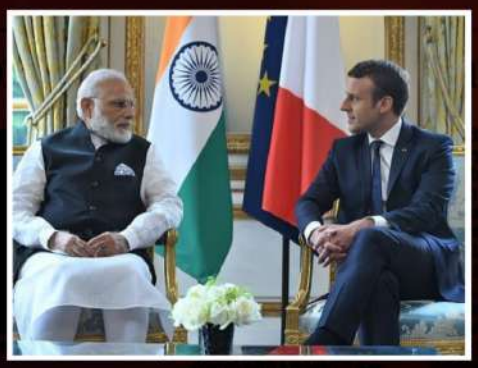
Strive Edge
IAS ACADEMY

STRIVE EDGE IAS

MONTHLY CURRENT AFFAIRS

MARCH 2026



FOR UPSC AND OTHER STATE GOVT. EXAMS

INDEX TABLE

Polity, Constitution and Governance

Prelims

International Relation

Prelims

- Iran
- Persian Gulf and Gulf of Oman

C. Bilateral Relations

- US Foundational Defence Agreements
- F-1 Visa (USA)
- India–Bangladesh Friendship Pipeline

D. Miscellaneous

Operation Sankalp
Section 301 of the U.S. Trade Act, 1974
Nuclear Non-Proliferation Treaty
Section 301 of the Trade Act, 1974

Economics

A. Indian Economy

- India's Informal Sector
- BioEconomy

B. Human Resource Development

- Transforming India's Workforce for a Technology-Driven Future

C. Infrastructure

- Innovation-Led Economy
- Financial Inclusion for Women

D. Inclusive growth and issues arising from it

- Menstrual Leave Policy in India

E. Agriculture

- Women in Indian Agriculture

Prelims

A. Indian Economy

- Goods and Services Tax (GST)
- Index of Industrial Production (IIP)
- India's Current Account Deficit (CAD)
- Revised GDP Series with Base Year 2022–23
- New Labour Codes in India
- Employees' Provident Fund Organisation (EPFO)
- Force Majeure
- Excise Duty on Petroleum Products

B. Banking, Monetary Policy and Capital Market

- Arbitrage
- NIFTY & SENSEX
- Accounting Standards
- Green Bonds
- Variable Repo Rate (VRR)
- Additional Tier-1 (AT-1) Bonds
- Exchange-Traded Funds
- National Securities Depository Limited (NSDL)

C. External Sector

- Foreign Exchange (ForEx) Reserves

D. Infrastructure

- Strategic Petroleum Reserves (SPR)

E. Agriculture

- Purified Terephthalic Acid and Mono Ethylene Glycol
- Sahiwal Cattle
- Coconut Development Board
- Cotton Corporation of India (CCI)
- APEDA

F. Miscellaneous

- Small Savings Schemes

Internal Security

A. AI and National Security

- Borderland National Integration

Prelims

A. Maritime Security Acquisitions

- Crime and Criminal Tracking Network and Systems (CCTNS)
- Xiaokang Border Defence Villages
- Indian Cyber Crime Coordination Centre (I4C)

History, Art & Culture

Prelims

Art and Culture

- A. Kalaripayattu
- Keeladi Excavation
- Hindu New Year Festivals
- World Buddhist Peace Conference 2026
- Sangita Kalanidhi Award
- Jnanpith Award
- Sahitya Akademi Literary Awards for 2025

Modern History

- Mahad Satyagraha (1927)
- Kakori Train Action (1925)

Environment, Ecology and Biodiversity

A. Conservation

- Environmental CSR in India

B. Climate Change

- Climate Change And International Legal Reforms
- India's New Climate Targets

Prelims

A. Pollution

- Hypercapnic Hypoxia in Mangroves
- Biogas
- Methane

B. Conservation
- National Tiger Conservation Authority (NTCA)
- Tropical Forest Forever Facility (TFFF)
- Biodiversity Management Committees (BMCs)
- Prosopis Juliflora
- CMS Report on Migratory Wildlife

C. Species in News
- Project Cheetah
- Nilgiri Tahr (Nilgiritragus hylocrius)
- Red-Crowned Roofed Turtle
- Hudsonian Godwit
- Chhapgarus Ngankeeae

D. Protected Areas
- Pobitora Wildlife Sanctuary

E. Miscellaneous
- India's Updated Climate Targets (NDC)

Science and Technology, Health

A. Topic: IT, Computer, Robotics, Bio-Technology
- AI for Inclusive Development
- India's Biotechnology Growth Momentum

B. Science and Technology - developments and their applications and effects in everyday life
- Algorithmic Sovereignty

Prelims

A. Space and Defence
- Generations of Fighter Jets
- Gravity Bombs
- LIGO
- NavIC
- Large Hadron Collider
- Antimatter
- James Webb Space Telescope (JWST)
- THAAD Missile System
- S-400 'Sudarshan Chakra' Air Defence System
- 2K22 Tunguska Air Defence System
- Advanced Short Range Air-to-Air Missile
- Missile Defence Systems

B. IT and Computer
- Quantum Computing

C. Health and Diseases
- Human Papillomavirus (HPV)
- Cervical Cancer
- Deinococcus Radiodurans
- Tuberculosis (TB)
- GLP-1 Weight-Loss Drugs
- Semaglutide
- Generic Drugs
- Parkinson's Disease
- Shigellosis (Shigella Infection)

D. Development of New Technology
- HALEU
- Desalination Plants
- FASTag

E. Bio-Technology
- Self-Replicating RNA (QT45)
- Bioactive Peptides (BAPs)
- Biopharma SHAKTI
- Biotechnology Research and Innovation Council (BRIC)

F. Miscellaneous
- Hydroxyl Megamaser
- Mineral Water
- Solar Ingots & Wafers Policy

Society and Social Justice

Prelims

A. Total Fertility Rate (TFR)
- Purple Fest

Geography

A. Melting of Glaciers
- Water Crisis and Governance in India

Prelims

A. Brent Crude
- Premium Petrol vs Normal Petrol
- Crude Oil
- Musi River
- Aravalli Hills
- India Revised Earthquake Design Code, 2025 (IS 1893)
- Oil Refineries and Petroleum Resources in India
- Godavari River
- Chambal River
- Cauvery River System
- Zojila Pass
- Coking Coal
- Indian Coffee
- Geological Survey of India (GSI)
- National Mineral Development Corporation
- Maritime Zones
- Western Disturbance
- Earth's Magnetic Field Reversals

Government Scheme

Prelims

A. Pradhan Mantri Garib Kalyan Anna Yojana

(PMGKAY)

- RELIEF Scheme
- UDAN Scheme Revamp
- IVFRT Scheme
- One District One Product (ODOP) Scheme
- Members of Parliament Local Area Development Scheme (MPLADS)
- SWAMIH Fund

Others

- Liquefied Petroleum Gas (LPG)
- World Happiness Report
- Euthanasia in India
- Passive Euthanasia

POLITY, CONSTITUTION & GOVERNANCE

Topic: Indian Constitution - historical underpinnings, evolution, features, amendments, significant provisions and basic structure.

Hate Speech

Context: The **Gauhati High Court** issued notice to Assam CM following **petitions seeking criminal prosecution** for alleged communal speeches.

What is Hate Speech?

- According to the **267th Law Commission Report (2017)**, hate speech refers to words or actions meant to stir hatred against groups based on race, ethnicity, gender, religion, or sexual orientation.
- Hate speech does not always take the form of explicit incitement to violence; it often operates as **prejudicial discourse that marginalises vulnerable communities**.
- It frequently operates through **"dog whistles"** as deliberately ambiguous statements that allow speakers to claim plausible deniability while communicating divisive messages.
- Hate speech is fundamentally about **power** i.e. **dominant groups** using speech to exclude and silence those who are more vulnerable, entrenching a democratic deficit.

Constitutional and Legal Framework

- **Constitutional Basis**
  - **Article 19(1)(a)** guarantees freedom of speech and expression.
  - **Article 19(2)** permits reasonable restrictions to protect sovereignty, public order, morality, dignity, and to prevent incitement to offences.
- **Key Legal Provisions**
  - **BNS 2023, Section 196** *(formerly IPC 153A)*: Penalises promoting enmity between groups on grounds of religion, race, caste, etc.
  - **BNS 2023, Section 299** *(formerly IPC 295A)*: Punishes deliberate acts outraging religious feelings of any class.
  - **IT Act 2000, Section66A** *(struck down)*: Was used to curb online hate speech but invalidated by supreme court in Shreya Singhal v. Union of India (2015).
  - **RPA 1951,Section 8**: Bars persons convicted of promoting group enmity from contesting elections.
  - **SC/ST (Prevention of Atrocities) Act, 1989**: Punishes intentional insult or humiliation of SC/ST members through words, gestures, or conduct.
  - **Protection of Civil Rights Act, 1955**: Penalises incitement of untouchability through words, written material, or signs.

Recommendations

- **267th Law Commission Report (2017)** recommended adding **Sections 153C and 505A** to the IPC to criminalise incitement to hatred and provoking violence.
- **Viswanathan Committee (2015)** proposed adding Sections 153C(b) and 505A to punish incitement based on religion, race, caste, gender, and disability, with up to two years imprisonment.
- **Bezbaruah Committee (2014)** proposed amending Section 153C IPC with up to **five years imprisonment** and Section 509A IPC with up to **three years imprisonment**.

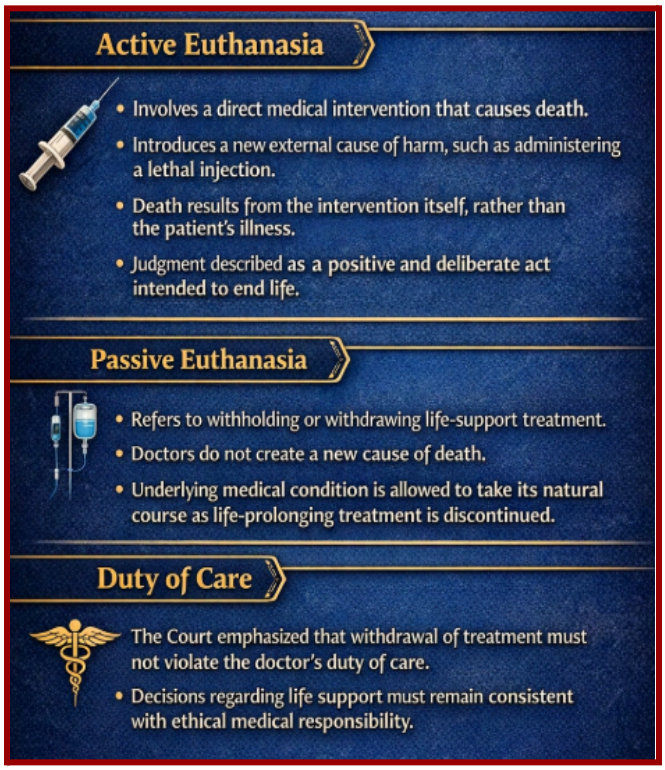
Way Forward

- **Legal Reforms**
  - **Clear legal definition** of hate speech focusing on **incitement to violence or discrimination**.
  - **Graded penalties** with **fines** and **imprisonment** for serious offences.
  - **Viswanathan and Bezbaruah Committee recommendations** to be incorporated in **BNS 2023**.
  - Recognition of hate speech as a **structural issue**, not merely **law and order**.
- **Institutional Strengthening**
  - **Supreme Court** to ensure compliance through **contempt proceedings**.
  - Creation of **independent oversight bodies** with **privacy safeguards**.
  - **Election Commission** to act under **RPA** against **communal rhetoric**.
- **Social and Educational Measures**
  - Promotion of **media literacy** and **critical thinking**.
  - Building **social consensus** against **divisive narratives**.

Right to Die with Dignity

Overview

- The Supreme Court upheld the **"right to die with dignity"** of **Harish Rana (32 years)**, who had been in a **persistent vegetative state (PVS) for nearly 13 years** after a severe accident in 2013.
- A Bench of Justices J.B. Pardiwala and K.V. Viswanathan allowed the withdrawal of **Clinically Assisted Nutrition and Hydration (CANH)**.
- This marks the **first implementation** of the **Supreme Court's 2018 guidelines** on **passive euthanasia**.
  - The 2018 judgment recognised **passive euthanasia** and laid down procedural safeguards, including:
    - Approval from two medical boards.
    - Verification of the patient's medical condition and prognosis.
  - The current case represents the **first practical application** of those guidelines by the Supreme Court itself.
- **Legal Recognition of Right to Die with Dignity**
  - The Court reaffirmed that the **right to die** with dignity is an integral part of the **right to life under Article 21** of the Constitution.
  - Withdrawal of life-sustaining treatment in irreversible medical conditions was recognised as **constitutionally permissible**.



Associated Issues with End-of-Life Decisions

- **Terminological Clarification**
  - The Court noted that the term **"passive euthanasia"** is obsolete and confusing.
  - It directed that the process should instead be described as **"withdrawing or withholding** of medical treatment."
  - **Active euthanasia**, where deliberate actions cause death, continues to remain illegal in India.
- **Medical and Ethical Challenges**
  - Doctors highlighted that **decision-making around withdrawal of life support is complex and emotionally difficult for families**.
  - Lack of awareness among **medical practitioners and families** often creates hesitation in applying existing legal provisions.

  - Conflicts within extended families can further complicate decisions regarding **end-of-life care**.
- **Fear of Legal Liability**
  - The Supreme Court observed that **fear of criminal liability among doctors** often discourages them from withdrawing life support, even when legally permissible.
  - This fear acts as a major barrier to implementing the **right to die with**
  - **dignity**.

Way Forward

- **Legislative Framework:** Parliament should enact clear legislation governing end-of-life decisions to ensure legal clarity and uniform implementation.
- **Strengthen Palliative Care Systems:** Expanding quality palliative and end-of-life (EOL) care services is essential for humane treatment of terminally ill patients.
- **Awareness Among Doctors and Families:** Training and awareness programmes can help reduce hesitation in applying legal provisions related to end-of-life care.
- **Safeguards Against Misuse:** Transparent medical boards and procedural checks are necessary to balance compassion with protection against abuse.

Compulsory Voting in India

What is the Right to Vote in India ?

- **Article 326** provides for **universal adult suffrage**, allowing every citizen above 18 years to vote, subject to disqualifications.
- **Section 19, Representation of the People Act, 1950** mandates that a person must be **18+ and ordinarily resident** to be enrolled as a voter.
- **Section 62, Representation of the People Act, 1951** grants the **right to vote to those listed in electoral rolls**.
- The **Supreme Court has clarified** that the **right to vote is a statutory right**, not a fundamental right.
- At the same time, voting is **not a legal or fundamental duty**, but a democratic entitlement.

Should Voting be Made Compulsory?

- Voting is essential for a **representative and participatory democracy**, but making it compulsory raises serious concerns.
- The **Dinesh Goswami Committee (1990)** rejected compulsory voting due to **practical difficulties** and instead emphasised awareness.
- The **Law Commission (255th Report, 2015)** noted that compulsory voting can increase turnout by **around 7%**, but only with **strict penalties**.
- Some countries like **Australia, Argentina, Brazil, and Peru** enforce compulsory voting through:
  - Fines for non-voters
  - Denial of certain public services
- However, such coercive measures may be **harsh and unsuitable in India's socio-economic context**.
- From a constitutional perspective, compulsory voting may **violate Article 19(1)(a)** (freedom of expression), which includes the **right not to vote**.

Feasibility in the Indian Context

- India's vast population, diversity, and socio-economic inequalities make **enforcement of compulsory voting extremely difficult**.
- Penalising non-voters could disproportionately affect **poor, migrant, and marginalised groups**.
- Administrative challenges in **tracking non-voters and enforcing penalties** would strain governance capacity.
- Thus, compulsory voting is considered **neither desirable nor practical** in India.

Concerns with Low Voter Turnout

- Low turnout can result in **candidates winning with limited public support**, weakening democratic legitimacy.
- Urban apathy, migration, and lack of awareness contribute to **uneven participation**.
- This creates a gap between **formal electoral rights and actual democratic participation**.

Way Forward

- **Voter Awareness Campaigns:** Promote civic responsibility through **education, social media, and behavioural nudges**.
- **Facilitating Migrant Voting:** Ensure **statutory holiday enforcement**, along with **special transport facilities (buses, trains)** for migrant workers.
- **Remote Voting Mechanisms:** Explore **secure digital or remote voting systems** to include mobile populations.
- **Ease of Voting:** Improve **accessibility, voter registration processes, and polling infrastructure**.
- **Positive Incentives over Penalties:** Encourage

participation through **recognition, facilitation, and trust-building**, rather than coercion.

Conclusion

- India's democracy is based on **informed and voluntary** participation, not coercion. While **low voter turnout** is a concern, **compulsory voting** may undermine **constitutional freedoms**. The focus should be on **empowering citizens** and fostering **democratic engagement** for conscious participation.

Custodial Deaths in India

Context

- **170 custodial deaths** recorded in just the **first 74 days of 2025**, surpassing the full-year figure of **140 in 2024-25.** Further, the NHRC received **2,346 judicial custody** and **160 police custody** death intimations in 2023-24.
- **National trend:** 176 custodial deaths (2021-22), 163 (2022-23), 157 (2023-24), 140 (2024-25), yet 2025 is already on track to exceed all previous years within just 74 days.

Safeguards in Place

- **Constitutional:**
  - **Article 21**: Right to life and personal liberty, extended to freedom from torture
  - **Article 20(3)**: Protection against forced self-incrimination
  - **Article 20(1)**: Prohibition of excessive or retrospective punishment
- **Legal:**
  - **Bharatiya Nyaya Sanhita 2023:** Penalises coerced confessions through violence
  - **BNSS 2023:** Mandates proper arrest and detention procedures
  - **Bharatiya Sakshya Adhiniyam 2023:** Invalidates confessions made under threat, inducement, or coercion
  - India ratified **International Covenant on Civil and Political Right (1979)** but has not yet ratified **UN-CAT** (Committee against Torture) despite signing in 1997
- **Judicial:**
  - **DK Basu v. State of West Bengal (1997)**: Binding arrest guidelines; state accountable for custodial violence
  - **Nambi Narayanan v. Siby Mathews (2018)**: Compensation for wrongful detention and psychological harm
  - **Law Commission 273rd Report (2017)**: Urged CAT ratification and dedicated anti-torture legislation

Key Challenges

- **No statutory definition** of torture as the **Prevention of Torture Bill** never enacted
- Policing governed by colonial **Police Act 1861** and **Prisons Act 1894.**
- **Prior government sanction** required for prosecution, shielding officials from accountability
- Torture **culturally normalised** as "tough policing"; forensic alternatives underdeveloped
- **NHRC recommendations non-binding**; weak CCTV compliance; magisterial inquiries lack independence

Way Forward

- Ratify **UN-CAT** and enact a dedicated **anti-torture statute** with clear legal definition
- **Enhance transparency through technology**: Expand CCTV monitoring, digital arrest records, and real-time reporting through **CCTNS** to reduce opportunities for abuse and improve evidence quality.
- Integrate **human rights, forensic tools**, and non-coercive interrogation into **police training**
- **Strengthen NHRC with binding powers**: Mandatory 24-hour reporting of custodial deaths with enforceable consequences for non-compliance must replace the current advisory framework.
- **Reform colonial policing laws**: Replace the Police Act 1861 with a modern, rights-respecting legislation aligned with constitutional values and contemporary human rights standards.

Paternity Leave in India

Context: The **Supreme Court** has recently highlighted the need to examine a legal framework for **paternity leave**, recognising that parenting is a **shared responsibility and essential** for child development.

Arguments in Favour of Paternity Leave

- **Child development** requires involvement of **both parents**, especially during formative years.
- **Absence of paternity leave** reinforces **gender stereotypes**, where caregiving is seen as a woman's role.

- **Women bear disproportionate burden** of unpaid work, spending **10 times more hours** on domestic tasks.
- **Unequal childcare responsibilities** restrict women's **labour force participation**.
- Paternity leave can help **reduce the motherhood penalty** in wages and career progression.
- **International experience** shows that shared parental leave improves **gender equality** and workforce participation.

Concerns and Practical Challenges

- India's labour market is dominated by the **informal sector**, with only **10% workforce** in formal employment.
- **Small enterprises** may find it difficult to accommodate **employee absence**.
- **Risk of unintended consequences** where men may not share responsibilities equally, reflecting **patriarchal norms**.
- **Possibility of misuse** of leave in absence of **social accountability**.
- **Existing maternity benefits** already face implementation gaps and **workplace discrimination**.
- **Gig workers and informal workers** remain outside the ambit of such benefits, highlighting **structural limitations**.

Structural Constraints in Indian Context

- Highly fragmented labour market with majority employed in **small enterprises**.
- Informal sector workers lack access to **social protection frameworks**.
- Patriarchal attitudes continue to shape workplace practices and **hiring behaviour**.
- Dual nature of labour markets limits uniform implementation of **labour policies**.

Way Forward: Towards a Balanced Approach

- Shift from maternity to **parental leave framework**, ensuring shared responsibility.
- Introduce **non-transferable leave** for fathers to ensure participation.
- Gradual expansion starting with formal sector, considering **economic feasibility**.
- Promote behavioural change to address **gender norms** alongside legal reforms.
- Strengthen labour market conditions and enterprise size to support **policy implementation**.

Conclusion: While paternity leave can promote gender equality and better child outcomes, its success in India depends on addressing deeper **structural and societal constraints**, making it both a policy and social reform challenge.

Topic: Federalism

16th Finance Commission

Criteria for Distribution of Central Taxes among States

Criteria	15th FC (2021-26)	16th FC (2026-31)
Income Distance	45%	42.5%
Population (2011)	15%	17.5%
Demographic Performance	12.5%	10%
Area	15%	10%
Forest	10%	10%
Tax and Fiscal Efforts	2.5%	-
Contribution to GDP	-	10%
Total	**100%**	**100%**

Sources: Reports of the 15th and 16th Finance Commissions.

Key Recommendations

- Retained **States' share at 41%** in the **divisible pool**, ensuring continuity in fiscal devolution.
- Addressed both **vertical devolution** (Centre-State) and **horizontal distribution** (inter-State).
- Introduced **"contribution to GDP" criterion** with 10% weight, based on **GSDP share** (square root method).
- Discontinued **revenue deficit grants**, **sector-specific grants**, and **state-specific grants**.
- Recommended **₹7.9 lakh crore grants** to **local bodies** with **performance-based conditions**.
- Suggested **curbing off-budget borrowings** and reforms in **Fiscal Responsibility Legislation (FRL)**.

Issues with the Recommendations

- **Shrinking divisible pool** due to rising **cesses and surcharges**, reducing effective State share.
- Contradiction in formula as **income distance** favours **poorer States**, while **GDP contribution** favours **richer States**.
- Removal of **fiscal effort criterion** weakens incentives for **tax efficiency and discipline**.
- Discontinuation of **grants** reduces **targeted fiscal support** to vulnerable States.
- **Post-GST compensation removal** has increased fiscal stress for several States.

- **Conditional local body grants** increase central dependence, with low actual fund release.
- Weak enforcement of **FRL norms** and persistence of **off-budget borrowings** create hidden liabilities.
- Several **poorer States lost share**, raising concerns of **equity in fiscal federalism**.

Way Forward

- Restore **equalisation principle** by balancing **fiscal capacity and developmental needs**.
- Rationalise **cesses and surcharges** and expand the **divisible pool**.
- Reintroduce **revenue gap or equalisation grants** to offset losses of disadvantaged States.
- Strengthen and enforce **FRL frameworks** to ensure **fiscal discipline and transparency**.
- Provide **post-GST revenue stabilisation mechanisms** for States facing fiscal stress.
- Enhance **cooperative federalism** through **greater Centre-State consultation**.
- Improve **administrative capacity of States** to meet grant conditions effectively.

Conclusion

- The 16th Finance Commission attempts to balance **stability and reform in fiscal federalism**, but concerns remain regarding **equity, fiscal autonomy, and shrinking resource space of States**.
- A more **cooperative and need-based approach**, rooted in **constitutional principles**, is essential to ensure that fiscal transfers strengthen both **national unity and State-level development**.

Double Engine Government

Context: The idea of a **"double-engine government"** has gained prominence in electoral politics. While it promises faster development through alignment, it raises **serious concerns about India's federal structure**.

What is meant by Double Engine Government?

- Refers to a situation where the **same political party** governs both the **Union and State governments**.
- It is argued that such alignment ensures **better coordination, faster decision-making, and accelerated development**.
- At face value, it reflects **cooperative federalism** (coordination between Centre and States). However, in practice, it may imply that **States ruled by different parties receive less support**, raising constitutional concerns.

Advantages of Double Engine Government

- **Administrative Coordination:** Easier policy implementation due to ideological alignment and reduces conflicts and delays between Centre and States.
- **Faster Development Outcomes:** Improved project approvals, funding flows, and execution efficiency. Further, there is a potential for better Centre-State synergy in welfare delivery.
- **Policy Continuity:** Ensures uniformity in governance priorities across levels and helps in implementing large-scale national schemes effectively.
- **Political Stability:** Reduces friction, enabling smooth governance and quicker decisions.

However, these **advantages are meaningful** only when **benefits are extended equally to all States**, irrespective of political alignment.

Challenges Associated with Federal Structure

- **Threat to Cooperative Federalism:** Development increasingly appears linked to political alignment rather than constitutional rights, weakening the idea of an impartial Union.
- **Distortion of Fiscal Federalism:** Public funds belong to the entire nation, yet their allocation sometimes reflects political considerations, undermining fairness.
- **Issues in Resource Distribution:** Use of recent population data penalises better-performing States, while rising cesses and surcharges reduce their fiscal share.
- **Weakening of State Autonomy:** Despite constitutional guarantees, States feel financially dependent, almost like "beggars" for funds.
- **Governor's Role and Delays:** Delays in assent to Bills disrupt governance; the Supreme Court has ruled against such inaction (Punjab 2023, Tamil Nadu 2025).
- **Case of Delhi:** Persistent conflicts between the elected government and Lieutenant Governor have led to governance paralysis.
- **Erosion of Federal Spirit:** Growing political centralisation weakens the spirit of federalism, even if the structure formally remains intact.

Reforms Required

- **Strengthening Fiscal Federalism:** Make Finance Commission recommendations more binding and ensure transparent and rule-based resource allocation.
- **Rationalising Cesses and Surcharges:** Limit excessive use to protect divisible pool of taxes.
- **Fixing Governor's Role:** Introduce statutory timelines (e.g., 3 months) for assent to Bills. Also, provide for deemed assent in case of delay.
- **Revitalising Inter-Governmental Mechanisms:** Strengthen Inter-State Council (Article 263) as a genuine platform for dialogue.
- **Ensuring Political Neutrality:** Governance should not be used to reward or punish States politically.
- **Promoting True Cooperative Federalism:** Encourage partnership model, not hierarchy between Centre and States.

Conclusion

- The idea of a double-engine government may promise efficiency, but **development cannot depend on political alignment**. India's federal structure is built on **fairness, equality, and institutional safeguards**, not partisan advantage. Thus, preserving the **spirit of cooperative federalism** is essential to ensure that every State and citizen receives equal opportunity and dignity.

Free and Fair Elections in India

Scale and Strength of India's Electoral System

- India conducts elections across **2.19 lakh polling stations**, including remote and difficult terrains, reflecting administrative depth.
- Nearly **25 lakh officials** manage elections for about **17.4 crore voters**, ensuring large-scale coordination.
- Deployment includes **8.5 lakh security personnel** and **49,000 micro observers**, strengthening monitoring mechanisms.
- Legal safeguards such as **Section 28A of the RPA** ensure that officials remain accountable to the Election Commission.
- Improvements such as reduction in polling phases and better logistical planning indicate maturing **election management capacity**.
- Inclusive measures like home voting for elderly and disabled voters and voter awareness initiatives reflect a commitment to **participatory democracy**.

Emerging Challenges to Electoral Integrity

- **Money, Muscle, Misinformation and MCC Violations**
  - **Money power** continues to distort electoral outcomes, with over **₹10,000 crore** worth of inducements seized in 2024.
  - **Muscle power**, though reduced, persists in certain regions through violence and intimidation.
  - **Misinformation and deepfakes** influence voter perception, especially through digital platforms.
  - Violations of **Model Code of Conduct** through appeals to caste, religion, and identity undermine fairness.
- **Electoral Inducements and Freebie Culture**
  - Distribution of cash and goods has become a **competitive political strategy**.
  - Pre-election welfare schemes and fiscally imprudent promises affect the **quality of democratic choice**.
- **Administrative and Institutional Concerns**
  - Allegations regarding **neutrality of officials** create public distrust.
  - Frequent transfers and political contestation over administrative decisions affect **institutional credibility**.
- **Media and Digital Challenges**
  - Misleading advertisements and last-minute campaigns limit **informed decision-making**.
  - Weak regulation of social media enables spread of **fake narratives and propaganda**.

Institutional Efforts to Strengthen Elections

- Deployment of **surveillance teams and flying squads** to monitor inducements and violations.
- Introduction of **webcasting and real-time monitoring** at polling stations to enhance transparency.
- Regulation of political advertisements, including pre-certification requirements, to curb misinformation.
- Voter awareness initiatives such as **SVEEP** to encourage informed participation.
- Technological and procedural improvements in EVMs and polling processes to ensure **credibility and accessibility**.

Way Forward: Strengthening Democratic Integrity

- Strengthen mechanisms to curb **money power and inducements**, ensuring strict enforcement.

- Develop robust regulatory frameworks to address **misinformation and deepfakes**, especially in digital media.
- Enhance **institutional neutrality and transparency** to build public trust in the electoral process.
- Promote ethical political behaviour by ensuring adherence to **Model Code of Conduct**.
- Strengthen **voter education and civic awareness**, enabling citizens to resist inducements and misinformation.
- Move towards a system where elections rely less on coercive mechanisms and more on **civic responsibility and democratic values**.

Conclusion

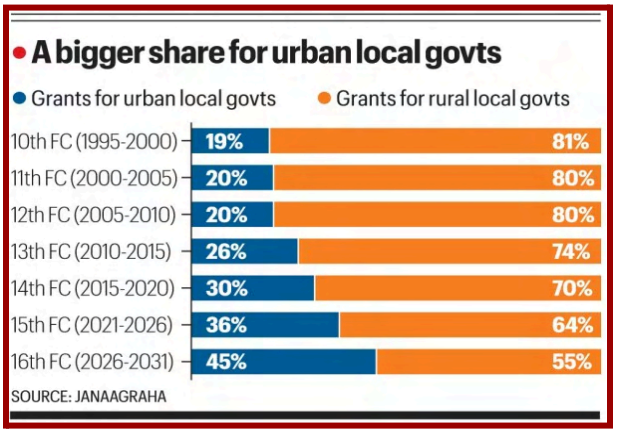
- India's electoral system reflects both the strength of its democratic institutions and the challenges of a rapidly evolving political landscape. Sustaining free and fair elections requires not only institutional reforms but also a deeper commitment from citizens to uphold the **moral essence of democracy**.

Committees and Commissions on Electoral Reforms

- **Tarkunde Committee (1974)**
  - Recommended a more independent process for appointing Election Commissioners.
  - Suggested a collegium comprising the **Prime Minister, Leader of Opposition, and Chief Justice of India**.
- **Dinesh Goswami Committee (1990)**
  - Focused on comprehensive **electoral reforms**, including curbing malpractice.
  - Several recommendations were implemented through reforms in **1996**.
- **Vohra Committee (1993)**
  - Highlighted the growing **nexus between crime and politics**.
  - Emphasised the need to address criminalisation in public life.
- **Indrajit Gupta Committee (1998)**
  - Examined the feasibility of **state funding of elections**.
  - Recommended partial funding to ensure a **level playing field**.
- **Law Commission of India – 255th Report (2015)**
  - Provided comprehensive recommendations on **electoral integrity**, including regulation of political finance and disqualification of candidates.
- **High-Level Committee on Simultaneous Elections (Ram Nath Kovind)**
  - Examined feasibility of **simultaneous elections** in India.
  - **Key Recommendations:**
    - **Phased implementation**: Lok Sabha and State Assembly elections together, followed by local body elections within 100 days.
    - **Electoral harmonisation**: Single **electoral roll and EPIC** for all tiers.
    - **Governance benefits**: Reduced election expenditure and improved **policy continuity and governance efficiency**.

Topic: Local Government

Grants to Urban Local Bodies (ULBs)



Context: India's urban centres contribute nearly **67% of GDP** and about **90% of government revenues**, yet **ULBs** remain fiscally constrained. The **16th Finance Commission** allocated **₹3.56 lakh crore (2026–31)**, but structural issues continue to limit **effective fiscal autonomy** of cities.

Issues with Finance Commission Grants

- **Inadequate Magnitude of Devolution**
  - **15th FC:** ₹1.2–1.3 lakh crore, about **0.12–0.13% of GDP**.
  - **16th FC:** ₹3.56 lakh crore, yet remains **~0.13% of GDP**.
  - With urban population projected to rise from

470 million to ~600 million, per capita transfers remain stagnant.

- **Low Absorptive Capacity**
  - Nearly ₹90,000 to 95,000 crore remained **unspent** under the 15th finance commission.
  - Around ₹30,000–35,000 crore allocated to **ULBs** was not utilised, indicating **institutional and administrative constraints**.
- **Tied and Conditional Grants**
  - Grants are largely **sector-specific** (water, sanitation), **restricting local fiscal flexibility.**
  - **Performance-based** conditions delay fund access and increase compliance burden.
  - **20%** of grants linked to **Own Source Revenue (OSR)** targets such as ₹1,200 per household, disadvantaging weaker municipalities.

Federal and Structural Concerns

- **Erosion of Federal Balance**
  - **₹10,000 crore incentive** for peri-urban mergers raises concerns of central influence over State subjects.
  - Urban governance falls under the **12th Schedule**, making such incentives a potential **federal overreach**.
  - In States with strong rural institutions, such as **Kerala**, forced integration may create **administrative inefficiencies**.
- **Fiscal Asymmetry**
  - **Cesses and surcharges (~2.2% of GDP, ₹8.8 lakh crore)** are excluded from the divisible pool.
  - A significant portion is generated from **urban economic activity**, yet does not accrue to cities.
  - This creates a mismatch where cities are expected to enhance **own revenues**, while **central fiscal retention increases**.
- **Neglect of Emerging Challenges**
  - The 16th FC does not adequately address **climate change financing**, a critical concern for urban governance.

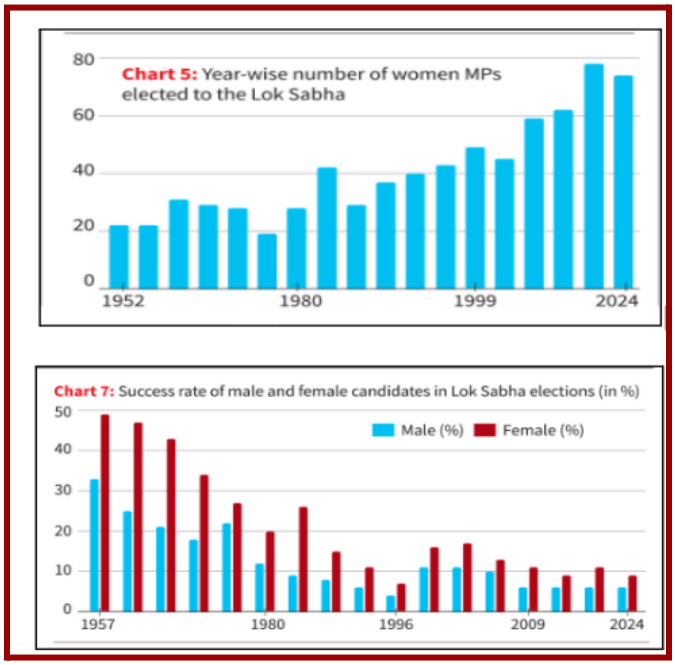
Way Forward

- Include **cesses and surcharges** in the divisible pool to ensure **equitable fiscal distribution**.
- Increase urban grants to at least **1% of GDP**, in line with **urbanisation demands**.
- Reduce the share of **tied grants** and enhance **untied fiscal transfers**.
- Strengthen **State Finance Commissions** and ensure timely implementation of their recommendations.
- Promote a governance model where **cities exercise greater fiscal autonomy**, with the Centre acting as a **facilitator**.

Conclusion

- India's urban transformation depends on aligning **financial devolution with economic contribution**. Strengthening ULB finances through **greater autonomy, adequate resources, and institutional capacity** is essential to ensure that cities can effectively deliver services and sustain inclusive growth.

Topics: Acts and Policies



Context: India has witnessed a significant rise in **women's electoral participation**, leading to near **gender parity in voting**. However, this progress has not translated into **proportionate representation** in legislatures and decision-making bodies.

Key Trends and Data

- **Voter Participation**
  - Gender gap declined from **11.2% (1967)** to **near parity (2019–24)**.

  - Women now **match or exceed male turnout** in several State elections.
  - Turnout advantage reached **+2.82% (2015–16)** and remains positive.
- **Campaign Participation**
  - Participation in rallies increased from **9% (2009)** to about **16%**.
  - Engagement in grassroots activities rose from **5–6% to ~11%**, though still lower than men.
- **Candidature Trends**
  - Women candidates increased from **45 (1957)** to **800 (2024)**.
  - Despite this, women remain a **minority among total contestants**.
- **Success Rates**
  - Women candidates often perform better when nominated.
  - **2019:** 11% (women) vs 6% (men); **2024:** 9% vs 6%.
- **Representation in Parliament**
  - Women constitute only about **14% of Lok Sabha**, indicating a persistent gap.

Key Challenges

- **Limited Political Representation:** High voter participation has not translated into equitable representation.
- **Party Nomination Constraints:** Political parties nominate fewer women, acting as institutional gatekeepers.
- **Campaign-Level Disparities:** Lower participation in campaign activities limits visibility and influence.
- **Social and Familial Constraints:** Political participation often requires **family approval**, affecting autonomy. Only about **50% women vote independently**, reflecting social influence.
- **Perception and Institutional Barriers: 58%** perceive advantage of political families; **57%** cite wealth barriers. Around **44%** believe parties prefer male candidates.
- **Structural Constraints: Patriarchal norms (22%)** remain the dominant barrier. Other factors include **household responsibilities (13%)**, **low awareness (12%)**, and **financial constraints (6%)**.

Way Forward

- **Strengthening Representation:** The **Women's Reservation Bill** provides a structural mechanism for enhancing representation.
- **Enhancing Party-Level Inclusion:** Political parties must increase women's candidature and leadership opportunities.
- **Promoting Political Socialisation:** Greater participation in grassroots activities can build **confidence and political capacity**.
- **Addressing Social Barriers:** Reducing constraints related to mobility, family norms, and responsibilities is essential.
- **Expanding Leadership Roles:** Inclusion in decision-making structures can convert participation into **substantive political power**.

Conclusion

- India has achieved near **gender parity in electoral participation**, marking a major democratic milestone. The critical challenge now is to ensure that this participation leads to **greater representation, autonomy, and influence** in political institutions.

National Security Act (NSA)

Context: Ladakhi activist **Sonam Wangchuk** was released from **Jodhpur Central Jail** after the **Union Home Ministry revoked** his **170-day detention under National Security Act (NSA)** with **"immediate effect"**.

Historical background of the Act

- Preventive detention laws in India trace their roots to **colonial regulations** such as the **Bengal Regulation III of 1818**, the **Defence of India Act, 1915**, and the **Rowlatt Act**.
- After Independence, the **Preventive Detention Act (1950)** was enacted but expired in **1969**.
- The **Maintenance of Internal Security Act (MISA), 1971** was later introduced but repealed in **1978** after criticism for misuse during the **Emergency (1975–77)**.
- The **NSA (1980)** was introduced to provide a framework for preventive detention with certain procedural safeguards.

Constitutional Basic of the Act

- The constitutional basis of the Act lies in **Article 22(3)(b)** of the Constitution, which permits **preventive detention** in certain circumstances.
- However, **Article 22(4)** mandates that detention beyond **three months** must be reviewed by an **Advisory Board consisting of qualified judges**.

Features of the Act

- **Preventive detention powers**

    - The Act authorises the **Central and State Governments** to detain individuals to prevent activities that threaten **national security, defence, or public order**.
    - It can also be used when an individual's actions threaten the **supply of essential goods and services** to the community.
- **Detention without formal charges**
    - Under the NSA, an individual may be detained **without formal charges or trial** for preventive purposes.
    - The detainee can be held for **up to 12 months**, with the possibility of extension if new grounds emerge.
- Under **ordinary criminal law**, an **arrested person has the right to:**
    - be informed of the grounds of arrest,
    - be produced before a magistrate within **24 hours**,
    - seek bail, and
    - consult legal counsel.
    - **Under the NSA**, these **protections are limited:**
        - the authorities may **withhold the grounds of detention for up to 10 days**,
        - the detainee **cannot have legal representation** before the Advisory Board.
- **Advisory Board review**
    - Each government must establish **Advisory Boards** consisting of **three members qualified to be High Court judges**.
    - The Board must review the detention **within three months** to determine whether there is sufficient cause for continued detention.
- **Protection of official action**
    - The Act provides **legal protection for officials acting in good faith**, preventing suits or prosecutions against authorities for actions taken under the law.
- **Temporary release**
    - The government may order **temporary release** of a detainee, either with or without conditions, and may revoke such release at any time.

Issues Associated with the Act

- **Risk of arbitrary detention:** Critics argue that the Act grants **wide discretionary powers** to authorities, which may lead to arbitrary or politically motivated detentions.
- **Concerns regarding natural justice:** The Act is seen as inconsistent with the spirit of **procedural safeguards in criminal law**, since detainees may not receive the same protections provided under the **Criminal Procedure Code (CrPC)**.
- **Limited transparency:** The detention process under the NSA is often **opaque**, making independent monitoring and accountability difficult.
- **Absence of reliable data:** The **National Crime Records Bureau (NCRB)** does not maintain separate data on NSA detentions because **no FIR is registered**, making it difficult to estimate the scale of its use.
- **Potential violation of fundamental rights:** Individuals can remain in detention for **up to three months** before review by the **Advisory Board**, raising concerns about possible **rights violations or mistreatment**.
- **Low conviction outcomes:** In several cases, detentions under the Act have not resulted in convictions. For instance, in **2021 the Allahabad High Court quashed 94 out of 120 NSA detention orders**, indicating possible misuse or weak evidence.

Way Forward

- **Strengthen judicial oversight:** Greater judicial scrutiny of detention orders can reduce the possibility of **arbitrary use of preventive detention powers**.
- **Legislative reforms:** Certain provisions of the Act, particularly the **restriction on legal representation before Advisory Boards**, require reconsideration.
- **Introduce periodic review:** The absence of a **sunset clause** means detention laws can operate indefinitely. **Periodic review** of detention provisions could prevent prolonged incarceration without trial.
- **Improve transparency:** Public access to information regarding **detentions, grounds of arrest, and review outcomes** can enhance accountability.
- **Protect civil liberties:** While **national security** remains a **priority**, reforms should **ensure that fundamental rights** such as freedom of expression and fair trial are **adequately protected.**

Conclusion

- The **National Security Act, 1980** remains an important legal instrument for addressing threats to national security and public order. However, its

effectiveness and legitimacy depend on maintaining a **careful balance** between **preventive security measures** and the **protection of constitutional liberties**, ensuring that the law is used responsibly and with appropriate safeguards.

Transgender Persons Amendment Bill, 2026

Context

- The bill seeks to introduce changes to the **Transgender Persons (Protection of Rights) Act, 2019**, which was enacted to **safeguard transgender persons** from discrimination and promote their welfare.
- The **2019 Act** was framed in the backdrop of the **Supreme Court's** landmark judgment in **NALSA v. Union of India (2014)**, which recognised **transgender persons as the third gender** and affirmed the right to self-determination of gender identity under **Article 21**.

Features of the Amendment Bill

- **Removal of self-perceived gender identity**
  - The Bill proposes deleting **Section 4(2)** of the 2019 Act, which recognises the **right to self-perceived gender identity**.
- **Redefinition of transgender persons**
  - The definition is narrowed to include:
    - socio-cultural identities such as **hijra, kinner, aravani, jogta, and eunuch**,
    - persons with **intersex variations**,
    - individuals with **congenital biological variations in sexual characteristics**.
  - Persons identifying solely on the basis of **self-perceived gender identity or gender fluidity** are excluded.
- **Inclusion of victims of forced gender alteration**
  - The revised definition also includes individuals who were **forced to adopt transgender identity** through **mutilation, castration, hormonal procedures, or coercion**.
- **Creation of a Medical Authority**
  - The Bill introduces a **medical authority**, generally a **medical board headed by a Chief Medical Officer**, to examine applications related to gender certification.
- **Changes in the gender certification process**
  - The **District Magistrate** will issue the transgender certificate only after reviewing the **recommendations of the medical authority**, replacing the earlier system of automatic issuance.
- **Mandatory revision of certificate after surgery**
  - Persons undergoing **Sex Reassignment Surgery (SRS)** must apply for a **revised gender certificate**, whereas under the 2019 Act this step was optional.
  - Hospitals performing **SRS procedures** must report these procedures to the **District Magistrate**.
- **Expanded offences and penalties**
  - The amendment strengthens criminal provisions with **graded punishments**, including **imprisonment and fines up to ₹5 lakh**, for offences such as:
    - denial of access to public places,
    - forced labour,
    - expulsion from homes.

Concerns and Criticism

- **Violation of constitutional principles**
  - Removal of self-identification contradicts the **NALSA judgment**, which upheld **autonomy and dignity**.
- **Medicalisation of identity**
  - Making identity subject to **medical verification** may lead to **invasive procedures and harassment**.
- **Exclusion of diverse identities**
  - Narrow definition risks excluding **genderqueer and gender-fluid persons**, creating divisions within the community.
- **Bureaucratic hurdles**
  - Increased role of authorities may lead to **delays, discretion, and misuse of power**.
- **Lack of consultation**
  - The Bill is criticised for being introduced **without adequate engagement with the transgender community**.
- **Government's Rationale**
  - The government argues that the earlier definition was **too broad and vague**, making implementation difficult.
  - It seeks to ensure that benefits reach **"genuinely disadvantaged"**

individuals, particularly those facing **biological and social exclusion**.
    - Emphasis is placed on creating a **more precise and administratively workable definition**.

Way Forward

- **Align with constitutional values:** Any reform must remain consistent with **NALSA principles of dignity, autonomy, and equality**.
- **Balance regulation and rights:** While clarity in definition is important, it should not come at the cost of **individual freedoms**.
- **Inclusive policy-making:** Ensure **meaningful consultation** with transgender communities to reflect lived realities.
- **Simplify certification process:** Retain a **self-declaration-based approach** with minimal bureaucratic interference.
- **Strengthen social protection:** Focus on **education, employment, healthcare, and social security**, rather than restrictive definitions.

Conclusion

- The Amendment Bill reflects a shift from a **rights-based to a regulation-focused approach**. The challenge lies in ensuring that governance mechanisms do not undermine the **core principle of dignity and self-identity**, which remains central to India's constitutional vision.

Topic: Important aspects of governance, transparency and accountability, e-governance

AI-Powered Tax Governance in India

Context

- India faces a persistent challenge of **low tax-GDP ratio (16.36%)** and significant **tax evasion (~4.3% revenue loss annually)**.
- To address this, the Income Tax Department launched **Project Insight (2017; operational 2019)**, using **AI and data analytics** to improve tax compliance and governance.

Key Features of AI-based Tax Governance (Project Insight)

- **Integrated data-driven system**
    - Uses multiple data sources: **banking, GST, property, securities, credit cards, high-value transactions**.
    - Builds a **360-degree financial profile** of taxpayers.
- **Core components**
    - **INTRAC (analytics engine):** Detects inconsistencies using AI.
    - **Compliance Processing Centre:** Ensures behavioural compliance.
    - **NUDGE strategy:** Sends **non-intrusive reminders (SMS/email)** for voluntary correction.
- **Focus areas**
    - Promote **voluntary compliance**.
    - Reduce **tax evasion and enforcement bias**.
    - Improve **efficiency and taxpayer services**.

Achievements and Emerging Trends

- Over **1 crore revised returns filed** since 2020–21, generating **₹11,000 crore additional tax**.
- **62% compliance** in foreign income disclosure campaigns.
- Detection of **₹70,000 crore suppressed sales** in restaurant sector using AI tools.
- Faster refunds: processing time reduced from **93 days to 17 days**.
- Increasing global trend: countries like **U.S., U.K., Australia, Italy** using similar systems.

Advantages of AI in Tax Governance

- **Improved compliance:** Helps detect **mismatches between income and spending patterns**.
- **Efficient enforcement:** Enables **risk-based targeting** of high-value evasion cases.
- **Administrative efficiency:** Automates routine tasks, allowing officials to focus on **complex cases**.
- **Better taxpayer services:** Facilitates easier filing, quicker refunds, and **AI-based assistance**.
- **Reduced human bias:** Moves towards **objective, data-driven decision-making**.

Challenges and Concerns

- **Data quality issues:** AI depends on data accuracy; may generate **false positives** due to complex financial behaviour.
- **Algorithmic bias:** Risk of reinforcing **existing socio-economic or regional biases**.
- **Lack of transparency:** Limited **explainability of AI decisions** affects trust and accountability.

- **Due process concerns:** Taxpayers may face difficulty in challenging automated decisions.
- **Privacy and security risks:** Handling sensitive financial data increases risks of data breaches and misuse.
- **Institutional gaps:** Absence of an **AI ombudsman**, independent audits, and public reporting mechanisms.

Way Forward

- **Ensure data integrity:** Improve **data quality and integration** across systems.
- **Strengthen accountability:** Introduce **AI audits, transparency norms, and public reporting** of outcomes.
- **Human oversight:** Maintain **human-in-the-loop systems** for critical decisions.
- **Protect taxpayer rights:** Ensure **clear grievance redressal and appeal mechanisms**.
- **Address bias and fairness:** Regularly evaluate algorithms to prevent **systemic discrimination**.
- **Institutional reforms:** Establish an **AI ombudsman** and regulatory framework for ethical AI use.

Conclusion

- AI-driven tax governance offers a powerful tool to enhance **compliance, efficiency, and revenue mobilisation**. However, its success depends on balancing **technological innovation with ethical safeguards**, ensuring that the system remains **fair, transparent, and trustworthy** for citizens.

Corruption

Context

- The **Corruption Perceptions Index (CPI) 2025** published by **Transparency International** reveals that corruption is not receding but **deepening globally**, eroding democratic accountability and hollowing out public institutions.

What the Data Show

- India scored **39 out of 100, ranked 91 out of 182 countries** in CPI 2025, remaining in the lower half of the global table.
- India's score has **fluctuated narrowly** between **38 and 41** over the past decade. In 2014 it stood at 38, and a decade later it remains broadly similar despite India becoming the **world's fourth-largest economy**.
- **China scores 42**; **Sri Lanka** stands close to India's level; **Bangladesh and Pakistan** score lower, yet India is behind several **upper-middle-income democracies** and **East Asian countries** that once operated at comparable development levels.
- **Corruption costs at least 5% of global GDP annually**, equivalent to more than **$2.6 trillion in lost output** each year through bribes, illicit financial flows, and public spending inefficiencies.
- Corruption costs India **0.5% of GDP directly**, rising to **1–1.5%** including indirect losses annually.

Structural Challenges in India

- Indian entrepreneurs operate under the shadow of **26,134 imprisonment provisions** embedded across business regulations, a staggering compliance burden that expands discretionary power and creates conditions for rent-seeking.
- A **pharmaceutical startup with a single manufacturing unit** must navigate **998 separate compliance obligations** before commencing operations, with nearly **49% carrying potential criminal liability**.
- Such extensive criminalisation within regulatory frameworks **raises the cost of doing business** and inadvertently creates incentives for corruption at every compliance checkpoint.
- Corruption increases **transaction uncertainty, raises compliance expenses, and diverts entrepreneurial energy** toward navigating rent-seeking systems rather than creating productive value.
- **Rapid economic expansion without parallel institutional strengthening** creates a dangerous imbalance and thus governance credibility has now become a competitive economic variable in global

investment decisions.

Encouraging Trends

- **Direct Benefit Transfers linked to bank accounts and digital identity** have reduced leakages in welfare schemes, demonstrating that institutional design can curb corruption at scale.
- The **RBI Digital Payments Index** rose to **516.76 in September 2025** from **493.22** in March 2025, reflecting **deepening payment digitalisation** and **reduced cash-based rent-seeking** opportunities.
- The **GST network has increased formalisation and traceability** in indirect taxation, reducing the scope for evasion and discretionary enforcement.
- **E-procurement portals and digital payment systems** have reduced opportunities for rent-seeking in government contracting and public spending.

Way Forward

- **Simplify the compliance architecture** by systematically reviewing and eliminating unnecessary imprisonment provisions across business regulations to reduce discretionary power available to regulators.
- **Strengthen judicial efficiency and institutional independence** to improve the credibility of anti-corruption enforcement beyond episodic crackdowns.
- **Expand digital public infrastructure** across more governance domains i.e. from land records to procurement to licensing, to reduce human discretion at corruption-prone interfaces.
- **Decouple regulatory oversight from criminal liability** for minor procedural violations, reserving criminal sanctions only for genuinely serious offences.

Conclusion: Countries that climbed CPI rankings did so through **cumulative, sustained reform**. India's economic ascent must now be matched with equal resolve in governance evolution toward its **$10 trillion economy vision**.

PRELIMS

Topic: Constitution

Article 22 of the Indian Constitution

Context: The **High Court of Karnataka** ordered the **release of two Nigerian nationals**, ruling that **Article 22(1)** extends to foreigners. The court found the **grounds for arrest were contrary to Supreme Court's guidelines**, emphasizing constitutional protection applies regardless of nationality.

