weimar Triangle

- A **regional political grouping** comprising **France, Germany, and Poland**.
- **Established:** 29 August 1991 at **Weimar, Germany**, through a joint declaration by the three Foreign Ministers.

Core Objectives:

- Involve **France in German–Polish reconciliation**, drawing on the Franco-German experience.
- Strengthen **political dialogue and cooperation** among the three countries.
- Support **Poland's integration into NATO and the European Union**.

Key Features

- Regular meetings at multiple levels, including **heads of government and foreign ministers**.
- Played a role in **Poland's accession to NATO (1999)** and the **EU (2004)**.
- Lacks a formal institutional structure but remains a **significant political coordination forum**.
- Extends beyond diplomacy to **civil society initiatives** such as youth exchanges, academic cooperation, and business networks.

M-STrIPES at Anamalai Tiger Reserve

Forest staff conducting the **tiger and wildlife census** at **Anamalai Tiger Reserve** will use the **M-STrIPES** app to enhance monitoring and protection.

About M-STrIPES

- **Full form:** *Monitoring System for Tigers: Intensive Protection and Ecological Status*
- Launched in **2010** by the **National Tiger Conservation Authority (NTCA)** with the **Wildlife Institute of India**.
- A **software-based system** for patrolling, monitoring, and management of Protected Areas.
- **Components:**
  - Central analytical engine (desktop + online tools)
  - **Android mobile app** for field data with **real-time GPS**
- Uses **GPS, GPRS, remote sensing, GIS, and statistical tools**.
- Forest guards patrol their **beats** (smallest forest admin unit) and log tracks and observations digitally.

About Anamalai Tiger Reserve

- **Location:** Anamalai Hills, **Tamil Nadu**; south of the **Palakkad Gap** (Western Ghats).
- **Altitude:** ~1,400 m

- **Neighbouring areas:** Parambikulam TR, Chinnar WLS, Eravikulam NP
- **Habitats:** Evergreen to dry deciduous forests, shola, grasslands, marshes
- **Fauna:** Tiger, Asiatic elephant, leopard, sambar, spotted deer, jungle cat
- **Communities:** Kadar, Muduvar, Malasar, Malai Malasar, Eravalar, Pulayar

Aralam Declared Kerala's First Butterfly Sanctuary

The **Kerala government** has renamed **Aralam Wildlife Sanctuary** as **Aralam Butterfly Sanctuary**, making it the **first butterfly sanctuary in the State**.

- Notified via **SRO No. 1407/2025** under **Section 18(1) of the Wildlife (Protection) Act, 1972**.
- Decision based on recommendations of the **State Board for Wildlife**, citing exceptional butterfly diversity.
- Amends the original **1984 notification** that declared the area a wildlife sanctuary.

About Aralam Butterfly Sanctuary

- **Location:** Kannur district, Kerala
- **Area:** ~55 sq km of **evergreen and semi-evergreen forests**
- **Ecological features:** Large-scale **butterfly migration** and **mud-puddling** sites
- **Fauna:** Habitat of the **Schedule I Slender Loris**
- **Boundaries:** Brahmagiri WLS (Karnataka), Kottiyoor WLS, North Wayanad forest division
- **River: Cheenkanni River** flows through the sanctuary

Biodiversity Highlights

- **266 butterfly species** recorded here out of **327 species in Kerala**.
- Mass migrations observed, including:
  - **~12,000 Common Albatross** butterflies in five minutes
  - Over **8 lakh Albatross butterflies** recorded on **11 January 2025**
- Other species include **Malabar Rose, Buddha Mayuri, Rosy, Thalir Neeli, Okila**, and **Spotted Butterfly**.

Kathputli Folk Art

In **Jaipur**, nearly **250 families** continue to preserve **Kathputli**, one of **Rajasthan's oldest folk art traditions**.

About Kathputli

- A **traditional string puppet theatre** of Rajasthan.
- Derived from **kath (wood)** and **putli (doll)**.
- Puppets are made of **wood, cloth, cotton, thread, and metal wire**.
- **Legless figures** draped in long skirts; controlled using **2–5 strings** tied to the puppeteer's fingers.

Key Features

- **Distinctive faces:** Large eyes, oval faces, prominent lips, arched eyebrows.
- **Costumes:** Bright colours inspired by **royal courts and desert culture**.
- **Themes:** Stories of **Rajput kings, warriors, folk heroes**, and moral tales.
- **Music:** Accompanied by **dholak and harmonium**.

- Performances blend **humour, satire, music**, and social commentary.

