

EPIC CURRENT AFFAIRS

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AUGUST 2025

INS Tamal
Conducts PASSEX

13 GW Hybrid Renewable
Park in Ladakh

17th Vice-Presidential
Election

Russia Pushes to Revive
Dormant RIC Troika

8.8 Megathrust
Earthquake

Sickle Cell Anaemia
Elimination Mission

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FOREWORD

The **EPIC UPSC Current Affairs Magazine – August Edition** has been meticulously curated to serve as more than just a news digest. It is designed to bridge the gap between **information and insight**, enabling aspirants to link each development with the relevant UPSC syllabus and examination requirements.

This compilation is a sincere attempt to **condense, simplify, and prioritise** the vast ocean of current affairs into exam-ready, high-yield content. Our aim is to ensure that every page you turn not only enhances your knowledge but also sharpens your ability to answer with precision in both Prelims and Mains.

 Note from the Team:

To reduce the **file size** and make it more convenient for students, we have deliberately kept the use of images minimal in this edition. In addition, due to an ongoing **restructuring of the EDUCASIUM Team**, there was a slight delay in the release of this magazine. We thank you for your patience and continued support.

Educasium has always been built on the vision, academic direction, and tireless guidance of **Purushoth Sir**. While people may come and go, the commitment of Educasium IAS Academy to aspirants **remains unshaken and uninterrupted**. Opportunities may be missed by some, but the mission continues without pause—for every serious student who entrusts us with their preparation.

On behalf of the entire **EPIC UPSC Team**, we reaffirm our dedication to deliver consistent, high-quality content that empowers aspirants in their pursuit of excellence.

Team EDUCASIUM
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Disclaimer: While every effort has been made to ensure accuracy, occasional errors may occur. Any such inaccuracies will be acknowledged and corrected in subsequent editions.

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AUGUST 2025

INDIAN POLITY GOVERNANCE

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1. Lok Sabha Speaker Nominates Panel of Chairpersons to Preside Over House



The **Lok Sabha Speaker** nominated an MP to the **Panel of Chairpersons**, who may preside over House proceedings in the absence of the Speaker and Deputy Speaker.

Legal Basis: Section 9, *Rules of Procedure & Conduct of Business, Lok Sabha*.

Nomination: Speaker nominates **up to 10 MPs** at the beginning of a session or as required.

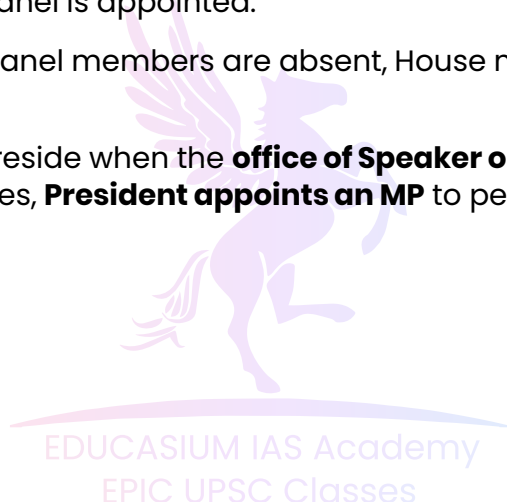
Role: Preside over House sittings **when requested** by Speaker (or by Deputy Speaker in Speaker's absence).

Assist in smooth conduct of proceedings.

Tenure: Until a new panel is appointed.

Substitution Rule: If Panel members are absent, House may designate another MP to preside.

Limitation: Cannot preside when the **office of Speaker or Deputy Speaker is vacant** – in such cases, **President appoints an MP** to perform Speaker's duties under Article 95(1).



UPSC Relevance: Prelims: Speaker nominates Panel of up to **10 members**. They preside only in Speaker/Deputy Speaker's absence and when requested. Cannot act if **Speaker's post is vacant** (President intervenes).



HOT Question: "Differentiate between the role of the Deputy Speaker and the Panel of Chairpersons in Lok Sabha. Why is the Panel considered crucial for legislative continuity?"



2. ECI Announces Schedule for the 17th Vice-Presidential Election



The **Election Commission of India (ECI)** announced the election schedule for the **17th Vice-President of India**, whose tenure is five years under **Article 67**.

Constitutional Provisions:

- **Article 66(1):** Election by **Proportional Representation (PR)** through **Single Transferable Vote (STV)** with **secret ballot**.
- **Article 66(3):** Eligibility → Citizen of India, **35 years+**, qualified to be **Rajya Sabha member**.
- **Article 67:** Term = **5 years**.
- **Article 68(2):** Election must be held **promptly if vacancy occurs**.
- **Authority:** ECI under **Article 324** and **Presidential & VP Elections Act, 1952**.

Electoral College:

- Comprises **Lok Sabha + Rajya Sabha MPs** (elected + nominated).
- Current strength: **782 MPs**.

Election Procedure:

- **Nomination:** 20 proposers + 20 seconders, deposit ₹15,000.
- **Voting:** In Parliament House; special ECI pens; first-preference vote mandatory.
- **Supervision:** Returning Officer (Rajya Sabha Secretary-General) + observers.

Safeguards:

- No party whip permitted.
- Use of unauthorized pen / violation of secrecy = vote invalid.
- Bribery or undue influence → grounds for legal challenge.



UPSC Relevance: Prelims: VP elected by **MPs only** (LS + RS, incl. nominated). Voting system = **PR by STV, secret ballot**. Age qualification = **35 years**, Rajya Sabha eligibility.



HOT Question: "Examine the procedure of election of the Vice-President of India. How does it differ from that of the President?"



3. 130th Amendment Bill Proposes Automatic Disqualification Of Ministers



The Bill, introduced by the Home Minister, was referred to a Joint Parliamentary Committee. It amends **Articles 75, 164, and 239AA** to mandate removal of Union, State, and Delhi Ministers (including CMs) detained for 30 days in offences punishable with ≥ 5 years imprisonment.

Key Provisions

- **Article 75 (Union):**
 - Union Minister arrested & detained ≥ 30 days → **removed by President** (on PM's advice).
 - If no advice, minister automatically ceases office on 31st day.
 - Reappointment possible after release.
- **Article 164 (States):** Same rule for Chief Ministers and State Ministers → removal by **Governor**.
- **Article 239AA (Delhi):** Same provision extended to **Delhi CM & Ministers** → removal by **Lt. Governor**.
- **Govt of Union Territories Act, 1963 & J&K Reorganisation Act, 2019:**
 - Provisions extended to UT Ministers (incl. J&K) → **Administrator / LG** empowered to remove.

Implications for Governance

- ✓ **Accountability:** Prevents Ministers from holding office while in prolonged detention.
- ✓ **Moral Integrity:** Aligns with constitutional morality & public expectations.
- ✓ **Clarity:** Addresses "moral vacuum" where Ministers continued in office under criminal trial.
- ✓ **Example:** In Kejriwal's 2024 arrest, SC restricted functioning but resignation remained discretionary.

Concerns Raised

- ⚠ **Constitutional Overreach:** Parliament may override presumption of innocence.
- ⚠ **Misuse Risk:** Arrests may be politically motivated, weaponising investigative agencies.
- ⚠ **Natural Justice Violation:** Removal occurs without trial or conviction.
- ⚠ **Federal Strain:** Expands LG/Administrator powers in Delhi & UTs, intensifying Centre-State friction.



UPSC Relevance: GS2 (Polity): Separation of powers, criminalisation of politics, constitutional morality.

Essay: "Politics of morality vs. politics of survival in Indian democracy."

Ethics: Integrity in public office.



HOT Question: "The 130th Constitution Amendment Bill, 2025 seeks to institutionalise constitutional morality but risks undermining natural justice. Critically evaluate the balance between accountability and misuse in this context."



4. Motion for Removal of Allahabad HC Judge Admitted in Lok Sabha



The **Lok Sabha Speaker** admitted a motion signed by **146 MPs** for the removal of Justice Yashwant Varma (Allahabad HC) on corruption charges. An **Inquiry Committee** comprising Justice Aravind Kumar, Justice Manindra Mohan Shrivastava, and jurist B.V. Acharya will examine the allegations.

Constitutional Framework

- **Article 124(4) & (5):** Provides for removal of SC judges (extended to HC judges via Article 217).
- **Grounds:** Proven misbehaviour or incapacity.
- **Final Authority:** President issues removal order after parliamentary approval.

JUDGES (INQUIRY) ACT, 1968 – PROCEDURE

Initiation:

- Motion signed by **100 MPs (Lok Sabha)** or **50 MPs (Rajya Sabha)**.
- Submitted to Speaker/Chairman → who may **admit or reject**.

Investigation:

- If admitted → a **three-member committee** is set up:
 - CJI or SC Judge,
 - HC Chief Justice,
 - Distinguished jurist.
- Committee investigates charges and submits a report.

Parliamentary Stage:

- If committee finds judge guilty → motion can be taken up.
- Requires **special majority in both Houses**:
 - **2/3rd of members present and voting + 50% of total membership.**

Final Step: If passed → President issues the removal order.

Key Significance

- **Checks and Balances:** Ensures judicial accountability without undermining independence.
- **High Threshold:** Stringent majority requirement protects judges from frivolous/partisan attempts.
- **Rare Process:** Only a few attempts in history (*Justice V. Ramaswami (1993)*, *Justice Soumitra Sen (2011)*, *Justice P.D. Dinakaran* – not completed).



UPSC Relevance: Prelims: Judges (Inquiry) Act, 1968, constitutional articles, removal procedure.

Mains (GS II): Balance between **judicial independence vs accountability**, role of Parliament, separation of powers.



HOT Question: "The procedure for removal of judges in India is designed to preserve judicial independence but has led to near-impossibility of accountability. Critically examine." (150 words)



5. President Appoints Additional Judges in High Courts to Address Case Backlogs



The **President of India** recently appointed **Additional Judges** in several High Courts under **Article 224**, aimed at tackling the growing pendency of cases and temporary surge in workload.

Constitutional Provision: Article **224** empowers the President to appoint **Additional Judges** when there is:

- A **temporary increase** in business of a High Court, or
- **Arrears of work.**

Tenure & Age:

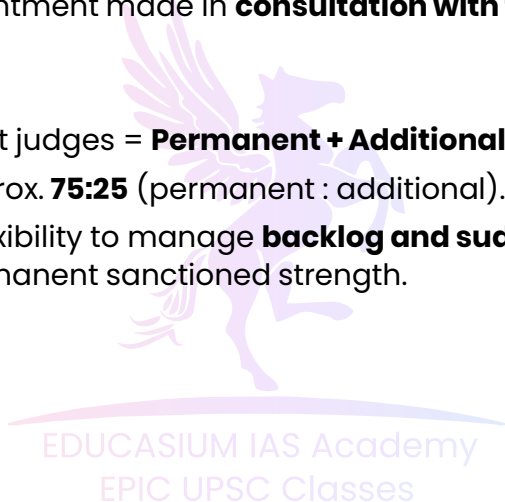
- Appointed for **not more than 2 years**.
- Serve till retirement age of **62 years** (like other High Court judges).

Consultation: Appointment made in **consultation with the Chief Justice of India (CJI)**.

Judicial Strength:

- High Court judges = **Permanent + Additional Judges**.
- Ratio approx. **75:25** (permanent : additional).

Purpose: Provide flexibility to manage **backlog and sudden workload spikes** without altering permanent sanctioned strength.



UPSC Relevance:

Prelims: Article 224 → appointment of Additional Judges (max 2 years). High Court retirement age = 62 years. Ratio approx. 75:25 (permanent : additional judges).



HOT Question: "Discuss the constitutional provisions regarding the appointment of Additional Judges in High Courts. How effective is this mechanism in addressing judicial pendency?"



6. SC Considers Extending Creamy Layer to SC/ST Reservations for Equitable Benefit Sharing



The Supreme Court is hearing petitions on applying the **creamy layer principle**—currently applicable only to OBCs—to SC/ST reservations to prevent concentration of benefits within dominant subgroups.

About the Creamy Layer

- **Definition:** Creamy layer excludes socially/economically advanced members from reservation benefits.
- **Objective:** Ensures **affirmative action reaches the genuinely disadvantaged**.
- **Present Scope:** Applicable **only to OBCs**, not SC/STs.
- **Legal Basis:** Established in *Indra Sawhney v. Union of India* (1992).
- **State Power:** States frame their own income/occupation criteria for OBC creamy layer.

Need for Extension to SC/STs

- Prevents **monopolisation** of benefits by affluent SC/ST families.
- Promotes **substantive equality** by prioritising poorest households.
- Improves **policy efficiency** by targeting real socio-economic need.
- Strengthens **legitimacy** of reservation by ensuring fairness and inclusivity.

Challenges in Extension

- **Caste Discrimination Persists:** Even affluent SC/ST individuals face stigma.
- **Legal Hurdles:** No explicit constitutional backing for creamy layer in SC/ST reservations.
- **Design Issues:** Difficult to define uniform exclusion criteria nationwide.
- **Social Risks:** May cause **division within SC/ST communities**.
- **Political Opposition:** Resistance from dominant subgroups could destabilise policy.

Judicial Landmarks

- **Indra Sawhney (1992):** Creamy layer principle introduced (for OBCs only).
- **E.V. Chinnaiah (2005):** SCs treated as homogeneous; sub-classification disallowed.
- **Jarnail Singh (2018):** Extended creamy layer to SC/STs in **promotions**.
- **Davinder Singh (2024):** Upheld **sub-classification** within SC/STs.
- **Ramashankar Prajapati (2025):** Notice issued on SC/ST creamy layer mechanism.

Way Forward

- **Expert Panel:** Draft criteria tailored for SC/ST creamy layer.
- **Socio-Economic Data:** Build evidence base via nationwide surveys.
- **Constitutional Amendment:** Provide explicit backing for economic screening.
- **Dialogue with Stakeholders:** Avoid resentment through participatory policy design.
- **Periodic Review:** Ensure criteria evolve with social/economic changes.



UPSC Relevance: **Prelims:** Creamy layer principle, Indra Sawhney case, E.V. Chinnaiah, Jarnail Singh, Davinder Singh rulings. **Mains (GS II):** Equity in reservation policy, constitutional morality vs social justice, challenges of sub-classification.



HOT Question: “Should the creamy layer principle be extended to SC/ST reservations? Discuss its potential impact on equity, efficiency, and social justice.” (150 words)”



7. SC Reviews Age of Consent Under POCSO: Balancing Adolescent Rights and Child Protection



In **Nipun Saxena vs Union of India (PIL)**, the **Supreme Court** is considering whether the **POCSO Act's age of consent (18 years)** should be **lowered to 16**, to prevent criminalisation of consensual adolescent relationships while still protecting minors from abuse.

Arguments for Reduction:

- Prevents criminalisation of genuine **consensual adolescent relationships**.
- Current framework often **harms girls more** by denying meaningful support.
- Suggestion: **16 years as threshold** for consensual peer cases, while retaining safeguards against coercion/authority abuse.

Counterarguments:

- Some "consensual" cases involve children as young as 12.
- Adolescents may lack **maturity for informed consent**.
- Risk of **predatory behaviour** being disguised as romance.

Key Issues:

- **Consent complexity** → adolescents & courts struggle with consistent interpretation.
- **Implementation gaps** → unsafe homes, stigma, pressure to withdraw cases.
- **Protection vs Autonomy** → rigid rules can restrict adolescent agency without preventing abuse.

Way Forward:

- Retain **18 years** as baseline but allow **judicial discretion** with "close-in-age" exemptions.
- Consider **16 years** in cases of **small age gaps & absence of coercion**.
- Strengthen **Child Welfare Committees** for counselling, education, reintegration.
- Provide **comprehensive sex education** on consent, rights, and relationships.

About POCSO Act (2012):

- Protects **children under 18** from sexual assault, harassment, pornography.
- Mandatory reporting & disposal of cases within one year.
- **2019 amendment**: Stricter penalties incl. **death penalty for aggravated assault**



UPSC Relevance: Prelims: POCSO Act = protection below 18; mandatory reporting; 2019 amendment → death penalty for aggravated assault.
Mains: Ethical/legal tension: **protection vs autonomy** of adolescents.



HOT Question: "Lowering the age of consent under POCSO risks legitimising exploitation but retaining it at 18 risks criminalising adolescent relationships. Discuss possible middle paths to balance autonomy and protection."



8. Supreme Court Orders Release of Prisoners Detained Beyond Sentence, Highlighting Urgent Prison Reforms



The **Supreme Court** recently directed the **immediate release of prisoners detained beyond sentence completion**, exposing systemic failures in prison governance and reinforcing the urgent need for comprehensive prison reforms.

Current Framework of Prison Governance

- **Constitutional Basis:** Prisons under **State List, Entry 4, Seventh Schedule**.
- **Law:** Prisons Act, 1894 & state prison manuals guide administration.
- **Administration:** Managed by state Home Departments.
- **Oversight:** NHRC & judiciary ensure compliance with rights.
- **Advisory Role:** BPR&D issues model guidelines.
- **Legal Aid:** NALSA provides free legal services.
- **Alternatives:** Juvenile Justice Act & Probation of Offenders Act allow non-custodial sentencing.

Why Urgent Reform?

- **Article 21 & 14:** Humane prison conditions = constitutional mandate.
- **Rehabilitation Focus:** Reduces **recidivism**, improves public safety.
- **Overcrowding Relief:** Alternatives like parole/probation reduce stress.
- **Judicial Authority:** Prevents illegal detention beyond sentence.
- **Social Stability:** Reintegration through skill training & counselling.
- **Global Commitments:** Align with **UN Mandela Rules** on humane treatment.

Key Structural & Operational Deficiencies

- **Overcrowding:** Occupancy >130%, poor hygiene & safety.
- **Undertrial Crisis:** ~77% inmates are undertrials.
- **Delayed Release:** Lapses in record-keeping → prisoners overstaying sentence.
- **Healthcare Deficit:** Inadequate medical/mental health services.
- **Gender Gap:** Poor maternity care & sanitation for women inmates.
- **Infrastructure Decay:** Dilapidated facilities impede rehabilitation.



UPSC Relevance: **GS2** – Polity & Governance: Prison reforms, rights of prisoners, judicial interventions. **GS3** – Internal Security: Overcrowding & undertrials as a law & order challenge. **GS4** – Ethics: Dignity, justice, and humane treatment of prisoners.



HOT Question: “Prison reforms in India must move beyond custodial control to embrace rehabilitation, reintegration, and human dignity. Critically evaluate with reference to the Supreme Court’s recent directives.”



9. SC Upholds Power of Courts & PCBs to Impose Environmental Compensation



The **Supreme Court** overturned a Delhi High Court ruling in *Delhi Pollution Control Committee v. Lodhi Property Co. Ltd.*, affirming that **courts and Pollution Control Boards (PCBs) can impose Environmental Compensation (EC)** on violators under the **Polluter Pays Principle**.

Environmental Compensation (EC):

- Policy tool based on **Polluter Pays Principle**.
- Imposed when activities cause **environmental harm**.
- Includes **compensatory + remedial liability**.

Legal Basis:

- **Water Act 1974, Sec. 33A** → PCBs empowered to issue directions incl. EC.
- **Air Act 1981, Sec. 31A** → similar powers.

Judicial Precedents:

- *Indian Council for Enviro-Legal Action v. UoI* → industries liable to repair damage.
- *Vellore Citizens' Welfare Forum v. UoI (1996)* → liability covers both compensation & restoration.

Course of Action for PCBs:

- Can impose **monetary penalties** (EC).
- Can direct **restoration of environment** depending on case.

Pollution Control Boards in India:

- **CPCB**: Under MoEFCC; constituted under Water Act, 1974; also enforces Air Act, 1981.
- **State PCBs**: Implement laws at state level.



UPSC Relevance: Prelims: EC linked to **Polluter Pays Principle**. CPCB = statutory body under Water Act, 1974. **Mains:** Judicial role in strengthening environmental governance.



HOT Question: "The Polluter Pays Principle has evolved from a moral obligation to a legally enforceable liability." Discuss with reference to Supreme Court rulings on Environmental Compensation. "



10. SC Empowers Pollution Control Boards to Levy Environmental Compensation



On **5th August 2025**, the **Supreme Court** upheld that **State Pollution Control Boards (SPCBs)** can impose **compensation for environmental damage already caused** or seek **bank guarantees** to prevent potential future harm.

Case Background:

- A **Delhi High Court order** had earlier restricted PCBs' powers, holding that **only courts** could levy damages under Water & Air Acts.
- **Supreme Court** overturned this, affirming PCB authority.

SC's Key Interpretations:

- **Legal Basis:**
 - **Section 33A** – *Water (Prevention & Control of Pollution) Act, 1974.*
 - **Section 31A** – *Air (Prevention & Control of Pollution) Act, 1981.*
- **Polluter Pays Principle:** Boards may impose **restitutionary or compensatory damages**.
- **Bank Guarantees:** Can be required to ensure preventive measures against imminent harm.
- **Limitation:** Compensation allowed **only if actual or imminent environmental damage is proven**, not for minor contraventions.
- **Safeguards:** Must follow subordinate legislation & **principles of natural justice** → transparency, certainty.

Constitutional Context:

- Reinforces **Article 21** (Right to clean environment).
- Supports **Article 51A(g)** – citizens' duty to protect nature.
- Strengthens state's role in tackling **climate change & ecological crises**.



UPSC Relevance:

Prelims: Powers of PCBs under Sec. 33A (Water Act) & Sec. 31A (Air Act). Polluter Pays Principle = liability for damage + restoration.



HOT Question: "The Supreme Court has reaffirmed that Pollution Control Boards are not toothless regulators but proactive enforcers of environmental justice." Discuss in the light of the 2025 ruling on compensatory powers."



11. Uttarakhand Passes One of India's Strictest Anti-Conversion Laws



The **Uttarakhand Cabinet** approved amendments to the **Freedom of Religion Act, 2018**, making it one of India's harshest anti-conversion frameworks, with strict punishments and digital-era applicability.

Key Provisions of the 2025 Bill

- **Expanded Definition:** Includes *incitement or conspiracy* by **digital means** (emails, messaging apps, social media).
- **New Offences:**
 - Derogatory portrayal of one religion vis-à-vis another.
 - Concealment of religion for marriage → 3–10 years jail + ₹3 lakh fine.
- **Victim Definition:** Now covers guardians & legal heirs.
- **Property Seizure:** DM empowered to confiscate unlawfully obtained property.
- **Burden of Proof:** Accused must prove innocence → departure from standard *presumption of innocence*.

Punishments

- **Fraudulent Conversion** → 3–10 years jail + ₹50,000 fine.
- **If victim is minor/woman/SC/ST/disabled** → 5–14 years jail + ₹1 lakh fine.
- **Mass conversion (2+ people)** → 7–14 years jail + ₹1 lakh fine.
- **Conversions via threats/assault/trafficking/marriage ploy** → Life imprisonment (20 years max) + rehabilitation compensation.
- **Foreign/banned funding** → 7–14 years jail + ₹10 lakh fine.

Comparison with Earlier Laws

- **2018 Act:** Max punishment = 5 years.
- **2022 Amendment:** Tougher → 2–7 years, prior declaration before DM, cognizable & non-bailable offences.
- **2025 Bill:** *Much stricter*, adds digital incitement, DM property powers, harsher sentences, limits **third-party complaints** (only victims & relatives allowed; UP law permits wider scope).



UPSC Relevance: **GS2** – Polity: Fundamental Rights (Articles 14, 19, 21, 25), separation of powers, judicial review. **GS2/GS3** – Social Issues & Internal Security: Religious harmony, minority rights, governance challenges.



HOT Question: “The Uttarakhand Freedom of Religion (Amendment) Bill, 2025, is argued to strengthen protections against coercion but risks undermining constitutional freedoms. Critically evaluate this tension in the context of Indian secularism.”



12. Jan Vishwas Bill 2025 Expands Decriminalisation to 355 Provisions Across 16 Acts



The Union Government introduced the **Jan Vishwas (Amendment of Provisions) Bill, 2025**, expanding reforms to decriminalise minor offences, ease compliance, and reduce judicial backlog.

Background

- The **Jan Vishwas Act, 2023** was India's **first consolidated law** to decriminalise minor offences, amending **183 provisions across 42 Acts**.
- The **2025 Bill** is a continuation, further widening the scope.

Key Features of the 2025 Bill

- **Scope:** Amends **355 provisions** across **16 Central Acts** under 10 ministries.
- **Penalty Reform:** Imprisonment for technical/procedural defaults replaced with **monetary penalties**.
- **Graduated Fines:** Higher fines for repeat offences.
- **Administrative Shift:** Designated officers empowered to levy penalties → reducing court burden.
- **Automatic Increase:** Penalties rise **10% every 3 years** without fresh amendment.
- **Targeted Acts:** Includes reforms in **Tea Act, 1953, Legal Metrology Act, 2009, Motor Vehicles Act, 1988, and Drugs & Cosmetics Act, 1940**.

Significance

- **Ease of Doing Business:** Removes criminal liability for minor lapses, encourages entrepreneurship.
- **Ease of Living:** Simplified compliance for citizens & enterprises.
- **Judicial Relief:** Reduces case pendency by moving contraventions out of courts.



UPSC Relevance: **GS2 – Polity & Governance:** Legal reforms, judicial backlog, governance efficiency. **GS3 – Economy:** Ease of Doing Business, regulatory simplification, investor confidence.



HOT Question: “Decriminalisation of minor offences through legislation such as the Jan Vishwas Bill is projected as a key step for Ease of Doing Business. Critically examine its impact on governance efficiency and citizen trust.”

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13. Parliament Approves Second Extension of President's Rule in Manipur till February 2026



The **Parliament of India** approved the **second extension of President's Rule in Manipur**, extending central rule in the state till **February 2026** amid ongoing constitutional and security concerns.

Constitutional Framework (Article 356):

- President's Rule imposed when the **constitutional machinery of a state fails**.
- Must be approved by **both Houses of Parliament within 2 months**.
- Duration: Extendable every **6 months**, maximum **3 years**.
- Beyond **1 year**, extension requires:
 - (a) **National Emergency (Art. 352)** in whole/part of India, OR
 - (b) **Election Commission certification** that elections cannot be held.

Context in Manipur:

- Security breakdown and governance failure led to continuation of central rule.
- Reflects interplay of **law & order** with **constitutional governance**.

Broader Governance Issues:

- **Security vs. Federalism:** Repeated use of Art. 356 raises concerns of **state autonomy erosion**.
- **Democratic Deficit:** Long spells of central rule undermine **popular mandate & local governance**.
- **Precedent:** May encourage central overreach in politically unstable states.



UPSC Relevance: Prelims: President's Rule = Article 356; max **3 years**; extension requires Parliament's approval. Special conditions for >1 year → National Emergency / EC certification.



HOT Question: "The frequent use of Article 356 threatens the spirit of cooperative federalism." Discuss with reference to the recent extension of President's Rule in Manipur. "



14. Parliament Passes Manipur GST (Amendment) and Appropriation Bills to Ensure Governance under President's Rule



Parliament passed the **Manipur Goods and Services Tax (Amendment) Bill, 2025**, and the **Manipur Appropriation (No.2) Bill, 2025**, to maintain **tax administration and budgetary support** in the state, which is under **President's Rule**.

Manipur GST (Amendment) Bill, 2025:

- Amends the **Manipur GST Act, 2017**, replacing an earlier ordinance.
- Ensures Manipur can **levy and collect GST** as approved by the GST Council.
- Maintains **revenue continuity** despite the absence of an elected government.

Manipur Appropriation (No.2) Bill, 2025:

- Authorises withdrawal from the **Consolidated Fund of the State** for FY 2025–26.
- **Outlay:** ₹2,898 crore (including ₹1,667 crore for capital expenditure).
- **Allocations:**
 - ₹523 crore → rehabilitation of camp residents.
 - ₹542 crore → strengthening security arrangements.

Parliamentary Passage:

- Bills cleared without discussion amid **opposition protests** and disruptions.

Significance:

- Demonstrates how **fiscal governance** continues under Article 356.
- Reflects Centre's role in meeting **administrative, social, and security needs** of conflict-affected Manipur.



UPSC Relevance: Prelims: Appropriation Bill = authorises withdrawal from **Consolidated Fund**. Under President's Rule, Parliament passes **state laws & budgets**. GST amendments in states must align with **GST Council decisions**.



HOT Question: "Discuss how financial governance in states is managed under President's Rule. Illustrate your answer with reference to the passage of GST and Appropriation Bills for Manipur in 2025."



15. Assam Expands Co-District Model with 10 New Units for Decentralised Governance



The Government of Assam announced the creation of **10 new co-districts**, expanding the innovative **co-district model** first introduced in 2024.

Assam's Co-District Initiative

- **First in India:** Assam became the **first state** to adopt the co-district model in 2024.
- **Expansion:** With the addition of 10 new units, Assam now has **49 co-districts** under the parent districts.
- **Objective:** To enhance **access to essential services** and **improve welfare delivery** in remote/rural areas.

What are Co-Districts?

- **Definition:** Administrative sub-district units carved under a parent district.
- **Purpose:** Designed for **decentralised governance**, quicker service delivery, and efficient grievance redressal.
- **Powers:** Co-district officials exercise **magisterial authority** and supervise **core departmental functions** (revenue, law & order, welfare schemes).

Significance

- **Accessibility:** Brings administration closer to citizens, especially in geographically challenging areas like Assam.
- **Welfare Delivery:** Enhances efficiency in implementation of government schemes.
- **Governance Innovation:** Provides a **middle path** between a full district and a sub-division, reducing administrative costs.



UPSC Relevance:

Mains (GS II): Decentralisation of power, innovative governance models for last-mile delivery, federal experiments at state level.



HOT Question: "Discuss how Assam's co-district model reflects innovative decentralisation in Indian governance. How can such models strengthen welfare delivery in geographically diverse states?"



16. Governor's Role as Chancellor Sparks Federal and Academic Autonomy Debate



Recent controversies in **Tamil Nadu** and **Kerala** reignited debates on the Governor's statutory role as Chancellor of state universities, with the Supreme Court intervening to curb delays and overreach.

Context & Background

- **Statutory Role:** The Governor's role as Chancellor is conferred under **State University Acts**, not the Constitution.
- **Judicial Check:** The Supreme Court has struck down Governors' attempts to exercise a *de facto veto* by indefinitely withholding assent to Bills.

Recent Controversies

1. **Tamil Nadu:** Governor R.N. Ravi referred the *Kalaingar University Bill* to the President instead of acting on it, stalling state initiatives.
2. **Kerala:** Governor Arlekar directed universities to observe *Partition Horrors Day* (14 Aug 2025), seen as ideological imposition.

Judicial Intervention

- **Veto Rejected:** SC invalidated indefinite Bill withholding by Governors.
- **Timelines Mandated:** Governors must act within reasonable deadlines.
- **Referral Nullified:** Bills referred to the President by Governors without assent action held infructuous.

Role of Governors as Chancellors

- **Political Neutrality:** Shield universities from partisan capture.
- **Academic Oversight:** Ensure UGC and NAAC standards in appointments and administration.
- **Centre-State Bridge:** Facilitate research and regulatory coordination.
- **Custodian of Standards:** Maintain quality and autonomy in higher education.

Concerns & Criticisms

- **Erosion of Federalism:** Governors bypass elected state governments in VC appointments.
- **Politicisation:** Aligning directives with ruling party ideologies (e.g., Partition Horrors Day).



UPSC Relevance: **GS2 – Polity & Governance:** Federalism, Governor's role, separation of powers. **GS2 – Education:** Autonomy and quality in higher education institutions.



HOT Question: "The Governor's statutory role as Chancellor of state universities has increasingly become a site of Centre-State friction. Critically analyse the constitutional, political, and academic implications of this trend. "



17. Centre Clarifies LG's Power to Nominate MLAs in J&K Assembly Without Cabinet Advice



The **Home Ministry informed the High Court** that Jammu & Kashmir's **Lieutenant Governor (LG)** can nominate up to **five MLAs** to the Union Territory Assembly **without Cabinet advice**, sparking debates on **democratic accountability and federal balance**.

Background : J&K Reorganisation Act, 2019: Split J&K into two UTs – Ladakh (no Assembly) & J&K (with Assembly).

- **Assembly Strength:** 114 sanctioned seats (90 elected + 5 nominated).

- **Nomination Rules:**

- o 2019 – LG may nominate **2 women** if underrepresented.
- o 2023 Amendment – LG may nominate **3 more:**
 - **2 Kashmiri migrants** (including 1 woman).
 - **1 from the PoJK community.**

Nomination in UT Assemblies

- **J&K Assembly:** 90 elected + 5 nominated (with full voting rights).

- **Puducherry Assembly:** 30 elected + 3 nominated.

- **Delhi Assembly:** Only elected members (70 seats).

Constitutional Framework

- **Rajya Sabha:** 12 nominated by the President.
- **State Legislative Councils:** 1/6th nominated by Governors.
- **Anglo-Indian Nominations:** Discontinued in 2020.
- **General Principle:** Nominations made on **aid and advice of the Council of Ministers** – unlike the present J&K practice.

Judicial Pronouncements

- **K. Lakshminarayanan Case (2018):** Madras HC upheld Centre's authority to nominate Puducherry MLAs without Cabinet advice; SC later set aside reform suggestions.
- **NCT Delhi Case (2023):** Established "**triple chain of command**" – LG bound by Cabinet advice in legislative matters.

Democratic Concerns

- **Centre-UT Friction:** Nominated members can tilt majority in small Assemblies.

- **Federal Spirit:** LG's unilateral power bypasses elected governments.

- **Democratic Accountability:** Undermines parliamentary principle of executive being answerable to legislature.

- **Electoral Subversion:** Nominated MLAs with **voting rights** can decide confidence motions, threatening elected governments.



UPSC Relevance: GS Paper 2 – Polity & Governance: Federalism, Union Territories, powers of LG, Centre-State relations.



HOT Question: "The provision of nominated members in Union Territory Assemblies raises questions of federalism and democratic accountability. Critically examine in light of recent developments in J&K. "



18. Tamil Nadu Launches Inclusive State Policy for Transgender People



Tamil Nadu became one of the first Indian states to notify a **comprehensive policy for transgender persons**, covering rights in **education, employment, healthcare, housing, inheritance, and safety**.

Key Features of the Policy:

- **Gender Choice:** Transgender & intersex persons may **self-identify** as male, female, or transgender, **without medical procedures or certificates**.
- **Inheritance Rights:** State to push for amendments to the **Hindu Succession Act & Indian Succession Act**.
- **Legal Basis:** Aligned with the **Transgender Persons (Protection of Rights) Act, 2019** and **NALSA v. Union of India (2014)** judgment.

Context:

- Census 2011: **~4.8 lakh transgender population** in India.
- Issues: Certification requirement under the **2019 Act** limits self-identification.

Existing Welfare Support:

- **SMILE Scheme:** Central scheme for welfare & livelihood.
- **National Portal for Transgender Persons:** Online certification.
- **Gender Inclusion Fund (NEP 2020):** Education access.
- **Garima Grehas:** Shelter homes.
- **PM-DAKSH:** Skill training.

Significance:

- Promotes **social justice, dignity, and livelihood**.
- Could set a model for other states in **inclusive governance**.



UPSC Relevance: Prelims: Tamil Nadu → first mover in state-level transgender policy. NALSA judgment (2014): recognised third gender as fundamental rights holders. Central schemes: SMILE, Garima Grehas, PM-DAKSH.



HOT Question: “Critically evaluate the significance of Tamil Nadu’s State Policy for Transgender People in advancing inclusive governance. How does it address the gaps left by the 2019 Transgender Persons Act?”



19. Parliament Clears Reservation for Scheduled Tribes in Goa Assembly



On **11th August 2025**, Parliament passed the *Readjustment of Representation of Scheduled Tribes in Assembly Constituencies of the State of Goa Bill, 2025*, enabling **ST reservation in the 40 member Goa Legislative Assembly**.

Context & Purpose

- Provides **STs with reserved seats** in the Goa Assembly for the first time.
- Ensures equitable democratic participation as ST population has grown to **1.49 lakh (2025)** from just **566 (2001 Census)**.

Current Representation

- Goa Assembly: 40 seats.
- Presently: 1 reserved for SCs, none for STs.
- Bill mandates **readjustment of constituencies** for fair representation.

Significance

- Democratic Inclusion:** Ensures marginalised tribal groups gain political voice.
- Social Justice:** Aligns Goa's electoral representation with constitutional equality principles.
- Precedent:** Fulfils constitutional mandate under **Articles 330–332** (seat reservation for SCs/STs).

Keywords: ST Reservation, Goa Assembly, Readjustment of Constituencies, Political Inclusion.



UPSC Relevance: **GS2 – Polity & Governance:** Representation of SC/STs, democratic reforms. **GS1 – Society:** Tribal empowerment in small states. **Prelims:** Constitutional provisions on reservation of seats.



HOT Question: “Discuss the significance of introducing Scheduled Tribe reservations in smaller state legislatures like Goa in strengthening democratic inclusion and social justice.”



20. PM Modi Outlines Vision for Viksit Bharat 2047 in Independence Day 2025 Speech



On **15 August 2025**, PM Modi delivered his Red Fort speech announcing reforms and transformative missions to align India's development with the **Viksit Bharat 2047 roadmap**, covering security, economy, technology, employment, and social empowerment.

National Security & Foreign Policy

- **Indus Treaty Withdrawal** – Ensures irrigation sovereignty, strengthens farmer rights.
- **Sudarshan Chakra Missile Shield (by 2035)** – Indigenous defence technology for credible deterrence.

Economic & Reform Agenda

- **Tax Reform** – Income up to ₹12 lakh exempted, boosting consumption.
- **GST 2.0** – Simplified compliance and business facilitation.
- **Legal Task Force** – Modernising outdated laws for 21st-century economy.
- **Zero-Defect Manufacturing Mission** – Export competitiveness and quality control.

Energy, Technology & Resources

- **Nuclear Expansion** – 10 new reactors sanctioned, tenfold capacity rise by 2047.
- **Deep Sea Mission** – Hydrocarbon and critical mineral exploration.
- **Critical Minerals Mission** – 1,200 surveyed sites to secure strategic resources.
- **Semiconductor Mission** – First "Made in India" chip to launch by Dec 2025.
- **Fertiliser Self-Reliance** – Domestic expansion to cut imports.

Youth, Employment & Innovation

- **Pradhan Mantri Viksit Bharat Rozgar Yojana** – 3.5 crore jobs, employer incentive ₹15,000 per youth.
- **BioE3 Policy** – Boosts patents and affordable biomedicine output.