Article 22

- Provides protection against **arbitrary arrest and detention**
- Acts as a **check and balance** on the powers of police officers and detaining authorities
- Available to **all persons**: citizens and non-citizens alike
- **Exception:** Cannot be availed by an **enemy alien.**
- Applicable to **all arrests except** those made under a **warrant issued by a court.**
- Covers offences of **criminal or quasi-criminal nature** or activities **prejudicial to state interests.**
- **Not applicable** to persons arrested or detained in a **civil matter.**

Clause-wise Explanation

- **Article 22(1): Rights at the Time of Arrest**
  - No person can be arrested or detained **without being informed of the reasons**
  - The arrested person is entitled to **consult and be defended by a legal practitioner of their choice**
- **Article 22(2): Production Before Magistrate**
  - Every arrested person must be **produced before the nearest Magistrate within 24 hours** of arrest
  - This time period **excludes travel time** from the place of arrest to the Magistrate's court
  - No person can be detained beyond 24 hours **without the permission of the Magistrate**
- **Article 22(3): Exceptions to Clauses (1) and (2)**
  - The protections under Articles 22(1) and 22(2) are **not applicable** to:
    - An **enemy alien**
    - Any person arrested under a **preventive detention law**
- **Article 22(4): Limit on Preventive Detention**
  - No person can be detained for **more than three months** under any preventive detention law
  - **Exception:** Detention beyond three months is permitted only if the **Advisory Board** opines that such detention is justified
- **Article 22(5): Grounds of Detention to be Disclosed**
  - The **grounds of arrest or detention must be disclosed** to the person detained

    - The detained person must be given an **opportunity to make a representation** against the detention order
- **Article 22(6): Exception to Disclosure**
    - The detaining authority is **empowered to withhold facts** that are considered **against public interest**, while disclosing grounds of detention
- **Article 22(7): Parliament's Power**
    - Parliament is empowered to prescribe:
        - Circumstances under which a person may be detained for **more than three months without Advisory Board opinion.**
        - **Maximum period** of detention under preventive detention laws.
        - **Procedure to be followed by the Advisory Board** while conducting an inquiry under Article 22(4).

National Register of Citizens (NRC)

Why in News: Protests erupted in Imphal demanding an **NRC-like exercise** in Manipur before the upcoming Census.

National Register of Citizens (NRC)

- The **NRC** is an official register that lists **Indian citizens with valid proof of citizenship**.
- It was first prepared in **1951** after the **first Census of independent India**.
- Since then, the NRC **has not been updated nationwide**.
- At present, the **NRC update has been carried out only in Assam** to identify **illegal migrants**.
- **NRC in Assam**
    - The process is based on the **Assam Accord (1985)**.
    - The Accord fixed **24 March 1971** as the **cut-off date** for citizenship in Assam.
    - For inclusion in the NRC, a person or their descendants must show their name in:
        - the **1951 NRC**, or
        - an **electoral roll up to 24 March 1971**.
    - Persons excluded from the NRC may be treated as **illegal migrants** and may face legal proceedings.

National Population Register (NPR)

- The **NPR** is a database of **usual residents of India**.
- A **usual resident** is a person who has lived in India for **at least six months** or intends to stay for the **next six months**.
- It includes **both citizens and foreign residents**.
- Registration is **mandatory** for all usual residents.
- It is prepared by the **Registrar General of India (RGI)** under the **Ministry of Home Affairs**.

Legal Basis and Link with Census

- The **NPR** is prepared under the **Citizenship Act, 1955** and **Citizenship Rules, 2003**.
- It is compiled at **local, sub-district, district, state and national levels**.
- NPR data is generally collected during the **house-listing phase of the Census**.
- The **second phase of the Census** deals with **population enumeration**.

Difference Between NRC and NPR

Feature	NRC (National Register of Citizens)	NPR (National Population Register)
Purpose	Identifies Indian citizens	Records all usual residents
Coverage	Currently updated only in Assam	Conducted across all states and UTs
Population covered	Citizens only	Citizens and foreigners
Proof requirement	Proof of citizenship required	No proof of citizenship required
Legal basis	Linked to Assam Accord (1985) and court supervision	Based on Citizenship Act, 1955 and Rules, 2003
Authority	Implemented by state authorities and RGI under Supreme Court monitoring	Conducted by Registrar General of India (RGI)
Relation with Census	Independent exercise	Conducted with Census house-listing phase

Article 101

Basic Provision

- **Article 101** deals with conditions under which **seats of Members of Parliament** become vacant. It applies to both **Lok Sabha and Rajya Sabha**, ensuring clarity and accountability in parliamentary membership.

Key Conditions for Vacancy

- **Dual Membership in Parliament**
  - A person cannot be member of **both Houses of Parliament simultaneously**.
  - If elected to both Houses, the member must **vacate one seat within prescribed time period**.
- **Parliament and State Legislature**
  - A person cannot be member of **Parliament and State Legislature at the same time**.
  - If elected to both, Parliament seat becomes vacant unless **State Legislature seat is resigned within specified time**.
- **Disqualification**
  - Seat becomes vacant if member is disqualified under **Article 102 provisions**.
  - Grounds include **office of profit, unsound mind, insolvency, loss of citizenship, and anti-defection law**.
- **Resignation**
  - Member may resign by submitting written notice to **Speaker (Lok Sabha) or Chairman (Rajya Sabha)**.
  - Resignation must be **voluntary and genuine**, otherwise presiding officer may refuse to accept it.
- **Absence from House**
  - Seat may be declared vacant if member is **absent for 60 days without permission of House**.
  - Period excludes days when House is **prorogued or adjourned for more than four consecutive days**.
- **Decision Authority**
  - Questions of disqualification are decided by **President of India under Article 103**.
  - President acts based on **opinion of Election Commission of India**.

Topic: Constitutional, Statutory and Executive Bodies

Removal of Chief Election Commissioner (CEC)

Constitutional Basis

- Governed by **Article 324(5)** of the Constitution
- The CEC can be removed only in the same manner and on the same grounds as a **Supreme Court judge**
- Service conditions **cannot be altered to his disadvantage** after appointment
- **Other Election Commissioners or Regional Commissioners** can be removed **only on the recommendation of the CEC**
- The removal is further governed by the **Chief Election Commissioner and other Election Commissioners (Appointment, Conditions of Service and Term of Office) Act, 2023**
- **Note**
  - The Constitution **reserves the term "impeachment" exclusively for the President** (Article 61)
  - For the CEC and judges, the correct constitutional term is **"removal"**
- **Grounds for Removal:** Limited to only two grounds: **proved misbehaviour** or **incapacity**

Removal Procedure

- **Step 1 (Initiation of Motion)**
  - Motion can be introduced in **either House of Parliament**
  - Requires signatures of **100 members in Lok Sabha** or **50 members in Rajya Sabha**
  - Submitted to the **Speaker (Lok Sabha)** or **Chairman (Rajya Sabha)**
- **Step 2 (Admission and Investigation)**
  - Speaker/Chairman may **admit or refuse** the motion
  - If admitted, a **three-member committee** is formed comprising a **Supreme Court Judge, a High Court Chief Justice, and a Distinguished Jurist**
  - The CEC has the **right to defend themselves** during investigation
- **Step 3 (Report Submission)**
  - If charges are **not proved**, the motion is **dropped**
  - If the CEC is found **guilty**, the report is submitted to the House where the motion was originally introduced

- **Step 4 (Voting in Parliament)**
  - Requires **Special Majority in both Houses** during the **same session**
  - Special Majority means **majority of total membership** of the House and **at least two-thirds of members present and voting**
- **Step 5 (Presidential Order)**
  - If the motion passes both Houses, a formal **address is presented to the President**
  - The President then issues the **official order for removal**

Removal of Other Election Commissioners

- Other Election Commissioners **cannot be removed independently**.
- Their removal requires **recommendation of the Chief Election Commissioner**, strengthening institutional independence.

Delimitation Commission

Basic Concept

- **Delimitation Commission** is a statutory and quasi-judicial body for redrawing electoral constituencies.
- It ensures **equal population representation** in Lok Sabha and State Assembly constituencies.
- Its orders have **force of law and cannot be challenged in any court**.
- **Constitutional Provisions**
  - **Article 82**: Parliament enacts Delimitation Act after every Census.
  - **Article 170**: Provides for readjustment of State Assembly seats after Census.
  - **Articles 330 & 332**: Provide reservation of seats for SCs and STs.
  - **Article 327**: Empowers Parliament to make laws related to elections.
  - **Article 329(a)**: Bars judicial challenge to delimitation orders.
- **Constitutional Amendments**
  - **42nd Amendment (1976)** froze seats until 2001 to promote population control.
  - **84th Amendment (2002)** extended freeze till 2026 with limited internal adjustments.
  - **87th Amendment (2003)** used 2001 Census for SC/ST seat allocation.
- **Composition**
  - Chairperson is a **retired Supreme Court judge**, ensuring legal neutrality.
  - Members include **Chief Election Commissioner and State Election Commissioners**.
  - **Associate members (MPs/MLAs)** participate in discussions but have no voting powers.

Delimitation Acts in India

- **Delimitation Act 1952**: Based on 1951 Census, created first constituencies.
- **Delimitation Act 1962**: Based on 1961 Census, revised boundaries and reservations.
- **Delimitation Act 1972**: Based on 1971 Census, later followed by seat freeze.
- **Delimitation Act 2002**: Based on 2001 Census, updated boundaries without changing total seats.

Criteria for Delimitation

- Ensures **population equality** across constituencies.
- Maintains **geographical compactness and contiguity** of areas.
- Considers **natural features like rivers and hills** while drawing boundaries.
- Avoids unnecessary division of **administrative units like districts and tehsils**.
- Allocates seats for SC/ST based on **their population proportion**.

Unique Identification Authority of India (UIDAI)

Context: The **UIDAI** has completed **mandatory biometric updates for 1.2 crore children** aged **7-15 years** through large-scale **school-based drives** after successful integration with the **UDISE+** platform.

Basic Facts

- **Nature:** Statutory body under the **Aadhaar Act, 2016**
- **Operational since:** July 12, 2016
- **Headquarters:** New Delhi
- **Nodal Ministry:** Ministry of Electronics and Information Technology **(MeitY)**
- **Key Functions**
  - **Issue of Aadhaar Numbers:** Issues a **12-digit unique identification number** to residents of India
  - **Authentication Services:** Provides **biometric and demographic**

authentication services
    - **Identity Management:** Maintains **security and privacy** of Aadhaar data
    - **Digital Inclusion:** Enables access to **welfare schemes and financial services**
    - **Policy Development:** Establishes procedures for **Aadhaar lifecycle operations**

About UDISE+ (Unified District Information System for Education Plus)

- One of the **largest Management Information Systems** in India
- An **online portal** for recording data related to **schools, teachers, enrolment, and infrastructure** across all recognised schools in the country
- Nodal Authority: Initiated by the **Department of School Education and Literacy (DoSEL)** under the **Ministry of Education.**
- **Coverage**
    - More than **14.72 lakh schools**
    - Over **98.08 lakh teachers**
    - Approximately **24.80 crore children**

National Medical Commission (NMC)

Context: National Medical Commission (NMC) warns against **"fake patient practice"** patients in medical colleges to fulfill the requirement of bed occupancy and investigations.

Establishment

- Statutory body established under the **NMC Act, 2019**
- Came into force on **25 September 2020**
- Replaced the earlier **Medical Council of India (MCI)**
- The existing Board of Governors was dissolved after NMC was constituted
- Constituted by the **Central Government**
- **Composition**
    - One Chairperson, Ten ex officio Members, Twenty-two part-time Members

Key Functions

- Lays down **policies and standards** for quality in medical education and practice
- Undertakes **healthcare planning** by mapping needs and available resources
- Ensures **coordination** among various boards and councils
- Enforces **ethical standards** and professional conduct among medical practitioners
- Regulates fees for **50% of seats** in private and deemed medical colleges
- Grants limited licences to **Community Health Providers**

Four Autonomous Boards under NMC

- **Undergraduate Medical Education Board (UGMEB)** supervises undergraduate medical education.
- **Post-Graduate Medical Education Board (PGMEB)** regulates postgraduate medical education.
- **Medical Assessment and Rating Board (MARB)** assesses and rates medical institutions.
- **Ethics and Medical Registration Board (EMRB)** maintains ethics and medical registration standards.

Commission on the Status of Women (CSW)

Overview

- A **functional commission** of the Economic and Social Council **(ECOSOC)**
- Established by **ECOSOC** resolution on 21 June 1946
- **Principal global intergovernmental body** dedicated to gender equality and empowerment of women
- **45 Member States** serve at any one time, elected by ECOSOC on an **equitable geographical distribution** basis
- Members are elected for a period of **four years**
- **CSW-70** (70th Session), recently held at **UN Headquarters**

Mandate

- Promotes women's **political, economic, civil, social, and educational rights**
- Documents the reality of women's lives globally
- Shapes **global standards** on gender equality

1996 Expansion of Mandate

- ECOSOC expanded mandate in **1996**
- CSW took a **leading role** in monitoring the implementation of the **Beijing Declaration and Platform for Action**
- Also tasked with **mainstreaming gender perspective** in UN activities

Beijing Declaration

- Adopted by **189 countries**
- Most **comprehensive and transformative** global agenda for gender equality
- CSW is the principal monitoring body for its implementation

National Council for Transgender Persons (NCTP)

Context: Union Government held a meeting with **National Council for Transgender Persons (NCTP)** amid backlash over the **Transgender Persons (Protection of Rights) Amendment Bill**.

About NCTP

- NCTP is a **statutory body** constituted under the **Transgender Persons (Protection of Rights) Act, 2019.**
- It works to **protect rights and ensure welfare of transgender persons** in India.
- Functions under **Ministry of Social Justice and Empowerment**.

Objectives

- Ensures effective implementation of provisions of the **Transgender Persons Act, 2019**.
- Focuses on **livelihood, awareness, and social inclusion** of transgender community.
- Promotes establishment of **transgender welfare boards** across states.
- Works to ensure access to **housing, healthcare, education, and basic services**.

Composition

- **Chairperson**: Union Minister of Social Justice and Empowerment.
- **Vice-Chairperson**: Minister of State for Social Justice and Empowerment.
- Includes representatives from **multiple central ministries at Joint Secretary level**.
- Members from **five states/UTs** on rotational basis representing different regions.
- Includes **five members from transgender community** across regions.
- Also includes representatives from **NITI Aayog, NHRC, NCW, and other departments**.
- **Non ex-officio members** have **tenure of three years**.

Functions and Powers

- **Monitors and evaluates** policies and programmes for transgender welfare and inclusion.
- **Advises central government** on legislation, schemes, and policy formulation.
- **Coordinates activities** of various ministries and departments related to transgender issues.
- **Addresses grievances and complaints** related to rights violations of transgender persons.
- Has **power to inquire** into complaints and recommend appropriate actions.

Transgender Persons (Protection of Rights) Act, 2019

- Defines transgender person as one whose **gender identity differs from gender assigned at birth**.
- Includes **transmen, transwomen, intersex persons, gender-queer, hijra and kinnar communities**.
- Provides **right to self-perceived gender identity** with certificate issued by District Magistrate.
- Grants **right of residence with family**, preventing forced eviction or exclusion.
- Prohibits discrimination in **education, employment, healthcare, and public services**.
- **Penal Provisions**
    - Offences against transgender persons attract **imprisonment from six months to two years with fine**.

Central Consumer Protection Authority (CCPA)

About

- The **Central Consumer Protection Authority (CCPA)** is established under **Section 10 of the Consumer Protection Act, 2019**.
- The **Consumer Protection Act, 2019** replaced the 1986 Act and came into force on **July 20, 2020**.
- **Nodal Ministry:** Ministry of Consumer Affairs, Food and Public Distribution.

Functions and Powers

- Protects, promotes, and enforces **consumer rights as a class**.
- Prevents **unfair trade practices** and **misleading advertisements**.
- Ensures that no entity publishes or disseminates **false or misleading advertisements**.
- Can initiate **class-action suits**, including **recall of goods, refund of price, and cancellation of**

licenses.
- Conducts **inquiries and investigations** through an **Investigation Wing headed by a Director-General**.
- Can **order discontinuation of unfair practices** and **impose penalties on violators**.

Composition
- Headed by a **Chief Commissioner**.
- Assisted by **two Commissioners**:
  - One for **goods-related matters**.
  - One for **services-related matters**.

Registrar General of India (RGI)

About
- The **Registrar General of India (RGI)** is a permanent office established in **1949** under the **Ministry of Home Affairs**.
- Headed by the **Registrar General and Ex-Officio Census Commissioner of India**.
- Responsible for **systematic collection of population data**, including size, growth, and distribution.
- The Registrar General is typically a **civil servant of Joint Secretary rank**.

Key Responsibilities
- Conducts the **decennial Census of India**, providing data on demographic, socio-economic, and geographic characteristics.
- Implements the **Registration of Births and Deaths Act, 1969**.
- Undertakes **demographic and linguistic surveys** across the country.

Major Functions
- **Census of India**
  - Provides comprehensive data on **population characteristics**.
  - Conducted **every 10 years**.
- **Linguistic Survey of India (LSI)**
  - Documents **linguistic diversity of India**.
  - First survey conducted by **George Abraham Grierson (completed in 1928)**.
- **Civil Registration System (CRS)**
  - System for **registration of births and deaths**.
  - Functions as a **continuous and real-time population data system**.
  - Birth certificate issued under **Section 12 of Registration of Births and Deaths Act, 1969**.
  - **Amendment (2023):** Mandatory registration of all births and deaths on a **centralised portal from October 1, 2023**.

Narcotics Control Bureau (NCB)

Basic Facts
- Nodal drug law enforcement and intelligence agency under the **Ministry of Home Affairs**
- Constituted on **14th November 1985** under the **NDPS Act, 1985**
- **Headquarters:** New Delhi

Key Functions
- Coordinates actions by **State Governments, various offices, and other authorities** under:
  - NDPS Act, 1985
  - Customs Act
  - Drugs and Cosmetics Act
- Implements India's obligations under **international conventions and protocols** against illicit drug trafficking
- Assists **foreign authorities and international organisations** in the prevention and suppression of illicit drug traffic
- Coordinates with **concerned ministries, departments, and organisations** on drug abuse matters

Enforcement Role
- Functions as an **enforcement agency** through its **zonal offices**
- **Zonal offices:**
  - Collect and analyse **seizure data** of narcotic drugs and psychotropic substances
  - Study **trends and modus operandi**
  - Collect and disseminate **intelligence**
  - Cooperate with **Customs, State Police, and other law enforcement agencies**

Topic: Acts and Government Initiative

VB-G RAM G Act, 2025

Context: The Viksit Bharat - Guarantee for Rozgar and Ajeevika Mission (Gramin) Act, 2025 proposed as a **replacement for MGNREGA, 2005. The** act aligns rural employment with PM Gati Shakti and Viksit Gram Panchayat Plans (VGPPs)

Key Provisions of VB-G RAM G Act

- **Employment & Wages**
  - Statutory guarantee of **125 days** as the right to demand employment is **legally enforceable**
  - **Unemployment allowance** is payable after 15 days if employment is not provided
  - Earlier **dis-entitlement** provisions removed.
- **Asset Creation: (Four Priority Domains)**
  - Water security and conservation
  - Core rural infrastructure
  - Livelihood-supporting infrastructure
  - Climate risk mitigation works
  - All assets integrated into **Viksit Bharat National Rural Infrastructure Stack**
- **Decentralised Planning**
  - Plans originate from **Viksit Gram Panchayat Plans (VGPPs)** approved by **Gram Sabhas**
  - Panchayats control **identification, prioritisation, and social audits**
  - Digital integration with **PM Gati Shakti**
- **Centre: State Financial Contribution**
  - **General States:** 60 : 40
  - **North-East & Himalayan States:** 90 : 10
  - **UTs without legislatures:** 100% Central
- **Administration & Technology**
  - Administrative expenditure ceiling raised from **6% to 9%**
  - Biometric authentication, geo-tagging, AI-enabled analytics, real-time dashboards
  - Technology as **enabler, not gatekeeper**
  - **Social audits by Gram Sabhas** strengthened

MGNREGA vs VB-G RAM G

Feature	MGNREGA	VB-G RAM G Act
Guaranteed Workdays	**100** **days**/household/year	**125 days**/household/year
Wage Funding	**100% Central** funding for unskilled wages	**60:40 Centre-State** cost sharing
Nature of Right	**Justiciable Right** as citizens can sue if work is denied; open-ended funding	**Schematic Entitlement** as a guarantee limited by a **fixed budget cap**
Budgeting Approach	Based on the **labour budget** reflecting actual demand from states	Centre determines **fixed state-wise annual allocation**
Operational Period	Continuous with **no seasonal pauses**	Work suspension is allowed up to **60 days** during peak agricultural seasons
Payment Frequency	Wages paid within **15 days** of work completion	Wages paid **weekly**

Nari Shakti Vandan Adhiniyam, 2023

About the Act

- **Nari Shakti Vandan Adhiniyam, 2023** provides **one-third reservation for women** in legislative bodies.
- It was enacted through the **Constitution (106th Amendment) Act, 2023**.
- The Act provides reservation for women in:
  - Lok Sabha
  - State Legislative Assemblies
  - Legislative Assembly of the National Capital Territory of Delhi.
- **Implementation Timeline**

- The provisions will come into force only after the **next delimitation** exercise.
- The **delimitation** must be conducted **after the enactment** of the amendment.

Constitutional Changes

- **Article Amended**
  - **Article 239AA** was amended to provide one-third reservation for women in the **Legislative Assembly** of the **National Capital Territory of Delhi**.

Articles Inserted	Provisions
Article 330A	• Provides one-third reservation for women in the **Lok Sabha.** • Includes seats reserved for Scheduled Castes (SCs) and Scheduled Tribes (STs).
Article 332A	• Provides one-third reservation for women in **State Legislative Assemblies**. • Also applies to SC and ST reserved seats.
Article 334A	• Specifies that the reservation will start after the **next delimitation** of constituencies. • Introduces a **15-year sunset clause**. • Allows extension and periodic rotation of reserved seats through law.

Essential Commodities Act, 1955

Context: The government invoked the **Essential Commodities Act, 1955** to prioritise natural gas allocation for key sectors.

About the Essential Commodities Act, 1955 (ECA)

- **Objective and Purpose**
  - The act was enacted by the **Government of India** to ensure **availability of essential goods** to citizens at fair prices.
  - The law seeks to **prevent hoarding, black marketing, and artificial shortages** of important commodities.
  - Historically, the Act has served as a key policy instrument to **control inflation, discourage hoarding, and safeguard national food security**.
- **Powers of the Central Government**
  - Under **Section 3 of the Act**, the Central Government can regulate the **production, supply, and distribution** of essential commodities.
  - These powers **allow the government to:** Impose stock limits; Regulate trade and distribution; Fix prices of commodities; Prevent hoarding and speculative storage.
- **Delegation of Powers to States**
  - **Section 5 of the Act** authorises the Central Government to **delegate powers under Section 3 to State Governments** or designated officials.
  - This delegation enables **quick enforcement and monitoring** at the State and local levels.
- **LPG as an Essential Commodity**
  - **Petroleum products**, including Liquefied Petroleum Gas (LPG), are classified as **essential commodities** under the Act.
  - The **Central Government can direct oil refineries** to maximise LPG production and prioritise supply for domestic households.
  - Refineries have also been restricted from diverting **propane and butane streams to petrochemical production**, ensuring these inputs remain primarily available for LPG supply.

Essential Commodities (Amendment) Act, 2020

- In **2020**, Parliament amended the Act to **limit the Centre's regulatory intervention** in certain agricultural commodities.
- Regulation of these commodities is allowed **only in extraordinary circumstances**, such as:
  - War, Famine, Natural calamity of grave nature, Extraordinary price rise.
- **Commodities covered under the amendment**
  - Cereals
  - Pulses
  - Potatoes
  - Onions
  - Edible oilseeds and edible oils.

Topic: Legislature and the Executive

Parliamentary Privileges

Context: Lok Sabha Speaker **Om Birla** reconstituted the **Committee of Privileges** appointing **Ravi Shankar Prasad** as its chairman.

What are Parliamentary Privileges?

- Special **rights, privileges, and immunities** enjoyed by each House of Parliament, its Committees, and individual members
- Without these privileges, Parliament **cannot perform its functions efficiently**
- **Objective:** To safeguard the **freedom, authority, and dignity of Parliament**
- Extended also to the **Attorney General of India** and **Union Ministers** who are entitled to speak and participate in House proceedings
- **Collective Privileges** *(Enjoyed by each House collectively)*
    - Right to **publish its reports, debates, and proceedings**
    - Right to **exclude strangers** from proceedings for secret sittings
    - Power to make rules to **regulate its own procedure** and conduct of business
    - Power to **punish members as well as outsiders** for breach of privilege or contempt
    - Right to **institute inquiries** and order the **attendance of witnesses**
    - **Courts are prohibited** from inquiring into the proceedings of a House or its Committees
    - **No legal process** can be served within the precincts of the House without the permission of the **presiding officer**
- **Individual Privileges** *(Enjoyed by individual members)*
    - MPs **cannot be arrested** during the session of Parliament and **40 days before** the beginning and **40 days after** the end of a session
    - **Freedom of speech** in Parliament i.e. **Article 105** (Parliament) and **Article 194** (State Assemblies)
    - Exempted from **jury service** and can refuse to give evidence or appear as a witness in a court case when Parliament is in session
    - Right to receive **immediate information** of the arrest, detention, conviction, imprisonment, and release of a member

Committee of Privileges

- Examines cases of **breach of privileges** of the House and its members and recommends appropriate action
- **Composition:**
    - **Lok Sabha:** 15 members
    - **Rajya Sabha:** 10 members
- The **Speaker** refers issues of **disqualification under anti-defection rules** to this committee for inquiry
- Can **summon relevant individuals** for examination and study pertinent documents
- Makes recommendations **"as it may deem fit"** after reviewing cases
- **Rajya Sabha's** Privileges Committee is chaired by the **Deputy Chairperson**.

Vacation of Seat in Legislature

Context: Bihar Chief Minister **Nitish Kumar**, after being **elected to the Rajya Sabha**, is required to resolve **simultaneous membership between Parliament and State Legislature** within the prescribed time limit.

Grounds

- Under the **Representation of the People Act, 1951**, in case of **double membership**:
    - If a person is **elected to both Houses of Parliament**, they must **intimate their choice within 10 days**, failing which the **Rajya Sabha seat becomes vacant**.
    - If a **sitting member of one House is elected to the other**, the **seat in the first House becomes vacant**.
    - If a person is **elected to two seats in the same House**, both seats become vacant if they **do not exercise their option**.
    - If a person becomes a **member of both Parliament and a State Legislature**, the **Parliament seat becomes vacant** if they do not resign from the State Legislature within **14 days**.
- A seat becomes vacant on **disqualification** if the member is disqualified under the **Constitution**, the **Representation of the People Act**, or under the **Tenth Schedule (anti-defection law)**.
- A member may vacate the seat through **resignation**, by submitting a **written resignation to the Presiding Officer** of the House.
- A seat becomes vacant due to **absence** if the member is absent from **all meetings for 60 days without permission** of the House.
- **Other circumstances** leading to vacancy include:

- If the **election is declared void by a court**.
- If the member is **expelled by the House**.
- If the member is **elected as the President of India**.
- If the member is **appointed as a Governor**.

Removal of Lok Sabha Speaker

Constitutional Basis for Removal

- **Article 94** of the Constitution of India lays down the conditions under which the **Speaker or Deputy Speaker** of the Lok Sabha **vacates office**.
- Under **Article 94(a)**, the Speaker ceases to hold office if they **stop being a member of the Lok Sabha**.
- Under **Article 94(b)**, the Speaker may **resign** at any time by submitting a written resignation to **Deputy Speaker.**
- Under **Article 94(c)**, the Speaker may be **removed through a resolution** passed by a **majority** of all the then **members of the Lok Sabha**.
- These provisions apply only to the **Lok Sabha** and not to the **Rajya Sabha**.

Initiation and Admission of the Removal Motion

- The **procedure for removal** is governed by **Rules 200–203** of the Rules of Procedure and Conduct of Business in Lok Sabha.
- A **removal resolution** can be moved only after giving a minimum notice of **14 days**.
- The notice must be submitted in writing to the **Secretary-General of the Lok Sabha** and signed by **at least one Member of Parliament**.
- If the notice is found in order, the **motion is included** in the List of Business and read before the House.
- For the motion to be taken up for discussion, **at least 50 members** must rise in support of the motion.
- If **fewer than 50 members support it**, the motion fails to obtain the "leave of the House" and is dropped.

Conditions and Majority Required for Removal

- The **charges** mentioned in the resolution must be **precise, clear, and specific**.
- The motion **must not contain** arguments, defamatory remarks, inferences, or ironic expressions and the debate in the House **remains strictly confined** to the charges mentioned in the resolution.
- For the removal to succeed, the resolution must be passed by a **majority of all the then members of the Lok Sabha**, which is known as an **Effective Majority**.
- Once the resolution is passed by this **Effective Majority**, the **Speaker is removed** from office immediately.

Role of the Speaker During Removal Proceedings

- According to **Article 96**, the **Speaker cannot preside** over the House while a resolution for their removal is under consideration.
- However, the Speaker **has the right to participate** in the debate and explain their position.
- The Speaker **may vote in the first instance** as an ordinary member, but **cannot exercise a casting vote** if the votes are equal.

Continuity of Office and Historical Instances

- The **Speaker does not vacate office** upon the dissolution of the Lok Sabha.
- The Speaker **continues in office** until immediately before the **first meeting** of the newly elected Lok Sabha.
- However, **if a removal resolution** is passed, the vacation of office takes **effect immediately**.

Historical Motions Against the Speaker

- **1954**: Motion moved against **G.V. Mavalankar**, the first Speaker of the Lok Sabha.
- **1966**: Motion moved against **Hukam Singh**.
- **1987**: Motion moved against **Balram Jakhar**.
- **Outcome:** All three motions **failed**, and **no Lok Sabha Speaker has ever been removed** through this constitutional process.

Cabinet Committee on Security (CCS)

Context: Prime Minister chaired **Cabinet Committee on Security meeting** to review global situation amid ongoing West Asia conflict.

Basic Features

- **Cabinet Committee on Security (CCS)** is the apex body for decision-making on national security matters in India.
- It is chaired by the **Prime Minister of India**.
- Deals with issues related to **defence, security, foreign affairs, and strategic policy decisions**.

Composition

- Chaired by **Prime Minister**, with key members including Home, Defence, Finance, and External Affairs Ministers.
- **National Security Advisor (NSA)** acts as coordinator on security-related matters.
- **Cabinet Secretariat** maintains records of meetings and proceedings of the committee.

Functions

- Takes decisions on **defence policy, security expenditure, and strategic national security issues**.
- Deals with matters related to **intelligence, nuclear policy, and space-related security aspects**.
- Acts as apex authority for **appointments in national security institutions**.

Topic: Judiciary

Recusal of Judges

Meaning of Recusal of Judges

- **Recusal** means a judge voluntarily withdrawing from a case due to possible conflict of interest.
- It ensures that **judicial decisions remain fair, impartial, and free from bias**.
- Based on principle **"nemo judex in sua causa"**, meaning no one should judge their own case.
- Also guided by idea that **justice must not only be done, but also be seen to be done**.

When Recusal Occurs

- When a judge has **financial interest**, such as shares in a company involved in case.
- When there is **personal or prior association** with any party in the dispute.
- When a judge hears an appeal in Supreme Court against **his/her own earlier High Court judgment**.
- When there is a **reasonable perception of bias in the mind of the affected party**.

Process of Recusal

- Decision to recuse is usually taken by **judge himself based on personal conscience and discretion**.
- Sometimes, **lawyers or parties request recusal** citing possible conflict of interest.
- There are **no formal codified rules**, but guided by judicial precedents and ethics.
- Judges take oath to act **without fear, favour, affection, or ill-will**, guiding recusal decisions.

Judges Refusal to Recuse

- Final decision to recuse or not **rests solely with the concerned judge**.
- Judges may refuse if they believe **no real bias or conflict exists in the case**.
- Refusal is also based on principle that **unnecessary recusals may delay justice delivery**.
- **Recording Reasons for Recusal**
    - Judges may **record reasons for recusal**, though **not mandatory** due to lack of formal rules.
    - Reasons can be stated **in open court or inferred from circumstances of the case**.
    - Transparency helps maintain **public trust in judicial process and fairness**.
    - However, sometimes judges **avoid detailed disclosure to protect institutional integrity**.

Judicial Principles & Case Laws

- In **Ranjit Thakur v Union of India**, SC held bias depends on **reasonable apprehension of party**.
- Court emphasised that perception of bias must be **viewed from standpoint of affected party**.
- In **Supreme Court Advocates-on-Record Association case**, pecuniary interest mandates recusal.
- Even **slight financial interest** can automatically disqualify a judge from hearing the case.

Topic: Elections

Electoral Systems

First Past the Post (FPTP)

- An electoral method where the **candidate with the most votes** in a constituency wins
- Used in **UK, Canada, and India** for legislative elections
- **How it Works**
    - **Single-Member Districts:** Each constituency elects **one representative**
    - **Plurality Wins:** The highest vote-getter wins — not necessarily a **majority**
- **Advantages**

- **Simplicity:** Easy for voters to understand and straightforward to count
- **Strong and Stable Governments:** Often produces **clear winners** with decisive mandates
- **Direct Representation:** Ensures every geographic area has a **dedicated representative**
- **Accountability:** Representatives can be **easily voted out** by their constituency

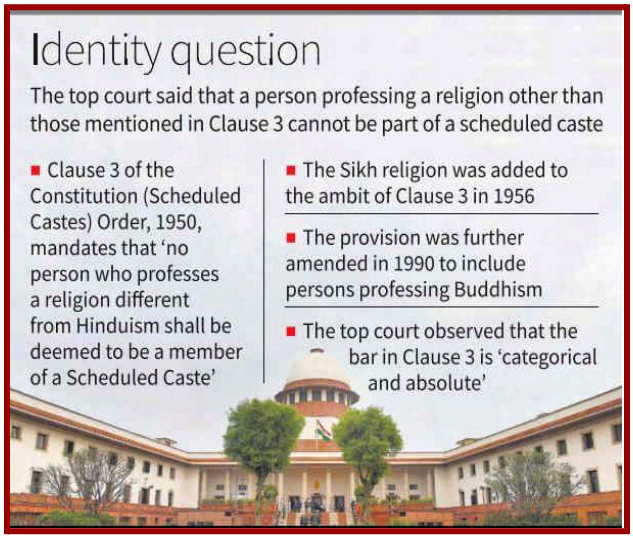
- **Disadvantages**
  - **Disproportionality:** Vote-share may **not match seat-share**
  - **Wasted Votes:** Votes for losing candidates **do not contribute** to election results
  - **Minority Rule:** Candidates can win with **less than a majority** of votes
  - **Geographic Concentration:** Favours parties with **concentrated regional support**
  - **Encourages Gerrymandering:** Constituency boundaries can be **manipulated** to favour parties

Proportional Representation (PR)

- Allocates seats in the legislature **based on the proportion of votes** each party receives
- Aims for an **accurate reflection of voter preferences**
- **How it Works**
  - **Party Lists:** Voters vote for **parties**, not individual candidates; seats are allocated based on vote share
  - **Multi-Member Districts:** Multiple representatives elected per constituency allowing **proportional seat allocation**
  - **Thresholds:** A **minimum vote percentage** is required for a party to gain representation
- **Advantages**
  - **Fair Representation:** Reflects voters' preferences **more accurately.**
  - **Minority Inclusion:** Better chances for **smaller parties and minority groups.**
  - **Reduced Wasted Votes:** Most votes **contribute to election results.**
  - **Encourages Voter Turnout:** Voters feel their votes have **more impact.**
- **Disadvantages**
  - **Coalition Governments:** Can lead to **instability** if coalition partners disagree.
  - **Complexity:** Harder for voters and authorities to **manage and understand.**
  - **Fragmentation:** Many small parties can make **building consensus difficult.**
  - **Weaker Constituency Links:** Representatives may **not be tied to specific geographic areas.**
  - **Influence of Party Leadership:** Party leaders **control candidate lists**, centralising power.

Topic: SCs, STs and OBCs

Scheduled Caste Status



Context: Supreme Court held that **conversion to other religions leads to loss of Scheduled Caste (SC) status**.

Constitutional Basis & Legal Provision

- Based on **Constitution (Scheduled Castes) Order, 1950**, especially Clause 3.
- SC status is limited to persons **following Hinduism, Sikhism, or Buddhism**.
- Sikhs were included in **1956** and Buddhists in **1990** through amendments.
- **Key Judgment & Interpretation**
  - If a person converts to any other religion, **SC status is lost immediately**, even if born in SC family.
  - The word **"profess" means openly following and practicing** a religion in public life.
  - One cannot **follow another religion and still claim SC benefits** at the same time.

- Further, protection under **SC/ST (Prevention of Atrocities) Act, 1989** will also not apply.
- However, **Scheduled Tribes (STs)** do not face such religion-based restrictions.

Re-conversion Conditions

- Person must clearly prove **original caste identity with proper evidence**.
- Must show **genuine return** to Hinduism, Sikhism, or Buddhism.
- Acceptance by **original caste community is necessary** after reconversion.
- Person must follow **customs and practices of that caste in real life**.

Creamy Layer in OBC Reservation

Supreme Court Observation in 2025

- The **Supreme Court** observed that **creamy layer status cannot be determined** solely on the basis of income.
- While hearing petitions regarding **horizontal reservations in public employment**, the Court emphasised that **social status and class background** must also be considered.
- The Court noted that the **1993 Office Memorandum (OM)** issued by the government provided criteria for identifying creamy layer among **OBCs**, including categories such as **high-ranking government officials and professionals**.
- The judgment highlighted that **government servants and professionals** who reach **higher positions after reservation benefits** should not automatically be **excluded solely due to income considerations**.

What is the Creamy Layer?

- The **Creamy Layer** refers to the **socially and economically advanced section** within the OBC category.
- Individuals in this group are **excluded from reservation benefits** in education, jobs, and welfare schemes meant for **socially and educationally backward classes**.
- The concept aims to ensure that **reservation benefits reach the genuinely disadvantaged sections** of OBCs.

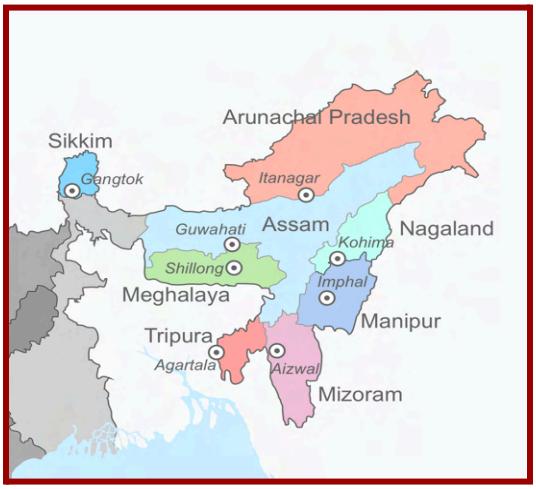
Eligibility Criteria for Creamy Layer (Current Practice)

- Families with **annual income above ₹8 lakh** are generally classified as **creamy layer** (revision proposals in some states range between **₹8-15 lakh**).
- Children of parents working in **Group A or Group B government services** are usually treated as part of the creamy layer.
- **Professionals and high-income earners** such as doctors, engineers, and entrepreneurs may also fall in this category.
- Persons in the creamy layer **cannot claim reservation under OBC quotas**.

Non-Creamy Layer of OBC

- The **Non-Creamy Layer** includes the **economically and socially disadvantaged section of OBCs**.
- Individuals in this group are **eligible for reservation benefits** in government employment, education, and welfare programmes.
- **Criteria**
  - **Annual family income below ₹8 lakh**.
  - Parents are **not in senior government positions or high-income occupations**.
  - A **Non-Creamy Layer certificate** is required to claim reservation benefits.
- The purpose is to ensure **targeted affirmative action** for the **most backward sections** within OBC communities.

Autonomous District Councils (ADCs)



About ADCs

- **Autonomous District Councils (ADCs)** are **self-governing bodies** created under the **Sixth Schedule** of the Indian Constitution.

- They provide **administrative autonomy** to **Scheduled Tribes** in certain tribal areas.
- ADCs exist in **Assam, Meghalaya, Mizoram, and Tripura**.
- Their purpose is to protect tribal customs, land rights, and local governance systems.
- **Composition of the Councils**
    - The **majority of members are elected** through democratic elections for a **five-year term**.
    - A limited number of members are **nominated by the Governor** to ensure representation of **marginalised groups**.

Powers of ADCs

- **Legislative Powers**
    - Councils can make laws on **land**, **forests**, **water resources**, **agriculture**, **public health**, **sanitation**, and **social customs**.
    - These laws mainly apply to **tribal areas under the council's jurisdiction**.
- **Executive Powers**
    - ADCs administer **village councils**, **traditional chiefs**, and aspects of **local governance**.
    - They also regulate matters such as **inheritance laws** and **community administration**.
- **Judicial Powers**
    - Councils can establish **tribal courts** to resolve disputes involving **Scheduled Tribe communities**.
    - Such courts can impose sentences **up to five years of imprisonment**.

Functions of ADCs

- Govern **tribal areas** while safeguarding **traditional customs and practices**.
- Manage local **natural resources** such as forests and water bodies.
- Support development of **basic infrastructure**, including education, healthcare, and rural roads.
- Promote **grassroots governance** through village councils.

Revenue Sources

- ADCs have the authority to **levy certain taxes and fees**.
- These include taxes on **land**, **buildings**, **vehicles**, **boats**, and **animals**.
- Councils may also collect **tolls on goods entering the district**, ferries, and roads.
- Revenue can also be raised through general taxation for maintaining **local infrastructure**.

Miscellaneous

Bail and Its Types

What is Bail?

- Bail is the **conditional/provisional release** of a person held under legal custody in matters yet to be pronounced by the Court
- It involves a **promise to appear in Court** as and when required
- Signifies a **security or collateral** deposited before the Court for release

Types of Bail in India

- **Regular Bail**
    - A direction by **any Court** to release a person who is **already under arrest** and in police custody
    - Application filed under **Section 437 and 439 of CrPC**
- **Interim Bail**
    - Bail granted for a **temporary and short period**
    - Granted while an application for **Anticipatory Bail or Regular Bail** is still pending before the Court
- **Anticipatory Bail (Pre-Arrest Bail)**
    - Allows an accused to apply for bail **before being arrested**
    - Granted under **Section 438 of CrPC, 1973**
    - Issued **only by Sessions Court and High Court**
    - **Discretionary** and not an absolute right

Conditions for Granting Anticipatory Bail

- The person must have reason to believe they may be arrested for a **non-bailable offence**
- Must make themselves **available for interrogation** by the investigating officer
- **Court considers:**
    - **Nature and gravity** of the offence
    - **Antecedents** of the accused
    - Likelihood of **absconding or tampering with evidence**
- **Court may impose conditions** such as:
    - Surrendering passport
    - Not leaving the country

  - Reporting to police station regularly
- May be granted for a **limited period** and the person must surrender to custody once it expires
- Court may also impose a **monetary bond** in case of non-appearance or violation of conditions

Chargesheet

Basic Concept

- A **chargesheet** is the **final report filed by police/investigating officer** after completion of investigation.
- It is also called **Police Report / Final Report**.
- It is filed in court to **initiate criminal prosecution** against the accused.
- It covers the entire process from **FIR to completion of investigation**.
- A chargesheet typically includes:
  - Names of **parties involved**
  - Nature of **information and offence**
  - Names of **witnesses**
  - Details of the **accused and offence committed**
  - Information on **arrest, custody, or bail status**

Legal Significance

- Filing of chargesheet **marks the beginning of trial proceedings**.
- It specifies the **charges/offences against the accused**.
- Helps courts decide the **course of prosecution**.
- Also aids the accused in **seeking bail**, as offences are clearly stated.

Time Limit and Default Bail

- Must be filed within:
  - **60 days** (cases triable by lower courts)
  - **90 days** (cases triable by Court of Sessions)
- Failure to file within this period gives the accused the right to **default bail**.

Cognizable vs Non-Cognizable

- **Cognizable Offence:**
  - Police can **arrest without warrant** and **start investigation without court approval**.
  - Filing of chargesheet is **mandatory**.
- **Non-Cognizable Offence:**
  - Police require **magistrate's permission** to investigate.
  - Chargesheet is **not mandatory unless directed by court**.

Choosing State DGPs

Context: The **UPSC** has revised rules for **empanelment of State Director-General of Police (DGP)** and **Head of Police Force**. The state governments must now **obtain Supreme Court consent** for any delay in submitting the **list of DGP-rank officers** to UPSC for empanelment.

Appointment of State DGPs

- **Legal Basis**
  - Process follows the **Prakash Singh vs. Union of India (2006)** Supreme Court judgment
  - Further governed by **UPSC guidelines of 2009**
  - Centre has recently introduced a **Single Window System** for appointing State DGPs
- **Appointment Process**
  - States must send a list of eligible officers to **UPSC at least 6 months** before the incumbent DGP retires
  - The **UPSC Empanelment Committee** selects a panel of:
    - **3 officers** for regular states
    - **2 officers** for smaller states
  - Selection is based on **merit**
  - The **State Government** then chooses the DGP from this panel
- **Eligibility Criteria**
  - Minimum **30 years of service**, or the rank of **police chief (and one rank below)** as stipulated for that state
  - Officers with **less than 6 months left to retire** are **not eligible**

Bharat Ratna

Overview

- India's **highest civilian honour**, established in **1954**
- Maximum **3 awards per year**, conferred on the **Prime Minister's suggestion to the President**
- Recipients receive a **Sanad (certificate)** signed by the President and a **medallion**, with **no monetary endowment**
- **Posthumous provision** was added in the **1966 statute**, as the original 1954 statute had no such provision
- **53 awardees** till date

Eligibility

- No formal requirement that the award be granted **only to Indian nationals**
- Initially limited to **literature, science, arts, and public services**
- Criteria expanded in **2011** to include **"any field of human endeavour"**
- Awardees **cannot use Bharat Ratna as prefix or suffix**, as per **Article 18(1)** of the Constitution which abolishes titles

Medallion Design

- Cast in **Bronze** and shaped like a **Pipal leaf**
- Features a **sunburst** in the centre with **"Bharat Ratna"** engraved below it
- The reverse side carries the **Emblem of India** with **"Satyameva Jayate"** inscribed in Devanagari script

Notable Awardees

- **First recipients (1954):** Sarvapalli Radhakrishnan, C.V. Raman, and Chakravarti Rajagopalachari
- **First sportsperson and youngest recipient** was Sachin Tendulkar
- **Non-Indian awardees** include **Khan Abdul Ghaffar Khan** (1987) and **Nelson Mandela** (1990)
- **Mother Teresa** (Agnes Gonxha Bojaxhiu), a naturalised Indian citizen, received it in **1980**
- **Posthumous Awards**
    - Generally **not conferred posthumously**, though granted in exceptional cases
    - **18 posthumous awards** have been given, including to Dr. B.R. Ambedkar, Lal Bahadur Shastri, Morarji Desai, and M.G. Ramachandran
    - In **1992**, Subhash Chandra Bose was posthumously awarded, but his family **refused to accept** it due to lack of concrete evidence of his death

INTERNATIONAL RELATION

Topic: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests

India-Brazil MoU On Rare Earths And Critical Minerals

Context

- India and Brazil signed an **MoU on rare earths and critical minerals** during President Lula da Silva's state to India. The MoU covers the **full mineral value chain** thus exploration, mining, processing, recycling, and refining.
- The agreement is **non-binding in nature** but carries significant strategic and economic signalling value.

India's Domestic Critical Minerals Strategy

- India is gradually shaping a strategy that balances **domestic capacity building** with **global partnerships**.
- The **National Critical Mineral Mission (2025)** reflects a shift towards **end-to-end resource security**.
- Identification of **30 critical minerals** highlights priority areas for economic and strategic planning.
- The Mines and Minerals (Development and Regulation) Act, 1957 **(MMDR Act) Amendment Act, 2023** strengthens the Centre's role in ensuring **efficient resource allocation**.
- Through **KABIL**, India is actively pursuing overseas assets, recognising that domestic resources alone may not suffice.
- The push for **domestic production of rare earth magnets by 2026** indicates an effort to reduce

dependence in sectors like **electric mobility and defence**.

Strategic Significance of the MoU for India

- The MoU reflects India's attempt to navigate an uncertain global environment with **greater confidence and autonomy**.
- Access to Brazil's largely **untapped reserves** offers an opportunity to secure future supply lines.
- It helps India reduce excessive reliance on **single-country sources**, especially in a geopolitically sensitive sector.
- By expanding partnerships, India strengthens its **negotiating position** in global markets.
- A stable supply of minerals is essential for **clean energy transitions, defence preparedness, and technological growth**.
- Cooperation on **responsible sourcing standards** enhances India's credibility in global value chains.

Connection to Pax Silica

- India joined **Pax Silica on February 20**, a US-led initiative to secure the **"silicon stack"** from raw materials through to AI hardware and computing.
- The India-Brazil MoU signed the next day **complements Pax Silica's goals** by helping secure access to and processing of critical minerals.
- However, the MoU **does not make Brazil a Pax Silica member** — the two arrangements remain distinct but complementary.

What the MoU Means for Brazil

- Brazil holds significant reserves including 21 million tonnes of **rare earth-oxide equivalent**, 2.7 billion tonnes of **bauxite**, and 0.4 million tonnes of **lithium**.
- The MoU helps Brazil **attract Indian capital** into Brazilian mining and processing projects, easing project financing.
- India as a large market can offer **long-term purchase contracts**, reducing speculative risk for new Brazilian projects.
- It supports Brazil's goal to **move up the value chain** rather than simply exporting raw unprocessed ores.

Broader Implications

- Critical minerals are the **new frontier of geopolitical competition**, essential for clean energy, defence, semiconductors, and advanced manufacturing.
- India's strategy of **building a diversified overseas mineral partnerships network** alongside domestic capacity reflects a mature industrial policy approach.
- The MoU exemplifies how **South-South cooperation can serve strategic autonomy** goals for both developing nations simultaneously.

India-Canada Relations

Context: Canadian PM Mark Carney visited India, marking a decisive shift from diplomatic tensions to commercially-anchored engagement. The visit produced landmark agreements across **trade, nuclear energy, critical minerals, and defence**, signalling renewed political will at the highest levels.

Historical Background

- India and Canada share **over 75 years of diplomatic relations**, formally upgraded to a **"Strategic Partnership" in 2018**.
- Security cooperation is anchored in the **Joint Working Group on Counter Terrorism (1997)** and **Framework for Cooperation on Countering Terrorism (2018)**.
- Legal collaboration is strengthened through the **Extradition Treaty (1987)** and the **Mutual Legal Assistance Treaty (1994)**.

Key Outcomes of PM Carney's Visit

- **Trade**
  - Terms of Reference signed to relaunch Comprehensive Economic Partnership Agreement **(CEPA) negotiations**, targeting bilateral trade of **USD 70 billion by 2030**.
  - In 2024, two-way trade stood at **USD 30.9 billion**, with India maintaining a goods trade surplus.
- **Civil Nuclear Deal**
  - **Department of Atomic Energy** signed a USD 2.6 billion, nine-year **uranium supply contract** with Canada's Cameco.
  - Directly supports India's goal of achieving **100 GW nuclear power capacity by 2047** under Viksit Bharat.
- **Critical Minerals and Clean Energy**
  - **MoU signed for secure critical mineral supply chains**, aligning with the **G7 Critical Minerals Action Plan**.

  - Canada officially joining both the **International Solar Alliance (ISA) and Global Biofuels Alliance (GBA)**.
- **Defence and Strategic Ties**
  - **First-ever India-Canada Defence Dialogue** established, which is a historically absent pillar now institutionalised.
  - India formally supported **Canada joining IORA as a Dialogue Partner**.
- **Innovation and People**
  - **AICTE-Mitacs MoU** to provide **300 fully-funded research internships** for Indian students in Canada.
  - **Joint Pulse Protein Centre of Excellence** to be set up at NIFTEM-K, addressing micronutrient deficiencies.
  - PM Carney extended an **invitation to PM Modi to visit Canada**, signalling a sustained reciprocal partnership.

Strategic Significance

- **Canadian pension funds** have invested over **USD 100 billion** in India's infrastructure and real estate sectors.
- **Indian diaspora** in Canada exceeds **1.8 million**, acting as a vital bridge for economic and people-to-people ties.
- Both democracies share converging interests in a **rules-based, free, and open Indo-Pacific**.
- Canada's **Indo-Pacific Strategy** specifically identifies **India** as a critical strategic partner.

India's Uranium Import Strategy

- Indian uranium ore contains only **0.02-0.45%** against the global average of **1-2%**, making domestic extraction costlier.
- India currently consumes **1,500-2,000 tonnes annually**; demand may rise to **5,400 tonnes** with nuclear expansion.
- **Over 70% of uranium** requirements are met through **imports** from Canada, Russia, Kazakhstan, and Uzbekistan.
- The **SHANTI Act 2025** enables greater private sector participation in India's nuclear energy sector.

Challenges

- **Khalistani extremist** activities openly operating from Canadian soil threaten India's internal security.
- **Trade barriers** persist over agricultural tariffs, IPR disputes, and professional mobility restrictions.
- **Visa and consular delays** worsened significantly following the 2023-24 diplomatic crisis.
- **Differences over India's non-alignment** and **strategic autonomy** occasionally create friction in bilateral ties.
- Canada's historically **inconsistent political will** has made sustained engagement structurally unreliable for India.