Bhadrakali Temple Inscription Highlights Somnath's Legacy

An ancient **Bhadrakali Temple inscription** at **Prabhas Patan** sheds light on the **timeless legacy of the Somnath Temple** and the role of **Solanki rulers**, especially **Kumarapala**, in its revival.

Key Highlights of the Inscription

- **Dated:** 1169 CE (Valabhi Samvat 850 / Vikram Samvat 1255)
- **Type:** Eulogistic inscription of **Param Pashupata Acharya Bhavabrihaspati**, spiritual preceptor of **Maharajadhiraj Kumarapala**
- **Location:** Embedded in the **Bhadrakali Temple** wall near Prabhas Patan Museum
- **Protection:** Under the **State Department of Archaeology**

What the Inscription Records

- Construction of **Somnath Mahadev in all four Yugas**:
  - **Satya Yuga:** Gold temple by **Chandra (Soma)**
  - **Treta Yuga:** Silver temple by **Ravana**
  - **Dvapara Yuga:** Wooden temple by **Shri Krishna**
  - **Kali Yuga:** Stone temple by **Bhimdev Solanki**
- **Fifth reconstruction** of Somnath by **Kumarapala (1169 CE)** on earlier remains.

Historical Significance

- Under the **Solanki dynasty**, Prabhas Patan emerged as a hub of **religion, architecture, and literature**.
- **Siddharaj Jaysinh's justice** and **Kumarapala's devotion** marked **Gujarat's Golden Age**.
- The inscription reflects **Sanatan cultural continuity**, valor, and resilience despite invasions.

Bargi Dam Issued Show-Cause Notice

The **National Dam Safety Authority (NDSA)** has issued a **show-cause notice** to the **Narmada Valley Development Authority** over **safety concerns at the Bargi Dam** in **Madhya Pradesh**.

About Bargi Dam

- **Type:** Major **multi-purpose dam** (irrigation, water supply, hydropower)
- **River: Narmada River**
- **Project:** Part of the **Narmada Valley Development Project**

- **Timeline:** Construction began **1974**; completed **1990**
- **Significance:** Among the **first completed dams** on the Narmada
- **Safety Status:** Classified **Safety Category III** ("minor deficiencies") in pre- and post-monsoon inspections

About National Dam Safety Authority (NDSA)

- **Established under: Dam Safety Act, 2021**
- **Mandate:** Regulation, oversight, and inspection of dams
- **Structure:** Chairperson + five members (Policy & Research, Technical, Regulation, Disaster & Resilience, Admin & Finance)
- **Headquarters: New Delhi**
- **Functions:**
  - Implement policies of the **National Committee on Dam Safety**
  - Resolve disputes involving **State Dam Safety Organisations (SDSOs)**
  - Frame inspection/investigation regulations
  - Accredit agencies for dam design, construction, and alterations

NPS Swasthya Pension Scheme (NSPS)

The **Pension Fund Regulatory and Development Authority (PFRDA)** has introduced the **NPS Swasthya Pension Scheme (NSPS)** on a **pilot basis** to test the integration of healthcare support within the pension system.

About NPS Swasthya Pension Scheme (NSPS)

- NSPS is a **new initiative of PFRDA** launched as a **Proof of Concept (PoC)** under its **Regulatory Sandbox Framework**.
- The scheme seeks to **combine health-related financial protection with retirement savings** under the existing **National Pension System (NPS)**.
- It is designed to provide financial assistance for both **out-patient and in-p atient medical expenses**.
- The scheme operates as a **sector-specific contributory pension scheme** under the **Multiple Scheme Framework (MSF)** of NPS.
- Participation is **voluntary** and open to **all Indian citizens**.
- Pension Funds will roll out the scheme **only after obtaining approval from PFRDA**.
- Being a pilot project, the number of subscribers will be **restricted during the PoC phase**.
- To enable smooth implementation, **certain provisions of the PFRDA (Exits and Withdrawals under NPS) Regulations, 2015** have been relaxed.
- Pension Funds may partner with **FinTech companies and Health Service Administrators** for operational support.

Key Features of NSPS

Eligibility & Contributions

- All Indian citizens can enroll, provided they have a **Common Scheme Account under NPS**.
- Subscribers may contribute **any amount**, as per existing NPS rules for the non-government sector.
- Subscribers **above 40 years of age** (excluding government employees) can transfer **up to 30% of their NPS contributions** to the Swasthya Pension Scheme.

Withdrawals for Medical Purposes

- **Partial withdrawals up to 25%** of the subscriber's own contribution are allowed for medical expenses.

- There is **no cap on the number of withdrawals**, provided the **minimum accumulated corpus is ₹50,000**.
- In case of **critical inpatient treatment**, where expenses exceed **70% of the available corpus**, subscribers may withdraw **up to 100% of the corpus prematurely** to meet medical costs.