Women & Social Empowerment

- **3 Crore Lakhpati Didis** – Advanced target achievement.
- **Namo Drone Didis** – Women SHGs driving rural drone adoption.
- **Eastern Priority** – Special focus on integrating Eastern Bharat into national development.
- **Phule Bicentenary** – "Priority to the backward" slogan for social justice.



UPSC Relevance: **GS2:** Welfare schemes, governance reforms, social justice. **GS3:** Economy, energy security, defence technology, critical minerals, innovation. **GS4 (Ethics):** Priority to backward & social equity measures.



HOT Question: "The Independence Day 2025 announcements reflect a balance between sovereignty, technology, and social justice. Critically examine whether such a developmental state model can ensure equitable progress for Viksit Bharat 2047."



21. Opposition Seeks Electoral Rolls in Machine-Readable Format for Greater Transparency



Amid allegations of vote theft, opposition parties urged the **Election Commission of India (ECI)** to publish **electoral rolls in machine-readable formats**, arguing that the current system limits error detection and data transparency.

About Electoral Rolls

- **Definition:** Official lists of eligible voters maintained by the **ECI**.
- **Digital Management:** Managed via **ERONET (Electoral Roll Management System)** – a centralised software for voter registration, deletion, and corrections.

Limitations of Current System

- Electoral rolls shared as **image PDFs or printouts without photos**.
- Difficult to process digitally → error detection, duplication checks, and analytics are time-consuming.
- Example: In Bengaluru, **11,965 duplicate entries** were found manually, indicating inefficiency.

Machine-Readable Electoral Rolls

- Published in **text-based formats** like CSV, Excel, or searchable PDFs.
- Allows **automated error/duplication checks** and data analysis.
- **OCR (Optical Character Recognition)** can convert image-only PDFs into text, but official machine-readable release ensures accuracy.

Significance

- **Transparency:** Enables parties, civil society, and citizens to audit voter lists effectively.
- **Efficiency:** Faster detection of fake/duplicate voters.
- **Trust Building:** Restores faith in electoral processes amid allegations of manipulation.
- **Inclusivity:** Easier for visually impaired or tech-assisted citizens to access.

Concerns : Privacy: Risk of voter data misuse if raw lists are freely downloadable.

- **Cybersecurity:** Text-based lists are more prone to unauthorised scraping.
- **Legal Gap:** No statutory mandate for ECI to publish in machine-readable formats.



UPSC Relevance: **GS Paper 2 – Polity & Governance:** Electoral reforms, transparency, and role of ECI. **GS Paper 3 – Cybersecurity:** Balancing digital transparency with data protection.



HOT Question: “Critically analyse the demand for electoral rolls in machine-readable formats. How can India balance transparency in voter lists with privacy and data protection concerns?”



22. Concerns Over Declining Academic Freedoms in India



FIRs against a Lokniti researcher and notices to **Centre for the Study of Developing Societies (CSDS)** have raised alarm over **shrinking academic space**. Triggered by a Lokniti post sharing incorrect electoral roll data in Maharashtra, later corrected — but official responses escalated to wider action against research bodies.

Key Issues

- **Disproportionate Response:** Even corrected errors result in FIRs, indicating state intolerance for independent research scrutiny.
- **Coordinated Pressure:** Think tanks like CSDS-Lokniti & CPR (Centre for Policy Research) face **funding freezes, tax probes, licence cancellations**.
- **Institutional Autonomy Erosion:** Excessive regulation undermines universities' ability to conduct independent, critical studies.
- **Global Rankings:** India placed in **bottom 20% of the 2024 Academic Freedom Index**, reflecting international concern.

Significance of Academic Freedom

- **Policy Integrity:** Evidence-based research ensures policies are robust, transparent, and socially responsive.
- **Democratic Accountability:** Free academic inquiry checks power misuse and strengthens governance.
- **Global Standing:** Strong research institutions boost India's soft power & innovation capacity.
- **Youth and Education:** Shrinking academic space discourages critical thinking, innovation, and global competitiveness of students.



UPSC Relevance: Prelims: Academic Freedom Index – published by V-Dem Institute (Sweden). **Mains (GS2):** Issues with institutional autonomy, role of civil society, importance of freedom of speech for governance and democracy.



HOT Question: “How does the decline in academic freedoms affect governance and democracy in India? Suggest reforms to balance state accountability with academic independence”



23. Census 2027: India's first fully digital census, an opportunity to measure and mainstream disability inclusion after 17 years.



Census 2027 will be the first **digital census**, after Census 2011 undercounted persons with disabilities (PwDs). Disability exclusion costs India **₹4.5–13 lakh crore annually (~4% GDP)** due to productivity losses and lack of inclusion.

Key Challenges in Disability Inclusion

Employment

- Only **23.8% of PwDs (15–59 yrs)** employed vs ~50% of non-disabled.
- Just **0.4% PwDs in private sector jobs**.

Education

- Nearly **46% illiterate**, and **<1% disabled children enrolled in schools**.
- COVID worsened exclusion – **75% PwD children dropped out** due to lack of accessibility.

Methodology Flaws in Census 2011

- Relied on **binary, medicalised questions**.
- Ignored **intellectual, psycho-social disabilities**, leading to **severe undercounting**.

Significance of Census 2027

Accurate Disability Data: Enables evidence-based policies in education, healthcare, employment.

Mainstreaming: PwDs integrated into Viksit Bharat 2047 agenda.

Legal & Global Alignment:

- Rights of Persons with Disabilities Act, 2016 (RPwDA).
- SDGs & UN Convention on the Rights of Persons with Disabilities (CRPD).

Economic Rationale: Harnessing PwD potential reduces 4% GDP loss.



UPSC Relevance: **GS2:** Welfare schemes for vulnerable sections, governance, and social justice. **GS1:** Social empowerment of weaker groups. **GS3:** Inclusive growth and human capital development.



HOT Question: “Discuss the significance of Census 2027 in ensuring disability inclusion in India's governance and developmental agenda. Suggest measures to make it both inclusive and accessible.”



24. MoPR launches AI-powered SabhaSaar to document Panchayat meetings



The **Ministry of Panchayati Raj** is set to launch **SabhaSaar**, an AI tool for documenting and summarising **Gram Sabha and Panchayat meetings**.

About SabhaSaar

- **Nature:** AI-powered meeting summarisation tool.
- **Function:** Generates structured **Minutes of Meeting (MoM)** from audio/video recordings.
- **Technology:** Uses **AI & Natural Language Processing (NLP)** to transcribe and extract decisions.
- **Integration:** Linked with **Bhashini** platform; supports **13 Indian languages**, with expansion planned.
- **Pilot Rollout:** All **Gram Panchayats and local bodies in Tripura** to adopt SabhaSaar first.

Significance

- **Participatory Democracy:** Ensures transparent, standardised, tamper-proof meeting records.
- **Efficiency:** Reduces manual documentation burden on Panchayat officials.
- **Inclusion:** Multilingual support empowers diverse linguistic communities.
- **Governance:** Strengthens **Digital India & e-Panchayat initiatives**.

Related Concept

- **Natural Language Processing (NLP):** Subfield of AI enabling machines to understand, interpret, and generate human language.



UPSC Relevance: **Prelims:** Features of SabhaSaar, Bhashini initiative, NLP. **Mains (GS II):** Role of AI in governance, Panchayati Raj reforms, participatory democracy.



HOT Question: "AI-powered tools like SabhaSaar can transform participatory democracy at the grassroots. Discuss their potential and challenges in strengthening Panchayati Raj Institutions."



25. Right to Charge: Ensuring Equitable Access to EV Charging in India



As India accelerates EV adoption, lack of reliable home-charging access—especially in apartments—has triggered calls for a legally protected “Right to Charge.”

Challenges to Home Charging in India

- **Global Benchmark:** 80–90% of EV charging happens at home/work globally.
- **Independent Houses:** Easier to install private chargers.
- **Apartment Hurdles:**
 - RWA permission issues.
 - Inadequate load/electrical infrastructure.
 - Limited parking space for charger installation.

Policy & Legal Support

- **MoHUA Building Byelaws:** Mandates EV charging provisions in new and existing buildings.
- **State Initiatives:** Maharashtra requires societies to issue *NOCs within 7 days*.
- **Judicial Backing:** High Court rulings uphold residents’ right to install charging points.
- **Enforcement Pillars:**
 1. **Legal Protection:** Clear rights for residents to install chargers.
 2. **Technical Standards:** Safety-compliant, standardised protocols.
 3. **Dispute Resolution:** Quick redressal against denial of permissions.

Significance of the Right to Charge

- **Democratises EV Adoption:** Reduces inequality between apartment and house dwellers.
- **Consumer Confidence:** Reliable home charging encourages EV purchase decisions.
- **Urban Sustainability:** Supports India’s *Net Zero by 2070* and reduces urban pollution.
- **Energy Transition:** Helps shift mobility sector from fossil fuel dependence to green energy.



UPSC Relevance: **GS2 (Governance/Policy):** Urban reforms, citizen rights, infrastructure policies. **GS3 (Environment/Economy):** EV adoption, net-zero targets, sustainable urbanisation. **Keywords:** *Right to Charge, EV Policy, Model Building Byelaws, Net Zero 2070.*



HOT Question: “Discuss the significance of a legally enforceable ‘Right to Charge’ in promoting EV adoption in India. How can urban planning and governance address apartment-level charging challenges?”



26. Universal free AI discussed in Rajya Sabha as a tool to bridge digital divides and boost competitiveness.



Recently, **universal free AI access** was raised in Rajya Sabha as a **national priority**, highlighting its role in reducing inequality, boosting productivity, and enhancing India's global competitiveness.

Significance of Universal AI Access

- **Equity Bridge:** Free AI reduces **digital divides** between rich & poor, urban & rural.
- **Social Empowerment:** Improves **individual productivity, learning, & well-being**.
- **Economic Opportunity:** Helps India tap into the **\$15 trillion global AI economy** (PwC estimate).
- **Learning Equity:** Democratises **education & skills** with personalised, cost-free AI support.
- **National Competitiveness:** Strengthens India's role in **emerging technologies** and global innovation.

Challenges for Universal Access

- **Fiscal Burden:** Sustained subsidies → strain on Union & State budgets.
- **Connectivity Gap:** Rural **internet deficits** undermine inclusive access.
- **Cyber Risks:** Platforms risk becoming vectors for **data theft & surveillance**.
- **Ethical Concerns:** AI misuse → **misinformation, deepfakes, algorithmic bias**.
- **Capacity Deficit:** Low **digital literacy** prevents effective utilisation.

Way Forward

- **State Platforms:** Build **publicly funded AI tools** ensuring universal baseline access.
- **Targeted Subsidies:** Voucher-based or Aadhaar-linked subsidies for poor households.
- **PPP Expansion:** Leverage **private sector & startups** to finance infrastructure.
- **AI Literacy:** Mass **training programs** on responsible AI usage.
- **Regulation:** Strong safeguards on **privacy, transparency, bias & accountability**.



UPSC Relevance: **GS2:** Digital divide, governance reforms, equity in technology. **GS3:** AI & emerging tech, economic development, cyber security. **Essay/GS4:** Ethics of universal access, balancing equity with risks.



HOT Question: "Universal access to Artificial Intelligence can transform India's development trajectory, but it poses fiscal, ethical, and regulatory challenges. Critically analyse."



27. Digital Colonialism in India: Microsoft Suspension of Nayara Energy Services Sparks Debate on Tech Dependence



Microsoft suspended services to **Nayara Energy**, a private Indian refinery, due to **EU sanctions on Russia**, disrupting refinery operations and exposing India's vulnerability to foreign-controlled digital infrastructure.

Understanding Digital Colonialism

- **Definition:** Control of nations via **software, licenses, cloud platforms, and data** instead of territorial conquest.
- **Mechanisms of Control:**
 - Licensing agreements dictate access to tools.
 - Dependency on foreign cloud/data centres.
 - Critical operations (ERP, email, analytics) locked into Western platforms.
- **Global Example:** Google's 2019 ban on Huawei from Android access showed digital control as a geopolitical weapon.

India's Systemic Digital Dependency

- **Foreign Reliance:** Heavy dependence on Microsoft, Google, AWS, Oracle, SAP.
- **Economic Impact:** High outflows due to licensing & cloud subscription fees.
- **Vulnerability:** Foreign sanctions or unilateral bans can disrupt core infrastructure.
- **Digital Sovereignty Gap:** India lacks full control or legal recourse against foreign cloud policy decisions.

Significance of the Issue

- **Strategic Risk:** Dependency makes critical sectors (energy, defence, finance) vulnerable.
- **Economic Drain:** Large payments to foreign companies weaken Atmanirbhar Bharat goals.
- **Geopolitical Leverage:** Western powers can use digital access as a sanction tool.
- **National Security:** Sudden cut-offs can paralyse key installations (refineries, ports, banks).



UPSC Relevance: **GS2:** Issues of Governance, Effect of Policies, Sovereignty in Digital Era. **GS3:** Cybersecurity, Digital Economy, Technology & National Security. **Essay:** "Digital Sovereignty is the new frontier of national security."



HOT Question: "What is meant by *digital colonialism*? Critically analyse its implications for India's sovereignty and economic security, citing recent examples. "



28. DoP Partners with Geospatial Firm for DIGIPIN



On **29th August 2025**, the **Department of Posts (DoP)** signed an **MoU with a private geospatial software company** in New Delhi to enhance the development and rollout of **DIGIPIN**, India's digital addressing system.

About DIGIPIN:

- A **digital PIN code system** designed to provide each address with a unique, geo-tagged identifier.
- Replaces conventional postal PIN codes with more **precise, location-based identifiers**.
- Integrated with the **Know Your DIGIPIN app** for easy access and generation of addresses.

MoU Highlights:

- Access to **high-quality base maps** from the private geospatial platform.
- Integration into postal applications for **accurate and error-free address generation**.
- Users can **search, generate, and navigate** to DIGIPIN-linked addresses seamlessly.

Significance:

- **Improves service reliability** in postal and logistics operations.
- Reduces **address duplication, fraud, and delivery errors**.
- Supports **e-commerce, digital governance, and last-mile delivery**.
- Advances India's **Digital India mission** and **smart governance**.

Keywords: DIGIPIN, Geospatial Data, Digital India, Postal Reforms, Location-based Services.



UPSC Relevance: Prelims: DIGIPIN concept, nodal ministry (DoP under Ministry of Communications), geospatial mapping applications.

Mains (GS2 – Governance): “Discuss how digital addressing systems like DIGIPIN can transform governance and service delivery in India.”



HOT Question: “How can the adoption of DIGIPIN improve efficiency, transparency, and inclusivity in India's postal and e-governance ecosystem?”



29. Voluntary exits by undocumented migrants at India's eastern border



BSF data indicate a sharp rise in **voluntary exits** in 2025 (till July), alongside continued interceptions along the India–Bangladesh border. The uptick aligns with stepped-up expulsion drives in mid-2025, especially in Assam, and intensified scrutiny of identity documents.

Definition—Undocumented migrant: A **foreigner without valid travel documents/authorization** under Indian law (Citizenship Act defines “illegal migrant”).

Voluntary exit vs deportation: *Voluntary repatriation/return* is a **free and informed choice to return in safety and dignity**; deportation is **state-enforced removal** under domestic law.

Legal framework (India):

Passport (Entry into India) Act, 1920 & Rules—require valid passports for entry.

Foreigners Act, 1946—power to detect, detain and remove illegal foreigners.

Citizenship Act, 1955—defines “illegal migrant”.

Foreigners' Tribunals Order, 1964—procedure to determine if a person is a foreigner (Assam FTs).

Assam Accord (1985): cut-off **25 March 1971** for detection & expulsion in Assam.

Geography/places: India–Bangladesh border: ~4,096 km across **WB, Assam, Meghalaya, Tripura, Mizoram**—porous riverine & plain stretches elevate irregular movement risk.

Drivers & patterns (context keywords): economic pull, porous border, document fraud, trafficking corridors, **seasonal spikes**; recent **administrative drives** increased exits. [Reuters](#)

Significance (pros/cons of voluntary exits): **Pros:** reduces detention congestion/costs; can align with **UNHCR's safety & dignity** principles; quicker resolution. [UNHCR](#)

Cons/risks: risk of **coercion/misinformation** (violates “voluntariness”); limited due-process audit; possible **family separation** and humanitarian concerns.



UPSC Relevance: Prelims: Acts & definitions (Passport Act 1920; Foreigners Act 1946; Citizenship Act—“illegal migrant”); **Assam Accord cut-off; border length & states**



HOT Question: “Critically assess ‘voluntary exit’ as a tool of India’s border management along the India–Bangladesh frontier. How can India balance enforcement with due process, humanitarian obligations, and bilateral cooperation?”



30. Parliament Passes Key Taxation, Sports, and Maritime Bills Amid Opposition Boycott



In August 2025, **Parliament passed multiple important legislations without debate** due to an Opposition boycott over alleged electoral malpractice in Bihar.

1. Taxation Laws (Amendment) Bill, 2025

Amends **Income-tax Act, 1961** & **Finance Act, 2025**.

Features: Rationalised tax rates for non-deduction claimants.

- Full IT exemption to **Saudi Arabia's Public Investment Fund (PIF)** & subsidiaries.
- NPS tax benefits extended to the **Unified Pension Scheme**.

2. Income-Tax (No. 2) Bill, 2025

- Consolidates **direct tax laws** for compliance ease.
- Introduces a **single tax return format**.
- Expands **digital filing & faceless assessment** scope.

3. National Sports Governance Bill, 2025

- Establishes **National Sports Board (NSB)** as apex oversight body for all federations (incl. BCCI).
- Aims to ensure **transparency & accountability** in sports governance.

4. National Anti-Doping (Amendment) Bill, 2025

- Aligns Indian framework with **World Anti-Doping Agency (WADA)** standards.
- Strengthens **NADA's powers**: search, seizure, and investigation.

5. Merchant Shipping Bill, 2024

- Replaces **Merchant Shipping Act, 1958**.
- Modernises maritime law, aligns with **IMO conventions**.
- Digitises approvals to boost **ease of doing business in shipping**.



UPSC Relevance: Prelims: Key provisions of **Taxation Bills**, NSB, NADA, Merchant Shipping framework. Mains: Transparency in **sports governance, tax reforms**



HOT Question: "The passage of multiple bills without debate raises concerns about parliamentary accountability. Discuss the implications of such legislative practices for Indian democracy."



31. MHA amends OCI rules, expanding grounds for cancellation linked to imprisonment and criminal charges



The **Ministry of Home Affairs (MHA)** issued a gazette notification expanding the conditions for **cancellation of OCI registration**.

Key Changes to OCI Rules

- OCI registration or card **liable for cancellation if**:
 - The cardholder is **sentenced to imprisonment ≥ 2 years** (India or abroad).
 - The cardholder is **charge-sheeted for an offence punishable ≥ 7 years**.
- Applicability: Even if conviction happens abroad, provided the offence is recognised under Indian law.

Existing Grounds for Cancellation (Section 7D, Citizenship Act, 1955)

- Registration obtained by **fraud/false representation/concealment**.
- Disaffection towards the Constitution of India**.
- Unlawful trade/communication with enemy** during war.
- Conviction within **5 years of registration** with imprisonment ≥ 2 years.
- Sovereignty, integrity, security, foreign relations, or public interest** considerations.

About OCI Scheme

- Launch**: 2005.
- Benefit**: Lifelong multiple-entry visa-free travel to India.
- Eligibility**: Foreign nationals of Indian origin, who were Indian citizens on/after **26 January 1950**. Descendants up to great-grandchildren.
- Exclusion**: Citizens of **Pakistan and Bangladesh** and their descendants.

Significance & Implications

- Tighter Security**: Prevents misuse of OCI by individuals with criminal backgrounds.
- Legal Uniformity**: Aligns Indian law with global practices on residency/citizenship revocation.
- Community Impact**: May cause concern among diaspora with pending or politically motivated charges abroad.
- Diplomatic Angle**: Strengthens India's control over OCI status while maintaining diaspora engagement.



UPSC Relevance: **Prelims**: Citizenship Act 1955; OCI eligibility & exclusions. **Mains (GS II)**: Issues of diaspora, dual citizenship debate, and balancing national security with overseas Indian engagement.



HOT Question: "OCI cardholders are vital for India's diaspora engagement, yet their rights remain conditional. Examine the implications of tightening cancellation rules for India's diaspora policy."



INTERNATIONAL AFFAIRS

Intl. Organizations / Events.
India and the World
International Relations

1. INS Tamal Conducts PASSEX with Italian Navy's
2. India Hosts 10th AITIGA Joint Committee
3. India and Bhutan Sign MoU on Agriculture Cooperation
4. India and Fiji Sign Seven Agreements
5. India and New Zealand Hold First Defence Dialogue
6. India and Nigeria Strengthen Defence Ties
7. India and Philippines Elevate Ties to Strategic Partnership
8. India and Singapore Conduct 32nd SIMBEX Exercise
9. Indian PM's Japan Visit Yields Major Outcomes
10. India-Saudi Arabia Defence Cooperation Meeting
11. India-Singapore Joint Working Group
12. ASEAN Centrality Faces Strain Amid US-China Rivalry
13. Russia Pushes to Revive Dormant RIC Troika
14. China Begins Construction of Xinjiang-Tibet Railway Line
15. Alaska Summit: First U.S.-Russia Bilateral Dialogue
16. Australia to Recognise Palestinian State at UNGA
17. Israel Proposes Indefinite Security Control over Gaza
18. Russia Retains Control Over ~20% of Ukrainian Territory
19. India Leverages Labour Mobility Diplomacy
20. India's youth bulge emerges as a diplomatic asset
21. U.S. formalises Golden Dome missile defence shield

1. INS Tamal PASSEX with Italian Navy



INS Tamal carried out a **Passage Exercise (PASSEX)** with Italian Navy ship **ITS Trieste** before entering Naples harbour, strengthening **India–Italy naval interoperability** and defence ties.

PASSEX Definition: Short-duration naval exercises conducted when two navies meet at sea.

Objective: Enhance operational coordination, tactical drills, and communication protocols.

Activities: Ship manoeuvres, Flying operations, Advanced communication drills

INS Tamal : Part of the Indian Navy fleet, deployed for operational and diplomatic missions. Designed for maritime security, surveillance, and international cooperation tasks.

Engagements in Naples

- **Cross-deck Visits:** Crew exchanges to learn best practices.
- **Official Meetings:** Defence and maritime officials engaged in bilateral talks.
- **Cultural Events:** Indo-Italian exchanges to foster goodwill.

Significance for India–Italy Defence Cooperation

Defence Diplomacy: Strengthens maritime partnership in the **Indo-Mediterranean**.

Interoperability: Builds confidence for joint operations and humanitarian missions.

Strategic Presence: Enhances Indian Navy's visibility in the European maritime domain.

Broader Ties: Complements India–Italy cooperation in **defence manufacturing & technology transfer**.

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UPSC Relevance: **GS2 – IR (India–Italy relations, maritime diplomacy).**
GS3 – Defence & Internal Security (Naval exercises, maritime security). Keywords: *PASSEX, Defence Diplomacy, Interoperability, Indo-Mediterranean, INS Tamal, ITS Trieste;*



HOT Question: “Naval exercises such as PASSEX are often seen as soft power tools of defence diplomacy. Evaluate their role in enhancing India’s strategic influence in the Indo-Pacific and beyond.”

2. India Hosts 10th AITIGA Joint Committee Meeting to Modernise ASEAN–India Trade Pact



India hosted the **10th AITIGA Joint Committee meeting in New Delhi**, where all 10 ASEAN nations participated to push forward the review of the ASEAN–India Trade in Goods Agreement (AITIGA). The next meeting will be held in **October 2025 at Jakarta**, hosted by Malaysia.

AITIGA : Full Form: ASEAN–India Trade in Goods Agreement.

Signed: 2009 | **Implemented:** 2010.

Purpose: Tariff liberalisation and trade facilitation between India and ASEAN.

Current Review: Aims to make the agreement more modern, user-friendly, and aligned with contemporary trade practices.

India–ASEAN Trade Snapshot

- ASEAN accounts for **11% of India's global trade**.
- Bilateral trade reached **USD 123 billion in 2024–25**.
- India exports petroleum products, machinery, pharmaceuticals; imports include electronics, palm oil, and machinery.

Significance of the Ongoing Review

Tariff Modernisation: Rationalises tariff lines for greater trade balance.

Ease of Business: Simplifies Rules of Origin and customs procedures.

Trade Diversification: Expands into digital trade, services, and sustainability-linked standards.

Strategic Leverage: Reinforces ASEAN centrality in Indo-Pacific strategy, balancing China's influence.

Challenges

Trade Deficit: India faces a significant trade deficit with ASEAN (especially in electronics & palm oil).

Non-Tariff Barriers: Complex standards and certifications limit Indian exports.

Sectoral Concerns: Domestic industries (steel, agriculture, electronics) fear adverse impacts from liberalisation.

China Factor: Many ASEAN supply chains are China-linked, reducing India's relative trade leverage.



UPSC Relevance: **GS2 – International Relations** (India–ASEAN relations, trade diplomacy, Indo-Pacific strategy). **GS3 – Economy** (Trade agreements, balance of payments, export competitiveness).



HOT Question: “ASEAN–India Trade in Goods Agreement (AITIGA) is being reviewed to balance trade facilitation with protection of domestic industries. Critically examine the opportunities and challenges for India in this renegotiation.”

3. India and Bhutan Sign MoU on Agriculture Cooperation



On **28th August 2025**, India and Bhutan signed an MoU in **Thimphu** on **Technical Cooperation in Agriculture and Allied Sectors**, strengthening their long-standing partnership in food security and rural development.

Key Features of the MoU

- **Agriculture & Research:** Framework for joint agricultural research, innovation, and sustainable practices.
- **Livestock Development:** Cooperation in animal health, production, husbandry, and veterinary systems.
- **Post-Harvest Management:** Focus on value-chain development, reducing wastage, and increasing farmer incomes.
- **Sustainability:** Promotes climate-resilient and eco-friendly farming systems.

Significance

- **Food Security:** Supports Bhutan's rural communities and aligns with India's neighbourhood-first policy.
- **Capacity Building:** Knowledge-sharing and technical support to modernise Bhutan's agriculture.
- **Economic Boost:** Enhances cross-border value chains, benefiting farmers and agri-businesses in both countries.
- **Strategic Relations:** Deepens India-Bhutan ties beyond hydropower and trade into agri-innovation.

Keywords: MoU, Agriculture Cooperation, India-Bhutan Relations, Food Security, Sustainable Farming.



HOT Question: "ASEAN-India Trade in Goods Agreement (AITIGA) is being reviewed to balance trade facilitation with protection of domestic industries. Critically examine the opportunities and challenges for India in this renegotiation."

4. India and Fiji Sign Seven Agreements to Boost Strategic Ties



On **25th August 2025**, India and Fiji signed **seven agreements** in New Delhi, deepening cooperation in health, security, and climate resilience, marking a new phase in India–Pacific Islands relations.

Key Agreements Signed

- **Healthcare:** 100-bed super speciality hospital in Suva; dialysis units, sea ambulances, and **Jan Aushadhi centres** for affordable medicines.
- **Cybersecurity & Security:** Collaboration on cybersecurity, data protection, counter-terrorism; action plan for defence cooperation.
- **Climate & Renewable Energy:** Partnership in renewable energy via **International Solar Alliance (ISA)**, **Coalition for Disaster Resilient Infrastructure (CDRI)**, and **Global Biofuels Alliance**.
- **Capacity Building:** Training, scholarships, and development projects to enhance Fiji's human capital.

Context & Significance

- **Strategic Geography:** Fiji, located in the South Pacific, enhances India's Indo-Pacific outreach.
- **Climate Vulnerability:** As a Small Island Developing State (SIDS), Fiji faces rising sea levels, where India's climate partnerships strengthen resilience.
- **Soft Power:** Healthcare and educational initiatives reinforce India's role as a trusted development partner.
- **Geopolitical Leverage:** Counters China's growing influence in the Pacific Islands through development-led diplomacy.

Keywords: ISA, CDRI, SIDS, Jan Aushadhi, Indo-Pacific, Suva.



HOT Question: “How do India’s developmental and climate initiatives in Pacific Island nations like Fiji contribute to its Indo-Pacific strategy?”

5. India and New Zealand Hold First Defence Strategic Dialogue in New Delhi



India and New Zealand held their **inaugural Defence Strategic Dialogue** in New Delhi, formalising defence diplomacy and expanding cooperation on **maritime security and Indo-Pacific stability**.

About the Dialogue:

- Marks shift from **episodic defence contacts** to **institutionalised cooperation**.
- Objectives: Address shared **Indo-Pacific security threats**, improve **operational interoperability**, and promote a **rules-based maritime order**.
- Proposed mechanisms:
 - **Joint training & exercises**.
 - **White shipping data exchange** → real-time maritime domain awareness.
 - Collaboration in **regional forums** for collective security.

Strategic Leverage of Partnership:

- **South Pacific Access**: NZ opens channels for India in Pacific Island engagement.
- **Intelligence Edge**: NZ's role in **Five Eyes** enhances India's threat assessment linkages.
- **Normative Alignment**: Both endorse **nuclear disarmament, anti-terrorism, and UNSC reform** (NZ supports India's permanent seat).
- Complements India's **SAGAR (Security and Growth for All in the Region)** & **IPOI (Indo-Pacific Oceans' Initiative)**.

Constraints in Alignment:

- **China trade dependence** → limits NZ's strategic positioning.
- **Small defence force** → restricts joint operations.
- **Diaspora-linked extremist concerns** (Khalistan issue).
- **Reliance on episodic leadership** over institutional continuity.
- **Alliance boundaries**: NZ's Pacific neutrality + Five Eyes commitments may constrain convergence.



UPSC Relevance: Prelims: India–NZ Defence Strategic Dialogue = inaugurated in **2025** at New Delhi. White shipping data = exchange of **non-military commercial shipping info** for maritime surveillance



HOT Question: “The India–New Zealand Defence Strategic Dialogue reflects India’s widening Indo-Pacific engagements.” Analyse its significance and the constraints that may limit deeper defence cooperation. (150 words)

6. India and Nigeria Strengthen Defence Ties with Focus on Counterterrorism & Maritime Security



India and Nigeria held defence talks in **New Delhi (2025)** to deepen their long-standing defence partnership and expand cooperation in new strategic areas.

Key Highlights of the Meeting

- **Counterterrorism:** Training programs to enhance Nigeria's capacity against **Boko Haram & ISWAP** insurgency.
- **Maritime Cooperation:** Focus on **hydrography, anti-piracy operations, and Gulf of Guinea security.**
- **Defence Manufacturing & R&D:**
 - Nigeria to collaborate with India's **Defence R&D Bureau.**
 - Investment avenues explored in Nigeria's defence industry.
- **Indian Platforms Showcased:**
 - **Light Combat Aircraft (LCA Tejas)**
 - **Light Combat Helicopter (LCH Prachand)**
 - **Offshore Patrol Vessels (OPVs)**

About Nigeria

- **Largest democracy in Africa**, often called the "**Giant of Africa.**"
- **Geography:** Located in **West Africa**, bordered by the **Sahel** (north) and the **Gulf of Guinea** (south).
- **BRICS Plus Role:** Joined as a **partner country in 2025** at the **16th BRICS Summit**, reflecting its rising global profile.

Strategic Significance for India

- **Energy Security:** Nigeria is one of India's largest crude oil suppliers.
- **Defence Diplomacy:** Strengthens India's role as a security partner in Africa.
- **Maritime Security:** Gulf of Guinea is vital for trade routes; cooperation enhances India's Indo-Pacific outreach.
- **BRICS Plus Synergy:** India-Nigeria alignment boosts Global South cooperation.



HOT Question: "Discuss the strategic importance of Nigeria in India's Africa outreach, with reference to defence cooperation and maritime security."

7. India and Philippines Elevate Ties to Strategic Partnership on 75th Anniversary of Diplomatic Relations



India and the Philippines elevated their ties to a **Strategic Partnership**, adopting a **Joint Vision of Action (2025–29)** covering **14 sectors** of cooperation, with focus on defence, economy, and Indo-Pacific security.

About Strategic Partnership:

- Involves long-term cooperation across **political, security, economic, technological, and cultural dimensions**.
- Guided by the **Joint Commission on Bilateral Cooperation**.

Key Areas of Cooperation:

- **Defence:** BrahMos missile exports, naval platforms, joint patrols.
- **Maritime Synergy:** Shared commitment to **rules-based order in South China Sea**.
- **Economy:** Rising trade; discussions on **Preferential Trade Agreement (PTA)**.
- **Digital & S&T:** Fintech, data sovereignty, space tech, and innovation pacts.
- **Connectivity:** Direct flights, digital corridors, liberal visa norms.
- **People-to-People:** Cultural diplomacy, diaspora links, ICCR scholarships

Convergences:

- Opposition to **China's assertiveness** in regional waters.
- Shared Indo-Pacific vision: **free, open, inclusive order**.
- Commitment to **multilateralism** (UNCLOS, WTO, ASEAN centrality).
- Democratic values → **rule of law, pluralism, constitutionalism**.

Divergences:

- **Low trade volume** despite complementarities.
- **Philippines' China hedging** limits full defence alignment.
- **Small Indian diaspora** compared to other ASEAN nations.
- Preference for **ASEAN-first consensus** over strong bilateral defence actions.

India's Policy Focus:

- **Act East & Indo-Pacific Strategy** integration.
- **MAHASAGAR vision** – Philippines as key maritime partner.
- **Defence exports & training (ITEC)** in cyber, health, disaster response.
- **Credit lines & infrastructure support** for defence, digital, and connectivity.
- **Soft power diplomacy** – Buddhist heritage, cultural exchange, scholarships.



UPSC Relevance: Prelims: India–Philippines ties elevated to **Strategic Partnership in 2025**. BrahMos export = cornerstone of defence relations.



HOT Question: “The elevation of India–Philippines ties to a Strategic Partnership reflects India’s widening Indo-Pacific engagements but also reveals limits of bilateral convergence.” Discuss.

8. India and Singapore Conduct 32nd Edition of SIMBEX Naval Exercise

In 2025, **INS Satpura**, a Shivalik-class stealth frigate, reached Singapore to take part in **SIMBEX-25**, marking the **32nd continuous edition** of the India–Singapore bilateral naval exercise.

SIMBEX:

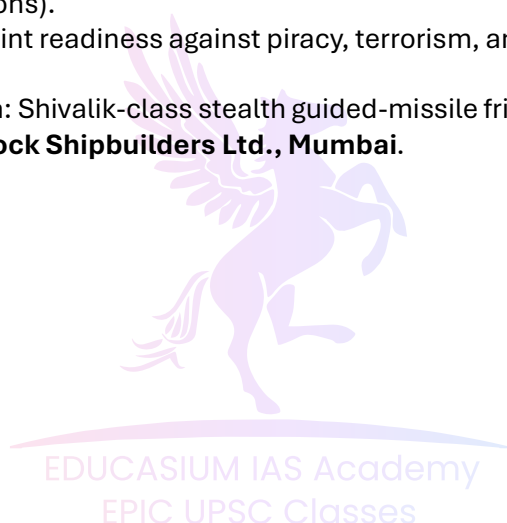
- Launched in **1994** as *Exercise Lion King*, renamed SIMBEX.
- India's **longest uninterrupted naval exercise** with any nation.
- Focus: **interoperability, anti-submarine warfare, maritime security, and naval coordination.**

Strategic Significance:

- Strengthens India–Singapore defence ties within **ASEAN & Indo-Pacific security frameworks.**
- Supports India's **MAHASAGAR vision** (Maritime Action for Security and Growth among Nations).
- Enhances joint readiness against piracy, terrorism, and maritime challenges.

Platform Highlight:

- **INS Satpura:** Shivalik-class stealth guided-missile frigate, indigenously built at **Mazagon Dock Shipbuilders Ltd., Mumbai.**



UPSC Relevance: Prelims: SIMBEX started in 1994; initially called *Exercise Lion King*. India's longest uninterrupted bilateral naval exercise. INS Satpura = Shivalik-class stealth frigate (indigenously built).



HOT Question: “Discuss the significance of SIMBEX as India's longest-running bilateral naval exercise. How does it align with India's maritime vision in the Indo-Pacific?”

9. Indian PM's Japan Visit Yields Major Outcomes



On **29th August 2024**, PM Narendra Modi concluded a two-day official visit to **Japan**, calling it “productive engagement.” The visit advanced the **India–Japan Special Strategic and Global Partnership** with a 10-year roadmap covering economic, security, digital, and climate cooperation.

Key Outcomes of the Visit

- **Joint Vision 2034:** Roadmap in **8 priority areas** – economy, technology, sustainability, mobility, health, security, sub-national & people-to-people ties.
- **Security Cooperation:** Signed *Joint Declaration on Security Cooperation* to strengthen defence ties and address Indo-Pacific challenges.
- **Human Resource Exchange:** Action Plan to facilitate movement of **500,000 individuals** (including 50,000 skilled Indians) to Japan in 5 years.
- **Agreements Signed:**
 - *MoC on Joint Crediting Mechanism* for climate goals.
 - *India–Japan Digital Partnership 2.0* → DPI, AI, semiconductors, IoT.
 - *ISRO–JAXA arrangement* on Chandrayaan-5 mission.
- **New Initiatives:** AI Initiative, Next-Gen Mobility, Sustainable Fuel, Economic Security for resilient supply chains.
- **Investment:** Japan pledged **JPY 10 trillion (~₹5.5 lakh crore)** private investment in India over 10 years.
- **Regional Engagement:** State–prefecture linkages, Kansai & Kyushu business forums, reciprocal high-level visits.

Strategic Significance

- Boosts **Act East & Indo-Pacific strategy**.
- Strengthens **technology & climate partnerships**.
- Enhances **supply-chain resilience** against China-centric risks.
- Expands **people-to-people mobility** and skilled workforce exchange.

Keywords: Special Strategic & Global Partnership, Joint Crediting Mechanism, ISRO–JAXA, Indo-Pacific, Supply-Chain Resilience.



HOT Question: “Discuss how India’s deepening partnership with Japan contributes to its Indo-Pacific strategy and economic security.”

10. India–Saudi Arabia Defence Cooperation Meeting



On **28th August 2025**, the **7th meeting of the India–Saudi Arabia Joint Committee on Defence Cooperation (JCDC)** was held, where both sides agreed to deepen collaboration in **training, defence industry, maritime security, and military exercises**.

About JCDC:

- A **bilateral mechanism** to review and strengthen defence cooperation.
- Focuses on **training, industrial partnerships, maritime cooperation, and staff exchanges**.