Way Forward

- Implement **NSA-level action plan** targeting violent extremism and organised crime networks jointly.
- **Finalise CEPA by end-2026** to unlock market access and reduce trade barriers.
- **Pursue Early Harvest Agreement** in less contentious sectors while CEPA negotiations continue.
- **Expand AICTE-Mitacs model** to more institutions, deepening education and talent mobility cooperation.
- **Leverage Canadian pension fund investments** to accelerate India's infrastructure and clean energy buildout.

West Asia and India

Context

- **West Asia** is a subregion of Asia, bordered by **Europe** to the west, **Central Asia** to the north, **South Asia** to the east, and **Africa** and the **Arabian Sea** to the south.
- The region broadly includes
  - Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Iran, Oman, Palestine, Qatar,

Saudi Arabia, Syria, Turkey, the United Arab Emirates, and Yemen.

- It is marked by **diverse landscapes** such as deserts, mountains, and coastlines, and is associated with important rivers such as the **Tigris, Euphrates, and Nile**.
- For India, West Asia is not just a nearby external region; it is a space deeply connected with **energy, trade, diaspora, connectivity, and strategic interests**.

Significance of West Asia for India

- **Energy security**
  - West Asia is crucial for India's **energy needs**, especially in **oil and natural gas**.
  - **Saudi Arabia** and **Iraq** are major suppliers of oil to India.
  - **Qatar** is India's most important supplier of **natural gas**, accounting for **41% of India's total natural gas imports**.
  - Any instability in the region can directly affect India's **energy security** and economic stability.
- **Economic significance**
  - West Asia is an important **trading partner** for India.
  - Indian companies have invested in sectors such as **infrastructure, construction, and technology** in the region.
  - India's trade with the **UAE** stood at **$73 billion in 2021-22**, recording a **68% growth** over 2020-21.
  - **Iraq** was India's **fifth largest trading partner in 2021-22** at **$34.3 billion**.
- **Diaspora linkages**
  - West Asia hosts a large **Indian diaspora**, especially in the Gulf countries.
  - The Indian diaspora is about **3.5 million in the UAE** and **2.5 million in Saudi Arabia**.
  - In the UAE alone, the Indian expatriate community of around **3.4 million** is the **largest segment of India's diaspora**.
  - This diaspora forms an important bridge in **economic, social, and cultural relations**.
- **Cultural ties**
  - India shares a long history of **cultural exchange** with West Asian societies.
  - India has established **cultural centres** in several countries of the region, deepening people-to-people ties.
- **Counter-radicalisation**
  - Cooperation with West Asian countries is also important for **countering radicalisation**.
  - Given the rise of extremist groups, closer engagement can support **security coordination** and reduce risks to Indian interests.
- **Gateway to Central Asia**
  - West Asia can serve as a **gateway to Central Asia**, particularly for a country like India seeking wider continental connectivity.
  - The development of **Chabahar Port in Iran** is important in this regard, especially for connectivity towards **Afghanistan and Central Asia**.

India's Foreign Policy Towards West Asia

- India has traditionally maintained **strong ties** with many West Asian countries through **economic, political, and cultural engagement**.
- Since the **1990s**, India has built trade partnerships with the region in areas such as **oil and energy**.
- In **2014**, India adopted a more focused approach towards the region through the **Look West Policy**.
- **Look West Policy**
  - The policy is aimed at advancing **India's national interest** without becoming entangled in the **regional politics of the Arab world**.
  - It reflects a **balanced and interest-driven approach**, rather than bloc-based alignment.
- **Important policy developments**
  - **India-UAE CEPA (2022):** Expected to deepen bilateral economic ties.
  - **Saudi investment:** Saudi Arabia has invested in the **Jio platform of Reliance Industries**.
  - **Chabahar Port:** Strengthens India's access to **Iran, Afghanistan, and Central Asia**.
  - **India-Arab Cooperation Forum (2014):** Hosted by India to promote engagement and annual ministerial exchanges.
  - **OIC engagement (2019):** India attended the **OIC Foreign Ministers' meeting** as a **guest of honour**, marking an important diplomatic step.

Challenges in India–West Asia Relations

- **Limited economic depth**

    - Despite progress, the text points out that India's trade with West Asia remains **relatively limited compared to other regions**.
    - In **2025**, India's total trade with West Asia accounted for **10-11% of its global trade**.
- **Geopolitical tensions**
    - West Asia remains a **volatile region**, requiring India to carefully manage ties amid regional rivalries and conflicts.
    - One example is the need to balance relations between **Israel and Palestine**.
- **Competition from major powers**
    - India's engagement is influenced by the presence of other powers, particularly **China**.
    - India has attempted to respond through stronger **economic and security cooperation** with countries like the **UAE and Saudi Arabia**.
- **Political instability**
    - Internal instability in countries such as **Syria, Iraq, and Yemen** can negatively affect India's interests in the region.
- **Terrorism and radicalisation**
    - The rise of the **Islamic State** and other extremist groups poses a threat to the **Indian diaspora** in West Asia.
    - Further, the concerns are over the **radicalisation of Indian youth**.
- **Energy vulnerability**
    - Since a large part of India's **energy imports** comes from West Asia, supply disruptions can have serious consequences for the economy.
- **Sectarian tensions**
    - Tensions between **Shia and Sunni** groups in the region complicate India's diplomatic balancing.
    - India must maintain ties with both **Iran** and **Saudi Arabia**, despite their differing regional positions.

Way Forward

- **Deepen economic engagement**
    - India should continue to strengthen trade and investment ties with West Asian countries.
    - There is a need to complete the pending **free trade agreement with the Gulf Cooperation Council**.
- **Strengthen counter-terror cooperation**
    - India can develop closer security cooperation with countries such as **Israel, Saudi Arabia, Bahrain, and Turkey**.
    - This may include **intelligence sharing, counter-terror operations, and joint exercises**.
- **Promote climate and sustainable development cooperation**
    - A **regional sustainable development treaty** under the **I2U2 grouping**, with wider participation from West Asian countries.
    - Further, greater Indian investments in **solar energy, electric vehicles, and clean technologies** in the region.
- **Expand cultural exchange**
    - Cultural engagement can deepen trust and mutual understanding.
    - Initiatives such as the **Indian Cultural Centre in Dubai** are examples of this approach.
- **Maintain a balanced approach**
    - India should preserve **good relations with all countries in the region** and avoid taking rigid sides in geopolitical disputes.
    - A **balanced and pragmatic foreign policy** remains essential for safeguarding India's long-term interests.

Conclusion

- West Asia occupies a central place in India's foreign policy because of its links with **energy, trade, diaspora, connectivity, and security**. India's approach has therefore evolved around **strategic balance, economic engagement, and regional cooperation**, while carefully managing the many tensions and uncertainties that continue to define the region.

Topic: Effect of policies and politics of developed and developing countries on India's interests, Indian diaspora

Iran-Israel War

The Iran-Israel War

- The United States and Israel launched **Operation Epic Fury in February 2026**, which resulted in the assassination of **Supreme Leader Khamenei** and

around 40 senior officials; more than 780 people were killed and over 500 locations were struck.

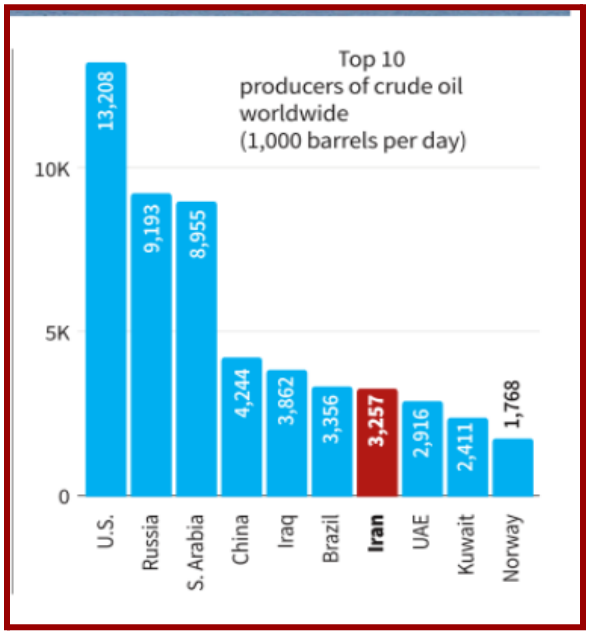
- This development marks a clear shift from a **shadow war to a direct high-intensity confrontation** between the two sides.
- In response, Iran launched **Operation Truthful Promise 4**, deploying drones and missiles against Israel as well as Gulf nations.
- **Historical Roots**
    - The conflict is rooted in long-term developments such as the **1953 CIA-backed coup**, the **1979 Islamic Revolution**, the ongoing **nuclear dispute**, and Iran's **Axis of Resistance**, which includes Hezbollah, Hamas, and the Houthis.
    - Israel's concerns were not limited to Iran's nuclear programme alone, but also extended to its **conventional military capabilities and expanding regional influence**.
- **Escalation**
    - Iran targeted US military installations, including **Al Udeid base in Qatar** and the **5th Fleet in Bahrain**, and also announced the closure of the **Strait of Hormuz**.
    - Following the escalation, **Qatar halted LNG production**, while refineries in **Saudi Arabia and Iraq suspended operations**, disrupting global energy supply.
    - Iranian missile strikes also reached **Cyprus and a French base in the UAE**, thereby rapidly internationalising the conflict.

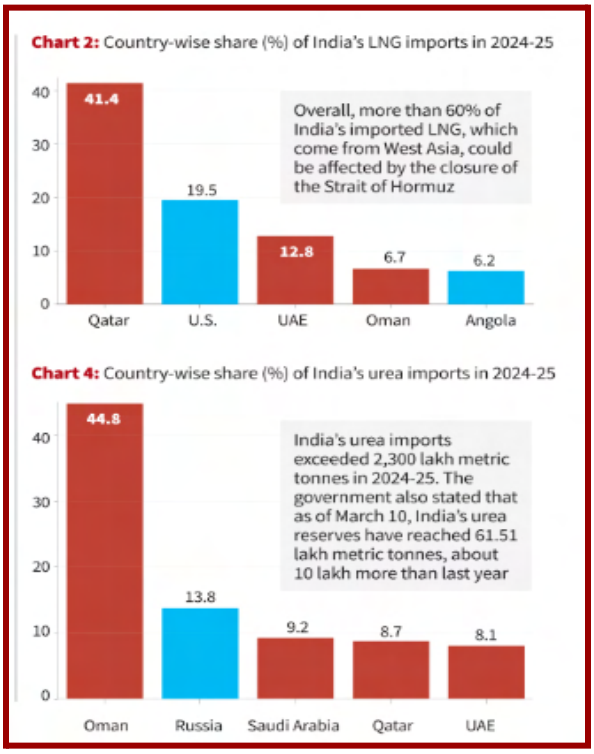
Legality of Strikes (International Law)

- **Article 2(4) of the UN Charter** prohibits the use of force against the territorial integrity or political independence of any state.
- **Article 51 of the UN Charter** permits the use of force only in self-defence against an actual armed attack, and not against a speculative future threat.
- The US and Israel justified their actions using the doctrine of **anticipatory self-defence**, which is not widely recognised by most international law scholars.
- Even under this doctrine, **three necessary conditions** were not established:
    - whether Iran had taken a decision to attack,
    - whether it possessed the capability, and
    - whether the strike represented the last available window to prevent the attack.
- A missile strike on a **girls' school in Minab**, which killed around 150 schoolchildren, was condemned by UNESCO as a grave violation of **International Humanitarian Law (IHL)**.
- The **International Criminal Court (ICC)** must assess whether such targeting of civilian infrastructure constitutes a war crime under the **Rome Statute**.

Global Challenges

- The **Strait of Hormuz**, through which **14 million barrels of oil pass daily** and which accounts for **31% of global seaborne crude**, was shut by Iran's IRGC through mine-laying and attacks on vessels.
- As a result, oil prices surged to **$78.31 per barrel**, representing a 12% increase within a week.
- West Asia contributes **31% of global oil production** and **38% of global oil exports (2024)**, making the disruption globally significant.
- China receives **5.4 million barrels per day** through the Strait, and Iran exported **97% of its oil to China in 2024**, highlighting China's dependence.
- **Gulf states** have been forced to choose sides, leading to the collapse of their earlier hedging strategy, while there is also a risk of intervention by **Russia and China**.





Significance For India

- **Energy**
  - India imports more than **60% of its energy from the Gulf**, and about **2.1 million barrels per day pass through the Strait of Hormuz**, making it the second-largest importer through this route.

    - India currently has crude oil stocks sufficient for only about **25 days**, and any prolonged closure of the Strait could lead to severe **inflationary pressures**.
- **Fertilizer & Food Security**
    - India imports more than **50% of its natural gas**, with over **40% of LNG coming from Qatar**, and around **60% of LNG passing through the Strait of Hormuz**.
    - Nearly **30% of LNG is used for urea and ammonia production**, linking energy directly to agriculture.
    - India's urea consumption stands at **387 lakh metric tonnes**, while domestic production is **306 lakh metric tonnes**, indicating a significant supply gap.
    - About **71% of urea imports come from West Asia**, including **45% from Oman** and **26% from Saudi Arabia, Qatar, and the UAE**.
    - Disruptions in LNG supply lead to reduced plant capacity, which directly threatens **food security**.
    - The government has responded through the **Natural Gas Supply Regulation Order, 2026**, and by maintaining urea reserves of **61.51 lakh metric tonnes (March 2026)**.
- **Strategic & Diaspora**
    - More than **10 million Indians living in the Gulf region** face risks to safety and livelihoods, along with potential disruption of remittances.
    - Strategic projects such as **Chabahar Port and the IMEC corridor** are directly threatened by the ongoing instability.
    - India's commitment to **strategic autonomy** is being tested, as the Prime Minister called for "diplomacy and dialogue" even while Western allies supported military action.

India's Policy Architecture Towards West Asia

- India's approach combines **Look West Policy (2005)** and **De-hyphenation Policy**, enabling independent engagement with Israel and Palestine, as well as balanced relations between Iran and Saudi Arabia.
- The **India–UAE CEPA (2022)** aims to increase non-oil trade to **$100 billion by 2030**.
- Institutional frameworks include the **Strategic Partnership Council with Saudi Arabia (2019)** and the **Tehran and New Delhi Declarations with Iran**.
- Connectivity initiatives such as the **INSTC** link India through Chabahar to Central Asia and Europe, bypassing Pakistan, supported by a **10-year agreement signed in May 2024**.
- The **IMEC corridor (G20, 2023)** connects India to Europe via the Gulf and is seen as a counter to China's BRI.
- India is also part of **I2U2 (2022)**, focusing on cooperation in water, energy, food, and technology sectors.
- India has secured access to the **Port of Duqm (Oman)** and conducts joint military exercises with regional partners.
- The inauguration of the **BAPS Mandir in Abu Dhabi (2024)** reflects India's growing cultural and soft power presence.
- India also supported the inclusion of **Saudi Arabia, UAE, and Iran in BRICS+**, reflecting its multilateral engagement.

Way Forward

- An **immediate ceasefire** through **UN Security Council intervention** is necessary, along with a neutral naval task force to ensure that the Strait of Hormuz remains open.
- An **ICC investigation into the Minab school strike** should be conducted, along with reaffirmation of the prohibition on anticipatory self-defence.
- India should **diversify LNG imports** beyond West Asia and expand **domestic gas-based fertilizer production**.
- There is also a need to build larger **Strategic Petroleum Reserves** and promote alternatives such as **nano-urea and organic fertilizers**.
- India must protect strategic projects like **Chabahar through diplomatic engagement**, while deepening partnerships such as **I2U2 and IMEC** for long-term stability.
- At the same time, India should maintain its **strategic autonomy** and avoid alignment with any specific geopolitical bloc.

Conclusion

- The Iran–Israel conflict has simultaneously stress-tested India's **energy security, food security, diaspora safety, and strategic connectivity**. India's response must combine **diversification, domestic capacity building, and proactive diplomacy**, while using its strategic

autonomy to shape global norms on issues such as **pre-emptive warfare** in forums like the **UN, ICC, and BRICS**.

Topic: India and its Neighbourhood- Relations

India-Nepal Relations

Historical Background

- **Ancient civilisational links** through shared Hindu and Buddhist traditions such as Pashupatinath, Lumbini, Janakpur, and Bodhgaya remain living symbols of cultural continuity.
- **Treaty of Sugauli (1816)** defined Nepal's boundaries along the Kali River, laying the groundwork for later territorial disputes like Kalapani and Susta.
- **1950 Treaty of Peace and Friendship** formalised open borders, reciprocal rights, and security cooperation and thus it is the legal foundation of bilateral relations that Nepal increasingly views as unequal.
- **Economic Blockade (1989-90)** severely strained trust as Nepal's GDP growth fell from **9.7% (1988) to 1.5% (1989)** when trade and transit treaties expired.
- **Operation Maitri (2015)** delivered immediate earthquake relief, reinforcing India's role as Nepal's first responder in humanitarian crises.

Key Areas of Cooperation

- **Trade and Connectivity**
  - Bilateral trade reached **₹57,858 crore in 2018-19**; India exports ₹54,300 crore while Nepal exports only ₹3,558 crore, reflecting deep asymmetry.
  - India provides **transit for nearly all of Nepal's third-country trade**, making Indian ports vital for Nepal's economic stability.
  - **Motihari-Amlekhgunj petroleum pipeline** is South Asia's first cross-border petroleum pipeline and thus ensures secure and affordable fuel supply to Nepal.
  - **Jayanagar-Kurtha rail line** operational; MoU signed for electric rail link between **Kathmandu and Raxaul**.
- **Energy and Hydropower**
  - **Arun-3 (900 MW)** implemented by SJVN with ₹1,236 crore Indian investment; **Arun-4 (490.2 MW)** agreement signed for long-term power cooperation.
  - **Pancheshwar Multipurpose Project** under Mahakali Treaty aims to generate **1,200 MW** while supporting irrigation and flood control.
  - India committed to **import 10,000 MW of electricity from Nepal** over a decade, boosting Nepal's revenue base significantly.
  - Nepal exported electricity worth **₹10.38 billion to India** by mid-2022 the hydropower becoming a major export sector.
- **Defence and Cultural Cooperation**
  - Around **32,000 Nepali citizens serve in Indian Army Gorkha Regiments**, a unique symbol of historic military integration between the two nations.
  - **Surya Kiran** is an annual joint military exercise enhancing interoperability, disaster response, and counterterrorism coordination.
  - Army chiefs of both nations confer **honorary General ranks** on each other, reflecting deep institutional respect.
  - **Sister-City Agreements** linking Kathmandu-Varanasi, Lumbini-Bodhgaya, and Janakpur-Ayodhya strengthen people-to-people ties.
  - India provides **over 1,500 scholarships annually** to Nepali students and has extended **over USD 1.5 billion in development assistance** since 2008.

Key Challenges

- **Territorial disputes** over Kalapani, Susta, Lipulekh, and Limpiyadhura intensified after Nepal's 2019 map claim; Nepal further issued **NPR 100 currency notes** depicting disputed territories, deepening diplomatic tensions.
- **Trade imbalance** persists as Nepal imports over **64% from India** but exports less than **10%** to India, creating structural economic dependence.
- **China's growing influence** through Belt and Road Initiative investments in Nepal directly challenges India's traditional influence and buffer-state dynamics.
- **Open border exploitation**: The 1,770 km porous boundary is misused for smuggling, fake currency circulation, human trafficking, and insurgent movement.

- **Trust deficit** caused by delays in project execution, perceptions of political interference, and the 1950 treaty's unequal image fuels anti-India sentiment in Nepal's political discourse.

Way Forward

- **Revise the 1950 Treaty** based on the Eminent Persons Group recommendations to reflect contemporary realities and address Nepal's perception of inequality.
- **Accelerate hydropower and connectivity projects** to demonstrate tangible development dividends and reduce the trust deficit caused by implementation delays.
- **Strengthen border management** through joint surveillance mechanisms while preserving the open border's humanitarian and economic benefits for border communities.
- **Engage Nepal through cultural and educational diplomacy** to build durable people-to-people connections that outlast political fluctuations.
- **Counter China's influence** not through pressure but through delivering on commitments — reliable partnership is India's most effective strategic tool with Nepal.

Other Important News

WTO's 14th Ministerial Conference (MC14)

Context

- **MC14** to be held in **Yaoundé, Cameroon** and it is WTO's highest decision-making body shaping the future of global trade governance
- WTO has **166 member countries**; despite challenges, **most global trade still operates under WTO rules**
- Arrives at a moment of **"wrecking-ball politics"** (Munich Security Report 2026) thus geopolitics increasingly driving trade rather than rules
- Only **two agreements reached in decades** thus reflects deep **institutional stagnation**
- Countries increasingly shifting towards **FTAs for trade rule-making**, bypassing WTO

Crisis In Trade Multilateralism

- Rising **US-China rivalry**, global conflicts, and **securitisation of trade** are weakening multilateralism
- US has imposed **arbitrary tariffs violating MFN principle** and bound tariff commitments
- US pursuing **one-sided trade agreements through tariff coercion**
- **WTO Appellate Body** remains paralysed as blocked appointments to the body have crippled the dispute settlement system
- Rise of **unilateral tariffs, bilateral deals, and economic coercion** reflects shift towards power-based trade over rules-based trade

Key Issues Before MC14

- **Dispute Settlement Crisis**
  - Appellate Body paralysis has weakened **enforcement and trust** in WTO rules
  - Revival requires innovative solutions for **alternative appointment mechanisms**
- **Plurilateral Agreements**
  - Debate on incorporating **Investment Facilitation and E-commerce** agreements into WTO framework
  - Plurilateral route seen as solution to **consensus paralysis** but risks **fragmentation** of the multilateral system
  - Must remain **transparent and open to all members** to avoid a two-tier WTO
- **E-Commerce Moratorium**
  - In place since **1998** and it prevents tariffs on digital trade
  - Developed countries favour continuation; India faces a **policy dilemma** and thus moratorium may cause **revenue losses for developing countries**
  - WTO rules remain outdated on **digital commerce and technology-driven trade**
- **Special and Differential Treatment (SDT)**
  - US seeking to **limit SDT benefits for emerging economies** like India
  - Persistent issues of **agricultural subsidies and unequal market access** create perceptions of unfairness for developing countries
- **Climate and Digital Trade Rules**
  - Existing WTO framework designed for **20th-century trade** thus fails to address **climate-related trade measures** and evolving global production systems

India's Role And Strategic Choices

- Must reaffirm commitment to **trade**

multilateralism and defend **rule-based order**

- Act as **normative leader** for the Global South and thus build coalitions with developing countries
- May need to **revisit rigid opposition to plurilateral agreements** for greater strategic flexibility
- Support **alternative Appellate Body appointment mechanisms** to restore institutional credibility
- Protect **developmental interests,** especially SDT, agricultural subsidies, and digital trade revenue
- **Failure of MC14** may strengthen unilateralism and entrench a **coercive trade order**, harming developing nations the most

Way Forward

- **Restore Appellate Body**: Rebuild a functional, binding dispute settlement system, the cornerstone of WTO credibility
- **Update trade rules**: Align WTO with digital economy, climate-related trade policies, and modern production systems
- **Revisit SDT**: Reflect current realities while protecting developing country interests
- **Inclusive plurilateralism**: Encourage plurilateral initiatives but ensure they remain open and transparent to all members
- **Address subsidies**: Resolve agricultural subsidy distortions and unequal market access concerns
- **Strengthen multilateral cooperation**: Reinforce WTO as a rules-based shield protecting weaker nations from coercion

Conclusion

- MC14 is a **critical juncture** as the WTO must choose between **reform or irrelevance**. A reformed WTO can ensure global trade remains **predictable, fair, and rules-based** rather than driven by power politics.
- For India, the challenge is balancing **defensive developmental interests** with the flexibility needed to remain a **credible shaper of the emerging global trade order**.
- Failure at MC14 will not just weaken the WTO, it will accelerate a fragmented, coercive trade system where the **Global South pays the highest price**.

PRELIMS

Topic: Organisation and Convention

World Trade Organization (WTO)

Basic Overview

- The **World Trade Organization (WTO)** is an **international body regulating global trade rules among nations**.
- Established under the **Marrakesh Agreement (1994)** after the **Uruguay Round (1986–94)** of GATT. It came into force in **1995**, replacing **GATT (1948)**.
- **Scope expanded beyond GATT:**
  - **GATT:** Trade in goods
  - **WTO:** Trade in **goods, services, and intellectual property**
- **Headquarters:** Geneva, Switzerland
- **Members:** 166 countries (~98% of global trade)
- **Key Institutional Mechanisms**
  - **Ministerial Conference (MC):** Highest decision-making body
  - **Dispute Settlement Body (DSB):** Resolves trade disputes among members

Important WTO Agreements

- **TRIMS:** Prohibits trade-distorting investment measures (e.g., local content requirements)
- **TRIPS:** Deals with **intellectual property rights (IPR)** protection
- **AoA (Agreement on Agriculture):** Governs global agricultural trade
- Other agreements:
  - **GATS (Services)**
  - **SPS (Sanitary & Phytosanitary Measures)**

Agreement on Agriculture (AoA)

- The agreement was negotiated during the **Uruguay Round** and **ratified in 1994 (Marrakesh)** and it came into force in **1995**.
- It aims to **liberalise global agricultural trade**.
- **Core Pillars of AoA**
  - **Market Access:** Reduce trade barriers (tariffs, quotas)
  - **Domestic Support:** Regulate subsidies (via subsidy boxes)
  - **Export Subsidies:** Reduce export

subsidies that distort trade

Subsidy Classification

Amber Box (Trade-distorting subsidies)

- Distorts trade by making domestic products artificially competitive.
- Examples:
  - **Fertiliser, electricity, irrigation subsidies**
  - **Minimum Support Price (MSP)**
- Countries must **reduce these subsidies**.
- **De Minimis limits:**
  - **10%** of production value (developing countries)
  - **5%** (developed countries)

Blue Box (Conditional subsidies)

- "Amber box with conditions"
- Allowed if it **limits production** (e.g., quotas, land set-aside).
- **No spending limits currently**

Green Box (Non-trade distorting subsidies)

- Minimal or no trade distortion
- **Examples:**
  - Environmental protection
  - Research, infrastructure
- **Government-funded** without price support
- Allowed **without limits**

Gulf Cooperation Council (GCC)

Context: India has renewed engagement with **Gulf Cooperation Council (GCC)** amid growing economic, energy, and diaspora-related strategic interests.

Basic Facts

- **Gulf Cooperation Council (GCC)** is a regional political and economic alliance of six West Asian countries.
- It includes **Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates** as founding member states.
- The organization was formally established on **25 May 1981** through signing of the GCC Charter.
- The permanent **headquarters of GCC** is located in **Riyadh, Saudi Arabia**, serving as its administrative center.

Organizational Structure

- **Supreme Council** is the highest authority, comprising heads of member states with rotating presidency in alphabetical order.
- **Ministerial Council** includes foreign ministers of member states and meets every three months for policy coordination.
- **Secretariat General** functions as administrative body, responsible for implementation of decisions and organizing official meetings.

World Gold Council

About

- The **World Gold Council (WGC)** is a **non-profit association of leading global gold producers**.
- Established in **1987** by major mining companies.
- **Headquarters:** London, United Kingdom.
- **Key Contribution:** Credited with creating the **first gold Exchange-Traded Fund (ETF)**.

Nature and Composition

- Functions as a **market development organisation for the gold industry**.
- Comprises **33 members**, primarily gold mining companies.
- Covers markets accounting for **about three-fourths of global gold consumption**.

Objectives

- To **promote demand and usage of gold** across sectors.
- To **maximize growth potential of the gold industry**.
- To monitor and support **existing gold consumption patterns**.

Functions and Activities

- Develops and promotes **gold standards and policies**.
- Ensures **fairness and sustainability** in gold mining practices.
- Provides **research, market analysis, and industry insights**.
- Publishes **quarterly reports on gold demand and market trends**.
- Supports **research for new uses and applications of gold**.
- Acts as a **global authority on gold-related data and analysis**.

BRICS

Brief Overview

- The term **BRIC** was coined by **Jim O'Neill in 2001** to describe emerging economies: **Brazil, Russia, India, and China**.
- **South Africa joined in 2010**, after which the grouping came to be known as **BRICS**.
- The group represents approximately **25% of the global economy** and nearly **40% of the world's population**.
- BRICS seeks to function as a **counterbalance to Western-dominated institutions** such as the **G7 and the World Bank**.

Formation and Key Milestones

- The grouping first emerged informally during the **G8 Outreach Summit at St. Petersburg in 2006**.
- It was formally institutionalised through the **BRIC Foreign Ministers' Meeting in New York (2006)**.
- The **first BRIC Summit** was held in **Yekaterinburg, Russia, in 2009**.
- **South Africa became a full member in 2010** and participated in its first summit in **2011 (China)**.
- The **Fortaleza Declaration (2014)** led to the establishment of the **New Development Bank (NDB)**.
- The **Ufa Declaration (2015)** focused on issues relating to **global governance and international security**.
- The **13th BRICS Summit (2021)** was hosted by **India in virtual format**.
- The **Beijing Declaration (2022)** emphasised cooperation in areas such as **public health, supply chains, and low-carbon development**.

Objectives and Agenda

- BRICS primarily aims to enhance **economic cooperation among emerging economies**.
- Its agenda has expanded to include issues such as **international terrorism, climate change, food and energy security, and global financial stability**.
- It also advocates **reform of Bretton Woods institutions** and addresses concerns related to **trade protectionism and WTO mechanisms**.

Functioning

- BRICS operates on principles of **openness, pragmatism, solidarity, non-bloc character, and neutrality towards third parties**.
- The **chairmanship rotates annually** among member countries.
- Its activities are guided by **action plans adopted during annual summits**.

Key Initiatives and Mechanisms

- **Economic and Financial Cooperation**
  - The **New Development Bank (NDB)** was established in **2014 (Fortaleza)** and became operational in **2015** to finance **infrastructure and sustainable development projects**.
  - The NDB is headquartered in **Shanghai, China**, with regional offices in **South Africa and Brazil**.
  - The bank's membership is open to **United Nations member countries**, while **BRICS nations retain at least 55% of voting power without veto rights**.
  - The **Contingent Reserve Arrangement (CRA)** was established in **2015** to provide **liquidity support during balance of payments crises**.
  - It has a total capacity of **$100 billion** and was legally agreed upon during the **Fortaleza Summit (2014)**.
  - BRICS is also working towards establishing a **payment system alternative to SWIFT**, aimed at reducing dependence on the **US dollar-dominated financial system**.
- **Political and Security Cooperation**
  - BRICS facilitates dialogue on **global and regional security issues**, including **counter-terrorism and cyber security**.
  - The **BRICS National Security Advisors' meetings** serve as an important platform for such discussions.
- **People-to-People Cooperation**

- The grouping promotes cooperation through initiatives such as the **BRICS Parliamentary Forum, Film Festival, Youth Summit, and Academic Forum**.

- **Expansion of BRICS**
  - More than **40 countries have expressed interest**, with **22 formal applications for membership**.
  - Countries invited to join (effective **January 1, 2024**) include **Argentina, Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE**.
  - Expansion reflects efforts to strengthen **Global South cooperation and diversify global governance structures**.

Raisina Dialogue 2026

What is Raisina Dialogue?

- India's **premier multilateral conference** on **geopolitics and geo-economics**
- Platform for world leaders, policymakers, military commanders, academics, and industry experts
- Name derived from **Raisina Hill**, the seat of the Government of India, New Delhi
- Comparable to the **Munich Security Conference** and the **Shangri-La Dialogue**

Basic Facts

- **Launched:** 2016
- **Hosted by:** Observer Research Foundation (ORF) in partnership with the **Ministry of External Affairs (MEA)**
- **First edition:** 1–3 March 2016
- **2026 Edition:** 11th edition, held **5–7 March 2026**, New Delhi
- **Participants: ~2,700 from 110 countries**

Raisina Dialogue 2026

- **Theme:** *Saṁskāra- Assertion, Accommodation, Advancement*
- **Six Thematic Pillars:**
  1. Contested Frontiers: Power, Polarity and Periphery
  2. Repairing the Commons: New Groups, New Guardians, New Avenues
  3. White Whale: The Pursuit of Agenda 2030
  4. The Eleventh Hour: Climate, Conflict and the Cost of Delay
  5. Tomorrowland: Towards a Tech-topia
  6. Trade in the Time of Tariffs: Recovery, Resilience, Reinvention

Significance

- Strengthens India's role as a **convening power** in global diplomacy
- Shapes global conversations on **geopolitics, geo-economics, and international cooperation**

International Energy Agency (IEA)

Basic Facts

- An **intergovernmental organisation** working to ensure global energy security, reliable energy data, and sustainable energy policies.
- **Established:** 1974
  - In the wake of the **1973 oil crisis (Arab oil embargo)**
- **Headquarters:** Paris, France
- **Aim:** To help industrialised nations coordinate a **collective response to major oil supply disruptions**
- **Membership Structure**
  - **Full Members:** Currently **33 countries**
    - Colombia was inducted as the **33rd member in February 2026**
    - Historically, a country must be a **member of OECD** to join the IEA
  - **Association Countries:** 13 countries, including **India, China, Brazil, and South Africa**
    - Participate in discussions but **lack decision-making rights**
- Members must hold oil stocks equivalent to at least **90 days of net imports** through the **Strategic Petroleum Reserve mechanism**
- Publishes the **World Energy Outlook** and the **Monthly Oil Market Report,** considered the gold standard for energy statistics

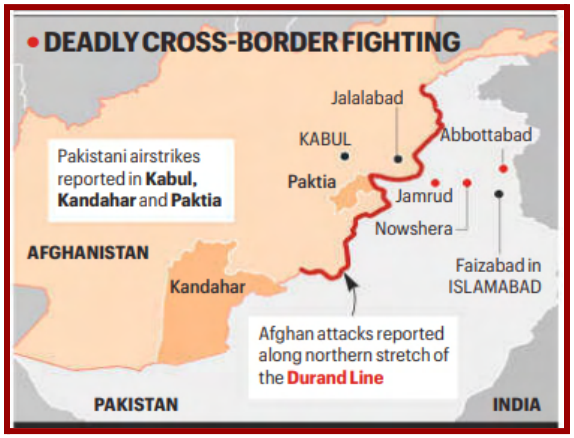
India and the IEA

- India became an **Associate Member in 2017** and signed a **Strategic Partnership in 2021**
- In **October 2023**, India formally applied for **full membership** to have a seat in global energy decision-making
- **The OECD Hurdle:**
  - India is **not a member of OECD** and has no immediate plans to join
  - For India to become a full member, the IEA must **amend its 1974 founding charter**

- IEA leadership and major members now support this amendment, recognising India as the **world's 3rd largest energy consumer**

Topic: Places in news

Durand Line



What is the Durand Line?

- A **2,600 km border** running from the **Iran border in the west** to the **China border in the east**
- Cuts across the **Karakoram range** and the **Registan desert**
- Drawn between **British India and Afghanistan** by **Sir Henry Mortimer Durand** (Foreign Secretary) and **Emir Abdur Rahman Khan** of Afghanistan in **1893**

Historical Background About Anglo-Afghan Wars

War	Year	Outcome
First Anglo-Afghan War	1839	British invaded but were **pushed back**
Second Anglo-Afghan War	1878	British won → **Treaty of Gandamak (1879)** → gave Britain control over Afghanistan's **foreign policy**
Third Anglo-Afghan War	1919	Ended with **Treaty of Rawalpindi** → restored Afghanistan's control over **foreign affairs** → reaffirmed the Durand Line

Significance of the Durand Line (1893)

- Split **Pashtun tribal areas** between British India and Afghanistan
- Placed **Balochistan under British India**
- Established the **Wakhan Corridor** as a **buffer zone between Russia and Britain**

Post-1947 Scenario

- **Pakistan inherited** the border after Partition
- **Afghanistan refused to recognise** it, calling it a **colonial creation**
- **Pashtun groups** on both sides demanded a separate **Pashtunistan**, deepening bilateral tensions
- **All Afghan governments, including the Taliban**, reject the Durand Line's legitimacy and press claims over Pashtun regions

US Military Bases in the Middle East

Basic Framework

- The United States maintains **permanent and rotational military bases** in Middle East under CENTCOM command structure.
- These bases aim to secure **oil routes, protect allies, counter terrorism, and deter regional threats like Iran**.

Key Naval & Air Bases

- **Bahrain** hosts US Fifth Fleet headquarters, ensuring maritime security across Persian Gulf and nearby strategic waters.
- **Qatar (Al Udeid Air Base)** is **largest US base**, serving as forward headquarters for CENTCOM operations.
- **UAE (Al Dhafra Air Base)** supports surveillance, air combat missions, and anti-ISIS operations in region.
- **UAE (Jebel Ali Port)** is busiest US naval port in region, handling aircraft carriers and major warships.

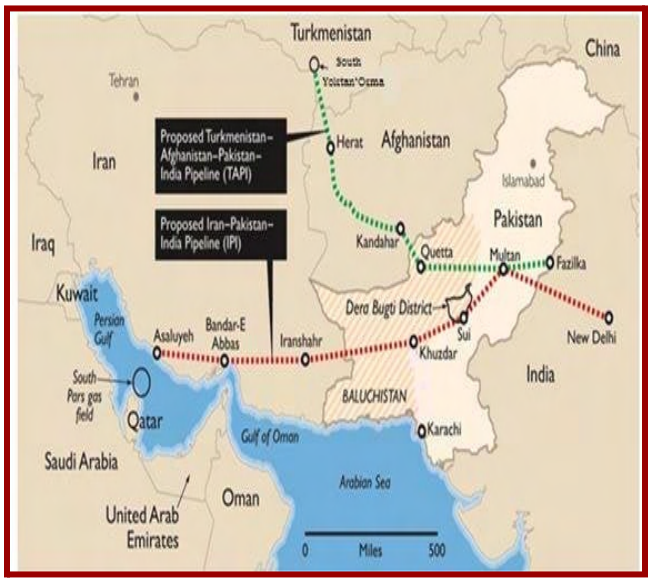
Strategic Land & Logistics Bases

- **Kuwait (Camp Arifjan)** serves as forward headquarters of US Army Central command operations.
- **Kuwait (Ali Al Salem Air Base)** acts as logistics hub supporting operations in Iraq and Syria.
- **Iraq (Ain Al Asad Air Base)** supports Iraqi forces and NATO missions, targeted during 2020 Iran strike.
- **Iraq (Erbil Air Base)** functions as logistics, intelligence, and military training hub in northern Iraq.

Defence & Regional Security Bases

- **Saudi Arabia (Prince Sultan Air Base)** hosts Patriot and THAAD systems for missile defence.
- **Jordan (Muwaffaq al Salti Air Base)** supports US air operations across Syria, Iraq, and Levant region.
- **Turkey (Incirlik Air Base)** jointly operated with NATO, hosting US nuclear weapons and anti-ISIS missions.

Gas Pipeline



Context: Ongoing **West Asia crisis** has revived discussions on **IPI and TAPI pipelines** amid concerns over India's energy dependence.

Iran–Pakistan–India (IPI) Pipeline

- **IPI Pipeline** is a proposed transnational gas pipeline connecting Iran, Pakistan, and India.
- It aims to transport natural gas from **Iran's South Pars field** to energy-deficient South Asian countries.
- Often referred to as the **"Peace Pipeline"** due to its regional cooperation potential.
- **Key Features**
  - Total length is about **2,775 km**, making it a major cross-border energy infrastructure project.
  - Designed to supply around **60 mmscmd of gas each to India and Pakistan**.
  - Provides a **cost-effective alternative to LNG imports**, reducing dependence on maritime transport.
  - Expected to enhance **regional economic interdependence and cooperation**.
- **Timeline & Status**
  - Concept originated in **1990s**, with major diplomatic progress during 2004–2005 period.
  - India withdrew from project in **2007 due to sanctions pressure, pricing issues, and security concerns**.

- Pipeline currently remains **dormant**, with limited progress in recent years.

Turkmenistan–Afghanistan–Pakistan–India (TAPI) Pipeline

- **TAPI Pipeline** is a trans-regional project transporting natural gas from Central Asia to South Asia.
- Supported by **Asian Development Bank (ADB)** as part of regional connectivity initiatives.
- **Key Features**
  - Total length is about **1,814 km**, shorter than IPI but strategically significant.
  - Gas source is **Galkynysh gas field in Turkmenistan**, one of world's largest reserves.
  - Expected capacity is about **33 billion cubic meters annually**.
  - Aims to diversify India's energy sources beyond **West Asia dependence**.
- **Timeline & Status**
  - India joined project through agreement in **2010**, though concept dates back to 1990s.
  - Turkmenistan–Afghanistan section was **inaugurated in 2025**, showing partial progress.
  - Extension into Pakistan and India remains **stalled due to security and geopolitical challenges**.

Strait of Hormuz

Basic Geography

- Located between **Iran (North)** and **Oman & UAE (South)**
- Connects the **Persian Gulf (West)** with the **Gulf of Oman / Arabian Sea (East)**
- Narrowest width is approximately **33 km (21 miles)**
- Shipping channel is only **2 miles wide** in each direction with a **2-mile buffer zone**
- Governed under **UNCLOS**; controlled by **Iran (North)** and **Oman (South)**

Strategic Importance

- The **only sea passage** from the oil-rich Persian Gulf to the open ocean
- Serves as a critical **global energy chokepoint**
- Around **20 million barrels** of crude oil and LNG thus representing **~20% of global daily consumption**, pass through it every day
- Deep enough to allow transit of **Very Large Crude Carriers (VLCCs)**
- Shipping lanes pass through both **Iranian and Omani territorial waters**
- **Key Countries Dependent on the Strait**
  - **Major exporters:** Iran, Iraq, Kuwait, Saudi Arabia, UAE, and Qatar
  - **Major importers:** China, India, Japan, and South Korea
- **Alternative Routes: Limited Capacity**
  - Saudi Arabia's **East-West Pipeline** and UAE's **Fujairah Pipeline** serve as alternatives
  - However, they **cannot collectively handle more than 15%** of the volume transiting through the strait
  - A closure would severely disrupt **global energy supply chains** and trigger **price surges**
- **Key Nearby Ports**
  - **Bandar Abbas**: Iran
  - **Fujairah**: UAE

Lebanon

Why in News: An **Israeli airstrike** near **Tyre in southern Lebanon** followed warnings targeting Hezbollah infrastructure amid escalating West Asia conflict.

Basic Overview

- **Lebanon** is a sovereign country in the **Middle East** located on the eastern coast of the **Mediterranean Sea**.
- It lies in the **Levant region of West Asia**, historically acting as a commercial and cultural link between the Arab world, Europe, and Asia.
- **Capital city:** Beirut.
- Lebanon **shares borders** with:
  - **Syria** to the **north and east**
  - **Israel** to the **south**
  - **Mediterranean Sea** to the **west**.

Major Physiographic Regions

- Lebanon has **four important physical regions**, which are important for geographical identification.
- **Coastal Plain**
  - A narrow fertile strip along the Mediterranean coast.
  - Contains major urban centres such as Beirut and Sidon.
- **Lebanon Mountains (Mount Lebanon Range)**
  - A limestone mountain chain running parallel to the Mediterranean coast.
  - Also known for the Cedars of Lebanon forests.
- **Bekaa Valley**
  - A fertile agricultural valley located between the Lebanon Mountains and the Anti-Lebanon Mountains.
  - Forms part of the Great Rift Valley system.
- **Anti-Lebanon Mountains and Mount Hermon**
  - An eastern mountain chain forming a **natural boundary with Syria**.

Chagos Archipelago and Diego Garcia

Context: U.K. condemned Iran after an unsuccessful missile attack on the U.K.-U.S. air base **at Diego Garcia** in the **Indian Ocean**.

Chagos Archipelago

- **Chagos Archipelago** is located in the Indian Ocean, about 500 km south of the Maldives.
- It consists of **around 58 islands**, forming part of a strategically important maritime region.
- **Historical Background**
  - Initially inhabited in the **18th century** by enslaved African and Indian labourers under French rule.
  - Under **Treaty of Paris (1814)**, France ceded Chagos along with Mauritius to Britain.
  - In 1965, Britain separated islands from Mauritius to form **British Indian Ocean Territory (BIOT)**.
  - Indigenous **Chagossians were forcibly displaced** during 1960s–70s to establish military base.

Diego Garcia

- **Diego Garcia** is the largest island and a coral atoll within the Chagos Archipelago.
- Located about **7° south of the equator**, it has major strategic military importance.
- Leased to **United States and United Kingdom**,

and developed into military base in 1986.

- **Strategic Importance**
  - Diego Garcia has been used in **Gulf War, Iraq War, Afghanistan War, and post-9/11 operations**.
  - It serves as a key base for **Indo-Pacific military logistics and surveillance operations**.
- **Recent Developments**
  - In 2024, UK agreed to **transfer sovereignty of Chagos Islands to Mauritius**.
  - However, **Diego Garcia** base will remain under **UK–US control** through a 99-year lease arrangement.
  - Move follows 2019 **ICJ advisory opinion** supporting **Mauritius' sovereignty claim**.

Kharg Island

Context: U.S. President claimed military forces **"obliterated" targets** on Iran's **Kharg Island**, which is **home to Iran's primary oil export terminal**. Kharg Island.

About the Island

- **Location and Physical Features**
  - **Kharg Island** is a small **coral island** located in **Iran** in the **northern Persian Gulf**.
  - It lies about **30 km** from the **Iranian mainland.**
  - It is a **rocky limestone island**, notable for being one of the few islands in the Persian Gulf with **freshwater stored within porous limestone**.
  - Its highest point is **Mount Didehban (87 m above sea level)**.
- **Development as an Oil Hub**
  - The discovery of an **offshore oil field in the early 1960s** led to rapid development of Kharg as a **major petroleum and petrochemical centre**.
  - Pipelines connecting the island to **offshore oil fields** and fields in **Khuzistan province** enabled large-scale oil transport.
- **Role in Iran's Oil Exports**
  - Kharg Island handles about **90% of Iran's oil exports**, making it vital to the country's economy.
  - The terminal can load around **7 million barrels per day**.
  - Its infrastructure can accommodate **Very Large Crude Carriers (VLCCs)** and **Ultra Large Crude Carriers (ULCCs)**.
  - The port can load **eight to nine supertankers simultaneously**.

Iran

Basic Facts

- Located in **southwestern Asia (West Asia)** thus acts as a bridge between the **Middle East, Central Asia, and South Asia**

- Commands strategic access to the **Persian Gulf and the Strait of Hormuz**
- **Capital:** Tehran
- **Political System:** Combines republican institutions with a **Shia Islamic theocracy** — since the **1979 Islamic Revolution**, real power rests with the **Supreme Leader**
- **Neighbouring Nations:** Azerbaijan, Armenia, Turkmenistan, Afghanistan, Pakistan, Turkey, Iraq
- **Bordered by:** Caspian Sea, Persian Gulf, and Gulf of Oman

Key Physical Features

- **Central Iranian Plateau:**
  - Vast, arid, and elevated region forming Iran's core
  - Dominated by **Dasht-e Kavir** and **Dasht-e Lut** deserts
  - Characterised by extreme temperatures, salt flats, and sparse habitation
- **Zagros Mountains:**
  - Long **northwest–southeast mountain system** in western Iran
  - Geologically young and **tectonically active**
  - Rich in **hydrocarbons**
  - Forms a natural barrier between the plateau and the **Mesopotamian plains**
- **Alborz Mountains:**
  - Runs along the **southern Caspian Sea coast**
  - Contains **Mount Damavand**: Iran's **highest peak**
  - Sharply separates the **fertile Caspian lowlands** from the interior plateau
- **Seismic Activity:**
  - Located at the convergence of the **Arabian and Eurasian tectonic plates**
  - One of the world's **most seismically vulnerable regions**
- **Rivers:**
  - River systems are largely **seasonal** due to arid conditions
  - **Karun River** (southwest) is Iran's **only fully navigable river** and a key source of **irrigation and hydroelectric power**

Persian Gulf and Gulf of Oman

Persian Gulf

- **Location & Physical Features**
  - Lies between the **Arabian Peninsula and Iran**
  - Connects to the Indian Ocean through the **Strait of Hormuz**
  - About **990 km long** and **55–340 km wide**
  - Average depth: **~50 metres**
- **Economic Importance**
  - Holds nearly **two-thirds of the world's proven oil reserves**
  - Contains about **one-third of global natural gas reserves**
  - One of the most important routes for **global maritime trade**
- **Coastal Countries**
  - Iran, Saudi Arabia, UAE, Kuwait, Iraq, Qatar, and Bahrain
  - Important islands: **Bahrain** and **Qeshm** (largest island in the gulf)

Gulf of Oman

- **Location & Connectivity**
  - Lies between **eastern Oman** and **southern Iran**
  - Connects the **Arabian Sea** to the **Persian Gulf** through the Strait of Hormuz
  - About **560 km long**
  - The **only maritime route** from the Indian Ocean into the Persian Gulf
- **Strategic Importance**
  - Roughly **one-third of the world's oil** passes through this route
  - Borders **Oman (south)**, **Iran and Pakistan (north)**, and **UAE (west)**
- **Key Ports & Islands**

- **Oman:** Muscat, Sur, Sohar
- **Iran:** Jask and Chah Bahar
- **Notable islands:** Sheytan Island, Al Fahal Island, Dimaniyat Islands

Topic: Bilateral Relations

US Foundational Defence Agreements

LEMOA

- **Logistics Exchange Memorandum of Agreement (LEMOA)** is an **India-specific version** of the US **Logistics Support Agreement (LSA).**
- Concluded between India and the US in **2016.**
- One of the **foundational agreements** that the US signs with countries having **close military ties.**
- **Key Provisions of LEMOA**
  - Gives **both countries access to designated military facilities** on either side
  - Can be used for **refuelling and replenishment** in four primary areas:
    - Port calls
    - Joint exercises
    - Training
    - Humanitarian Assistance and Disaster Relief (HADR)
- **Significance**
  - The **biggest beneficiary is the Indian Navy**, as it interacts and exercises most with foreign navies
  - **Fuel exchange** gets subsumed into LEMOA by doing away with the need for a **separate agreement**

COMCASA

- Communications Compatibility and Security Agreement **(COMCASA)** is an **India-specific version** of the Communication and Information on Security Memorandum of Agreement **(CISMOA).**
- Signed in **September 2018** after the **first 2+2 Dialogue** between India and the US.
- **Key Provisions**
  - Allows the US to provide India with **encrypted communications equipment and systems** for **US-origin military platforms** such as:
    - **C-17, C-130** (transport aircraft)
    - **P-8I** (maritime patrol aircraft)
  - Enables Indian and US **military commanders, aircraft, and ships** to communicate through **secure networks** in both **peace and war**
  - Paved the way for transfer of **communication security equipment** from the US to India
  - Enables interaction not only between Indian and US forces but also potentially with **other militaries using US-origin systems** for **secure data links**

F-1 Visa (USA)

Context: After the Donald Trump administration's immigration crackdown last year, the number of **F-1 visas issued to Indian students** fell by **69%** in **June and July 2025** compared to the previous year.

What is an F-1 Visa?

- A **non-immigrant visa** allowing international students to enter the **United States** for **full-time academic study.**
- Valid for study at **SEVP (Student and Exchange Visitor Program)-certified** colleges, universities, seminaries, conservatories, or language training programs.

Key Requirements

- Must be admitted to a **SEVP-approved school.**
- Must hold a **Form I-20** (certificate of eligibility issued by the school).
- Must maintain **full-time student status.**
- Must prove **financial capability** to support studies.
- Must demonstrate **intent to return home** after graduation.

Employment Provisions

- **On-campus work:** Permitted generally up to **20 hours per week.**
- **Off-campus work:** Requires special authorisation such as:
  - **CPT (Curricular Practical Training)**
  - **OPT (Optional Practical Training)**

Duration

- Valid for the **duration of the academic programme** plus **60 days** to depart (or the OPT period)

Dependents

- Spouses and unmarried children under **21 years** may accompany the student on an **F-2 visa**

India–Bangladesh Friendship Pipeline

Context: India supplied diesel to Bangladesh through the **India–Bangladesh Friendship Pipeline** amid Dhaka's petroleum shortage.

About the Pipeline

- The India-Bangladesh Friendship Pipeline (IBFP) is a cross-border energy pipeline connecting **India and Bangladesh**.
- It links **Siliguri in West Bengal (India)** with **Parbatipur in Dinajpur district of Bangladesh**.
- It has a transport capacity of **1 Million Metric Ton Per Annum (MMTPA)**.
- Construction of the pipeline **began in September 2018**.

Other India–Bangladesh Energy Cooperation Projects

- **Maitree Power Project**
  - A **US $2 billion thermal power project** developed under a concessional financing scheme from India.
  - The Maitree Super Thermal Power Plant in **Khulna** has begun supplying **660 MW of electricity** to Bangladesh's national grid.
- **Bangladesh India Friendship Power Company Limited (BIFPCL)**
  - **BIFPCL** is a **50:50 joint venture** between:
    - National Thermal Power Corporation (NTPC), India
    - Bangladesh Power Development Board (BPDB)
  - The project aims to establish **Bangladesh's largest power plant** once completed.