Claim Settlement & Safeguards

- Withdrawn amounts will be paid **directly to hospitals, Health Benefit Administrators (HBA), or Third-Party Administrators (TPA)** based on valid medical claims.
- Any **unused surplus** after settling medical bills will be **credited back to the subscriber's Common Scheme Account**.

Tehri Lake

Two paragliders were recently rescued by the **State Disaster Response Force (SDRF)** after falling into **Tehri Lake** during the **Acro Festival & SIV Championship Tehri 2026**.

About Tehri Lake

- **Artificial reservoir** formed by the **Tehri Dam** in **Tehri Garhwal, Uttarakhand**
- Created by **diverting the Bhagirathi River** during dam construction
- Located at an elevation of **~1,700 m** above sea level
- **Depth:** ~262 m | **Length:** ~42 km
- Supports **hydropower generation, drinking water supply, and irrigation**
- Surrounded by the **Himalayan ranges**, making it a major tourism site

Key Facts about Tehri Dam

- **Multipurpose dam** on the **Bhagirathi River** (source stream of the Ganga)
- **Height:** 260 m → *Tallest dam in India; among the tallest in the world*
- **Completed:** 2006
- **Type:** Earth and rock-fill dam
- **Installed capacity:**
  - 1,000 MW hydropower
  - 1,000 MW pumped storage
- **Managed by:** THDC India Limited (subsidiary of NTPC Limited)

Pechora Missile System

Bengaluru-based **Alpha Design Technologies Limited (ADTL)** has successfully completed a major **indigenous upgrade of the Indian Air Force's (IAF) Pechora surface-to-air missile system**, aligning with the government's push to modernise legacy defence platforms under *Atmanirbhar Bharat*.

About Pechora Missile System

- **Official name:** S-125 Neva/Pechora
- **Origin:** Soviet Union

- **Type:** Medium-range **Surface-to-Air Missile (SAM)** system
- **Role:** Interception of **low- to medium-altitude aerial targets**
- Part of **India's air defence network since the 1970s.**

Key Features

- Consists of **radar-guided missile launchers** and a **fire control unit**
- Uses the **V-600 missile** for interception
- Employs **4R90 Yatagan radar** with five parabolic antennas for detection and tracking
- Highly effective against **low-flying aircraft, drones, and cruise missiles**
- Can function **independently or within an integrated air defence network**
- Designed to operate effectively even under **heavy electronic jamming**

Technical Specifications

- **Range:** 30–35.4 km (up to 35.4 km in upgraded versions)
- **Engagement altitude:** 20 m to 20–25 km
- **Radar detection range:** ~100 km
- **Target capability:** Can engage **two targets simultaneously**
- **Speed handling:** Up to 900 m/s
- **Kill probability:** ~92%

PAIMANA Portal

The **Ministry of Statistics and Programme Implementation (MoSPI)** has operationalised the **PAIMANA Portal** for **mandatory monitoring of Central Sector Infrastructure Projects costing ₹150 crore and above**.

About PAIMANA Portal

- **Full form:** *Project Assessment, Infrastructure Monitoring & Analytics for Nation-building (PAIMANA)*
- **Nodal Ministry:** MoSPI
- A **flagship digital initiative** for systematic monitoring of large infrastructure projects
- Acts as a **centralised national repository** of infrastructure project data
- Enables **web-based analytics, improved data accuracy, and operational efficiency**
- Integrated with **DPIIT's Integrated Project Monitoring Portal (IPMP / IIG-PMG)** through APIs

Key Features

- **Centralised Project Monitoring:**
  - Single-window platform for ministries, departments, and agencies to upload and track projects
- **Real-time Dashboards:**
  - Sector-wise, state-wise, and timeline-based monitoring with drill-down features
- **Advanced Analytics:**
  - Role-based access, interactive dashboards, reporting & query modules
  - Helps identify **data gaps, delays, and bottlenecks**
- **Coverage:**
  - Mandatory for **Central Sector Infrastructure Projects ≥ ₹150 crore**