Key Outcomes of 2025 Meeting:

- **Progress Review:** Both sides noted satisfaction with significant steps taken since the last meeting.
- **Training Cooperation:** India offered training slots for Saudi armed forces personnel.
- **Industrial Partnerships:** Opportunities under *Make in India* highlighted; joint production and technology sharing explored.
- **New Domains:** Cybersecurity, tactical communication, disaster management, and IT discussed.
- **Staff Talks:** Navy and Army staff talks successfully conducted in 2025; agreed to continue exchanges.

Strategic Significance:

- Enhances **maritime security in the Indian Ocean & Gulf region**.
- Positions India as a **reliable defence partner** in West Asia.
- Complements wider **strategic energy and diaspora ties** with Saudi Arabia.

Keywords: JCDC, Make in India, Maritime Security, Cybersecurity, Staff Talks.



HOT Question: “Discuss the role of the India–Saudi Arabia Joint Committee on Defence Cooperation (JCDC) in advancing India’s strategic interests in West Asia.”

11. India–Singapore Joint Working Group on Trade and Investment Marks 60 Years of Ties



India hosted the **4th JWGTI Meeting** at *Vanijya Bhawan, New Delhi*, coinciding with **60 years of diplomatic relations** and **20 years of the Comprehensive Economic Cooperation Agreement (CECA)**.

About JWGTI

- **Joint Working Group on Trade and Investment (JWGTI):** Institutional mechanism to deepen trade & investment cooperation.
- **Focus Sectors:** Digital trade, semiconductors, skill development, logistics, capacity building, and emerging technologies.

Highlights of the 4th Meeting

- Agreed to **streamline regulations** and reduce trade frictions.
- Identified **digital economy & semiconductor supply chains** as priority areas.
- Capacity-building initiatives in **skill development and emerging tech**.
- Reaffirmed Singapore's role as a **gateway hub** for India's ASEAN engagement.

India–Singapore Bilateral Relations

- **Historical Ties:** Over 1,000 years of cultural & commercial exchanges.
- **CECA (2005):** India's first comprehensive economic pact with any country; upgraded to **Strategic Partnership (2015)**.
- **Trade:** Singapore is India's **largest ASEAN trading partner** (\$34.26 bn in 2024–25).
- **FDI Source:** 2nd largest investor in India (USD 163.85 bn, 2000–2024).
- **Digital Payments:** First nation linked to India's cross-border **UPI** system.
- **Infrastructure:** Singapore supporting **Vadhavan Port** (Maharashtra) and **Green & Digital Shipping Corridor**.



HOT Question: “India–Singapore relations, anchored in CECA and strategic partnership, are increasingly driven by digital economy and investment flows. Discuss how Singapore acts as a gateway for India's ASEAN and Indo-Pacific engagement.”

12. ASEAN Centrality Faces Strain Amid US–China Rivalry and Weakening Multilateralism



The **US–China rivalry**, **tariff disputes**, and **shifting Indo-Pacific coalitions** are weakening **ASEAN's centrality**, threatening its role as the anchor of regional stability.

Key Challenges:

- **US–China Rivalry** → divides ASEAN members depending on security/economic ties; consensus-based model limits crisis response.
- **Trade Tensions** → US tariffs & bilateral deals (e.g., with Vietnam) disrupt ASEAN unity, reducing collective bargaining.
- **Weak Multilateralism** → forums like AUKUS & Quad dilute ASEAN's role; Myanmar crisis erodes credibility.

Four-Fold Approach to Reinforce Centrality:

- **Internal Reform** → move beyond rigid consensus; adopt flexible decision-making for security & economic issues.
- **Diversify Partnerships** → engage EU, Australia, GCC, BRICS to reduce overdependence on China/US.
- **India Engagement** → deepen ASEAN–India cooperation via BIMSTEC, trade, and maritime security.
- **Revise Agreements** → modernise India–ASEAN FTA, strengthen RCEP, explore CPTPP expansion.

About ASEAN:

- Established: **1967 (Bangkok Declaration)**.
- Members: **10 countries** – Indonesia, Malaysia, Singapore, Thailand, Philippines, Brunei, Vietnam, Laos, Myanmar, Cambodia.
- Secretariat: **Jakarta, Indonesia**.
- **India is not a member**, but engages through **ASEAN–India Summit & Act East Policy**.



HOT Question: “ASEAN centrality is under strain in the Indo-Pacific but remains indispensable for regional stability. Analyse.”

13. Russia Pushes to Revive Dormant RIC Troika Amid Rising Western Pressures



Russia has called for the **revival of the Russia–India–China (RIC) Troika**, inactive since the **2020 Galwan clash**, citing **eased India–China tensions** and the need to counter **Western strategic dominance**.

About RIC Troika:

- Proposed by Russia in the **late 1990s**, institutionalised in **2002**.
- Informal trilateral forum for **strategic coordination** in politics, economy, and multilateral reform.
- Has held **20+ ministerial-level meetings**; went dormant post-2020 border tensions.

Drivers of Revival:

- **US protectionism** & tariff hikes → need for alternative markets.
- **Western sanctions on Russia** → deepening Asian partnerships.
- **Dollar weaponisation** → push for non-Western **payment systems**.
- **Connectivity gains** → INSTC cargo surge highlights Eurasian corridors.
- **Global supply disruptions** → diversification of trade channels.
- **Multilateral reform** → coordinated push for **UN, IMF, WTO reforms**.

Strategic Significance:

- **Eurasian weight** → balances Western alliances.
- **Economic clout** → $\sim \frac{1}{3}$ of global GDP.
- **Multipolarity push** → alternative to Western-led blocs.
- **UNSC leverage** → Russia & China support India's case (though with caveats).
- **Security dialogue** → regional conflict management forum.
- **Integration synergy** → aligns **connectivity & trade initiatives** across Eurasia.

Challenges:

- **India–China border disputes** → core trust deficit.
- **Historical rivalries** → limit defence/intel cooperation.
- **India's Western alignment** → Quad, Indo-Pacific commitments dilute RIC focus.
- **Neutrality concerns** → contradictions in global crisis positions.



HOT Question: "The revival of the Russia–India–China (RIC) Troika highlights the search for multipolarity but exposes India's tightrope walk between Eurasian and Indo-Pacific alignments."

14. China Begins Construction of Xinjiang–Tibet Railway Line Near LAC



China announced the start of the **Xinjiang–Tibet railway project**, a 2,000 km corridor linking Hotan (Xinjiang) to Shigatse (Tibet), passing close to **Ladakh's Line of Actual Control (LAC)** and the disputed **Aksai Chin** region.

About the Railway Project

- **Route:** Connects the Lhasa–Shigatse line with a new Hotan–Shigatse route.
- **Elevation & Terrain:** Average altitude **4,500 m**, traversing Kunlun, Karakoram, Kailash & Himalayas.
- **Strategic Importance:**
 - Enhances **PLA troop & equipment mobility** near the India–China border.
 - Strengthens **China's hold over Tibet & Aksai Chin**, improving supply chains in high-altitude terrain.
 - Integrates Tibet's economy with Xinjiang and the rest of China.

Implications for India

- **Security Risk:** Infrastructure close to LAC could alter **force mobilisation balance** in eastern Ladakh.
- **Geopolitical Signal:** Reinforces China's claims over Aksai Chin, complicating border dispute talks.
- **Strategic Challenge:** May require India to **accelerate border infrastructure projects** (roads, tunnels, BRO works).
- **Regional Connectivity Impact:** Counters India's efforts in the **Chabahar port, INSTC, and Act East policy**.



HOT Question: “Critically analyse the implications of China's Xinjiang–Tibet railway project on India's border security and regional connectivity strategy.”

15. Alaska Summit: First U.S.–Russia Bilateral Dialogue Since Ukraine War



The **U.S.–Russia Alaska Summit**, held at **Elmendorf–Richardson Military Base**, marked a rare direct dialogue focused on exploring pathways for a **Ukraine ceasefire** and peace-building amid shifting global power balances.

About the Alaska Summit

- **First direct bilateral meeting** since the Ukraine conflict intensified.
- Hosted at a U.S. military base in Alaska, symbolising both security caution and controlled engagement.
- **Agenda:** Peace prospects in Ukraine, sanctions, NATO posture, and trilateral engagement possibilities.

Outcomes

- **Symbolic Legitimacy:** Russia received equal-level diplomatic recognition at a U.S. base.
- **No Settlement:** No ceasefire or peace framework emerged.
- **Strategic Messaging:** U.S. highlighted that peace talks must be pursued by **Ukraine & Russia directly**.
- **Future Signals:** Openings for trilateral dialogue and possible follow-up negotiations.

Challenges

- **Trust Deficit:** Long-standing mistrust, sanctions, and military escalations.
- **Ukraine Sovereignty:** Russia's control over ~1/5th of Ukraine (Crimea, Donbas, Kherson, etc.) remains the sticking point.
- **Geopolitical Rivalry:** NATO's security role and U.S. domestic politics complicate stable diplomacy.
- **Escalation Risk:** Failure of talks could trigger renewed hostilities and wider confrontation.



HOT Question: “The Alaska Summit between the U.S. and Russia reflects symbolic diplomacy but little substantive progress on the Ukraine war. Discuss the role of great power summits in conflict resolution and their limitations in today’s multipolar order.”

16. Australia to Recognise Palestinian State at UNGA



On **11th August 2025**, Australia announced it will **formally recognise the State of Palestine** at the **80th UN General Assembly (September 2025)**, joining France, Britain, and Canada in backing the **two-state solution**.

Background

- The **two-state solution** envisions an independent **Palestine alongside Israel**, based on 1967 borders with mutually agreed swaps.
- Palestine has **observer state status** in the UN since 2012; ~140 UN members already recognise it.

Australia's Decision

- **Purpose:** Push for Gaza ceasefire, hostage release, and durable peace.
- **Conditions:** Recognition tied to reforms by the **Palestinian Authority (PA)**, excluding Hamas from governance.
- **Concerns Raised:** Israel's **settlement expansion** and **annexation threats** undermine peace prospects.
- **PA Reforms:** Governance restructuring, demilitarisation, and elections promised.
- **Arab League Role:** Insists on Hamas' exit from Gaza leadership.

International Context

- Growing Western momentum for recognition (France, UK, Canada).
- **New Zealand** to review its stance.
- Israel continues to oppose Palestinian statehood, citing security risks.

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Keywords: Two-state solution, Palestinian Authority, Hamas, UNGA 80, Albanese, Gaza conflict.



HOT Question: "Growing international recognition of Palestine indicates a shift in global diplomacy. Critically analyse its implications for India's West Asia policy."

17. Israel Proposes Indefinite Security Control over Gaza After Hamas Removal



Israeli PM **Benjamin Netanyahu** unveiled a **post-war plan** for Gaza, proposing **indefinite Israeli security oversight** while transferring day-to-day governance to **local Palestinian authorities under Israeli supervision**.

Current Gaza Governance:

- **Dual Authority** → Hamas governs internally; Israel controls borders, airspace, maritime access.
- **Egypt's Role** → manages **Rafah terminal** exclusively.
- **Sovereignty Gap** → no full territorial/administrative control by any one authority.
- **Aid Reliance** → UN & NGOs provide essentials under blockade restrictions.

Proposed Israeli Plan:

- **Security Control** → indefinite Israeli oversight to prevent Hamas resurgence.
- **Hamas Removal** → dismantling armed and political capacity.
- **Interim Transition** → possible Palestinian Authority or international administration.
- **Avoiding Direct Rule** → Israel seeks oversight without assuming full governance burden.

Implications:

- **Legitimacy Risk** → local governance may lack credibility without broader Palestinian participation.
- **International Law** → shift in occupation classification could arise if Israel reduces direct governance role but retains security dominance.
- **Regional Stability** → risks escalation with Hezbollah/Iran proxies; complicates Arab-Israel normalisation.
- **Humanitarian Concerns** → prolonged blockade + aid dependency may deepen crisis.



HOT Question: "Israel's plan for indefinite security control over Gaza seeks stability but risks deepening the legitimacy and humanitarian crisis. Critically analyse."

18. Russia Retains Control Over ~20% of Ukrainian Territory Including Key Industrial Hubs



As of 2025, **Russia controls about one-fifth of Ukraine**, including parts of **Donbas, Crimea, and southern Ukraine**, consolidating its strategic and industrial hold despite continued fighting.

Major Areas Under Russian Control:

- **Crimea (2014 annexation)** → Naval stronghold in Black Sea; hosts Russia's Black Sea Fleet.
- **Luhansk (Donbas region)** → Fully under Russian control; industrial hub with metals, chemicals.
- **Donetsk (~75% controlled)** → Contains Ukraine's key defensive "fortress belt."
- **Kherson (~73% controlled)** → Strategic land bridge linking Crimea to mainland Russia.
- **Zaporizhzhia (largely controlled)** → Hosts **Europe's largest nuclear power plant**; energy leverage.
- **Kharkiv & Sumy** → Small occupied pockets, but crucial for supply lines and buffer zones.

Strategic Implications:

- **Land Corridor** → Ensures continuous Russian-controlled zone from Donbas to Crimea.
- **Industrial Assets** → Control over heavy industries, mines, and energy plants.
- **Geopolitical Leverage** → Russia uses territorial control to negotiate from a position of strength.



HOT Question: "Russia's control over strategic Ukrainian territories has reshaped the regional security architecture. Analyse its implications for global geopolitics and India's foreign policy."

19. India Leverages Labour Mobility Diplomacy to Enhance Economic and Strategic Influence



India is increasingly deploying **labour mobility as a diplomatic tool**, using its **youthful workforce** to deepen economic integration, boost remittances, and expand global influence amid rising skill shortages worldwide.

Mechanisms of Labour Mobility Diplomacy:

- **Mobility Partnerships** → formal bilateral agreements for safe & legal migration.
- **Bilateral Corridors** → orderly recruitment channels.
- **Occupational Mapping** → align migrant skills with host labour needs.
- **Mutual Recognition** → qualification equivalence to ease employment.
- **Data Portability** → cross-border data exchange for credential verification.
- **Worker Protections** → safeguard migrants' rights, boost India's diplomatic credibility.

Strategic Advantages for India:

- **Remittances** → countercyclical economic support.
- **Negotiating leverage** → skilled migration strengthens trade talks.
- **Soft power** → diaspora networks amplify influence.
- **Brain circulation** → return migration aids innovation.
- **Demographic advantage** → India's **median age ~28** aligns with global workforce gaps.

Challenges:

- Skill mismatch between supply & demand.
- Visa bottlenecks & outdated frameworks.
- Informal recruitment & exploitation risks.
- Weak social security in host countries.
- Fragmented data governance.

Government Interventions:

- **e-Migrate & e-Shram** → migrant data management.
- **SWADES Initiative** → maps returnee skills.
- **PKVY's Pre-Departure Orientation (PDOT)** → legal & cultural training.
- **Labour Attachés abroad** → welfare & diplomatic support.
- **NSDC global partnerships** → skill councils linked to overseas employers.

Way Forward:

- Regional **South-South mobility pacts**.
- National **migration observatory** for real-time demand forecasting.
- **Inter-ministerial governance body** aligning migration & trade.
- **Host-country social security protocols** for migrant protection.



HOT Question: "Labour mobility diplomacy offers India an avenue to convert its demographic dividend into strategic and economic capital. Analyse."

20. India's youth bulge emerges as a unique diplomatic asset in an ageing global order.



India's large youth population—unlike ageing China, Europe, and Japan—offers strategic leverage in trade, technology, and diplomacy, but requires institutional support and skills development to realise its full potential.

Demography as Geopolitical Capital

- **Youth Share:** ~27% of India's population is youth (15–29 years).
- **Median Age:** At 28 years, India's population remains youthful compared to China (39) and Japan (49).
- **Human Capital:** Over 40 million higher-education students – a vast innovation reservoir.
- **Labour Supply:** ~8 million youth enter the workforce annually, strengthening manufacturing & services.
- **Global Edge:** Ageing in the West & East Asia enhances India's strategic demographic advantage.

Youth as Instruments of Influence

- **Soft Power:** Cultural exports, arts, and sports projects enhance global appeal.
- **Diaspora Leverage:** Skilled migrants in US, EU, Gulf, and Africa influence host-country policies.
- **Research Diplomacy:** Participation in global science networks builds India's credibility.
- **Digital Leadership:** IT talent showcases India's role in digital governance & AI diplomacy.
- **Consumer Force:** Expanding youth demand attracts FDI and cushions external trade shocks.

Constraints Diluting Youth Potential

- **Skill Deficit:** Vocational & STEM gaps reduce competitiveness.
- **Inequality:** Income and gender divides limit opportunities.
- **Visa Barriers:** Immigration restrictions curb youth mobility.
- **R&D Weakness:** India invests ~0.7% of GDP in R&D, below global averages.
- **Institutional Exclusion:** Youth rarely represented in foreign policy institutions.

Way Forward

- **Skill Expansion:** Scale vocational training, STEM, and AI-based learning.
- **Inclusive Growth:** Bridge gender & regional divides in employment.
- **Research Linkages:** Strengthen university–industry global partnerships.
- **Mobility Framework:** Negotiate visa liberalisation and youth exchange



UPSC Relevance: **GS1:** Population & Society – Demographic dividend.
GS2: International Relations – Role of diaspora, youth diplomacy.
GS3: Economy – Human capital, skill development.



HOT Question: “India's demographic dividend is not merely an economic asset but also a diplomatic one. Critically examine how India can use its youth population as a strategic capital in the global arena.”

21. U.S. formalises Golden Dome missile defence shield to intercept ICBMs



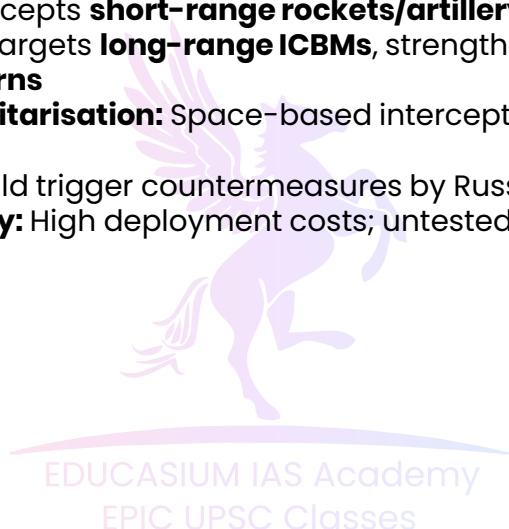
The U.S. confirmed design approval and leadership appointments for its **Golden Dome missile defence system**, a step towards strengthening strategic deterrence.

About Golden Dome

- **Nature:** Multi-layered defence shield against **intercontinental ballistic missiles (ICBMs)**.
- **Mechanism:** Intercepts missiles during **boost & midcourse** phases using **lasers + interceptors**.
- **Layers:** Four tiers → one space-based, three land-based.
- **Integration:** Combines **satellites, radars, interceptors, Patriot systems**.

Comparison with Iron Dome (Israel)

- **Iron Dome:** Intercepts **short-range rockets/artillery**.
- **Golden Dome:** Targets **long-range ICBMs**, strengthening U.S. homeland defence. **Concerns**
- **Outer Space Militarisation:** Space-based interceptors risk violating **Outer Space Treaty**.
- **Arms Race:** Could trigger countermeasures by Russia/China.
- **Cost & Reliability:** High deployment costs; untested in full-scale combat.



UPSC Relevance: **GS3 (Defence & S&T):** Missile defence, space militarisation. **GS2 (IR):** Strategic stability, U.S.-Russia-China dynamics.

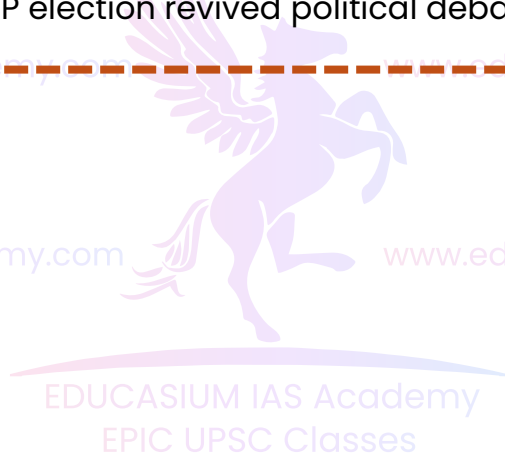


HOT Question: “Missile defence systems like the U.S. Golden Dome may strengthen deterrence but also risk militarising outer space. Discuss in light of international law and India’s security interests.”

AUGUST 2025

DEFENCE & INTERNAL SECURITY

1. India Inducts Final Batch of Airbus C-295 Transport Aircraft
2. India approves induction of 97 indigenous LCA Mk1A fighter
3. Navy Commissions Udaygiri & Himgiri Stealth Frigates
4. DRDO Tests Integrated Air Defence Weapon System (IADWS)
5. Private sector's share in defence production hits record
6. AI-enabled terrorism emerges as new threat
7. 2025 VP election revived political debate on Salwa Judum



1. India Inducts Final Batch of Airbus C-295 Transport Aircraft



India received the **final batch of 16 Airbus C-295 aircraft from Spain**, marking the first phase of induction before indigenous production begins under the **Make in India defence manufacturing programme**.

About C – 295 :

- A **new-generation tactical transport aircraft** in the light-medium category.
- Designed & built by **Airbus Defence and Space** (Europe).
- Capable of transporting troops, paratroopers, and cargo.

Key Features:

- **Endurance:** Flight range up to **11 hours**.
- **Payload capacity:** ~9 tonnes.
- **Versatility:** Short/rough airstrip operations, air-to-air refuelling (in some versions), and medical evacuation.
- Will replace the IAF's ageing **HS-748 Avro fleet**.

Strategic Significance for India:

- Enhances **IAF's tactical airlift capability**.
- **Indigenous production line:** 40 out of 56 aircraft to be manufactured in India by **Tata-Airbus JV in Vadodara, Gujarat** – India's first private military aircraft manufacturing facility.
- Boosts self-reliance under **Atmanirbhar Bharat** in defence.



UPSC Relevance: Prelims: C-295 → Airbus-built tactical transporter; replaces Avro fleet. India's first private aircraft manufacturing line = Tata-Airbus (Vadodara).



HOT Question

"Discuss the significance of the induction and indigenous production of C-295 transport aircraft for India's defence preparedness and defence manufacturing ecosystem."



2. India approves induction of 97 indigenous LCA Mk1A fighter jets to replace MiG-21 fleet



The Cabinet Committee on Security (CCS) approved the procurement of **97 LCA Mk1A fighter jets**, designed by **Hindustan Aeronautics Limited (HAL)**, strengthening India's indigenous defence capabilities and replacing the ageing MiG-21 fleet.

About LCA Mk1A

- **Type:** Single-engine, supersonic, multi-role fighter aircraft.
- **Developer:** Hindustan Aeronautics Limited (HAL).
- **Indigenous Content:** ~65% localisation, strengthening *Atmanirbhar Bharat*.
- **Upgraded Variant:** Based on **LCA Tejas**, featuring advanced avionics and better survivability.
- **Role:** Replacing MiG-21, India's oldest fighter jet series.

Key Features

- **Avionics:** AESA (Active Electronically Scanned Array) radar, electronic warfare suite.
- **Weapons:** Capable of carrying BVR (Beyond Visual Range) missiles, precision-guided bombs.
- **Design:** Lightweight yet supersonic, supports air-to-air and air-to-ground combat.
- **Operational Flexibility:** Designed for both defensive and offensive missions.

Significance

- **Defence Modernisation:** Strengthens the Indian Air Force (IAF) fleet with advanced indigenous fighters.
- **Indigenous Manufacturing:** Major boost to defence indigenisation and aerospace ecosystem.
- **Strategic Autonomy:** Reduces reliance on foreign suppliers amid global supply chain disruptions.
- **Export Potential:** Enhances India's prospects as a defence exporter.
- **National Security:** Replaces MiG-21s, which had high accident rates and ageing technology.



UPSC Relevance: GS3 (Defence): Modernisation of Indian Air Force.

GS3 (S&T): Indigenisation of defence technology.

GS2 (IR): Defence exports strengthening India's global partnerships.



HOT Question

"Discuss the significance of the LCA Mk1A induction in India's defence preparedness. How does indigenisation of defence manufacturing enhance strategic autonomy?"



3. Indian Navy Commissions Udaygiri & Himgiri Stealth Frigates Together under Project 17A



The Indian Navy will **simultaneously commission Udaygiri and Himgiri stealth frigates at Visakhapatnam**, marking the first parallel induction of frontline combatants from different domestic shipyards.

About the Simultaneous Commissioning

First-of-its-kind milestone → simultaneous induction of two major warships.

Class → Project 17A *Nilgiri-class* frigates, advanced replacements for Shivalik-class.

Propulsion → **CODOG** (Combined Diesel or Gas) → fuel-efficient + high-speed manoeuvrability.

Integrated Platform Management System (IPMS) → centralised machinery control for combat readiness.

About Himgiri

- **Built by:** GRSE, Kolkata.
- **Special Feature:** Enhanced stealth with reduced radar/infrared signatures.
- **Mission Profile:** Anti-air, anti-surface, and anti-submarine warfare.
- **Weapons:** BrahMos, Barak-8 SAMs, torpedoes, advanced sonar.

About Udaygiri

- **Built by:** MDL, Mumbai.
- **Design Milestone:** 100th ship designed by Navy's Warship Design Bureau.
- **Stealth Features:** Hull shaping for low detectability.
- **Mission Profile:** Blue-water escort, maritime security operations.
- **Weapons:** Supersonic SSMs, MR-SAMs for layered defence.

About Project 17A

- Indigenous Nilgiri-class frigate programme.
- Designed for **multi-mission roles** with enhanced stealth, automation, and combat capability.



UPSC Relevance: GS3 (Defence): Modernisation of Indian Air Force.

GS3 (S&T): Indigenisation of defence technology.

GS2 (IR): Defence exports strengthening India's global partnerships.



HOT Question

"The commissioning of Project 17A frigates marks a major step in India's naval self-reliance. Discuss their strategic role in the Indo-Pacific maritime security environment."



4. DRDO Successfully Tests Integrated Air Defence Weapon System (IADWS)



The **Defence Research and Development Organisation (DRDO)** conducted the **first successful flight test** of the **Integrated Air Defence Weapon System (IADWS)**, marking a milestone in India's indigenous defence capability.

Key Components:

- **Quick Reaction Surface-to-Air Missiles (QRSAM):** Medium-range interception of hostile aircraft & missiles.
- **Very Short-Range Air Defence System (VSHORADS):** Counter low-altitude, close-in aerial threats.
- **Directed Energy Weapons (DEWs):** High-energy laser system to neutralise drones, UAVs, and swarms.

Networked Integration: Real-time data sharing among radar, missiles, and DEWs for layered defence.

Mission Sudarshan Chakra (Vision 2035)

- Aims to build a **comprehensive, networked national defence shield**.
- **Focus Areas:**
 - Integration of **air defence, cyber security, and surveillance systems**.
 - Protecting **borders, critical infrastructure, and cities**.
 - Promoting **self-reliance (Atmanirbhar Bharat)** in high-end defence technology.

Significance of the Test

- **Operational Readiness:** Boosts India's layered defence against missiles, UAVs, and aircraft.
- **Strategic Deterrence:** Complements existing systems like **Akash, Barak-8, and S-400**.
- **Indigenous Capability:** Reduces dependence on imports, strengthening defence self-sufficiency.
- **Future Warfare Preparedness:** DEWs address **drone swarms and asymmetric threats**.



UPSC Relevance: Prelims: QRSAM, VSHORADS, Directed Energy Weapons, Mission Sudarshan Chakra.

Mains (GS3): Indigenous defence production, strategic technology self-reliance, challenges of modern warfare.



HOT Question

"Discuss the significance of DRDO's Integrated Air Defence Weapon System (IADWS) for India's national security. How does it align with Mission Sudarshan Chakra (Vision 2035)?"



5. Private sector's share in defence production hits record 22.56% in FY 2024-25.



India's private sector defence production touched **₹1.5 lakh crore in FY 2024-25**, with exports multiplying 34 times since 2013-14, reflecting the impact of Make in India and indigenisation reforms.

India's Defence Sector Growth

- **Budgetary Rise:** Defence budget rose from ₹2.53 lakh crore (2013-14) → ₹6.81 lakh crore (2025-26).
- **Exports:** Increased from ₹686 crore (2013-14) → ₹23,622 crore (2024-25).
- **Production:** Tripled since 2014-15 (₹46,429 crore) → ₹1.5 lakh crore (2024-25).
- **Private Sector Share:** 22.56% in 2024-25 – the highest ever.

Government Initiatives Driving Growth

- **Make in India:** Priority to indigenous manufacturing.
- **Defence Acquisition Procedure (DAP):** Simplifies procurement & prioritises Indian vendors.
- **Positive Indigenisation Lists:** Bans imports of 500+ defence items to promote local production.
- **Support Schemes:**
 - *iDEX (Innovations for Defence Excellence):* Funds defence start-ups.
 - *ADITI (Acing Development of Innovative Technologies with iDEX):* Pushes futuristic R&D.
 - *DTIS (Defence Testing Infrastructure Scheme):* Expands private access to testing facilities.
 - *TDF (Technology Development Fund):* Supports MSMEs for innovation.



UPSC Relevance: GS3 (Defence & Economy): Indigenisation of technology & manufacturing.

Essay/GS2: Strategic autonomy, Atmanirbhar Bharat, & India's rise as an arms exporter



HOT Question

"Critically examine the role of private sector participation in India's defence production. How far can it contribute to India's goal of strategic autonomy and Atmanirbhar Bharat?"



6. AI-enabled terrorism emerges as new threat while India's Naxal insurgency declines



A contrast has emerged between **India's successful containment of Naxalism** and the **growing global fears of AI-enabled terrorism**.

Extremists are exploiting artificial intelligence for cyberattacks, drone warfare, and deepfake radicalisation, raising complex new security challenges.

AI-Enabled Terrorism

- **Deepfake Propaganda:** Synthetic media used to radicalise youth and spread misinformation.
- **Drone Swarms:** AI-enabled autonomous drones can attack infrastructure, leaders, or military bases.
- **Cyberterrorism:** Machine learning algorithms breach banking, aviation, and power grids.
- **Bio-Terrorism Risks:** AI-assisted models may help design or modify pathogens.
- **Predictive Targeting:** Terrorists may exploit AI data-mining to identify soft targets.

Comparative Counter-Terrorism Approaches

- **India (Naxals):** Focused on development + surrenders + reintegration, alongside security force action.
- **U.S. (Jihadists):** Prioritised militant elimination through external strikes with limited rehabilitation.
- **Judicial Oversight:** India's operations faced courts/human rights checks; U.S. largely operated without.

Decline of Naxalism in India

- **Security Offensives:** Coordinated counter-insurgency campaigns eliminated cadres.
- **Territorial Contraction:** Maoist influence now largely limited to Bastar and a few adjoining forests.
- **Leadership Crisis:** Neutralisation of top leaders fragmented organisational strength.
- **Development Integration:** Roads, welfare, and banking penetrated Maoist strongholds.
- **Alternative Livelihoods:** Rural jobs (MGNREGA, skill programmes) drew youth away from Maoist recruitment.



UPSC Relevance: **GS3 (Internal Security):** Changing nature of terrorism (AI-driven vs ideological insurgencies). **GS2 (Governance):** Balancing civil liberties with counter-terror measures. **Essay/IR:** "Technology as a double-edged sword in national security."



HOT Question "Artificial Intelligence has opened new frontiers in terrorism, even as traditional insurgencies like Naxalism are declining in India. Discuss how India should recalibrate its counter-terrorism strategy in light of emerging AI threats."



7. 2025 VP election revived political debate on the controversial Salwa Judum counterinsurgency campaign in Chhattisgarh



The **Salwa Judum campaign**, disbanded by the Supreme Court in 2011, is again in focus amid debates over **state-sponsored counterinsurgency strategies** in the Maoist-affected Bastar region.

About Salwa Judum

- **Meaning:** "Peace march" in Gondi language.
- **Launch:** Mid-2000s in Dantewada, South Chhattisgarh.
- **Nature:** State-backed vigilante movement against Maoists.
- **Participants:** Tribal villagers mobilised as **Special Police Officers (SPOs)** – popularly called *Koya Commandos*.
- **Legal Basis:** SPOs appointed under **Chhattisgarh Police Act, 2007**, bypassing standard magisterial oversight.

Objectives:

Expand manpower for counter-Maoist operations.
Protect relief camps housing displaced villagers.
Weaken Maoist base by mobilising local youth.

Criticisms and Allegations

- **Human Rights Violations:** Reports of civilian killings, arson, and retaliatory violence.
- **Forced Displacement:** Thousands of tribals uprooted into camps.
- **Unconstitutional Recruitment:** SPOs recruited without proper safeguards.
- **Civilian Militarisation:** Vulnerable youth exposed to life-threatening risks.

The Salwa Judum Case (Nandini Sundar vs State of Chhattisgarh, 2007)

- **Petition:** Challenged SPO recruitment as unconstitutional.
- **Allegations:** Violation of human dignity, unlawful displacement, discriminatory practices.
- **State's Defence:** Claimed SPOs were voluntarily recruited and strengthened local security.
- **Supreme Court Ruling (2011):**
 - Disbanded Salwa Judum.
 - Declared SPO deployment unconstitutional, violating **Articles 14 (Equality) & 21 (Right to Life)**.
 - Directed security operations to be carried out only by trained police/paramilitary forces.



HOT Question "The Salwa Judum judgment exemplifies the balance between state security imperatives and constitutional rights." Critically discuss with reference to internal security challenges in India."



AUGUST 2025

ECONOMY

1. DFS Urges PSBs to Review Minimum Average Balance
2. RBI reviews India's inflation targeting framework
3. Govt. Allows Central Employees to Shift from UPS to NPS
4. Senior Citizens' Income Tax Contributions Rise 28%
5. Banking Laws (Amendment) Act, 2025
6. Income Tax Department Launches PAN 2.0
7. Government Saves ₹560 Crore via Bond Switching
8. Government Withdraws Income-Tax Bill, 2025
9. PAC urges overhaul of India's tolling system
10. Government Amends Edible Oil Regulations
11. Balancing E-Commerce Growth with Traditional Retailers
12. India's soybean sector stagnates
13. Dairy Sector of India – Opportunities and Challenges
14. CBIC waives 11% import duty on cotton
15. India Bans Certain Jute Product Imports from Bangladesh
16. US Slaps 50% Tariff on Indian Imports
17. Agriculture Disputes Stall India-US Trade Talks
18. India Weighs Oil Import Diversification
19. Cabinet Approves Railway Multitracking Projects
20. Cabinet approves Bhubaneswar Bypass Project in HAM model
21. Parliament Passes Merchant Shipping Bill, 2024
22. TRAI's Manual for Rating Properties on Digital Connectivity
23. PM E-DRIVE Scheme Extended Until 2027-28
24. Measures to Overcome Ethanol Blending Challenges
25. India releases draft Climate Finance Taxonomy
26. Parliament Passes MMDR Amendment Bill, 2025
27. India's first indigenously made semiconductor chip
28. Transforming India into a Product Nation
29. IPPB Introduces Aadhaar-Based Face Authentication
30. Finance Ministry Flags Low PMLA Convictions
31. SC Admits Appeals in Google-Android Antitrust Case
32. Union Cabinet clears Online Gaming Bill 2025
33. Action plan to address uneven industrial distribution
34. Cabinet Approves ₹2,000 Crore Grant-in-Aid Scheme for NCDC
35. India Celebrates 11th National Handloom Day
36. Restructuring and Extension of PM SVANidhi Scheme
37. India Emerges as a Leading Global Hub for Medical Tourism
38. Government Plans GST Overhaul for Automobiles
39. GoM Approves GST 2.0 with Two-Rate Structure
40. GoM proposes GST exemption on life insurance premiums,
41. S&P Global Upgrades India's Sovereign Credit Rating to BBB
42. Dubai Launches Unified Freezone Passport System
43. Oman to Launch Revamped Golden Visa Programme



1. DFS Urges PSBs to Review Minimum Average Balance Penalties



The Department of Financial Services (DFS) asked Public Sector Banks to revisit **MAB penalty structures**, after concerns that penalties—yielding ₹9,000 crore in five years—hurt financial inclusion and burden low-income users.

What is MAB?

- Monthly Average Balance = average of daily closing balances over a month.
- Penalties are imposed when account holders fail to maintain required MAB.

Banking Significance

- Encourages liquidity stability in deposits, improving **CASA ratio** (Current Account–Savings Account).
- CASA ratio lowers banks' cost of funds → boosts lending margins.

Concerns

- **Disproportionate impact** on low-income customers, discouraging savings and formal banking usage.
- Lack of uniformity: thresholds and penalties vary across banks within RBI guidelines.
- May contradict financial inclusion objectives (e.g., Jan Dhan Yojana).

Revenue: PSBs earned ~₹9,000 crore in penalties (2018–23).

Policy Direction: DFS seeks rationalisation to balance bank stability with customer protection.



UPSC Relevance: Prelims: MAB = monthly average of daily closing balances. CASA ratio: higher = lower cost of funds. Uniform guidelines, graded penalties, or waivers for weaker sections.



HOT Question: Evaluate the implications of Minimum Average Balance penalties on financial inclusion in India. Should RBI mandate uniform norms across banks? (150 words)



2. Banking Laws (Amendment) Act, 2025 Strengthens Governance & Depositor Safeguards



The **Banking Laws (Amendment) Act, 2025**, effective **August 1, 2025**, introduces a major overhaul of India's banking framework with 19 amendments across five laws, focusing on governance, audit reforms, and depositor protection.

Scope: Amends RBI Act (1934), Banking Regulation Act (1949), SBI Act (1955), Banking Companies Acts (1970 & 1980).

Governance Safeguard: Raises "substantial interest" threshold from ₹5 lakh (1968 limit) to **₹2 crore**, curbing insider control risks.

Tenure Reform: Extends cooperative bank directors' tenure (except chairperson/whole-time directors) from 8 → **10 years**, aligning with the **97th Constitutional Amendment**.

Investor Safeguard: PSBs must transfer **unclaimed shares & proceeds** to the **Investor Education & Protection Fund (IEPF)** for transparency.

Audit Reform: Allows PSBs to fix auditor remuneration, aimed at strengthening audit independence & quality.

Key Terms:

- **Substantial interest:** minimum stake granting influence in a bank.
- **IEPF:** Govt. fund under Companies Act, 2013 → safeguards unclaimed assets, promotes investor awareness.