Miscellaneous

Operation Sankalp

Background

- Launched in response to attacks on merchant ships in the **Gulf of Oman.**
- The Indian Navy began **Maritime Security Operations** under this mission.
- **Primary objective:** Protect Indian ships passing through the **Strait of Hormuz.**
- Reflects India's commitment to maintaining **peace in international waters** and safeguarding **global maritime trade.**

Coordination Mechanism

- Led by the **Indian Navy** in coordination with:
  - Ministry of Defence
  - Ministry of External Affairs (diplomatic coordination)
  - Ministry of Shipping (maritime logistics)
  - Ministry of Petroleum and Natural Gas (energy security)
  - Directorate General of Shipping

Deployment Details

- **23 warships** deployed under the mission
- On average, **16 Indian-flagged merchant vessels** escorted daily in the Gulf region
- **INS Talwar** (stealth frigate) currently deployed for the operation

Significance for India

- India imports nearly **85% of its crude oil** requirements from abroad
- Around **62% of oil imports** in 2019–20 came from the **Gulf region**, valued at approximately **$66 billion**

- Protecting Indian vessels ensures **continuity of energy supplies**
- Strengthens India's role in **regional stability and security**

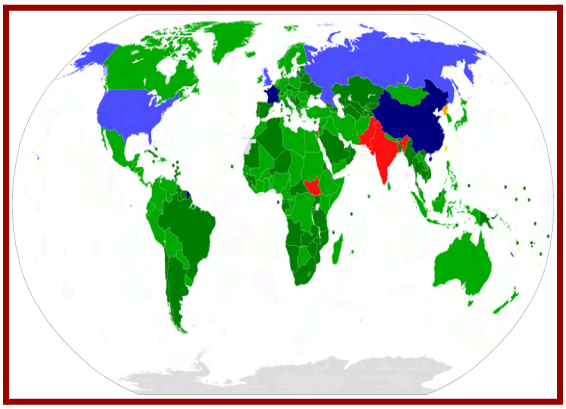
Section 301 of the U.S. Trade Act, 1974

Context: The **Trump administration** has initiated fresh investigations into alleged **"unfair trade practices"** by **16 major trading partners**, including **India, China, and Bangladesh**.

What is Section 301 of the Trade Act, 1974?

- **Section 301** is a provision of the **U.S. Trade Act, 1974** used to address **unfair trade practices by foreign countries**.
- It authorises the **United States Trade Representative (USTR)** to investigate actions by other governments that are:
    - Unjustifiable
    - Unreasonable
    - Discriminatory
- If such actions are found to **burden or restrict U.S. commerce**, the U.S. government may impose **tariffs or other trade restrictions**.
- Under **Section 302(b)** of the Act, the **USTR can initiate investigations independently**.
- **Scope of a Section 301 Investigation**
    - A **Section 301(b)** investigation examines whether a country's **laws, policies, or practices** are discriminatory or unreasonable toward U.S. trade.
    - The investigation is conducted with guidance from the **inter-agency Section 301 Committee** and consultations with relevant advisory bodies.
- **Procedure After the Investigation Begins**
    - Once the investigation is launched, the **USTR seeks consultations** with the concerned countries.
    - A **public comment process** is opened to gather views from stakeholders.
        - Written submissions and requests to testify must be filed within the notified deadline.
    - The **USTR conducts hearings** to review evidence and stakeholder feedback.
    - Based on the findings, the U.S. may impose **tariffs or other trade remedies**.

Nuclear Non-Proliferation Treaty



Context: Iran's Parliament is **reviewing a possible exit from the Nuclear Non-Proliferation Treaty (NPT)** amid ongoing geopolitical tensions.

About NPT

- **Nature and Objective**
    - The **Nuclear Non-Proliferation Treaty (NPT)** is a **multilateral international treaty (1970)** aimed at:
        - Preventing the **spread of nuclear weapons**
        - Promoting **peaceful use of nuclear energy**
        - Advancing **nuclear disarmament**
- **Key Provisions**
    - The treaty recognises **Nuclear-Weapon States (NWS)** as those that **manufactured and tested nuclear weapons before 1 January 1967**.
    - The five recognised NWS are **USA, Russia, United Kingdom, France, and China**.
    - **Non-nuclear weapon states** agree **not to acquire nuclear weapons**, while NWS agree **not to transfer nuclear weapons or technology**.
    - The treaty permits **peaceful nuclear activities**, including energy production.
    - It includes a provision for **withdrawal if national security interests are threatened**.
- **Membership and Monitoring**
    - The treaty has **191 member states**, making it one of the most widely adhered-to arms control agreements.

  - Compliance is monitored by the **International Atomic Energy Agency (IAEA)**.
  - The **NPT Review Conference** is held **every five years** to assess implementation.
- **India and NPT**
  - **India is not a signatory** to the NPT.
  - India has opposed the treaty as **discriminatory**, as it legitimises nuclear weapons for a select group of countries.
  - India follows a policy of **No First Use (NFU)** and supports **global nuclear disarmament**.

Section 301 of the Trade Act, 1974

Context: U.S. has initiated **Section 301 investigations** against India and other countries over excess capacity and forced labour concerns.

Basic Concept

- **Section 301** is a U.S. trade law empowering authorities to act against unfair foreign trade practices.
- It authorises the **U.S. Trade Representative (USTR)** to investigate discriminatory or unjustifiable trade barriers.
- It aims to protect **U.S. commerce and domestic industries** from harmful external practices.

Key Features

- Provides **unilateral authority**, allowing U.S. to act without waiting for WTO approval.
- Covers wide areas including **subsidies, intellectual property violations, labour practices, and excess production**.
- Once initiated, it requires **formal investigation with hearings and evidence-based assessment**.
- Allows imposition of **tariffs, quotas, or other retaliatory measures** against offending countries.
- Investigations are generally **time-bound, lasting around six to twelve months**.

Scope of Current Investigations

- First investigation targets **excess manufacturing capacity** across 16 economies including India, China, and EU.
- Second investigation focuses on **forced labour practices**, covering around 60 countries globally.

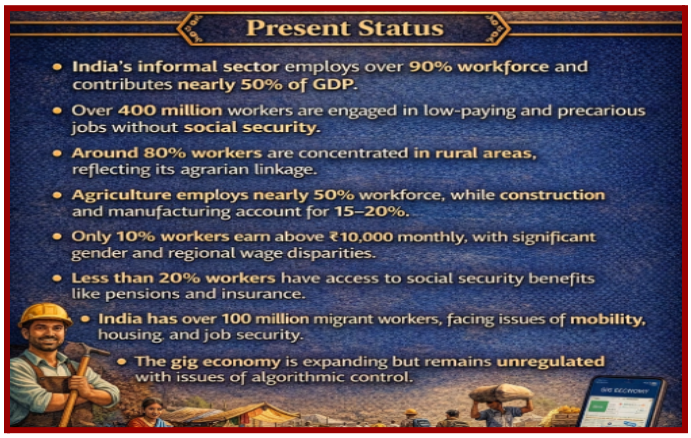
India-Specific Issues

- U.S. raised concerns about **excess production capacity in solar modules, steel, petrochemicals, and automobiles**.
- Claims surplus production may lead to **dumping of goods in international markets including the U.S.**.
- Also examining whether India has taken **adequate measures to prevent forced labour in supply chains**.

ECONOMICS

Topic: Indian Economy

India's Informal Sector



Significance of Informal Sector in India

- Acts as a major driver of **employment generation**, absorbing surplus labour.
- Supports economic growth through **low-cost production** and flexible labour supply.
- Serves as a **shock absorber** during crises like COVID-19.
- Facilitates **urban growth**, with migrants supporting industrial and service sectors.
- Functions as a **social safety net** in absence of formal employment opportunities.
- Preserves **cultural heritage**, including handlooms employing over 4.3 million workers.
- Enhances **women's participation**, especially in domestic work and self-employment.

Key Challenges Faced by Informal Sector

- Over **76% workers** lack access to formal social security systems.

- Workers face **low wages** and exploitative conditions, often below minimum wage.
- High prevalence of **unsafe workplaces**, with around 48,000 annual workplace deaths.
- Weak implementation of labour laws limits **institutional protection**.
- Sector is highly vulnerable to **economic shocks**, as seen during COVID-19.
- Lack of legal coverage excludes many workers from **labour protections**.
- Hazardous occupations expose workers to serious **health risks**.

Conclusion

- India's informal sector remains central to its economy but continues to face structural vulnerabilities. A balanced approach combining **social protection, legal reforms, and inclusive growth** is essential to transform it into a sustainable pillar of development.

Bio Economy

Context

- **India BioEconomy Report 2026** released during **BIRAC's 14th Foundation Day**, prepared by **ABLE**.
- Bioeconomy is emerging as a **key pillar of India's sustainable growth strategy**.

What is Bioeconomy?

- It refers to an economy based on **biological resources** such as plants, animals, and microorganisms.
- It uses **biotechnology-driven processes** to produce medicines, biofuels, food, and biomaterials.
- The bio-economy aims to promote **sustainability by reducing dependence on fossil fuels**.

Key Data & Trends

- Bioeconomy size reached **$195.3 billion (2025)** with **18% growth rate**. It contributes around **4.8–5% of India's GDP**.
- Over **11,855 biotech startups**, with **1,780 added in 2025**.
- More than **150** life sciences Global Capability Centers (GCCs) employing **3 lakh professionals**.
- Sectoral imbalance: **BioIndustrial ($90.2 billion)** dominates over **BioAgri ($14.6 billion)**.

Challenges

- **Regulatory and IP constraints**
  - Complex **biosimilar litigation** limits growth opportunities.
  - Need for specialised workforce to match **global regulatory standards**.
- **High capital intensity**
  - Biotech requires **long-term funding** for trials and commercialisation.
  - Startups face difficulty in **scaling beyond initial stages**.
- **Global competition and brain drain**
  - Multinational R&D dispersal leads to **loss of skilled talent**.
  - Limited high-end research restricts **global competitiveness**.
- **Sectoral imbalance**
  - Weak adoption of biotechnology in **agriculture (BioAgri lagging)**.
- **Innovation-to-market gap**
  - Poor **industry-academia linkage** hampers commercialisation of research.

Way Forward

- **Strengthen collaborative ecosystem:** Enhance coordination among government, academia, and industry and expand role of BIRAC in incubation and innovation scaling.
- **Leverage global opportunities:** Use patent expiries to lead in biosimilars and pharmaceuticals.
- **Enhance Global Capability Centers (GCCs) role:** Develop GCCs as hubs for advanced R&D and digital health innovation.

- **Support startup ecosystem:** Provide targeted incentives, funding, and scale-up support.
- **Promote balanced growth:** Boost biotechnology adoption in **agriculture sector**.
- **Align long-term policies:** Integrate Bio-E3 Policy and National Bio-Pharma Mission with Vision 2047 goals.

Conclusion

- Bioeconomy is becoming a **strategic driver of economic growth and sustainability**. Thus, addressing structural gaps in funding, regulation, and innovation is essential. With focused reforms, India can achieve its goal of a **$1 trillion bioeconomy by 2047**.

Topic: Human Resource Development

Transforming India's Workforce for a Technology-Driven Future

Context

- India is witnessing rising **youth unemployment** at a time when **technological changes** are accelerating rapidly. The **Automation, Artificial Intelligence (AI), and data-driven systems** are changing the nature of work, making continuous reskilling essential.

Emerging Trends Regarding Nature of Work

- **Rising Educated Unemployment**
  - Large share of unemployed youth possesses **secondary or higher education**.
  - Many remain **detached from both jobs and formal learning systems**.
- **Technological Disruption**
  - AI impacts **not just low-skilled but also high-skilled professions** (coding, law, design).
  - Traditional jobs are declining while **new, undefined sectors are emerging**.
- **Shift in Employability Paradigm**
  - Job security depends less on degrees and more on **adaptability and continuous learning**.
  - **Manual and care-based jobs** show relatively lower automation risk.

Humanics Framework (Joseph Aoun)

- A balanced model for future-ready education:
- **Technical Discipline:** Skills like coding, machine learning, and automation handling.
- **Data Discipline:** Competence in data interpretation, visualisation, and application.
- **Human Discipline:** Emphasis on creativity, ethics, empathy, and cultural awareness.

Challenges in Workforce Transformation

- **Rigid Education System:** Dominance of rote learning and degree-centric approach.
- **Skill Mismatch:** Gap between industry requirements and educational outcomes.
- **Digital Divide:** Unequal access to devices, internet, and digital infrastructure.
- **Teacher Preparedness:** Lack of capacity among educators to adapt to new learning paradigms.
- **Socio-Economic Inequalities:** Marginalised groups face barriers in accessing quality education and skills.

Way Forward

- **Curricular Reforms**
  - Introduce digital, data, and AI skills from early education.
  - Promote experiential and interdisciplinary learning.
- **Micro-Credentials and Lifelong Learning**
  - Develop flexible, modular courses for continuous upskilling.
- **Teacher Capacity Building**
  - Transform teachers into facilitators and mentors, not just instructors.
- **Institutional Reforms**
  - Enable credit mobility, hybrid learning, and interdisciplinary systems.
- **Inclusive Skill Development**
  - Expand digital infrastructure and regional-language resources.
  - Provide scholarships, mentorship, and targeted support.

- **Industry-Academia Collaboration**
  - Align curriculum with **real-world labour market needs**.
- **Recognition of Prior Learning (RPL)**
  - Validate **informal and traditional skills**, especially in rural sectors.

Conclusion

- India stands at a critical juncture where its **demographic dividend can turn into a liability** without timely reforms. Thus, building a workforce that is **adaptive, skilled, and inclusive** is essential. A shift towards **flexible, future-oriented education and skill systems** will enable India to thrive in a technology-driven global economy.

Topic: Infrastructure

Innovation-Led Economy

Present Scenario

- India has shown **growing policy ambition** in research, development, and innovation (RDI) through funding commitments, regulatory reforms, and institutional initiatives.
- Recent policy measures include the creation of a **₹1,00,000 crore Research, Development and Innovation Fund**, a **₹20,000 crore corpus for deep-tech startups**, and expanded support for **Atal Tinkering Labs**.
- Regulatory reforms such as the **removal of restrictions on deep-tech startups** and the **SHANTI Act, 2025** allowing patents for peaceful uses of nuclear energy signal greater openness to innovation.
- India has also improved its standing in global innovation metrics, reflecting an encouraging policy direction.
- However, despite this progress, India continues to face a **gap between policy intent and innovation outcomes**, particularly in translating research into globally competitive technologies.

Data and Trends

- India ranked **38th among 139 economies** in the **Global Innovation Index (2025)**, showing gradual improvement in innovation performance.
- **Patent filings** increased significantly from **less than 59,000 in 2020-21** to **over 1,10,000 in 2024-25**, with **domestic filings accounting for about 62%** of the total.
- Yet, India's scale remains modest compared to global leaders:
  - **China:** over **1.8 million patent applications** (1.6 million domestic).
  - **United States:** around **600,000 filings**.
- **Patent Cooperation Treaty (PCT) applications** is an indicator of global technological relevance and it stood at **4,547 in 2024**, up **22% from 2023**.
- However, this remains far lower than:
  - **China:** over **70,000 applications**.
  - **United States:** over **54,000 applications**.
  - **Japan:** over **48,000 applications**.
- **R&D expenditure** in India stands at **0.65% of GDP**, which is significantly lower than many innovation-driven economies and even several BRICS countries.
- India's **human capital indicators** also reveal weaknesses:
  - Rank **95** in employment in knowledge-intensive sectors.
  - Rank **80** in number of full-time equivalent researchers.
  - Rank **101 out of 119 economies** in employment of women with advanced degrees.

Associated Challenges

- **Low R&D investment**
  - India's R&D spending remains limited, particularly from the **private sector**, with the government bearing a disproportionate share of innovation expenditure.
- **Weak industry participation**
  - In most leading innovation economies, **industry drives research investment**, whereas in India, private firms remain reluctant to invest in **long-term, high-risk innovation**.
- **Limited global technological influence**
  - Despite growth in patent filings, India's **global patent footprint remains small**, limiting its influence in emerging technology standards.
- **Human capital constraints**
  - Shortages of researchers and low participation in **knowledge-intensive employment sectors** weaken the country's innovation ecosystem.

    - **Gender imbalance in advanced research roles** further limits the talent pool.
- **Weak research-to-market linkages**
    - India's innovation system faces a major bottleneck in **commercialising research outcomes**.
    - Technology transfer mechanisms, venture creation, and alignment with risk capital remain underdeveloped.
- **Structural limitations**
    - India's development trajectory lacked **large-scale labour-intensive industrialisation**, resulting in greater reliance on agriculture and services.
    - Many emerging digital businesses rely more on **labour abundance rather than deep technological innovation**.

Way Forward

- **Strengthen private-sector participation:** Industry must play a larger role in long-term R&D investment, particularly in high-risk and high-impact sectors.
- **Promote deep-tech innovation:** Government initiatives such as the RDI Fund and deep-tech startup corpus should encourage sustained investment in frontier technologies.
- **Build stronger research-industry linkages:** Innovation ecosystems must strengthen collaboration between universities, industry, and finance, enabling ideas to move from laboratory to market.
- **Enhance talent inclusion:** Expanding participation in knowledge-intensive sectors and improving gender diversity in research can strengthen the innovation base.
- **Encourage long-term risk capital:** High-technology entrepreneurship requires patient funding and tolerance for failure, supported by robust intellectual property protection.
- **Focus on globally competitive technologies:** India's future innovation success will depend on creating globally relevant technologies, including emerging domains such as deep tech and next-generation communication systems like 6G.

Conclusion

- India's innovation landscape reflects a **promising policy framework but a fragile execution environment**. Moving toward a true innovation-led economy will require **greater private-sector commitment, stronger research-to-industry linkages, and sustained investment in human capital and deep technology ecosystems**.

Financial Inclusion for Women

Context: In the recent years, India has shifted from **financial inclusion to financial prosperity** for women. However, despite near-universal banking access through **JAM trinity**, women lag in **wealth creation and asset ownership**.

Present Status of Financial Inclusion

- **Expansion of Banking Access**
    - Over **53% of 51+ crore** Pradhan Mantri Jan Dhan Yojana **(PMJDY)** accounts belong to **women**, closing gender gap in banking.
    - Further, the JAM trinity enabled **direct and transparent** financial access.
- **Direct Benefit Transfers (DBT)**
    - Welfare schemes like **PMAY-G and LPG subsidies** credited directly to women. It has strengthened **financial identity and reduced leakages**.
- **Digital Financial Inclusion**
    - The growth of **UPI and smartphones** enabled rural women to join the digital economy.
    - It reduced dependence on **informal high-interest credit systems**.
- **Role of Self-Help Groups (SHGs)**
    - Schemes like **Lakhpati Didi (target: 3 crore women earning ₹1 lakh annually)** strengthen grassroots economy.
- **Issues Faced in Wealth Creation**
    - **Low Participation in Investments:** Less than **10% of women invest** in market-linked instruments, compared to over **20% of men.**
    - **Preference for Low-Risk Assets:** Savings concentrated in **gold, fixed deposits, and cash**, limiting wealth growth.
    - **Limited Financial Security:** Weak retirement planning, asset ownership, and long-term wealth accumulation.

Challenges to Women's Financial Prosperity

- **Economic Barriers**
    - Low **female labour force participation (LFPR)** limits income surplus.
    - Further, the persistent **gender pay gap** reduces investable income.

- **Sociological Constraints**
  - Women manage household expenses but lack **control over investment decisions**.
  - Earnings often prioritised for **family welfare over personal wealth creation**.
- **Structural and Legal Issues**
  - Limited **ownership of land/property**, restricting access to credit.
  - Lack of **collateral for business expansion**.
- **Financial Literacy Deficit**
  - High **digital literacy (UPI usage)** but **low financial literacy** (risk, returns, compounding).

Way Forward

- **Transform SHGs into Wealth Platforms:** Convert SHGs into **micro-investment hubs** for mutual funds and assets.
- **Promote Financial Literacy:** Launch **targeted investment awareness campaigns** in local languages.
- **Encourage Asset Ownership:** Incentivise property ownership in women's names through **lower stamp duties**. Also there is a need to introduce **women-centric savings and investment schemes**.
- **Strengthen Institutional Support:** Develop **gender-sensitive financial products** addressing career breaks. Thus enhancing the role of **FinTech and banking sector** in inclusive wealth creation.

Conclusion

- India has successfully achieved **financial inclusion for women**, but **true empowerment lies in wealth ownership**. Moving women from **account holders to asset owners** is essential for inclusive growth. Women's financial prosperity is not just a social goal, but a **critical driver of India's economic transformation**.

Topic: Inclusive growth and issues arising from it

Menstrual Leave Policy in India

Context

- The debate on **menstrual leave** has re-emerged after the **Supreme Court** declined to mandate a national law providing menstrual leave for women workers and students.
- The Court observed that **mandatory menstrual leave** may unintentionally affect **women's employment opportunities**, as employers might hesitate to hire or assign responsibilities to women if such leave becomes compulsory.
- Instead, the Court encouraged **voluntary initiatives by States and institutions**, while suggesting that the government frame a policy **after consulting stakeholders**.
- The issue highlights the broader challenge of **balancing women's health needs with workplace equality and participation**.

What is Menstrual Leave?

- **Menstrual leave** refers to a policy that allows **women and trans women** to take **paid leave during menstruation**, particularly when symptoms such as cramps, fatigue, or related medical conditions affect their ability to work.
- The idea is to recognise **menstrual health as a legitimate workplace concern**, while creating supportive and inclusive work environments.

Significance of Menstrual Leave

- **Recognition of health needs**
  - Many women experience **severe menstrual pain or medical conditions** such as **endometriosis, PCOD and PCOS**, which can significantly affect daily functioning.
- **Alignment with constitutional values**
  - Policies supporting menstrual health can be linked to **Article 21 (Right to Life and dignity)** and **Article 14 (Equality)**.
  - The Constitution also permits **special provisions for women under Article 15(3)**.
- **Improving workplace well-being**
  - Supportive policies can reduce **presenteeism** (working despite illness), promote **healthy work cultures**, and acknowledge the biological realities faced by women.
- **Reducing stigma around menstruation**
  - Open discussion and institutional recognition of menstruation can help **normalise conversations on women's health** and improve awareness about **menstrual hygiene and reproductive health**.

Status of Menstrual Leave

National level

- India currently **does not have a central law** on menstrual leave.
- The **Draft Menstrual Hygiene Policy (2023)** recognised the need to create enabling workplaces through **leave provisions and flexible work options**.
- A **Private Member Bill** (Right of Women to Menstrual Leave and Free Access to Menstrual Health Products Bill, 2022) proposed **three days of paid menstrual leave**, though it has not been enacted.

State-level initiatives

- **Bihar (1992):** Provides **two days of paid menstrual leave per month** for women government employees.
- **Kerala (2023):** Introduced menstrual leave for **female students in universities and trainees in educational institutions**.
- **Odisha:** Allows women government employees up to **55 years** an additional **day of leave each month**.
- **Karnataka:** Proposed menstrual leave for women employees in both **public and private sectors**, though the order is under judicial challenge.

Private sector initiatives

- Some companies such as **Zomato and Swiggy** have introduced menstrual leave policies, reflecting evolving workplace practices.

Global Practices

- **Japan (1947):** Labour law allows women to request menstrual leave.
- **South Korea (2001):** Provides a monthly **"physiologic leave" day** for women workers.
- **Indonesia (2003):** Allows women to take leave during the **first two days of menstruation** if they experience pain.
- Other countries such as **Zambia, Vietnam and Taiwan** also recognise menstrual leave in various forms.

Concerns and Challenges

- **Risk of workplace discrimination:** Mandatory menstrual leave may reinforce stereotypes that **women are less capable or reliable workers**, potentially affecting recruitment, promotions and responsibilities.
- **Biological determinism:** Policies framed solely around biological differences may unintentionally strengthen **sexist assumptions about women's productivity**.
- **Impact on employment opportunities:** Employers may become reluctant to hire women if additional leave obligations increase **operational costs or workflow disruptions**.
- **Limited applicability in informal sector:** A large share of Indian women work in the **informal economy**, where formal leave provisions are difficult to implement.
- **Societal stigma:** Even where policies exist, many women hesitate to avail them due to **social discomfort in discussing menstruation**.
- **Economic realities:** Many women, especially in **low-income or informal jobs**, cannot afford to lose workdays, making mandatory leave less practical.

Way Forward

- **Adopt flexible and voluntary policies**
  - Rather than mandatory leave, workplaces can adopt **flexible arrangements** such as work-from-home options, flexible hours or use of existing sick leave provisions.
- **Improve workplace infrastructure**
  - Ensuring access to **clean sanitation facilities, private spaces and menstrual hygiene products** is essential for dignity and health.
- **Promote awareness and destigmatisation**
  - Educational campaigns and workplace sensitisation programmes can help **normalise discussions around menstruation and reproductive health**.
- **Encourage supportive workplace cultures**
  - Inclusive leave policies such as covering **sick leave, parental leave and flexible work arrangements**, can better address diverse worker needs without singling out women.

Conclusion

- The debate on menstrual leave reflects a larger effort to recognise **women's health and dignity in the workplace**. Policies must carefully balance **health support with employment equality**, ensuring that well-intentioned measures do not unintentionally create new barriers for women's participation in the workforce.

Topic: Agriculture

Women in Indian Agriculture

Context

- **FAO declared 2025** as the **International Year of the Woman Farmer**, drawing global attention to women's agricultural contributions.
- **Feminisation of Agriculture**: increasing participation of women in agricultural labour and farm management due to **male migration, mechanisation, and changing rural employment patterns.**
- Women work **3,300 hours per crop season**, double their male counterparts, yet remain **invisible in law and policy.**

Women's Role In Agriculture

- **Workforce Participation**
  - Rural women's workforce participation rose from **35% (2011-12) to 46.5% (2023-24)** per PLFS, still below global average of **57-63%**
  - **117.6 million women** engaged in agriculture vs 127.5 million men (2023-24)
    - 95.1 million self-employed
    - 21.7 million hired labour
    - 0.8 million in regular jobs
  - Real share may be **even higher due to systematic undercounting**
- **Self-Employment**
  - Share of self-employed rural women workers rose from **60% (2011-12) to 73% (2023-24)**
  - Within agriculture specifically, rose from **48% to 62%**
- **Crop Cultivation**
  - Women account for **one-third of family labour** in agriculture
  - Including hired labour, participation ranges from **41% to 61% of total labour** in crop cultivation (PARI Project, Foundation for Agrarian Studies)
- **Livestock Sector**
  - Women spend about **two hours per animal daily** on feeding, cleaning, and care
  - **40 million rural households** own milch animals, meaning roughly **40 million women** are involved in livestock-related work (AIDIS 2018-19).

Challenges Faced By Women Farmers

- **Land and Legal Exclusion**
  - Women own only **10-11% of agricultural land** despite performing **70% of farming activities**
  - Without land titles, women are locked out of **credit, insurance, and government schemes**
  - Only **4% of women farmers in UP** access institutional credit **(OXFAM)**
  - **29% of suicide farmers' widows** could not get land transferred to their names **(MAKAAM 2018)**
  - Only **2 in every 1,000 women** have received any official agricultural training (NSO 2021)
- **Wage Inequality and Stagnation**
  - **Average daily agricultural wage for women: ₹384** vs men's wages (Labour Bureau, November 2025); Kerala highest at **₹646**
  - **Tamil Nadu villages:** women earned **₹290/day**, less than half of men's wages
  - **Uttar Pradesh villages:** women earned **₹242-276/day**
  - **Real wages have remained almost stagnant** over the past decade when adjusted for inflation
- **Low Income from Farming**
  - Livestock income is estimated at only **₹100/day**, two-fifths of the typical agricultural wage
  - Crop cultivation income: less than **₹16,000 annually** in eastern UP villages; less than **₹24,000 annually** in Palakurichi, Tamil Nadu
- **Health and Work Burden**
  - Women work **14 hours daily**, rising to **16 hours during peak harvesting seasons.**
  - Anaemia among women rose from **53% to 57%** between NFHS-4 and NFHS-5, a worsening trend.
  - Despite **₹940.1 crore spent on Anaemia Mukt Bharat**, anaemia rates have continued rising in **22 states.**
  - Heavy workloads with no drudgery-reducing tools severely damage **long-term health.**
- **Food and Nutrition Security Gaps**
  - **PDS remains cereal-centric**, ignoring pulses, millets, and nutrient-dense foods women need.
  - Poor **digital literacy and connectivity** exclude many women from claiming rightful entitlements.

- Maternal undernutrition causes **low birth weight, stunting, and impaired child development.**

Way Forward

- **Recognise women as farmers** in law and policy, including cultivators, tenants, and sharecroppers
- **Promote joint spousal land titles** urgently; female landholdings grew only **1% in five years**
- **Equal resource access** could raise farm yields by **20-30%**, feeding millions more (FAO estimate)
- Women with secure property rights earn **nearly four times more** (Landesa 2018)
- **Enforce equal remuneration laws** and minimum wage standards strictly
- **Support livestock and allied activities** through dedicated credit, training, and infrastructure
- **Labour-saving tools and tailored extension services** must reach women to reduce drudgery
- **Reform PDS** to prioritise nutri-cereals and pulses grown by women farmers
- Promote **kitchen gardens, seed banks, and localised food planning** for community nutrition
- **Gender-disaggregated agricultural data** must be systematically collected to make women's contributions truly visible
- Strengthen **social protection** through income support, insurance, and welfare schemes for women farmers

Conclusion

- Women are the **backbone of Indian agriculture** yet remain its most invisible stakeholders, denied land, wages, credit, and recognition in equal measure. Genuine agrarian transformation requires placing **women's land rights, health, and economic agency** at the centre of agricultural policy, not its periphery.

PRELIMS

Topic: Indian Economy

Goods and Services Tax (GST)

Context: Gross GST collection increased by **8.1% to over ₹1.83 lakh crore** in February, led by higher growth in revenues from imports and domestic sales. **Gross domestic revenue** rose **5.3%** to about **₹1.36 lakh crore**, while gross import revenue climbed 17.2% to ₹47,837 crore.

What is GST?

- GST is an **indirect tax** levied on the **supply of goods and services** for domestic consumption across India
- It is based on the principle of **value addition at each stage** of the supply chain
- GST has **unified and replaced** a range of previous indirect taxes levied by both Central and State Governments
- Consumers pay this tax at the **point of purchase**, while businesses collect and deposit it with the government

Constitutional Framework

- GST was introduced in Parliament in **2014** and passed as the **Constitutional 101st Amendment Act, 2016.**
- Three new articles were introduced
  - **Article 246A:** Parliament and State Legislatures get **concurrent powers** to legislate on GST; Parliament alone legislates on **inter-state trade.**
  - **Article 269A:** Inter-state GST collected by **Central Government** and distributed between Centre and States as per **GST Council recommendations**
  - **Article 279A: President of India** has the power to outline the **composition and functioning of the GST Council**

Key Features

- **Tax on Supply** levied on supply, not on manufacture or sale (unlike earlier regime)
- **Destination-Based Tax** revenue goes to the state where goods/services are **consumed**, not produced
- **Dual GST Structure,** both the Centre and States levy GST **simultaneously** on a common base
- **Harmonised Tax Rates** finalised through **mutual agreement** between Centre and States based on GST Council recommendations
- **Multiple Tax Slabs** currently **7 slabs for goods** and **5 slabs for services**
- **Threshold Exemption** small businesses with turnover below specified limits are **exempt from GST**

Four Components of GST

- **CGST (Central GST):**
  - Levied on **intra-state transactions**
  - Collected by the **Central Government**
  - Rate is **uniform across India**
- **SGST (State GST):**

  - Levied on **intra-state transactions** alongside CGST
  - Collected by the **respective State Government**
  - States have the power to decide their **own rates**
- **UTGST (Union Territory GST):**
  - Applicable in **UTs with their own legislature**
  - Collected alongside CGST
  - Each UT has the authority to decide its **own GST rates**
- **IGST (Integrated GST):**
  - Levied on **inter-state supply** of goods and services
  - Collected by the **Central Government** and then distributed between Centre and States
  - Rate remains **uniform across the country**

GST Council

- Established under **Article 279A** by the President of India
- Recommends key aspects of GST — **tax rates, exemptions, laws, and procedural rules**
- Plays a **central role** in overseeing the implementation and administration of the GST framework

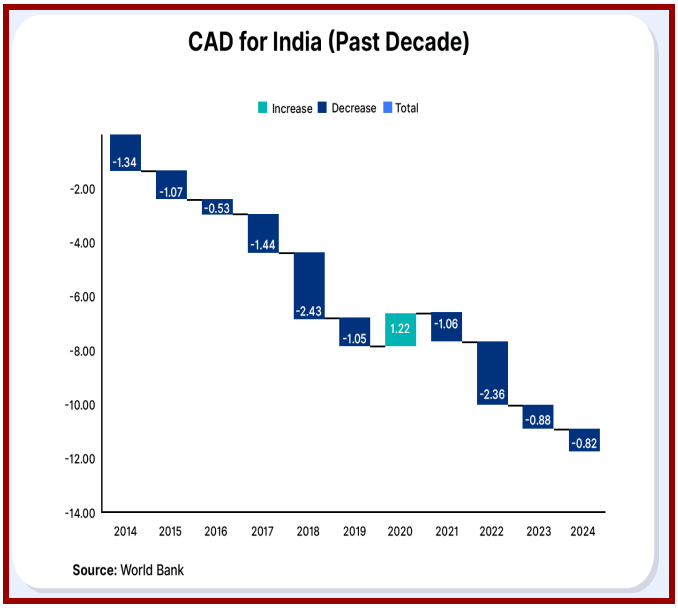
Index of Industrial Production (IIP)

Context: India's **industrial activity** slowed to a three-month low of **4.8%** in **January 2026**.

What is IIP?

- **Index of Industrial Production (IIP)** measures **short-term changes** in industrial output volume.
- Acts as a **key indicator** of industrial growth or contraction in the economy.
- Reflects **performance trends** across core productive sectors.
- **Publishing Authority**
  - Compiled and released by the **Central Statistics Office (CSO)**.
  - CSO functions under the **Ministry of Statistics and Programme Implementation (MoSPI)**.
- **Base Year of IIP**
  - Current base year is **2011–12**, ensuring relevance to modern industrial structure.
  - Base year revised periodically to capture structural economic changes.
  - Earlier base years included **1937, 1946, 1951, 1956**, and subsequent revisions.
- **Sectoral Composition of IIP (Weight-wise)**
  - **Manufacturing:** 77.63% weight, covering 809 industrial items.
  - **Mining:** 14.37% weight, represented by 29 items.
  - **Electricity:** 7.99% weight, represented by 1 composite item.
- **Eight Core Industries**
  - Constitute **40.27% weight** within the overall IIP index.
  - Represent foundational infrastructure and industrial inputs.
- **Core Industries (Descending Weight Order)**
  - Refinery Products
  - Electricity
  - Steel
  - Coal
  - Crude Oil
  - Natural Gas
  - Cement
  - Fertilisers

India's Current Account Deficit (CAD)



What is Current Account Deficit (CAD)?

- CAD shows whether a country **spends more foreign exchange than it earns.** It is an important component of the **Balance of Payments (BoP).**
- A **deficit arises** when imports and income payments exceed exports and receipts
- A **moderate deficit** is manageable, but **persistent deficits** can affect currency stability.
- **Components of Current Account**
    - **Exports and imports** of goods and services
    - **Net income** such as interest and dividends
    - **Net transfers** including remittances
- **How is CAD Calculated?**
    - **Current Account Balance = Total Receipts – Total Payments** under the current account
    - A **negative value** indicates the presence of a Current Account Deficit

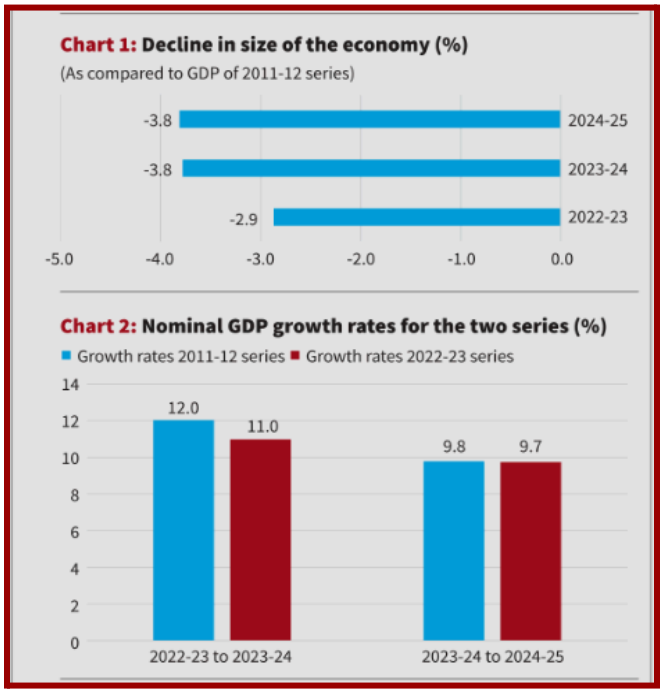
Major Causes of India's CAD

- **Crude oil imports** of approximately **USD 166.73 billion** in FY 2024–25.
- **Gold imports** worth **USD 53.53 billion.**
- High imports of **electronics and machinery** due to limited domestic production
- **Merchandise exports lagging** behind imports thus sustaining a persistent goods trade gap
- **Global commodity price volatility** raises import costs

Measures to Moderate CAD

- Improve **manufacturing competitiveness** to boost merchandise exports
- Expand **high-value services exports** for stronger foreign exchange earnings
- Reduce **crude oil dependence** to lower the import burden
- Encourage **domestic production** to reduce reliance on imports
- Promote **alternatives to physical gold** to contain gold imports
- **Diversify export markets** to reduce vulnerability to regional demand shocks
- Maintain adequate **foreign exchange reserves** for external sector stability

Revised GDP Series with Base Year 2022–23



Meaning of GDP

- **Gross Domestic Product (GDP)** is the **total value of final goods and services produced in a year**, excluding material inputs.
- It is the most widely used indicator of a country's **economic size**.
- GDP or **Gross Value Added (GVA)** estimates are compiled using **data on production and prices**, along with several statistical procedures.
- In India, the **National Statistical Office (NSO)** periodically revises the National Accounts Statistics (NAS).
    - National accounts follow the **UN System of National Accounts (UNSNA)** framework.

Base Year Revision in GDP

- The **base year** for national accounts is typically revised **every 5 to 10 years**.
- The revision updates GDP estimates along with **national savings, consumption, and investment** data.
- Such revisions reflect **changes in production patterns and relative prices** as the economy evolves.
- The latest revision adopts **2022-23 as the base year** and follows the **2025 edition of UNSNA**.

- This revision came after **11 years**, making it particularly significant.

Concerns with the 2011–12 Series

- The previous revision with base year **2011–12** was released in **2015**.
- Many analysts questioned the **accuracy of GDP growth estimates** in that series.
- In sectors such as **manufacturing**, growth rates appeared **higher and sometimes showed a different trend** compared with earlier estimates.
- The **non-financial private corporate sector (PCS)** appeared much larger in the economy than previously reported.
- The **IMF**, in its review of member countries' economic statistics, gave India a **"C" grade** for the quality of its **national accounts data**.

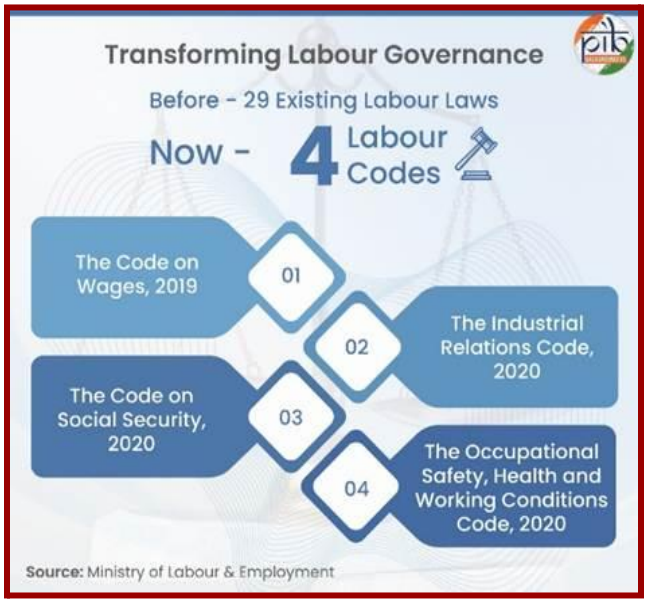
Key Findings of the 2022–23 GDP Series

- The revised estimates show that **India's GDP size is about 3–4% smaller** than in the earlier series.
- However, **annual GDP growth rates remain broadly similar**, differing by **about ±1 percentage point** from the previous estimates.
- The **production structure** of the economy has changed slightly:
    - **Agriculture** and **industry** shares have increased.
    - The **services sector share has declined**.

Changes in Sectoral and Institutional Shares

- Within the **industrial sector**, the share of **manufacturing** increased slightly from **14.3% to 14.7%** of GDP.
- Despite this higher share, the **absolute size of the manufacturing sector declined by about 1.5-1.6%** compared with the earlier series.
- The share of the **non-financial private corporate sector (PCS)** declined:
    - From **35.4%** in the earlier series to **33.9% in 2022–23**.
    - The gap widened to **3.4 percentage** points in 2023–24.
- The **household or informal sector** share increased slightly:
    - **+0.7** percentage points in 2022–23
    - **+2.7** percentage points in 2023–24.
- Much of this increase is linked to **agriculture**.

New Labour Codes in India



Background and Objective

- India has introduced **four new Labour Codes** to modernise its labour governance framework.
- These codes consolidate **29 existing labour laws** into a simplified structure.
- The reforms aim to improve **worker protection**, **social security coverage**, and **ease of compliance for industries**.
- Implementation of the new framework began on **21 November 2025**.
- The reforms support the vision of **Aatmanirbhar Bharat** by strengthening rights of **women, youth, gig workers, migrant and unorganised workers**.

The Four Labour Codes

Labour Code	Focus Area	Key Objective
Code on Wages, 2019	Wages and minimum wages	Ensures **statutory minimum wages for all workers**
Industrial Relations Code, 2020	Hiring, layoffs, trade unions and dispute resolution	Enables **faster dispute settlement and employment flexibility**

Code on Social Security, 2020	PF, ESIC, maternity benefits and gig workers	Expands **social security coverage**
Occupational Safety, Health and Working Conditions Code, 2020	Workplace safety and working conditions	Ensures **safe workplaces across industries**

Why Labour Reforms Were Needed

- India's labour laws were largely framed between the **1930s and 1950s**, when the nature of work was very different.
- Over time, the system became **complex and fragmented across 29 different Acts**.
- Several challenges emerged:
  - Lack of legal recognition for **gig and platform workers**.
  - **Slow labour dispute resolution mechanisms**.
  - Limited **social security coverage**, especially for informal workers.
  - Restrictions on **women working night shifts** in many sectors.

Major Changes Introduced

Area	Earlier System	New Labour Codes
Formalisation	No mandatory appointment letters	Mandatory appointment letters for workers
Minimum wages	Applicable only to certain sectors	Minimum wage for all workers
Social security	Limited coverage	Universal PF, ESIC and insurance
Healthcare	No mandatory check-ups	Annual health check-up for workers above 40
Wage payment	Weak enforcement	Mandatory timely wage payments
Women employment	Restrictions in night shifts	Night work allowed with safety provisions
ESIC coverage	Limited to notified areas	Expanded coverage across India
Compliance	Multiple licences and returns	Single registration and return system

Key Benefits for Workers

- **Fixed-term employees:** Equal wages and benefits with gratuity after one year.
- **Gig and platform workers:** Legal recognition and portable Aadhaar-linked welfare benefits.
- **Contract workers:** Equal benefits and health check-ups.
- **Women workers:** Equal pay, safety measures and night-shift opportunities.
- **Youth workers:** Assured minimum wages and formal employment documentation.
- **MSME employees:** Social security coverage and standard working hours.
- **Hazardous sector workers:** National safety standards and health monitoring.

Employees' Provident Fund Organisation (EPFO)

	EPF	EPS
Employee contribution	12% of employee's basic salary + DA	Nil
Employer contribution	3.67% of employee's basic salary + DA	8.33% of employee's basic salary + DA
Maximum contribution	12% of employee's basic salary + DA	8.33% of salary up to ₹15,000, or ₹1,250.
Interest rate	Reviewed annually.	No interest paid.
Withdrawal limit	Up to 100% of eligible corpus; 25% of corpus must remain till the end of career.	Pension starts at 58 after at least 10 years of service, or earlier, under specific conditions.

What is EPFO?

- The **Employees' Provident Fund Organisation (EPFO)** is a **statutory body** established under the **Employees' Provident Funds and Miscellaneous Provisions Act, 1952**.
- It functions under the **Ministry of Labour and Employment**.

- EPFO administers **social security schemes** for workers in the organised sector.
- **Schemes Operated by EPFO**
    - **Employees' Provident Fund Scheme, 1952 (EPF)** provides retirement savings benefits.
    - **Employees' Pension Scheme, 1995 (EPS)** provides pension benefits after retirement.
    - **Employees' Deposit Linked Insurance Scheme, 1976 (EDLI)** provides insurance cover to members.
    - **EPF i-Grievance Management System (EPFiGMS)**
        - **EPFiGMS** is a customised portal created to redress grievances of EPFO members.
        - Grievances can be lodged from any location through this portal.
        - The complaint automatically reaches the concerned office for resolution.

Organisational Structure

- EPFO is governed by a **tripartite body** known as the **Central Board of Trustees**.
- The board includes representatives of the **Central and State Governments**, **employers**, and **employees**.
- The board is chaired by the **Union Minister of Labour and Employment**.

The **Central Board of Trustees** administers three key social security schemes:

- **Employees' Provident Fund Scheme (1952)**: Provides **retirement savings** for employees.
    - Under the **EPF Scheme**, both **employer and employee contribute 12% of the employee's salary**.
    - The **employee's full contribution** goes to the **EPF account**.
    - From the **employer's contribution**:
        - **8.33%** goes to the **Employees' Pension Scheme (EPS)**.
        - **3.67%** goes to the **EPF account**.
- **Employees' Pension Scheme (1995)**: Provides **pension benefits after retirement**.
    - The **EPS** provides pension benefits to employees in the organised sector.
    - Pension can be claimed after **retirement at the age of 58 years**.
    - An employee must have completed **at least 10 years of service** to be eligible.
- **Employees' Deposit Linked Insurance Scheme (1976)**: Provides **insurance coverage to employees**.

Force Majeure

What is Force Majeure?

- A **French term** literally meaning **"greater force"**
- Refers to an **extraordinary event** that renders the legal obligations between contractually bound parties **impossible to fulfil**
- Related to the concept of an **"act of God"**, an event for which **no party can be held accountable** and which is entirely **beyond the parties' reasonable control**

Key Features

- Many commercial agreements contain **force majeure clauses** as a precautionary measure against **breach of contract.**
- These clauses list major events that could result in **non-performance of contractual duties**
- Notable events include **war, riots, criminal activity, epidemics, pandemics**, and other unforeseeable circumstances.
- For force majeure to apply:
    - The hindering circumstances must be **beyond a party's reasonable control**
    - Parties must prove their **reasonable efforts to mitigate** the circumstances

Consequences of Force Majeure

- Parties may **delay their obligations** for a period of time
- Contract terms may be **revised**
- Parties may agree on the contract's **cancellation**

Force Majeure in Indian Law

- Force majeure has **neither been defined nor specifically dealt with** in Indian statutes
- However, **Section 32 of the Indian Contract Act, 1872,** provides that if a contract is contingent on the happening of an event which **becomes impossible**, then the **contract becomes void.**

Excise Duty on Petroleum Products

Context

- The Union Government **reduced special additional excise duty on petrol and diesel by ₹10 per litre**. The duty on **diesel reduced to zero** and on **petrol to ₹3 per litre**.

About Excise Duty

- **Excise duty** is an **indirect tax levied on manufacture or production of goods within a country**.
- Though collected at production stage, the **burden is passed on to consumers**.
- **Nature of Tax**
  - Levied on **manufacture of goods**, not on services.
  - **Taxable event: manufacture**.
  - Collected by the **Central Government** (pre-GST framework).
- **Constitutional and Legal Basis**
  - **Entry 84, Union List (Seventh Schedule)** empowered Parliament to levy excise duty.
  - Governed by the **Central Excise Act, 1944**.
  - **Post-GST (2017):** Applicable mainly to **petroleum products and tobacco**.

Key Features

- **Production-based** tax.
- **Can be:**
  - **Ad valorem** (percentage of value)
  - **Specific duty** (fixed amount per unit)
- Earlier allowed input credit through **CENVAT system**.
- **Goods Subject to Excise (Post-GST)**
  - Petroleum products (petrol, diesel, ATF)
  - Tobacco and tobacco products
- **Excise Duty vs GST**
  - Excise is levied on **manufacture**, whereas GST is levied on **supply**.
  - Excise applies only to **select goods**, while GST covers **goods and services**.

Economic Significance

- Major source of **Union Government revenue**, especially from fuel.
- Used as a **fiscal tool to influence prices and consumption**.
- Continues to play a crucial role in **fuel pricing and revenue mobilisation**.

Topic: Banking, Monetary Policy and Capital Market

Arbitrage

What is Arbitrage?

- Arbitrage refers to the practice of **capturing profit from price gaps** of the same asset in **two different markets or financial instruments**
- Involves **buying at a lower price and selling at a higher price** at nearly the same time
- Since trades are executed simultaneously, it **does not rely on market predictions**

Arbitrage Funds

- A category of **hybrid mutual funds** that generate returns from **short-lived price differences**
- Classified by **SEBI as equity-oriented funds**
- Must maintain at least **65% gross exposure to equities** or equity-related securities
- Remaining/unutilised portions are invested in **short-term debt or money-market instruments** for liquidity management

How Do Arbitrage Fund Managers Operate?

- Buy a stock in the **cash (spot) market** at a lower price and sell its **futures contract** in the derivatives market at a higher price
- Alternatively, exploit price differences **across exchanges,** i.e. buying on NSE and selling on BSE (or vice versa)
- Do **not attempt to predict** market direction (bullish or bearish)

Role of Market Volatility

- **Higher volatility** increases the likelihood of **price mismatches** across exchanges or between spot and derivatives markets, creating more arbitrage opportunities
- In **calm or sideways markets**, price gaps may be smaller or disappear quickly, limiting opportunities

Risks & Returns

- **Not entirely risk-free** as returns depend on availability of pricing gaps, which can vary

- Short-term fluctuations may occur due to **execution risks, limited liquidity, or transaction costs**
- Historically delivers about **6–7% annualised returns**, considered a **moderate, low-volatility** return option.
- **Not suitable** for investors seeking **aggressive long-term or high equity-style growth**

NIFTY & SENSEX

Context: Indian stock markets witnessed a **sharp sell-off** with **benchmark Nifty 50 falling 1.5%** and **Sensex declining 1.4%**.

What is a Stock Index?

- A **stock index** is a metric that tracks how much the **stock market has changed** over time.
- It monitors **pricing changes and overall market performance.**
- Created by selecting stocks with **comparable features** i.e. based on industry, market capitalisation, or business size.
- Any change in the value of underlying stocks **directly affects the index value.**
- Serves as a reliable **indicator of market fluctuations** and overall **investment sentiment.**

Types of Indices in India

- **Benchmark Indices:** NSE NIFTY and BSE SENSEX
- **Broad-based Indices:** NIFTY 50, BSE 100, NIFTY Next 50
- **Market Capitalisation-based:** BSE Smallcap, BSE Midcap, NIFTY Smallcap, NIFTY Midcap
- **Sectoral Indices:** NIFTY Bank, NIFTY IT, NIFTY FMCG, NIFTY Auto

NIFTY 50

- The name **NIFTY** is derived from **"National Stock Exchange"** and **"Fifty"** — abbreviated as **NSE Fifty**
- Tracks the **top 50 actively traded equity stocks** on the National Stock Exchange
- Also referred to as **NIFTY50** or **CNX NIFTY.**
- Established in **1992** and trading began in **1994.**
- Owned and managed by **India Index Services and Products Limited (IISL).**
- **How is NIFTY Calculated?**
  - Uses the **free-float market capitalisation** method.
  - **Base date:** November 3, 1995 with a **base value of 1000.**
  - **Base capital:** Rs. 2.06 trillion.
  - **Formula:**
    - Market Capitalisation = Price × Equity Capital
    - Free Float Market Cap = Price × Equity Capital × Investable Weight Factor (IWF)
    - Index Value = Current Market Value ÷ (1000 × Base Market Capital)
  - The **Investable Weight Factor (IWF)** measures how many shares are actually accessible for trading
  - Index is calculated in **real time** since stock values fluctuate daily
  - Also accounts for corporate actions like **stock splits and rights issues**

SENSEX

- Launched on **January 1, 1986**
- Tracks the performance of India's **30 largest** and most **financially sound** companies listed on the **Bombay Stock Exchange (BSE)**
- Calculated in both **Indian Rupee (INR)** and **US Dollar (USD).**
- Components selected by the **S&P BSE Index Committee.**
- **Criteria for Selection of SENSEX Companies**
  - Must be **listed on BSE**
  - Should be **large to mega-cap** companies
  - Stocks should be **relatively liquid**
  - Companies should earn revenue from their **core activities**
  - Sector balance should reflect the **overall Indian stock market**
- **How is SENSEX Calculated?**
  - Uses the **free-float capitalisation method**, adopted in **September 2003** (earlier used simple market capitalisation)
  - Only considers **freely tradable shares**, excluding restricted stocks held by company insiders or executives.
  - Gives **greater weight to larger companies** within the index.

Accounting Standards

Context: The **IRDAI** proposed **April 1** as the deadline for insurers to adopt

Indian Accounting Standards (Ind AS), applicable to **all categories including life, general, health insurers and re-insurers**.

What are Accounting Standards?