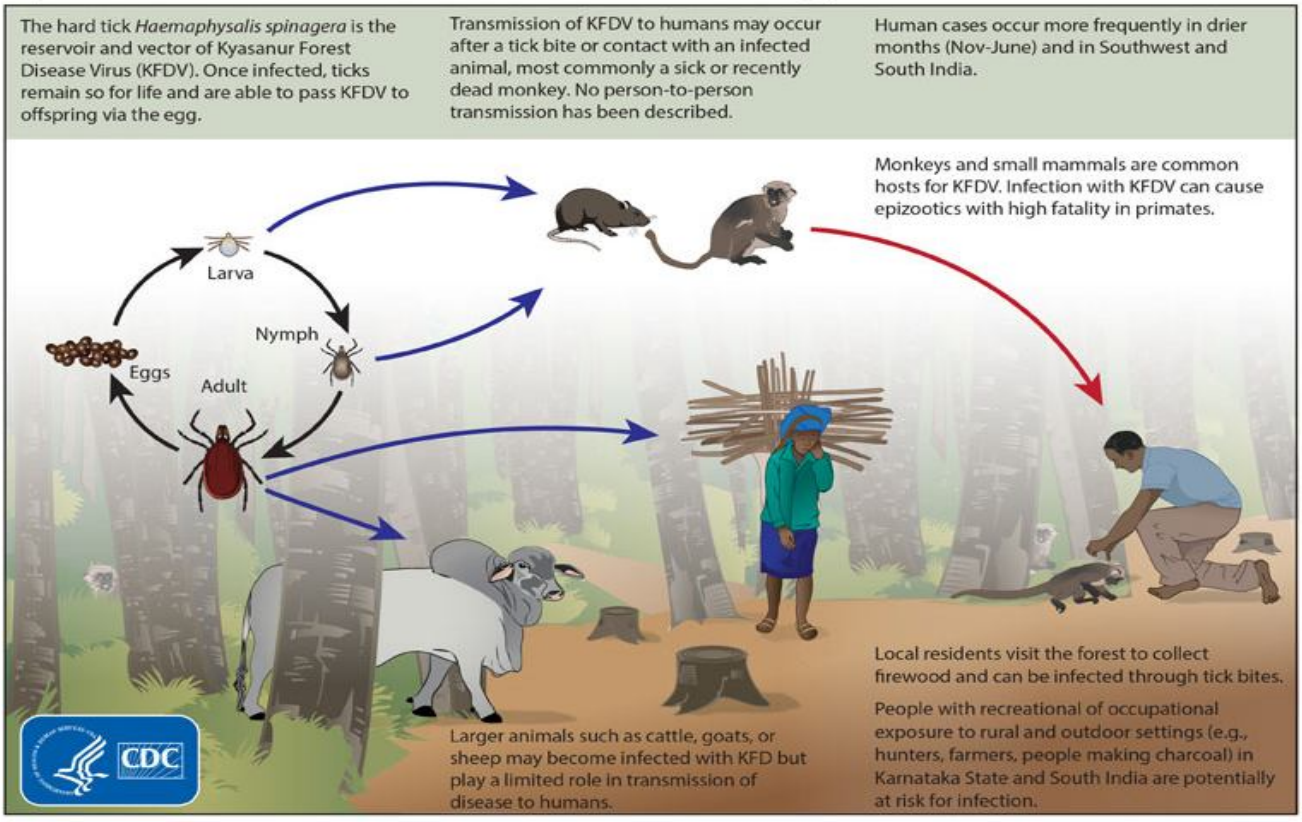
Kyasanur Forest Disease (KFD)

A 29-year-old man in Karnataka recently died after contracting **Kyasanur Forest Disease (KFD)**, also known as **monkey fever**, highlighting renewed concerns about this often-neglected tick-borne disease.

About Kyasanur Forest Disease (KFD)

- **Tick-borne viral haemorrhagic disease** endemic to **southern India**
- First identified in **1957 in Kyasanur Forest, Karnataka**

Kyasanur Forest Disease (KFD) Virus Ecology



- Caused by **KFD virus** (family *Flaviviridae*, genus *Flavivirus*)
- Belongs to the **tick-borne encephalitis (TBE) complex**
- Called **monkey fever** due to frequent monkey deaths linked with outbreaks

Transmission

- Spread by **hard ticks (Hemaphysalis spinigera)**
- Humans infected through:
  - **Tick bites**
  - Contact with infected animals, especially **sick or dead monkeys**
- **No human-to-human transmission**
- **Seasonality:**
  - Begins: October–November
  - Peaks: January–April
  - Declines: May–June

Symptoms

- Sudden high fever, extreme weakness, nausea, vomiting, diarrhea
- May progress to **neurological and haemorrhagic complications**
- **Fatality rate:** 5–10%

Treatment

- **No specific antiviral cure** available
- Only **supportive treatment**: fluids, oxygen, BP management, and treatment of secondary infections
- Early medical care significantly improves recovery

Vaccine

- **KFD vaccine available**
- Recommended for people in **endemic regions of India**

Solar Cycles

A research team from **IIT Kanpur** has developed a **new method to predict solar cycles**, improving the understanding of solar activity and its Earth impacts.