UPSC Relevance: **Prelims:** IEPF = statutory fund under Companies Act, 2013. Substantial interest limit raised from ₹5 lakh → ₹2 crore. **97th Amendment:** relates to cooperative societies. **Mains:** Impact on governance and depositor confidence in PSBs.



HOT Question: Examine the significance of the Banking Laws (Amendment) Act, 2025, in addressing legacy governance gaps in India's banking sector. How does it enhance depositor and investor protection? (150 words)



3. RBI reviews India's inflation targeting framework: Discussion paper released



The RBI has published a discussion paper on India's **Inflation Targeting Framework**, reviewing its effectiveness ahead of the 2026 review cycle.

About Inflation Targeting in India

- **Definition:** Monetary policy framework where RBI explicitly sets an inflation target and adjusts policy rates to maintain it.
- **Adoption:** Introduced in **2016** via amendment to the RBI Act, following recommendations of the Urjit Patel Committee (2014).
- **Target:** **4% CPI inflation** with a tolerance band of **2–6%**.
- **Review Cycle:** Every 5 years (next in 2026).
- **Measurement:** India targets **headline inflation** (includes food & fuel) unlike Uganda, which targets core inflation.

Recent Inflation Trends (2014–2025)

- **Retail inflation (July 2025):** 1.55% (8-year low).
- **Core inflation (2025):** 4.1% → showing stable underlying demand pressures.
- **Historical range (2014–2025):** 1.5% – 8.6%.
- **Food inflation volatility:** –2.7% to 14.2% → main driver of headline swings.

Significance of the Framework

- **Price Stability:** Anchors inflation expectations, improving purchasing power.
- **Growth Balance:** By keeping inflation low, supports sustainable economic growth.
- **Credibility:** Strengthens RBI's independence & policy predictability.
- **Investor Confidence:** Stable inflation encourages investment inflows.

Criticisms & Challenges

- **Food Price Dominance:** Headline inflation is highly volatile due to seasonal food prices beyond RBI's control.
- **Growth Trade-off:** Excessive focus on inflation may suppress growth in slowdown years.
- **Global Shocks:** Oil and commodity price volatility reduce RBI's control.
- **Rural Sensitivity:** CPI includes food heavily, making rural inflation politically sensitive.



UPSC Relevance: **GS3 – Economy:** Monetary Policy, RBI, Inflation Control. **GS2 – Governance:** RBI's institutional role and accountability.



HOT Question: Critically evaluate the effectiveness of India's inflation targeting framework since its adoption in 2016. Should India shift focus from headline to core inflation?



4. Govt. Allows Central Employees to Shift from UPS to NPS



The Union Finance Ministry has **opened a transition window** for Central Government employees to shift from the **Unified Pension Scheme (UPS)** to the **National Pension System (NPS)**.

Key Features of the Transition

- **Objective:** Flexibility for employees & reinforce NPS as the long-term sustainable pension model.
- **Timeline:**
 - Switch permitted **up to 1 year before superannuation** or **3 months before voluntary retirement**.
- **Irreversible:** Once opted, cannot revert to UPS.
- **Exclusions:** Employees under **dismissal, removal, or disciplinary action** cannot switch.

About UPS and NPS

- **Unified Pension Scheme (UPS):**
 - Launched in 2024 as a middle path between the **Old Pension Scheme (OPS)** and **NPS**.
 - Features: Assured pension floor + market-based upside.
- **National Pension System (NPS):**
 - Introduced in 2004 for govt. recruits.
 - **Defined contribution** system: Pension depends on returns on invested corpus.
 - Regulated by **PFRDA**; provides partial tax exemptions and annuity-based payouts.
 - Considered fiscally sustainable compared to OPS.

Significance of the Move

- **Flexibility:** Empowers employees with **choice of pension model**.
- **Sustainability:** Strengthens NPS adoption, reducing future fiscal stress from UPS/OPS liabilities.
- **Predictability:** Aligns with global shift to **contribution-based pensions** for long-term viability.



UPSC Relevance: **Prelims:** Features of UPS, NPS, OPS; regulatory body **PFRDA**. **Mains (GS2/GS3):** Pension reforms, fiscal sustainability, welfare vs. economic discipline.



HOT Question: Discuss the fiscal and social implications of India's transition from defined-benefit pensions (OPS/UPS) to contribution-based pensions (NPS).



5. Senior Citizens' Income Tax Contributions Rise 28% in AY 2024-25



The **Ministry of Finance** reported a **28% increase in income tax contributions from citizens over 70 years** in Assessment Year (AY) 2024-25 compared to AY 2023-24.

Senior Citizens' Income Tax Contribution Trends

- **Overall tax rise:** Income tax collections rose **25% in FY 2023-24**, signalling improved compliance.
- **Steady share:** Seniors contributed **~5.3–5.8% of total income tax collections** (FY 2019-20 to 2022-23).
- **Pandemic exception:** FY 2020-21 saw an **8% rise in senior contributions** even as overall collections fell 1%.
- **Current share:** In FY 2023-24, collections reached **₹10.45 lakh crore**, with seniors contributing **5.9%**.

Key Drivers of the Trend

1. **Improved Compliance:**
 - Digital filing, simplified tax regimes, and stricter reporting.
2. **Diverse Income Sources:**
 - Pensions, deposits, dividends, rentals, and capital gains widened the taxable base.
3. **TDS Expansion:**
 - Wider tax deduction at source (TDS) on deposits & capital gains increased upfront collections.
4. **Demographic Factor:**
 - Rising life expectancy expanded the 70+ population base.
 - Male life expectancy rose from **59.4 (1990-94) → 68.6 (2016-20)**.
 - Female life expectancy rose from **60.4 → 71.4** in the same period.



UPSC Relevance: **GS3 (Economy):** Direct & indirect taxes, mobilisation of resources, demographic dividend vs. ageing. **GS2 (Governance):** Welfare measures for vulnerable groups like senior citizens.



HOT Question: Rising income tax contributions from senior citizens highlight both demographic transitions and compliance improvements. Discuss the implications for India's fiscal policy and welfare planning.



6. Income Tax Department Launches PAN 2.0 Project for Unified Tax Identity Management



The **Income Tax Department** awarded a contract for the **PAN 2.0 Project (2024)** to modernise and integrate the issuance and management of **PAN (Permanent Account Number)** and **TAN (Tax Deduction & Collection Account Number)**.

About PAN:

- Introduced in **1972**.
- **10-digit alphanumeric identifier** linking taxpayers' financial transactions with IT Department.

About TAN:

- 10-digit alphanumeric code for entities responsible for **Tax Deducted/Collected at Source (TDS/TCS)**.

• PAN 2.0 Features:

- **Unified portal** for PAN & TAN issuance.
- **Paperless processing** → faster approvals.
- **Enhanced security** → PAN Data Vault & digital safeguards.
- **Automated compliance management** → better monitoring of tax base.

• Difference (PAN vs. PAN 2.0):

- **PAN (Old)** → Only taxpayer ID, partly manual, limited security.
- **TAN (Old)** → Separate ID for TDS/TCS entities.
- **PAN 2.0** → Unified, digital, secure system for **PAN + TAN**, automated updates, transparency.

• Significance:

- Improves **efficiency & compliance** in tax administration.
- Reduces fraud risk and duplication.
- Strengthens India's move towards **Digital Governance**.



UPSC Relevance: **Prelims:** PAN = introduced in 1972, 10-digit alphanumeric. TAN = for TDS/TCS entities. PAN 2.0 = integrates both PAN & TAN. **Mains:** Digitalisation in taxation → efficiency, transparency, compliance. Challenges: data privacy, integration of legacy databases.



HOT Question: Discuss the significance of the PAN 2.0 Project in modernising India's tax administration. How does it improve upon the existing PAN-TAN system? (150 words)

7. Government Saves ₹560 Crore via Bond Switching to Ease Debt Pressure



A **Bank of Baroda study** revealed that the Government of India saved **₹560 crore in interest costs** through **bond switching**, a key debt management strategy amid rising maturities.

What is Bond Switching?

- A process where the **government replaces short-term sovereign bonds** with **longer-duration bonds**.
- Example: Bonds maturing in **FY27–FY29** switched with those maturing after **FY32** → repayment burden deferred.

Process:

- Conducted with **market participants** (banks, institutions).
- Can also be done directly with the **RBI**.

Objectives:

- **Smoothen liability profile** – reduce bunching of repayments.
- **Lower near-term refinancing risks**.
- **Support market development** by extending yield curve.
- Manage **fiscal stress** without increasing overall debt stock.

Significance:

- Enhances fiscal stability.
- Provides breathing space in years of heavy maturities.
- Creates benchmarks for long-term bonds in the debt market.



UPSC Relevance: Prelims: Bond switching = replacing short-term debt with long-term debt. Involves govt., market participants, and RBI. Mains: Role of bond switching in **public debt management**. Importance for fiscal sustainability in high-debt economies



HOT Question: Bond switching has emerged as a critical tool for India's debt management strategy." Explain how it helps in reducing refinancing risks and interest burden. (150 words)



8. Government Withdraws Income-Tax Bill, 2025



On **8th August 2025**, the Union Finance Minister **withdrew the Income-Tax Bill, 2025** in the Lok Sabha after reviewing suggestions from the **31-member Select Committee**, which submitted a detailed report recommending major reforms.

About the Income-Tax Bill, 2025

- Drafted to **replace the Income-Tax Act, 1961**, aiming at simplification and modernisation.
- Covered provisions for **taxpayer relief, MSMEs, non-profits, and procedural reforms**.

Key Recommendations of the Select Committee

- **Simplification:** 566 suggestions in a **4,584-page report** to make law user-friendly.
- **Refund Relief:** Amend provision disallowing refunds for late returns.
- **MSME Definition:** Align with **MSME Act** for consistency.
- **Non-Profit Clarification:** Distinction between *income* vs. *receipts*; rules on anonymous donations; remove *deemed application* to cut disputes.
- **Procedural Ease:** Clearer rules on advance ruling fees, TDS on provident funds, low-tax certificates, and penalty powers.

Significance

- Withdrawal signals **government openness to review & redraft** for stakeholder acceptance.
- Reflects balance between **taxpayer convenience** and **administrative efficiency**.
- Shows importance of **Parliamentary committees** in legislative scrutiny.

Keywords: Income-Tax Act 1961, Select Committee, MSME Act, Refunds, Anonymous Donations, Taxpayer Relief.



UPSC Relevance: **GS3 – Economy:** Direct taxes, tax reforms, fiscal management. **GS2 – Polity:** Role of Parliamentary committees in legislation. **Prelims:** Difference between Finance Bill and Money Bill; functions of Select Committees.



HOT Question: Discuss the role of Parliamentary committees in ensuring taxpayer-friendly and transparent tax reforms in India, with reference to the withdrawal of the Income-Tax Bill, 2025.”



9. PAC urges overhaul of India's tolling system, focusing on fairness, transparency, and user accountability.



The **Public Accounts Committee (PAC)** has recommended major reforms in India's tolling system, highlighting unfair financial burdens, inefficiencies in FASTag operations, and lack of an independent regulator.

Current Tolling System Framework

- **Legal Basis:** Section 7, *National Highways Act, 1956* & *NH Fee Rules, 2008*.
- **Collection:** Union → public highways.
 - Concessionaires → BOT (Build-Operate-Transfer), ToT (Toll-Operate-Transfer), InvIT models.
- **Revenue:** Flows to Consolidated Fund of India.
- **Local Concessions:** Residents within 20 km → discounted passes (Aadhaar-verified).

Challenges in Current System

- **Toll Beyond Recovery:** Fees continue even after capital & O&M cost recovery.
- **Automatic Escalation:** 3% annual hike + 40% WPI-linked hike without review.
- **FASTag Issues:** Scanner failures, congestion, weak ground support dilute digitalisation promise.
- **Public Perception:** Seen as revenue-maximisation rather than user-service.

PAC Recommendations

- **Fair Tolling:** Stop tolls post-recovery OR justify continuation transparently.
- **Independent Regulator:** To oversee pricing, fairness, & grievance redressal.
- **Construction Rebate:** Automated reimbursement to users during road construction.
- **FASTag Reform:** Real-time monitoring of traffic flow, queues, delays, lane use.

Recent Government Actions

- **MoRTH-NITI Aayog Study:** Reviewing costs, damage, willingness-to-pay.
- **FASTag Annual Pass (Aug 2025):** Covers 200 tolls, lowers cost for frequent users.
- **Barrierless Tolling:** FASTag + ANPR (Automatic Number Plate Recognition) being developed for seamless traffic.



UPSC Relevance: **GS3 (Economy & Infrastructure):** Issues in PPP models, digital governance, user accountability. **GS2 (Governance):** Role of independent regulators in ensuring fairness & transparency.



HOT Question: The PAC has criticised India's tolling system as revenue-centric rather than user-centric. Discuss the challenges in India's toll collection framework and evaluate the reforms needed to ensure fairness and transparency.



10. Government Amends Edible Oil Regulations to Stabilize Supply and Prices



The **Ministry of Consumer Affairs** amended the *Vegetable Oil Products Production and Availability (Regulation) Order, 2011* under the **Essential Commodities Act, 1955**, to enhance **transparency, prevent supply disruptions, and ensure fair pricing** in India's edible oil sector.

India's Edible Oil Profile:

- Largest **importer of vegetable oils** globally.
- Import dependence fell from **63.2% (2015–16) → 54.9% (2021–22)**.
- **Imports share:** Palm oil (59%), Soybean oil (23%), Sunflower oil (16%).
- **Top oilseeds:** Soybean (34%), Rapeseed–Mustard (31%), Groundnut (27%) → ~92% of production.

Reasons for Import Dependence:

- 72% of oilseed area under **rainfed farming**.
- Low productivity due to poor irrigation, weak tech adoption, and price volatility.

Government Initiatives:

- **NMEO–OP (National Mission on Edible Oils – Oil Palm):** Scale up domestic oil palm cultivation.
- **NFSM–OS&OP (National Food Security Mission – Oilseeds & Oil Palm):** Productivity boost in 9 oilseed crops + expansion of oil palm & tree-borne oilseeds.

Significance of New Regulation:

- Ensures **stable edible oil availability**.
- Protects consumers from price spikes.
- Strengthens supply chain transparency.



UPSC Relevance: Prelims: Legal basis = Essential Commodities Act, 1955. Largest imported oil = Palm oil (~59%). 9 major oilseed crops covered under NFSM. **Mains:** Challenges in India's edible oil self-reliance.



HOT Question: Why is India heavily dependent on edible oil imports? Discuss recent policy interventions aimed at reducing this dependence. (150 words)



11. Balancing E-Commerce Growth with Protection of Traditional Retailers



India's retail sector is undergoing a **transformation due to rapid e-commerce expansion**, creating **synergies but also conflicts** with traditional retailers, prompting calls for **smart hybrid policies**.

Retail Landscape:

- **E-commerce growth** → driven by **digital infra, UPI, logistics**, reaching even rural & Tier III/IV towns.
- **Traditional retail resilience** → thrives on **trust, personal service, and credit networks**; proved reliable during **demonetisation & COVID-19 shocks**.

Synergies & Conflicts:

- **Convergence** → Kirana home deliveries vs. e-commerce quick commerce.
- **Conflict** → **capital-rich e-commerce oligopoly** vs. fragmented small retailers.
- Concern: **Predatory pricing** → selling below cost to eliminate competition.

Policy Options for Hybrid Growth:

- **Regulate predatory pricing** → tax/penalties on below-cost sales.
- **Ensure fair competition** → allow innovation, low consumer prices, and job creation.
- **Support small retailers** → provide credit, retail space, protection from municipal harassment.
- **Encourage collaboration** → integrate kirana stores into e-commerce supply chains for bulk sourcing and last-mile delivery.



UPSC Relevance: Prelims: Predatory pricing = selling below cost to oust rivals, then hiking prices later. Oligopoly = few big players dominate market share. Role of **policy in balancing innovation & inclusion** in retail.



HOT Question: India's retail sector needs policies that balance e-commerce innovation with protection of traditional retailers." Analyse.
(150 words)



12. India's soybean sector stagnates; calls to declare 2026 as the Year of Soy



Despite being the **fifth-largest producer globally**, India's soybean output has stagnated, prompting experts to push for renewed focus through a **"Year of Soy" (2026)** campaign.

About Soybean (Golden Bean)

Crop Type: Kharif oilseed crop; requires **26–30°C**, ~90 cm rainfall, fertile loamy soils.

FAO Classification: Oilseed crop producing edible oil & protein-rich by-products.

Global Standing: Brazil leads production; India ranks 5th.

Nutritional Value: High in protein, omega-3/6 fatty acids, antioxidants.

Variety: **MACS 1407** (ICAR, 2021) – high-yielding, pest-resistant.

Soybean in India

Oilseed Share: 34% of oilseed area, 23% of output.

Area Expansion: 30,000 ha (1970s) → 13 million ha (2022–23).

Output: 13.6 million tonnes (2021), but stagnating since.

Major States: Madhya Pradesh, Maharashtra, Rajasthan.

Trade: Exports soymeal (animal feed); imports high-value soy protein products.

Challenges

- **Profitability:** Climate shocks, pests, unstable prices.
- **Consumption Gap:** Only 2 g/day per capita vs higher Asian levels.
- **Identity Crisis:** Perceived as feed crop, underutilised as food.

Way Forward

- **Farmer Support:** MSP reforms, crop insurance, storage infra.
- **Year of Soy 2026:** Public awareness campaign.
- **Product Diversification:** Promote soy-based foods & nutraceuticals.
- **Collective Models:** FPOs (e.g., Latur) stabilise prices.
- **Processing Hubs:** Integrated grading, storage & processing units.



UPSC Relevance: **GS3 (Economy/Agriculture):** Oilseed security, import substitution. **Essay/GS2:** Nutrition and food policy challenges.



HOT Question: Soybean has remained the 'golden bean' of Indian agriculture but is stuck in stagnation. Critically evaluate its role in food security and farmers' income



13. Dairy Sector of India – Opportunities and Challenges



India's dairy sector, which sustains nearly **80 million rural households**, faces competitiveness challenges as the **US pushes for market liberalisation**, raising concerns about livelihoods and affordability.

Landscape of Indian Dairy

- **Largest Producer:** 239.3 million tonnes (2023–24), ~25% of global milk production.
- **Economic Weight:** Contributes ~3.5% of India's GDP.
- **Organised Share:** Only ~33% of milk surplus flows through organised channels.
- **Farmgate Prices:** Slightly below US & New Zealand, keeping exports competitive.

Socio-Economic Significance

- **Employment:** Supports 80 million households, mostly smallholders.
- **Farmer Benefits:** Cooperatives transfer 75%+ of consumer prices to farmers.
- **Women's Empowerment:** Enhances income, decision-making, and assets.
- **Nutrition:** Milk is key to tackling undernourishment (12% of Indians).

Structural Challenges

- **Low Productivity:** Cow yield ~1.64 tonnes annually vs much higher in West.
- **Rising Costs:** Declining family labour, high fodder shortages, and energy expenses.
- **Climate & Disease Stress:** Lumpy skin disease, heat stress reduce yields.
- **Scale Limitation:** 50+ million smallholders rear ~110 million animals, restricting economies of scale.
- **Technology Gap:** Limited automation compared to US-style mechanised dairy farms.

Way Forward

- **Genetic Upgrades:** AI, IVF, and sex-sorted semen under *Rashtriya Gokul Mission*.
- **Productivity Drive:** Breed improvement programs like Brazil's model.
- **Mechanisation:** Affordable chilling & milking technologies.
- **Health Safeguards:** NADCP + climate-resilient livestock housing.
- **FPOs & Cooperatives:** Build scale efficiency like New Zealand's mega-farm cooperatives.

Keywords: Rashtriya Gokul Mission, NADCP, Farmgate Price, Lumpy Skin Disease, FPOs.



UPSC Relevance: **GS3 – Economy & Agriculture:** Dairy as part of India's food security and export strategy. **GS2 – Governance:** Role of cooperatives in rural empowerment. Role of animal husbandry in doubling farmer incomes.



HOT Question: *The dairy sector is both an economic engine and a social safety net in rural India. Discuss the challenges and opportunities in making India's dairy sector globally competitive*



14. CBIC waives 11% import duty on cotton to support India's textile exports amid global competition.



The **Central Board of Indirect Taxes and Customs (CBIC)** has waived the **11% import duty on cotton**. The move is aimed at stabilising domestic prices, ensuring raw material availability, and improving competitiveness of India's **labour-intensive textile sector**, which faces falling exports to the U.S.

Objectives of the Waiver

- **Price Stabilisation:** Prevents raw cotton shortages and price volatility.
- **Export Boost:** Improves global competitiveness of Indian garments and textiles.
- **SME Protection:** Secures cotton supply for small and medium textile firms.
- **Labour Security:** Supports ~35 million workers directly dependent on the sector.

Rationale

- **U.S. Market Loss:** India's share of U.S. textile imports fell to **3.3% (June 2025)**, lagging behind **Vietnam and Bangladesh**.
- **Input Costs:** Import duties raised cotton costs, eroding India's cost advantage.
- **Global Trade Goals:** Duty waiver supports India's plan to **double textile exports to \$100 billion by 2030**.

About the Textile Sector

- Contributes **2% of India's GDP** and **7% of industrial output (2023)**.
- Accounts for **4% of global textile trade**.
- **Cotton dominance:** Makes up ~80% of India's textile exports.
- **Employment:** Provides livelihood to ~35 million people, one of the largest job-creating sectors after agriculture.



UPSC Relevance: **GS3 – Indian Economy:** Agriculture–industry linkages, export competitiveness. **GS2 – Governance & Policy:** Role of trade policy in protecting vulnerable sectors. **GS1 – Geography of Crops:** Cotton as a key kharif crop influencing industrial supply chains.



HOT Question: Discuss the significance of cotton in India's textile sector and evaluate the implications of waiving cotton import duty on domestic industry and exports.



15. India Bans Certain Jute Product Imports from Bangladesh



On **11th August 2025**, India banned the import of specific **jute products and ropes from Bangladesh** through all land ports, permitting entry only via the **Nhava Sheva Seaport** (Maharashtra).

About the Ban

- **Products Covered:** Bleached/unbleached woven jute fabrics, twine, cordage, ropes, jute sacks & bags.
- **Notification:** Issued by the **Directorate General of Foreign Trade (DGFT)**.
- **Restriction:** Imports via land routes barred; only Nhava Sheva Seaport allowed.
- **Previous Curbs:** June 2025 restrictions on flax tow, jute yarn, and woven fabrics; earlier (Apr–May 2025) curbs on garments, processed foods, and transshipment facilities.

Economic & Political Context

- **Bilateral Trade:** USD 12.9 billion in 2023–24.
- **Competition:** Bangladesh is a strong competitor in textiles and jute products.
- **Diplomatic Strain:** Triggered by remarks from Bangladesh's interim leader Muhammad Yunus in China and concerns over minority attacks in Bangladesh.
- **Domestic Protection:** Aims to safeguard India's jute sector (notably West Bengal, Bihar, Assam).

Keywords: DGFT, Nhava Sheva, Trade Restrictions, India–Bangladesh Relations, Jute Industry.



UPSC Relevance: **GS2 (IR):** India–Bangladesh relations, trade diplomacy. **GS3 (Economy):** Protectionism, trade restrictions, MSMEs and agro-based industries. **Prelims:** DGFT functions, Nhava Sheva port location, India's jute-producing states



HOT Question: India's recurring restrictions on jute imports from Bangladesh reflect both economic protectionism and diplomatic signalling. Critically analyse



16. US Slaps 50% Tariff on Indian Imports, Citing Russia-Linked Trade Concerns



The **United States** invoked emergency trade powers to impose a **50% punitive tariff on Indian imports**, citing **Russia-related sanctions evasion, BRICS alignment, and a rising US trade deficit**.

About the Tariff Hike:

- US tariffs on India doubled to **50%**, with a **25% ad valorem surcharge**.
- Invoked **WTO Article XXI (security clause)** and **US emergency trade statutes**.
- India gets **21-day negotiation window** for settlement.
- India now faces the **highest US tariff** globally (vs. China 30%, Pakistan 19%).
- Exemptions: ~50% of Indian exports (esp. **pharma, electronics**) remain duty-free.

Impacts on India:

- **Competitiveness loss** → Indian goods costlier in US vs. rivals.
- **Forex stress** → weaker exports may widen CAD, reduce forex inflows.
- **Diplomatic strain** → may delay defence/strategic engagements.
- **Investment risk** → tariff unpredictability discourages FDI.
- **Input inflation** → higher duty on intermediate goods raises sectoral costs.

Strategic Openings:

- **Supply-chain shifts** → potential to integrate India in new value chains.
- **Reform push** → external shock may fast-track ease-of-doing-business reforms.
- **Geopolitical leverage** → India gains bargaining autonomy in multipolar order.
- **Make-in-India boost** → tariffs incentivise domestic value addition.
- **Service diplomacy** → new space for negotiations in IT, digital trade, cross-border mobility..



UPSC Relevance : Prelims: US invoked **WTO Article XXI (security clause)**. India's tariff rate now **highest among US trade partners**. *Ad valorem duty* = tax based on value of goods.



HOT Question: The US tariff shock on Indian imports reflects the growing fusion of geopolitics and trade." Analyse its implications for India's economy and foreign policy. (150 words)



17. Agriculture Disputes Stall India–US Trade Talks Amid Tariff Escalation



India–US trade negotiations have stalled over **agricultural market access**, with the US imposing a **50% tariff** on select Indian exports, intensifying trade tensions.

Key Disputes:

- **GM Imports** → US seeks access for **GM soybean & maize**, but India bans GM food crops citing biosafety and farmer concerns.
- **Biofuels** → US ethanol & maize imports risk **depressing domestic crop prices**.
- **Dairy Imports** → Strong resistance from Indian farmers against US milk powder, butter oil & cheese imports; India retains **high tariffs & non-tariff barriers**.
- **Fisheries** → US imposed **50% tariff** on Indian seafood (India's seafood exports grew **32.5% in early 2025**).

Implications:

- **Export Hit** → India's seafood sector most vulnerable.
- **Farmer Concerns** → Domestic agriculture prices may crash if imports liberalised.
- **Negotiation Strain** → Stalemate may delay broader trade pact and reduce goodwill.
- **Geopolitical Risk** → Adds friction to India–US strategic partnership despite defence/tech alignment.



UPSC Relevance: Prelims: India bans commercial cultivation/import of GM soybean & maize. India maintains **high tariffs** on dairy imports to protect farmers. Seafood = major export commodity to the US. **Mains:** Trade–agriculture conflicts as **barriers in India's FTA negotiations**.



HOT Question: Agriculture remains the most sensitive and contentious issue in India's trade negotiations. Analyse in the context of the stalled India–US trade talks. (150 words)



18. India Weighs Oil Import Diversification as Russian Discounts Narrow and U.S. Tariff Pressures Rise



Russia's crude oil discount to India has fallen from **\$8–10/barrel to \$2–3/barrel**, while U.S. tariff actions intensify, underscoring the urgency for **strategic diversification of India's oil imports**.

India's Current Oil Import Profile:

- **Import dependence:** ~90% of crude needs.
- **Supplier spread:** Russia (~35%), Iraq (~20%), Saudi Arabia (~15%), U.S. (~8%), Brazil & Nigeria (~7%).
- **Sanctioned suppliers:** Iran & Venezuela negligible due to U.S. sanctions.
- **OPEC's share:** Now <50%, reflecting gradual diversification.

Why Diversify?

- **Energy security** → reduces reliance on geopolitically sensitive suppliers.
- **Economic leverage** → strengthens India's bargaining power on pricing.
- **Refinery optimisation** → multiple crude grades enhance product variety & margins.
- **Sanction-proofing** → limits disruption from compliance risks.
- **Price hedging** → reduces volatility in fiscal planning.

Challenges:

- **Higher costs** from distant suppliers (freight, insurance).
- **Refinery mismatch** with some crude grades.
- **Logistics bottlenecks** → limited tanker fleet, port capacity.
- **Geopolitical overexposure** to multiple volatile regions.
- **Fiscal pressure** from increased import bills.

Way Forward:

- **Supplier share caps** → prevent overdependence on any one country.
- **Refinery tech upgrades** for flexible multi-grade processing.
- **Diplomatic outreach** → deepen ties with Latin America, West Africa, ASEAN.
- **Contract innovation** → long-term flexible contracts for volume & price stability.
- **Infrastructure boost** → expand SPRs (strategic petroleum reserves), tanker fleet & port capacity.



UPSC Relevance: Prelims: India imports ~90% of crude needs. Top suppliers = Russia, Iraq, Saudi Arabia. OPEC's share <50% in India's crude basket.
Mains: Link crude diversification to **energy security & foreign policy**



HOT Question: "Crude oil import diversification is no longer just an economic need but a strategic imperative for India's energy security. Discuss." (150 words)



19. Cabinet Approves Railway Multitracking Projects Worth ₹11,169 Crore



On **31st July 2025**, the Cabinet Committee on Economic Affairs (CCEA) approved four multitracking projects covering **574 km across six states**, aimed at boosting freight, passenger capacity, and regional connectivity under the PM Gati Shakti framework.

Project Scope & Corridors

- **Length:** 574 km across 13 districts in Maharashtra, Madhya Pradesh, West Bengal, Bihar, Odisha, and Jharkhand.
- **Key Corridors:**
 - Fourth line between *Itarsi – Nagpur*.
 - Doubling of *Aurangabad (Chhatrapati Sambhajinagar) – Parbhani*.
 - Third & fourth lines on *Aluabari Road – New Jalpaiguri*.
 - Third & fourth lines on *Dangoaposi – Jaroli*.

Strategic Framework

- Part of **PM Gati Shakti National Master Plan** for integrated, multi-modal connectivity.
- Supports freight corridors, industrial hubs, and mining belts in eastern and central India.

Economic Impact

- Additional **95.91 million tonnes of freight annually**.
- Reduces logistics costs, improves supply-chain reliability, and decongests busy passenger routes.

Employment Generation

- Estimated **2.29 crore person-days** of direct employment during construction.

Beneficiaries

- Direct impact on **2,309 villages and 43.6 lakh people**, through better passenger facilities, faster freight movement, and regional economic growth.

Keywords: PM Gati Shakti, Freight Corridors, Multi-tracking, Integrated Infrastructure, Logistics Costs.



UPSC Relevance: **GS3 – Economy & Infrastructure:** Transport-led growth, logistics efficiency. **GS2 – Governance:** PM Gati Shakti as a whole-of-government approach. **Essay:** Infrastructure as a growth multiplier.



HOT Question: “Railway multitracking projects under PM Gati Shakti are more than transport upgrades; they are economic multipliers. Discuss.”



20. Union Cabinet approves 6-lane Bhubaneswar Bypass Project under HAM model



The Union Cabinet cleared a ₹ project for a **6-lane, 110 km Bhubaneswar Bypass (Greenfield Capital Region Ring Road)** to decongest NH-16 and improve multi-modal connectivity in Odisha.

About the Project

- **Mode:** Hybrid Annuity Model (HAM) – 40% govt. funding, 60% private recovery.
- **Route:** Connects **Rameshwaram to Tangi**, bypassing Bhubaneswar city.
- **Integration:** Links **NH-16, NH-55, NH-57, NH-655, SH-65**, airport, railway, SEZ, MMLP, and Puri/Astrang ports.
- **Official Name:** *Greenfield Capital Region Ring Road*.

Significance

- **Decongestion:** Reduces traffic load on NH-16 (Kolkata–Chennai corridor).
- **Freight Efficiency:** Cuts logistics costs, enhancing industrial competitiveness.
- **Regional Development:** Boosts SEZ, mining, and industrial clusters in Odisha.
- **Multi-modal Connectivity:** Links road, rail, port, and airport networks.
- **Socio-economic Impact:** Improves rural–urban linkages, job creation, and access to markets.

Key Highways Involved

- **NH-16:** Part of Golden Quadrilateral; links Kolkata–Chennai.
- **NH-55:** Sambalpur–Cuttack (east–west corridor in Odisha).
- **NH-57:** Khagaria (Bihar) to Silchar (Assam), crossing Bengal & NE.
- **NH-655:** Industrial/mining belt connector in Odisha.

Hybrid Annuity Model (HAM)

- A **PPP model** combining EPC (Engineering, Procurement, Construction) and BOT (Build, Operate, Transfer).
- **40%** cost borne by government, paid in milestones.
- **60%** recovered by private player via annuity payments, not tolls.
- Reduces private investor risk, ensures timely project delivery.



UPSC Relevance: **GS3 (Infrastructure/Economy):** Roads, logistics, PPP models, regional development. **GS2 (Governance):** Centre–state coordination in infrastructure.



HOT Question: Discuss how infrastructure projects such as the Bhubaneswar Bypass under the Hybrid Annuity Model can balance private participation with public welfare. How do such projects contribute to India's logistics efficiency and economic growth?"



21. Parliament Passes Merchant Shipping Bill, 2024, and Carriage of Goods by Sea Bill, 2025 to Modernise Maritime Law



Parliament passed two **landmark maritime legislations** — the **Merchant Shipping Bill, 2024** and the **Carriage of Goods by Sea Bill, 2025** — replacing colonial-era laws to align with **global shipping standards** and boost India's **maritime economy**.

Background:

- Replaces **Merchant Shipping Act, 1958** & **Carriage of Goods by Sea Act, 1925**.
- Needed as older laws were **partially aligned** with IMO conventions and global practices.

Merchant Shipping Bill, 2024:

- Aligns with **IMO conventions** → safety, emergency response, environmental protection.
- Promotes **ease of doing business** → simplified compliance, investor-friendly.
- Strengthens **seafarer welfare & ship safety** → better rights and working conditions.

Carriage of Goods by Sea Bill, 2025:

- Adopts **Hague-Visby Rules** (global cargo liability standards).
- Simplifies cargo regulations → reduces litigation.
- Promotes **transparency & contract standardisation** in maritime trade.

Significance for India:

- Trade Competitiveness:** Enhances India's reputation as a **trusted maritime hub**.
- Economic Gains:** With **90%+ trade by sea**, lowers transaction costs; supports **Maritime India Vision 2030** & **Blue Economy strategy**.
- Environment & Safety:** Stronger rules for **pollution control & SDG-14 alignment**.
- Geopolitical Role:** Advances India's **SAGAR vision** & Indo-Pacific maritime governance leadership.



UPSC Relevance: Prelims: New laws replace 1958 & 1925 Acts. Carriage of Goods by Sea Bill aligns with **Hague-Visby Rules**. Over **90% of India's trade by volume** moves by sea. Mains: Maritime law reform for **global competitiveness & Blue Economy**



HOT Question: Modernisation of maritime law is central to India's economic growth and Indo-Pacific role." Examine in the context of the Merchant Shipping Bill, 2024, and Carriage of Goods by Sea Bill, 2025.



22. TRAI's Manual for Rating Properties on Digital Connectivity



On **13th August 2025**, the **Telecom Regulatory Authority of India (TRAI)** released India's first **Manual for Rating Properties for Digital Connectivity**, setting a framework to assess how well buildings support reliable high-speed digital access.

About the Manual

- Issued under the **Rating of Properties for Digital Connectivity Regulations, 2024**.
- Provides methodology for **Digital Connectivity Rating Agencies (DCRAs)**.
- Serves as a guide for property managers, service providers, and buyers/tenants.

Context

- **Indoor Usage:** >80% of India's mobile data is consumed indoors.
- **Challenge:** 4G & 5G signals weaken due to modern building materials → poor user experience.

Assessment Criteria

- Fibre readiness & broadband speed.
- In-building mobile coverage.
- Wi-Fi availability & reliability.
- User experience benchmarks.

Significance

- **For Consumers:** Enables informed choice of property based on digital readiness.
- **For Developers:** Encourages integration of strong digital infra during design phase.
- **For Economy:** Boosts **Digital India**, smart cities, and workplace productivity.
- **For Governance:** Creates transparent and credible benchmarks.

Keywords: TRAI, Digital Connectivity Rating, DCRA, Fibre readiness, 5G penetration.



UPSC Relevance: **GS2:** E-Governance, service delivery through digital infrastructure. **GS3:** Infrastructure, ICT, Digital India, Urban development. **Prelims:** Role of TRAI, regulations under the TRAI Act, 1997.



HOT Question: *Digital connectivity is emerging as a basic infrastructure need like water and electricity. Discuss the significance of TRAI's property rating framework in bridging India's digital divide*



23. PM E-DRIVE Scheme Extended Until 2027-28 Amid Low Fund Utilisation



The Government extended the **PM Electric Drive (E-DRIVE) Scheme** by **two years** (till 2027-28) due to underutilised funds, though **subsidies for electric two- and three-wheelers** will end after 2025-26.

About PM E-DRIVE:

- Launched: **2024-26** by **Ministry of Heavy Industries**.
- Type: **Centrally Sponsored Scheme**.
- Aim: Promote **electric vehicle adoption** & build **charging infrastructure**.

Key Provisions:

- Incentives for **electric 2W & 3W** → valid only till FY 2025-26.
- **Charging Infra Expansion** → will continue till FY 2027-28.
- Financial support for EV buyers + public charging stations.

Extension Rationale:

- Significant portion of allocated funds remains unutilised.
- EV infrastructure roll-out slower than expected.



UPSC Relevance: **Prelims:** PM E-DRIVE = Centrally Sponsored Scheme under **Ministry of Heavy Industries**. Covers EV adoption + charging infra. **Mains:** Role of EV adoption in India's Net Zero 2070 target.



HOT Question: Discuss the role of government incentive schemes like PM E-DRIVE in accelerating India's electric mobility transition. What challenges hinder their effective implementation?



24. India Adopts Multi-Pronged Measures to Overcome Ethanol Blending Challenges



On **World Biofuels Day 2025**, the Government reaffirmed ethanol's role in reducing import dependence and emissions, while addressing challenges such as **food security, water use, vehicle wear, and efficiency loss** highlighted in NITI Aayog's **E20 roadmap (2021)**.

A. Measures to Reduce Food–Fuel Conflict

- **Molasses Use** → B-heavy & C-heavy molasses replace direct sugarcane juice for ethanol.
- **Surplus Grains** → Broken rice, damaged foodgrains diverted for ethanol production.
- **2G Biofuels** → Assam bamboo-to-ethanol plant operational; start-ups testing seaweed-based ethanol.
- **Alternate Crops** → Trials with maize, sorghum, sweet potato as future feedstocks.
- **Policy Shift** → Diverting surplus sugar to ethanol rather than exports; stable farmer incomes.
- **Research Push** → National Bio-Energy Programme incentivises non-food biofuel R&D.