- A set of **written principles, rules, and guidelines** issued by regulatory authorities to standardise the **preparation and presentation of financial statements**
- Define how financial transactions should be **recognised, measured, recorded, and disclosed**

Key Objectives

- Ensure **uniformity and comparability** in financial statements
- Improve **transparency and reliability** of financial information
- Prevent **manipulation and misrepresentation** of accounts
- Enhance **investor confidence** and decision-making

Indian GAAP (Before Ind AS)

- India earlier followed Indian Generally Accepted Accounting Principles **(IGAAP).**
- Developed by the **Institute of Chartered Accountants of India (ICAI)** and provisions under the **Companies Act, 1956.**
- Comprised **18 accounting standards**, focused on historical cost accounting and legal compliance

Indian Accounting Standards (Ind AS)

- Notified by the **Ministry of Corporate Affairs (MCA)** in 2015.
- Largely converged with **International Financial Reporting Standards (IFRS).**
- Emphasises a **principle-based approach** focusing on fair value measurement, transparency, and enhanced disclosure.

Phased Adoption of Ind AS

- **Phase 1 (2016):** Applicable to **listed and unlisted companies** with **net worth ≥ ₹500 crore**.
- **Phase 2 (2017):** Applicable to companies with **net worth ≥ ₹250 crore but < ₹500 crore**.
- **Phase 3 (2018):** Applicable to **banks, NBFCs, and insurance companies** with **net worth ≥ ₹500 crore**.
- **Phase 4 (2019):** Applicable to **NBFCs** with **net worth ≥ ₹250 crore but < ₹500 crore**.

International Financial Reporting Standards (IFRS)

- Issued by the **International Accounting Standards Board (IASB).**
- Provides a **common global accounting language** enabling transparency and comparability across countries.
- IASB is an **independent standard-setting body** established in **2001**, succeeding the International Accounting Standards Committee (IASC).
- **Headquartered** in London.

Green Bonds

What are Green Bonds?

- According to **SEBI**, a green debt security is one issued with the intention of raising money for causes like **sustainable development or increased energy efficiency.**
- Green bonds are **debt instruments similar to normal bonds**, but the capital raised must be **earmarked exclusively for green projects.**
- Green projects typically include those linked to **renewable energy, pollution reduction, and similar environmental initiatives.**

Key Features

- Green bonds can be issued by both **governments and private companies** such as multinational corporations.
- They generally carry **lower interest rates** than loans provided by commercial banks.
- They are considered **less risky** since they are linked to the **issuer rather than the successful completion** of the projects.
- When issuing green bonds, issuers must provide information about the **project needing green financing** and the **overall environmental benefits** arising from it.

Green Bonds vs Normal Bonds

Aspect	Normal Bonds	Green Bonds
1. Use of funds	Any project	Green projects only
2. Interest rate	Market rate	Generally lower

3. Disclosure requirement	Standard	Must disclose environmental benefits

Variable Repo Rate (VRR)

Context: Reserve Bank of India **(RBI)** injected **₹25,101 crore liquidity** via a **3-day Variable Rate Repo (VRR) auction**.

Basic Concept

- **Variable Repo Rate (VRR)** is a liquidity tool where banks borrow short-term funds from RBI through auctions.
- Interest rate under VRR is **market-determined**, unlike **fixed repo rate** decided **directly by RBI**.
- It is part of RBI's **Liquidity Adjustment Facility (LAF)** framework for managing short-term liquidity.

How VRR Works

- RBI conducts **auction-based repo operations** generally with maturities ranging from 1 day to 14 days.
- Banks submit bids specifying **amount and interest rate** at which they want to borrow funds.
- RBI accepts bids based on **favourable rates**, and final rate emerges through competitive bidding process.
- The VRR rate cannot fall below the **reverse repo rate**, ensuring a lower bound for interest rates.

Purpose and Need

- VRR is used when **market interest rates fall below policy repo rate**, making fixed repo unattractive.
- It helps align **liquidity conditions with market realities** without altering overall monetary policy stance.
- Ensures smoother **transmission of policy rates** and maintains stability in short-term money markets.

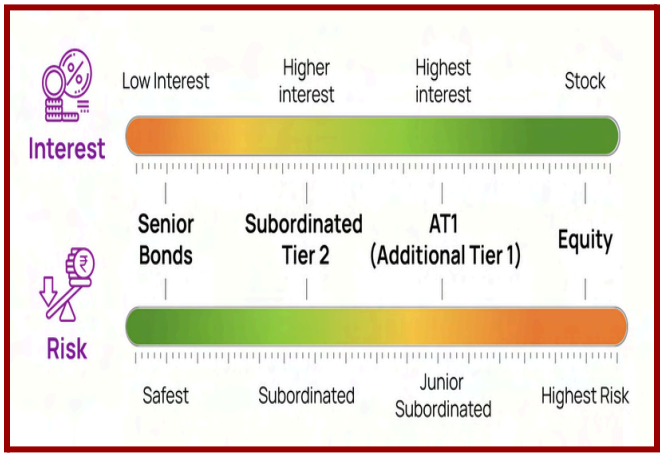
Role in Liquidity Management

- VRR helps in **injecting short-term liquidity** into banking system during tight liquidity conditions.
- It ensures **market rates remain aligned within LAF corridor**, between repo and reverse repo rates.
- Supports **financial stability and efficient monetary policy transmission** in evolving market conditions.

Variable Rate Reverse Repo (VRRR)

- **Variable Rate Reverse Repo (VRRR)** is used by RBI to absorb excess liquidity through auction mechanism.
- Banks deposit surplus funds with RBI, and **interest rate is determined competitively through bidding**.
- VRRR is important during **excess liquidity situations**, helping control inflationary pressures.

Additional Tier-1 (AT-1) Bonds



Basic Concept

- **AT-1 bonds** are perpetual bonds with no maturity date, meaning principal is not repaid to investors.
- Investors receive **regular interest payments**, generally higher than other bonds due to higher associated risks.
- These bonds are often treated as **quasi-equity instruments** rather than pure debt due to their structure.
- **Issuance & Regulatory Framework**
  - AT-1 bonds are issued by **banks under RBI guidelines** to meet capital adequacy requirements.
  - They form part of **Tier-1 capital**, helping banks maintain required Capital Adequacy Ratio (CAR).
  - Capital adequacy norms are based on **Basel III framework**, introduced after the 2008 global financial crisis.

Key Features

- AT-1 bonds are **contingent convertible bonds (CoCos)**, convertible into equity if bank's capital falls below threshold.
- They include a **call option**, allowing banks to buy back bonds after a specified period.
- There is **no put option**, so investors cannot return bonds to issuing bank.
- Bonds are **listed on stock exchanges**, allowing investors to sell them in secondary market.

Risk Factors

- These bonds carry **higher risk**, as interest payments can be skipped during financial stress.
- RBI can direct banks to **write down or cancel bonds** without investor consent during crisis situations.
- AT-1 bonds are **subordinate debt**, meaning they rank lower than other debt during liquidation.

Purpose

- Funds raised act as a **financial buffer or shock absorber** during periods of financial instability.
- Helps banks strengthen capital base and **absorb losses without immediate external support**.

Exchange-Traded Funds

About ETF

- An **Exchange-Traded Fund (ETF)** is a collection of **marketable securities** that tracks an **underlying index**.
- It combines features of **mutual funds (diversification)** and **stocks (exchange trading)**.
- ETFs can be **bought and sold on stock exchanges throughout the trading day** at **market-determined prices**.
- This differs from mutual funds, which are **priced only at the end of the trading day**.
- ETFs are generally **passively managed**, resulting in **lower fees and expenses** compared to actively managed mutual funds.

Key Advantages

- **Diversification:** Investors gain exposure to a **basket of assets through a single investment**.
- **Liquidity and Flexibility:** Units can be **traded anytime during market hours** like shares.
- **Cost Efficiency:** Lower **expense ratios** due to passive management.
- Large ETFs often track major indices such as the **S&P 500**, providing **broad market exposure**.

Types of ETFs

- **Equity ETFs:** Track **stock market indices**.
- **Debt ETFs:** Invest in **government and corporate bonds**.
- **Commodity ETFs:** Track commodities such as **gold and silver**.
- **Sectoral/Thematic ETFs:** Focus on **specific industries or investment themes**.
- **International ETFs:** Track **foreign market indices**.

National Securities Depository Limited (NSDL)

About

- **NSDL** is India's **first securities depository**, established under the **Depositories Act, 1996** and operational since 1996.
- Introduced the system of **dematerialisation (demat)** of securities in India.
- Functions as a **market infrastructure institution** for electronic holding and transfer of securities.
- Earlier system based on **physical share certificates** faced issues like loss, theft, forgery, delays, and bad deliveries.
- NSDL enabled a shift to a **secure, efficient, electronic system**, reducing risks and inefficiencies.
- **Regulation and Oversight**
    - Regulated by the **Securities and Exchange Board of India (SEBI)**.
    - Coordinates with the **Reserve Bank of India (RBI)** in matters related to banking and government securities.

Core Functions

- Provides **electronic custody of securities** through demat accounts.
- Enables **electronic transfer of securities (book-entry system)**.
- Facilitates **settlement of trades on stock exchanges**.
- Supports **pledge and hypothecation of securities for loans**.
- Handles **corporate actions** such as dividends, bonus, and rights issues.
- **Role in Banking and Financial System**

- Banks act as **Depository Participants (DPs)** linking investors with NSDL.
- Facilitates use of **demat securities as collateral**, improving liquidity and risk management.

Topic: External Sector

Foreign Exchange (ForEx) Reserves

Context: India's forex reserves declined by **$7.052 billion** to **$709.759 billion** as per **RBI data** thus indicates **volatility in external sector** amid changing **global financial conditions**.

About ForEx

- **Foreign Exchange Reserves (Forex Reserves)** are reserve assets held by a central bank in foreign currencies.
- These include **foreign currencies, bonds, treasury bills, and other government securities denominated in foreign currencies**.
- Reserves are expressed in **US dollar terms**, which acts as the global reference currency.
- In India, **Reserve Bank of India (RBI)** is the custodian of foreign exchange reserves.

Components of ForEx Reserves

- **Foreign Currency Assets (FCA)** form largest share, held in currencies like US dollar, euro, pound, yen.
- **Gold reserves** are maintained as physical assets, contributing to overall reserve strength.
- **Special Drawing Rights (SDR)** are reserve assets allocated by International Monetary Fund (IMF).
- **Reserve Tranche Position (RTP)** represents India's reserve capital with IMF, accessible for balance of payments needs.

Purpose and Functions

- Forex reserves help in **stabilizing exchange rate and managing external sector shocks effectively**.
- RBI uses reserves to **intervene in foreign exchange market to control excessive rupee volatility**.
- They act as **buffer against external crises**, ensuring ability to meet international payment obligations.
- Reserves support **confidence in economy**, improving credibility among global investors and trading partners.

Role in Currency Management

- When rupee depreciates, RBI **sells foreign currency like US dollars to stabilize domestic currency value**.
- Adequate reserves ensure protection against **sudden capital outflows and external financial instability risks**.

Topic: Infrastructure

Strategic Petroleum Reserves (SPR)

Context: The **International Energy Agency** proposed a record oil release from **strategic reserves amid rising crude prices.**

What are Strategic Petroleum Reserves?

- **Strategic Petroleum Reserves (SPR)** are **emergency crude oil stockpiles** maintained by governments.
- They are used to manage **supply disruptions or global oil crises**.
- According to the **IEA**, member countries should maintain reserves equal to **at least 90 days of net oil imports**.

Management of SPR in India

- India's SPR programme is managed by **ISPRL** (Indian Strategic Petroleum Reserves Limited).
- ISPRL functions under the **Ministry of Petroleum and Natural Gas**.
- India is the **third-largest importer and consumer of crude oil** in the world.

Current Capacity and Locations

- India currently holds **about 5.33 million tonnes (MMT)** of crude oil in strategic reserves.
- These reserves are stored in **underground rock caverns**.
- The three operational sites are:
  - **Visakhapatnam – 1.33 MMT**
  - **Mangaluru – 1.5 MMT**
  - **Padur – 2.5 MMT**
- Together they provide about **9.5 days of crude oil coverage**.

Expansion Plans

- The government has approved expansion of the SPR network.
- Planned additions include:
  - **2.5 MMT** additional capacity at **Padur (Karnataka)**.
  - A **4 MMT facility at Chandikhole (Odisha)**.
- Other proposed sites include **Bikaner**, **Mangaluru**, **Rajkot**, and **Bina (Madhya Pradesh)**.

Total Energy Buffer

- Strategic reserves complement **commercial oil inventories** maintained by oil companies.
- When combined with stocks at **refineries, ports, and floating storage**, India has an overall **energy buffer of about 74 days**.

Topic: Agriculture

Purified Terephthalic Acid and Mono Ethylene Glycol

Context: Prices of key textile raw materials **Purified Terephthalic Acid (PTA)** and **Mono Ethylene Glycol (MEG)** witnessed sharp volatility amid crude oil fluctuations.

Purified Terephthalic Acid (PTA)

- **PTA** is a **white crystalline powder** used as a key raw material for producing **polyester fibers, PET bottles, and polyester fabrics**.
- It forms about **70–80% of the composition of polyester products**, making it one of the most important inputs for the **textile and packaging industries**.
- **Trade Policy Change**
  - The **Union Budget 2020** removed the **anti-dumping duty (ADD)** on PTA imports.
  - Earlier, the duty applied to imports from **China, Thailand, South Korea, Indonesia, Malaysia, Taiwan, and Iran**.
- **Reason for Policy Change**
  - To **increase competitiveness** of the Indian textile industry.
  - To **reduce dependence** on a limited number of domestic manufacturers.
  - To **lower raw material costs** for polyester production.

Mono Ethylene Glycol (MEG)

- **MEG** is a **clear, odorless liquid** produced by reacting **ethylene oxide with water**.
- It is widely used in the manufacture of **polyester fibers**, **PET resin**, and also as a **coolant or antifreeze**.
- **Industry Scenario**
  - India remains **heavily dependent on imports of MEG** to meet domestic demand.
  - Major suppliers include **Saudi Arabia, Qatar, and Singapore**.
- **Importance for India's Textile Sector**
  - Both **PTA** and **MEG** are critical raw materials for the **Man-Made Fiber (MMF) industry**.
  - The MMF sector is being promoted under government initiatives such as:
    - **PM MITRA scheme** (Mega Integrated Textile Region and Apparel Parks)
    - **PLI scheme** for the textile sector.

Sahiwal Cattle

Context: ICAR-IVRI successfully produced **Sahiwal calves using OPU–IVF–ET technology**, advancing indigenous breed improvement efforts.

About the cattle

- **Sahiwal cattle** is one of the best indigenous milch breeds known for high milk production.
- Originates from **Sahiwal region of Punjab (Pakistan)**, now widely reared in India.
- Also known as **Lambi Bar, Lola, Montgomery, Multani, and Teli**.
- **Physical Features**
  - Cows are **reddish-brown in colour**, ranging from mahogany red to greyish shades.
  - Bulls usually have **darker extremities**, sometimes with small white patches on body.
- **Production & Traits**
  - Average milk yield is about **2325 kg per lactation**, with variation between 1600 to 2750 kg.
  - Known for **heat tolerance, tick resistance, and strong immunity against parasites**.
  - Well adapted to **tropical climates**, making it suitable for Indian conditions.

- **Distribution & Importance**
  - Widely exported to **Asian countries, Africa, and Caribbean regions** due to superior traits.
  - Important for **dairy productivity and indigenous breed conservation in India**.

About OPU–IVF Technology

- **Ovum Pick-Up (OPU)** is a reproductive technology used to collect eggs from live animals.
- It uses **ultrasound-guided needle technique** to retrieve oocytes from ovarian follicles.
- **Process**
  - Retrieved oocytes undergo **in vitro maturation, fertilization, and embryo culture**.
  - Developed embryos are transferred to **surrogate animals to produce offspring**.
- **Importance**
  - Helps in **rapid multiplication of superior genetic breeds** like Sahiwal cattle.
  - Reduces generation interval and improves **genetic quality of livestock population**.

Coconut Development Board

Basic Facts

- A **statutory body** under the **Ministry of Agriculture and Farmers Welfare**, Government of India
- Established on **12th January 1981**
- **Headquarters:** Kochi, Kerala
- **Regional Offices:** Bangalore (Karnataka), Chennai (Tamil Nadu), Guwahati (Assam), and Patna (Bihar)

Objective

- Integrated development of **coconut production and utilisation** in India
- Focus on **productivity increase and product diversification**

Key Functions

- Imparts **technical advice** to those engaged in coconut cultivation and industry.
- Provides **financial and other assistance** for expansion of area under coconut.
- Encourages adoption of **modern technologies** for processing coconut and its products.
- Recommends measures for **improving marketing** of coconut and its products.
- Recommends measures for **regulating imports and exports** of coconut and its products.
- Fixes **grades, specifications, and standards** for coconut and its products.
- Adopts measures to secure **incentive prices** for coconut and its products.

Cotton Corporation of India (CCI)

Recent News

- Government approved ₹1,718.56 crore to **Cotton Corporation of India (CCI)** for MSP operations in 2023–24 season. The measure aims to **stabilise cotton prices, prevent distress sales, and ensure better returns to farmers**.
- India produced **325.22 lakh bales**, contributing nearly **25% of global cotton output** in 2023–24.

About CCI

- **Cotton Corporation of India (CCI)** was established in 1970 under **Ministry of Textiles** as a PSU.
- Functions under the **Companies Act, 1956**, focusing on cotton procurement and price stabilisation.
- Primary role is **MSP operations when market prices fall below government-declared minimum support prices**.
- Operates **without quantitative limits**, ensuring assured procurement for cotton farmers across India.
- Also undertakes **commercial purchases** to supply raw cotton to domestic textile industry during lean seasons.

APEDA

Context: Parliamentary Standing Committee on Commerce recommended **higher budget allocation** to Agricultural and Processed Food Products Export Development Authority **(APEDA)** to support **farmers and exporters**.

About APEDA

- **APEDA** is a statutory body established under an Act of Parliament in December 1985.

- It replaced the earlier **Processed Food Export Promotion Council (PFEPC)** for promoting agri-exports.
- APEDA functions under the **Ministry of Commerce and Industry**.
- Headquarters of APEDA is located in **New Delhi**.
- It is headed by a **Chairman appointed by the Central Government**.

Objective & Scope

- Main objective is to **develop and promote export of scheduled agricultural and processed food products**.
- Products covered under APEDA Act are called **scheduled products**, requiring mandatory registration of exporters.
- Examples include **fruits, vegetables, meat, poultry, dairy products, honey, jaggery, and bakery items**.
- APEDA also monitors **import of sugar**, in addition to its export promotion role.

Institutional Role

- APEDA acts as Secretariat for **National Accreditation Board (NAB)** under organic certification framework.
- Implements accreditation of certification bodies under **National Programme for Organic Production (NPOP)**.
- Plays key role in promoting **organic exports and quality certification systems in India**.

BHARATI Startup Challenge

- **BHARATI initiative** aims to promote innovation and entrepreneurship in agri and processed food export sector.
- Provides **mentorship, market access, and policy support** to export-oriented startups.
- Selected startups receive **international exposure through global events like Gulfood and BIOFACH**.

Miscellaneous

Small Savings Schemes

About and Management

- **Small Savings Schemes** are government-backed savings instruments designed to **encourage** regular savings among citizens across **all age groups**.
- These schemes are popular due to their **relatively higher returns than bank fixed deposits**, **sovereign guarantee**, and **tax benefits**.
- Since **2016**, the **Finance Ministry** reviews interest rates on a **quarterly basis**.
- All collections under these schemes are pooled into the **National Small Savings Fund (NSSF)**. The fund is used by the Central Government to finance its **fiscal deficit**.
- The schemes are **broadly classified** into:
  - Post Office Deposits
  - Savings Certificates
  - Social Security Schemes

Key Schemes and Features

- **Post Office Deposits**
  - Includes **Savings Account, Recurring Deposit (RD), Time Deposits (1–5 years), and Monthly Income Account**.
  - The **Post Office Savings Account** offers **4% annual interest** and can be opened with a **minimum ₹500**.
  - The **Recurring Deposit** provides **5.8% interest (compounded quarterly)** with a maturity of **5 years**, allowing monthly deposits starting from **₹100**.
  - The **5-year Time Deposit** qualifies for **tax deduction under Section 80C**.
- **Savings Certificates**
  - Includes **National Savings Certificate (NSC)** and **Kisan Vikas Patra (KVP)**.
  - **NSC** offers **6.8% annual interest**, matures in **5 years**, and qualifies for **Section 80C tax benefits**.
  - Interest in NSC is **reinvested automatically every year**.
  - **KVP** doubles the investment in **124 months** (approx. **6.9% annual return**).
  - Minimum investment in KVP is **₹1000**, with **no upper limit**.
- **Social Security Schemes**
  - **Public Provident Fund (PPF):**
    - Offers **7.1% annual interest** with **tax benefits under Section 80C**.
    - Maturity period is **15 years**, extendable in **5-year blocks**.
    - **Interest and maturity amount are fully tax-exempt**.

- **Sukanya Samriddhi Account (SSA):**
  - Launched under **Beti Bachao Beti Padhao** for **girl child below 10 years**.
  - Offers **7.6% annual interest** with **Section 80C benefits**.
  - Tenure is **21 years**, with a maximum annual investment of **₹1.5 lakh**.
- **Senior Citizens Savings Scheme (SCSS):**
  - Available for individuals **above 60 years of age**.
  - Offers **7.4% annual interest**, payable **quarterly**.
  - Provides **tax benefits under Section 80C** with a **5-year maturity period**.

INTERNAL SECURITY

AI and National Security

Context

- The recent developments highlight the growing intersection between **Artificial Intelligence (AI) and national security**. Anthropic, an American AI company, has urged authorities to treat **Chinese AI labs** such as DeepSeek, MoonshotAI, and MiniMax **as national security threats**.
- At the same time, **AI models** developed by American firms have reportedly been used by the **U.S. military in the Iran attacks**, helping accelerate the **"kill chain"** from target identification to legal approval and military strike.

Associated Issues Due to Intersection

- **AI Model Distillation and Strategic Competition**
  - Chinese AI companies have been accused of **distilling frontier AI models** developed by American firms.
  - **Distillation** refers to the process where a **weaker AI model learns** by analysing the outputs of a **stronger model.**
  - Such practices raise concerns about **technological diffusion and competitive advantage** in the AI race.
- **Difficulty in Controlling AI Proliferation**
  - Generative AI is often compared to **nuclear technology**, suggesting the need for strict non-proliferation measures.
  - However, the comparison is misleading because **AI is a dual-use** general-purpose technology, closer to **semiconductors than nuclear weapons**.
  - Unlike nuclear research driven by governments, **AI innovation** is largely conducted by **private** companies for **civilian purposes**.
  - **Mathematical AI models are not scarce or easily traceable**, making proliferation extremely difficult to control.
- **Ineffectiveness of Technology Restrictions**
  - Restrictions on **AI inputs such as semiconductors** have often been circumvented or partially repealed.
  - The development of **DeepSeek's model** at a **fraction of the cost** of frontier models demonstrates how innovation can bypass regulatory controls.
  - **Distillation techniques** create another pathway for technological diffusion, making restrictions even harder to enforce.
- **Ethical Concerns and Military Applications**
  - Frontier AI models developed by companies such as **Anthropic, OpenAI, Google, and xAI** may be used in military systems for:
    - Surveillance operations
    - Cyber warfare
    - Lethal autonomous weapon systems
  - When Anthropic raised concerns about such uses, it risked losing defence contracts and being labelled a **"supply chain risk"**, while competitors like **OpenAI accepted permissive military contracts**.
  - This situation highlights a **competitive "race to the bottom"** among AI companies seeking government partnerships.
- **Talent Mobility and Knowledge Diffusion**
  - **AI talent is highly mobile**, making restrictions on knowledge transfer difficult.
  - Many researchers working in Chinese AI laboratories were **trained in U.S. universities or previously employed in American companies**.
  - This global circulation of expertise makes **technological containment strategies less effective**.
- **Concentration of Power in the AI Industry**

- Calls for coordinated action across **AI companies, cloud providers, and policymakers** may strengthen the market dominance of a small group of technology companies.
- Input-based restrictions risk **consolidating technological power** within a few firms, potentially harming innovation, scientific collaboration, and global economic development.

Way Forward

- **Global Governance Frameworks:** States should develop plurilateral agreements on responsible military use of AI technologies.
- **Human Oversight in Lethal Decisions:** International norms must ensure meaningful human control over decisions involving lethal force.
- **Restrictions on Mass Surveillance:** Agreements should include limits on the use of AI for large-scale civilian surveillance.
- **Auditable Technical Standards:** Establish transparent and verifiable standards for AI systems used in defence operations.
- **Universal Applicability:** Governance frameworks must apply across all states and actors to ensure effectiveness.
- **Balanced Innovation Policy:** Policymakers should avoid overly restrictive technology controls that hinder innovation and international scientific cooperation.

Borderland National Integration

Context

- 2026 marks the **silver jubilee of the Ministry of Development of North Eastern Region (DONER)**, established by PM Vajpayee to address apathy and ignorance toward Northeast India.
- The ministry's budget allocation has seen a **152% increase,** i.e. from **₹2,332 crore** in **2014-15** to **₹5,892 crore in 2023-24**.
- Despite budgetary growth, the ministry has at times been a **victim of government apathy**, with the broader challenge of national integration remaining unresolved.

Core Problem: Identity, Not Just Development

- Development of any region is linked to **recognising the identity of its people** and this is true not just for the Northeast but all border areas.
- People from border areas, including the Northeast, **continue to face ignorance and insensitivity** from mainstream India.
- Recent incidents such as **racial abuse and threats against Arunachali women in Delhi** are stark reminders of this failure of national responsibility.

Associated Challenges

- **Ignorance and insensitivity** toward people from border areas persist despite decades of development spending.
- **Racial discrimination** against people from the Northeast in cities represents a failure of the **"one people"** ideal.
- For border areas like **Jammu and Kashmir, Ladakh, Andaman-Nicobar, and Lakshadweep**, there is no comprehensive policy ensuring their emotional integration into the national mainstream.
- The "one people" demand requires **shared identity and shared ethos**, something that budget allocations alone cannot build.
- **IAS and IPS officers** from non-border states often lack experiential understanding of border regions, limiting effective governance.

Way Forward

- **Educational Reforms**
  - Revise school textbooks to include **lessons on border areas** and directives should ensure that students in **Classes V to X** have at least **one lesson** pertaining to the **Northeast** covering History, Geography, Social Studies, English, and regional language.
  - Establish **university departments of border area studies** on the lines of Latin American Studies, African Studies, and Eurasian Studies departments.
  - Make **border area studies a mandatory subject** for students appearing for competitive examinations including the UPSC.
- **Mandatory Service in Border Regions**
  - Spending at least **two years in border areas should be made mandatory** for all IAS and IPS officers from other states.
  - This will provide experiential learning and build genuine understanding of border regions and their people.
- **Sister-School Linkages**

- One school from every district in non-border areas should **enter into a sister-institution relationship** with a school from a border district.
- The two schools should then **collaborate on a variety of projects**, building grassroots understanding among the next generation.

- **Celebrating Border Area Heroes**
  - Border areas have produced many **freedom fighters, litterateurs, artists, and thinkers** i.e. from Lachit Borphukan to Bhupen Hazarika, from Moji Riba and Lokpriya Gopinath Bordoloi of Assam to Rani Gaidinliu of Nagaland.
  - Celebrating anniversaries of such heroes **nationally would help weave a common national ethos** and build a sense of shared identity.
- **Comprehensive Policy for Emotional Integration**
  - A **comprehensive policy and plan** is needed specifically to ensure the emotional integration of border area people into the national mainstream.
  - Such efforts must be **oriented toward the next generation** to build lasting understanding and belonging.

PRELIMS

Maritime Security Acquisitions

Overview

- Defence Ministry signed contracts worth **₹5,083 crore** for two key acquisitions to strengthen **maritime security.**

Advanced Light Helicopter Mk-III (ALH Mk-III)

- **Contract value:** ₹2,901 crore
- **Manufacturer:** Hindustan Aeronautics Limited (HAL)
- **Quantity:** 6 helicopters (maritime role)
- **Category:** Indigenously Designed, Developed, and Manufactured (**IDDM**)
- **Twin-engine helicopters** with state-of-the-art features
- Can operate from both **shore-based airfields and ships at sea**
- **Capabilities**
  - Protection of **artificial islands** and offshore installations.
  - Safety of **fishermen** and **marine environment.**
  - Wide spectrum of **maritime security missions.**
- **Economic Impact**
  - Involves supply from **more than 200 MSMEs.**
  - Expected to generate approximately **65 lakh man-hours of employment.**
  - Reinforces **Aatmanirbhar Bharat** and **Make in India** initiative.

Shtil (Surface-to-Air Vertical Launch) Missiles of Navy

- **Contract value:** ₹2,182 crore
- **Supplier: JSC Rosoboronexport**, a state-run company of the **Russian Federation**
- To be installed on **Indian Navy's frontline warships**
- **Capabilities**
  - Substantially enhances **air defence capabilities** against a wide spectrum of **aerial threats**
  - Provides **rapid-reaction, all-weather engagement** capability
  - Improves **survivability in contested maritime environments**
  - Bolsters India's **layered air defence architecture** aboard naval platforms
- **Strategic Significance**
  - Underscores the **longstanding India-Russia defence partnership**

Crime and Criminal Tracking Network and Systems (CCTNS)

Basic Facts

- Launched in **2009** under the **Ministry of Home Affairs**
- Budget: **₹2,000 crore**
- Part of India's **National e-Governance Plan**
- Classified as a **Mission Mode Project (MMP)**

Objective

- Establish a comprehensive and integrated system to enhance the **efficiency and transparency of police operations** at the police station level.
- Provides tools for **investigation, data analytics, policymaking, and citizen-centric services.**

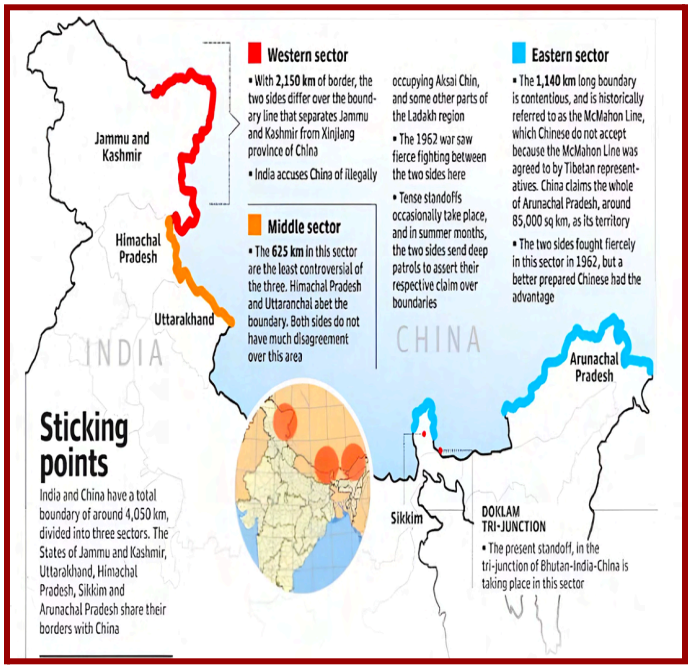
Key Features

- Connects all **17,130 police stations** across 28 states and 8 UTs.
- Achieved **100% deployment,** thus including remote areas like **Manipur, Nagaland, and Lakshadweep**
- Maintains a comprehensive **crime database,** i.e. records of accused persons, habitual offenders, proclaimed offenders, missing persons, and stolen vehicles.
- Enables citizens to track **complaints, verification requests, and case updates.**
- Integrated with the **Integrated Criminal Justice System (ICJS)**, connecting police data with **courts, prisons, prosecution, forensics, and fingerprint databases.**
- **Key Updates Under New Laws**
    - Bharatiya Nyaya Sanhita, Bharatiya Sakshya Adhiniyam, Bharatiya Nagarik Suraksha Sanhita
    - **Mandatory videography** of crime scenes and forensic evidence collection in cases punishable by **over seven years**
    - **Biological samples** collected upon request of investigating officers
    - **Senior officer approval** required for arrests in specific cases
    - **Arrest information** communicated to relatives and displayed publicly
    - **Victims updated** on investigation progress within **90 days**
    - **Daily diaries** sent to magistrates **fortnightly**

National Crime Records Bureau (NCRB)

- Established in **1986** under the **Ministry of Home Affairs**
- **Headquarters:** New Delhi
- Acts as the **central repository for crime and criminal data** in India
- **Key Responsibilities**
    - Collecting and analysing **crime statistics**
    - Managing the **Central Finger Print Bureau** thus maintains a national database of fingerprints
    - Publishing key reports:
        - **Crime in India**
        - **Accidental Deaths & Suicides**
        - **Prison Statistics**
    - Providing technical support in **Digital Forensics and Network Security**

Xiaokang Border Defence Villages



Context: China's construction of **'Xiaokang' border defence villages** near the Line of Actual Control (LAC) has raised strategic concerns for India.

What are Xiaokang Villages?

- **Xiaokang villages** (meaning **"well-off villages"**) are model settlements built by **China along its international borders**.
- They are part of a broader **strategic infrastructure programme** along sensitive frontier regions, including areas near the **Line of Actual Control (LAC) with India**.

- Several such villages have been constructed **opposite India's Lohit Valley and the Tawang sector of Arunachal Pradesh**.
- These settlements are often developed in **areas where territorial claims are contested**, reinforcing China's administrative and strategic presence.

Dual-Use Infrastructure

- These villages are designed as **dual-use infrastructure**, serving both **civilian and strategic purposes**.
- The settlements provide **housing and civic facilities for civilians**, while also enabling **logistical support and presence for security forces**.
- Such development helps China **strengthen infrastructure and population presence in border regions**.

Concerns for India

- **Territorial assertion:** China has reportedly built about 628 villages along the border with the Tibet Autonomous Region, signalling an attempt to reinforce territorial claims along the LAC.
- **Military implications:** The dual-use nature of these settlements raises concerns about possible militarisation of border areas.
- **Transparency issues:** Limited information about the actual population and purpose of these villages creates uncertainty and suspicion regarding China's intentions.

India's Initiatives along the LAC

- **Vibrant Villages Programme**
  - The **Vibrant Villages Programme** aims to develop **663 border villages** located near India's northern borders.
  - **17 villages** have been identified for development along the **India–China border** in regions such as **Ladakh, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh**.
  - The programme focuses on improving **infrastructure, connectivity, and local livelihoods**.
- **Border Infrastructure Development**
  - **Border Roads Organisation (BRO)**
    - The **BRO** has completed **90 infrastructure projects** along the **India–China border**, worth about **₹2,941 crore**.
    - **Major strategic highways** under development include: Trans-Arunachal Highway; Frontier Highway; East–West Industrial Corridor Highway
- **Border Area Development Programme (BADP)**
  - The **BADP** is a **centrally sponsored scheme** aimed at improving the living conditions of people in **remote border areas**.
  - Funds are used for projects related to **infrastructure, livelihoods, education, health, agriculture, and allied sectors**.
- **Railway Connectivity**
  - **Indian Railways** is constructing **strategic railway lines in the Northeast** to enable **faster movement of troops and logistics** along the border.

Indian Cyber Crime Coordination Centre (I4C)

About

- The **Indian Cyber Crime Coordination Centre (I4C)** was launched in **2020** under the **Ministry of Home Affairs**.
- It serves as a **centralised framework to address cyber crimes in a coordinated manner**, including cyber fraud.

Objectives and Functions

- Acts as a **nodal agency to combat cybercrime** in the country.
- Focuses on cybercrimes against **women and children**.
- Facilitates **online reporting** of cybercrime complaints.
- Identifies cybercrime **trends and patterns** for better policy response.
- Functions as an **early warning system** for law enforcement agencies.
- Promotes **public awareness** on cybercrime prevention and **cyber hygiene**.
- Supports **capacity building of police, prosecutors, and judicial officers** in cyber forensics and investigation.

Core Components of I4C

- **National Cybercrime Threat Analytics Unit (TAU):** Analyses and reports cybercrime threats and trends.
- **National Cybercrime Reporting Portal (NCRP):** Enables 24×7 online reporting of cybercrime complaints across India.
- **National Cybercrime Training Centre (NCTC):** Provides training to law enforcement and government officials.
- **National Cybercrime Research and Innovation Centre:** Develops indigenous tools and technologies for cybercrime prevention.
- **Platform for Joint Cyber Crime Coordination Team:** Facilitates coordination and information sharing among States/UTs law enforcement agencies.
- **Cybercrime Ecosystem Management Unit:** Promotes public awareness and cyber hygiene practices.
- **National Cybercrime Forensic Laboratory Ecosystem:** Supports cyber forensic investigation by law enforcement agencies.

Other Key Initiatives under I4C

- **Citizen Financial Cyber Fraud Reporting and Management System:** Enables immediate reporting of financial frauds and helps prevent fund diversion in near real time.
- **National Helpline '1930':** Provides assistance for reporting cyber fraud complaints.
- **"CyberDost" Initiative:** Social media platform for disseminating cyber safety awareness.
- **Cyber Crime Volunteers Program:** Encourages citizen participation in reporting and preventing cybercrime.

HISTORY, ART & CULTURE

Topic: Art and Culture

Kalaripayattu

What is Kalaripayattu?

- One of the **oldest and most scientific martial art forms** in the world.
- Aimed at **mind and body** coordination.
- Originated and is widely practised in **Kerala.**
- **"Kalari"** in Malayalam refers to a **traditional gymnasium** where this martial art (**Payattu**) is taught.
- According to mythology, the warrior sage **Parasurama** is credited with establishing Kalaripayattu.

Four Stages of Kalaripayattu

- **Maippayattu:** Body conditioning phase that prepares the body for combat; must be completed before proceeding to the next stage
- **Kolthari:** Training with **wooden weapons** such as short sticks and long sticks for attack and self-defence
- **Angathari:** Introduction of **sharp metal objects** once the practitioner overcomes the fear of wooden weapon combat
- **Verumkai: Bare-hand fighting** where students are taught **body anatomy** to understand vulnerable pressure points

Keeladi Excavation

Context: The **Archaeological Survey of India (ASI)** has granted permission to the **Tamil Nadu State Department of Archaeology (TNSDA)** for conducting excavations at **eight historical sites**, including **Keeladi**.

About Keeladi Site

- **Keeladi** is a village in **Sivaganga district (Tamil Nadu)**, located about **12 km south-east of Madurai** along the **Vaigai river**.
- The site has emerged as an important archaeological centre for understanding early **South Indian civilisation**.
- The excavations (since 2015) reveal the presence of a well-developed **urban settlement**:
    - Settlement dated to around **6th century BCE** through **carbon dating**.
    - Evidence of **urban planning**: burnt brick houses, drainage systems, water tanks and wells.
    - Presence of **industrial activities** such as pottery, weaving, dyeing and bead-making.
    - Discovery of furnaces with **soot and ash**, indicating organised **manufacturing activity**.
    - Artefacts like **spindle whorls, terracotta beads and tools** reflect structured economic life.

    - Over **120 potsherds with Tamil-Brahmi inscriptions** found, including names like *Aathan* and *Uthiran*.
- **Link with Sangam Age**
    - Traditionally, the **Sangam Age** is dated between **3rd century BCE to 3rd century CE**.
    - Findings from Keeladi push this timeline **further back to 6th century BCE**.
    - A sample dated to **580 BCE** provides strong archaeological evidence.
    - The site helps bridge the gap between the **Iron Age** and the **Early Historic Period**.
- **Linkages with Indus Valley Civilisation**
    - Keeladi is associated with the **Vaigai Valley Civilisation**.
    - Some symbols on pottery show resemblance to **Indus Valley signs**.
    - However, there exists a **time gap of about 1000 years** between the two civilisations.
    - Iron Age materials in South India act as a **link between these phases**.

About Archaeological Survey of India (ASI)

- The **Archaeological Survey of India (ASI)** is the main government body that looks after India's **ancient monuments and archaeological heritage**.
    - **Founded:** 1861 by **Alexander Cunningham**
    - **Revived:** 1871 as a separate department
    - **Headquarters:** New Delhi
    - Works under the **Ministry of Culture**
- **Aim of ASI**
    - Protect and preserve **historical monuments and sites**.
    - Study and document India's **ancient past through excavations**.
- **Key Functions**
    - **Excavation & Survey:** Studies buried remains to understand history.
    - **Conservation:** Maintains **3,600+ protected monuments** under the **AMASR Act, 1958**.
    - **Research:** Publishes reports like *Indian Archaeology - A Review*.
    - **Underwater Archaeology:** Explores submerged heritage through a dedicated wing.

Hindu New Year Festivals

Context: Several **regional Hindu New Year festivals** are celebrated across India, reflecting **cultural diversity** with a shared **civilizational base.**

Common Feature

- Most festivals are celebrated in the **month of Chaitra (March–April)**.
- Based on **lunar or lunisolar calendars**.
- Mark the **beginning of a new year, agricultural cycle, and spring season**.

Major Festivals (Region-wise)

- **Chaitra Sukladi (North India)**
    - Marks the beginning of the **Hindu New Year (Vikram Samvat)**.
    - Associated with **King Vikramaditya of Ujjain**.
    - Vikram Samvat begins with **Chaitra month**.
- **Ugadi (Andhra Pradesh, Telangana, Karnataka)**
    - Derived from **"Yuga + Adi" (beginning of a new age)**.
    - Key ritual: **Panchanga Sravanam** (reading of almanac).
- **Gudi Padwa (Maharashtra, Goa)**
    - Also called **Samvatsar Padvo**.
    - Marks **Marathi New Year** and beginning of **Chaitra month**.
- **Cheti Chand (Sindhi Community)**
    - Marks **Sindhi New Year**.
    - Celebrates birth of **Jhulelal (Uderolal)**, patron saint of Sindhis.
- **Navreh (Kashmiri Pandits)**
    - Derived from **"Nava Varsha" (New Year)**.
    - Dedicated to **Goddess Sharika**.
- **Sajibu Cheiraoba (Manipur)**
    - Celebrated by the **Meitei community**.
    - Marks beginning of the **Manipuri lunar calendar year**.

World Buddhist Peace Conference 2026

Context: Hyderabad hosted the **World Buddhist Peace Conference 2026**, with participation from **delegates of over 20 countries**.

Key Facts

- The conference was organised by the **Buddhavanam project** under the **Telangana Tourism Development Corporation**, in collaboration with **international Buddhist institutions**.
- It aims to promote **Buddhist heritage diplomacy** and position **Telangana as a centre for Buddhist heritage and peace-building**.
- The event emphasises **Buddhist principles** such as compassion, non-violence, ethical values, and dialogue.
- It is part of efforts to **strengthen cultural ties**, particularly between **India and Sri Lanka**.

Buddhist Heritage in Telangana

- Key sites included in the proposed **Buddhist tourism circuit**:
  - Phanigiri
  - Dhulikatta
  - Nagarjunakonda
  - Buddhavanam (Nagarjunasagar)
- **Buddhavanam** is being developed as a **global centre for spiritual tourism and peace studies**.

Sangita Kalanidhi Award

Context: The **100th Conference and Concerts** of **The Music Academy, Chennai**, beginning in **December 2026**, will be marked by conferment of the **Sangita Kalanidhi award** on renowned **veena player Jayanthi Kumaresh**. **Bharatanatyam dancer Narendra G.** will receive the **Nritya Kalanidhi award**, announced **Music Academy President N. Murali** on Sunday.

Sangita Kalanidhi Award

- Translates as **"Treasure of Music and Art"**
- The **highest honour in Carnatic music**
- Awarded **annually** by the **Madras Music Academy**
- Recipients receive a **gold medal and a birudu patra (citation)**
- Since **2005**, the awardee also receives the **MS Subbulakshmi Award** instituted by **The Hindu**

About The Music Academy

- Established in **1928**
- Founded following a decision taken at the **Indian National Congress session** in Chennai in **December 1927**
- Objective was to promote **Carnatic music and Bharatanatyam**
- Lawyer, freedom fighter, and artiste **E. Krishna Aiyar** played a key role in reviving **Bharatanatyam**, which had suffered from its association with devadasis

Carnatic Music

- Classical music tradition of **South Indian states** including Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, and **southern Odisha**
- Emphasises **vocal music, intricate melodies, rhythms, and improvisations** based on **ragas and talas**
- Rooted in ancient Hindu traditions, particularly the **Samaveda**
- One of the **two main classical music traditions** of India, the other being **Hindustani music**
- Key instruments: **Violin, Mridangam, Tambura, Ghatam, and Veena**
- Uses the **Melakarta system**, a classification of **72 parent ragas (janaka ragas)**

Jnanpith Award

Basic Facts

- India's **oldest and most prestigious literary award**, instituted in **1961** by **Bharatiya Jnanpith**
- Recognises authors for exceptional contributions to literature in **Indian languages as well as English**
- **No posthumous category** i.e. it honours only **living writers**
- Recipients receive a **cash prize of ₹11 lakh**, a **statue of Vagdevi (Saraswati)**, and a **citation**

Evolution

- Originally recognised the **"most outstanding work"** with a citation plaque, cash prize, and **bronze replica of Saraswati**
- Criteria later shifted to works published in the **preceding twenty years**
- Cash prize increased to **₹1.5 lakh in 1981** and further to **₹11 lakh by 2015**

Selection Process

- Nominations received from **literary experts, critics, universities, and language associations**

- An **advisory committee** for each language constituted every **three years**, comprising **three literary critics and scholars**
- **Jnanpith Award Selection Board** evaluates nominations based on advisory committee recommendations
- **60th Award Selection Committee** was chaired by noted writer **Pratibha Ray**

Notable Recipients

Year	Recipient	Language	Significance
1965	G. Sankara Kurup	Malayalam	First ever recipient; awarded for *Odakkuzhal* (The Bamboo Flute)
1975	P.V. Akilan	Tamil	First Tamil writer to receive the award
1976	Ashapoorna Devi	Bengali	First woman recipient; awarded for *Prothom Protishruti* (The First Promise)
2002	D. Jayakanthan	Tamil	Second Tamil writer to receive the award
2025	R. Vairamuthu	Tamil	Third Tamil writer; first Tamil **poet** to receive the award

60th Jnanpith Award: R. Vairamuthu (2025)

- Tamil poet, lyricist, and writer born on **July 13, 1953** in Tamil Nadu
- Literary career spanning **more than four decades**
- Authored **more than 37 books** including poetry collections, essays, and novels
- Announced by **Bharatiya Jnanpith** in **March 2026**
- Third Tamil writer and **first Tamil poet** to receive the award, **23 years after Jayakanthan (2002)**
- **Notable Works**
  - *Kallikattu Ithikasam* → also won **Sahitya Akademi Award (2003)**
  - *Karuvachi Kaaviyam*
  - *Thanneer Desam*
  - *Moondraam Ulagapor*
- **Awards & Honours**
  - **National Film Award for Best Lyrics** won **7 times**
  - **Padma Shri** (2003)
  - **Padma Bhushan** (2014)
  - **Kalaimamani** awarded by Government of Tamil Nadu

Sahitya Akademi Literary Awards for 2025

Context: The **Sahitya Akademi** announced its **awards for 2025** in **24 recognized languages**.

More in News

- **Former diplomat Navtej Sarna** awarded in **English category** for novel **Crimson Spring** at this year's ceremony.
- **Hindi writer Mamta Kalia** receives award for memoir **Jeete Jee Allahabad** in Hindi language category.
- **Tamil author Sa Tamilselvan** awarded for work **Thamizh Sirukathaiyin Thadangal** in **literary criticism genre**.

About Sahitya Akademi Awards

- The **Sahitya Akademi Awards** are given annually for the **most outstanding books of literary merit** in recognised Indian languages.
- Covers **22 languages listed in the Constitution**, along with **English and Rajasthani**.
- Award includes a **plaque, shawl and ₹1 lakh prize money**.

Sahitya Akademi

- Established on **12 March 1954** by the Government of India.
- Registered under the **Societies Registration Act, 1860**.
- Functions as an **autonomous body** under the **Ministry of Culture**.
- **Headquarters:** New Delhi
- **Role and Functions**
  - Acts as the central institution for **literary promotion and dialogue** in India.
  - Supports **publication, translation and literary activities**.
  - Works across **24 languages**, making it unique in promoting linguistic diversity.

Topic:Modern History

Mahad Satyagraha (1927)

About Mahad Satyagraha

- Mahad Satyagraha (1927), led by Dr. B.R. Ambedkar, marked assertion of Dalit rights over public resources.
- **Background & Cause**
  - **Depressed Classes (Dalits)** faced denial of access to public spaces like water tanks, temples, and schools.
  - Social discrimination led to **systematic exclusion**, reinforcing economic, social, and political marginalization in colonial India.
  - Dr. Ambedkar emphasized **social reform along with political freedom**, highlighting need to dismantle caste hierarchy.
- **Legal Background**
  - **S.K. Bole Resolution (1923)** allowed Depressed Classes access to public places funded by government resources.
  - Bombay Government issued orders to implement resolution across **public institutions and water sources**.
  - Mahad Municipality opened **Chavdar Tank**, but dominant castes prevented its actual implementation.
- **Events of Mahad Satyagraha (1927)**
  - Conference held at Mahad on **19–20 March 1927**, organized by **Bahiskrit Hitkarini Sabha.**
  - Dr. Ambedkar led march to **Chavdar Tank and drank water**, asserting equal rights of Dalits.
  - Second phase in **December 1927** included **burning of Manusmriti**, rejecting caste-based social order.

Kakori Train Action (1925)

Context: Statues of Kakori train action martyrs were **demolished using bulldozer** allegedly during **road construction work** in **Shahjahanpur, Uttar Pradesh**, sparking **outrage** with **Opposition parties** demanding **action** against those responsible.

About

- **Kakori Train Action** took place on 9 August 1925 near Kakori, close to Lucknow in present-day Uttar Pradesh.
- Revolutionaries targeted a **British government treasury** being transported by train to fund their activities.
- The incident involved **Number 8 Down train** running between Shahjahanpur and Lucknow.
- It was one of the earliest **well-planned revolutionary actions** against colonial rule in India.

Background

- After the **Jallianwala Bagh massacre (1919)**, anger against British rule intensified among Indian youth.
- Suspension of the **Non-Cooperation Movement (1922)** created frustration among radical nationalists.
- Revolutionaries formed the **Hindustan Republican Association (HRA) in 1924** to organise armed resistance.
- The organisation aimed to **collect funds by targeting British government resources**, especially railway treasuries.

Key Personalities

- **Ram Prasad Bismil** was the main leader and planner of the Kakori action.
- **Ashfaqullah Khan** played a crucial role and symbolised Hindu-Muslim unity in the freedom struggle.
- Other participants included **Rajendra Lahiri, Keshav Chakraborty, Mukundi Lal, and Banwari Lal**.
- **Chandrashekhar Azad** was associated with HRA and helped in planning, though he escaped arrest later.

British Response

- The British government launched a **widespread crackdown**, arresting most of the revolutionaries involved.
- **Seventeen revolutionaries were imprisoned**, while several others received harsh punishments.
- Four leaders **Bismil, Ashfaqullah Khan, Rajendra Lahiri, and Roshan Singh** were executed.
- The incident dealt a **temporary setback to revolutionary activities**, weakening the HRA network.

ENVIRONMENT, ECOLOGY AND BIODIVERSITY

Topic: Conservation

Environmental CSR in India

Context

- **Companies Act 2013**: Companies with net worth **>₹500 crore**, turnover **>₹1,000 crore**, or net profit **>₹5 crore** must spend **2% of average net profits** on CSR
- Despite India's **net-zero by 2070** commitment at COP26, ecological needs remain **critically underrepresented** in CSR funding
- **Supreme Court** has reframed environmental spending as a **constitutional mandate under Article 51A(g)**, linking business rights with planetary restoration responsibility, not merely discretionary charity

Skewed CSR Spending Pattern

- Over seven years, CSR funds allocated to: **Education 38%, Healthcare 22%, Rural Development 10%,** while the environment received only **7-9%**
- Corporations view environmental crises as **distant threats** compared to immediate, visible social needs
- **Commendable Exceptions:**
    - **Mahindra's Project Hariyali**: planted **25 million trees**, focusing on survival rates not sapling counts
    - **ITC Forestry Programme**: spans **1.3 million acres**, integrating livelihoods with conservation
    - **Tata Group**: watershed management for water conservation
    - **JSW**: mangrove restoration; **Coca-Cola and HUL**: circular waste management

Key Challenges

- India aims to restore **26 million hectares by 2030** under the **Bonn Challenge**, yet private companies contributed a negligible **2% of the 9.8 million hectares** restored so far
- Companies prefer **"quick win" projects** like renewable energy installations, awareness drives, and green branding, which offer rapid visibility over genuine ecological impact
- Land-based restoration (forest recovery, watershed, habitat) requires **long gestation periods** and **expert ecological skills** that most CSR partners lack
- **Miyawaki plantations** are popular but compromise **native ecology and biodiversity**, prioritising optics over genuine restoration
- **Urban bias** in target area selection and poor collaboration with forest departments weaken outcomes
- A massive **"restoration gap"** exists between the ecological damage caused by industry and the investment made to repair it

Judicial & Constitutional Shift

- **Supreme Court's observations** on **Great Indian Bustard habitat** destruction by energy firms catalysed the reframing of corporate environmental responsibility
- By invoking **Article 51A(g)** (fundamental duty to protect and improve the natural environment), the Court established that environmental responsibility is **constitutionally grounded, not merely regulatory**
- Signals a shift from **shareholder-centric to ecosystem-centric corporate governance**, with directors acting as **fiduciaries for the environment**
- Aligns with India's international commitments under the **Paris Agreement, CBD, and Bonn Challenge**

Way Forward

- **Mandate minimum 25-30% environmental CSR spending** for high ecological footprint industries, including mining, energy, and manufacturing
- **National Restoration Project Registry**: companies adopt specific degraded landscapes, creating accountability and preventing duplication
- **Reform CSR reporting**: replace activity counts with **verified ecological outcomes** such as soil carbon sequestration, water retention, and biodiversity recovery; make **third-party ecological audits mandatory**
- **Build CSR partner capacity** through certification programmes in ecological restoration, soil science, and biodiversity monitoring
- **Restoration Trust or Escrow Fund**: guarantee long-term financing continuity for landscape-scale projects requiring decades of impact
- **Link environmental performance** to regulatory approvals, tax incentives, and public procurement eligibility for **market-based incentives**
- Prioritise **degraded and remote forest lands** as

primary targets to correct urban bias
- Build **alliances** between forest departments, universities, NGOs, and **Joint Forest Management Committees** under scientific supervision

Conclusion
- India's CSR framework stands at a **turning point**. The judicial invocation of **Article 51A(g)** has elevated environmental responsibility from corporate discretion to a **constitutional obligation**. Corporate India must move past basic compliance and embrace **genuine ecosystem stewardship**, treating planetary health as a **mandatory, non-negotiable component of business strategy**. Only then does sustainable development transition from an aspirational goal to a **lived national reality**.