About Solar Cycles

- A **solar cycle** is an approximately **11-year periodic variation in solar activity**
- Driven by changes in the **Sun's magnetic field**
- Marked by the **number and intensity of sunspots** on the solar surface
- Every ~11 years, the Sun's **magnetic poles flip** (north ↔ south)
- It takes another 11 years to flip back → forming a **22-year magnetic cycle (Hale cycle)**
- Solar activity is tracked mainly through **sunspot counts**

Stages of a Solar Cycle

- **Solar Minimum:**
  - Beginning/end of a cycle
  - Very few or no sunspots
- **Solar Maximum:**
  - Mid-point of the cycle
  - Peak sunspot activity, solar flares, and coronal mass ejections (CMEs)
- After maximum, activity declines back to **solar minimum**, starting a new cycle

Impacts on Earth

- Influences **space weather** and satellite operations
- Affects **radio communication, GPS, and power grids**
- Alters **cosmic ray flux, ozone distribution, and upper atmospheric conditions**
- May have **indirect climatic effects** through variations in solar radiation

JALAJ Livelihood Centres

The Union Minister of Jal Shakti inaugurated **25 JALAJ Livelihood Centres** to strengthen river conservation through community-based livelihoods.

About JALAJ

- Joint initiative of **Namami Gange Mission** and **Wildlife Institute of India (WII)**
- Integrates **river conservation with sustainable livelihoods** in the Ganga basin
- Based on **circular economy model**
- Trains local communities in eco-friendly livelihood practices

Key Features

- Promotes **community ownership**, with special focus on **women's participation**
- Establishes **symbiotic relationship between rivers and people**
- Centres reflect **local culture and indigenous communities**
- Act as hubs for:
  - Conservation education
  - Livelihood training
  - Sale of eco-products
- **Target:** 75 centres

Phosphorus

Excess **phosphorus accumulation in US farmlands** is causing severe **water pollution and eutrophication**.

About Phosphorus

- Chemical element (Group 15), **symbol: P**, **atomic number: 15**
- Highly reactive non-metal
- Main forms:
  - **White phosphorus** (toxic, flammable)
  - **Red phosphorus** (non-toxic, stable)

Uses

- **Fertilisers (largest use)** – ammonium phosphate
- Matches, flares, incendiaries
- Steel production
- Detergents (being phased out due to

pollution)
- Special glass & chinaware

Biological Role
- Essential for **bones, teeth, ATP, DNA, RNA, phospholipids**
- Key nutrient for **energy storage and cell repair**

Environmental Concern
- Excess phosphates cause **algal blooms & oxygen depletion**

Deuteron

A study by the **ALICE collaboration at CERN (LHC)** explained how deuterons survive extreme particle collisions.

About Deuteron
- Nucleus of **heavy hydrogen (^{2}H or D)**
- Contains **1 proton + 1 neutron**
- Found in natural water and gas giants

Properties
- Mass ≈ 2× proton
- Charge: +1
- Spin: 1
- Magnetic moment: 0.8574 nuclear magnetons

Applications
- Heavy water (nuclear reactors)
- Fusion fuel (deuterium)
- Tritium production

Scabies

The **WHO** highlighted scabies as one of the most common skin diseases in developing countries.

About Scabies
- Contagious **parasitic skin disease**
- Caused by **Sarcoptes scabiei mite**
- Common in **hot, tropical regions**

Transmission
- Direct skin-to-skin contact
- Shared clothing & bedding
- Spreads rapidly in crowded settings

Symptoms & Treatment
- Severe itching (worse at night), rash
- Treated with **topical creams & oral drugs**

WHO Status
- Classified as a **Neglected Tropical Disease (NTD)**

Sea of Japan (East Sea)

North Korea fired a ballistic missile towards the **Sea of Japan**.

About
- Marginal sea of the **western Pacific Ocean**
- Bounded by **Japan, Russia, North Korea, South Korea**
- Also called **East Sea**

Connections
- East China Sea → Tsushima & Korea Straits
- Okhotsk Sea → La Perouse & Tatar Straits
- Pacific Ocean → Tsugaru Strait
- Inland Sea of Japan → Kanmon Strait

Key Features
- Deepest point: **Dohoku Seamount (underwater volcano)**
- Warm waters → mild Japanese climate
- Almost **no tides** (like Mediterranean Sea)
- High oxygen → **high marine productivity**

Major Ports
- **Russia:** Vladivostok, Nakhodka
- **North Korea:** Chongjin, Wonsan
- **Japan:** Niigata, Maizuru