B. Measures to Reduce Vehicle Wear & Improve Efficiency

- **E100 Access** → Over 400 retail pumps supply pure ethanol; flex-fuel pilots underway.
- **Fleet Transition** → **E20-compatible vehicles from 2025**, phasing out older models.
- **Hybrid Flex-Fuel Models** → Plug-in hybrids promoted to balance efficiency and emissions.
- **Pricing Signals** → Differential pricing to offset ethanol's lower calorific value.
- **CBG Integration** → Target: **4% CBG in CNG mix by 2030**.
- **Green Aviation** → Panipat refinery producing **Sustainable Aviation Fuel (SAF)** from used cooking oil.



UPSC Relevance: Prelims: B-heavy & C-heavy molasses = sugar by-products used in ethanol. E100 = pure ethanol; CBG = renewable substitute for CNG. Mains: Ethanol blending → link with **energy security, farmer welfare, food-water-energy nexus**.



HOT Question: Ethanol blending in India faces challenges of food security, efficiency loss, and vehicle compatibility. Examine the recent measures adopted to overcome these challenges



25. India releases draft Climate Finance Taxonomy to curb greenwashing and mobilise climate-aligned investments.



The Ministry of Finance released India's **draft Climate Finance Taxonomy**, a framework to classify sustainable investments. Its success depends on a **structured review system** ensuring credibility and alignment with global norms.

About India's Climate Finance Taxonomy

- A **classification framework** labelling economic activities as *sustainable* to guide climate investments.
- Objective: **mobilise finance**, curb **greenwashing**, and build **investor confidence**.
- "Living Document" → evolves with India's **Net Zero (2070) & Viksit Bharat (2047)** goals.

Need for the Taxonomy

- **Global Parity**: EU, China, and other economies already adopted taxonomies → India lagged.
- **FDI Gap**: Climate finance accounts for just **3% of FDI inflows**.
- **Greenwashing Risk**: Unverified "green claims" misallocated funds, hurting trust.
- **Goal Alignment**: Mobilises **private finance** for Net Zero transition.
- **Inclusive Finance**: Ensures **MSMEs & vulnerable groups** are not excluded.

Review Framework for Success

- **Paris Agreement Link**: Review mechanism under **Article 6.4** to align globally.
- **Dual Structure**:
 - **Annual Reviews** → address gaps, consult stakeholders.
 - **Five-Year Revisions** → align with **NDC cycles & UNFCCC global stocktake**.
- **Legal Coherence**: Must align with **Energy Conservation Act**, SEBI norms, carbon-credit rules.
- **Accountability**: Standing expert committee in **Department of Economic Affairs (DEA)** + **public dashboards** for review reports.



UPSC Relevance: GS3 (Environment): Climate finance, green investments, sustainable development. **GS2 (Governance)**: Regulatory frameworks, investor confidence. **Essay**: Green growth & India's Net Zero transition



HOT Question: India's draft Climate Finance Taxonomy seeks to mobilise green investments while curbing greenwashing. Critically evaluate its role in meeting India's Net Zero and sustainable finance goals.



26. Parliament Passes MMDR Amendment Bill 2025 to Reform Mining and Critical Mineral Security



The Mines and Minerals (Development & Regulation) Amendment Bill, 2025 was passed by Parliament to reform the mining sector, expand critical mineral access, and enhance India's resource security.

Key Provisions of the Bill

- **Expansion of Leases:** Leaseholders may add critical/strategic minerals to existing leases *without additional premium*.
- **Captive Mines Reform:** Previous cap of 50% on sale removed; now **100% commercial sale** of minerals permitted.
- **Mineral Exchanges:** Establishes an authority for **registration & regulation of mineral exchanges**, enhancing transparency.

National Critical Mineral Mission

- **Launch:** January 2025 with ₹32,000 crore corpus.
- **Coverage:** 24 **critical minerals** (e.g., lithium, cobalt, rare earths) vital for **EVs, renewable energy, electronics, defence**.
- **Global Engagement:** PSU **KABIL (Khanij Bidesh India Ltd.)** exploring in Zambia, Argentina, and Australia.

Significance

- **Strategic Security:** Reduces dependence on China-dominated global supply chains.
- **Green Growth:** Supports India's **EV adoption, solar & wind targets, and net-zero goals**.
- **Economic Impact:** Attracts FDI, boosts exploration, and generates jobs in mining value chain.
- **Global Strategy:** Deepens resource partnerships in **Africa, Latin America, and Australia**.



UPSC Relevance: **GS3 (Economy, Resources):** Natural resource management, critical mineral strategy, mining reforms. **GS2 (Governance):** Role of legislation in resource regulation and economic growth.



HOT Question: India's dependence on critical minerals poses both economic and strategic vulnerabilities. Discuss how the MMDR Amendment Bill, 2025 and the National Critical Mineral Mission can transform India's green economy and strategic autonomy.



27. India's first indigenously made semiconductor chip.



India's first indigenously made semiconductor chip, set for launch by end-2025, marks a structured entry into the Fourth Industrial Revolution (Industry 4.0).

About the Fourth Industrial Revolution (4IR)

- **Definition:** WEF → *Fusion of physical, digital, and biological domains.*
- **Key Drivers:** AI, IoT, robotics, quantum tech, big data, cyber-physical systems.
- **Semiconductors:** The backbone enabling automation, connectivity, and computation.
- **Global Impact:** PwC → Projected **\$15 trillion GDP effect**, reshaping competitiveness.

India's Competitive Advantages

- **Demographic Dividend:** 65% of population <35 years → potential workforce edge.
- **Digital Scale:** 900+ million internet users → fastest adoption of emerging tech.
- **Design Strength:** India = 20% of global chip design workforce.
- **Startup Base:** 1.6 lakh DPIIT-recognised startups → AI, robotics breakthroughs.
- **Strategic Leverage:** Quad tech cooperation boosts semiconductor supply chain resilience.

⚠ Structural Constraints

- **Infra Gap:** No 300-mm fabs → reliance on imports.
- **Skill Shortage:** 1 million AI talent shortfall projected by 2026.
- **Import Dependence:** >90% chips imported → supply chain vulnerabilities.
- **Regulatory Lag:** DPDP Act 2023 lacks AI-ethics framework.
- **Inequality Risk:** WB → 69% Indian jobs vulnerable to automation.

🏛 Government Interventions

- **Indian Semiconductor Mission (2021)** – strengthens ecosystem.
- **PLI Scheme** – incentivises electronics & chip manufacturing.
- **Digital India (2015)** – expands digital infrastructure.
- **PMKVY 4.0** – AI & robotics training.
- **National Quantum Mission (₹6,000 cr)** – quantum research boost.
- **Atal Innovation Mission (AIM)** – supports R&D and incubation.
- **National AI Portal** – awareness & knowledge dissemination.



UPSC Relevance: GS3 Economy: Industry 4.0 and jobs. GS3 S&T:

Semiconductor mission, AI, quantum computing. **Essay:** “Technological revolutions and inclusive growth in India.”



HOT Question India's planned launch of an indigenous semiconductor chip by end-2025 is seen as a gateway to Industry 4.0. Critically examine India's readiness for the Fourth Industrial Revolution with reference to semiconductor capacity, skilling, data governance, and MSME adoption. In your answer, discuss key trade-offs (growth vs. jobs, openness vs. sovereignty) and propose a phased roadmap (design → OSAT → fab, regulation, and global alliances) to ensure inclusive, resilient transformation.

28. Transforming India into a Product Nation



Rising trade conflicts and tariff pressures highlight India's vulnerability as an assembly-based economy, strengthening the push to become a *Product Nation*—manufacturing and exporting high-value, IP-driven goods.

Definition: A *Product Nation* refers to an economy that captures value by innovating, designing, and exporting high-tech, IP-intensive products (chips, EVs, advanced machinery), rather than relying on low-margin assembly.

Context:

- Taiwan's chip monopoly shows how chokepoint products enhance geopolitical leverage.
- China's rare-earth control secures global dependence.
- India's export basket remains dominated by substitutable goods (textiles, primary commodities).

Significance:

- **Strategic Power:** IP-led production strengthens national security.
- **Value Capture:** 70% smartphone profits come from branding/design, not assembly.
- **Jobs:** Semiconductor fabs & allied industries create high-skill employment.
- **Export Resilience:** Reduces vulnerability to tariff wars.

Challenges:

- **Design Deficit:** India has 20% of global chip designers but <10% fabs.
- **High Logistics Costs:** ~8–9% of GDP vs 4–5% in developed economies.
- **Standards:** Non-compliance with BIS norms hurts credibility.
- **Skill Gap:** NSDC projects 29 million-worker shortfall in advanced manufacturing/AI.

Keywords: IP-driven exports, chokepoint products, DLI Scheme, Semicon India, Industry 4.0, logistics cost, skill deficit.



UPSC Relevance: **GS3 (Economy | Industry):** Manufacturing, Atmanirbhar Bharat, Innovation ecosystems. **GS2 (Governance):** Role of policy reforms, regulatory standards, and skilling initiatives.



HOT Question: India's export basket remains dominated by substitutable goods. Critically analyse the need to transform India into a "Product Nation," and suggest policy interventions to overcome design, logistics, and skill bottlenecks.

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29. IPPB Introduces Aadhaar-Based Face Authentication Nationwide



On **1st August 2025**, the **India Post Payments Bank (IPPB)** rolled out **Aadhaar-based face authentication** across India, aimed at simplifying and securing banking services, especially for the elderly and differently-abled who face challenges with fingerprints or OTP-based verification.

About the Initiative

- **Technology:** Developed under **UIDAI's framework**, uses **facial recognition** for verification.
- **Coverage:** Enables services like account opening, balance inquiry, fund transfer, utility bill payments.
- **Inclusivity:** Removes dependency on fingerprints/OTPs, benefiting elderly & people with limited digital access.
- **Safety:** Contactless method is safer during health crises (e.g., pandemics).

About IPPB

- Established: **2018**, under the **Department of Posts**.
- Network: **1.65 lakh post offices, 3 lakh+ postal employees**.
- Reach: Covers **5.57 lakh villages**, serving **11 crore+ customers**.

Alignment with Government Missions

- **Digital India:** Promotes tech-driven citizen services.
- **Financial Inclusion:** Bridges the urban-rural banking divide.
- **Ease of Living:** Simplifies last-mile service delivery.

Keywords: Aadhaar, UIDAI, IPPB, face authentication, financial inclusion.



UPSC Relevance: **GS3 – Economy:** Financial inclusion, digital banking innovations. **GS2 – Governance:** Aadhaar-enabled service delivery. **Prelims:** Facts on IPPB establishment, UIDAI role, Aadhaar-based innovations.



HOT Question: *Aadhaar-enabled innovations like face authentication are crucial to India's financial inclusion journey but raise concerns of privacy and surveillance. Critically examine.*

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30. Finance Ministry Flags Low PMLA Convictions, Rising Money Laundering Risks in India



A Finance Ministry report to the **Rajya Sabha** highlighted the **rising number of money laundering cases**, the **low conviction rate under PMLA**, and concerns of **ED overreach and misuse of powers**.

Recent Data:

- **5,892 cases registered** since 2015 → only **15 convictions**.
- **3,985 searches conducted**, assets worth **₹1.5 lakh crore attached**.
- **1.2 lakh shell firms** struck off under Companies Act violations.

What is Money Laundering?

- Concealing illegal money origins through **layered transactions**.
- **Stages**: Placement → Layering → Integration.
- **Tools**: Shell firms, real estate, trade misinvoicing, digital assets.

Legal Framework:

- **PMLA, 2002** – defines laundering (Sec. 3), prescribes **3–7 years' imprisonment + fines (Sec. 4)**.
- **Enforcement**: ED & FIU-IND.
- **Trigger**: Enforcement Case Information Report (ECIR) can be filed without FIR.

Challenges:

- **Scope creep** → inclusion of minor offences dilutes focus.
- **Bail inversion (Sec. 45)** → burden of proof on accused.
- **ED overreach** → misuse of arrest, search, seizure powers.
- **Federal strain** → ED bypasses state approval.
- **Low conviction rate** undermines credibility.

International Cooperation:

- **FATF compliance** – India meets all 40 AML recommendations.
- **Treaties**: 85+ DTAA's, UNTOC, Vienna Convention.
- **FIU–Egmont Group** → intelligence sharing.

Government Measures:

- PMLA amendments → conspiracy, intermediaries, NGOs covered.
- **Digital KYC** (Aadhaar-based); **AI red-flag tools**.
- **Benami Act enforcement**.
- **Data integration** with PAN, Aadhaar, GSTN.
- Expanded reporting → jewellery dealers, real estate agents, NGOs.



UPSC Relevance: Prelims: PMLA 2002, Sec. 3 & 4. Stages of money laundering. Institutions: ED, FIU-IND, FATF, Egmont Group. Mains: Critically analyse India's AML enforcement gaps. Impact of ED powers on federalism & civil liberties.



HOT Question: “Despite strong laws, India struggles with low conviction rates and enforcement overreach in money laundering cases.” Critically analyse with reference to PMLA. (150 words)



31. SC Admits Appeals in Google–Android Antitrust Case After NCLAT’s Mixed Ruling



The **Supreme Court** admitted **cross-appeals** against the **NCLAT’s March–May 2025 judgments**, which partly upheld the **Competition Commission of India’s (CCI)** findings of **Google’s abuse of dominance** in the Android ecosystem.

About the Institutions

- **CCI:** Statutory body under the **Competition Act, 2002**; mandate – prevent abuse of dominance, ensure consumer welfare.
- **NCLAT:** Quasi-judicial appellate body; hears appeals against CCI orders before they reach SC.

CCI’s Key Findings (2020–2022 Investigation)

- **Play Billing Mandate:** Google forced app developers to use **Google Play Billing System (GPBS)** → declared **anti-competitive**.
- **Self-Preferencing:** Exempted **YouTube** from billing rules, creating an **unfair cost advantage**.
- **App Bundling:** Android licensing tied to **mandatory pre-installation** of Google apps to access Play Store → reduced competition.

NCLAT Rulings (2025)

- **March 2025:**
 - Upheld **abuse of dominance** charges.
 - Reduced penalty imposed by CCI.
 - Narrowed behavioural remedies, striking down provisions deemed **too broad**.
- **May 2025:**
 - Ordered **transparency in billing data policies**.
 - Barred Google from **using billing data** to advantage its own apps.



UPSC Relevance: Prelims: Role of **CCI & NCLAT**. Competition Act, 2002 provisions on **abuse of dominance**. Mains: Digital economy regulation in India. Balancing **innovation vs. competition law enforcement**.



HOT Question: Discuss the significance of the Google–Android antitrust case in shaping India’s digital market regulation. How does it balance consumer interest, developer autonomy, and innovation?” (150 words)



32. Union Cabinet clears Online Gaming Bill 2025 banning money-based games, ensuring safe digital play.



The **Promotion and Regulation of Online Gaming Bill, 2025** was approved by the Union Cabinet to regulate money-based online games and curb rising risks of addiction, fraud, and financial exploitation.

About the Bill

Definition: A money game involves paying stakes (skill, chance, or both) for monetary returns.

Exemptions: eSports & casual online games are excluded.

Objectives: Address compulsive gaming, financial harm, and consumer protection.

Prohibitions: Bans offering, advertising, promoting, or transferring funds for money-based games.

Punishment: Up to **3 years' imprisonment or ₹1 crore fine**.

Focus: Players exempted; penalties on promoters and enablers.

Authority: New regulatory body to decide if a game qualifies as money-based.

Search Powers: Officials may conduct **warrantless searches** in physical & virtual spaces.

Framework: Creates India's first *national-level regulatory system*, ending fragmented state laws.

Significance

Public Protection: Prevents gambling-like addictions, youth debt traps, & mental health crises.

Digital Economy: Encourages **skill-based & eSports growth** while restricting harmful sectors.

Investor Confidence: Clear national rules attract global gaming & tech investment.

Regulatory Clarity: Brings uniformity across states, easing compliance for start-ups.

Global Benchmark: Positions India as a leader in *responsible digital innovation*.



UPSC Relevance: **GS2 (Governance):** Regulation of digital platforms, consumer protection. **GS3 (Economy, S&T):** Digital economy regulation, cybersecurity, innovation policy.



HOT Question: "Online money-based gaming is both an opportunity and a threat in India's digital economy. Critically analyse how regulation can balance innovation with public interest."



33. Parliamentary panel seeks action plan to address uneven industrial distribution across Indian states.



The **Standing Committee on Finance** recommended reforms and incentives to promote **balanced industrial distribution**, warning that excessive concentration in a few states risks widening regional inequalities.

Current Landscape of Industrial Distribution

- **Output Skew:** Just five states contribute **53% of manufacturing GVA** and national industrial jobs.
- **Clustering:** Tamil Nadu dominates in factory numbers; Bihar remains industrially weak.
- **Regional Divide:** Gujarat, Uttarakhand, and Himachal thrive, while northern and eastern states lag.

Reasons for Uneven Industrial Growth

- **Historical Legacy:** Colonial-era concentration in Bengal & Maharashtra created enduring imbalances.
- **Geographical Barriers:** Himalayan terrain & Northeast isolation limit large-scale industrialisation.
- **Infrastructure Deficits:** Power shortages, weak transport, & logistics constraints in eastern India.
- **Policy Disparities:** Green Revolution favoured Punjab & Haryana, widening inter-state gaps.
- **Skill Imbalance:** R&D hubs and engineering talent remain concentrated in southern states.

Committee's Recommendations

- **PSE Policy:** Privatisation/closure of loss-making PSUs in non-strategic sectors.
- **State Incentives:** Revise central fund incentives for states pursuing PSU reforms.
- **Investment Rate:** Raise national investment to **35% of GDP** to sustain 8% growth.

Way Forward

- **Cooperative Reform:** Centre-State coordination with reform-linked incentives.
- **PM GatiShakti:** Upgrade logistics & connectivity in underdeveloped regions.
- **Cluster Expansion:** Create plug-and-play EV, electronics, & pharma parks in lagging states.
- **Energy Security:** Expand pumped storage & reliable electricity grids for industry.



UPSC Relevance: **GS3 (Economy):** Industrial policy, regional disparities, growth strategies. **GS2 (Governance):** Federal cooperation & Centre-State coordination.
Essay: "Balanced regional development is key to inclusive growth."



HOT Question: *Uneven industrial distribution in India is a legacy of history but reinforced by policy and infrastructure gaps. Critically examine how India can balance industrial growth while ensuring equity among states*

34. Cabinet Approves ₹2,000 Crore Grant-in-Aid Scheme for NCDC (2025–29)



The Union Cabinet approved a **Central Sector Scheme** (FY 2025–26 to 2028–29) providing **₹2,000 crore grant-in-aid** to the **National Cooperative Development Corporation (NCDC)** to expand credit support for cooperatives.

Scheme Details:

- Outlay: ₹2,000 crore → ₹500 crore annually from GoI budget.
- Multiplier: Enables NCDC to mobilize **₹20,000 crore** from the open market.
- Purpose: Provide **long-term loans** (new projects, modernization, technology upgradation) & **working capital loans** for cooperative operations.
- Executing Agency: **NCDC** (loan disbursement, monitoring, recovery).

About NCDC:

- Established: **1963**, statutory corporation.
- HQ: New Delhi.
- Ministry: **Ministry of Cooperation**.
- Mandate: Promote cooperative programmes in **production, processing, marketing, storage, export/import** of agriculture, livestock, and allied sectors.

Significance:

- Strengthens financial capacity of cooperatives.
- Encourages modernization & competitiveness of rural/agri-cooperatives.
- Aligns with GoI's **vision of "Sahakar se Samridhi"** (prosperity through cooperation).



UPSC Relevance: Prelims: NCDC → statutory body (1963), under Ministry of Cooperation. Central Sector Scheme → 100% funded by GoI. Outlay = ₹2,000 crore (2025–29). Mains: Role of cooperatives in rural development & financial inclusion.



HOT Question: Evaluate the significance of the Grant-in-Aid Scheme (2025–29) for NCDC in strengthening India's cooperative sector. How does it align with the vision of "Sahakar se Samridhi"? (150 words)



35. India Celebrates 11th National Handloom Day to Honour Weavers and Promote Indigenous Textiles



On **7th August 2025**, the **Ministry of Textiles** celebrated the **11th National Handloom Day**, presenting **National Weaver Awards**, inaugurating an **Exclusive Handloom Expo** and “**Haat on Wheels**” at Handloom Haat, New Delhi.

- **Historical Significance:**

- Celebrated on **7th August** since **2015**, marking the launch of the **Swadeshi Movement (1905)**, which promoted **indigenous industry and handlooms** against colonial imports.

- **Cultural Heritage:**

- World-renowned Indian handloom products include **Banarasi, Pochampally, and Kanchipuram sarees**.
- Reflects India's **craft traditions, regional identity, and soft power**.

- **Economic Role:**

- **Second-largest employment sector after agriculture**.
- Provides livelihoods to over **35 lakh people, 70% women**.
- Acts as a **pillar of rural economy & women empowerment**.

- **Recent Initiatives (2025):**

- **Exclusive Handloom Expo** – platform for weavers to showcase products.
- **Haat on Wheels** – mobile marketing initiative to widen consumer outreach.



UPSC Relevance: Prelims: National Handloom Day = **7th August**, linked to **Swadeshi Movement 1905**. Handloom sector = **second-largest employer** after agriculture. Mains: Handloom sector in **inclusive growth & women empowerment**.



HOT Question: “The handloom sector reflects India’s cultural identity as well as its economic resilience.” Discuss with reference to the celebration of National Handloom Day. (150 words)



36. Restructuring and Extension of PM SVANidhi Scheme Approved



On **27th August 2025**, the Union Cabinet approved the **restructuring and extension** of the **Prime Minister Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi)** scheme till **31st March 2030**, with a total outlay of **₹7,332 crore**.

About PM SVANidhi Scheme (Launched 2020):

- Provides **collateral-free working capital loans** to street vendors to recover from COVID-19 impact.
- Implemented by **Ministry of Housing & Urban Affairs (MoHUA)** in collaboration with **Department of Financial Services**.

Key Features of Restructured Scheme:

- **Coverage:** 1.15 crore beneficiaries, including 50 lakh new vendors.
- **Loan Amounts:**
 - 1st tranche: ₹15,000 (earlier ₹10,000).
 - 2nd tranche: ₹25,000 (earlier ₹20,000).
 - 3rd tranche: ₹50,000 (unchanged).
- **Digital Incentives:** Cashback up to ₹1,600 for using digital payments.
- **Geographic Expansion:** Beyond statutory towns → census towns & peri-urban areas.
- **Capacity Building:** Training in entrepreneurship, digital literacy, and marketing.
- **Convergence:** Strengthened SVANidhi se Samriddhi to link families with welfare schemes through monthly **Lok Kalyan Melas**.

Significance:

- Empowers urban informal workers & promotes **financial inclusion**.
- Boosts **digital transactions**, supporting Digital India.
- Strengthens **livelihood resilience** of vulnerable groups.

Keywords: Financial Inclusion, Street Vendors, Digital Payments, Collateral-Free Loans, Atmanirbhar Bharat.



UPSC Relevance: **Prelims:** Loan structure of PM SVANidhi, digital incentives, nodal ministry. **Mains (GS3 – Economy):** “Discuss the role of PM SVANidhi scheme in strengthening financial inclusion and urban livelihoods in India.”



HOT Question: How does the restructuring of the PM SVANidhi scheme contribute to inclusive growth and digital empowerment of India's urban informal sector?



37. India Emerges as a Leading Global Hub for Medical Tourism



India's **medical tourism sector** has grown over threefold in recent years, with **6.6 lakh arrivals in 2023**, ranking **10th globally (Medical Tourism Index 2020–21)**, and contributing **8% of the global market**.

Current Status:

- **FTAs (Jan–Apr 2025):** 1,31,856 medical tourists (4.1% of all FTAs).
- Major source countries: **Bangladesh, Iraq, Somalia, Oman, Uzbekistan**.
- Market size: **\$7.69 billion** (8% of global share).

Government Initiatives:

- **National Strategy & Roadmap (2022)** → policy framework & brand positioning.
- **Heal in India Campaign** → PPP-based promotion + digital facilitation.
- **Visa Support:**
 - **E-medical & attendant visas** for 171 countries.
 - **AYUSH visa (2023)** → for Ayurveda, Yoga, Siddha, etc.
- **Medical Value Travel Portal** → single-window multilingual platform.
- **Market Development Assistance Scheme** → support for wellness providers.
- **Gujarat Model** → integrates hospitals with wellness retreats.

Why India is Preferred:

- **Cost advantage:** 60–80% cheaper than US/Europe.
- **Medical expertise:** English-speaking, globally trained doctors.
- **Advanced facilities:** Specialisation in cardiology, oncology, orthopaedics, transplants.
- **AYUSH systems:** Wellness tourism via Ayurveda, Yoga, Unani, Siddha, Homoeopathy.
- **Shorter wait times** than developed countries.



UPSC Relevance: Prelims: India ranked **10th in Medical Tourism Index 2020–21**. AYUSH visa introduced in 2023. Major source country: Bangladesh. Mains: Medical tourism as a **driver of service exports & soft power**.



HOT Question: “Medical tourism strengthens India’s economy, soft power, and healthcare diplomacy but faces regulatory and infrastructure challenges.” Discuss. (150 words)



38. Government Plans GST Overhaul for Automobiles to Balance Affordability and Revenue



The Union Government is considering restructuring GST slabs in the automobile sector, aiming to boost demand in the entry-level segment while maintaining revenue neutrality through adjusted taxes on mid-size and luxury vehicles.

Proposed GST Reforms

- **Entry Segment:**
 - Cars <4m, <1200cc petrol / <1500cc diesel, and bikes ≤350cc.
 - GST may reduce from **28% → 18%**.
- **Mid-Size Segment:**
 - Cars above 1200cc petrol / 1500cc diesel.
 - Overall tax incidence may reduce from **43% → 40%**.
- **Luxury & SUVs:**
 - Retained at **40% GST slab + cess** → maintains ~50% effective incidence.

Significance of Rationalisation

- **Boost Demand:** Makes entry-level cars and two-wheelers more affordable, encouraging first-time buyers.
- **Revenue Neutrality:** Loss from small-vehicle segment offset by maintaining higher taxation on luxury vehicles.
- **Industry Growth:** Revives demand in an industry contributing ~7% to GDP and ~50% to manufacturing GDP.
- **Social Equity:** Supports mobility for middle- and lower-income groups.

Challenges

- **Revenue Risk:** Lower GST on mass segment may initially reduce government revenue.
- **Cess Complexity:** Retaining luxury cess makes overall GST structure still complicated.
- **State Resistance:** States may oppose rationalisation due to dependence on GST compensation cess.
- **Environmental Concerns:** Lower prices may increase fossil-fuel vehicle demand, contradicting EV transition goals.



UPSC Relevance: GS3 – Economy (Taxation, Industry, Growth-Equity Balance), GS2 – Governance (Centre-State fiscal relations under GST framework)



HOT Question: “GST rationalisation in the automobile sector seeks to balance affordability with revenue stability. Critically analyse its implications for industrial growth, fiscal federalism, and environmental sustainability.”

39. GoM Approves GST 2.0 with Two-Rate Structure and New Sin Goods Slab



The **Group of Ministers (GoM)** approved the Centre's proposal for **GST 2.0**, introducing a simplified **two-rate structure** and a new **40% slab** for sin and ultra-luxury goods.

Key Provisions of GST 2.0

- **Slab Rationalisation:**
 - Existing **12% and 28% slabs replaced** with 5% and 18%.
 - **99% items under 12% slab** shifted down to **5%.**
 - **90% items under 28% slab** shifted down to **18%.**
- **New 40% Slab:** For sin and ultra-luxury goods.
- **Coverage:** Items under 40% slab include **tobacco products, pan masala, sugary drinks, gambling & betting, luxury vehicles, and junk/processed foods.**

Objectives of the Reform

1. **Simplification** – Fewer slabs, fewer disputes, smoother compliance.
2. **Consumer Relief** – Farmers, MSMEs, and middle class benefit from reduced indirect tax burden.
3. **Revenue Safeguard** – 40% sin tax offsets losses from slab rationalisation.
4. **Transparency** – Minimises classification disputes and litigation.

Understanding Sin Goods

- **Definition:** Goods harmful to health or society, taxed heavily to discourage consumption.
- **Examples:** Tobacco, alcohol (outside GST), sugary drinks, pan masala, gambling, luxury vehicles, junk food.
- **Dual Role:**
 - **Revenue:** Provides states & Centre with high tax yields.
 - **Public Health:** Discourages harmful consumption.

Significance of GST 2.0

- Moves India closer to a **“Good & Simple Tax”**, fulfilling original GST promise.
- **Boosts Compliance** – Fewer slabs = less confusion, reduced litigation.
- **Improves Equity** – Lower slabs support consumption of essential goods.
- **Public Health Gains** – Sin slab aligns taxation with **WHO “sin tax” recommendations.**
- **Political Consensus** – States likely to support due to assured compensation via sin tax.



UPSC Relevance: **GS3 (Economy)** – Taxation, resource mobilisation, GST reform. **GS2 (Governance)** – Centre–State fiscal relations. **Essay/GS1** – Public health taxation (sin taxes) & equity in governance.



HOT Question: Discuss the significance of GST 2.0 reforms in addressing structural issues of India's indirect tax regime. How can the proposed 40% sin slab balance revenue concerns with public health objectives?



40. GoM proposes GST exemption on life insurance premiums, sparking industry concerns.



The **Group of Ministers (GoM)** has suggested **removing the 18% GST** on life insurance premiums. While aimed at consumer relief, insurers warn it could disrupt input tax credit (ITC) flows and raise base premiums.

Key Concerns with GST Exemption

- **Loss of ITC:**
 - GST exemption blocks **Input Tax Credit**.
 - Insurers cannot claim credit on services (advertising, IT, reinsurance).
 - Raises **operational costs**, cutting profit margins.
- **Tax Imbalance:**
 - Inputs taxed at 18% but output is GST-free.
 - Creates **unutilised credit**, leading to inefficiencies.
- **Premium Impact:**
 - To offset costs, insurers may **increase base premiums**.
 - This negates consumer benefit of GST exemption.

Suggested Alternatives

1. **Zero-Rated Insurance:**
 - Retains **ITC** while keeping premiums GST-free (like exports).
 - Ensures tax neutrality.
2. **Reduced GST Slab (5% with ITC):**
 - Lowers consumer tax burden.
 - Allows insurers to still claim input tax credits.

Significance

- **Consumer Relief:** Makes life insurance more affordable, supporting financial inclusion.
- **Insurance Penetration:** India's penetration is just **~4% of GDP**, below the global average (~7%).
- **Fiscal Challenge:** Lower tax revenues for the government in the short run.



UPSC Relevance: **GS3 – Economy:** GST reforms, ITC mechanism, financial sector regulation. **GS2 – Governance:** Cooperative federalism through GST Council decisions.



HOT Question: Critically analyse the implications of exempting life insurance premiums from GST. Suggest alternatives that balance consumer affordability with industry sustainability.



41. S&P Global Upgrades India's Sovereign Credit Rating to BBB



S&P Global Ratings upgraded India's sovereign credit rating from **BBB- to BBB**, marking the first rating improvement in two decades and signalling stronger fiscal and macroeconomic fundamentals.

◆ Sovereign Credit Rating

- **Definition:** An evaluation of a country's ability and willingness to repay its debt.
- **Agency:** S&P Global Ratings, along with Moody's and Fitch, is among the "Big Three" credit rating agencies.
- **Importance:** Impacts foreign investment flows, borrowing costs, and investor sentiment.

◆ Drivers Behind India's Upgrade

- **Fiscal Consolidation:** Fiscal deficit reduced from **9.2% in FY21 to 4.4% in FY26**, moving closer to FRBM Act target (3%).
- **Growth Resilience:** Despite GDP slowing to **6.5% in FY25**, India remains the fastest-growing large economy.
- **Price Stability:** Inflation fell to **1.55% in July 2025** (lowest since 2017), improving policy credibility.

◆ Significance for India

- **Historic Achievement:** First S&P upgrade in 20 years, boosting India's credibility in global markets.
- **Cheaper Capital:** Lower yields on sovereign bonds reduce borrowing costs for govt. and corporates.
- **Investor Confidence:** Strengthens India's image as a stable investment destination.
- **Currency Impact:** The rupee appreciated, signalling improved external stability.

◆ S&P Rating Scale and India's Position

- **Scale:**
 - Investment Grade: **BBB (lowest)** → AAA (highest).
 - Speculative Grade: Below BBB (BB+, B, CCC, etc.).
- **India's Status:** Now at **BBB**, same as Greece, Mexico, Indonesia.
- **Global Comparison:** USA – AA+, Japan – A, China – A+.



UPSC Relevance: **GS3 (Economy):** External sector, fiscal consolidation, investment climate. **GS2 (Governance):** Policy credibility, FRBM Act, institutional reforms. **Keywords:** S&P Upgrade, Sovereign Credit Rating, Fiscal Deficit, FRBM Act, Inflation Control.



HOT Question: "Critically analyse how sovereign credit rating upgrades influence India's economic growth and fiscal space. Should India prioritise ratings or domestic developmental needs?"



42. Dubai Launches Unified Freezone Passport System



On **18th August 2025**, Dubai launched the “**One Freezone Passport**”, enabling businesses to operate across all its free zones under a single license. This is a major reform to cut regulatory costs and boost investment.

About the Initiative

- Introduced by the **Dubai Free Zones Council**.
- Replaces multiple freezone permits with a **single unified license**.
- Simplifies incorporation, compliance, and expansion across Dubai.

Economic Context

- Supports **Dubai Economic Agenda D33** → aims to **double GDP by 2033**.
- Part of efforts to boost **innovation, FDI inflows, and economic diversification**.

Significance

- **Ease of Doing Business:** Cuts administrative costs, reduces red tape.
- **Investment Attraction:** Encourages foreign companies to scale faster in Dubai.
- **Competitiveness:** Strengthens Dubai’s position as a global hub for trade, finance, and logistics.
- **Regional Impact:** May influence other Gulf nations to adopt similar licensing frameworks.

Keywords: Freezone Passport, Dubai D33, Ease of Doing Business, FDI, Licensing Reform.



UPSC Relevance: Prelims: Free Trade Zones, Dubai Economic Agenda D33. Mains (GS2 – IR / GS3 – Economy): “Discuss how reforms in Gulf economies, like Dubai’s Freezone Passport, impact India’s trade, diaspora, and investment opportunities.”



HOT Question: “Dubai’s One Freezone Passport reform reflects a new model of global competitiveness. Analyse its implications for India’s exporters, investors, and labour market.”



43. Oman to Launch Revamped Golden Visa Programme



From **31st August 2025**, Oman will implement its revamped **Golden Visa Programme**, offering renewable 5- and 10-year residency permits to attract foreign investors, entrepreneurs, retirees, and skilled professionals as part of **Vision 2040**.

About the Programme

- **Ten-year Visa:** Requires investment of at least **OMR 500,000 (~USD 1.3 mn)** or creation of a business employing **≥50 Omani nationals**.
- **Five-year Visa:** Requires investment of at least **OMR 250,000 (~USD 650,000)**.
- **Retirement Visa:** Five-year option with fixed monthly income **≥ OMR 4,000**.
- **Privileges:** Full business ownership, property rights in freehold zones, access to healthcare & education.
- **No Local Sponsor Needed:** Marks a departure from traditional Gulf visa systems.

Context & Significance

- Part of Oman's **Vision 2040** → reduce dependence on oil, diversify economy.
- Aims to attract **FDI, skilled workforce, and retirees**.
- Strengthens Oman's competitiveness against UAE, Saudi Arabia & Qatar, who already run similar schemes.
- Potential opportunities for **Indian diaspora**, especially investors, professionals, and retirees.

Keywords: Golden Visa, Oman Vision 2040, FDI, Residency Rights, Gulf Economic Diversification.



UPSC Relevance: Prelims: Golden Visa schemes in Gulf countries, Oman Vision 2040. Mains (GS2 – IR / GS3 – Economy): “Discuss how Gulf residency reforms like Oman’s Golden Visa can reshape India–Gulf economic and diaspora relations.”



HOT Question: “Critically analyse how long-term residency schemes in Gulf countries may influence India’s labour exports, investment opportunities, and remittance flows.”

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AUGUST 2025

ENVIRONMENT

1. India Commissions 1 MW Green Hydrogen Power Plant
2. India Achieves 20% Ethanol Blending in 2025
3. India's Battery Waste Rising with EV
4. 13 GW Hybrid Renewable Park in Ladakh
5. SC Upholds PCB Power to Impose Damages
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7. India Sets Up National Authority for Carbon Markets
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19. Brown Revolution 2.0
20. Record Krill Harvest in Antarctica
21. Global Treaty Talks on Plastic Pollution
22. MoES Survey Warns of Rising Microplastic Pollution
23. Toxic Heavy Metals Found in Clouds
24. Study highlights on invasive plants
25. Study finds Arctic sea ice melting slowed
26. Haryana Defines "Forest" under SC Direction
27. Beavers, Prairie Dogs, and Termites: Nature's Architects

1. India Commissions 1 MW Green Hydrogen Power Plant at Kandla Port



Under the **National Green Hydrogen Mission**, India inaugurated its first **indigenously-built 1 MW Green Hydrogen Power Plant (GHPP)** at **Kandla Port**, with an annual output of ~140 MT of green hydrogen.

About the Plant:

- Capacity: **1 MW**, output $\approx$ **140 MT/year**.
- Location: **Kandla Port, Gujarat**.
- Developed under National Green Hydrogen Mission to demonstrate hydrogen use in port operations & industry.

What is Green Hydrogen?

- Produced via **electrolysis of water** using renewable energy (solar/wind).
- By-product: Oxygen (O_2).

Applications:

- **Industry**: Steel (replace coking coal), refineries, fertiliser plants.
- **Transport**: Hydrogen fuel cell trucks, buses.
- **Energy**: Grid balancing & long-duration energy storage.

Challenges:

- High cost: **\$4–6/kg**.
- Storage/transport $\rightarrow$ requires high pressure & cryogenics.
- Water requirement: ~9 litres/kg hydrogen.

National Green Hydrogen Mission:

- Target: **5 MMT/year by 2030**.
- Ministry: **MNRE**.
- Components: **SIGHT Programme** (electrolyser/hydrogen production incentives), pilot projects (steel, mobility, shipping), Green Hydrogen Hubs.