Topic: Climate Change

Climate Change And International Legal Reforms

Context
- Climate change is no longer just an environmental challenge; it is beginning to **unsettle the fundamental principles of international law itself**
- States have so far focused only on **burden-sharing formulas and biophysical impacts**, while deeper legal consequences remain entirely unaddressed
- **Three core pillars of international law** face direct challenge:
    - Permanent Sovereignty over Natural Resources (PSNR)
    - Territorial basis of statehood
    - Maritime zone boundaries
- **The Fossil-Fuel Non-Proliferation Treaty** is gaining momentum, first raised at **COP28 and again at COP30**, to keep large reserves permanently underground and limit warming to **1.5°C**

Challenges To International Law
- **Crisis of Statehood**
    - **The Montevideo Convention of 1933** established four criteria for statehood: territory, permanent population, government, and capacity to enter relations with other states
    - None of these criteria **accounts for climate-induced territorial loss**
    - **ICJ Advisory Opinion**: disappearance of a state's constituent elements does not necessarily entail loss of statehood, though scholars have called this a **"very modest legal claim"**
    - **Pacific Islands Forum (2023)** declared that international law does not contemplate the demise of small island states due to climate-related sea level rise
- **UNCLOS and Maritime Boundaries**
    - Rising sea levels threaten to **shift baselines** (legal expression of a coastline), affecting territorial seas, contiguous zones, **Exclusive Economic Zones (EEZ)**, and continental shelves
    - Small island states are declaring **existing baselines as permanent**, conflicting with the **ambulatory baseline approach** under UNCLOS, which requires baselines to reflect actual coastal geography
    - Accepting either approach demands **fundamental changes in UNCLOS interpretation,** with enormous implications for resource rights and fishing zones
- **Climate Refugees: A Legal Vacuum**
    - **The 1951 Refugee Convention** defines refugees based on persecution (race, religion, nationality, political opinion); climate-displaced persons **do not fit this definition**
    - People displaced by sea level rise lose not just their homes but **all the protections and benefits** that accrued to them in their country of origin
    - Absence of a dedicated legal framework leaves **millions of potential climate refugees** without recognised rights, status, or resettlement pathways
    - Expert **Frank Biermann** proposes a **separate Protocol to the UNFCCC** for recognition, protection, and resettlement of climate refugees

Impact on State Sovereignty
- **Permanent Sovereignty over Natural Resources (PSNR)** is a foundational right representing developing countries' resolve for **economic independence**, now facing pressure from global decarbonisation demands

- Developing countries may accept limited obligations on PSNR as a **"common concern of mankind"**, but these must:
    - Not be permanent
    - Not disregard the interests of **fossil-fuel-dependent economies**
- Developed countries must provide **climate finance and carbon-neutral technologies before** imposing limits on sovereign resource rights

Way Forward

- **UNFCCC COP forums** must apply equitable principles addressing gaps in existing international law for vulnerable nations
- **UNCLOS renegotiation**: urgent multilateral deliberation on baseline rules and maritime zones affected by rising sea levels
- **UNFCCC Protocol**: negotiate a dedicated framework for recognition, protection, and resettlement of climate refugees globally
- **PSNR, statehood, and maritime boundaries** must be collectively renegotiated as a priority, not deferred
- Developed countries must fulfil **climate finance obligations** before imposing decarbonisation limits on sovereign resource rights

Conclusion: Climate change has pushed international law to its **conceptual limits**, exposing critical gaps in statehood, maritime boundaries, and refugee protection. Reforming **UNCLOS, the Refugee Convention, and PSNR frameworks** is no longer a legal exercise but a **civilisational necessity** that the multilateral community cannot afford to defer.

India's New Climate Targets

	NDC-1	NDC-2	NDC-3	PROGRESS
Year of announcement	2015	2022	2026	
Target year	2030	2030	2035	
Goal 1: Reducing emissions intensity (emissions per unit GDP)	**33-35%** from 2005 levels	**45%** from 2005 levels	**47%** from 2005 levels	**36%** reduction achieved by 2020
Goal 2: Share of non-fossil electricity sources	40%	50%	60%	**52%** in February 2026
Goal 3: Creating additional carbon sinks (forests, trees)	**2.5 to 3 bn tonnes** over 2005 stock	**2.5 to 3 bn tonnes** over 2005 stock	**3.5 to 4 bn tonnes** over 2005 stock	**2.3 bn tonnes** created by 2021

Context: India has announced its updated **Nationally Determined Contributions (NDCs) for 2035**, signalling continued commitment to a clean energy transition despite global uncertainties.

Key Features of India's Updated Climate Targets

- India aims to reduce **emissions intensity** of GDP to **47% below 2005 levels by 2035**, improving upon the 45% target for 2030.
- It targets **60% of installed electricity capacity** from non-fossil fuel sources by 2035, up from 50% earlier.
- India has already achieved **36% emissions intensity reduction** by 2020.
- Non-fossil fuel capacity has reached **52% (February 2026)**.
- Carbon sink creation target increased to **3.04 billion tonnes**, compared to 2.5–3 billion tonnes earlier.

Significance of the New Targets

- Demonstrates India's continued commitment to **climate leadership**, even as global momentum weakens.
- Reflects a **balanced approach** between development needs and climate responsibility.
- Signals policy continuity despite global uncertainties like reduced climate financing.
- Enhances India's credibility in international climate negotiations.

Challenges

- **Global Context and Emerging Challenges**
    - Global climate action is weakening, with some developed countries retreating from **renewable commitments**.
    - The U.S. has scaled back international climate financing and multilateral engagement.
    - Developed countries have not fulfilled the promised **$100 billion annual climate finance**.
    - Developing nations, including India, face constraints due to lack of **financial support**.
- **India's Strategic Position and Constraints**
    - India is among the most vulnerable countries to **climate change impacts**, necessitating adaptive strategies.
    - It has limited fiscal capacity to accelerate transition without adequate **international funding**.

- India has argued for greater focus on **adaptation and resilience** rather than only mitigation.
- Dependence on fossil fuels persists due to developmental and energy security needs.

Way Forward

- India should continue expanding **renewable capacity** in a phased manner, ensuring that the transition does not disrupt economic growth or energy security.
- There is a need to **balance mitigation** with stronger emphasis on **climate adaptation**, especially given India's vulnerability to climate impacts and developmental priorities.
- India must persistently push for **adequate climate finance**, highlighting that developed countries have not fulfilled commitments such as the $100 billion annual support.
- **Strengthening domestic capacity** through consistent policy signals will help sustain progress in **non-fossil energy expansion** and carbon sink creation.
- India should adopt a flexible approach that allows it to scale ambition based on availability of **technology and financial support**, rather than committing to unrealistic targets.
- In global negotiations, India must continue advocating for **equity and differentiated responsibilities**, ensuring that developing countries are not overburdened.
- A calibrated transition strategy should ensure that fossil fuel dependence is reduced gradually, without undermining **industrial growth and development needs**.

Conclusion

- India's updated climate targets reflect a pragmatic balance between ambition and feasibility. While modest in scale, they reinforce India's commitment to a **sustainable and equitable energy transition** in a challenging global context.

PRELIMS

Topic: Pollution

Hypercapnic Hypoxia in Mangroves

Context: Recent study shows most mangrove ecosystems are already experiencing mild to severe **hypercapnic hypoxia conditions**.

Overview

- **Hypercapnic hypoxia** refers to condition of **high carbon dioxide levels combined with low oxygen availability**.
- It creates a **stressful chemical environment** affecting survival of aquatic organisms in estuarine ecosystems.
- Commonly observed during **low tide, low salinity conditions, and in warm tropical mangrove regions**.
- **Causes**
  - **Rising atmospheric CO_2 levels** due to climate change increase carbon dioxide concentration in coastal waters.
  - **Temperature rise** reduces oxygen solubility in water, intensifying hypoxic conditions in mangrove ecosystems.

Impact on Biodiversity

- It threatens **fish nurseries**, as mangroves serve as critical breeding and feeding grounds for marine species.
- Leads to **decline in biodiversity** and deterioration of habitat quality for aquatic organisms.
- Affects **fisheries and livelihoods** of communities dependent on mangrove-based resources.
- Causes **shift in species composition**, reducing presence of large reef-associated fish species.

Biogas

What is Biogas?

- Biogas is an **energy-rich gas** produced during the **anaerobic digestion** (breakdown without oxygen) of biomass
- Primarily composed of
  - **methane, carbon dioxide, water vapour, and hydrogen sulphide.**
- Mainly used in **wastewater treatment plants** for electricity generation or natural gas production

Types of Biogas

- **Liquid Biogas (LBG):**
  - Derived from biogas through a **liquefaction process**

  - A clean vehicle fuel and eco-friendly substitute for **heating and electricity generation**
  - Easier to **store and transport** and helps reduce emissions
- **Compressed Biogas (CBG):**
  - Formed by **compressing biogas**
  - Contains **more than 90% methane**
  - A high-density fuel increasingly used in **transportation** as an alternative to fossil fuels

Biogas Production: Key Stages

- **Pre-treatment and Digestion:** Organic substrates enter the digester; some may require pre-treatment before entry.
- **Fermentation:** Microorganisms degrade organic matter in the **absence of light and oxygen** at a controlled temperature.
- **Biogas Production:** Fermentation yields biogas, primarily **methane and carbon dioxide.**
- **Digestate Extraction:** Residual digestate is removed and it acts as a **nutrient-rich, eco-friendly fertiliser.**
- **Biogas Purification:** Water, impurities, and hydrogen sulphide are removed to yield **biomethane** thus suitable for energy and heat generation.

Biogas in India

- More than **5.1 million biogas plants** installed across India
- Majority are **household/community type** producing **1–25 cubic metres per day** for cooking fuel needs
- Total biogas generation capacity: approximately **4.43 million cubic metres per day (MCD)**, equivalent to around **47 gigawatts or 3.2 billion cubic metres per year**

Government Initiatives

- **National Biogas Programme (NBP):**
  - Develops biogas plants for **clean cooking fuel and decentralised power generation**
  - Aims to improve **sanitation, management of plant slurry**, create rural employment, and reduce greenhouse gas emissions
- **SATAT Initiative:**
  - **Full form:** Sustainable Alternative Towards Affordable Transportation
  - Encourages entrepreneurs to establish **CBG plants** and supply to **Oil Marketing Companies (OMCs)** for use as automotive and industrial fuel
- **GOBARdhan Scheme:**
  - **Full form:** Galvanising Organic Bio-Resources Dhan
  - Converts organic waste like **cow dung and agricultural residue** into energy and wealth
  - Part of the **Swachh Bharat Mission (SBM)**
  - Aims to improve **village cleanliness and environmental sanitation**
- **RUCO Initiative:**
  - **Full form:** Repurpose Used Cooking Oil
  - Launched by **FSSAI (Food Safety and Standards Authority of India)**
  - Aims to prevent reintroduction of Used Cooking Oil (UCO) into the food supply
  - Creates a legal framework to redirect UCO towards **waste-to-wealth industries like biogas production**

Methane

Context: Satellite data shows **Turkmenistan hosts many of world's largest methane emission sites** from oil and gas sector.

Basic Facts

- **Methane (CH_4)** is a potent greenhouse gas and major contributor to global warming.
- It accounts for about **30% of global temperature rise since the Industrial Revolution**.
- Atmospheric concentration is **around 2.5 times higher than pre-industrial levels**.
- **Sources**
  - Major anthropogenic sources include **agriculture, energy sector, and waste management activities**.
  - It is the **primary component of natural gas** and released during fossil fuel extraction.

Key Characteristics

- Methane is a **colourless, odourless, and highly flammable gas**, also called marsh gas.
- It remains in atmosphere for about **12 years**, shorter than carbon dioxide.

- However, it has **much higher heat-trapping capacity in short term compared to CO_2**.

Global Warming Potential

- Methane is about **86 times more effective than CO_2 at trapping heat over 20 years**.
- Over longer period, it contributes around **28 times more warming per unit mass than CO_2**.
- Plays a major role in **short-term climate change and rapid temperature rise**.

Topic: Conservation

National Tiger Conservation Authority (NTCA)

About NTCA

- **Statutory body** under the Ministry of Environment, Forest and Climate Change **(MoEFCC)**
- Established in **2006** under the **Wildlife Protection Act, 1972**
- Provides **statutory authority** to Project Tiger
- **Project Tiger** is a **Centrally Sponsored Scheme** of MoEFCC for **in-situ conservation** of tigers in designated tiger reserves

Composition

- **Chairperson:** Minister in charge of MoEFCC
- **Vice-Chairperson:** Minister of State in MoEFCC
- Three Members of Parliament + Secretary (MoEFCC) + other members

Key Functions

- Approves the **Tiger Conservation Plans** prepared by State Governments
- Lays down **normative standards for tourism** in the core and buffer areas of tiger reserves
- Ensures tiger reserves and **wildlife corridors** are not diverted for ecologically unsustainable uses
- Any diversion requires approval of the **National Board for Wildlife (NBWL)** and advice of NTCA
- Approves and coordinates **research and monitoring** on tigers, prey, and habitats
- Addresses **human-wildlife conflict** and promotes coexistence
- Supports the **capacity building** of tiger reserve staff and officers

Objectives

- Fosters **Centre-State accountability** in Tiger Reserve management through MoUs
- Provides **Parliamentary oversight** of tiger conservation
- Addresses the **livelihood interests** of local communities around tiger reserves

Tropical Forest Forever Facility (TFFF)

What is TFFF?

- The **Tropical Forest Forever Facility (TFFF)** is a proposed **global investment fund** created to support the long-term conservation of **tropical forests**.
- It aims to reward **developing tropical forest countries** for protecting their **old-growth forests** instead of clearing them for economic activities.

How the Initiative Works

- Countries will receive **financial incentives** for keeping forests intact.
- Payments will be based on **annual satellite monitoring**, ensuring **transparent forest tracking**.
- Around **74 tropical forest countries** are expected to benefit from the mechanism.

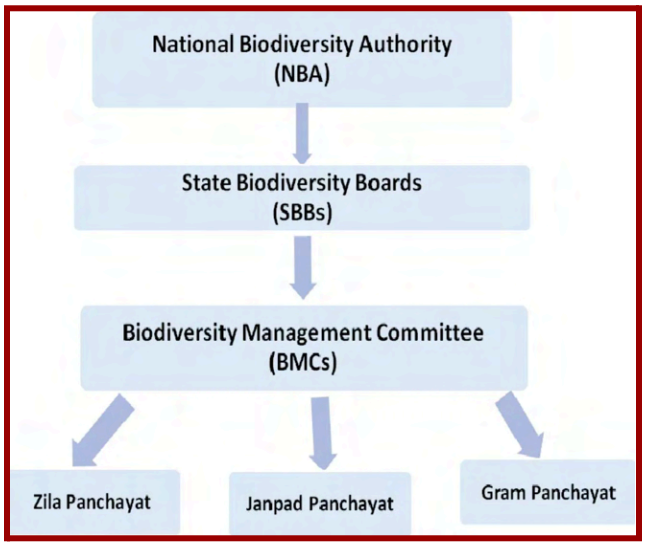
Funding Structure

- The initiative aims to mobilise about **USD 125 billion**:
  - **USD 25 billion** from **governments and philanthropies**.
  - **USD 100 billion** from **private investors**.
- The fund will invest in **public and corporate bonds**, and the returns will be distributed to participating countries as **incentives for forest protection**.

Significance

- Encourages countries to view **standing forests as valuable assets**.
- Helps protect forests that support **carbon storage, climate regulation and biodiversity**.
- Seen as a major initiative giving the **Global South a leading role in forest conservation**.

Biodiversity Management Committees (BMCs)



Context: Around **2.76 lakh** Biodiversity Management Committees **(BMCs)** have been established across India. They also play a key role in ensuring **fair benefit-sharing** under the **Nagoya Protocol**.

About Biodiversity Management Committees (BMCs)

- **BMCs** are local-level bodies constituted under the **Biological Diversity Act, 2002**.
- They are set up by **local bodies** to promote **conservation, sustainable use and documentation of biodiversity**.
- **Composition**
  - Consists of a **Chairperson + up to 6 members** nominated by the local body.
  - At least **one-third members must be women**.
  - Minimum **18% representation** for **SC/ST communities**.
- **Key Function**
  - The most important role of BMCs is to prepare the **People's Biodiversity Register (PBR)**.
  - This is done in consultation with **local communities**, documenting **local biological resources and traditional knowledge**.

Nagoya Protocol

- The **Nagoya Protocol** is a **legally binding international agreement** under the **Convention on Biological Diversity (CBD)**.
- It focuses on **access to genetic resources** and **fair and equitable sharing of benefits** arising from their use.
  - **Adopted:** 2010 (Nagoya, Japan)
  - **Came into force:** 12 October 2014
- **Objective**
  - To ensure that benefits from the use of **genetic resources** are shared **fairly and equitably**.
  - It supports one of the key goals of CBD: **benefit-sharing**.
- **Key Features**
  - Provides a **transparent legal framework** for access and benefit-sharing (ABS).
  - Ensures that countries and communities providing resources get a **share in benefits**.
  - Covers both **genetic resources** and **traditional knowledge (TK)** linked to them.
- **Benefits**
  - Encourages **research and innovation** in biotechnology with legal clarity.
  - Ensures **benefit-sharing** (monetary or non-monetary) with provider countries.
  - Protects the rights of **indigenous and local communities**, especially their **traditional knowledge**.

Prosopis Juliflora

Context:
Madras High Court issued directions for **eradication of Prosopis juliflora**, recognising its harmful ecological impact.

Basic Facts

- **Prosopis juliflora** is a shrub or small tree belonging to **Fabaceae family (mesquite group)**.
- It is native to **Mexico, South America, and the Caribbean region**.
- Introduced in India during **British period (1920s)** for afforestation and land development purposes.
- Known locally as **seemai karuvelam, vilayati kikar, gando baval, and Bellary jaali**.

Key Characteristics

- Shows **high ecological adaptability**, growing in sandy, clayey, saline, and alkaline soils.
- Thrives in **arid and semi-arid regions** with wide rainfall range from 50 mm to 1500 mm.
- Exhibits **rapid and aggressive growth**, enabling it to outcompete native plant species.
- Can grow across **wide altitude range**, making it highly resilient invasive species.

Environmental Impacts

- Consumes large amounts of water, **depleting groundwater resources in already water-stressed regions**.
- Leads to **decline of native biodiversity** by replacing indigenous vegetation and grasslands.
- Causes **habitat loss for animals and birds**, reducing ecological balance of ecosystems.
- Contributes to **land degradation and erosion** due to disappearance of natural grass cover.
- May negatively affect **soil and groundwater quality** in invaded areas.

CMS Report on Migratory Wildlife

About the Report

- An **interim report** updating the landmark **State of World's Migratory Species**, first released in **2024.**
- Published under the **UN's Convention on the Conservation of Migratory Species of Wild Animals (CMS).**
- Based on data from the **IUCN Red List** of threatened species and population trends documented in scientific literature.

Key Findings

- **49% of migratory species** protected under CMS are **declining in population.**
- **24%** of migratory species are now **facing extinction.**
- Threat of population decline has **risen 5% in just two years.**
- Percentage of species facing extinction has **risen by 2%** over the same period.
- Out of **1,189 total species** listed under the global treaty, **582 migratory species** face population decline challenges.

Species at Risk

- Species facing population declines range from **many bird species** (with flu recognised as a threat, including mass mortality) to:
    - **Ungulates/hooved animals**: Wildebeest and Llama
    - **Freshwater fish**
    - **Marine species**: Sharks, rays, and turtles
- Between **2002 and 2021**, mobility declined significantly for the **Mongolian Gazelle**
- **India-Specific Concerns**
    - Pronounced long-term declines in **migratory shorebirds** noted at **coastal sites in India**
    - **Sharks and rays** in the **northern Indian Ocean** are facing **extinction risk**
    - **Vulture populations** are improving slowly in **South Asia**

Topic: Species in News

Project Cheetah

About Cheetah

- **Scientific name:** Acinonyx jubatus
- The **fastest land animal** thus relies on **speed rather than strength** to hunt
- A **diurnal predator** that hunts by **sight and speed**, not ambush
- **Cannot roar** thus communicates through chirps, purrs, growls, and hisses
- **Females are solitary**; **males form coalitions** (usually brothers)
- Gestation period: **90–95 days**; gives birth to **3–5 cubs**

Historical Background

- Cheetahs were once widely found across the **Indian subcontinent**
- Decline caused by **excessive hunting, habitat loss, and decline in prey base**
- Officially declared **extinct in India in 1952**
- Early reintroduction proposals discussed in the **1970s** but did not materialise

Project Cheetah: Launch & Implementation

- Launched in **2022** after extensive scientific studies
- Implemented under the **Ministry of Environment, Forest and Climate Change**
- First batch of **African cheetahs from Namibia** released into **Kuno National Park, Madhya Pradesh**
- Second batch arrived from **South Africa in 2023**

Key Objectives

- Reintroduce cheetahs after a gap of **more than 70 years**
- Establish a **viable, free-ranging, self-sustaining** cheetah population
- Restore **grassland and savannah ecosystems**

- Re-establish a **top predator** in the food chain
- Promote **eco-tourism and local livelihoods**

Current Status (2025)

- Around **30 cheetahs** are currently present in India, including translocated adults and India-born cubs
- **Multiple litters** born in Kuno thus indicating successful adaptation
- Nearly **two-thirds** of the current population are **India-born cubs**
- **Kuno National Park** remains the primary habitat
- **Gandhi Sagar Wildlife Sanctuary** has emerged as the **second cheetah site**
- **Future target: 60–70 cheetahs** across interconnected landscapes in central India

Nilgiri Tahr (Nilgiritragus hylocrius)

Basic Facts

- **Nilgiri Tahr** is a caprine ungulate endemic to Western Ghats, locally called Varayaadu or Nilgiri Ibex.
- It is mainly found in **Tamil Nadu and Kerala**, with Tamil Nadu recognizing it as state animal.
- Scientifically known as **Nilgiritragus hylocrius**, it is unique among mountain ungulates of southern India.

Habitat & Distribution

- It inhabits **montane grasslands and shola forests** at elevations between 1,200 and 2,600 metres.
- Prefers **steep grassy slopes and rocky cliffs**, typical of high-altitude Western Ghats landscapes.
- **Eravikulam National Park** in Kerala supports the largest population of Nilgiri Tahr.
- Smaller populations occur in **Palani Hills, Srivilliputtur, Meghamalai, and Agasthiyar ranges**.

Behaviour & Ecology

- Nilgiri Tahr is a **diurnal species**, remaining active and grazing during daytime hours.
- Average lifespan is around **3–3.5 years**, though individuals may live up to 9 years.
- Acts as **important prey for tiger and leopard**, contributing to ecological balance.
- Shares habitat with endemic species like **Nilgiri langur and lion-tailed macaque**.

Threats & Conservation

- Major threats include **habitat loss from deforestation, hydroelectric projects, and monoculture plantations**.
- **Livestock grazing and poaching** further degrade habitat and reduce population sustainability.
- Local extinction observed in **Karnataka highlands**, indicating shrinking distribution range over time.
- **IUCN status is Endangered**, reflecting high extinction risk in wild populations.
- Listed under **Schedule I of Wildlife Protection Act, 1972**, ensuring highest legal protection.

Red-Crowned Roofed Turtle

About and Distribution

- The **Red-Crowned Roofed Turtle** is a **freshwater turtle species endemic to South Asia**.
- It belongs to the genus **Batagur**, which includes **three large freshwater turtle species found in India**.
- The species is distributed in **India, Bangladesh, and Nepal**.
- It was historically widespread in the **Ganga River system** and is also found in the **Brahmaputra basin**.

Key Features and Ecological Role

- Males are **significantly smaller**, reaching only about **half the length of females**.
- The species is characterised by a **reddish-orange head with a black crown** and a **greenish-brown carapace with yellow patterns**.
- The **plastron (lower shell)** is **yellow with black markings**.
- It is **omnivorous**, feeding on both **plant and animal matter**.
- It acts as a **bio-indicator of river health**, reflecting the ecological condition of freshwater systems.
- It contributes to **nutrient cycling**, thereby supporting the **overall aquatic ecosystem**.

Conservation Status

- **IUCN Red List:** Critically Endangered
- **CITES:** Appendix II
- **Wild Life (Protection) Act, 1972:** Schedule I

Hudsonian Godwit

Context: The population of **Hudsonian Godwit** has declined by nearly **95% in last four decades**, raising serious conservation concerns.

Basic Understanding

- Hudsonian Godwit is a **large migratory shorebird** belonging to the sandpiper family *Scolopacidae*.
- Scientifically known as **Limosa haemastica**, it is famous for its **extraordinary long-distance migration**.
- Considered one of the **world's most remarkable avian travellers** due to its endurance and navigation ability.

Habitat & Distribution

- Breeds in **wetland ecosystems like sedge meadows and muskeg** in sub-Arctic and Boreal regions.
- Found across **North America during breeding season** and migrates to South America.
- Spends non-breeding period in **southern regions like Patagonia**.
- Depends heavily on **coastal wetlands and shallow water ecosystems** during migration.

Unique Features

- Has **long legs and slightly upturned bill**, adapted for feeding in shallow waters.
- Shows **distinct breeding plumage of gold, brown and reddish tones**, turning grey-brown later.
- Can fly nearly **11,000 km non-stop without food, water or rest**, a rare biological feat.
- Feeds mainly on **insects and crustaceans by probing into soft mud or shallow water**.

Threats

- **Habitat loss** due to wetland degradation is a major concern across its migratory route.
- **Climate change** affects breeding grounds and food availability in Arctic regions.
- Being a long-distance migrant, it faces **multiple threats across different countries and ecosystems**.

Conservation Status

- Listed as **Vulnerable in IUCN Red List**, indicating high risk of population decline.
- Sharp population decline highlights importance of **international conservation cooperation**.

Chhapgarus Ngankeeae

Context: Zoological Survey of India discovered a **new crab species from mangrove ecosystems of Goa**.

Overview

- **Chhapgarus ngankeeae** is a newly identified species of marine crab from India.
- Named in honour of **Dr Ngan Kee Ng**, a noted marine biologist.
- Found in **mangrove habitats along the west coast of India**, especially intertidal zones.
- **Habitat**
    - Occurs in **muddy intertidal mangrove forests**, which experience regular tidal flooding and exposure.
    - Mangrove ecosystems provide **nutrient-rich and sheltered environment for such small crustaceans**.

Key Characteristics

- It is a **small-sized crab**, measuring around 1.6 cm across its squarish shell.
- Body is **brown and hairy**, helping in camouflage within muddy mangrove environment.
- Shows **narrow abdomen with equal width of second and third segments**.
- Tailpiece (telson) is **as broad as its length**, a distinctive morphological feature.
- Male reproductive organ (gonopod) has **unique V-shaped constriction with unequal lobes**.

Ecological Significance

- Mangrove crabs play role in **nutrient recycling and maintaining productivity of coastal ecosystems**.
- They support **food chains and overall health of mangrove biodiversity systems**.

Topic: Protected Areas

Pobitora Wildlife Sanctuary

Context: National Board for Wildlife approved proposal to **rationalise boundaries of Pobitora Wildlife Sanctuary in Assam**.

Location & Establishment

- **Pobitora Wildlife Sanctuary** is located in the state of Assam.
- It was established in **1998** to protect rich biodiversity of Brahmaputra floodplains.
- Comprises **Rajamayong Reserve Forest and Pobitora Reserve Forest**.

Physical Features

- Region forms part of **floodplains of Brahmaputra River**, supporting fertile and dynamic ecosystems.
- Landscape is dominated by **alluvial grasslands and tall elephant grass vegetation**.

Flora

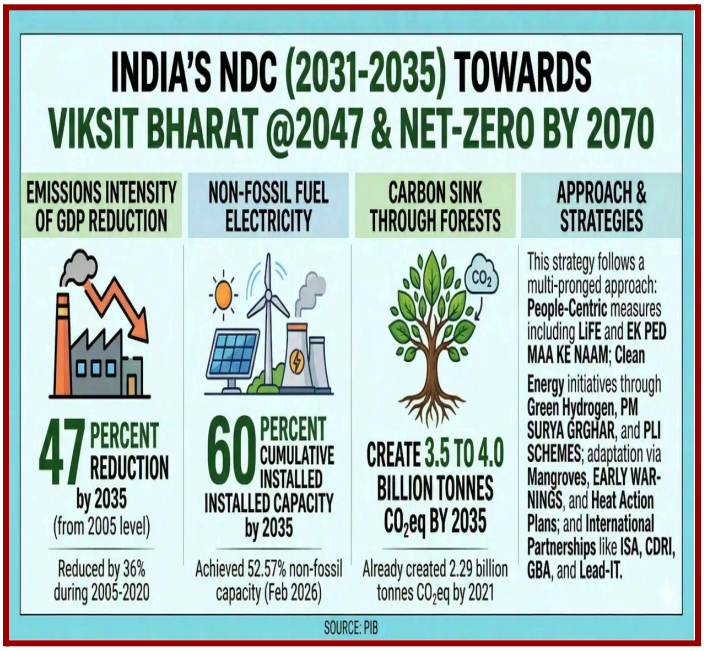
- Around **72% area consists of wet savannah grasslands** with species like Arundo, Saccharum, and Phragmites.
- **Water hyacinth** is a major invasive species, affecting aquatic ecosystem and waterfowl habitats.

Fauna

- Sanctuary has highest density of **Greater One-Horned Rhinoceros** in India.
- Other species include **leopard, wild boar, barking deer, and wild buffalo**.
- Important site under **Indian Rhino Vision 2020** programme.

Topic: Miscellaneous

India's Updated Climate Targets (NDC)



Why in News: India has updated its climate commitments under its **Nationally Determined Contributions**, setting **targets for 2035.**

Nationally Determined Contributions (NDCs)

- NDCs are climate targets communicated to the United Nations Framework Convention on Climate Change.
- They outline national actions towards **emission reduction and energy efficiency improvement**.
- India submits NDCs as part of its commitment under the Paris Agreement.

India's Climate Targets: 2030 and 2035

- **Targets for 2035**
  - **60% installed electric capacity** from non-fossil fuel sources.
  - **47% reduction** in emissions intensity of GDP from 2005 levels.
  - **Carbon sink** of 3.5 to 4 billion tonnes CO_2 equivalent.
- **Existing Targets for 2030**
  - **50% installed electric capacity** from non-fossil sources.
  - **44% reduction** in emissions intensity of GDP from 2005 levels.
  - **Carbon sink** of 2.5 to 3 billion tonnes CO_2 equivalent.

India's Current Status and Energy Profile

- **52% of installed electric capacity** is already from non-fossil sources.

- Only about **25% of actual electricity generation** is non-fossil.
- **36% reduction** in emissions intensity achieved during 2005–2020.
- **1.97 billion tonnes CO_2 equivalent carbon sink** created between 2005 and 2019.
- **Non-fossil sources include:** solar, wind, hydropower, biomass and nuclear power.

Global Climate Process and Key Facts

- **Conference of Parties (CoP)** meets annually to discuss climate issues and energy transition.
- As of **December 31, 2025**:
  - India and Argentina had not announced 2035 NDCs.
  - **128 parties** submitted new NDCs.
  - These covered about **78% of global greenhouse gas emissions**.
  - Included **21 Small Island Developing States, 19 Least Developed Countries and 18 G20 members**.

Forest and Carbon Sink Status

- Forest and tree cover is **24.6% of geographical area (2021)**.
- Increased from **21% in 2005**.
- Below the national policy goal of **33% forest cover**.

SCIENCE, TECHNOLOGY AND HEALTH

Topic: IT, Computer, Robotics, Bio-Technology

AI for Inclusive Development

Context: At the **India AI Impact Summit 2026**, a set of **AI Impact Casebooks** were released documenting **real-time AI deployments** benefiting farmers, students, patients, and the physically challenged across the Global South.

AI for the Physically Challenged

- **For the Visually Impaired**
  - **PathPal** is an edge-AI system enabling users to point their smartphone at **handwritten notices, printed text, or currency notes** to receive instant spoken feedback in their preferred language, functioning even in areas with unstable internet connectivity.
  - **SMARTON** uses advanced computer vision to understand document structure, converting tables, diagrams, and charts into structured audio explanations, serving over **15,000 users** across schools and NGOs.
- **For the Hearing and Speech Impaired**
  - **Shruti AI** provides real-time voice-to-Indian Sign Language translation, bridging the communication gap for the deaf.
  - **Vaani AI** offers augmentative and alternative communication support for individuals with autism or speech impairments, using intent prediction and contextual prompts to reduce caregiver dependence.
- **For Physical Rehabilitation**
  - **Pheezee** is an AI-powered wearable integrating joint mobility sensors and surface muscle activity sensors to quantify muscle recovery for patients suffering from strokes or amputations.

AI for Agriculture and Farmer Welfare

- Traditional **agricultural extension systems** are severely strained without timely guidance.
- **MapMyCrop** monitors sugarcane farms using **multi-sensor satellite** imagery to predict the precise **15-day window** when **sucrose levels peak**, helping farmers boost yields from 98–148 tonnes per hectare to up to 358 tonnes, **a 57% improvement**.
- The **Chemistry-Aware Crop Yield Prediction system** uses physics-guided machine learning to detect **hidden soil toxicities and nutrient imbalances**, enabling farmers to **reduce nitrogen use by 28%** while simultaneously boosting yields.
- **MahaVISTAAR (Maharashtra)** and **FarmAdvice (Africa)** use **natural language processing** and **voice-first interfaces** to deliver expert-vetted advice on **pest outbreaks and weather anomalies** in local dialects, democratising predictive capabilities previously available only to large agribusinesses.

AI for Women Empowerment

- **NyayaSakhi-SWATI** is an AI-supported legal assistant deployed in Maharashtra to guide **domestic violence survivors**, trained on women-specific legal

judgments to help women privately understand their rights and legal remedies before approaching courts.

- **AtenIA (Peru)** uses a **"phygital" model** blending physical books with conversational AI to mentor girls in STEM fields, with participants' intention to pursue STEM careers jumping dramatically from **9% to 76%**.
- **YASHODA AI** trains **women in rural and semi-urban areas** to identify AI-driven harms like deepfakes and financial scams through localised, peer-led training.
- **MetsaQ (Odisha)** uses small language models to deliver voice-based agricultural advisories through women's Self-Help Groups, with **42% of users being women** and **34% of participating farmers accessing formal credit** compared to a baseline of just 11%.

AI for Healthcare

- **Nayanamritham 2.0 (Kerala)** is a government-led initiative integrating AI into the state's chronic eye disease screening programme, democratising access to **diabetic retinopathy screening** at scale.
- **Cough Against TB (CATB)** strengthens tuberculosis elimination efforts by triaging potential cases through AI-powered sound analysis.
- In **Rwanda and Kenya**, AI-assisted visual inspection tools are augmenting human expertise to screen for cervical cancer, addressing the critical shortage of oncologists in rural areas.
- **AyurVAID D-RISK** uses machine learning for **non-invasive diabetes detection**.
- The **Predictive Virtual Cardiac Twin** platform allows surgeons to visualise a patient's heart in 3D before surgery, improving precision and outcomes.

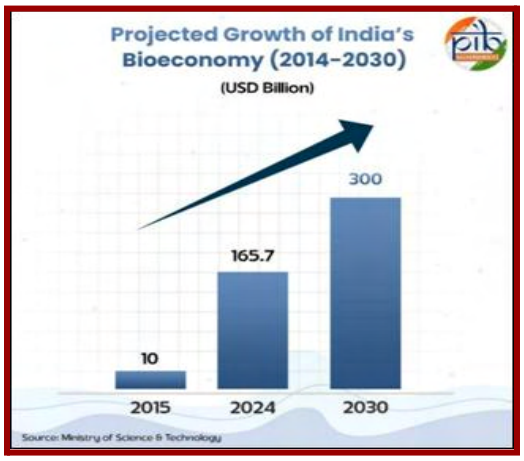
AI for Education

- **BharatGen Yojaka** is a **human-in-the-loop AI assessment platform** that automates evaluation of spoken language, enabling scalable formative assessment in public schools while retaining teacher oversight.
- **Chimple** offers a Generative AI studio empowering educators to create curriculum-aligned learning games in local languages, addressing the shortage of vernacular educational resources.
- **QwiXGenie** provides AI tutoring for **coding and technical skills** to students in Tier-2 and Tier-3 cities.
- **PadhAI** uses speech recognition to assess oral reading fluency, providing immediate feedback to learners.

Significance for India and the Global South

- These casebooks collectively demonstrate that AI can serve as a powerful **equaliser**, extending quality services access to underserved populations.
- The emphasis on **voice-first, offline-capable, and multilingual interfaces** reflects a design philosophy suited to the realities of the Global South, where literacy barriers and connectivity gaps remain significant.
- India's leadership in hosting this summit and showcasing these tools positions it as a potential **global standard-setter for inclusive AI governance**.
- These deployments align directly with India's broader goals of **Digital India, AI Mission, and Viksit Bharat**, demonstrating that technology can serve social justice alongside economic growth.

India's Biotechnology Growth Momentum



Context

- India's biotech startups increased **20-fold between 2018 and 2025**, supported by **94 incubators across 25 states**, reflecting a transition from generic manufacturing to deep-tech innovation.
- The **BioE3 Policy 2025** targets a **$300 billion bioeconomy by 2030**, positioning biotech alongside IT and energy as a national growth pillar.

India's Strengths in Biotech

- India supplies **60% of global immunisation doses** (DPT, BCG, measles), earning its reputation as the **"Pharmacy of the World"**.
- **Low-cost R&D ecosystem and young STEM talent pool** enable competitive innovation at a fraction of global costs.
- Integration of **AI and data analytics** into biotech startups is accelerating drug discovery and diagnostics significantly.
- **100% FDI is permitted in biotech**, drawing global investors and partnerships under the Startup India framework.
- The **Serum Institute-Oxford collaboration during COVID-19** demonstrated India's capacity for world-class biotech diplomacy and manufacturing at scale.

Key Government Initiatives

Initiative	Purpose
BIRAC (Biotechnology Industry Research Assistance Council)	Seed funding, grants, incubation through BIG and SBIRI schemes; supported 6,000+ startups
BioE3 Policy 2025	Integrates biomanufacturing, bio-agriculture, bioenergy, and biopharma under one framework
PLI for Biopharma	Encourages domestic production of bulk drugs and critical raw materials
Biopharma SHAKTI (Budget 2026-27)	₹10,000 crore for biologics and biosimilars manufacturing capacity

Key Challenges

- **Funding gap in scale-up phase**: India attracted only **$3 billion in biotech investment (2023-25)** compared to China's **$12 billion**, with Series B and C rounds remaining scarce.
- **Fragmented infrastructure**: Over 70 incubators exist but few offer end-to-end GMP or pilot-scale facilities, forcing startups to travel between Hyderabad, Pune, and Bengaluru to complete one product cycle.
- **Regulatory outdatedness**: Current clinical trial and patent regimes lag behind emerging technologies like **CRISPR and AI-based therapeutics**, costing startups international collaborations and IP protection.
- **Brain drain**: India loses over **40% of its biotech PhDs** to overseas research hubs due to limited career pathways and funding continuity.
- **Limited global market access**: Only **15% of Indian biosimilars meet EU EMA approval criteria** due to data integrity gaps, restricting high-value exports.

Way Forward

- **Create integrated Bio Commons clusters** in Genome Valley and the **Mumbai-Pune corridor** with shared GMP and regulatory facilities, clustered models in **Boston and Seoul** have cut scale-up costs by 25%.
- **Establish a National Bio-Venture Fund** using blended financing combining equity, venture debt, and institutional capital from pension and insurance funds.
- **Modernise regulations** through risk-based, adaptive frameworks aligned with EU AI Act and US FDA models, potentially cutting market-entry delays by **6-12 months** for low-risk biologics.
- **Launch reverse brain drain programmes** with tax incentives, relocation grants, and micro-credential training in CRISPR, AI-biostatistics, and GMP data integrity as **Israel's similar programme** boosted R&D capacity by 20%.
- **Foster public-private co-development partnerships** between government labs, academia, and private firms to replicate the Serum Institute-Oxford model across other therapeutic areas.

Topic: Science and Technology - developments and their applications and effects in everyday life

Algorithmic Sovereignty

What is meant by Algorithmic Sovereignty ?

- **Algorithmic Sovereignty** refers to a **nation's ability to** design, control, and govern its own Artificial Intelligence systems, data, and computational infrastructure.
- It implies **ownership over algorithms, training datasets, and digital architectures** that

increasingly shape knowledge, policy analysis, and decision-making.

- In the current global AI ecosystem, many systems are **trained predominantly on Western datasets and scholarship**, which influences how geopolitical and legal questions are interpreted.
- As a result, **AI outputs often reproduce Western legal doctrines and strategic perspectives**, even when Global South countries hold different interpretations.
- The concept therefore emphasises **strategic autonomy in the algorithmic layer of the digital ecosystem**, ensuring that national perspectives and realities are reflected in AI-driven interpretations.

Features of Algorithmic Sovereignty

- **Control over AI Infrastructure:** Ownership of computing power, cloud systems, and foundational AI models rather than relying entirely on foreign platforms.
- **Indigenous Data Ecosystems:** Use of domestic datasets reflecting linguistic, cultural, and socio-economic diversity, instead of datasets dominated by Western sources.
- **Independent Interpretive Frameworks:** Development of AI systems capable of reflecting national legal and geopolitical interpretations, such as India's understanding of international law or maritime norms.
- **Strategic Choice without Isolation:** Ability to integrate with global AI ecosystems while avoiding structural dependence on foreign technology providers.
- **Protection from Digital Colonialism:** Preventing a situation where foreign algorithms determine data flows, innovation pathways, and knowledge production.

Importance for India

- **Safeguarding Strategic Narratives:** AI systems increasingly shape how international law, geopolitics, and policy debates are interpreted, making algorithmic autonomy critical.
- **Preventing Structural Bias in Knowledge Systems:** AI models trained mainly on Western scholarship can prioritise Western strategic preferences, marginalising Global South perspectives.
- **Strengthening National Security and Geopolitics:** Control over AI architectures ensures that strategic and legal interpretations affecting India's interests are not externally mediated.
- **Supporting Domestic Innovation Ecosystem:** Indigenous AI development can drive applications in healthcare, agriculture, education, and governance tailored to Indian realities.
- **Avoiding Long-term Dependence:** If core infrastructure, compute resources, and frontier models remain controlled abroad, India's technological sovereignty becomes conditional.

Challenges in Achieving Algorithmic Sovereignty

- **Dominance of Global AI Powers:** The global AI ecosystem is increasingly bipolar, led by U.S. and Chinese technological architectures.
- **Resource and Capability Constraints:** Building frontier AI models requires massive computational resources, high-quality datasets, and advanced research capacity.
- **Temptation of Foreign AI Stacks:** Offers of chips, cloud infrastructure, and AI platforms from external partners provide a quick path to capability but may deepen dependence.
- **Deployment vs. Innovation Debate:** Some argue that India should focus on applications rather than foundational models, which creates tension in policy priorities.
- **Risk of Algorithmic Bias:** Foreign models trained predominantly on Western data may carry linguistic, cultural, and strategic biases unsuitable for India's diverse context.

Way Forward

- **Develop a Sovereign AI Stack:** India must build its own ecosystem of compute infrastructure, foundational models, and AI platforms.
- **Invest in Indigenous Training Data:** Large-scale creation of datasets reflecting Indian languages, cultures, and lived realities should be prioritised.
- **Strengthen Secure Data Infrastructure:** Establish robust domestic data governance and secure storage systems to ensure strategic control.
- **Promote Domestic Research and Innovation:** Encourage collaboration among academia, government, and industry to develop frontier AI capabilities.
- **Adopt Strategic Integration with Global Systems:** India should participate in global AI ecosystems while retaining autonomy over core technological layers.

PRELIMS

Topic: Space and Defence

Generations of Fighter Jets

What are Fighter Jet Generations?

- **"Generations"** classify fighter jets based on **technological advancements and era of development.**
- Each generation reflects innovations in **speed, stealth, avionics, and weaponry.**

Generations of Fighter Jets

- **1st Generation (1943–1955)**
  - **Key Features:** Subsonic speeds, basic avionics, unguided weapons, straight or swept wings
  - **Examples:** Messerschmitt Me 262, MiG-15, Hawker Hunter
- **2nd Generation (1955–1970)**
  - **Key Features:** Supersonic speeds, afterburners, radar systems, semi-active guided missiles
  - **Examples:** MiG-21, F-104 Starfighter, Sukhoi Su-9.
- **3rd Generation (1960–1970)**
  - **Key Features:** Multi-role capabilities, beyond-visual-range combat, integrated airframes, advanced radars
  - **Examples:** MiG-23, F-4 Phantom, Harrier
- **4th Generation (1970–2000s)**
  - **Key Features:** Fly-by-wire control systems, heads-up displays, initial stealth features, multi-role fighters
  - **Examples:** F-16, Su-30, Dassault Rafale, Eurofighter Typhoon
- **5th Generation (2000 onwards)**
  - **Key Features:** Stealth design, advanced avionics, network-centric warfare, data fusion, sustained supersonic speeds
  - **Nations with 5th Generation Fighters**
    - **United States:** F-22 Raptor, F-35 Lightning II
    - **Russia:** Sukhoi Su-57
    - **China:** Chengdu J-20
    - **India (Developing):** AMCA (Advanced Medium Combat Aircraft)
- **6th Generation (In Development)**
  - **Key Features:** Hypersonic capabilities, AI integration, optionally manned systems, directed-energy weapons
  - **Examples:** Tempest (UK-Italy-Japan), NGAD (USA), Baidi (China)

Gravity Bombs

What is a Gravity Bomb?

- Historically known as a **"free-fall" bomb** i.e. an unpowered munition
- Unlike a cruise missile, it **lacks an internal engine.**
- Once released, its trajectory is dictated entirely by **gravity, aerodynamics, and the speed and altitude** of the dropping aircraft.
- The US has modernised these into **"precision ammunition"** by attaching **Joint Direct Attack Munition (JDAM) kits**, equipped with **GPS and steerable fins** to glide precisely to specific coordinates

Conventional vs Nuclear Gravity Bombs

Aspect	Conventional	Nuclear
Examples	Mark 80 series (MK 82, 83, 84)	B61 and B83 series
Explosive	Standard chemical explosives	Nuclear yield
Yield Measurement	Pounds of explosive	Kilotons or megatons of TNT
Cost	~$25,000–$30,000 (with JDAM)	Upwards of $20 million per unit

Authorisation	Theatre commanders (four-star generals)	Explicit authorisation from the US President
Implication	Tactical battlefield use	Signals global nuclear escalation

LIGO

About LIGO

- **LIGO** (Laser Interferometer Gravitational-Wave Observatory) is an **interferometer-based observatory** designed to detect **gravitational waves.**
- **Gravitational waves** are **ripples in space-time** generated by extremely energetic cosmic events.
- Such events include **collisions or orbital motion** of neutron stars and black holes.
- These ripples **travel at the speed of light**, carrying information about their origin and the nature of gravity.
- The existence of gravitational waves was predicted by **Albert Einstein in 1916** in the **General Theory of Relativity**.

Principle of Detection

- LIGO relies on the **interaction between light and distortions in space-time** to detect gravitational waves.
- The system uses **laser interferometry** to measure extremely small changes in space caused by passing waves.
- The observatory consists of **two perpendicular vacuum tunnels** forming an L-shape, each about 4 kilometres long.
- A **laser beam is split into two paths**, reflected by mirrors, and later recombined.
- If a gravitational wave passes, **space slightly stretches or compresses**, altering the **interference pattern of the laser beams**.
- This change allows scientists to **identify and study gravitational waves**.

LIGO-India

- **LIGO-India** was approved by the Government of India in **2016**.
- It will become part of the **global network** of gravitational wave observatories.
- The project aims to **strengthen research on gravitational waves**, which were first detected in 2015 at LIGO-USA.
- The project is being **developed jointly** by:
  - Department of Atomic Energy (DAE)
  - Department of Science and Technology (DST)
- **Participating Indian Institutions**
  - Institute of Plasma Research (IPR), Gandhinagar
  - Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune
  - Raja Ramanna Centre for Advanced Technology (RRCAT), Indore
- **Other Global Gravitational Wave Observatories**
  - LIGO (USA)
  - VIRGO (Italy)
  - KAGRA (Japan)

NavIC

What is NavIC?

- **NavIC (Navigation with Indian Constellation)** is India's **regional satellite navigation system** developed by **ISRO**.
- It was earlier known as the **Indian Regional Navigation Satellite System (IRNSS)**.
- NavIC provides **Position, Velocity and Timing (PVT)** services for **India and up to about 1500 km beyond the Indian landmass**.

Satellite Constellation and Features

- The system was originally designed with **7 satellites** supported by a network of **ground stations**.
- Satellite configuration:
  - **3 satellites in Geostationary Orbit (GEO)**
  - **4 satellites in Inclined Geosynchronous Orbit (IGSO)**
- Satellites transmit signals in **two frequency bands**:
  - **L5 band**
  - **S band**
- The **L5 signal is encrypted** for **military and strategic use**.
- At least **four operational satellites** are required to provide reliable navigation services.
- **NavIC provides two types of services:**

- **Standard Position Service (SPS):** Available for civilian users.
- **Restricted Service (RS):** Encrypted service for authorised users including defence forces.

Significance of NavIC

- Ensures **strategic autonomy** in navigation services.
  - The need for an indigenous system was highlighted during the **1999 Kargil War**, when **GPS access was denied to India**.
- Provides **secure navigation signals** for defence applications.

Recent Challenge

- The **atomic clock** onboard the **IRNSS-1F satellite stopped functioning**.
  - Atomic clocks provide **precise timing signals**, which are essential for **accurate satellite navigation**.
- The failure has reduced the number of **fully functional satellites**, weakening the system's navigation capability.

Next-Generation NavIC Satellites

- To strengthen the system, **ISRO is deploying second-generation NavIC satellites (NVS series)**.
  - **NVS-01** (launched **May 2023**) carries an indigenously developed **rubidium atomic clock**.
  - **NVS-02** (launched **January 2025**) **failed to reach** its intended orbit.

Country / Region	Navigation System
United States	GPS (Global Positioning System)
Russia	GLONASS
European Union	Galileo
China	BeiDou
India	NavIC (IRNSS)

Large Hadron Collider

Context: Scientists at **CERN's Large Hadron Collider (LHC)** discovered a new baryon named **Xi-cc-plus particle**.

About the discovery

- It is the **80th particle discovered** by LHC, marking continued advances in particle physics research.
- The particle contains **two charm quarks and one down quark**, making it significantly heavier than protons.
- Discovery achieved with **7 sigma statistical significance**, exceeding the 5 sigma threshold for confirmation.
- It is the **first particle discovered after 2023 upgrades** of the LHCb detector.

About Large Hadron Collider (LHC)

- The Large Hadron Collider (LHC) is the **world's largest and most powerful particle accelerator**.
- Located at **CERN near Geneva**, spanning **27 km underground** across France and Switzerland.
- It accelerates **protons to near light speed and collides them** to study fundamental particles.
- Enabled the discovery of the **Higgs boson (2012)**, validating key predictions of particle physics.

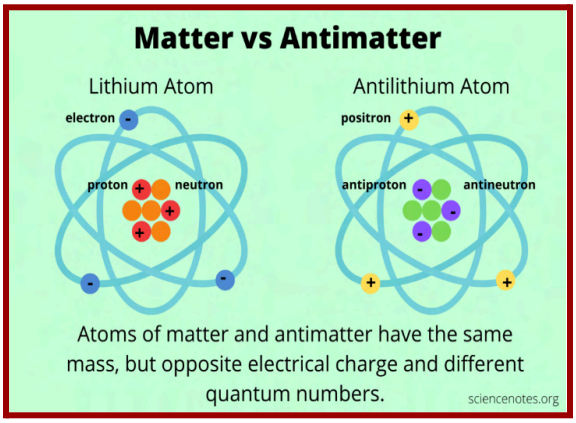
Key Scientific Concepts

- **Baryons:** Particles made of **three quarks** (e.g., protons and neutrons).
- **Quarks:** Fundamental particles with six flavours such as **up, down, charm, strange, top, bottom**.
- The new particle differs from earlier ones due to **heavier charm quarks replacing lighter up quarks**.