UPSC Relevance: **Prelims:** Green hydrogen = via renewable-powered electrolysis. Kandla Port = site of India's 1 MW GHPP. National Green Hydrogen Mission target = 5 MMT by 2030. **Mains:** Role of green hydrogen in energy transition & decarbonisation.



HOT Question: "Green hydrogen is often termed the 'fuel of the future' for India's decarbonisation drive. Discuss the opportunities and challenges in scaling up production, with reference to the National Green Hydrogen Mission." (150 words)

2. India Achieves 20% Ethanol Blending in 2025, Eyes 27% by 2030



India has met its target of **20% ethanol blending (E20) in petrol five years early** and has now set a new goal of **27% blending by 2030**, raising concerns about mileage, engine safety, and consumer choice.

Technical & Operational Challenges

- **Mileage Reduction:** E20 lowers vehicle fuel efficiency by ~7%; E100 reduces it by ~30%.
- **Corrosion Risk:** Ethanol absorbs water, accelerating rusting in older vehicles (pre-2023).
- **Ignition Issues:** Higher ethanol blends need higher ignition temperatures, delaying cold starts.
- **Disclosure Gap:** Pump stations rarely display blending ratios, limiting consumer awareness.
- **No Price Advantage:** Ethanol blends cost the same as petrol, giving no user incentive.
- **Warranty Concerns:** Older vehicles may lose warranty cover if filled beyond E10.
- **Evidence Gap:** Long-term durability impacts on non-E20-ready engines remain untested.

Global Benchmark – Brazil Model

- **Origins:** Initiated in 1970s oil crisis to cut import dependence.
- **Flex-Fuel Engines:** Vehicles designed to run on both petrol and ethanol blends (E18–E27, E100).
- **Retail Choice:** Fuel stations mandated to provide multiple blend options.
- **Price Support:** Ethanol kept **25–35% cheaper than petrol** via subsidies/tax incentives.
- **Phased Transition:** Allowed old vehicles to remain on lower blends while new engines adopted higher blends



UPSC Relevance:

Prelims: National Bio-Energy Policy, Ethanol Blending Program (EBP), NITI Aayog's E20 Roadmap. **Mains (GS III):** Energy security, import substitution, climate goals, biofuel challenges.



HOT Question: “Critically examine India’s E20 ethanol blending policy in light of Brazil’s ethanol transition model. What safeguards are needed to ensure consumer acceptance and engine safety?” (150 words)

3. India's Battery Waste Rising with EV and Energy Storage Boom



India's **Net Zero 2070 pathway**, with a surge in **Electric Vehicles (EVs)** and **Battery Energy Storage Systems (BESS)**, is creating a **battery waste crisis** that demands urgent regulatory and recycling reforms.

Scale of the Problem:

- Lithium battery demand: **4 GWh (2023) → 139 GWh (2035)**.
- Lithium batteries = **700,000 MT of e-waste (2022)**.
- Risks: **metal leaching** (cobalt, lithium), **worker exposure** to carcinogens, and **forex loss** (~\$1 billion by 2030).

Current Challenges (Battery Waste Management Rules, 2022):

- **Extended Producer Responsibility (EPR)** weakly enforced.
- **EPR price floor** too low → disincentivises recyclers.
- Only **1% of lithium-ion batteries** recycled into reusable materials.
- **Certification loopholes** enable fake compliance.
- **Capacity underuse**: plants running at **30–35%**.

Strategic Interventions Needed:

- **Global alignment**: adopt viable EPR pricing models (UK ~₹600/kg).
- **Integrate informal recyclers** into formal networks to expand safe processing.
- **Digital oversight**: national battery registry + real-time EPR tracking.
- **PLI support**: incentivise battery recycling infrastructure and R&D.



UPSC Relevance:

Prelims: Battery Waste Management Rules, 2022 → introduced **EPR obligations**. Lithium-ion batteries = major share of India's e-waste.
Mains: Challenges of **circular economy** in clean energy transition.



HOT Question: "India's EV and energy storage push is creating a parallel environmental crisis of battery waste." Critically evaluate existing policies and suggest reforms. (150 words)

4.13 GW Hybrid Renewable Park in Ladakh sparks green vs livelihood conflict



India is setting up its largest **Hybrid Renewable Energy Park (13 GW)** in Ladakh's **Changthang region**, combining solar, wind, and battery storage. While it accelerates clean energy goals, it risks displacing Changpa nomads and their GI-tagged pashmina economy.

About the Project

- **Capacity:** 13 GW (9 GW solar + 4 GW wind + battery storage).
- **Cost:** ~₹60,000 crore.
- **Sites:** Pang, Debring, Kharnak (Changthang, Ladakh).
- **Pilot:** SECI has already installed a **25 MW solar-battery project at Taru, Leh**.

Significance

- **Clean Energy Push:** Key step toward India's 500 GW non-fossil target by 2030.
- **Energy Security:** Hybrid model (solar + wind + storage) stabilises grid supply.
- **Strategic Location:** Ladakh's high solar irradiance and wind corridors are ideal for renewables.
- **Global Image:** Strengthens India's climate leadership and Paris Agreement commitments.

Concerns

- **Changpa Nomads:** Pastoralists of Changthang depend on **pashmina goat grazing pastures**.
- **Livelihood Threat:** Loss of grazing land threatens GI-tagged *Changthangi Pashmina*, vital for exports.
- **Land Rights Gap:** Nomads lack land ownership, risking displacement without compensation.
- **Green Grabbing:** Land taken in the name of climate goals undermines **indigenous rights** (violating **UNDRIP principles**).
- **Cultural & Ecological Risks:** Worker influx, habitat disruption, and strain on Ladakh's fragile ecosystem.



UPSC Relevance:

GS3 (Environment/Economy): Renewable energy, climate change, livelihoods, land conflicts. **GS2 (Governance):** Rights of indigenous communities, international obligations (UNDRIP).



HOT Question: "Large-scale renewable projects often present a paradox between climate goals and local livelihoods. Discuss with reference to the Hybrid Renewable Energy Park in Ladakh."

5. India Relaxes SO₂ Control Norms; SC Upholds PCB Power to Impose Environmental Damages



The government **relaxed the 2015 mandate** requiring coal plants to install **flue gas desulphurisation (FGD)** units due to cost concerns. Simultaneously, the **Supreme Court** reaffirmed that **Pollution Control Boards (PCBs)** can impose **environmental compensation and bank guarantees** under the *Polluter Pays Principle*.

Sulphur Dioxide Emissions in India

- **Status:** Largest global SO₂ emitter in 2022 (~20% of anthropogenic emissions).
- **Sources:** Coal-fired plants (major), heavy industry, minor natural emissions.
- **Regulation:** Air Act, 1981 → SO₂ limits: 80 µg/m³ (24-hr, all areas), 50 µg/m³ (annual, urban), 20 µg/m³ (sensitive zones).
- **Compliance Gap:** Of **537 coal-based plants**, only **39 installed FGD units**.

Impacts of SO₂

- **Health:** Asthma, respiratory distress, chronic lung disease, premature deaths.
- **Environment:** Acid rain damages crops, soil, water; sulphate aerosols reduce visibility & harm ecosystems.

Control Measures

- **Pre-combustion:** Fuel switching, coal washing, fluidised bed combustion (FBC).
- **Post-combustion:** Dry/wet FGDs (using limestone → gypsum by-product); regenerative & biotech methods recover sulphur.

SC Ruling on Environmental Compensation

- **Legal Basis:** Sec. 33A (Water Act, 1974) & Sec. 31A (Air Act, 1981).
- **Judicial Precedents:** *Vellore Citizens' Welfare Forum (1996)*, *Enviro-Legal Action (1996)* → polluter liable for damage + restoration.
- **Constitutional Link:** Enforcing **Art. 51A(g)** (fundamental duty to protect environment).
- **Condition:** Compensation only when environmental harm is **clear or imminent**.

Pollution Control Boards (PCBs)

- **CPCB:** Statutory body under MoEFCC; sets standards, monitors air & water pollution, advises Centre.
- **SPCBs:** State-level enforcement, permits, compliance checks.



UPSC Relevance: Prelims: SO₂ = India largest global emitter. FGDs = gypsum by-product. PCBs = powers under Water Act & Air Act. Mains: Challenges in enforcing emission norms vs. cost of compliance.



HOT Question: "The Polluter Pays Principle has evolved from judicial innovation into a statutory enforcement tool in India." Discuss with reference to SO₂ emission norms and the recent SC ruling on Pollution Control Boards. (150 words)

6. State Energy Efficiency Index (SEEI) 2024 Released



On **29th August 2024**, the **Ministry of Power** released the **SEEI 2024**, developed by the **Bureau of Energy Efficiency (BEE)** and **Alliance for an Energy Efficient Economy (AEEE)**. The index tracks state performance in implementing energy efficiency measures.

About SSEE

- **Objective:** Measures progress of 36 states/UTs in promoting energy efficiency.
- **Sectors Covered:** Buildings, industry, transport, agriculture, municipal services, and electricity distribution.
- **Indicators:** 66 indicators with greater focus on implementation in the 6th edition.

Key Highlights 2024

- **Top Performers:** Maharashtra, Andhra Pradesh, Assam, and Tripura topped their consumption groups.
- **Front Runners (5):** Andhra Pradesh, Karnataka, Maharashtra, Telangana, Tamil Nadu. (↓ from 7 in 2023)
- **Achievers:** Assam, Kerala.
- **Contenders:** Haryana, Punjab, Rajasthan, Odisha, Uttar Pradesh.
- **Sector Case:** Kerala achieved **74% adoption of energy-efficient pumps**.

State Actions

- All 36 states/UTs prepared **State Energy Efficiency Action Plans (SEEAPs)**.
- 31 states/UTs formed **energy transition steering committees**.

Significance

- **Climate Commitments:** Aligns with India's **Net Zero by 2070** and **45% emissions intensity reduction by 2030 (NDCs)**.
- **Policy Tool:** Helps states identify gaps, improve efficiency, and attract green investments.
- **National Priority:** Energy efficiency is the "first fuel" for decarbonisation, lowering costs and improving energy security.

Keywords: BEE, AEEE, Energy Efficiency, Net Zero 2070, State Energy Efficiency Action Plans.



UPSC Relevance: Prelims: SSEE, BEE, AEEE, key performers. Mains (GS3 – Economy/Environment): "Examine the role of state-level initiatives like the SSEE in achieving India's climate goals and net-zero pathway."



HOT Question: Discuss how the State Energy Efficiency Index (SEEI) promotes cooperative federalism in India's climate action strategy.

7. India Sets Up National Authority for Carbon Markets



The Ministry of Environment, Forest and Climate Change (MoEFCC) has constituted a **21-member National Designated Authority (NDA)**, headed by the Environment Secretary, to operationalise carbon markets under **Article 6 of the Paris Agreement**, finalised at COP29, Baku (2024).

Article 6 of Paris Agreement

- Provides framework for **carbon markets and emissions trading**.
- Allows countries to trade emission reductions to achieve their **Nationally Determined Contributions (NDCs)**.
- Contentious issue since 2015, resolved in COP29.

India's NDC Commitments

- **Reduce emission intensity of GDP by 45%** by 2030 (from 2005 levels).
- **50% cumulative power capacity** from non-fossil fuels by 2030.
- Create additional **carbon sink of 2.5–3 billion tonnes CO₂ equivalent** through afforestation by 2030.

Significance of NDA

- Ensures **transparency & integrity** in emission trading.
- Helps Indian firms earn revenues via **carbon credits**.
- Aligns markets with **Net Zero 2070** and *Lifestyle for Environment (LiFE)* initiatives.
- Strengthens India's voice in **global climate negotiations**.

Challenges

- Risk of **greenwashing** if carbon credits lack verifiable standards.
- Need for **robust MRV (Monitoring, Reporting, Verification)** frameworks.
- Balancing **industry interests vs. environmental integrity**.

Keywords: Carbon credits, NDCs, Article 6, Net Zero 2070, COP29, afforestation sink, MRV system.



UPSC Relevance:

GS3 – Environment | Climate Change: Carbon markets, India's climate commitments. **GS2 – International Relations:** India's obligations under Paris Agreement.



HOT Question: Critically examine the role of carbon markets under Article 6 of the Paris Agreement. How can India balance economic growth with environmental integrity in its pursuit of NDC targets?

8. Indo-Burma Ramsar Regional Initiative Discusses Wetland Conservation at COP15



At **Ramsar COP15**, the **Indo-Burma Ramsar Regional Initiative (IBRRI)** held a side event highlighting the need to **halt and reverse wetland loss** in Southeast Asia under its new **Strategic Plan 2025–2030**.

About IBRRI:

- Regional initiative under **Ramsar Convention**.
- Secretariat: **IUCN** (International Union for Conservation of Nature).
- Supported by: **BRIDGE Project** (*Building River Dialogue and Governance*).
- **Members**: Cambodia, Lao PDR, Myanmar, Thailand, Vietnam.
- Focus: Strengthen wetland protection, restoration, and Ramsar Strategic Plan implementation.

Strategic Plan 2025–30:

- Aim: **Halt & reverse wetland degradation**.
- Encourage regional cooperation for wetland-dependent communities, migratory species, and biodiversity corridors.

About BRIDGE Project:

- Promotes **sustainable management of shared river basins**, biodiversity conservation, and peaceful cross-border water cooperation.

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UPSC Relevance:

Prelims: IBRRI = Ramsar regional initiative with **5 member states** (not India). BRIDGE = cross-border river governance project. **Mains**: Role of regional initiatives in achieving global biodiversity & wetland targets.



HOT Question: “Regional initiatives like IBRRI strengthen the Ramsar Convention’s objectives. Analyse their role in wetland conservation and transboundary water cooperation in Southeast Asia.” (150 words)

9. MoEFCC Launches Matri Van Urban Afforestation Project in Gurugram



The **Ministry of Environment, Forest & Climate Change (MoEFCC)** launched the **Matri Van initiative** in Gurugram, Haryana, under the *Ek Ped Maa Ke Naam* programme, linking tree plantation with personal memory and ecological restoration.

About Matri Van:

- Urban afforestation project on **750 acres** in the **Aravalli Hill area** (Gurugram–Faridabad Road).
- Aim: Restore Aravalli ecology, increase green cover, and enhance biodiversity in **Delhi–NCR**.

Objectives:

- Promote **urban greening** & climate resilience.
- Rejuvenate degraded landscape** by replacing invasive shrubs with native trees.
- Create **theme-based urban forest** for ecological & community benefits.

Collaborative Framework:

- Implemented with **CSR firms, NGOs, MNCs, schools, and govt. bodies**.
- Encourages **citizen participation** by linking tree planting to maternal remembrance.

Link with Ek Ped Maa Ke Naam (2024):

- National movement urging individuals to plant a tree in honour of their **mother**.
- Integrates **emotional connect + environmental stewardship**.



UPSC Relevance:

Prelims: Matri Van = Aravalli urban afforestation, Gurugram. Part of *Ek Ped Maa Ke Naam* programme (2024, MoEFCC). Collaborative model with CSR & NGOs. **Mains:** Role of **urban forestry** in combating climate change



HOT Question “Urban afforestation projects like Matri Van are vital for ecological resilience in polluted metropolitan regions.” Discuss with reference to the Aravalli landscape in NCR. (150 words)

10. Asian Giant Tortoise Reintroduced into Zeliang Community Reserve, Nagaland



The **Asian Giant Tortoise**, the largest tortoise in mainland Asia and a keystone species, was **reintroduced into Nagaland's Zeliang Community Reserve** as part of a community-led conservation effort.

Habitat:

- Found in **tropical & subtropical evergreen forests** across Bangladesh, Brunei, India, Indonesia, Malaysia, Myanmar, Thailand.
- Extirpated (locally extinct) in **Singapore**.

Distinct Features:

- **Largest tortoise** in mainland Asia.
- **Keystone species** – critical for ecosystem balance.
- Only tortoise that **nests above ground** instead of burrowing.

Conservation Status:

- **IUCN Red List**: Critically Endangered.
- **Wildlife Protection Act, 1972**: Schedule I species.

Threats:

- **Habitat loss** due to deforestation.
- **Hunting & collection** for local consumption.

Significance of Reintroduction:

- Restores lost population in Northeast India.
- Strengthens community-based conservation.
- Enhances ecological resilience of forest ecosystems.



UPSC Relevance: Prelims: Only tortoise that nests **above ground**. Conservation status: **Critically Endangered (IUCN)**, **Schedule I WPA 1972**. Reintroduction site: **Zeliang Community Reserve, Nagaland**.



HOT Question: “Community-led conservation initiatives can play a transformative role in saving critically endangered species.” Discuss with reference to the reintroduction of the Asian Giant Tortoise in Nagaland. (150 words)

11. India Hosts World Elephant Day 2025 in Coimbatore, Focus on Habitat Connectivity & Conflict Mitigation



On **August 12, 2025**, India marks **World Elephant Day** in Coimbatore with a focus on **human-elephant conflict mitigation, habitat connectivity, and matriarchal herd conservation** under the theme “*Matriarchs & Memories*.”

About World Elephant Day

- Observed annually on **12 August**; founded in **2012 (Thailand partnership)** to address poaching & habitat loss.
- 2025 theme: “*Matriarchs & Memories*” → honours elephant matriarchs & women conservationists.

Asian Elephant (*Elephas maximus*)

- **Range** → India, Sri Lanka, SE Asia, Sumatra.
- **Features** → Smaller than African elephants; one trunk finger; matriarchal herds.
- **Biology** → 22-month gestation; ~60-year lifespan; advanced cognition & memory.
- **Role** → Ecosystem engineers & indicator species of healthy forests.
- **Status** → IUCN: Endangered | WPA 1972: Schedule I | CITES: Appendix I.

Elephants in India

- **Global Share** → India hosts ~60% of world's wild Asian elephants.
- **Habitat Network** → 33 Elephant Reserves + 150 corridors for connectivity.
- **Population Trend** → ~20% decline since 2017.
- **Top States** → Karnataka (~25%), Assam, Kerala.
- **Threats** → Habitat fragmentation, poaching, rising human-elephant conflict.
- **Heritage Animal** → Declared in **2010**.
- **Project Elephant (1992)** → Habitat protection, anti-poaching, community awareness.



UPSC Relevance: Prelims: Elephant = National Heritage Animal (2010). India's share = ~60% of global Asian elephants. Project Elephant launched in 1992 (MoEF&CC). **Mains:** Link to **biodiversity, conservation, human-animal conflict, SDG 15 (Life on Land)**.



HOT Question: “Asian elephants are both ecosystem engineers and heritage species, yet face severe decline due to human pressures. Critically analyse India's conservation strategy in light of World Elephant Day 2025.”

12. Tiger Carcass Burning in Maharashtra Sparks NTCA Protocol Violation Concerns



Recently, forest staff in **Balaghat (Maharashtra)** burned a tiger carcass without conducting a mandatory postmortem, violating **NTCA guidelines** designed to identify cause of death and prevent poaching cover-ups.

◆ NTCA Protocols for Tiger Carcass

- **Forensic Postmortem:** Mandatory for every discovered carcass.
- **Cause Determination:** Helps identify if death was due to poaching, disease, conflict, or natural causes.
- **Daylight Rule:** Must be conducted in daylight in presence of **NTCA, Chief Warden, and NGO representatives**.
- **Carcass Disposal:** Incineration must be supervised, photographed, and video recorded for evidence.

◆ About the Tiger (*Panthera tigris*)

- **Largest Cat:** Adult males weigh up to 300 kg.
- **Unique Stripes:** Each tiger has distinctive stripe patterns for identification.
- **Habitat Range:** From **mangroves (Sundarbans)** to **Himalayan forests**, covering diverse Indian ecosystems.
- **Reproduction:** ~100 days gestation, usually 2–4 cubs.
- **Distribution:** Found in **13 Asian countries**; India holds **~75% of global tiger population**.
- **Population:** Global – ~5,574; India – **3,682 (2022 census)**.

◆ Conservation Status: IUCN: Endangered : CITES: Appendix I

- **Wildlife Protection Act, 1972:** Schedule I

◆ Threats

- **Poaching:** Illegal trade in tiger parts.
- **Prey Depletion:** Decline in deer and wild boar populations.
- **Habitat Loss:** Deforestation and linear projects fragment habitats.
- **Human-Wildlife Conflict:** Retaliatory killings in buffer zones.



UPSC Relevance:

GS3 (Environment): Conservation of flora & fauna, environmental governance. **Keywords:** Tiger Conservation, NTCA, Project Tiger, Forensic Protocols, Poaching Control



HOT Question: “Critically examine the role of the National Tiger Conservation Authority (NTCA) in safeguarding tiger populations in India. How do procedural lapses in carcass management undermine conservation efforts?”

13. NTCA Restricts Tiger Corridor Definition to 32 Least-Cost Pathways



The **National Tiger Conservation Authority (NTCA)** has **narrowed the definition of tiger corridors** to only **32 GIS-based least-cost pathways** (2014 report), replacing earlier broader definitions. This move could **ease mining and infrastructure clearances** but risks **fragmenting tiger connectivity**.

What are Tiger Corridors?

- **Definition:** Natural pathways that connect isolated tiger habitats, ensuring safe movement, dispersal, and genetic exchange.
- **Legal Basis:** Protected under the **Wildlife Protection Act, 1972**.
- **Clearances:** Projects within corridors require approval from the **Standing Committee of the National Board for Wildlife (SC-NBWL)**.

Earlier vs. New Definition :

- **Earlier Definition:** Tiger corridors included:
 - Wildlife Institute of India (WII) studies.
 - Tiger Conservation Plans (TCPs).
 - All-India Tiger Estimates.
 - 2014 Least-cost pathway models.
- **New Definition (2025):** Restricted to **only 32 least-cost pathways** identified in the 2014 NTCA-WII report.

Key Concept – Least-Cost Pathways

- **GIS-based routes** modelling the easiest, least resistant pathways for tiger movement across fragmented landscapes.
- Based on factors like forest cover, water availability, terrain, and human disturbance.



UPSC Relevance: **Prelims:** NTCA mandate, WPA 1972, SC-NBWL role, least-cost pathways, Tiger Census. **Mains (GS3):** Wildlife conservation vs. development, ecological corridors, governance of protected areas



HOT Question Critically evaluate the implications of restricting the definition of tiger corridors to “least-cost pathways” for wildlife conservation and infrastructure development in India.

14. India Extends Privileges and Immunities to International Big Cat Alliance (IBCA)



On **22nd August 2025**, the Union Environment Minister announced that India has granted **privileges and immunities to IBCA and its officials** under the **United Nations (Privileges & Immunities) Act, 1947**, strengthening its role as a global conservation platform.

About IBCA

- Launched by India in 2023 to promote **conservation of seven big cats**: Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar, and Puma.
- HQ: New Delhi, functioning as an intergovernmental alliance for collaboration, research, and capacity building.

Privileges and Immunities

- Notification (8th Aug 2025) under Section 3 of UN Act, 1947.
- Extends provisions of Articles I, II, III, V & VI of the Schedule to IBCA, its reps, and officials.
- Provides legal protection, functional autonomy, and tax exemptions to aid global operations.

Significance

- Strengthens India's leadership in global conservation diplomacy.
- Helps IBCA attract international membership and funding.
- Facilitates smooth functioning of IBCA as a **neutral, intergovernmental body**.

Keywords: IBCA, UN Privileges & Immunities Act 1947, Global Tiger Conservation, Big Cats.



HOT Question: "India has extended privileges and immunities to the International Big Cat Alliance (IBCA). Analyse how such measures strengthen both global conservation and India's environmental diplomacy."

15. Eight firefly species identified in Tamil Nadu's Anamalai Tiger Reserve through DNA barcoding, highlighting rich nocturnal biodiversity.



The **Tamil Nadu Forest Department** confirmed the presence of **eight firefly species** in Anamalai Tiger Reserve (ATR). The reserve lights up annually during mass **synchronous firefly mating displays**, an important ecological phenomenon.

About Fireflies

- **Taxonomy:** Soft-bodied beetles (family *Lampyridae*).
- **Bioluminescence:** Produced via **luciferin–luciferase reaction**, used for mate signalling.
- **Habitat:** Moist forests, wetlands, agro-ecosystems, near water bodies.
- **Distribution:** Found worldwide (except Antarctica), richest in Asia & Latin America.
- **Diet:** Larvae feed on snails/worms; adults feed on nectar, pollen.
- **Ecological Role:** Natural pest control, pollination, soil fertility improvement.

Anamalai Tiger Reserve (ATR)

- Location: Tamil Nadu, part of the **Western Ghats**.
- Features: Rich biodiversity, elephant corridors, tribal settlements.
- UNESCO: Recognised as part of the Western Ghats World Heritage Site.
- New Finding: **Eight firefly species confirmed** via **DNA barcoding & phototactic studies**.

Threats to Fireflies

- **Habitat Destruction:** Deforestation, wetland loss.
- **Pesticides:** Reduce insect prey & pollute ecosystems.
- **Artificial Light Pollution:** Disrupts mating synchrony.
- **Climate Change:** Alters habitats & reproduction cycles.

Firefly Diversity

- ~2,000 species worldwide.
- ~60 species recorded in India.
- ATR finding strengthens India's biodiversity documentation.



UPSC Relevance: **GS3 (Environment):** Biodiversity conservation, species identification, ecosystem services. **GS1 (Geography):** Western Ghats ecology & hotspots.



HOT Question Fireflies are not only fascinating but ecologically crucial. Discuss their ecological role, the threats they face, and the significance of their discovery in Anamalai Tiger Reserve for biodiversity conservation in India.

16. IUCN Confirms Four Distinct Giraffe Species Based on Genetic Evidence



The **IUCN** has officially recognized **four genetically distinct giraffe species** instead of a single species, revising long-standing taxonomy.

Recognized Giraffe Species

Species	Distribution	Distinctive Feature	Note
Southern Giraffe	Southern Africa	Pale coat with rounded patches	Most numerous
Northern Giraffe	Central–Northeast Africa	Lighter coat, fewer patches	Most threatened
Reticulated Giraffe	Horn of Africa	Net-like polygonal patchwork	Most distinct
Masai Giraffe	East Africa	Irregular vine-leaf patches	Largest-bodied

About Giraffes (*Giraffa camelopardalis*)

- **Tallest Animal:** Reach ~5.5 metres.
- **Habitat:** Savannahs, open woodlands, dry shrublands.
- **Range:** Sub-Saharan Africa with fragmented populations.
- **Diet:** Herbivorous; feed on **acacia leaves & thorny trees**.
- **Ecological Role:**
 - *Landscape engineers:* prune trees, disperse seeds.
 - **Threats:** Poaching, habitat loss, civil conflict, climate-induced droughts.
- **Conservation Status:**
 - **IUCN:** Vulnerable
 - **CITES:** Appendix II

Significance of the Taxonomic Revision

- **Conservation Priority:** Recognising 4 species helps in targeted protection of the **Northern Giraffe**, the most threatened.
- **Policy Impact:** Alters **population counts**, influencing IUCN Red List assessments.
- **Biodiversity Insight:** Demonstrates the importance of **genetics in taxonomy**.
- **Ecological Stability:** Protecting giraffes sustains savannah ecosystems.



HOT Question: Discuss the ecological role of giraffes as “landscape engineers.” How does the recognition of four distinct species alter conservation priorities in Africa?

17. Mycelium Bricks Gain Attention as Low-Carbon Alternative in Construction



With the construction industry being a **major CO₂ emitter** (fired clay bricks alone release ~300 million tonnes annually), **mycelium bricks** are emerging as a **bio-based, sustainable alternative** in architecture.

What are Mycelium Bricks?

- Made from **mycelium** → root-like fungal network (e.g., *Pleurotus ostreatus*, oyster mushroom).
- Properties:
 - **Biodegradable & lightweight** (up to 60× lighter than clay bricks).
 - **Fire-retardant & thermally insulating.**
 - Can be **moulded into diverse shapes.**
 - Favourable **strength-to-weight ratio**, suitable for **low-load tall structures.**

Advantages:

- Eco-friendly → drastically reduces carbon footprint.
- Promotes **circular economy** by using agro-waste as substrate.
- Enhances **indoor air quality** (no toxic off-gassing).

Limitations:

- Lower **structural strength** vs. conventional bricks.
- Vulnerable to **moisture and pests.**
- Lack of **standardisation, testing protocols, and market adoption.**

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UPSC Relevance: Prelims: Mycelium bricks = fungi-based, biodegradable, fire-retardant, lightweight. Traditional bricks = major CO₂ emitter. Mains: Role of **bio-materials in sustainable development & green buildings.**



HOT Question: “Mycelium bricks showcase the promise and challenges of bio-based construction materials in India’s sustainable development pathway.” Discuss. (150 words)

18. HpNPV Virus Developed as Eco-Friendly Biocontrol Against Teak Defoliator



The **Kerala Forest Research Institute (KFRI)** has successfully mass-produced **Hyblaea puera Nucleopolyhedrosis Virus (HpNPV)** as a **sustainable solution** to tackle the destructive **teak defoliator moth**, a major forest pest in India and Southeast Asia.

About HpNPV:

- A naturally occurring **host-specific biocontrol virus** lethal to teak defoliator larvae.
- **Eco-safe**: No impact on non-target species or ecosystems.
- **Stable**: Viral particles remain viable for months in forest conditions.

Mode of Action:

- Infects larvae → virus multiplies inside → larva disintegrates, spreading inoculum.
- **Generational impact** → sub-lethal infections pass to next generations.
- **Epidemic cycle** → dead larvae spread virus across populations.

Benefits:

- Protects **teak foliage & timber yield**.
- Reduces dependence on **chemical pesticides** (eco-friendly, cost-efficient).
- Aligns with **global restrictions on pesticides**, boosting timber export credibility.

About Teak Defoliator (*Hyblaea puera*):

- Cryptic moth species; larvae feed on teak leaves, leaving only midribs.
- Found across South & Southeast Asia, up to New Guinea.
- **Outbreaks** coincide with monsoon → severe defoliation reduces timber productivity.



UPSC Relevance: Prelims: HpNPV = host-specific biocontrol virus for **teak defoliator moth**. Teak defoliator = larvae feed on teak & mangrove leaves, cause monsoon outbreaks.



HOT Question Discuss how biocontrol methods like HpNPV can balance ecological sustainability with economic forestry needs in India.” (150 words)

19. Brown Revolution 2.0 proposes cooperative-led agro-waste management to restore soil fertility and curb farm pollution.



A proposal for **Brown Revolution 2.0** aims to revive soil fertility by adopting an **Amul-style cooperative model** for managing agricultural waste.

Background : Brown Revolution (original): Referred to promotion of **leather production & cocoa cultivation** in tribal areas.

Crisis Context: Soil organic matter levels in large tracts of farmland have fallen below critical thresholds.

- Less than **20% of crop residues** are scientifically recycled; the rest are burnt or dumped, worsening air pollution and soil degradation.

Key Features of Brown Revolution 2.0

- **Amul-Inspired Cooperatives:** Village-level groups to collect, process, and add value to agro-waste.
- **Value Addition Products:** Compost, vermicompost, biochar.
- **Dual Benefits:**
 - Restores soil fertility & reduces fertiliser dependence.
 - Cuts air pollution by preventing stubble burning.
- **Technology Integration:** AI & IoT for soil health tracking, production optimisation, and carbon credit participation.

Policy Framework

- **Mandatory Funding:** Cooperative-based agro-waste clusters in every district.
- **Economic Incentives:** MSP-like mechanism for processed biomass.
- **Strict Ban Enforcement:** Open burning of crop residues.
- **Integration:** Linked with **Soil Health Card** scheme for data-driven farmer feedback.

Significance

- **Agricultural Sustainability:** Revives soil productivity and resilience.
- **Environmental Gains:** Reduces PM_{2.5}, CO, and CO₂ emissions; lowers eutrophication risk in water bodies.
- **Rural Economy:** Creates jobs in waste collection, processing, and cooperative management.
- **Climate Action:** Supports carbon credit mechanisms, contributing to India's Net Zero 2070 goals.



HOT Question: Discuss the significance of Brown Revolution 2.0 in addressing soil degradation and air pollution while ensuring sustainable agriculture."

20. Record Krill Harvest in Antarctica Raises Sustainability Concerns



A **record-breaking industrial harvest of Antarctic krill** forced an **early fishery shutdown**, sparking global concerns about **marine ecosystem stress, overfishing, and sustainability of polar biodiversity**.

About Krill:

- Small **shrimp-like pelagic crustaceans** (esp. *Euphausia superba* in Antarctica).
- Habitat: Cold, nutrient-rich waters of the **Southern Ocean** & sub-Antarctic zones.
- Traits:
 - **Filter-feed** on phytoplankton & algae.
 - Form **massive swarms** (visible as reddish-brown sea patches).
 - Some species are **bioluminescent**.

Commercial Use:

- Harvested for **omega-3 oil, livestock feed, and aquaculture fishmeal**.

Threats to Krill:

- **Climate change** → warming seas, sea-ice loss, ocean acidification.
- **Overfishing** → intensified by industrial-scale harvesting.

IUCN Status: Antarctic krill = **Least Concern**, but vulnerable due to rapid ecosystem change.

Ecological Role:

- **Keystone species:** Major food source for whales, seals, penguins, squid, seabirds.
- **Nutrient cycling:** Through vertical migration & excretion.
- **Carbon sequestration:** Faecal pellets + exoskeletons transport carbon to ocean depths.



UPSC Relevance: Prelims: Krill = keystone species of **Antarctic food web**. Uses: omega-3 supplements, fishmeal, feed. IUCN status: **Least Concern**. Mains: Significance of krill in **carbon sequestration & global climate balance**.



HOT Question: “Krill are the foundation of the Antarctic marine ecosystem. Overfishing threatens not only biodiversity but also global climate regulation.” Discuss. (150 words)

21. Global Treaty Talks on Plastic Pollution Stall Over Health Concerns



Recent **UN talks in Geneva** failed to reach consensus on a global plastic pollution treaty due to disputes on whether **health risks** should be included alongside waste management.

Why is Plastic a Concern?

- **Origin:** Plastics are fossil fuel-derived polymers, cheap, versatile, and pervasive.
- **Chemical Load:** Plastics may contain **16,000+ chemicals**, with limited health impact studies.
- **Hazardous Substances:** ~4,000 chemicals in everyday plastics like **PVC, PET, and polyurethane** are known to be harmful.

Health Implications

- **Everyday Exposure:** Packaging, toys, cosmetics, paints, electronics, medical devices.
- **Toxic Compounds:** Bisphenols, phthalates, **PFAS**, PBDEs, PCBs.
- **Diseases Linked:** Thyroid disruption, hypertension, cancers, gestational diabetes.
- **Microplastics (<5 mm):** Detected in **blood, breast milk, placenta, bone marrow**.
 - Suspected links to cancers, autoimmune disorders, and metabolic diseases (still under research).

India's Stance and Policy

- **Single-Use Ban:** Nearly 20 states banned low-reusability, hard-to-recycle plastics.
- **EPR (Extended Producer Responsibility):** Holds companies accountable for lifecycle management, but enforcement remains weak.
- **Viewpoint Gap:** India frames plastics primarily as a **waste management issue**, not a **public health hazard**.



UPSC Relevance: **GS3 (Environment, Health, IR):** Pollution, public health impacts, environmental treaties. **GS2 (Governance):** Policy & regulation gaps, global negotiations. **Keywords:** *Microplastics, EPR, Plastic Treaty, Chemical Exposure, PFAS.*



HOT Question: *"Plastics are not only an environmental menace but also an emerging public health crisis. Critically examine this statement in the context of global treaty negotiations and India's policy stance."*

22. MoES Survey Warns of Rising Microplastic Pollution Along India's Coastlines



The **Ministry of Earth Sciences (MoES)** has reported alarming levels of **microplastic pollution** in India's coastal waters (2022–25), with evidence of contamination in common food items like **salt and sugar**.

What are Microplastics?

- Plastic particles sized **1 μm –5 mm**.
- **Primary** → manufactured small (e.g., microbeads in cosmetics).
- **Secondary** → breakdown of larger plastics (bags, bottles, nets).

Survey Findings (NCCR, 2022–25):

- High contamination in **coastal sediments & waters**.
- **Key Sources** → riverine plastic inflows + **Abandoned, Lost, Discarded Fishing Gear (ALDFG)**.
- **NGO findings** → microplastic traces in **salt & sugar samples** across India.

Environmental & Health Impact:

- Marine food chain contamination → ingested by fish, shellfish → enters human diet.
- Causes **bioaccumulation**, gut inflammation, and potential **toxic chemical release** (e.g., BPA, phthalates).
- Reduces soil fertility, harms plankton, and disrupts marine ecosystems.



UPSC Relevance:

Prelims: Definition: Microplastics = 1 μm –5 mm. ALDFG identified as major marine source. **Mains:** Link to **GS3 (Pollution, Health, Blue Economy, SDG 14 – Life Below Water)**.



HOT Question: “Microplastics are invisible pollutants that pose visible threats to marine ecosystems and human health. Discuss with reference to India's coastline survey (2022–25).” (150 words)

23. Toxic Heavy Metals Found in Clouds over Himalayas & Western Ghats



In **July 2025**, a **DST-led study** found carcinogenic and toxic heavy metals such as **cadmium, chromium, copper, and zinc** in clouds drifting over the **Eastern Himalayas and Western Ghats**, raising serious public health and ecological concerns.

About the Study

- Conducted during **early monsoon season** on **non-precipitating clouds**.
- **Eastern Himalayas**: 1.5× higher pollutants than Western Ghats, due to **vehicular & industrial emissions** in foothill regions.
- **Detected Metals**: Cadmium (Cd), Chromium (Cr), Copper (Cu), Zinc (Zn).

Health Concerns

- **Exposure Routes**: Inhalation of cloud droplets, ingestion, skin absorption.
- **Carcinogenic Risks**: Chromium linked to cancers; cadmium damages kidneys and bones.
- **Children at Risk**: Models show higher vulnerability in developing bodies.

Comparative Findings

- India's cloud pollution levels **lower** than in **China, Pakistan, Italy, and the U.S.**
- But rising contamination + lack of long-term baseline data pose **future challenges**.

Keywords: Heavy metals, Eastern Himalayas, Western Ghats, cadmium, chromium, cloud pollution.

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UPSC Relevance: **GS3 – Environment:** Air pollution, health impacts, toxic heavy metals. **GS2 – Health:** Public health risks & governance measures. **Prelims:** Locations (Eastern Himalayas, Western Ghats), pollutants, cloud chemistry.