Significance of the discovery

- Helps test **Quantum Chromodynamics (QCD)**, the theory explaining the **strong nuclear force**.
- Provides insight into **rare baryons and exotic particles** like tetraquarks and pentaquarks.
- Enhances understanding of **matter composition and fundamental forces in the universe**.

Antimatter



About Antimatter

- **Antimatter** consists of particles having **same mass and spin** but **opposite charge and quantum numbers**.
- When a particle meets its **antiparticle**, **annihilation** occurs, converting mass into **energy (photons)**.
- **Basic Properties**
  - Every particle has a corresponding **antiparticle** with opposite **charge, baryon number, and lepton number**.
  - Examples include **positron (antielectron)**, **antiproton**, and **antihydrogen**.
  - Antimatter follows the same **physical laws**, though slight **CP symmetry violation** exists.
- **Production and Storage**
  - Produced in **particle accelerators**, **radioactive decay**, and **cosmic-ray interactions**.
  - Stored using **magnetic and electric fields**, along with **ultra-high vacuum and cryogenic systems**.
  - Any contact with **ordinary matter** leads to **instant annihilation**, making storage difficult.
- **Annihilation and Energy**
  - Governed by **Einstein's equation ($E = mc^2$)**.
  - Annihilation of **1 kg matter + antimatter** releases about **1.8×10^{17} joules**.
  - Large-scale use is limited due to **high production cost and storage challenges**.

Types of Antimatter

- **Antiparticles:** positrons, antiprotons, antineutrons.
- **Antiatoms:** e.g. **antihydrogen**.
- **Antinuclei:** combinations of antiprotons and antineutrons.
- **Virtual antiparticles:** short-lived entities in **quantum theory**.

Scientific Significance

- Helps explain **the matter–antimatter asymmetry** in the universe.
- Linked to **baryogenesis theories** involving symmetry violations.
- Used to test **CPT symmetry (Charge, Parity, Time)**.

James Webb Space Telescope (JWST)

What is the James Webb Space Telescope?

- The James Webb Space Telescope (JWST) is the **largest and most advanced** infrared space observatory ever built.
- It is designed to study the early universe, formation of stars and galaxies, and atmospheres of **exoplanets**.
- **Launch date:** 25 December 2021.
- The mission was developed by **NASA** in collaboration with the **European Space Agency (ESA)** and the **Canadian Space Agency (CSA)**.

Key Technological Features

- **Large Deployable Structure**
  - The telescope is comparable in size to a tennis court and about three stories tall.
  - It was engineered to fold in an origami-like configuration to fit inside a launch rocket.
- **Infrared Observation Capability**
  - JWST observes the universe using infrared radiation (heat signals) that are invisible to the human eye.
  - This capability allows it to see through cosmic dust and observe very distant objects in the early universe.
- **Gold-Coated Mirror System**
  - The telescope contains 18 hexagonal mirrors coated with gold.
  - These mirrors improve reflection of infrared light, enabling clearer and deeper observations of distant celestial objects.
- **Sunshield Protection**
  - JWST is equipped with a large silver sunshield.

- The shield protects scientific instruments from solar heat.
- It maintains a temperature difference of about 600°F between its two sides, enabling sensitive infrared observations.

THAAD Missile System

What is THAAD (Terminal High Altitude Area Defence)?

- One of the most **advanced missile defence platforms** developed by the **United States**
- A major element of the broader **Ballistic Missile Defence System (BMDS)**
- **Recent Context:** Iran destroyed a key **THAAD radar system** used by the US in the Middle East
- **Key Features**
  - Designed to intercept missiles during the **final stage of flight (terminal phase)**
  - Can destroy threats **both inside and outside Earth's atmosphere**
  - Defends against **short, medium, and limited** intermediate-range ballistic missiles
  - Uses **"hit-to-kill" technology,** thus interceptors destroy targets through **direct kinetic collision** (no explosive blast)
  - Engagement range: **~150–200 kilometres**
- **Key Components**
  - **Interceptor missiles**: kinetic impact destruction
  - **Truck-mounted launchers** for deployment
  - **AN/TPY-2 radar**: detects and tracks long-range missile threats
  - **Tactical fire control and communications unit** for targeting coordination
- **THAAD Battery Composition**
  - ~90 personnel
  - 6 launchers
  - 48 interceptors (each launcher carries 8 missiles)

S-400 'Sudarshan Chakra' Air Defence System

About

- The **S-400 Triumf** is a **long-range, multi-layered surface-to-air missile (SAM) system** developed by Russia.
- NATO codename: **SA-21 Growler**.
- Developed by **Almaz-Antey Air and Space Defence Corporation**.
- Inducted into Russian service in **2007**.
- In India, it is known as **'Sudarshan Chakra'**.

India's Procurement

- Deal signed in **October 2018** worth about **₹35,000 crore**.
- **5 squadrons ordered**, with **3 delivered** so far.
- Remaining units expected by **2026 and 2027**.

Purpose and Role

- Designed to **neutralise aerial threats** including:
  - Fighter aircraft
  - Ballistic missiles
  - Cruise missiles
  - Unmanned Aerial Vehicles (UAVs)
- Provides **airspace denial and strategic deterrence**.
- Protects **critical infrastructure, cities, and military installations**.

Key Features

- **Detection Range:** Up to **600 km**.
- **Engagement Range:** Up to **400 km** with multiple missile types.
- **Multi-target capability:** Can track and engage **up to 80 targets simultaneously**.
- Capable of countering **stealth aircraft, drones, and hypersonic threats**.
- **Rapid response system** with quick tracking-to-launch cycle.
- Uses active and semi-active **radar guidance**.
- **System Components includes:**
  - Command and control vehicle
  - Long-range surveillance radar
  - Engagement radar
  - Launcher vehicles
- Each squadron consists of **multiple mobile units (16+ vehicles)**.

Deployment in India

- Deployed in **strategic locations** such as:
  - Pathankot
  - Siliguri Corridor
  - Western front

- Used for **air defence operations against aerial threats**.

2K22 Tunguska Air Defence System

Context

- The **Ministry of Defence** signed contracts worth **₹858 crore** for procurement of the **2K22 Tunguska air defence system** and inspection of **P-81 maritime reconnaissance aircraft**.
- The **Defence Acquisition Council (DAC)** approved proposals worth about **₹2.38 lakh crore** to strengthen defence capabilities.
- The Tunguska contract, valued at **₹445 crore**, was signed with **JSC Rosoboronexport (Russia)**.
- The system will enhance India's **multi-layered air defence network** against threats such as **aircraft, drones, and cruise missiles**.

About Tunguska System

- The **2K22 Tunguska** is a **Soviet-origin, tracked, self-propelled air defence system**.
- **NATO designation:** SA-19 "Grison".
- Designed to protect ground forces from **low-flying aerial threats**.
- Combines **missiles and guns on a single platform**, enabling engagement across different ranges and altitudes.

Key Features

- Integrates **surface-to-air missiles** with **twin 30 mm autocannons**, making it a **hybrid air defence system**.
- Effective against **helicopters, drones, and cruise missiles**.
- **Missile capability:**
  - Uses **9M311 missile family**.
  - Engagement range: **8–10 km**.
  - Altitude coverage: up to **3,500 metres**.
  - Uses **radio command guidance** for accuracy.
- **Gun system:**
  - Twin autocannons fire at **3,900–5,000 rounds per minute**.
  - Provides **rapid close-range defence**.
- **Radar and Tracking**
  - Equipped with **360-degree target acquisition radar**.
  - Detection range up to **18 km**.
  - Includes **tracking radar and digital fire control system** for precision.
  - Has **optical tracking capability**, enabling operation even under **radar jamming conditions**.
- **Mobility and Integration**
  - Mounted on a **tracked chassis**, allowing movement with **armoured units across varied terrain**.
  - Designed to function as part of an **integrated air defence network**, receiving inputs from external systems.

Advanced Short Range Air-to-Air Missile

About

- The **Advanced Short Range Air-to-Air Missile (ASRAAM)** is a **short-range air-to-air missile** developed by the European multinational company **MBDA**.
- It is designed for **close-range aerial combat (dogfights)**.

Key Features

- The missile is about **2.9 metres long**, weighs approximately **88 kilograms**, and carries a **high-explosive warhead**.
- It uses **infrared (heat-seeking) guidance technology** to track targets.
- It operates on a **fire-and-forget principle**, allowing it to guide itself after launch without pilot intervention.
- It can achieve speeds of **over Mach 3** and engage targets at ranges of **more than 25 kilometres**.
- It is equipped with **Lock-On After Launch (LOAL)** capability, enabling launch before the seeker locks onto the target.
- The missile is **highly manoeuvrable**, capable of sustaining **extreme G-forces** to track agile targets.
- Its **aerodynamic design and powerful rocket motor** ensure sustained energy throughout flight, enhancing accuracy.
- **Deployment and Integration:** The missile has been integrated with **indigenous LCA Tejas** and **Jaguar aircraft** in India.

Missile Defence Systems

What is Missile Defence?

- Missile defence **finds and destroys incoming missiles** before they reach targets using satellites and ground-based radar.
- Beyond saving lives, it **discourages adversaries from initiating conflict** and gives political leaders more time to deliberate.
- Two interception methods: **proximity fuse** (shrapnel-based, older) and **hit-to-kill** (kinetic collision, newer and more precise).

Effectiveness of Key Systems

System	Country	Effectiveness
Iron Dome	Israel	80–97% against slow short-range rockets
Patriot PAC-3	USA	Dropped to ~10% after Russia added decoys
GMD (homeland defence)	USA	Only 55% in scripted tests — 3 misses in last 6 tries

Strategic Innovations Worth Noting

- **Iron Beam (Israel)**: A high-energy laser system that neutralises drone swarms cost-effectively, allowing Israel to ration expensive interceptors.
- **Cheongung II (South Korea, deployed by UAE)**: 360° radar coverage without physical rotation, addressing a critical gap in older Patriot systems.
- **Directed-energy weapons** represent the future of cost-effective missile defence. The US has accelerated their deployment to naval vessels.
- **Layered defence architecture**: By combining Arrow 3, THAAD, David's Sling, Patriot, and Iron Dome is **now the established model** for comprehensive air defence.

India's Ballistic Missile Defence (BMD) System

Overview

- India's BMD shield is a **two-tier missile defence system** comprising:
  - **PAD**: Prithvi Air Defence (High Altitude)
  - **AAD**: Advanced Air Defence (Lower Altitude)

Tier 1: High Altitude: PAD Interceptors

- Designed to intercept **longer-range ballistic missiles** at altitudes of **50–80 km**
- Operates in **exo-atmospheric space** (outside Earth's atmosphere)
- **Two PAD Variants:** Pradyumna Missile and Prithvi Defence Vehicle (PDV)
- **Pradyumna Missile:**
  - Two-stage **solid and liquid-fuelled** quick-reaction missile
  - Intercepts incoming missiles at **80 km altitude**
  - Maximum speed: **Mach 5**
- **Prithvi Defence Vehicle (PDV):**
  - Advanced variant using a **kinetic kill vehicle** (instead of explosives)
  - **Collides directly** with hostile missiles above the atmosphere

Tier 2: Lower Altitude: AAD Interceptors

- Engages enemy missiles **endo-atmospherically** (within Earth's atmosphere)
- Operational altitude range: **15–30 km**
- **AAD Ashwin Interceptors:**
  - **Single-stage solid rocket-propelled** missiles
  - Speed: **Mach 4.5**
  - Range: **100 km**
  - Operational altitude: **20 km**

Topic: IT and Computer

Quantum Computing

What is Quantum Computing?

- A rapidly emerging technology that harnesses the laws of **quantum mechanics** to solve problems **too complex for classical computers**
- A **fundamentally different way of processing information** compared to today's classical computing systems

- Quantum mechanics is a subfield of physics describing the behaviour of **atoms, electrons, photons**, and particles at the molecular and submolecular level

How is it Different from Classical Computing?

- Classical computers store information as **binary 0 and 1 states (bits)**
- Quantum computers use **quantum bits (qubits).**
- Unlike a bit (which is either 0 or 1), a qubit can exist in a **combination of states simultaneously** and this allows for **exponentially larger calculations.**
- This enables quantum computers to solve **complex problems** that even the most powerful **classical supercomputers** cannot.

Significance

- Expected to shed light on **molecular and chemical interactions**
- Can address difficult **optimisation problems**
- Boosts the power of **Artificial Intelligence**
- Opens doors to **new scientific discoveries, life-saving drugs**, and improvements in **supply chains, logistics, and financial modelling**

India's Key Initiatives

- **National Mission on Quantum Technologies and Applications:**
  - Announced in the **Union Budget 2021**
  - Allocation of **₹8,000 crore** for developments in quantum computing, cryptography, communications, and material science
- **Quantum Computing Laboratory (Indian Army):**
  - Set up in **December 2021** at a military engineering institute in **Mhow, Madhya Pradesh**
  - Also includes an **AI centre**
  - Backed by the **National Security Council Secretariat (NSCS).**
- **Quantum Communication Lab (C-DOT):**
  - Launched by the **Centre for Development of Telematics (C-DOT)** in October 2021
  - Supports more than **100 km of standard optical fibre.**
- **I-HUB Quantum Technology Foundation (I-HUB QTF):**
  - Launched by the **Department of Science and Technology** along with **13 research groups from IISER Pune**
  - Aimed at enhancing the development of quantum technology.

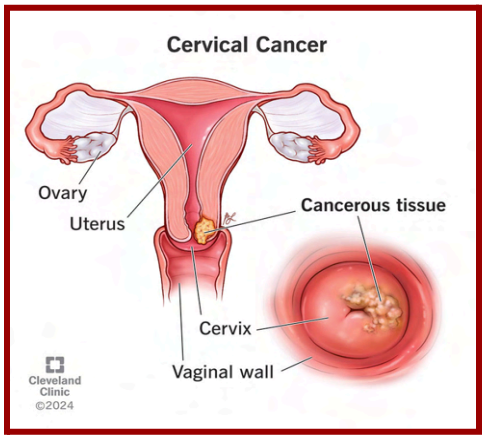
Topic: Health and Diseases

Human Papillomavirus (HPV)

About Human Papillomavirus (HPV)

- HPV is a group of **more than 200 related viruses.**
- More than **40 types** spread through direct sexual contact.
- **2 types** cause genital warts, while about a **dozen types** can cause certain cancers.
- More than **95% of cervical cancer** cases are caused by HPV.
- **Transmission**
  - HPV is the **most common STI (Sexually Transmitted Infection)** globally.
  - Also spreads through **skin-to-skin contact**, not just sexual contact.
  - Most infected people remain **completely asymptomatic** i.e. they carry and spread the virus without knowing it.
  - In most cases, the body **naturally clears the virus** on its own.
  - If the virus **persists in the body for long**, it can eventually lead to cancer.
- **HPV Vaccine**
  - Administered as a **series of shots.**
  - Prevents HPV infections from progressing to **cancer or genital warts.**
  - Most effective when given between **9–26 years of age.**
  - Once a person is already infected, the **vaccine becomes less effective.**
  - **Not administered** during pregnancy.
  - Protects **both men and women** against HPV-related cancers.

Cervical Cancer



About The Disease

- **Cervical cancer** begins in the cells of the cervix, the lower narrow part of the uterus.
- It usually develops **slowly over several years**, starting from abnormal cell changes.
- In early stages, symptoms may not appear, which makes **regular screening very important**.
- If detected early, it is **highly preventable and treatable**.

Causes and Role of HPV

- The main cause is **Human Papillomavirus (HPV)**, a common sexually transmitted infection.
- HPV can affect **skin, genital areas, and even the throat**, often without noticeable symptoms.
- In most people, the **immune system clears the virus naturally**, without causing harm.
- However, in some cases, the virus persists and leads to **cancerous changes in cervical cells**.
- Around **14 types of HPV are cancer-causing**, with types 16 and 18 responsible for about 70% cases globally.

HPV Vaccines

- Vaccines are designed to **protect against high-risk HPV types before infection occurs**.
- **Quadrivalent vaccine (Gardasil)** protects against four HPV types (16, 18, 6, 11).
- **Bivalent vaccine (Cervarix)** targets the two most cancer-causing types (16 and 18).
- **Non-valent vaccine (Gardasil 9)** offers broader protection against nine HPV types.
- India has developed **Cervavac**, a more affordable indigenous vaccine for wider public use.
- **How the Vaccine Helps**
  - The vaccine works by **preventing the virus from entering the body and infecting cells**.
  - It is most effective when given **before exposure to HPV**, usually before sexual activity begins.
  - By stopping infection early, it helps prevent **cervical cancer as well as genital warts**.
  - It plays a major role in **reducing long-term disease burden and treatment costs**.

Prevention and Screening

- Vaccination between **9–14 years of age** is considered the most effective preventive measure.
- Regular screening from around **30 years of age helps detect early-stage disease**.
- Early treatment of abnormal cells can **completely prevent development of cancer**.
- Awareness, access to healthcare, and timely vaccination are **key to controlling cervical cancer**.

Deinococcus Radiodurans

What is it?

- A **bacterium** best known for its **extreme resistance** to ionising radiation
- Known as the most **radiation-resistant organism** on Earth
- Nicknamed **"Conan the Bacterium"**
- First discovered in **1956 in canned meat** treated with radiation
- **Gram-positive, nonmotile, reddish-coloured** bacterium

Key Features

- Withstands radiation **thousands of times higher** than lethal doses for humans
- Can survive **extreme cold, dehydration, vacuum, and acid**
- **Recent finding:** Can survive pressures of **14,000–24,000 Earth atmospheres** — simulating being blasted off a planet's surface

Mechanism of Resistance

- Contains **simple metabolites** that combine with **manganese** to form a powerful **antioxidant**

- Enzyme **thioredoxin reductase** helps repair broken **DNA strands**
- Can eliminate **damaged DNA parts**
- Carries **extra copies of important genes**
- Helps recover from **desiccation (extreme dryness)** and **starvation**

Tuberculosis (TB)

Context: World TB Day 2025 theme: **"Yes, We Can End TB: Commit, Invest, and Deliver"**.

About Tuberculosis (TB)

- **Tuberculosis (TB)** is a bacterial disease caused by *Mycobacterium tuberculosis*.
- Primarily affects **lungs**, but can also involve bones, glands, abdomen, and nervous system.
- Spreads through **airborne droplets** released during coughing or sneezing by infected person.
- **Types of TB**
    - **Pulmonary TB** affects lungs and is most infectious form with visible symptoms.
    - **Latent TB** has no symptoms and is non-infectious, as bacteria remain inactive.
    - **Active TB** occurs when immune system fails, making disease symptomatic and infectious.
- **Symptoms**
    - Persistent cough for **more than three weeks**, sometimes with blood.
    - **Weight loss, fever, night sweats, fatigue**, and loss of appetite.
    - May include **chest pain and swollen lymph nodes** in advanced cases.
- **Treatment & Prevention**
    - TB is **curable with antibiotics**, usually requiring treatment for 6 to 18 months.
    - Standard treatment includes **2-month intensive phase and 4-month continuation phase**.
    - First-line drugs include **Isoniazid, Rifampicin, Pyrazinamide, and Ethambutol**.
    - **BCG vaccine** provides protection, especially against severe TB in children.

Drug-Resistant TB

- **MDR-TB (Multidrug-Resistant TB)**
    - Resistant to **Isoniazid and Rifampicin**, the most effective anti-TB drugs.
    - Diagnosed using **CBNAAT test** for early detection.
    - **Caused by** improper treatment, incomplete drug use, or transmission.
- **XDR-TB (Extensively Drug-Resistant TB)**
    - Resistant to **first-line drugs** plus **fluoroquinolones** and injectable **second-line drugs**.
    - Requires longer, complex, and expensive treatment with lower success rates.

New Treatment Regimen (BPaLM)

- Consists of **Bedaquiline, Pretomanid, Linezolid, and Moxifloxacin drugs**.
- Provides shorter, safer, and more effective treatment for drug-resistant TB.
- **Reduces treatment** duration to **6 months** compared to traditional **20 months**.

National TB Elimination Programme (NTEP)

- **NTEP** replaced Revised National Tuberculosis Control Programme in 2020 with elimination target by 2025.
- It follows **National Strategic Plan (2017–2025)** based on Detect, Treat, Prevent and Build pillars.
- **Programme emphasizes** early diagnosis, private sector engagement, contact tracing, and addressing social determinants.
- India reported **25.5 lakh TB cases in 2023 and 26.07 lakh cases in 2024** under NTEP.
- **Ni-kshay Portal** enables real-time case tracking, surveillance, and efficient TB programme implementation nationwide.
- **Key Initiatives under NTEP**
    - **Ni-kshay Poshan Yojana** provides monthly financial assistance for nutritional support to TB patients during treatment. The nutritional support increased from **₹500 to ₹1000 per month** to improve recovery outcomes.
    - **Pradhan Mantri TB Mukt Bharat Abhiyaan (2022)** focuses on community participation and patient support systems.
    - **Ni-kshay Mitra initiative** enables individuals and organizations to provide food and social support to patients.
    - Government disbursed **₹3,202 crore to 1.13 crore beneficiaries** through Direct Benefit Transfer mechanism.

GLP-1 Weight-Loss Drugs

Context:
Central Drugs Standard Control Organisation warned pharmaceutical companies against advertising prescription **anti-obesity drugs** to the public. The **GLP-1 receptor** and similar medicines must be prescribed only by Registered Medical Practitioners.

GLP-1 Weight-Loss Therapies

- **GLP-1 drugs** are injectable medicines used for **obesity** and **type-2 diabetes** management.
- Pharmaceutical companies **Novo Nordisk** and **Eli Lilly** have introduced such drugs in India.
- Examples include **semaglutide** and **tirzepatide**.
- Clinical studies show these therapies can reduce **15–20% of body weight**, a result comparable to **bariatric surgery**.
- They also show benefits for **cardiovascular disease**, **kidney disease**, **fatty liver disease**, and **obstructive sleep apnea**.
- **Mechanism of Action**
    - These medicines belong to the class of **GLP-1 receptor agonists**, which mimic **incretin hormones** produced in the gut.
    - Their major physiological actions include:
        - Increasing **insulin secretion** to improve glucose use.
        - Reducing **glucagon release** from the liver.
        - Slowing **gastric emptying**, preventing sudden spikes in blood sugar.
        - Suppressing **appetite signals** in the brain, promoting a feeling of fullness.
    - **Tirzepatide** also mimics the hormone **GIP (glucose-dependent insulinotropic polypeptide)**, enhancing its metabolic effects.
- **Discovery and Development**
    - Scientific interest in **incretin hormones** increased in the **1960s**.
    - The hormone **GLP-1** was identified in **1986**.
    - Early GLP-1 treatments increased insulin levels but were **chemically unstable**.
    - **Novo Nordisk** later developed **liraglutide**, although early use caused **nausea**, which was managed through dose adjustments.
    - A more advanced drug, **semaglutide**, administered **once weekly**, showed stronger results and received approval for **obesity treatment in 2021**.

Clinical Benefits of GLP-1

- **Weight reduction:**
    - **Semaglutide** users lost about **15% body weight**.
    - **Tirzepatide** users lost up to **20% body weight**.
- **Cardiovascular benefits:**
    - Semaglutide reduced **major cardiovascular events by 20%**.
    - It also lowered **all-cause mortality by 19%**.
- **Liver health:**
    - Resolved **fatty liver disease in 63%** of cases.
    - Improved **liver fibrosis in 37%** of patients.
- **Other potential benefits:**
    - Tirzepatide shows effectiveness in **obesity-related sleep apnea**.
    - Research suggests possible benefits in **Alzheimer's risk reduction** and **addiction treatment**.

About Central Drugs Standard Control Organization (CDSCO)

- The **CDSCO** is the **National Regulatory Authority** for drugs and medical devices in India.
- It functions under the **Ministry of Health and Family Welfare**.
- The organisation operates according to provisions of the **Drugs and Cosmetics Rules**.
- **Headquarters: New Delhi**.
- Under the **Drugs and Cosmetics Act**, CDSCO performs several regulatory functions:
    - **Approval of new drugs** before they are introduced in the market.
    - Oversight of **clinical trials** conducted in India.
    - Establishing **standards for drugs**.
    - Monitoring the **quality of imported drugs** entering the country.
    - Coordinating regulatory activities with **State Drug Control Organizations**.

Semaglutide

Context: Indian drugmakers launched generic versions of **Semaglutide** after **patent expiry** of Novo Nordisk's drugs (Wegovy, Ozempic).

Basic Concept

- **Semaglutide** is a drug belonging to class of **GLP-1 receptor agonists (GLP-1 RAs)**.
- It mimics the **GLP-1 hormone**, which is naturally released in the gut after food intake.
    - GLP-1 helps in **stimulating insulin secretion**, thereby reducing blood glucose levels in the body.
- Semaglutide acts by **enhancing insulin release** in response to increased blood glucose levels.
- It also helps in **regulating appetite and slowing gastric emptying**, contributing to weight management.

Uses / Indications

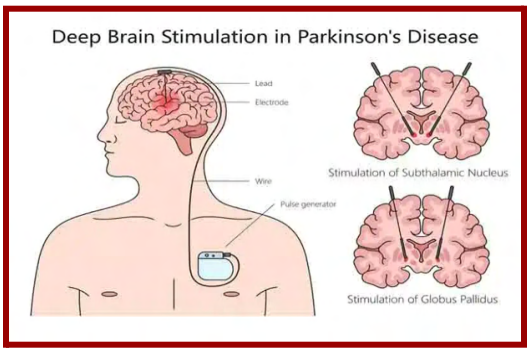
- Used to **control blood sugar levels** in patients with type 2 diabetes.
- Helps reduce risk of **heart attack, stroke**, and death in patients with cardiovascular disease.
- Prescribed for **weight loss** in obese or overweight individuals with related health conditions.
- Helps in **reducing risk of kidney disease** progression in patients with type 2 diabetes.

Generic Drugs

Overview

- **Generic drugs** are medicines containing the same active ingredient as corresponding brand-name drugs.
- They produce the **same therapeutic effect** as brand-name medicines when used in same dosage.
- **Key Features**
    - Generic drugs are **identical** in dose, strength, safety, quality, and method of administration.
    - They work in the **same way in the body**, ensuring equivalent clinical outcomes.
    - Concept of **bioequivalence** ensures the same effectiveness and safety as **brand-name drugs.**
    - They may differ in **inactive ingredients** such as colour, flavour, or preservatives.
- **Regulatory Aspect**
    - Generic drugs can be marketed only after **expiry of patent of original brand-name drug**.
    - Approval is based on proving **bioequivalence**, not through full-scale clinical trials again.
- **Cost Advantage**
    - Generic drugs are **significantly cheaper** than brand-name drugs due to lower development costs.
    - Lower price improves **accessibility and affordability of medicines** for larger population.

Parkinson's Disease



Basic Understanding

- **Parkinson's disease** is a progressive neurological disorder that mainly affects body movement and coordination.
- It develops gradually and can lead to **reduced mobility and, in advanced stages, cognitive decline**.
- The disease is more common in **older individuals**, though younger people can also be affected.
- **Men are more frequently affected** than women.
- Globally, cases have **increased significantly in last 25 years**, with India contributing nearly 10% burden.

Causes & Mechanism

- Exact cause is **not fully known**, but involves both genetic and environmental factors.
- It is mainly due to **loss of dopamine-producing neurons in the brain**.
- Dopamine is important for **smooth and coordinated muscle movements**.
- Reduction in dopamine leads to **motor as well as non-motor symptoms over time**.

Symptoms

- **Motor symptoms** include tremors, slow movement (bradykinesia), muscle rigidity, and difficulty in walking.
- Patients may experience **postural instability and balance problems** as disease progresses.
- **Non-motor symptoms** include memory issues, depression, anxiety, and sleep disturbances.
- Other symptoms may include **pain, fatigue, and sensory problems affecting daily life**.

Treatment & Management

- There is **no complete cure**, but treatment helps in managing symptoms effectively.
- **Levodopa/carbidopa** is the most commonly used medicine to increase dopamine levels.
- Other approaches include **surgery, physiotherapy, and rehabilitation support**.
- Early diagnosis and continuous care help **improve quality of life of patients**.

Shigellosis (Shigella Infection)

Context: A recent **outbreak of Shigellosis** has been reported in **Kerala**, raising public health concerns.

About Shigellosis

- **Shigellosis** is an **infectious disease caused by Shigella bacteria**.
- It is **highly contagious** and is one of the **leading bacterial causes of diarrhoea worldwide**.
- **Humans are the only natural reservoir** of the bacteria.
- The infection spreads primarily through the **faecal–oral route**, including:
    - **Direct contact with infected individuals**
    - **Contaminated food and water**
    - **Contact with infected faecal matter**
    - **Sexual transmission in certain cases**

Symptoms, Risk Groups and Treatment

- The most common symptom is **diarrhoea**, which may be **bloody or mucus-filled** and can last **three days or more**.
- Other symptoms include **abdominal cramps, fever, vomiting, and tenesmus (urge to pass stool without output)**.
- The disease is more severe in **children under five, elderly persons, immunocompromised individuals, and malnourished populations**.
- It is generally **self-limiting in mild cases**, while **antibiotics may be required in severe infections**.

Topic: Development of New Technology

HALEU

Context: A scientific debate has emerged over the use of **HALEU (thorium fuel)** in India's **Pressurised Heavy Water Reactors (PHWRs)**. A study by the **Bhabha Atomic Research Centre (BARC)** questioned whether this **fuel combination is suitable** for India's existing reactors.

Understanding the Fuel

- **HALEU (High-Assay Low-Enriched Uranium)**
    - Uranium enriched with **5–20% uranium-235 (U-235)**.
    - **U-235** is a **fissile material** that can sustain a nuclear chain reaction.
- **Thorium**
    - Thorium is a **fertile material** that can convert into **uranium-233 (U-233)** inside a reactor.
    - India has **large thorium reserves**, making it important for the country's long-term nuclear energy plans.

Key Findings of the Study

- **HALEU- thorium fuel** showed the **highest burn-up** (energy extracted from fuel), about **50 gigawatt-days per tonne (GWd/t)**.
- It also produced **much less radioactive waste** compared with current fuels.
- However, the study raised a safety concern:
    - The fuel could make **shutdown rods about 26% less effective**.
    - **Shutdown rods** are critical safety devices used to **rapidly stop nuclear reactions** during emergencies.
- Because of this, the study concluded that **HALEU-thorium is not a direct replacement** for fuel in existing PHWR reactors.

Desalination Plants

About

- **Desalination plants** convert saline seawater or brackish water into potable freshwater.
- They remove **dissolved salts and minerals**, making water suitable for drinking and domestic use.
- Most common method used is **Reverse Osmosis (RO)** technology.
- **Technology Used**
    - **Reverse Osmosis (RO)** uses high pressure to push water through semi-permeable membranes.
    - Membranes allow water to pass while **retaining salts and impurities**.
    - Process is **energy-intensive**, often linked with thermal or gas-based power systems.

Global Distribution

- Concentrated in **arid coastal regions** with limited freshwater availability.
- Major regions include **West Asia (Gulf countries), North Africa, Israel, Spain, Australia, USA, and China**.
- West Asia accounts for **around 70% of global desalination capacity**.

Key Features

- Often developed as **large-scale infrastructure**, sometimes co-located with power plants.
- Produces **brine (concentrated saltwater)** as by-product, discharged into oceans.
- Global sector includes **over 21,000 plants**, with rapid annual growth.

FASTag

What is FASTag?

- A device employing **Radio Frequency Identification (RFID) technology** for making **toll payments directly while the vehicle is in motion**
- Valid for **5 years** from the date of issuance
- Available in **seven different colour codes**
- NHAI launched two mobile apps: **MyFASTag** and **FASTag Partner** to facilitate availability

Benefits of FASTag

Beneficiary	Benefit
Road Users	Near non-stop movement through toll plazas; cashless payment; reduced commute time
Toll Operators	Lower operating costs; better audit control via centralised accounts; improved capacity without new infrastructure
Government	Fuel savings; reduced emissions from idling; improved transparency of toll transactions

About RFID

- A technology that uses **radio waves** to passively identify a tagged object
- Has two basic components: **tags and readers**
- The **reader** emits radio waves and receives signals from the RFID tag, while the **tag** communicates its identity and other information back via radio waves

About NHAI

- Constituted by an **Act of Parliament in 1988** under the **Ministry of Road Transport and Highways**
- Became **operational in February 1995**
- Mandated to **develop, maintain, and manage National Highways**
- **Composition: Full-time Chairman**, not more than **5 full-time Members** and **4 part-time Members**, all appointed by the Central Government.

Topic: Bio-Technology

Self-Replicating RNA (QT45)

Context: Scientists discovered **QT45**, a small RNA molecule that can **copy itself**, providing the first clear evidence of a **self-replicating RNA**

Background

- **Miller-Urey Experiment (1953):** Recreated early Earth conditions in a lab and showed that **amino acids** (building blocks of proteins) could form naturally, but **did not find DNA or RNA**
- **Core Problem:** Life needs genetic material to **store information and copy itself**
    - Modern cells use **proteins to copy DNA/RNA**, but DNA/RNA are needed to **make those proteins** thus creating a **"chicken-and-egg" problem**

- **RNA's Special Role**
  - In the **1980s**, scientists discovered that RNA could **both store genetic information AND carry out chemical reactions**, acting like a basic enzyme
  - This suggested that **early life may have depended only on RNA**, before proteins evolved known as the **RNA World Hypothesis**

About QT45

- Only **45 nucleotides long**, making it the **simplest self-replicating RNA** discovered
- Copies itself using **three-nucleotide building blocks**
  - First makes a **matching copy**, then use that copy to **rebuild the original**
- Copying is **very slow** and needs special conditions, it can take **weeks**, while modern cells do it in **seconds**
- Developed by selecting rare RNA sequences from large pools and improving them step by step
- **Significance**
  - Strengthens the **RNA World Hypothesis** that RNA was Earth's first genetic material. However, it **does not conclusively prove** it

Quick Facts

Aspects	**DNA**	**RNA**
Structure	Long, stable, **double-stranded**	Shorter, **single-stranded**
Function	Stores and replicates genetic information — **blueprint of life**	Carries genetic instructions from DNA to build proteins; chemically more reactive

Bioactive Peptides (BAPs)

What are Bioactive Peptides (BAPs) ?

- **Bioactive peptides** are short chains of **2–20 amino acids** that remain biologically active even after digestion.
- They are usually **embedded within larger proteins** and remain inactive until the parent protein is broken down.
- These peptides are released when proteins are degraded by **enzymes during digestion, fermentation, or food processing**.

Structure and Scientific Characteristics

- Both **proteins and peptides** are made of **amino acids linked by peptide bonds**.
- The key distinction is length:
  - **Peptides** contain **short chains of amino acids**.
  - **Proteins** generally contain **more than 50 amino acids**.
- Bioactive peptides interact with biological molecules through **electrostatic forces, hydrogen bonding, and hydrophobic interactions**.

Health Benefits of Bioactive Peptides

- **BAPs** can produce **multiple beneficial physiological effects**, including:
  - Antimicrobial activity
  - Antihypertensive effects (blood pressure regulation)
  - Antioxidant properties
  - Immune-modulatory functions
- **They may also help regulate:**
  - Blood pressure
  - Blood sugar levels
  - Inflammation
  - Cardiovascular and metabolic health.
- **Role in Precision Nutrition**
  - The impact of **bioactive peptides** varies among individuals due to differences in:
    - Genetic makeup
    - Gut microbiota
    - Dietary patterns
    - Overall health status.
  - This variation highlights the potential for **precision nutrition**, where dietary recommendations are tailored to **individual biological characteristics**.
  - Such an approach is particularly relevant for a **diverse population like India**, where genetic and dietary diversity is high.

Amino Acids: Building Blocks of Proteins

- **Amino acids** are organic compounds that form the **basic units of proteins** and are essential for **growth, tissue repair, and normal body functions**.
- **Types of Amino Acids**

- **Essential amino acids:** Cannot be synthesized by the body and must be obtained from food (e.g., histidine, leucine, lysine).
- **Nonessential amino acids:** Can be produced naturally by the human body (e.g., alanine, glutamic acid, glycine).
- **Conditionally essential amino acids:** Normally produced by the body but become essential during stress or illness (e.g., arginine, cysteine, glutamine).

Biopharma SHAKTI

About the Initiative

- **Biopharma SHAKTI** (Strategy for Healthcare Advancement through Knowledge, Technology & Innovation) is a government initiative aims to make India a **global hub for biopharmaceutical manufacturing and innovation**.
- It focuses on strengthening **domestic production of biologics and biosimilars**.
- The initiative seeks to build a **robust ecosystem for advanced healthcare technologies and therapies**.

Key Features

- Establishment of **3 new NIPERs and upgradation of 7 existing institutes** for biopharma focus.
- Creation of **network of over 1000 accredited clinical trial sites across India**.
- Development of **biopharma innovation and manufacturing infrastructure** at national level.
- Encourages **research, industry collaboration, and skill development in pharmaceutical sector**.

Financial Outlay & Duration

- Total outlay of **₹10,000 crore allocated for implementation of the initiative**.
- Programme duration is **five years**, focusing on long-term capacity building.
- Investment aims to boost **advanced manufacturing and research capabilities**.
- Expected to attract **private investments and global partnerships in biopharma sector**.

Objectives & Significance

- Promotes **self-reliance in high-value medicines**, reducing import dependence.
- Addresses rising burden of **non-communicable diseases like diabetes, cancer, and autoimmune disorders**.
- Enhances India's position in **next-generation therapies and global healthcare supply chains**.
- Improves **accessibility and affordability of advanced medicines for Indian population**.

Biologics

- **Biologics** are complex medicines derived from living organisms or biological processes.
- Used in treatment of **chronic and advanced diseases like cancer and autoimmune disorders**.
- Manufacturing is complex, limiting availability mainly to **high-income countries traditionally**.
- Require **specialised infrastructure and advanced biotechnology processes**.

Biosimilars

- **Biosimilars** are highly similar versions of existing biologic medicines.
- Developed through **rigorous analytical, preclinical, and clinical testing for equivalence**.
- Provide **cost-effective alternatives while maintaining safety and effectiveness**.
- Help increase **competition and reduce overall cost of biologic treatments**.

Biotechnology Research and Innovation Council (BRIC)

Context: The **inaugural meeting of the BRIC–Research Advisory Board (BRIC-RAB)** was held at the **Regional Centre for Biotechnology (RCB), Faridabad**.

About BRIC

- The **Biotechnology Research and Innovation Council (BRIC)** is an **apex autonomous body established as a registered society**.
- It was created by **subsuming 14 autonomous institutes** under the **Department of Biotechnology (DBT)**.
- It functions under the **Ministry of Science and Technology**.
- BRIC provides a **centralised and unified governance mechanism** for its institutions through **intra-mural core grants**.

Objectives and Functions

- BRIC promotes **multi-disciplinary biotechnology research**, covering the entire spectrum from **basic discovery to applied research**.
- It aims to **foster innovation and translation across institutions**, enhancing collaboration.
- It focuses on developing **indigenous technologies and capabilities** in line with **Atmanirbhar Bharat**.
- It seeks to nurture **next-generation scientific leadership** by supporting research in **globally competitive and nationally relevant ecosystems**.
- It aligns research priorities with **national development goals in biotechnology**.

Miscellaneous

Hydroxyl Megamaser

What is a Hydroxyl Megamaser?

- A **giant, naturally occurring maser** found in deep space
    - A **maser** focuses **microwave or radio waves** into a concentrated beam — similar to how a laser focuses visible light
- The term **'hydroxyl'** refers to a simple molecule made of **one oxygen atom and one hydrogen atom (OH^-).**
- These molecules float in **large clouds of gas within distant galaxies.**
- **How Does it Form?**
    - When **two galaxies collide**, the impact triggers:
        - Intense **star formation**
        - Feeding of **giant black holes**
        - Release of massive amounts of **infrared energy**
    - This infrared energy strikes the **hydroxyl molecules**, pumping them into a **high-energy state**
    - As molecules settle back down, they release a **powerful, amplified beam of radio waves**, this is the megamaser.
- Why Called 'Mega'maser?
    - They shine **millions of times brighter** than the smaller masers found in our own **Milky Way galaxy**
    - **Scientific Significance**
        - Astronomers treat these beams as **cosmic beacons**
        - Radio waves can **travel through thick dust** thus allowing scientists to study obscured sources
        - Help measure **how fast galaxies are moving**
        - Aid in understanding the **evolution of the universe**

Recent Discovery

- The most distant **hydroxyl maser** yet was found using the **MeerKAT telescope**
- Originates from a galaxy **billions of lightyears away**
- A natural **cosmic lens magnified** its emission thus making it the **brightest ever seen**
- Earned the special name **'Gigamaser'**

Mineral Water

About

- **Mineral water** is water containing **naturally dissolved minerals and trace elements**, sourced from **protected underground reservoirs such as springs or aquifers**.
- It retains minerals acquired through **geological processes over long periods**, unlike treated tap water.

Formation

- Formed when **rainwater percolates through rock layers** like limestone, granite, sandstone, or basalt, dissolving minerals.
- Stored underground or emerges as **natural springs due to pressure conditions**.

Regulation in India

- Governed by **FSSAI and BIS standards (IS 13428)**.
- **Key conditions:**
    - Must originate from **protected underground sources**.
    - Must maintain **stable mineral composition and TDS levels**.
    - **Chemical treatment is not allowed**; only filtration, aeration, and sterilisation permitted.
    - Requires **FSSAI license, BIS certification, and ISI mark**.

- Labels must mention **source and mineral composition**.

Key Characteristics

- Contains minerals such as **calcium, magnesium, sodium, potassium, bicarbonates, sulphates, and chlorides**.
- Mineral content determines **Total Dissolved Solids (TDS)** and water properties.
- **Differs from:**
  - **Packaged drinking water** (treated and re-mineralised).
  - **Spring water** (natural source but less strict composition standards).

Related Concepts

- **Artesian water**: groundwater that rises to the surface due to **pressure from impermeable rock layers**.
- **Distilled water**: nearly pure H_2O without dissolved minerals, obtained by evaporation and condensation.

Solar Ingots & Wafers Policy

Context: India has announced that from **June 2028**, only **domestically manufactured solar ingots and wafers** will be allowed in certain solar projects to boost **domestic manufacturing capacity**.

What are Solar Ingots and Wafers ?

- **Solar ingots:** Blocks of purified silicon used as raw material.
- **Solar wafers:** Thin slices cut from ingots, used to make **solar cells**.
- ***Flow:*** Ingot → Wafer → Solar Cell → Solar Module (panel)

Key Policy Measure

- Introduction of **ALMM List-III (Approved List of Module Manufacturers)** for **ingots and wafers**.
- ALMM is a **mandatory** registration mechanism **(since 2019)** under the **Ministry of New and Renewable Energy (MNRE)**.
- **From June 2028:**
  - Only **ALMM-listed domestic ingots & wafers** allowed in specified projects.
  - Extends earlier rules (for **cells and modules**) to **upstream components**.

Applicability

- **Applies to:**
  - Government-funded solar projects
  - Open-access and net-metering projects
  - **Schemes like:**
    - PM Surya Ghar Yojana
    - PM-KUSUM Scheme
    - SECI tenders
- Only **domestic products eligible** for **Production-Linked Incentive (PLI)** schemes.
- **Grandfathering provision:** Projects already in pipeline are **protected from new rules**.

Significance

- Reduces **import dependence** (currently high for wafers and ingots).
- Strengthens **Atmanirbhar Bharat in solar manufacturing**.
- Builds **complete domestic value chain** in solar sector.

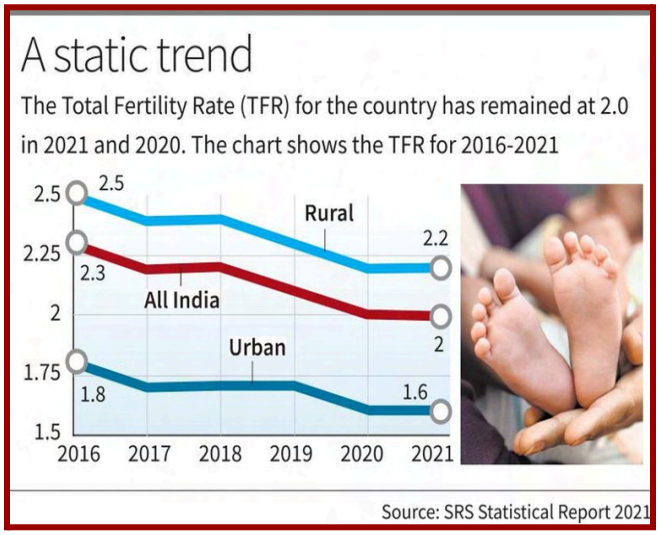
Solar Capacity Targets

- **Target:** 280 GW solar capacity by 2030
- **Installed (Nov 2025):** ~132 GW

SOCIETY AND SOCIAL JUSTICE

PRELIMS

Total Fertility Rate (TFR)



Context: Andhra Pradesh introduced the **Draft Population Management Policy,** aiming to **raise the Total Fertility Rate (TFR)** from **1.5** to an optimal **2.1**, reversing the **declining fertility rate**.

Total Fertility Rate (TFR)

- The **average number of children** a group of women would have by the end of their **reproductive years (ages 15–49)**, assuming current fertility rates and no mortality
- Expressed as **children per woman**
- As per **NFHS-5 (2019–21):** India's TFR has declined to **2.0 children per woman** from **2.2 (NFHS-4, 2015–16)**

Replacement Level

- A TFR of **2.1** is considered the **replacement level**, where each generation replaces itself without significant population growth or decline
- A TFR **below 2.1** can lead to **negative population growth**, causing long-term demographic challenges including an **ageing population**

Consequences of Low Fertility Rates

- **Ageing Population**
  - With fewer births and longer life expectancy, India's population is **ageing rapidly**
  - Currently, India has **149 million people aged 60 years or above**, comprising **10.5% of the total population**
  - By **2050**, this number is expected to surge to **347 million or 20.8% of the population.**
- **Economic Impact**
  - A shrinking young workforce and growing elderly population lead to **higher dependency ratios**
  - Strains **social welfare and healthcare systems**
  - Rising costs of **pensions and elder care** burden both governments and families
  - Unlike developed nations that aged with **higher per capita incomes**, India faces the challenge of **ageing without the same economic cushion**
  - India risks getting caught in the **middle-income trap** if growth cannot be sustained
- **Impact on the Labour Market**
  - Declining fertility reduces the **size of the workforce**, negatively impacting **productivity and economic output**.

Purple Fest

Context: Recently, **Rashtrapati Bhavan** hosted the **Purple Fest** to celebrate the achievements and talents of **Divyangjan (persons with disabilities)** and to promote a more inclusive society.

About the Fest

- **Purple Fest** is an inclusive awareness and celebration event organised by the **Ministry of Social Justice and Empowerment**.
- It recognises the **talent, achievements and aspirations** of Divyangjan and encourages wider public participation in building an inclusive environment.
- The **festival aims** to:
  - Promote **awareness** about disability inclusion.
  - Uphold the **dignity and rights** of persons with disabilities.
  - Encourage their **equal participation** in social, cultural and public life.

Key Features

- **Inclusive participation:** More than **8,000 Divyangjan** visited **Amrit Udyan** during the event.
- **Cultural performances:** Participants showcased their talents through **music, dance and cultural programmes** at the Open Air Theatre.
- **Interactive activities:** Organisations set up **accessible games, stalls and learning activities**.

- **Awareness initiatives:** The event highlighted the **rights and capabilities** of persons with disabilities.
- **Community engagement:** Encouraged participation of **citizens, institutions and civil society** in empowering Divyangjan.

GEOGRAPHY

Melting of Glaciers

Context

- An **ISRO study (2025)** on the **Dharali flash flood (Uttarakhand)** found that it was triggered by the **collapse of an exposed ice patch** on the **Srikanta Glacier**.
- This shifts the focus from large **Glacial Lake Outburst Floods (GLOFs)** to smaller, less visible **cryospheric instabilities** caused by rapid deglaciation.
- It highlights the need to monitor not just glaciers and lakes, but also **micro-level changes in ice structure**.

What is Glacier Melting?

- **Glacier melting (deglaciation)** refers to the reduction in glacier mass when **melting exceeds snow accumulation**.
- Rising temperatures thin the protective **snow and firn layer**, exposing **older and unstable ice patches**.
- These exposed patches become vulnerable to **collapse**, triggering sudden disasters in downstream regions.

Data and Key Trends

- Himalayan glaciers are losing ice at about **0.5 metres per year** since 2000.
- The **Hindu Kush Himalaya region** is warming faster than the global average, with projections of up to **75% glacier loss by 2100**.
- Around **1.3 billion people** depend on rivers originating from these glaciers.
- The frequency of **GLOFs and ice-collapse events** has **tripled in the last two decades**.

Causes of Accelerated Glacier Melting

- **Rising temperatures:** Reduced snow cover exposes darker ice, increasing melt rates.
- **Black carbon deposition:** Pollutants absorb heat and accelerate glacier retreat (e.g., Gangotri region).
- **Changing precipitation:** Shift from snowfall to rainfall reduces glacier recharge (e.g., Ladakh).
- **Infrastructure pressure:** Roads and tunnelling create **local instability and heat effects** (e.g., Char Dham project).
- **Geomorphic processes:** Freeze-thaw cycles create **nivation hollows**, leading to sudden collapses (e.g., Dharali event).

Impacts and Risks

- **Water insecurity:** Initial increase in river flow is followed by **long-term decline**, affecting millions.
- **Disaster vulnerability:** Sudden floods in narrow valleys cause **high human and economic losses**.
- **Evolving hazards:** Risks are no longer limited to lakes but include **ice-patch collapses and avalanches**.
- **Local exposure:** Settlements like **Dharali village** face direct threat due to proximity to glacier-fed streams.

Initiatives Taken

- **National Mission for Sustaining the Himalayan Ecosystem (NMSHE):** Focus on glacier and ecosystem monitoring.
- **ISRO satellite mapping:** Monitoring over **9,500 glaciers** using advanced imagery.
- **Early Warning Systems (EWS):** Installed in vulnerable valleys after recent disasters.
- **International collaboration:** Programs like **Indo-Swiss partnerships** for glaciology research.

Challenges

- **Difficult terrain:** High-altitude regions limit installation and maintenance of monitoring systems.
- **Data gaps:** Lack of historical data hinders prediction of rare events like ice collapses.
- **Transboundary issues:** Glaciers span multiple countries, complicating coordination.
- **Socio-economic vulnerability:** Communities in fragile terrains face disproportionate risks.
- **Unpredictable weather:** Sudden micro-climatic changes reduce effectiveness of forecasts.

Way Forward

- **Integrated monitoring:** Combine satellite data with **ground-based sensors** for real-time tracking.
- **Community awareness:** Train local populations to identify early warning signs.

- **Sustainable infrastructure:** Enforce strict environmental checks in fragile zones.
- **Regional cooperation:** Strengthen data sharing across Himalayan countries.
- **Focused mapping:** Identify and monitor **geomorphologically sensitive zones** like nivation hollows.

Conclusion

- The Dharali incident shows that Himalayan risks are becoming **more complex and less visible**. Addressing glacier-related hazards now requires a shift from isolated monitoring to a **holistic ridge-to-valley approach**, ensuring both environmental protection and human safety.

Water Crisis and Governance in India

Context

- India has **18% global population** but only **4% freshwater resources**, indicating severe imbalance. Further, the **per capita water availability declined** from 1,816 cubic metres (2001) to 1,486 (2021).
- By **2050,** India may approach water scarcity threshold of **1,000 cubic metres.**
- Also, the economic losses reached **₹5 lakh crore (2019–2023)** due to extreme water-related events.

Challenges

- **Structural Water Scarcity**
  - Rising demand and limited supply create **long-term water stress across regions**.
  - Declining availability constrains **agriculture, industry, and domestic consumption sustainability**.
- **Climate Variability**
  - **55% tehsils report increased rainfall**, but concentrated bursts cause flooding risks.
  - Around **11% tehsils face rainfall decline**, affecting agricultural productivity during sowing.
- **Agricultural Inefficiency**
  - Agriculture consumes **nearly 90% of total water resources**, creating sectoral imbalance.
  - Water productivity remains **low at $0.52 per cubic metre**, far below global standards.
  - Further, the policies incentivise **water-intensive crops like rice** accelerates groundwater depletion.
- **Neglect of Green Water**
  - Policy focuses on **blue water**, ignoring soil moisture as critical resource.
  - **60% rainfall stored as green water** globally supports rainfed agriculture systems.
- **Urban Water Crisis**
  - Only **28% urban wastewater is treated**, with minimal reuse across cities.
  - Urbanisation creates **impermeable surfaces**, reducing recharge and increasing flood risks.
  - Over **half of Delhi's 1,300 water bodies have disappeared** due to encroachment.
- **Governance and Pricing Failures**
  - Water is treated as **free resource**, leading to inefficient and excessive usage.
  - Poor households often **pay higher prices through informal markets**, showing inequity.
- **Environmental Degradation**
  - **Chemical-intensive agriculture** reduces soil water retention capacity significantly.
  - Loss of forests disrupts **hydrological cycles and downstream water availability**.

Way Solution

- **Recognising Water as Strategic Resource**
  - Water must be treated as **finite economic resource** requiring efficient allocation mechanisms.
  - Implement **digital water accounting systems** for transparency and real-time monitoring.
- **National Green Water Mission**
  - Integrate **soil moisture management** into water governance frameworks for sustainability.
  - Promote **regenerative practices** like mulching and no-till farming to retain moisture.
  - Protect **upstream forests** to regulate downstream water flows effectively.
- **Agricultural Reforms**
  - Shift 3.6 million hectares from **rice to millets and pulses** to save water.