HOT Question: *Heavy metal contamination in India is increasingly shifting from soil and water to atmospheric systems. Discuss the implications of this trend for human health and ecological security.*

24. Study highlights that invasive plants inflict the highest global economic costs, with India showing the world's largest underreporting of management expenditure.



A global study revealed that India has a **1.16 billion % discrepancy** between reported and actual costs of managing invasive alien species, exposing hidden ecological and financial burdens.

India's Hidden Burden

- **Reporting Gap:** Actual management expenditure largely undocumented, leading to serious underreporting.
- **Fragmented Governance:** Absence of a centralised **national invasive species database**; weak coordination between forest, agriculture, trade, and port authorities.
- **Financial Underestimation:** Costs borne by **state forest departments, NGOs, and local communities** rarely captured in national or global accounts.
- **Knowledge Bias:** Regional language studies & grey literature excluded from databases like **InvaCost**.
- **On-ground Reality:**
 - *Lantana camara* in Bandipur NP → raises fire risk, reduces grazing land, affects wildlife, undermines eco-tourism.
 - *Water hyacinth* in Kerala backwaters → blocks navigation & fisheries.
 - *Prosopis juliflora* in Gujarat → outcompetes native species & depletes groundwater.

⚠ Challenges

- **Globalisation Factor:** Spread via trade, travel, ports, and ballast water.
- **Eradication Limits:** Some invasive species integrated into **agriculture & economy** (e.g., eucalyptus, prosopis).
- **Weak Documentation:** India lags in **monitoring, research, and strategic budgeting** for invasive species.
- **International Comparisons:** While CBD & IMO conventions slowed invasions globally, India's data gap hinders policy action.



UPSC Relevance: GS3 (Environment): Biodiversity conservation, ecological economics. **Essay Paper:** "Balancing development and ecology: India's hidden costs of growth." **Prelims:** Invasive species identification & ecological impacts.



HOT Question: Invasive alien species are not just a biodiversity concern but a hidden economic burden for India." Discuss with examples and suggest policy measures.

25. Study finds Arctic sea ice melting slowed temporarily over 2005–24, but trend is expected to reverse, signalling faster future melt.



A new study reported that Arctic sea ice loss has **slowed fourfold in the past 20 years** compared to the earlier two decades, but the respite is temporary, not climate recovery.

Key Findings

- **Slower Loss:** 2005–24 → **0.35 million sq km per decade** decline (vs. 1.3 million sq km per decade in 1993–2012).
- **Temporary Phase:** Expected reversal in **5–10 years** with accelerated melting.
- **PDO Link:** Cooling from the **Pacific Decadal Oscillation (PDO)** likely reduced melting.
- **Future Outlook:** After slowdown, melt may rise to **0.6 million sq km per decade**.

Pacific Decadal Oscillation (PDO)

- A **20–30-year long-term climate cycle** in the Pacific Ocean.
- Involves shifts in **sea surface temperatures**.
- Impacts: Alters **weather, temperature, rainfall, and ocean currents** globally.
- Current phase → cooler waters helped slow Arctic ice melt.

Implications of Arctic Sea Ice Loss

- **Not Climate Recovery:** GHG emissions & global warming continue to rise.
- **Accelerated Warming:** Reduced ice lowers albedo → more heat absorption → Arctic amplification.
- **Sea Level Rise:** Faster melt of surrounding glaciers & Greenland ice sheets.
- **Biodiversity Threats:** Polar bears, walruses, seals, and Arctic ecosystems at risk.
- **Global Impact:** Influences **jet streams**, intensifies extreme weather (heatwaves, floods).
- **Geopolitics:** Melting opens **Northern Sea Route**, fuelling Arctic resource competition.



UPSC Relevance: **GS1 (Geography):** Ocean currents, cryosphere, climate variability. **GS3 (Environment):** Climate change, biodiversity threats, global warming. **Essay Paper:** “Melting poles, warming planet: humanity at risk.”



HOT Question: Arctic sea ice melting has slowed in the last two decades, but this is not a sign of climate recovery. Analyse the scientific reasons behind this slowdown and its wider implications for global climate and geopolitics.

26. Haryana Defines “Forest” under Supreme Court’s Directives on FCA 2023



The **Haryana government** officially notified a definition of “forest” in line with the Supreme Court’s **March 2025 directives**, which required states to adopt clear definitions using GIS-based surveys.

Supreme Court Directives (March 2025)

- States must define forests and set up expert committees.
- Committees to complete surveys within **six months** following GIS-based **Lafarge guidelines**.
- Interim reliance on **Godavarman ruling (1996)** until final records are prepared.

Haryana’s Forest Definition

- **Isolated patches:** At least **5 hectares** with **40% canopy cover**.
- **Contiguous patches (with notified forests):** At least **2 hectares** with **40% canopy cover**.
- **Exclusions:**
 - Linear plantations (roadsides, canals).
 - Compact agroforestry.
 - Orchards outside notified forests.

Issues with Haryana’s Definition

- **High canopy threshold:** Excludes drought-adapted, open-canopy Aravallis (critical for ecology).
- **Area threshold:** Ignores smaller but **ecologically vital patches** (<2 ha).
- **Exclusion risks:** Agroforestry and orchards left out, allowing **mining and real estate encroachment**.

Forest Definitions in India

- **No uniform definition** across laws.
- **FCA 1980:** Forest = recorded as forest (reserved/protected).
- **FSI:** Any land >1 hectare with ≥10% canopy cover, irrespective of ownership.
- **Godavarman Case (1996):** Forest includes all areas recorded as forest, regardless of ownership.
- **FCA 2023 Amendment:** Restricts definition to **notified/recorded forests**, narrowing Godavarman’s broad scope.



UPSC Relevance: **GS3 (Environment)** – Forest governance, FCA 1980 & 2023, SC directives, Godavarman ruling. **Prelims** – Forest Survey of India (FSI) criteria, Lafarge guidelines, FCA amendments.



HOT Question: The Supreme Court’s directives on defining forests seek to resolve ambiguity, but state-level definitions risk diluting ecological protections. Critically analyse with reference to Haryana’s official definition.

27. Beavers, Prairie Dogs, and Termites: Nature's Master Architects



A recent report highlighted how wild species such as **beavers, prairie dogs, and termites** build **sophisticated and sustainable habitats**, often outperforming human designs in efficiency and ecological value.

Species with Remarkable Home-Building Skills

Beavers

- **Genus:** *Castor* (semi-aquatic mammals).
- **Construction:** Dams made of **wood, mud, and stones** to flood areas and create ponds.
- **Lodges:** Dome-shaped with **underwater entrances** and **multiple chambers**.
- **Ecological Impact:** Their ponds create **wetlands** that support fish, amphibians, birds, and aquatic plants.

Prairie Dogs

- **Habitat:** Grasslands of North America.
- **Burrows:** Complex **tunnel networks** with nurseries, sleeping areas, waste zones, and "listening chambers."
- **Mounds:** Prevent flooding and act as **lookout points**.
- **Safety:** Include **secret escape routes** for predator evasion.

Termites

- **Regions:** Africa and Australia.
- **Mounds:** Towering structures up to **10 feet high**.
- **Architecture:** Contain **queen's chamber, nurseries, fungus gardens, and ventilation shafts**.
- **Climate Control:** Built-in ventilation regulates **temperature and humidity**, functioning like natural air-conditioning.

Significance

- **Ecosystem Engineers:** Species transform habitats, supporting biodiversity.
- **Sustainable Designs:** Structures use **renewable, biodegradable materials**.
- **Human Inspiration:** Lessons for **bio-inspired engineering**, green architecture, and climate adaptation.



UPSC Relevance:

Prelims: Species-habitat linkage (Beaver → wetlands, Prairie dog → burrows, Termite → mounds). **Mains (GS3):** Role of keystone species and bio-inspired architecture in ecological sustainability.



HOT Question: What do "ecosystem engineers" like beavers, prairie dogs, and termites teach us about sustainable habitat construction? Discuss with examples.

AUGUST 2025

SCI & TECH

1. ISRO Launches NASA-ISRO NISAR Satellite on GSLV-F16
2. ISRO Developing Lunar Module Launch Vehicle (LMLV)
3. ISRO Conducts First Integrated Air Drop Test (IADT-01)
4. ISRO Inaugurates HOPE Analog Mission in Ladakh's
5. India Celebrates Second National Space Day
6. India's Lack of a National Space Law
7. SpaceX's Starlink Secures License
8. SpaceX Launches Astronaut Crew-11 to ISS
9. China Tests Lanyue Lunar Lander for Manned Moon Mission
10. Astronomers detected RBFLOAT
11. Rare Quadruple Star System Discovered in the Milky Way
12. India hosts 18th International Olympiad on Astronomy
13. India Discovers CRIB: A New Rare Blood Group
14. Indian Scientists Develop VEGF-C Nano Therapy
15. Study Finds Anticancer Potential in Fungi from Soursop
16. Nanotech Tool for Early Parkinson's Detection
17. CATCH Grant Program Launched
18. India Inaugurates First Animal Stem Cell Biobank
19. India drafts guidelines for veterinary blood banks
20. ICMR Launches SHINE Initiative for Students
21. China Develops Artificial Pregnancy Robot
22. Engineered E. coli a living, self-powered mercury sensor
23. Compound 3b to Revive Antibiotic Effectiveness
24. Ionic Liquids Could Support Life Beyond Water
25. Government Pushes Semiconductor Design Innovation
26. India Launches First National Biofoundry Network
27. India Seeks Regulatory Reform "Pharmacy of the World"
28. OpenAI launched its first Learning Accelerator
29. South Africa Launches Rhisotope
30. Northeast Frontier Railway adopts bioplastic packaging
31. Darwin Tree of Life Project Nears Completion
32. GEAC Approves GM Maize Field Trials at PAU
33. Unregulated aluminium cookware raises lead poisoning
34. Kerala reports cases of brain-eating amoeba
35. Puga Hot Spring in Ladakh
36. Entangled Atomic Clocks Proposed to Probe



1. ISRO Successfully Launches NASA–ISRO NISAR Satellite on GSLV–F16



In **2025**, ISRO launched the **NASA–ISRO Synthetic Aperture Radar (NISAR)** satellite aboard **GSLV–F16** from Sriharikota. The mission marked ISRO's **first polar-orbit launch using GSLV** and its **first commercial launch of a fully NASA-owned satellite**.

About NISAR:

- Joint NASA–ISRO mission for **earth observation**, using **dual-band synthetic aperture radar (L-band by NASA & S-band by ISRO)**.
- Will monitor **climate change, deforestation, ice-sheet dynamics, and natural disasters**.

Mission Highlights:

- **Orbit:** Placed into **Sun-Synchronous Polar Orbit (SSPO)**.
- **Cryogenic Stage:** CE-20 engine enabled precise orbital injection.
- **Commercial First:** ISRO launched a fully NASA-owned satellite, generating revenue.

Significance:

- Strengthens **India–U.S. space partnership**.
- Demonstrates **indigenous cryogenic engine capabilities**.
- Enhances India's **global reputation** in reliable foreign satellite launches.
- Adds to ISRO's revenue-generating commercial portfolio.



UPSC Relevance: Prelims: NISAR = NASA–ISRO Earth-observation satellite using dual-band radar. Launched by **GSLV-F16** into **SSPO**. CE-20 cryogenic stage used for orbital precision.



HOT Question “Discuss the significance of the NISAR mission in strengthening India–U.S. space collaboration. How does it reflect India's growing role in the global commercial satellite launch market? (150 words)



2. ISRO Developing Lunar Module Launch Vehicle (LMLV) for India's Crewed Moon Mission by 2040



The **Indian Space Research Organisation (ISRO)** is developing its **heaviest rocket yet – the Lunar Module Launch Vehicle (LMLV)**, aimed at supporting India's **first crewed Moon landing by 2040**.

About LMLV

- **Replacement:** Replaces the planned **Next Generation Launch Vehicle (NGLV)**.
- **Height:** ~40 stories tall, making it India's tallest and heaviest rocket.
- **Payload Capacity:**
 - **80 tonnes** to **Low Earth Orbit (LEO: 200–2000 km)**.
 - **27 tonnes** to **lunar orbit/mission trajectory**.
- **Propulsion:**
 - **First stage:** Liquid propellant.
 - **Second stage:** Liquid propellant.
 - **Third stage:** Cryogenic engine for high-energy transfers.
- **Timeline:** Targeted for **completion by 2035**, enabling deep space and human spaceflight missions.

Significance

- **Crewed Lunar Mission:** Enables India's ambition to land humans on the Moon by **2040**.
- **Heavy-Lift Capability:** Puts ISRO in the league of NASA's **SLS**, SpaceX's **Starship**, and China's **Long March 9**.
- **Strategic Autonomy:** Reduces reliance on foreign heavy-lift launchers for lunar/planetary missions.
- **Space Economy Boost:** Enhances India's commercial competitiveness in **global launch markets**.

Technology Advancement: Strengthens cryogenic propulsion mastery and deep-space exploration readiness



UPSC Relevance: **Prelims:** Features of LMLV, cryogenic propulsion, LEO vs lunar orbits. **Mains (GS3):** "Discuss the significance of India's development of LMLV for future lunar and planetary exploration."



HOT Question India is developing the Lunar Module Launch Vehicle (LMLV) as part of its long-term lunar programme. Examine how LMLV will transform India's space exploration capacity and its role in global space competition.



3. ISRO Conducts First Integrated Air Drop Test (IADT-01) for Crew Module



On **24th August 2025**, ISRO successfully carried out the **first Integrated Air Drop Test (IADT-01)** at **Satish Dhawan Space Centre, Sriharikota**, demonstrating the parachute-based deceleration system critical for the recovery of India's human spaceflight **Crew Module**.

About the Test

- **Purpose:** Validated safe recovery system for crew module, simulating an **abort scenario**.
- **Crew Module Simulation:** 4.8-tonne dummy module dropped from **3 km altitude** using an **IAF Chinook helicopter**.
- **Parachute System:**
 - 10 parachutes in total – **2 Apex Cover Separation (ACS), 2 Drogue, 3 Pilot, 3 Main (25 m each)**.
 - Deployment sequence: ACS → Drogue (initial deceleration) → Pilot → Main (final descent).
 - Reduced **terminal velocity to ~8 m/s** for safe splashdown.
- **Recovery:** Retrieved by **INS Anvesha** and transported to Chennai port.
- **Telemetry:** Onboard avionics transmitted real-time data during descent.

Significance

- Ensures astronaut safety in abort/splashdown scenarios.
- Strengthens India's preparedness for **Gaganyaan mission** and future crewed space exploration.
- Enhances ISRO-IAF-Indian Navy coordination for human spaceflight operations.

Keywords: IADT-01, Crew Module, Gaganyaan, parachute-based deceleration, INS Anvesha.



UPSC Relevance:

Prelims: Gaganyaan, Satish Dhawan Space Centre, INS Anvesha.



HOT Question: "How does the Integrated Air Drop Test (IADT-01) strengthen India's human spaceflight safety architecture under Gaganyaan?"



4. ISRO Inaugurates HOPE Analog Mission in Ladakh's Tso Kar Valley



The **Indian Space Research Organisation (ISRO)** launched the **HOPE (Himalayan Outpost for Planetary Exploration)** Analog Mission in **Tso Kar Valley, Ladakh**, to simulate space-like conditions for **Moon and Mars exploration research**.

About HOPE Mission:

- Led by **ISRO's Human Space Flight Centre (HSFC)**.
- Modules: **Habitat (crew living) & Utility (operations)**.
- Objectives:
 - Simulate lunar & Martian environments.
 - Test **human survival protocols, health monitoring, and equipment reliability**.

Research Focus:

- **Human studies:** epigenetics, genomics, physiology, psychology.
- **Astrobiology:** microbial analysis, sample collection.
- **Operational validation:** surface activity protocols, medical support.

Why Tso Kar Valley (Ladakh)?

- Extreme cold, saline permafrost.
- High UV radiation & low atmospheric pressure.
- Close terrestrial analogue to **Martian terrain** → ideal for space habitat & astrobiology research.

Link to Gaganyaan Mission:

- HOPE is part of India's broader **Human Spaceflight Programme**.
- **Gaganyaan:** 3 crew members → 400 km orbit → 3 days → Indian sea landing.
- Launch Vehicle: **LVM3 rocket**.
- Key milestones: **Pad abort tests, air drop tests, unmanned & manned flights**.



UPSC Relevance: Prelims: HOPE = ISRO Analog Mission in Ladakh. Tso Kar Valley = Mars-analogue terrain in India. Gaganyaan → human spaceflight, LVM3 launch vehicle.



HOT Question:

“Analog missions like HOPE are crucial stepping stones for interplanetary exploration.” Discuss how ISRO's Ladakh initiative supports India's human spaceflight programme. (150 words)



5. India Celebrates Second National Space Day



On **23rd August 2025**, India observed its **second National Space Day**, commemorating two years since the **Chandrayaan-3 mission's historic soft landing** on the Moon's south polar region, a global first.

Chandrayaan - 3 Milestone (2023)

- Vikram lander achieved a **soft landing near the south pole**, later named **Shiv Shakti Point**.
- Pragyan rover deployed successfully, conducting in-situ experiments.
- India became the **fourth nation** to land on the Moon and the **first at the lunar south pole**.

National Space Day (23rd August)

- Declared by GoI in 2023 to honour Chandrayaan-3's success.
- **Theme 2025:** "Aryabhata to Gaganyaan: Ancient Wisdom to Infinite Possibilities."
- Celebrates India's journey from **Aryabhata (1975)**, ISRO's first satellite, to upcoming **Gaganyaan human spaceflight mission (expected 2026-27)**.

Significance

- Inspires innovation, youth participation, and scientific temper.
- Highlights India's transition from **remote sensing pioneer to deep-space exploration nation**.
- Positions India as a **leader in cost-effective space technology and space diplomacy**.

Keywords: Chandrayaan-3, Shiv Shakti Point, ISRO, National Space Day, Gaganyaan.



UPSC Relevance: **Prelims:** Chandrayaan-3, National Space Day, Aryabhata satellite. **Mains (GS3 – S&T):** "Discuss the significance of Chandrayaan-3 in India's space programme"



HOT Question: "From Aryabhata to Gaganyaan, India's space journey reflects both scientific achievement and strategic vision. Discuss the role of National Space Day in shaping public engagement with India's space programme"



6. India's Lack of a National Space Law Raises Concerns over Governance, Investment, and Sustainability



Despite being a signatory to the **Outer Space Treaty, 1967**, India still lacks a **comprehensive statutory framework** for space activities, raising issues of governance, private participation, and long-term sustainability.

Outer Space Treaty, 1967 – Key Features

- **Global Commons:** Outer space declared “heritage of humanity”; no national appropriation.
- **Peaceful Use:** Bans weapons of mass destruction, mandates non-military exploration.
- **State Liability:** States responsible for all space activities (govt. & private).
- **Compensation Mechanism:** Liability implemented through **1972 Liability Convention**.
- **Non-Self-Executing:** Requires national laws for enforcement.

Why India Needs a National Space Law

- **Legal Certainty:** Converts global treaty commitments into enforceable domestic law.
- **Regulatory Clarity:** Licensing timelines, dispute redressal, and safety protocols.
- **Investment Confidence:** Predictable governance framework attracts global capital.
- **Safety Standards:** Statutory backing to debris mitigation & accident response.
- **IPR Security:** Clarifies ownership, boosting domestic R&D and innovation.

Current Indian Framework

- **Treaty Compliance:** Ratified OST & Liability Convention; no domestic law.
- **Policy Support:** *Indian Space Policy, 2023* promotes private launches, satellites, & ground ops.
- **IN-SPACE:** Authorises private players but lacks statutory power.
- **Standards:** *Catalogue of Indian Standards, 2023* sets benchmarks for safety.
- **Pending Law:** Draft Space Activities Bill (awaiting passage) leaves a legislative vacuum.

Bottlenecks in Space Governance

- **Fragmented Approvals:** Multiple agencies slow down licensing.
- **Weak Authority:** IN-SPACE non-statutory → weak enforcement, investor hesitation.
- **High Liability Burden:** Expensive insurance requirements deter startups.
- **FDI Restrictions:** Complex and unclear norms reduce foreign inflows.
- **IPR & Innovation Gap:** Weak protection and over-regulation drive talent abroad.



UPSC Relevance: **GS Paper 2:** Governance, regulatory framework, Centre-private sector coordination. **GS Paper 3:** Science & Tech, indigenisation of technology, space policy reforms.



HOT Question: “Critically examine the need for a **National Space Law in India**. How can such legislation balance private sector participation with India’s global treaty obligations?”



7. SpaceX's Starlink Secures License to Provide Satellite Internet in India



SpaceX's **Starlink** received regulatory clearance to operate satellite-based internet services in India, expanding high-speed connectivity to **remote and underserved regions**.

About Starlink:

- Satellite internet service by **SpaceX**, deploying thousands of satellites in **Low Earth Orbit (LEO)**.
- Objective: Provide **global broadband coverage**.

Satellite Internet Services:

- Internet provided wirelessly via communication satellites.
- Advantage: **Location-independent**, especially useful where terrestrial fiber/cable is not feasible.

Significance for India:

- **Bridging Digital Divide**: Enables internet in rural, tribal, border, and island regions.
- **Disaster Resilience**: Ensures connectivity in **cyclones, floods, earthquakes**.
- **Emerging Tech Support**: IoT, telemedicine, distance education, smart agriculture.
- **Military Use**: Already tested by **Indian Army in Siachen** for high-altitude communication.

Challenges:

- **Affordability**: High device and service costs limit rural accessibility.
- **Spectrum & Regulation**: Coordination needed with existing telecom operators.
- **Space Debris Risk**: Large constellations increase orbital crowding.



UPSC Relevance: Prelims: Starlink = SpaceX initiative using LEO satellites. Satellite internet ≠ dependent on ground cables; useful in remote/disaster-hit areas.



HOT Question: “Discuss the potential of satellite internet services like Starlink in bridging India’s digital divide. What regulatory and affordability challenges need to be addressed? (150 words)”



8. SpaceX Launches Astronaut Crew-11 to ISS



On **2 August 2025**, SpaceX launched **Crew-11**, an international crew of four astronauts aboard a **Falcon 9 rocket with the Dragon capsule**, marking a potential shift in mission duration to **eight months** for schedule synchronisation

About Crew - 11 Mission

- **Crew Members:**
 - NASA: Zena Cardman, Michael Fincke
 - Roscosmos: Oleg Platonov
 - JAXA: Kimiya Yui
- **Mission Duration:** May extend from 6 to **8 months**, subject to capsule health monitoring.
- **Objective:** Enhance **U.S.–Russia schedule alignment** and strengthen international crew coordination.

About the International Space Station (ISS)

- A habitable artificial satellite in low Earth orbit, launched in **1998**, continuously inhabited since 2000.
- Collaboration between **NASA (U.S.)**, **Roscosmos (Russia)**, **ESA (Europe)**, **JAXA (Japan)**, and **CSA (Canada)**.
- Functions as a laboratory for **microgravity**, **life sciences**, **physics**, and **space technology**.

Significance of the Mission

- **International Cooperation:** Despite geopolitical tensions post-Ukraine war, ISS remains a rare forum of U.S.–Russia collaboration.
- **Private Space Sector:** Highlights SpaceX's role in NASA's **Commercial Crew Program**, reducing reliance on Russian Soyuz.
- **Extended Missions:** New duration models could optimise crew rotations and scientific output.

Keywords: Crew Dragon, Falcon 9, ISS, Commercial Crew Program, extended mission, U.S.–Russia cooperation.



UPSC Relevance: **GS3 – Science & Technology:** Space exploration, private space industry, international cooperation. **GS2 – IR:** India's role in global space governance & lessons for collaboration.



HOT Question: “Critically examine how private companies like SpaceX are reshaping global space cooperation, with reference to the ISS partnership model.”



9. China Tests Lanyue Lunar Lander for Manned Moon Mission



On **6th August 2025**, China conducted the **first test of the Lanyue lunar lander** in Hebei province, validating ascent and descent systems. The lander is central to China's plan to land astronauts on the **Moon before 2030**, competing with the U.S. Artemis programme.

About Lanyue Lunar Lander

- **Meaning:** "Lanyue" means *embrace the moon* in Mandarin.
- **Function:** Transports astronauts between lunar orbit and the moon's surface.
- **Capabilities:** Acts as a living module, power hub, and data center post-landing.
- **Test Simulation:** Conducted on terrain mimicking lunar soil, reflectivity, craters, and rocks.

Significance of the Test

- **Technical Milestone:** Verified systems under extended time & multiple operational conditions.
- **Strategic Edge:** Positions China in the global race for manned lunar exploration.
- **Space Race Context:** U.S. **Artemis programme** targets lunar orbit in 2026 & landing in 2027; China aims for 2030.

China's Broader Lunar Ambitions

- **Tiangong Space Station** already operational in LEO.
- Plans to build a **lunar research base** with Russia.
- Showcases **dual-use space capability** with geopolitical implications.

Keywords: Lanyue Lander, CMS, Artemis Programme, Moon Mission, Hebei Test Site.



UPSC Relevance: **GS3 – Science & Technology:** Space exploration, indigenisation & global space race. **GS2 – IR:** Strategic competition between U.S. and China in outer space.



HOT Question: "China's Lanyue lunar lander test signals a renewed global space race. Discuss its implications for international cooperation and competition in outer space"



10. Astronomers detected RBFLOAT, the brightest and closest non-repeating fast radio burst, opening new frontiers in high-energy astrophysics.



Astronomers discovered **RBFLOAT (Radio Brightest Flash of All Time)**, a non-repeating **Fast Radio Burst (FRB)**, in spiral galaxy **NGC-4141**, about **130 million light-years away**, making it the **closest and brightest FRB detected so far**.

About Fast Radio Bursts (FRBs)

- **Nature:** Millisecond-long, ultra-bright flashes of radio energy.
- **Energy:** Release as much energy in milliseconds as the Sun emits in days.
- **Types:**
 - **Repeaters** → occur multiple times at irregular intervals.
 - **Non-repeaters** → occur once, like RBFLOAT.
- **Probable Sources:**
 - Magnetar flares (violent eruptions from magnetised neutron stars).
 - Neutron star mergers.
 - Exotic hypotheses include black hole interactions.
- **Scientific Significance:**
 - Probe intergalactic **plasma density & magnetic fields**.
 - Trace **cosmic matter distribution** (baryonic matter).
 - Contribute to mapping the universe's "missing matter."

RBFLOAT: Radio Brightest Flash of All Time

- **Type:** Non-repeating FRB.
- **Galaxy:** NGC-4141 (spiral galaxy).
- **Distance:** ~130 million light-years (closest FRB known).
- **Detection:** Canada's **CHIME telescope** & its outtrigger stations.
- **Significance:**
 - Enabled **JWST-based multi-wavelength study**.
 - Proximity offers unprecedented insight into FRB mechanisms.
 - Confirms **magnetars and neutron stars** as leading candidates.

Challenges in FRB Research

- **Short-lived signals** (milliseconds) → difficult to localise.
- **Non-repeating bursts** limit long-term study.
- **Instrument dependence** on highly sensitive, wide-field telescopes.



UPSC Relevance: GS3 (Science & Tech): Space research, astrophysics breakthroughs. **Prelims:** FRBs, magnetars, neutron stars, telescopes like CHIME & JWST.



HOT Question: "Fast Radio Bursts (FRBs) have emerged as one of the most puzzling astronomical phenomena of the 21st century. Discuss their significance in understanding cosmic matter distribution and the challenges faced in their study."



11. Rare Quadruple Star System Discovered in the Milky Way



In **August 2025**, scientists discovered **UPM J1040–3551 AabBab**, a rare quadruple star system consisting of two **brown dwarfs** orbiting two **red dwarf stars** — a cosmic configuration never observed before.

About the Discovery

- **System Composition:** 2 T-type brown dwarfs + 2 young red dwarfs.
- **Uniqueness:** First quadruple star system with this combination.

What are Brown Dwarfs?

- Often called “**failed stars**”.
- Mass lies between the heaviest gas giants and the lightest stars (~13–80 Jupiter masses).
- Cannot sustain hydrogen fusion like normal stars.
- Classified into L, T, and Y spectral types (T-type = very cool, methane-rich).

Challenges in Detection

- Brown dwarfs are **cold and faint** in visible light.
- Detected using infrared surveys, spectroscopy, and advanced telescopes.

Significance of the Discovery

- Provides **new insights into stellar and planetary formation**.
- Helps define the **boundary between stars and planets**.
- Contributes to understanding **mass distribution in the universe**, crucial for dark matter studies.

Keywords: Brown Dwarfs, Red Dwarfs, Quadruple Star System, Dark Matter, Milky Way.



UPSC Relevance:

Prelims: Brown dwarfs, spectral types (L, T, Y)



HOT Question: “How does the discovery of quadruple star systems with brown dwarfs enhance our understanding of the link between star formation, planetary science, and dark matter studies?”



12. India hosts 18th International Olympiad on Astronomy & Astrophysics (IOAA), inspiring young global talent in astronomy



India hosted the **18th IOAA** at **Jio World Convention Centre, Mumbai**, organised by **Homi Bhabha Centre for Science Education (HBCSE)** and **TIFR**. Over **300 students from 64 countries** participated.

About the International Olympiad on Astronomy & Astrophysics (IOAA)

- **Launch:** 2007 in Thailand.
- **Objective:** Inspire high school students' interest in **astronomy, astrophysics, and space sciences**.
- **Nature:** Combines theoretical, observational, and practical problem-solving competitions.
- **Global Reach:** Now among the fastest-growing science olympiads with participation from all continents.

Significance for India

- **STEM Promotion:** Encourages Indian students' engagement with frontier sciences.
- **Scientific Diplomacy:** Strengthens India's role in international science collaborations.
- **Institutional Recognition:** Highlights HBCSE–TIFR's role in nurturing scientific talent.

Inspiration: Acts as a platform for India's youth to pursue careers in astronomy, astrophysics, and ISRO-linked research.



UPSC Relevance: Prelims: IOAA facts, organiser institutions (HBCSE, TIFR), year of launch. **Mains (GS III – Science & Tech):** Role of international science olympiads in promoting STEM and India's science diplomacy



HOT Question: "International science olympiads like IOAA promote global scientific collaboration and STEM education. Discuss their significance for India's scientific aspirations." (150 words)



13. India Discovers CRIB: A New Rare Blood Group Antigen in the Cromer System



In **Bengaluru (2025)**, researchers identified a new human blood group antigen, **CRIB**, later recognised by the **International Blood Group Reference Laboratory (IBGRL)**, UK, and officially classified by the **International Society of Blood Transfusion (ISBT)**.

What is CRIB?

- A newly identified antigen within the **Cromer (CR) blood group system**.
- Named **CRIB** = *Cromer + India + Bengaluru*.

Scientific Context:

- Triggered by **panreactivity** (sample reacting with all donors).
- Cromer antigens are located on the **Decay-Accelerating Factor (DAF) protein**, which shields red blood cells from immune attacks.

Global Significance:

- Adds to the rare blood group antigen database.
- Vital for **safe transfusion medicine**, preventing mismatched reactions.
- Underscores India's growing contribution to **molecular hematology & transfusion research**.
- Emphasises need for **rare donor registries** and international collaboration.



UPSC Relevance: Prelims: CRIB = new antigen in the Cromer system, discovered in Bengaluru. ISBT = global authority for naming blood group antigens. DAF protein protects RBCs from immune system attack.



HOT Question: “Examine the significance of discovering rare blood group antigens like CRIB for India’s healthcare system. How can international collaboration enhance transfusion safety? (150 words)”



14. Indian Scientists Develop VEGF-C Nano Therapy for Liver Cirrhosis



Researchers at the **Institute of Liver and Biliary Sciences (ILBS)**, New Delhi, and **NIPER Guwahati**, supported by the **Department of Science & Technology (DST)** under the **Nano Mission**, developed a **VEGF-C nano-therapy** to repair lymphatic vessel damage in **liver cirrhosis** patients.

Liver Cirrhosis Problem:

- Scar tissue damages **gut lymphatic vessels** → fluid accumulation (*ascites*), high portal pressure, weak immunity.
- Currently, **no treatment repairs lymphatic damage**; liver transplant is the only option in advanced cases.

Scientific Breakthrough:

- **VEGF-C (Vascular Endothelial Growth Factor-C)** → protein promoting lymphatic vessel growth (*pro-lymphangiogenic*).
- **Reverse Micelle Technology** used to create **oral nanocarriers** → enhance targeted lymphatic uptake.
- **Animal Trials**: Improved fluid drainage, reduced ascites & portal pressure, stronger gut immunity.

Significance:

- **First non-invasive targeted therapy** for advanced liver disease addressing lymphatic damage.
- **Cost-effective, scalable alternative** to liver transplants.
- Can be integrated into **Ayushman Bharat–PMJAY liver care modules** after human trials.



UPSC Relevance:

Prelims: VEGF-C = pro-lymphangiogenic protein. Reverse Micelle Technology = oral nanocarrier innovation. Supported under DST's **Nano Mission**.



HOT Question:

“Nanotechnology is emerging as a transformative tool in healthcare.” Discuss with reference to the development of VEGF-C nano-therapy for liver cirrhosis in India. (150 words)



15. Study Finds Anticancer Potential in Fungi from Soursop Leaves Against Cervical Cancer Cells



A recent study has discovered that **endophytic fungi** found in **soursop (Annona muricata) leaves** exhibit strong anticancer activity against cervical cancer cells, highlighting the scope for **alternative cancer therapies**

About Soursop (Graviola)

- **Scientific Name:** *Annona muricata*.
- **Native Origin:** Central & South America, Caribbean.
- **Indian Cultivation:** Kerala, Tamil Nadu, and adjoining regions.
- **Nutrients & Compounds:** Contains acetogenins, flavonoids, tannins, saponins, and phytosterols.
- **Health Benefits:** Antioxidant, antibacterial, low-calorie fruit.

Anti-Cancer Potential

- **Acetogenins:** Target mitochondrial pathways, selectively destroying cancer cells.
- **Flavonoids:** Neutralise free radicals, lowering mutation risks.
- **Endophytic Fungi:** Strains like *Sir-SM2* show potent anticancer action in cervical cancer cell lines.
- **Experimental Evidence:** Extracts from aerial parts (leaves, stems) suppress multiple cancer cell types in lab studies.

Significance

- **Medical Research:** Expands drug discovery from plant-fungal interactions.
- **Affordable Treatment:** Potential for low-cost cancer therapies using indigenous resources.
- **Nutraceutical Market:** Opens commercial opportunities in functional foods & supplements.

Limitations

- Current studies are **pre-clinical** (lab-based).
- **Toxicity, dosage, and efficacy** in humans remain unverified.
- Risk of **overhype in alternative medicine markets** without strong clinical trials.



UPSC Relevance:

GS2 – Health (Cancer burden, alternative medicine potential).

GS3 – Science & Tech (Drug discovery, biotechnology, nutraceuticals).



HOT Question:

“Plant-derived and microbial compounds are emerging as potential game-changers in cancer therapy. Discuss the opportunities and ethical challenges of bio-prospecting biodiversity for pharmaceutical development in India.”



16. Nanotech Tool for Early Parkinson's Detection



In **August 2025**, scientists at the **Institute of Nano Science and Technology (INST), Mohali**, developed a **nanotechnology-based biosensor** to detect **Parkinson's Disease (PD)** at its earliest stages, enabling timely diagnosis and intervention.

About Parkinson's Disease (PD):

- A progressive **neurodegenerative disorder** affecting movement, balance, and cognition.
- Caused by the accumulation of **toxic α -synuclein protein aggregates** that destroy brain cells.

Nanotech Innovation:

- **Gold nanoclusters (AuNCs)**: Engineered to glow under specific conditions.
- **Amino acid coatings**:
 - *Proline-coated AuNCs* → detect **healthy α -synuclein**.
 - *Histidine-coated AuNCs* → detect **toxic aggregated α -synuclein**.
- Allows **clear distinction** between healthy and diseased states.

Significance:

- **Early Detection**: Identifies PD before motor symptoms appear.
- **Healthcare Impact**: Reduces long-term treatment costs, improves quality of life.
- **Broader Potential**: Same platform adaptable for **Alzheimer's and other neurodegenerative diseases**.

Keywords: Parkinson's Disease, α -synuclein, Gold Nanoclusters, Neurodegenerative Disorders, Biosensor.



UPSC Relevance:

Prelims: Protein α -synuclein, nanotechnology in healthcare, role of INST Mohali. **Mains (GS3 – S&T, Health)**: “Discuss how nanotechnology is revolutionising early disease diagnostics in India.”



HOT Question:

How can nanotechnology-based biosensors transform early detection and management of neurodegenerative diseases in India?



17. CATCH Grant Program Launched to Boost AI in Cancer Care



The **IndiaAI Independent Business Division (IBD)**, in collaboration with the **National Cancer Grid**, launched the **CATCH (Cancer Technology using AI for Comprehensive Healthcare) Grant Program** to support AI-driven cancer innovations in India.

About the Program

- **Objective:** Support development of **AI tools** for cancer screening, diagnostics, treatment planning, and operational efficiency.
- **Funding:**
 - Up to **₹50 lakh per project**.
 - Additional **₹1 crore** for successful scale-up.
- **Eligibility:** Start-ups, health-tech companies, academic institutions, and hospitals.
- **Implementation Focus:**
 - Responsible AI development.
 - Clinical validation of solutions.
 - Deployment readiness in Indian healthcare settings.

Institutional Roles

- **IndiaAI IBD:** Operates under the **Digital India Corporation**, Ministry of Electronics & IT; focuses on AI leadership, self-reliance, and ethical use.
- **National Cancer Grid:** Network of cancer centres across India ensuring standardisation of cancer care and research.

Significance

- **Healthcare Impact:** Improves early detection, reduces diagnostic errors, and supports oncologists with decision-making.
- **Policy Link:** Complements **Digital India, Ayushman Bharat Digital Mission, and National AI Strategy**.

Innovation Ecosystem: Encourages start-ups and academia in health-tech R&D



UPSC Relevance:

Prelims: IndiaAI IBD, Digital India Corporation, National Cancer Grid.

Mains (GS II/III): Health governance, Digital India, role of AI in healthcare, innovation policy.



HOT Question: “Artificial Intelligence has the potential to transform cancer care in India, but it also raises ethical and deployment challenges. Discuss with reference to the CATCH Grant Program.” (150 words)



18. India Inaugurates First Animal Stem Cell Biobank at NIAB, Hyderabad



The **National Institute of Animal Biotechnology (NIAB)**, Hyderabad inaugurated **India's first Animal Stem Cell Biobank**, backed by the **National Biopharma Mission (DBT)**, to advance regenerative medicine, tissue engineering, and livestock research.