    - This transition can save **29 billion cubic metres annually** while improving nutrition.
- **Circular Water Economy**
    - Treat wastewater as **resource rather than waste**, enabling reuse and recycling.
    - Circular model can create **₹3.2 lakh crore market by 2047**.
    - It can generate **over one lakh jobs** and enhance economic sustainability
- **Urban Water Resilience**
    - Adopt **blue-green infrastructure** like wetlands, urban forests, and permeable surfaces.
    - Prioritise **stormwater absorption and aquifer recharge** in urban planning frameworks.
    - Develop **decentralised wastewater treatment systems** for peri-urban regions.
- **Governance and Pricing Reforms**
    - Ensure **rational water pricing** with protection for vulnerable populations.
    - Introduce bulk water **trading and monitoring systems** to improve efficiency.
- **Climate-Integrated Water Management**
    - Align water policies with **climate adaptation strategies** addressing floods and droughts.
    - Strengthen **drainage systems and groundwater recharge** mechanisms for resilience.

Conclusion

- India's water crisis is a **structural challenge affecting economy, society, and sustainability**. The climate change and governance failures have **deepened existing vulnerabilities significantly**. However, reforms in **governance, agriculture, and urban systems** can transform outcomes. A shift toward **efficient, sustainable, and equitable water management** is essential for future resilience.

PRELIMS

Brent Crude

What is Brent Crude?

- The most widely used **global benchmark** for defining oil prices worldwide
- Named after the **Brent oil field**, discovered in the **1970s** in the North Sea
- A **light, sweet crude oil** extracted from oil fields in the **North Sea**
- About **two-thirds of all internationally traded crude oil** is priced relative to Brent

Key Characteristics

- **Low density and low sulphur content**, making it easier to process into high-value products like **gasoline and plastics.**
- Being **water-borne**, it is easy to **transport to distant locations.**
- Falls under the category of **Sweet Crude** i.e. crude oil with **very low sulphur content**
    - Sulphur is undesirable as it **lowers the yield of high-value refined products**
- **Price Influencing Factors**
    - Supply and demand dynamics
    - Geopolitical events
    - Production disruptions
    - Economic factors

Premium Petrol vs Normal Petrol

Context: Indian Oil-Marketing Companies (OMCs) **increased premium petrol prices** by about ₹2–₹3/litre and industrial diesel by ₹22/litre amid rising global crude oil prices.

Basic Difference

- **Premium petrol** differs mainly in higher octane rating and added detergents improving engine performance and efficiency.
- **Normal petrol** has lower octane rating and is suitable for regular vehicles used in daily commuting.

Octane Rating & Knocking

- **Octane number** measures fuel's resistance to premature ignition or engine knocking during combustion process.
- **Normal petrol** in India usually has **octane rating between 87–91**, suitable for low-compression engines.
- **Premium petrol** has **higher octane rating (91–95 or more)**, **reducing knocking** in high-performance engines.

Additives & Engine Maintenance

- **Premium petrol** contains **detergent additives** that clean fuel injectors and intake valves, reducing carbon deposits.
- **Normal petrol** lacks advanced additives, leading to comparatively higher chances of residue buildup over time.

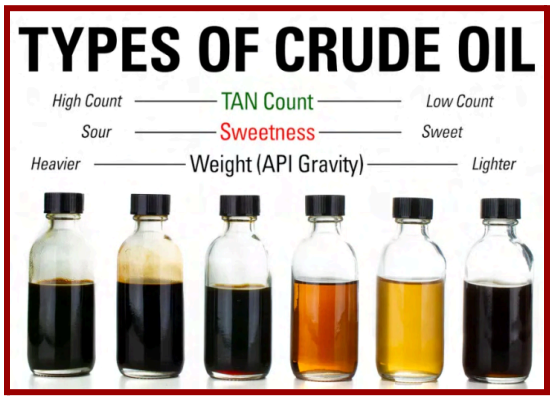
Suitability of Use

- **Premium petrol** is ideal for high-compression engines, luxury cars, turbocharged and sports vehicles.
- **Normal petrol** is sufficient for mass-market cars, bikes, and scooters designed for regular driving conditions.

Cost & Efficiency

- Premium petrol is **costlier** due to additional refining processes and inclusion of performance-enhancing additives.
- In regular engines, using premium petrol generally **does not improve mileage or performance significantly**.

Crude Oil



Classification Based on Sulphur Content

Type	Sulphur Content	Quality
Sweet Crude Oil	Less than **0.5%**	High quality
Sour Crude Oil	More than **0.5%**	Lower quality

Sweet Crude Oil

- Contains less than **0.5% sulphur**, along with small amounts of **hydrogen sulphide (H_2S) and carbon dioxide (CO_2)**
- Called "sweet" due to its **gently sweet taste and pleasing aroma** owing to low sulphur content.
- **It is a high quality** crude oil and preferred for processing **gasoline (naphtha), kerosene, and high-grade diesel**
- **"Light Sweet Crude Oil"** is the most preferred variety due to its high fraction of fuel-grade components.
- **Key Producing Regions**
  - **North Sea:** UK (Brent Crude) and Norway
  - **North Africa:** Algeria and Libya
  - **West Africa:** Ghana and Nigeria
  - **Far East:** Indonesia, India, Malaysia, Australia
  - **South America:** Guyana basin and Suriname

Brent Crude Oil

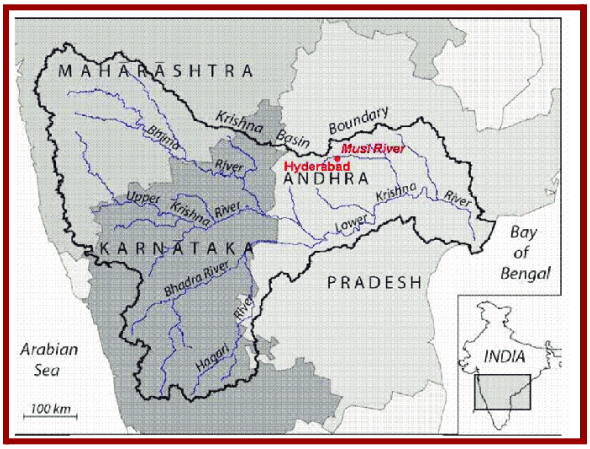
- Sourced from the **North Sea.**
- Used to **price approximately two-thirds** of the world's traded crude oil.
- Serves as a **global benchmark** i.e. production from **Africa, Middle East, and Europe** flowing West is priced relative to Brent.
- Named after the **Brent Goose**, Shell UK named its fields after birds
- **Also known as** London Brent, Brent Petroleum, and Brent Blend

Sour Crude Oil

- Contains **more than 0.5% sulphur**
- Impurities must be **removed before refining**, increasing the cost of processing
- Results in **higher-priced gasoline** compared to sweet crude
- Generally processed into **heavy oil products** like **diesel and fuel oil** to reduce processing costs
- Can be **toxic and corrosive**, especially when high in **hydrogen sulphide (H_2S)**
  - At low concentrations: **smell of rotten eggs**
  - At high concentrations: **immediately fatal** upon inhalation
  - At very high concentrations: **damages the olfactory nerve**, making it odourless and undetectable while paralyzing the respiratory system
- **Key Producing Regions**

- **North America:** US Gulf of Mexico, Alberta (Canada), Mexico
- **South America:** Venezuela, Colombia, Ecuador
- **Middle East:** Saudi Arabia, Iraq, Kuwait, Iran

Musi River



About the River

- **Musi River**, also called Muchukunda or Musunuru River, is a **major tributary of the Krishna River**.
- It flows across the **Deccan Plateau region** in Telangana.
- The river is historically significant as it passes through the centre of **Hyderabad city**.
- Within Hyderabad, it traditionally divided the **Old City from the New City**.

Course

- **Source: Anantagiri Hills**, located in Vikarabad district of Telangana.
- The river originates from the **confluence** of two small **rivulets**:
  - **Esi** is approximately **8 km long**.
  - **Musa** is approximately **13 km long**.
- The river finally **joins the Krishna River near Wazirabad** in Nalgonda district.
- **Total Length:** Approximately **240 kilometres**.

Dams on the Musi River

- Two important dams have been constructed on the river:
  - **Himayat Sagar**
  - **Osman Sagar**.

Aravalli Hills

Basic Features

- The **Aravalli Hills** are among the **oldest fold mountain ranges** in the world.
- The range stretches for about **670 km**, forming an important geographical feature of northern and western India.
- It extends **from near Delhi** through **southern Haryana and Rajasthan to Gujarat**.
- The range acts as an important **ecological barrier and wildlife corridor** in this region.
- It helps block sand and dust movement from the **Thar Desert**, protecting nearby agricultural and inhabited areas.

Geological Formation and Structure

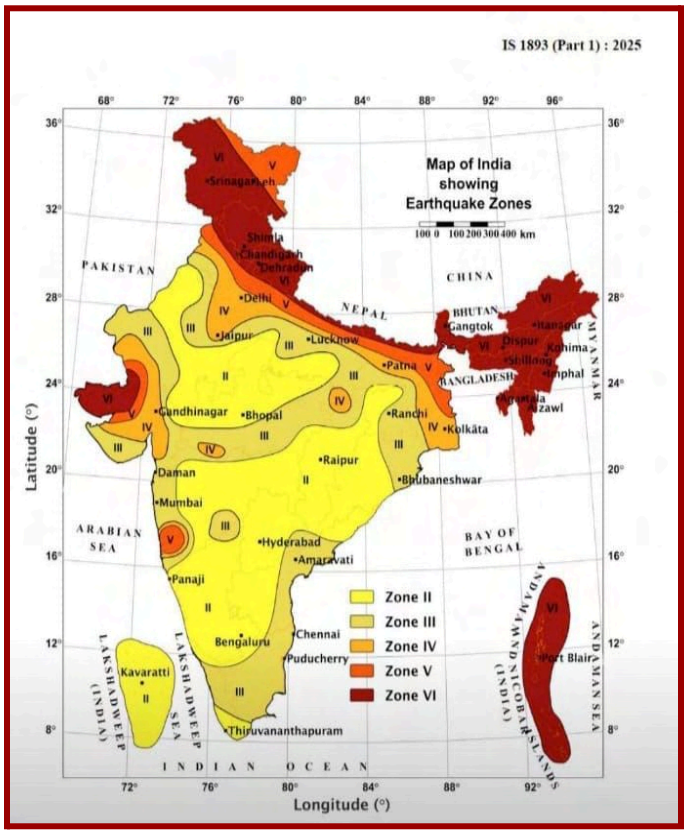
- The Aravalli range was formed during the **Proterozoic era** through ancient tectonic collisions.
- It forms part of the **Aravalli-Delhi orogenic belt**.
- The hills generally rise between **300 and 900 metres in height**.
- The **highest peak is Guru Shikhar (1,722 m)** located in Mount Abu.
- The Aravalli region contains rocks such as **quartzite, marble, and granite**.
- The range is also associated with mineral deposits containing **copper and zinc**.

- Several important rivers originate in this region, including **Banas, Luni, Sabarmati, and Sahibi**.

Aravalli "100-Metre Definition" Issue

- **What is the 100-Metre Definition?**
  - The **Supreme Court** accepted a recommendation of the **Environment Ministry** regarding the definition of Aravalli hills.
  - According to this rule, **only landforms rising 100 metres** or more above the surrounding ground level will be recognised as **Aravalli Hills**.
  - Hills **less than 100 metres** in height are excluded from this classification.
- **Implications of the New Definition**
  - Under this rule, **only taller hill sections** remain protected.
  - The **Forest Survey of India (FSI)** indicated that the 100-metre definition may **exclude nearly 90% of the hills** from protection.
- Earlier scientific criteria that considered **slope and a minimum height of 30 metres** would have protected **around 40% of the hills**.

India Revised Earthquake Design Code, 2025 (IS 1893)



About Seismic Zonation Map

- **Seismic zonation map** classifies regions based on earthquake hazard to guide structural design requirements.
- It helps determine **strength and safety standards of buildings** against expected seismic forces.
- Updated map is issued by **Bureau of Indian Standards (BIS)** under revised Earthquake Design Code, 2025.
- It uses **Probabilistic Seismic Hazard Assessment (PSHA)** for scientific and risk-based classification.

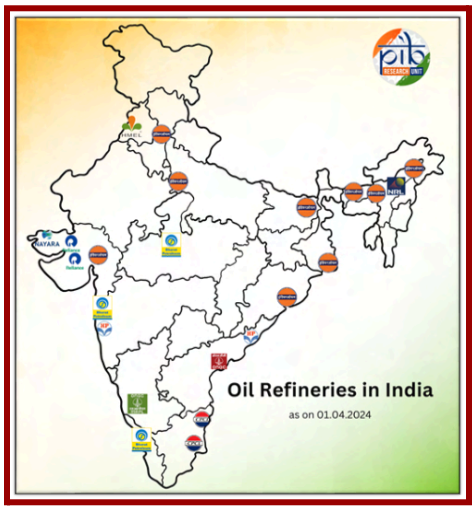
Key Features of Revised Zonation Map

- **Introduction of Zone VI**
  - A new **highest-risk Zone VI** has been introduced covering entire Himalayan arc from J&K to Arunachal Pradesh.
  - It reflects high tectonic stress along **Indian–Eurasian plate** boundary.
- **Expanded High-Risk Coverage**
  - About **61% of India** now falls under moderate to high seismic hazard zones.
  - It is based on **scientific modelling of faults, rupture potential, and seismic activity**, not just past earthquakes.
- **Boundary Rule for Cities**
  - Cities located between two zones are **automatically assigned** to higher-risk zone.
  - Ensures classification based on **geological risk** rather than administrative boundaries.
- **Rupture Extension Recognition**
  - Map recognises that **Himalayan thrust ruptures can extend into foothill regions** like Dehradun.
- **Structural Safety Norms**
  - New norms require securing **non-structural elements like ceilings, tanks, façades, and equipment**.
  - Buildings near faults must withstand **strong ground motions typical of near-fault earthquakes**.
- **Soil and Ground Response Provisions**
  - Includes provisions for **liquefaction, soil flexibility, and site-specific** seismic response studies.
  - Encourages **geotechnical investigations** before major construction projects.
- **Exposure Mapping (PEMA Method)**
  - Incorporates **population density, infrastructure, and socioeconomic vulnerability** into risk assessment.
  - Moves towards **impact-based seismic hazard evaluation**.

Significance

- Enables **better earthquake preparedness** through improved hazard mapping and updated building standards.
- Highlights need for **retrofitting old structures**, especially in Himalayan and high-risk regions.
- Ensures **uniform hazard classification across Himalayan belt**, correcting earlier underestimation.

Oil Refineries and Petroleum Resources in India



What are Oil Refineries?

- An **oil refinery** is an industrial facility where **crude oil (petroleum)** is processed into useful petroleum products.
- Major products include **petrol, diesel, kerosene, LPG, fuel oil, heating oil, asphalt, and petroleum naphtha**.
- Refineries are **large industrial complexes** with extensive pipelines that move fluids between processing units such as **distillation columns**.
- Their functioning is similar to **chemical plants**, as both rely on complex chemical processing technologies.
- Historically, **Chinese civilizations** were among the earliest to refine crude oil.

Oil Exploration: Onshore and Offshore Drilling

- **Oil exploration** involves extracting petroleum from beneath the **earth's surface or seabed**.
- **Onshore drilling:** Extraction of oil from **underground deposits on land**.
- **Offshore drilling**
  - Extraction of oil from **beneath the ocean floor** using **floating or fixed drilling platforms**.
- Both **onshore and offshore drilling** are used for **oil and natural gas extraction**.

Petroleum Industry in India

- India's **oil and gas sector** is largely dominated by **public sector companies**, though private firms also play a major role.
- Major private players include **Reliance Industries Limited (RIL)**, **Reliance Petroleum Limited (RPL)**, and **Nayara Energy**.
- **RIL's refining capacity:** about **34 MMTPA**.
- **Production and consumption**
  - **Offshore production:** about **16.9 million tonnes**.
  - **Onshore production:** about **17.3 million tonnes**.
- **Import dependence**
  - India imported about **88.3%% of its crude oil** in **2024–25**, costing around **USD 112 billion**.
- **Consumption**
  - Total oil consumption reached **212 MMT in 2018–19**, making India the **third-largest oil consumer** after the **United States** and **China**.
- **Exports**
  - India exported about **64.7 million metric tonnes (MMT)** of petroleum products in FY 2024–25, strengthening its position as a major global refined fuel exporter.

Distribution of Oil-Bearing Areas in India

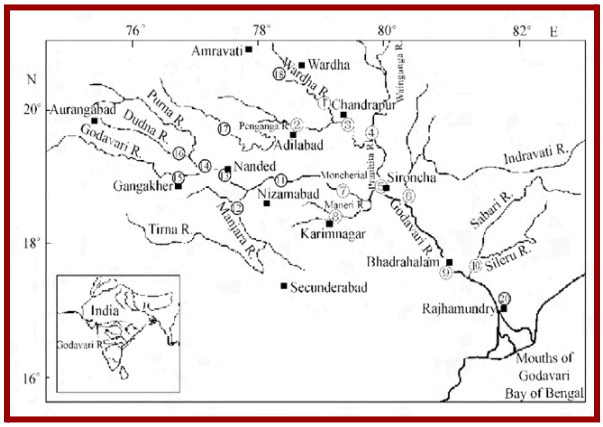
- **Sedimentary rocks**, where petroleum is usually found, cover about **1 lakh sq km (42% of India's area)**.
- **Marine basins** of the **Mesozoic and Tertiary periods** cover about **10 lakh sq km**.
- The **continental shelf** with potential oil-bearing rocks extends over **2 lakh sq km**.
- India has about **27 sedimentary basins** including **onshore and offshore areas**.
- **Major productive regions**
  - Mumbai High
  - Gulf of Khambhat
  - Assam basin

Major Oil Refineries in India

Refinery	Sector	State
Jamnagar	Private	Gujarat
Vadinar	Private	Gujarat
Kochi	Public	Kerala
Mangalore	Public	Karnataka
Paradip	Public	Odisha

Panipat	Public	Haryana
Gujarat (Koyali)	Public	Gujarat
Mumbai	Public	Maharashtra
Manali	Public	Tamil Nadu
Visakhapatnam	Public	Andhra Pradesh
Nagapattinam	Public	Tamil Nadu
Digboi	Public	Assam

Godavari River



Basic Overview

- **Godavari River** is the largest peninsular river system and is popularly known as **Dakshin Ganga.**
- It originates from **Trimbakeshwar near Nashik in Maharashtra** and flows eastwards into Bay of Bengal.
- Total length of river is about **1465 km**, making it **second longest river** in India.
- Godavari basin is bounded by **Satmala hills (north), Ajanta and Mahadeo ranges (south)**.
- Eastern and Western boundaries are formed by **Eastern Ghats and Western Ghats respectively**.
- Basin covers **Maharashtra, Telangana, Andhra Pradesh, Chhattisgarh, Odisha**, with smaller parts in nearby regions.

Tributaries

- **Important tributaries** include Pravara, Purna, Manjra, Penganga, Wardha, Wainganga, Indravati and Sabari rivers.
- **Pranhita River** is major tributary formed by combined flow of Wardha, Wainganga and Penganga rivers.
- **Right bank tributaries** include Pravara, Manjira and Maner rivers.
- **Left bank tributaries** include Purna, Pranhita, Indravati and Sabari rivers.

Cultural & Economic Significance

- **Kumbh Mela** is held at Nashik on banks of Godavari, making it culturally significant river.
- Major cities along basin include **Nashik, Aurangabad, Nagpur and Rajahmundry**.
- Basin supports industries like **rice milling, cotton textiles, sugar processing and oil extraction units**.

Important Projects

- Major projects include **Polavaram Irrigation Project and Kaleshwaram Lift Irrigation Scheme**.
- Other projects include **Sriram Sagar Project, Inchampalli project and Sadarmatt Anicut**.

Chambal River

Basic Facts

- **Chambal River** is a perennial, rain-fed river forming part of the greater Gangetic drainage system.
- It is one of the **cleanest rivers in India**, known for minimal pollution and rich aquatic biodiversity.

- It is the **largest tributary of the Yamuna River**, joining it at Pachnada in Uttar Pradesh.

Origin & Course

- Originates from **Janapav (Vindhya Range)** near Mhow in Madhya Pradesh at about 843 metres elevation.
- Flows through **Madhya Pradesh, Rajasthan, and Uttar Pradesh**.
- Forms a natural boundary between **Madhya Pradesh and Rajasthan** in several stretches.
- **Left bank tributaries** include Banas and Mej rivers.
- **Right bank tributaries** include Kali Sindh, Parbati, Shipra, Kuno, Seep, and Kwari rivers.

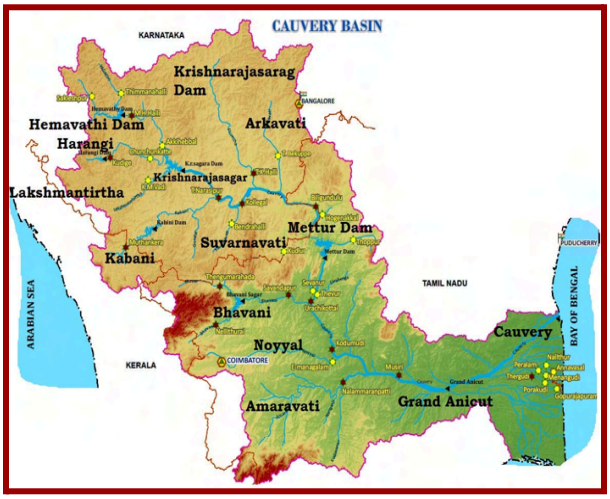
Key Physical Features

- Lower course is marked by **Chambal ravines**, formed due to severe soil erosion and gully formation.
- It is an **anterior drainage river**, older than the Yamuna and Ganga river systems.
- River forms **deep pools during lean seasons**, supporting aquatic life during water scarcity.
- Initial course shows **steep gradient and gorges**, especially near Chaurasigarh region.

Ecological Significance

- Important habitat for **Gharial, Ganges river dolphin, and several freshwater turtle species**.
- Hosts biodiversity including **critically endangered species and aquatic mammals**.
- Protected under **National Chambal Sanctuary**, a major conservation area for riverine fauna.

Cauvery River System



Overview

- The **Cauvery (Kaveri)**, known as the **"Ganga of the South".**
- It originates at **Talakaveri (Brahmagiri hills, Karnataka)** at about 1,341 m.
- The river flows for nearly **800 km** in a southeasterly direction through Karnataka and Tamil Nadu before draining into the **Bay of Bengal**, forming a fertile delta.

Basin and Physiography

- The basin extends over **Karnataka, Tamil Nadu, Kerala, and Puducherry**, covering about **81,000 sq. km**, bounded by the **Western Ghats (west)** and **Eastern Ghats (east and south)**.
- The **Nilgiri hills divide the basin** into the Karnataka plateau (north) and Tamil Nadu plateau (south), with three physiographic divisions: **Western Ghats, Mysore plateau, and delta region**.
- The delta is the **most fertile region**, often referred to as the **"garden of southern India"**.

Flow and Course

- The river is **almost perennial**, as the upper basin receives rainfall from the **south-west monsoon** and the lower basin from the **north-east monsoon**, ensuring relatively stable flow.
- It descends through **Sivasamudram Falls**, forms the **Mekedatu gorge**, flows along the **Karnataka–Tamil Nadu boundary**, and enters plains near **Mettur reservoir**.
- Near Tiruchirapalli, it splits into the **Kollidam (Coleroon) distributary and main Cauvery branch**, forming a wide delta before entering the sea.

Tributaries

- Major tributaries include **Harangi, Hemavati, Shimsha, Arkavati (left bank)** and **Lakshmantirtha, Kabini, Suvarnavati, Bhavani, Noyyal, Amaravati (right bank)**.

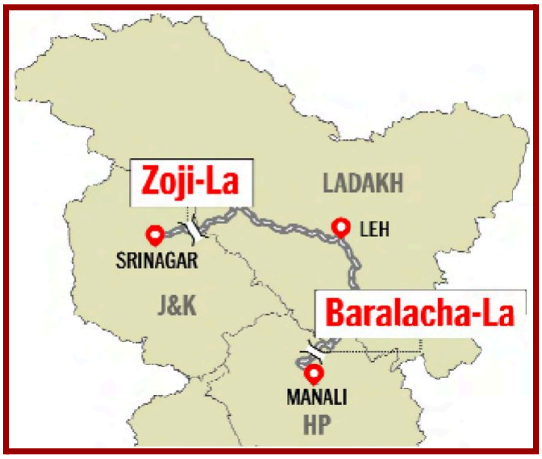
Economic Importance and Projects

- Nearly **66% of the basin area is under agriculture**, supported by irrigation from the river system.
- The river is among the **best-regulated systems**, with extensive utilization for irrigation and hydropower through projects such as **Krishnarajasagar and Mettur dams**.

Cauvery Water Dispute

- A major **inter-state river dispute involving Karnataka, Tamil Nadu, Kerala, and Puducherry**, with the **Cauvery Water Disputes Tribunal (1990)** giving its award in 2007.

Zojila Pass



Context: An **avalanche at Zojila Pass** on the **Srinagar–Leh National Highway** led to the death of **five persons** and injuries to several others.

About Zojila Pass

- **Location and Features**
  - **Zojila Pass**, also known as the **"Mountain Pass of Blizzards"**, connects the **Kashmir Valley with Ladakh**.
  - It is located on the **Srinagar–Kargil–Leh highway (NH-1)** at an altitude of about 11,650 feet (≈ 3,500 metres).
  - The pass remains **closed for nearly half of the year** due to **heavy snowfall**.
- **Strategic Importance**
  - Zojila Pass serves as a crucial link between **Kashmir and Ladakh**.
  - It holds significant importance for **defence logistics** and **civilian connectivity**.
- **Historical Significance**
  - The pass played a key role during the **Indo-Pakistan War (1947–48)**.
  - It was recaptured by the Indian Army under **Operation Bison (1 November 1948)**.

Zojila Tunnel

- The **Zojila Tunnel** is an **under-construction tunnel** on the **Srinagar–Leh highway** at an altitude of about **11,578 feet**.
- **Key Features**
  - It will have a **total length of 14.15 km**.
  - It is expected to be **India's longest road tunnel** and **Asia's longest bi-directional tunnel**.
  - It aims to provide all-weather connectivity between **Srinagar and Leh**.

Coking Coal

Context and Legal Framework

- The **Government of India** has declared **Coking Coal** as a **Critical and Strategic Mineral** under the Mines and Minerals (Development and Regulation) Act, 1957 **(MMDR Act)**.
- Using **Section 11C of the MMDR Act, 1957**, the government amended the **First Schedule**.
- **Coking Coal** has been included within **"Coal" in Part A** and also listed separately in **Part D as a Critical and Strategic Mineral**.
- The objective is to **reduce import dependence** and support **Aatmanirbhar Bharat and Viksit Bharat 2047**.

About Coking Coal

- **Coking coal**, also known as **metallurgical coal**, is a **special grade of bituminous coal** used in steel production.
- It undergoes **carbonisation to produce coke**, which is essential for converting **iron ore into pig iron in blast furnaces**.
- Its importance lies in its **caking properties**, as it **softens and swells when heated** to form coke.

- It contains **low impurities**, particularly **low ash, sulphur, and phosphorus**, making it suitable for metallurgical processes.

Strategic Importance and Global Scenario

- Approximately **780 kg of coking coal** is required to produce **one tonne of steel**, highlighting its **critical role in the steel industry**.
- It is an **irreplaceable input** in traditional blast furnace steelmaking.
- Major global producers include **China, Australia, Russia, the United States, and Canada**.

Indian Scenario

- India is the **second-largest producer of crude steel in the world**.
- Nearly **95%** of India's coking coal requirement is met through **imports**, with a significant share coming from **Australia**.
- Imports reached about **57.58 million tonnes in 2024–25**, indicating rising dependence.
- India has estimated reserves of about **37.37 billion tonnes**, primarily located in **Jharkhand**, with additional reserves in **Madhya Pradesh, West Bengal, and Chhattisgarh**.

Indian Coffee

Context: India's **coffee exports** have been disrupted due to the **U.S.–Iran conflict**, affecting shipping through the **Strait of Hormuz**.

About Coffee

- **Coffee** is a **tropical plantation crop** generally grown under **shade trees**.
- Two major varieties are **Arabica** and **Robusta**.
- **Cultivation in India**
  - Major producing states include **Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, and Odisha**.
  - **Karnataka contributes over 70%** of India's total coffee production.
- **Climatic Requirements**
  - Grown at elevations of **600–1,600 metres above sea level**.
  - Requires **hot and humid climate** with temperature between **15°C and 28°C**.
  - Needs **150–250 cm of rainfall**.
  - Suitable soil includes **well-drained loamy soil rich in humus and minerals (iron and calcium)**.
  - **Dry weather is essential during ripening** of coffee berries.
- **Trade and Export**
  - **Europe is the largest destination** for Indian coffee exports.
  - Major importers include **Italy, Germany, Belgium, Middle East countries, Korea, and Japan**.

Geological Survey of India (GSI)

Basic Facts

- Established in **1851** by **Sir Thomas Oldham**
- Originally set up to **find coal deposits for the Railways**
- **Headquarters:** Kolkata
- **Six Regional Offices:** Lucknow, Jaipur, Nagpur, Hyderabad, Shillong, and Kolkata
- **Nodal Ministry:** Ministry of Mines (attached office)

Key Functions

- Provides **geological expertise and geoscientific information** for policy-making and socio-economic needs
- Systematic documentation of **geological processes** — both surface and subsurface — including offshore areas
- Conducts **geological, geophysical, and geochemical surveys**
- **National geoscientific information** creation and updation
- **Mineral resource assessment**
- Has played a pioneering role in **geological mapping, mineral exploration, disaster studies, and geoscientific research**

National Mineral Development Corporation

About NMDC

- **NMDC Limited** is a **Navratna Central Public Sector Enterprise (CPSE)** under the **Ministry of Steel**.
- It is the **largest producer of iron ore in India** and a major player in the country's mineral development.
- **Established:** 1958
- **Headquarters:** Hyderabad

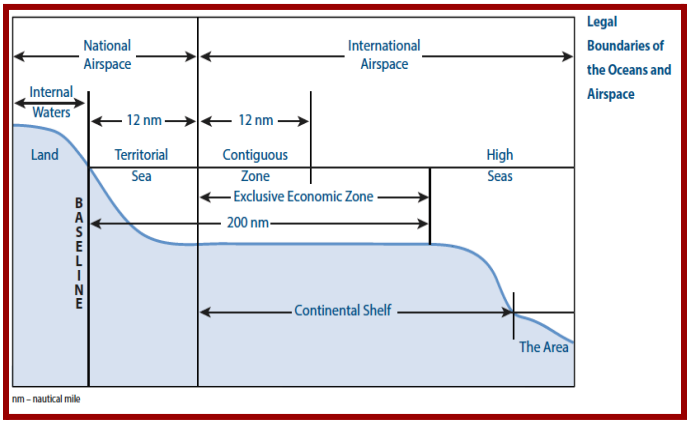
Objectives

- **Explore and develop mineral resources** in India.
- Ensure a **reliable domestic supply of iron ore** for the steel sector.
- Support India's goal of achieving **300 million tonnes steel capacity by 2030**.

Major Functions

- **Iron ore production:** Operates large mechanised mines mainly in **Chhattisgarh and Karnataka**.
- **Mineral exploration:** Conducts geological surveys to identify new **mineral deposits**.
- **Diamond mining:** Runs India's only mechanised diamond mine at **Panna (Madhya Pradesh)**.
- **Research and Development:** Maintains an R&D centre in **Hyderabad**, recognised by **UNIDO** as a Centre of Excellence.
- **Sustainable mining:** Adopts **scientific mining and environmental management practices**.

Maritime Zones



Context: Sri Lanka is **evacuating 208 crew members** from the Iranian naval ship **IRINS Bushehr,** stranded near its territorial waters.

Maritime Zones

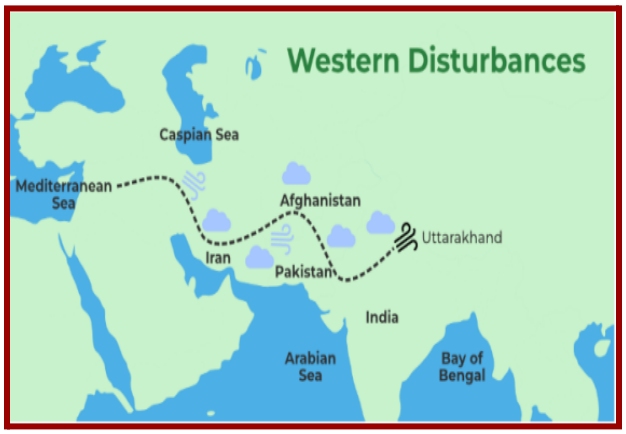
- **Baseline**
  - The **low-water line along the coast** as officially recognised by the coastal state
  - All maritime zones are measured **seaward from this line**
- **Internal Waters**
  - Waters on the **landward side of the baseline.**
  - Coastal states have **full sovereignty** over internal waters, similar to land territory.
  - Examples: **bays, ports, inlets, rivers, and lakes** connected to the sea.
  - **No right of innocent passage** exists in internal waters.
    - Innocent passage means passing through waters in a manner **not prejudicial to peace and security** and nations can suspend this right.
- **Territorial Sea**
  - Extends **up to 12 nautical miles (nm)** from the baseline
    - 1 nautical mile = **1.1508 land miles or 1.85 km**
  - Coastal states have **full sovereignty and jurisdiction**, including over the **surface, seabed, subsoil, and airspace**
  - However, this sovereignty is **limited by the right of innocent passage** for foreign ships
- **Contiguous Zone**
  - Extends **up to 24 nm** from the baseline
  - An **intermediary zone** between the territorial sea and the high seas
  - A coastal state can **prevent and punish** infringement of **fiscal, immigration, sanitary, and customs laws**
  - Jurisdiction is **only over the ocean surface and floor**, does **not** extend to airspace
- **Exclusive Economic Zone (EEZ)**
  - Extends **up to 200 nm** from the baseline
  - Within the EEZ, coastal states have **sovereign rights** for:
    - **Exploring, exploiting, conserving, and managing natural resources** — both living and non-living — of the seabed and subsoil
    - **Production of energy** from water, currents, and wind
  - The EEZ does **not** give the coastal state the right to **prohibit freedom of navigation or overflight**
- **High Seas**
  - Ocean surface and water column **beyond the EEZ**
  - Considered the **"common heritage of all mankind"** thus beyond any national jurisdiction

- All states can conduct activities here for **peaceful purposes** such as transit, marine science, and undersea exploration

About UNCLOS

- United Nations Convention on the Law of the Sea **(UNCLOS), 1982,** is also known as the **Law of the Sea**
- The **only international convention** that stipulates a framework for **state jurisdiction in maritime spaces**
- Provides different **legal status** to different maritime zones
- Serves as the backbone for **offshore governance** by coastal states

Western Disturbance



Context: The parts of **Delhi received light rain** thusbringing **respite from prevailing hot conditions**.

What is a Western Disturbance?

- **Extra-tropical low-pressure system** originating over the **Mediterranean region**
- Travels eastward across **Middle East, Iran, Afghanistan, and Pakistan**
- **Origin**
  - Develops over the **Mediterranean Sea region**
  - Receives moisture from **Caspian Sea and Black Sea**
- **Formation Mechanism**
  - **Cold polar air** interacts with **warm moist Mediterranean air**
  - Forms **extra-tropical depression system**
  - Guided by **Subtropical Westerly Jet Stream** toward Indian subcontinent
  - **Himalayan barrier** forces uplift, causing condensation and precipitation

Impacts on India

- **Winter Precipitation**
  - Primary source of **non-monsoonal winter rainfall in India**
  - Causes **snowfall in Western Himalayas** and **rain in northern plains**
- **Agricultural Effects**
  - Benefits Rabi crops like wheat, mustard, and gram
  - Causes hailstorms and crop damage during intense disturbances
- **Temperature Effects**
  - Raises **night temperatures before arrival due to cloud cover**
  - Triggers **cold waves after departure due to northerly winds**
- **Water Security**
  - Feeds **Himalayan glaciers and perennial river systems**
  - Supports **Ganga, Yamuna, and Indus river flows**

Earth's Magnetic Field Reversals

Earth's Magnetic Field

- The **Earth's magnetic field** is generated by the **geodynamo**, which results from the movement of **molten iron in the outer core**.
- **It performs two key functions:**
  - Helps in **navigation** (compass alignment with magnetic poles).
  - Protects the Earth from **high-energy solar radiation** by deflecting charged particles.

Magnetic Pole Reversal

- A **geomagnetic reversal** occurs when the **north and south magnetic poles interchange positions**.
- These reversals have occurred many times in **Earth's geological history.**
- Earlier studies suggested that such reversals typically lasted around **10,000 years**.
- **New Study Findings**
  - Recent research analysing **deep-sea sediment records** (dating back about **40 million years to the Eocene epoch**) suggests that some reversals lasted longer.

- One reversal lasted about **18,000 years**.
- Another reversal lasted about **70,000 years**, much longer than previously believed.

GOVERNMENT - SCHEMES

PRELIMS

Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY)

Background

- Announced in **2020** during the **COVID-19 pandemic** as part of the existing **Pradhan Mantri Garib Kalyan Yojana**
- Nodal Ministry: **Ministry of Finance**
- Implemented by: **Department of Food and Public Distribution** under the Ministry of Consumer Affairs, Food and Public Distribution

Key Features

- Provides food grains to the poorest citizens through the **Public Distribution System (PDS)**
- Covers all **priority households,** i.e. ration card holders and those under **Antyodaya Anna Yojana (AAY)**
- Entitlement: **5 kg of rice or wheat per person** and **1 kg of dal per family,** thus provided **above** the monthly entitlement under NFSA
- Budget: **₹2 Lakh Crores** for FY 2022-23, thus making it the **largest food security programme in the world**

About the National Food Security Act (NFSA), 2013

- **Nodal Ministry: Department of Food and Public Distribution** under Ministry of Consumer Affairs, Food and Public Distribution
- **Coverage**
  - **75% of rural population** and up to **50% of urban population** covered under subsidised foodgrains through **Targeted Public Distribution System (TPDS)**
  - Total coverage: **67% of India's population**
- **Beneficiary Categories**
  - **Antyodaya Anna Yojana (AAY):**
    - Entitled to **35 kg of foodgrains per month** irrespective of family size
  - **Priority Households:**
    - Each member entitled to **5 kg of foodgrains per month**
    - Identification of eligible households done by **States/UTs**
- **Support for Women and Children**
  - **Pregnant women and lactating mothers** entitled to **maternity benefits of not less than ₹6,000**
  - Children **(6–14 years)**, pregnant women, and lactating mothers entitled to meals under **ICDS** and **Mid-Day Meal (MDM)** schemes
  - **Eldest woman of the household aged 18 years or above** shall be the **head of household** for issuing ration cards
- **Other Provisions**
  - Central Government provides assistance to states for **transportation of foodgrains, handling, and FPS dealers' margin**
  - Provision for **food security allowance** to entitled beneficiaries in case of **non-supply of foodgrains or meals**

RELIEF Scheme

Context:

Government launched ₹497 crore **Resilience & Logistics Intervention for Export Facilitation (RELIEF) scheme** to support exporters impacted by disruptions due to ongoing West Asia crisis.

Key Features of the Scheme

- It provides **credit insurance support** to affected exporters.
- Scheme is part of **Export Promotion Mission**, announced in Budget 2025–26 to boost export resilience.
- Focus is on **MSME exporters**, ensuring financial protection and continuity of export operations during crisis.
- Insurance premium rates remain at **pre-conflict levels**, reducing financial burden on exporters.

Components of RELIEF Scheme

- **First component (₹56 crore)** supports exporters already insured under Export Credit Guarantee Corporation (ECGC) with pre-disruption premium benefits.
    - Covers shipments with **Bill of Lading dated between February 14 and March 15, 2026**.
- **Second component (₹159 crore)** covers new exporters opting for ECGC insurance for shipments till June 15, 2026.
    - Provides up to **95% insurance cover** against losses, excluding energy sector shipments.
- **Third component (₹282 crore)** targets MSMEs without prior ECGC cover, with support capped at ₹50 lakh.

Coverage & Scope

- Applies to exports destined for **UAE, Saudi Arabia, Kuwait, Qatar, Oman, Bahrain, Iraq, Iran, Israel, Yemen**.
- ECGC provides protection against **commercial, political, and war-related risks** affecting export consignments.
- Scheme ensures coverage for goods stranded or delayed due to **geopolitical disruptions in West Asia region**.

UDAN Scheme Revamp

Context: The Union Cabinet has approved a **modified UDAN scheme** with an outlay of **₹28,840 crore**, introducing key changes in subsidy structure and duration.

More in News

- Subsidy support for airlines on select **Tier-2 and Tier-3 routes** extended from **3 years to 5 years**.
- Shift in subsidy mechanism from Regional Connectivity Scheme (RCS) **levy in airfares to direct budgetary support** from the exchequer.
    - Earlier, subsidies were funded through a **levy on non-UDAN routes**.

About UDAN Scheme

- UDAN stands for **Ude Desh ka Aam Nagrik**.
- Launched in **2016** under National Civil Aviation Policy (NCAP).
- Aims to enhance **regional air connectivity** and make air travel affordable.
- Focuses on connecting **unserved and underserved airports**.
- Operates on **Viability Gap Funding (VGF) model** to support airlines.
- Promotes **regional development, tourism, trade, and job creation**.
- **Key Features**
    - **Viability Gap Funding (VGF):** Financial support to airlines to ensure route viability.
    - **Airfare Cap:** Limits ticket prices for affordability.
    - **Collaborative Model:** Involves Centre, States, Airports Authority of India, and private operators.
- **Incentives to Stakeholders**
    - **Airport Operators:** Waiver of landing, parking, and navigation charges.
    - **Central Government:** Excise duty on ATF capped at **2%**.
    - **State Governments:** VAT on ATF reduced to **1% or lower for 10 years**.

Phases of UDAN Scheme

- **UDAN 1.0 (2017):** 128 routes across 70 airports; first flight Shimla–Delhi.
- **UDAN 2.0 (2018):** Expanded to underserved airports; included helipads.
- **UDAN 3.0 (2019):** Introduced tourism routes and seaplanes.
- **UDAN 4.0 (2020):** Focus on hilly, island, and border regions.
- **UDAN 5.0 Series (2023–2025):** Focus on efficiency and connectivity expansion.

IVFRT Scheme

Context: The Union Cabinet has approved the extension of the Immigration, Visa, Foreigners Registration & Tracking **(IVFRT) scheme for 5 years (2026–2031)** with an outlay of **₹1,800 crore**.

About IVFRT Scheme

- IVFRT aims to interlink and optimise functions related to **immigration, visa issuance, registration and tracking of foreigners**.
- Launched in **2010** to modernise and upgrade **immigration and visa services**.
- Provides a **secure and integrated service delivery framework**.
- Facilitates **online visa services** including appointment scheduling and payment.

- Supports **immigration control** and management of **illegal migration**.
- Implemented as a **Mission Mode Project** under the National e-Governance Plan (NeGP) by the **Ministry of Home Affairs.**

Coverage and Infrastructure

- Covers Immigration Posts, Indian Missions abroad, FRROs and FROs/SPs/DCPs across the country.
- Enables coordination between **immigration checkpoints and foreigner registration authorities**.

One District One Product (ODOP) Scheme

About the Scheme

- **ODOP** is a flagship initiative of the **Ministry of Commerce and Industry**.
- Implemented by the **Department for Promotion of Industry and Internal Trade (DPIIT)** with support from **Invest India**.
- It promotes **one distinctive product from each district** to strengthen local economies.
- Inspired by **Japan's "One Village One Product" model**.
- **Launched in Uttar Pradesh in 2018**, beginning with **Moradabad's brassware**.
- As of **2025**, the scheme covers **1,102 products across 761 districts** in sectors such as **agriculture, handicrafts, textiles and food products**.

Objectives

- Promote **local products as global brands**.
- Support **artisans, farmers and micro-enterprises**.
- Preserve **traditional crafts and cultural heritage**.
- Improve **market access and value addition** for district products.

Product Selection

- **States and Union Territories identify district-specific products** based on local resources and skills.
- These products are then notified to **DPIIT**.
- **ODOP** products are promoted through platforms such as:
    - Government e-Marketplace (GeM)
    - ODOP Bazaar

Supporting Initiatives

- **ODOP Wall**
    - A display space showcasing **district-specific products** at locations such as **SARAS Aajeevika Stores**.
- **PM Ekta (Unity) Malls**
    - Dedicated retail hubs promoting **ODOP and GI-tagged products**.
    - Developed under **Public–Private Partnership (PPP)** model.
    - 29 Unity Malls approved across **27 States**.

Members of Parliament Local Area Development Scheme (MPLADS)

Basic Facts

- **Type:** Central Sector Scheme
- **Launched:** 1993
- **Nodal Ministry:** Ministry of Statistics and Programme Implementation
- **Fund Allocation:** Each MP is entitled to **₹5 crore per annum**
- Funds are **non-lapsable** — unspent amounts are carried forward to subsequent years
- **Objective**
    - Enable Members of Parliament to recommend works for creation of **durable community assets** such as drinking water, sanitation, etc., based on **locally felt needs**
- **Implementing Agency**
    - Government departments, trusts, and cooperatives selected by the **Implementing District Authority (IDA)**
- **Jurisdiction of MPs**
    - **Lok Sabha MPs:** Can recommend works within their **Lok Sabha constituency**
    - **Rajya Sabha MPs:** Can recommend works within the **state they are elected from**
    - **Nominated Members:** Can recommend works **anywhere in the country**

Special Provisions

- **SC/ST Areas**
    - MPs must recommend at least **15% of MPLADS funds for SC-inhabited areas** and **7.5% for ST-inhabited areas** every year

- If a Lok Sabha constituency has fewer tribals, funds may be utilised in **SC-dominated areas and vice versa**

- **Out-of-Area Exceptions**
  - MPs can recommend up to **₹50 lakh per year** outside their usual region (raised from ₹25 lakh after **April 2023**)
  - In case of a **calamity of severe nature** (as declared by the Government of India), MPs can recommend up to **₹1 crore for the affected district**

SWAMIH Fund

Context: The **Special Window for Affordable and Mid-Income Housing (SWAMIH)** Fund is aimed at reviving **stalled housing projects** in India's real estate sector. Many housing projects had remained incomplete due to **financial constraints**, affecting homebuyers who had already invested their savings.

About SWAMIH Fund

- **SWAMIH** is a **government-backed investment fund** created to provide **last-mile financing** to stalled residential housing projects.
- The scheme was **launched in 2019**.
- The fund is **sponsored by the Ministry of Finance**.
- It is **managed by SBICAP Ventures Ltd.**, a company belonging to the **State Bank Group**.

Objective of the Scheme

- **Complete stalled affordable and mid-income housing projects**.
- Protect the interests of **homebuyers waiting for possession of their houses**.
- Restore confidence in the **real estate sector**.

Others

Liquefied Petroleum Gas (LPG)

What is LPG?

- **Liquefied Petroleum Gas (LPG)** is a hydrocarbon fuel composed of:
  - **50–60%** Propane**; 40–50%** Butane
  - Composition varies with **season and supply**

Production & Import in India

- **Domestic production: ~12.8 MT (35%)** of total requirement
- **Imports:** Exceeded **~21 MT (65%)** of total requirement
- India is heavily **import-dependent** for LPG
- **Qatar** is largest source of import followed by **UAE, Kuwait, and Saudi Arabia**
- **Demand Pattern: Households account for over 90%** of India's total LPG demand

World Happiness Report

Context: World Happiness Report 2026 highlights that **excessive social media use is negatively affecting well-being of young people globally**.

Basic Features

- **World Happiness Report** is an annual global report measuring levels of happiness and wellbeing across countries.
- Published by **Oxford Wellbeing Research Centre** in partnership with Gallup and UN Sustainable Development Solutions Network.
- It is considered a **leading global publication on wellbeing and quality of life indicators**.
- Based on survey where people rate their life on a **scale from 0 (worst) to 10 (best)**.

Methodology

- Rankings are based on responses from around **100,000 individuals across nearly 140 countries and territories**.
- Focuses on **self-reported life evaluation**, not just economic indicators or objective measures.

Key Indicators Used

- **GDP per capita** reflecting economic prosperity and standard of living.
- **Healthy life expectancy** indicating overall health conditions of population.
- **Social support** measuring strength of family and community networks.
- **Freedom to make life choices** reflecting personal autonomy and liberty.
- **Generosity** capturing charitable behaviour and social trust.

- **Perception of corruption** indicating trust in institutions and governance.

Highlights of 2026 Report

- Top countries include **Finland, Iceland, Denmark, Costa Rica, and Sweden**.
- Least happy countries include **Afghanistan, Sierra Leone, Malawi, and Zimbabwe**.
- **India** improved its ranking from **126th** in 2024 to **118th** in 2025.

Euthanasia in India

Context and Legal Evolution

- The Supreme Court, in **Harish Rana v. Union of India (2026)**, reaffirmed the right to die with dignity under **Article 21**, allowing withdrawal of life support such as Clinically Assisted Nutrition and Hydration (CANH).
- The right to die with dignity was earlier recognised in **Common Cause v. Union of India (2018)** as an integral part of the right to life.
- The concept of **passive euthanasia** and validity of **Advance Medical Directives (living wills)** were established in **Aruna Shanbaug case (2011)**.
- In **Common Cause (2023)**, procedural requirements were simplified by reducing multiple approvals and easing implementation.
- The latest judgment emphasises **patient autonomy**, allowing individuals to refuse life-prolonging treatment.

Ethical Dimensions of Euthanasia

- The debate revolves around balancing natural processes of life and death with the need for **dignity in suffering**.
- **Principle of autonomy**: Recognises the patient's right to make decisions regarding their own life and treatment.
- **Principle of beneficence**: Doctors must act in the best interest of the patient, including relief from suffering.
- **Principle of non-maleficence**: Decisions should minimise harm and avoid prolonging unnecessary suffering.
- **Principle of justice**: Ensures fairness and protection from exploitation or unequal treatment.
- The **Theory of Double Effect** suggests that an action leading to both death and relief from suffering can be ethically justified if the intention is to reduce pain.

Social Implications and Concerns

- Reflects a shift from preserving life at all costs to prioritising **quality of life and dignity**.
- Provides relief from prolonged suffering and reduces **emotional and physical distress** for patients.
- Addresses the economic burden of prolonged life-support treatment, especially for **middle- and lower-income families**.
- However, risks of misuse remain:
    - Vulnerable groups such as **elderly, disabled, and poor** may face coercion.
    - Decisions may be influenced by **financial constraints or social neglect**.
- Raises concerns about **ethical conflicts** and possibility of "disguised abandonment".
- The Court clarified that withdrawal of treatment does not mean abandonment, and **palliative care must continue**.

Way Forward

- Strengthen safeguards to prevent **coercion and misuse**, especially for vulnerable populations.
- Promote awareness and proper implementation of **living wills and advance directives**.
- Expand access to **palliative and end-of-life care**, ensuring dignity beyond legal provisions.
- Develop clear institutional protocols to ensure **ethical decision-making and accountability**.
- Encourage a societal shift towards **compassionate care and informed consent**.
- Ensure that the right to die with dignity complements, rather than replaces, the right to **live with dignity**.

Conclusion

- The recognition of the right to die with dignity reflects a humane and evolving understanding of life and suffering. However, its ethical and social implications require careful balancing of **autonomy, compassion, and safeguards**, ensuring that dignity remains central to both life and death.

Passive Euthanasia

Context: In **March 2026**, the Supreme Court allowed the **withdrawal of life support** for **Harish Rana**, who had remained in a **persistent vegetative state for nearly 13**

years. It held that continuing treatment had become futile and that the **right to life under Article 21** includes the **right to die with dignity**.

Understanding Euthanasia

- Euthanasia is broadly understood in **two forms:**
  - **Active euthanasia:** Directly causing death through a deliberate act, such as administering a lethal injection. *(Illegal in India)*
  - **Passive euthanasia:** Withdrawing or withholding life-sustaining treatment such as ventilator support.
- The Court clarified that the difference lies in the **source of harm**:
  - Active euthanasia introduces a **new external cause of death**.
  - Passive euthanasia removes **artificial medical support**, allowing the illness to take its natural course.

The "Best Interests" Test

- The Supreme Court applied the **best interests test** to determine whether life support should continue.
- **Key points of the test:**
  - It examines whether **continuing medical treatment serves the patient's best interests**.
  - Both **medical and non-medical factors** must be considered.
  - There is a **strong presumption in favour of preserving life**, but it may be set aside when treatment only prolongs suffering in an **irreversible medical condition**.

Evolution of India's Legal Position

- **Gian Kaur v. State of Punjab (1996):** Recognised that a terminally ill patient may have a right to die with dignity.
- **Aruna Shanbaug Case (2011):** Allowed withdrawal of life support under strict guidelines.
- **Common Cause v. Union of India (2018):** Constitution Bench recognised passive euthanasia and allowed Advance Medical Directives (living wills).
- **2023:** Supreme Court simplified procedures for living wills and withdrawal of life support.
- Despite these developments, **active euthanasia remains illegal in India**.

Articles Inserted	Provisions
Article 330A	• Provides one-third reservation for women in the **Lok Sabha.** • Includes seats reserved for Scheduled Castes (SCs) and Scheduled Tribes (STs).
Article 332A	• Provides one-third reservation for women in **State Legislative Assemblies**. • Also applies to SC and ST reserved seats.
Article 334A	• Specifies that the reservation will start after the **next delimitation** of constituencies. • Introduces a **15-year sunset clause**. • Allows extension and periodic rotation of reserved seats through law.