About the Biobank

- Stores and preserves **animal stem cells** for R&D.
- Focus areas: **regenerative medicine, cellular therapies, reproductive biotechnology, tissue engineering.**
- Supported under DBT's **National Biopharma Mission.**

Significance

- **One Health Approach** → Tackles zoonotic diseases linking human-animal health.
- **Livestock Productivity** → Genetic tools enhance breeding, resilience, and disease resistance.
- **Economic Impact** → Supports agriculture GDP growth and **"Evergreen Revolution"** goals.
- **BioE3 Policy Alignment** → Strengthens biotechnology-led economic growth & innovation.

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UPSC Relevance:

Prelims: First Animal Stem Cell Biobank → NIAB, Hyderabad. Backed by National Biopharma Mission (DBT). **Mains:** Role of biotechnology in livestock, food security, One Health approach.



HOT Question:

"India's first Animal Stem Cell Biobank is a step towards integrating biotechnology into agriculture and healthcare. Discuss its significance under the One Health framework." (150 words)



19. India drafts guidelines for establishing veterinary blood banks to strengthen animal healthcare and livestock productivity.



The **Department of Animal Husbandry & Dairying** (Ministry of Fisheries, Animal Husbandry & Dairying) has released **draft guidelines** for **Blood Banks & Blood Transfusion for Animals**

Key Provisions of the Draft Guidelines

- **Donor Criteria:** Healthy, vaccinated, non-pregnant animals within prescribed **age-weight limits**.
- **Bank Locations:** Veterinary colleges, referral hospitals, diagnostic centres, and government multi-speciality hospitals; **must function 24×7**.
- **Operating Mandate:**
 - Mandatory **disease screening** of donor animals.
 - **Traceability system** for every blood unit.
 - Maintain records for **5 years**.
- **National Network:** Creation of **National Veterinary Blood Bank Network (N-VBBN)** with registries, inventories, helplines, and standardised protocols.
- **Non-Commercial Basis:** No monetary incentives; **voluntary donations** encouraged.

Rationale & Need

- **Animal Health:** Supports safe, efficient blood transfusions for pets, farm animals, and working animals.
- **Demographic Scale:** India has **536.76 million livestock** and ~125 million pets.
- **Economic Significance:** Livestock contributes **~30% of Agricultural GVA** and **~5.5% of GDP**.
- **Global Standing:**
 - Largest population of **cattle and buffaloes**.
 - Second largest in **goats**.
- **Policy Gap:** No unified veterinary transfusion system existed before; lifesaving need in cases of **trauma, surgery, or disease (e.g., tick fever, anaemia, poisoning)**.



UPSC Relevance: Prelims: N-VBBN, ministry nodal role, livestock population stats. **Mains (GS III):** "Discuss the significance of veterinary blood banks in improving animal health and agricultural productivity in India."



HOT Question "With over 500 million livestock, India's veterinary health infrastructure faces critical gaps. Discuss how the establishment of animal blood banks can contribute to animal welfare, economic productivity, and disaster resilience." (150 words)



20. ICMR Launches SHINE Initiative for Students



In **August 2025**, the **Indian Council of Medical Research (ICMR)** launched the **SHINE Initiative (Science & Health Innovation for the Nextgen Explorers)** to foster scientific curiosity among **Classes 9–12 students** across India. The launch coincided with the birth anniversary of **Prof. V. Ramalingaswami**, a pioneer in Indian medical research.

About the SHINE Initiative

- **Objective:** Inspire young students towards **science, health, and biomedical research**.
- **Scope:** Nationwide outreach through all ICMR institutes.
- **Mode:** Hands-on learning, interactive workshops, exposure to real-world labs & researchers.
- **Target Group:** School students (Class 9–12).

Significance

- **Scientific Temper:** Aligns with **Article 51A(h)**, promoting the spirit of inquiry.
- **Talent Pipeline:** Encourages early careers in **health research and biomedical innovation**.
- **Nationwide Reach:** Simultaneous activities across ICMR centres ensure inclusivity.
- **Global Standing:** Strengthens India's future position in **public health research & innovation ecosystems**.

About Prof. V. Ramalingaswami

- Eminent pathologist, nutritionist, and medical researcher.
- Former Director-General of ICMR and President of INSA.
- Key contributor to tackling malnutrition and liver diseases in India.

Keywords: ICMR, SHINE Initiative, Prof. V. Ramalingaswami, Scientific Temper, Biomedical Research



UPSC Relevance:

GS2 – Health & Education: Role of research institutions in human resource development. **GS3 – Science & Tech:** Promoting innovation & research ecosystems.



HOT Question:

Discuss the significance of early exposure to scientific research in shaping India's human resource base for health and innovation. Illustrate with reference to ICMR's SHINE initiative



21. China Develops Artificial Pregnancy Robot; Live-Birth Prototype Expected by 2026



China is advancing work on an **artificial pregnancy robot**—a synthetic womb that mimics the human uterus—aiming to deliver a live-birth prototype by **2026**, raising both technological promise and ethical debates.

About the Project

- **Synthetic Womb:** Foetus floats in an artificial womb, receiving **oxygen and nutrients via tubes**, simulating natural gestation.
- **Precedent:** Builds on the **2017 “biobag” experiment** in the U.S., which kept premature lambs alive.
- **Medical Purpose:** Primarily designed to aid **infertility treatment**, a condition affecting **~15% of couples worldwide**.
- **Tech Integration:** Combines robotics, bioengineering, and medical AI for real-time monitoring of foetal development.

Potential Benefits

- **Infertility Solutions:** Offers hope for couples unable to conceive naturally.
- **Premature Births:** Could provide safer gestation for preterm babies, reducing infant mortality.
- **Research Platform:** Allows scientists to study **foetal development** without ethical restrictions of direct human experimentation.
- **Demographic Use:** May address China’s declining birth rates and ageing population concerns.

Ethical Concerns

- **Foetal Bonding:** Lack of maternal connection may impact emotional development.
- **Exploitation Risks:** Commercial egg sourcing may exploit women.
- **Psychological Impact:** Children born via artificial wombs may face **identity and bonding challenges**.
- **Regulation Gap:** No global legal framework yet for synthetic wombs or AI-driven gestation.

Keywords: Artificial womb, synthetic pregnancy, infertility technology, bioethics, assisted reproduction.



UPSC Relevance:

GS3 (Science & Tech): Emerging biotech and AI in healthcare. **GS2 (Health & Society):** Ethical implications of medical technology. **GS4 (Ethics):** Human dignity, reproductive rights, and bioethics.



HOT Question “

“Artificial womb technology challenges traditional notions of reproduction, family, and bioethics. Discuss its potential benefits and ethical dilemmas in the context of India’s healthcare system and demographic trends.”

22. Engineered E. coli becomes a living, self-powered mercury sensor



Scientists have modified **E. coli bacteria** to act as **low-cost, self-powered biosensors** that can detect toxic substances like **mercury** and sugars such as arabinose, producing **direct electronic signals** for real-time monitoring of water pollution.

About E. coli

- Belongs to *faecal coliforms*, commonly found in the intestines of humans and animals.
- Some strains cause diseases, while others are harmless and widely used in biotechnology.

The New Biosensor

- **Function:** Detects mercury ions in ~3 hours and sugars like arabinose in ~2 hours.
- **Sensitivity:** Identifies mercury at **25 nanomoles**, below WHO safety limits.
- **Mechanism:** Modified bacteria generate **direct electronic output** when exposed to target chemicals.
- **Programmability:** Can be engineered to detect various toxic chemicals in water.
- **Power Source:** Self-powered—does not require external batteries.

Significance

- **Environmental Safety:** Early detection of heavy metals like mercury in water prevents health hazards.
- **Low Cost:** Cheaper than conventional spectrometric or chemical assays.
- **Real-Time Monitoring:** Enables continuous water quality checks in rural and urban areas.
- **Health Benefits:** Prevents mercury poisoning, which can cause neurological and kidney damage.

Keywords & Concepts

- **Arabinose:** A pentose sugar found in plant cell walls, used as a carbon source by bacteria.
- **WHO Mercury Limit:** WHO recommends less than 6 micrograms/Litre in drinking water.
- **Biosensor:** A device using biological elements (cells, enzymes, DNA) to detect chemicals.



UPSC Relevance: **GS3 (Science & Tech):** Biotechnology applications in pollution detection. **GS3 (Environment):** Heavy metal contamination and its monitoring. **GS2 (Health):** Public health challenges of mercury poisoning.



HOT Question: “Discuss the role of synthetic biology in developing low-cost biosensors for environmental monitoring. Highlight the ethical and ecological risks of using genetically modified organisms in open environments.”



23. IIT Roorkee Develops Compound 3b to Revive Antibiotic Effectiveness



In **August 2025**, IIT Roorkee scientists announced **Compound 3b**, a breakthrough drug candidate that restores the power of **Meropenem** against *Klebsiella pneumoniae*, a WHO-classified multidrug-resistant superbug.

Context & Significance

- *Klebsiella pneumoniae* is a leading cause of hospital-acquired infections, resistant to multiple antibiotics.
- WHO has listed it among the **top-priority pathogens** for urgent new drug development.

About Compound 3b

- **Mode of Action:** Inhibits bacterial enzymes that break down Meropenem, reviving its potency.
- **Combination Therapy:** Works *with* Meropenem, not as a standalone antibiotic.
- **Preclinical Evidence:** Safe for human cells, reduces lung infection in animal models.

Global Health Relevance

- **Antibiotic Resistance:** Restores life-saving effectiveness of existing antibiotics.
- **Procedural Safety:** Makes surgeries, cancer therapies, and ICU treatments safer.
- **Cost-Effective:** Revives old antibiotics instead of relying solely on costly new drug pipelines.

Keywords: AMR (Antimicrobial Resistance), Superbug, *Klebsiella pneumoniae*, Meropenem, Adjuvant Therapy.



UPSC Relevance: **GS3 – Science & Tech | Health:** Biotechnology innovation against AMR. **GS2 – Governance:** Public health challenges, WHO priority pathogens. **Prelims:** Antibiotic resistance, WHO lists, IIT innovations.



HOT Question: “Antimicrobial resistance (AMR) is a silent pandemic. Discuss how innovations like Compound 3b can reshape global strategies to combat AMR.”



24. Ionic Liquids Could Support Life Beyond Water



In **August 2025**, an MIT study proposed that **ionic liquids**, instead of water, could act as life-supporting solvents on rocky planets and moons, reshaping definitions of planetary habitability.

What are Ionic Liquids?

- Salts that remain **liquid below 100°C**.
- Formed by mixing **sulfuric acid** (common in volcanic activity) with **nitrogen-based organic compounds** (already detected on asteroids/planets).

Why Significant?

- **Planetary Relevance:** Could exist naturally on rocky planets and moons.
- **Advantages over Water:**
 - Extremely **low vapour pressure**, resist evaporation.
 - Stable at **higher temperatures & lower pressures** than water.
- **Biomolecular Potential:** Some proteins remain stable in ionic liquids → could sustain **biochemical processes**.

Expanding the Habitable Zone

- Traditional habitability linked only to water.
- With ionic liquids, the range of potentially habitable environments in the **universe expands**.

Keywords: Ionic Liquids, Habitability, Astrobiology, Sulfuric Acid, Nitrogen Organics, MIT Study



UPSC Relevance:

Prelims: Basics of ionic liquids, habitable zone definition.



HOT Question:

“The concept of a habitable zone in astrobiology is undergoing revision with the discovery of ionic liquids. Discuss how this challenges Earth-centric definitions of life.”



25. Government Pushes Semiconductor Design Innovation



On **22nd August 2025**, the Government of India sanctioned **23 chip-design projects under the Design Linked Incentive (DLI) Scheme**, aiming to build a strong domestic semiconductor design ecosystem.

About the DLI Scheme

- **Launched by MeitY (2021):** Provides financial incentives, mentorship, and access to Electronic Design Automation (EDA) tools.
- **Focus:** Supports startups, MSMEs, and academia in developing IP-driven chip designs.
- **Significance:** Reduces import dependence, boosts *Atmanirbhar Bharat*, and integrates India into global semiconductor value chains.

Case Study – VerveSemi Microelectronics

- **BLDC Controller ASIC:** For small motors (fans/appliances) under Chips to Startup (C2S) Programme; samples due 2026.
- **Precision Motor-Control ASIC:** For EVs, drones, industrial automation; sampling in 2026.
- **Multifunction Data Acquisition ASIC:** ML-powered, designed for space & avionics applications; samples due 2026.

Keywords: ASIC (Application-Specific Integrated Circuit), DLI, C2S Programme, Semiconductor Mission.



UPSC Relevance:

Prelims: DLI Scheme, Chips to Startup (C2S), Indian Semiconductor Mission



HOT Question “Examine the role of the Design Linked Incentive (DLI) Scheme in making India a global hub for semiconductor design and innovation.”



26. India Launches First National Biofoundry Network



On **27th August 2025**, the Union Science & Technology Minister launched the **National Biofoundry Network (NBN)**, comprising six institutions, to scale up biomanufacturing, generate employment, and position biotechnology as a key driver of India's economy and sustainability.

About the National Biofoundry Network (NBN)

- Six premier institutions form the network.
- Focus: Converting **proof-of-concept into scalable technologies**, indigenous biomanufacturing, and job creation.
- Linked to **BioE3 Policy** (Economy, Environment, Employment).

India's Bioeconomy Growth

- Grew from **\$10 bn (2014) → \$165.7 bn (2024)**.
- Target: **\$300 bn by 2030**.

Key Initiatives

- **BioE3 Challenge for Youth:** Encourages young innovators to design safe, sustainable biotech solutions.
- **State Partnerships:** Assam signed MoU to establish a **BioE3 Cell** as a pilot model.
- **Global Engagement:** India's missions in **52 countries** involved in shaping BioE3 Policy.

Significance

- Expands biotech beyond labs into **startups, jobs, and sustainable development**.
- Applications across **healthcare, agriculture, clean energy, and environment**.
- Strengthens India's role in global **bioeconomy & green growth transition**.

Keywords: Biofoundry, Bioeconomy, BioE3 Policy, Biomanufacturing, Synthetic Biology



UPSC Relevance:

Prelims: Biofoundry, BioE3 Policy, bioeconomy value targets



HOT Question: "How can India's National Biofoundry Network transform the country's bioeconomy while ensuring environmental sustainability and employment generation?"



27. India Seeks Regulatory Reform to Transform from “Pharmacy of the World” to Biotechnology Innovation Hub



India, while a leader in affordable generic medicines, faces regulatory bottlenecks that restrict its biotechnology and biopharma innovation potential. The government and industry stress the need for faster approvals, updated rules, and predictable regulation

Current Regulatory Framework

- **Statutory Basis:** *Drugs & Cosmetics Act, 1940* governs pharmaceuticals and biotech products.
- **Regulator:** *Central Drugs Standard Control Organisation (CDSCO)* under MoHFW.
- **Clinical Trials:** Governed by *New Drugs & Clinical Trials Rules, 2019*.
- **Ethical Oversight:** *Institutional Ethics Committees* safeguard patient rights.
- **Pricing:** *National Pharmaceutical Pricing Authority (NPPA)* regulates essential drugs & biologics.
- **Advisory:** *Drugs Technical Advisory Board (DTAB)* provides technical guidance.

Challenges in India's Regulatory System

- **Fragmented Oversight:** CDSCO + state regulators cause duplication & delays.
- **Slow Approvals:** Long timelines deter startups & global investors.
- **Capacity Gaps:** Shortage of trained manpower for inspections & compliance.
- **Outdated Rules:** Legacy laws fail to accommodate *gene therapy, CRISPR, digital health tools*.
- **Investor Concerns:** Regulatory unpredictability → venture capital hesitancy.

Significance of Reform

- **Innovation Potential:** Streamlined rules enable faster discovery of *novel biologics & vaccines*.
- **Market Access:** Quick approvals aid critical diseases (rare genetic disorders, cancers).
- **Investment Climate:** Predictability attracts FDI, venture funding, and partnerships.
- **Strategic Transition:** From low-cost generic producer → global innovation hub.
- **Job Creation:** Supports biotech clusters, R&D centres, and start-up ecosystem.

Way Forward

- **Digital Window:** *Unified national approval platform* integrating CDSCO & state bodies.
- **Adaptive Trials:** Flexible trial models with *real-world evidence & digital monitoring*.
- **AI Tools:** Predictive toxicology & safety using AI-driven models.
- **Market Access:** *Special listing frameworks* for biotech startups to raise early funding.
- **Incentives:** Patent-box tax breaks, R&D-linked subsidies to encourage biotech IP creation.



UPSC Relevance: **GS3 (Science & Tech / Economy):** Biotechnology regulation, innovation ecosystem, pharma sector. **GS2 (Governance):** Regulatory reforms, statutory bodies, ease of doing business.



HOT Question “India is called the ‘pharmacy of the world’ due to its strength in generics. Critically analyse how regulatory reform in biopharmaceuticals can help India transition into a global biotechnology innovation hub.”



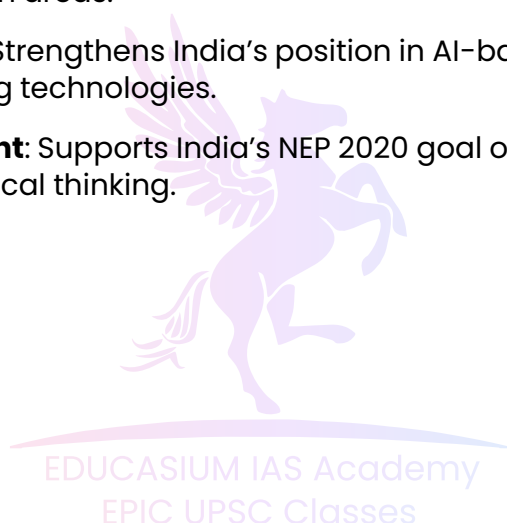
28. OpenAI launched its first India-focused Learning Accelerator in New Delhi, partnering with IIT Madras and the Ministry of Education



OpenAI will open its **first India office in New Delhi**, expanding into its **second-largest user market**. Collaboration with **IIT Madras** includes a **\$500,000 research grant** for AI-driven learning studies. **500,000 ChatGPT licenses** to be distributed to educators and students in partnership with the Ministry of Education

Significance

- **Digital Transformation:** Accelerates integration of AI in classrooms and higher education.
- **Equity in Education:** Reduces barriers to personalised learning for students in rural and urban areas.
- **Research Edge:** Strengthens India's position in AI-based pedagogy and adaptive learning technologies.
- **Skill Development:** Supports India's NEP 2020 goal of technology-enabled learning and critical thinking.



UPSC Relevance:

GS2 (Governance): Role of AI in improving public education. **GS3 (S&T):** India's AI innovation ecosystem.



HOT Question: "Examine how AI-powered learning accelerators can bridge educational inequalities in India. What regulatory safeguards are necessary to prevent misuse?"



29. South Africa Launches Rhisotope Project Using Radioisotopes to Curb Rhino Poaching



A South African university initiated the **Rhisotope Project** in the **Waterberg Biosphere Reserve**, deploying **isotope tagging of rhino horns** to deter illegal poaching and trafficking.

Radioactive Isotopes (Radioisotopes):

- Unstable elements that **emit radiation** until stable.
- Radiation can be traced, making them useful for **tracking & detection**.

Isotope Tagging Process:

- **Non-invasive injection** of **low-dose radioisotopes** into rhino horns.
- Tagged horns become **detectable by Radiation Portal Monitors (RPMs)** at **airports, ports, and borders**.
- RPMs are typically used to detect **unauthorized nuclear material**, now adapted for **wildlife crime prevention**.

Significance:

- Innovative **anti-poaching technology** integrating wildlife conservation with nuclear detection systems.
- Deters trafficking by making rhino horns **easily traceable internationally**.
- Potentially scalable for other endangered species with high-value body parts (e.g., pangolins, tigers).



UPSC Relevance:

Prelims: Rhisotope Project = South Africa, rhino horn isotope tagging. RPMs detect nuclear materials but adapted for anti-poaching.



HOT Question:

The Rhisotope Project is a novel example of nuclear science applied to wildlife conservation." Discuss its significance and potential challenges in combating global wildlife trafficking. (150 words)



30. Northeast Frontier Railway adopts compostable bioplastic packaging for green transport



The **Northeast Frontier Railway (NFR)** became the first railway zone in India to introduce **compostable bioplastic packaging** developed by IIT Guwahati. The initiative aligns with India's ban on single-use plastics and railway sustainability goals.

About Bioplastics

- **Definition:** Plastics derived from renewable sources (corn starch, sugarcane, etc.).
- **Types:**
 - *Biobased but not biodegradable* (e.g., bio-PE).
 - *Biodegradable but not biobased* (e.g., fossil-based PBAT).
 - *Both biobased & biodegradable* (e.g., PLA blends).
- **Compostable Bioplastic:** Certified to decompose fully under controlled composting without leaving microplastic residue.

NFR's Initiative

- **Adoption:** Compostable bioplastic for packaging to reduce plastic footprint.
- **Innovation:** IIT Guwahati-developed technology ensures biodegradability.
- **Circular Economy Step:** Inoculum generation facility at Kamakhya station converts biodegradable waste into bedroll bags.
- **Geography:** NFR, India's easternmost zone, covering Assam, Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Mizoram, and Tripura.

Significance

- **Supports Plastic Ban:** Aligns with India's 2022 ban on single-use plastics.
- **Sustainability:** Reduces non-biodegradable waste in railway catering and packaging.
- **Scalability:** Pilot model for replication across Indian Railways.
- **Innovation Ecosystem:** Promotes academic-industry collaboration (IIT Guwahati).

Pros & Cons

✓ **Pros:** Environment-friendly, reduces landfill burden, supports green transport, boosts Indian R&D.

✗ **Cons:** Higher cost vs. conventional plastic, requires controlled composting facilities, limited large-scale production capacity.

Keywords: Bioplastic, Compostable, IIT Guwahati, Indian Railways, Single-use Plastic Ban, Circular Economy.



UPSC Relevance: **GS3 (Environment):** Sustainable alternatives to single-use plastic. **GS3 (Infrastructure):** Green practices in Indian Railways.



HOT Question: "Compostable bioplastics are being promoted as a sustainable alternative to single-use plastics. Critically analyse their environmental viability and scalability in India."



31. Darwin Tree of Life Project Nears Completion of First Phase



The **Darwin Tree of Life (DTOL) Project**, aimed at sequencing all eukaryotic species in Britain and Ireland, announced near completion of its **first phase**, contributing to the global **Earth BioGenome Project (EBP)**.

Darwin Tree of Life (DTOL):

- Target: **Sequence genomes of ~70,000 eukaryotic species** in Britain & Ireland.
- Purpose: Build genomic resources for conservation, evolution studies, and biotechnology.
- Linked to **Earth BioGenome Project (EBP)**.

Earth BioGenome Project (EBP):

- Ambition: Sequence, catalog, and characterize **~10 million eukaryotic species** worldwide within 10 years.
- Scope: Largest global genomics initiative with collaborations across universities, research institutions, and conservation bodies.
- Impact: Helps understand **biodiversity, climate resilience, species conservation, and bioresource use**.

Key Concept:

- **Eukaryotes** = organisms with **nucleus and membrane-bound organelles** (plants, animals, fungi, protists).



UPSC Relevance: Prelims: DTOL = UK–Ireland project, part of Earth BioGenome Project. EBP = global effort to sequence all eukaryotic life. Eukaryotes = organisms with nucleus & organelles.



HOT Question: “Examine the significance of the Darwin Tree of Life and Earth BioGenome Project in biodiversity conservation and scientific advancement. What lessons can India draw for its own biodiversity initiatives? (150 words)”



32. GEAC Approves GM Maize Field Trials at PAU Amid Environmental Concerns



The **Genetic Engineering Appraisal Committee (GEAC)** approved **confined field trials of two GM maize varieties** developed by Bayer at **Punjab Agricultural University (PAU)** for the **2025 Kharif season**.

About GM Maize

- **Traits being tested:**
 - **Herbicide Tolerance (HT):** Resistant to *glyphosate-K* for weed management.
 - **Insect Resistance (IR):** Protection against *lepidopteran pests* (moths, butterflies).
- **Objective:** To evaluate **agronomic performance, yield stability, and biosafety** before commercial release.

Regulatory Framework

- **GEAC (Genetic Engineering Appraisal Committee):**
 - Apex body under **MoEFCC** for approving GM organism research, trials, and release.
 - Works under the **Environment (Protection) Act, 1986**.
- **Biosafety Requirement:** Only *confined field trials* allowed; commercial release requires multiple clearances.

Criticism & Concerns

- **Punjab Glyphosate Ban (2018):** State prohibits glyphosate sale due to soil and health risks.
- **Environmental Risks:**
 - Glyphosate overuse → herbicide-resistant “superweeds”.
 - Threats to non-target species (bees, soil microbes).
- **Health Concerns:** Glyphosate suspected carcinogen (WHO’s IARC classified as “probable carcinogen”).
- **Farmers’ Autonomy:** Seed patenting by MNCs like Bayer may lead to corporate control over agriculture.
- **Biodiversity Impact:** Possible cross-pollination with native maize strains.

Significance

- **Agricultural Productivity:** May reduce crop losses from pests and weeds.
- **Labour Saving:** HT maize reduces manual weeding costs.

Policy Debate: Balances **food security vs. biosafety concerns** in India’s GM policy



UPSC Relevance:

GS3: Science & Tech (Biotech), Agriculture, Environmental Pollution, Biodiversity. **GS2:** Governance – Role of regulatory bodies like GEAC.



HOT Question “

Critically examine the recent approval of GM maize field trials in India. Discuss its potential benefits and associated risks in the context of food security and environmental safety.



33. Unregulated aluminium cookware raises lead poisoning risks in India, posing public health and economic challenges.



A recent study revealed that **older aluminium pressure cookers**, especially those manufactured from **unregulated scrap metals**, can leach **toxic lead into food**, intensifying India's already high burden of lead exposure

About Lead

- **Nature:** Soft, malleable, ductile heavy metal with low conductivity.
- **Uses:** Batteries, paints, pipes, alloys, solder, toys, cosmetics.
- **WHO Classification:** Listed as one of the *top 10 public health concerns*.
- **Toxicity Threshold:** Blood lead $\geq 5 \mu\text{g/dL}$ causes neurological, developmental, and cardiovascular harm.

Lead Poisoning (Plumbism)

Definition: Gradual accumulation of lead in body tissues causing toxic effects.

Sources: Cookware (pressure cookers, pans), lead paint, polluted water, soil, mining, batteries.

Burden: One-third of global children affected.

India worst-hit, with **~5% GDP loss** attributed to lead exposure.

- **Health Impacts:**
 - Anaemia, kidney damage, hypertension.
 - Cognitive decline, IQ loss, behavioural disorders in children.
 - Foetal harm in pregnant women.

Policy Measures in India

- **Leaded Petrol Ban (2000):** Eliminated a major exposure source.
- **Lead Paint Rules (2016):** Decorative paints capped at **90 ppm**, aligning with GAELP targets.
- **FSSAI Food Limits (2011):** Lead chromate banned in turmeric; ≤ 10 ppm in packaged foods.
- **Insecticides Act (2019):** Banned lead arsenate in farming (weak enforcement).
- **PVC Stabiliser Rules (2021):** Restricted lead stabilisers in PVC pipes.
- **Air Standards (2009):** CPCB's NAAQS set permissible ambient lead levels.
- **Global Alliance to Eliminate Lead Paint (GAELP, 2011):** UNEP-WHO partnership for global elimination.



UPSC Relevance:

GS2 (Governance, Health): Public health policy, regulatory gaps. **GS3 (Environment, S&T):** Pollution hazards, toxic exposure, GAELP.



HOT Question: "Lead poisoning is both a public health and an economic problem in India. Critically analyse the challenges in regulating informal industries and propose a roadmap for eliminating lead exposure by 2030."



34. Kerala reports three new cases of brain-eating amoeba infection, a rare but fatal disease.



Kerala has reported three cases of **Primary Amoebic Meningoencephalitis (PAM)** in 2025, caused by the brain-eating amoeba *Naegleria fowleri*, which carries a fatality rate of 97%.

About *Naegleria fowleri* & PAM

- **Pathogen:** *Naegleria fowleri* – a free-living amoeba found in **warm freshwater, hot springs, lakes, rivers, and soil**.
- **Infection Route:** Enters via the nose → migrates through the olfactory nerve → destroys brain tissue.
- **Non-Transmission:** Not spread by drinking water or human-to-human contact.
- **Fatality:** Mortality rate ~97%, death within 5–18 days of symptom onset.

◆ Symptoms

- Early: Headache, fever, nausea, vomiting.
- Advanced: Stiff neck, confusion, seizures, hallucinations, coma.

◆ Challenges

- **No definitive cure** – Amphotericin B, miltefosine, and combination therapies tried with limited success.
- **Early detection rare** – Symptoms mimic bacterial/viral meningitis.
- **High fatality** – Most patients die within days despite treatment.

◆ Prevention

- Avoid swimming/diving in untreated warm freshwater.
 - Use nose clips to prevent entry of water into nasal passages.
- Ensure chlorination of swimming pools and water storage tanks.



UPSC Relevance:

GS2 (Health): Public health challenges, communicable diseases. **GS3 (S&T):** Microbiology & rare pathogens.



HOT Question “

“The emergence of rare pathogens like *Naegleria fowleri* (‘brain-eating amoeba’) highlights the need for stronger disease surveillance in India.

Discuss the challenges in tackling such rare infections and suggest a way forward.”

35. Puga Hot Spring in Ladakh: A Natural Lab for Origin of Life Studies



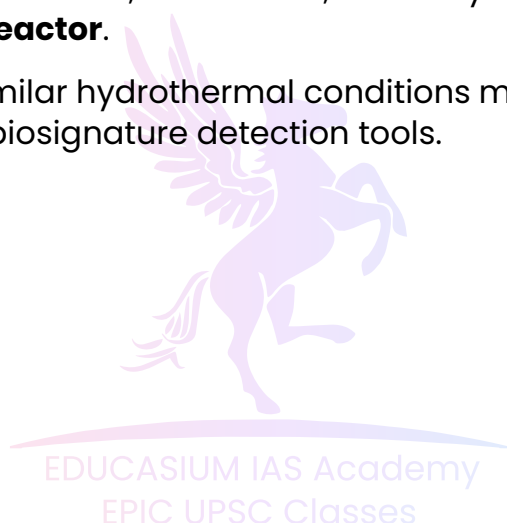
A recent study highlighted **Puga Hot Spring, Ladakh**, as a key site where **travertine deposits** preserve prebiotic molecules, aiding both the study of Earth's early life and ISRO's Mars life-detection research.

Location: Puga Valley, Changthang Plateau, Ladakh.

Geothermal Significance: Part of the Himalayan geothermal belt, with hot springs, mud pools, sulphur, borax, lithium, and surface temperatures up to 84°C.

Key Insight: Travertine (CaCO_3 deposits) at Puga stabilises organic molecules like amino acids, formamide, and fatty acids—acting as a **natural prebiotic reactor**.

Mars Analogue: Similar hydrothermal conditions make it useful for developing ISRO's biosignature detection tools.



UPSC Relevance:

Prelims: Puga Hot Spring → Changthang Plateau, Ladakh. Rich in borax, sulphur, lithium. Travertine = CaCO_3 deposit around hot springs, preserves organics.



HOT Question: “Discuss the significance of Puga Hot Spring, Ladakh, in origin-of-life research and its relevance for India's planetary exploration programmes. (150 words)”



36. Entangled Atomic Clocks Proposed to Probe Quantum–Gravity Interface



Scientists have proposed using **quantum-entangled atomic clocks** placed at different heights to experimentally test how **quantum mechanics interacts with general relativity in curved spacetime**, potentially resolving one of physics' greatest conflicts.

Quantum Mechanics: Explains matter at microscopic scales using concepts like **superposition, entanglement, and probability**.

General Relativity: Explains gravity as **curvature of spacetime** caused by massive bodies, governing planetary and cosmic dynamics.

Conflict Zone: Both theories are experimentally successful but diverge in extreme conditions (black holes, Big Bang, etc.).

Proposed Experiment

Setup: Entangle three atomic clocks placed at **kilometre-scale height differences**.

Relativity Prediction: Gravitational curvature alters time flow → produces **nonlinear differences** in clock readings.

Verification: Entanglement allows detection of **tiny relativistic frequency shifts** otherwise immeasurable.

Goal: First direct **laboratory test of quantum mechanics in curved spacetime**.

Significance

Scientific Validation: Could confirm or challenge our understanding of time under **quantum + relativistic overlap**.

Applied Potential:

Improved **satellite navigation & GPS precision**.

Tools for detecting **dark matter and gravitational waves**.

Advances in **quantum communication and secure networks**.

Challenges

Fragility: Entangled states are prone to **decoherence** from environment.

Measurement Precision: Requires unprecedented accuracy in detecting **tiny frequency shifts**.

Scaling: Maintaining entanglement across kilometre distances is technologically difficult.

Key Terms

Atomic Clocks: Devices measuring time via atomic energy transition oscillations.

Quantum Entanglement: Two or more particles linked so changes in one instantly affect the other, regardless of distance.

Spacetime Curvature: Bending of spacetime around massive bodies, producing gravity.

Decoherence: Loss of quantum properties due to environmental interference.



UPSC Relevance:

GS Paper 3 – Science & Technology Applications of quantum technologies in space, communication, and defence. India's Quantum Mission and international research in fundamental physics.



HOT Question:

How can entangled atomic clocks help bridge the gap between quantum mechanics and general relativity? Discuss the scientific and applied significance of such an experiment.



AUGUST 2025

HISTORY ART & CULTURE

1. Piprahwa Relics of Lord Buddha
2. Centenary of Kakori Train Action, 1925
3. 1.48 Million-Year-Old Hominid Artefacts
4. INS Guldar to be India's First Underwater Museum
5. 64th National Exhibition of Art Opens in New Delhi
6. 71st National Film Awards (2023)
7. Manika Vishwakarma Crowned Miss Universe
8. Naangarni Spardha
9. Despite a 1997 ban, Dhirio bullfights continue.
10. Bihar Hosts Asia Rugby U-20 Championship 2025
11. India Hosts First Khelo India Water Sports Festival
12. India celebrates National Sports Day 2025



1. Piprahwa Relics of Lord Buddha Return to India



The **Piprahwa relics**, associated with Lord Buddha's mortal remains, were brought back to India in 2025, after part of them had been dispersed abroad since their discovery in 1898.

Discovery (1898): British engineer **William Claxton Peppé** excavated a stupa at **Piprahwa, Uttar Pradesh**, believed to be among the eight original stupas built to house Buddha's relics.

Findings: A stone coffer containing **ashes, bone fragments, gold ornaments, pearls, gemstones**.

Inscription: A **Brahmi script** casket inscription confirmed relics belonged to Lord Buddha, deposited by his **Shakya clan**.

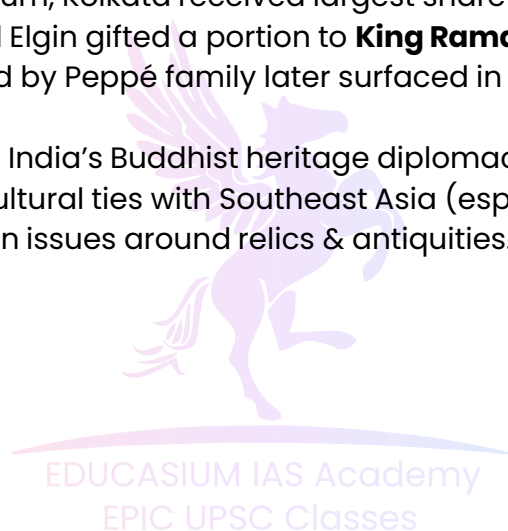
Dispersal:

- Indian Museum, Kolkata received largest share (1899).
- Viceroy Lord Elgin gifted a portion to **King Rama V of Siam (Thailand)**.
- Part retained by Peppé family later surfaced in auction (2025).

Significance:

- Strengthens India's Buddhist heritage diplomacy.
- Enhances cultural ties with Southeast Asia (esp. Thailand, Myanmar).

Reinforces conservation issues around relics & antiquities.



UPSC Relevance: **Prelims:** Piprahwa → Uttar Pradesh (Kapilvastu region). Eight original stupas built after Buddha's Mahaparinirvana. Brahmi inscriptions confirm early Buddhist history.



HOT Question “Examine the historical and cultural significance of the Piprahwa relics in the context of Buddhist traditions and India's cultural diplomacy. (150 words)”



2. Centenary of Kakori Train Action, 1925



On **9th August 2025**, PM Narendra Modi paid tribute to the revolutionaries of the **Kakori Train Action**, marking **100 years of the historic event** that shook the British Empire during India's freedom struggle.

About Kakori Train Action

- **Date & Place:** 9 August 1925, near Kakori railway station (Uttar Pradesh).
- **Organisation:** Planned by the **Hindustan Republican Association (HRA)**, founded by **Sachindranath Sanyal**.
- **Revolutionaries Involved:** Ram Prasad Bismil, Ashfaqulla Khan, Rajendranath Lahiri, Thakur Roshan Singh, Sachindranath Sanyal.
- **Event:** Revolutionaries stopped the **No. 8 Down Train** and looted funds from the British Government Treasury stored in the guard's cabin.
- **Purpose:** To finance revolutionary activities against the British using money taken from the colonial treasury (collected via heavy taxation).

Significance

- Exposed colonial exploitation and inspired youth towards armed struggle.
- Showed the determination of revolutionaries to link **economic resistance** with **political liberation**.
- **Aftermath:** Several revolutionaries were arrested; Bismil, Ashfaqulla, Lahiri, and Roshan Singh were executed in 1927; others were given long sentences.

Keywords: Hindustan Republican Association (HRA), Armed Struggle, 1920s Revolutionary Movement, British Treasury Robbery.



UPSC Relevance:

GS1 (Modern Indian History): Contribution of revolutionaries to India's independence. **Prelims:** Facts on HRA, leaders, date/place of Kakori Train Action.



HOT Question “Revolutionary movements like the Kakori Train Action kept alive the spirit of defiance in India's freedom struggle. Discuss their role in complementing mainstream nationalist movements



3. 1.48 Million-Year-Old Hominid Artefacts Found in Indonesia's Wallacea Challenge Migration Theories



Archaeologists unearthed stone tools in **Sulawesi, Indonesia**, dating to **~1.48 million years ago**, the **oldest evidence of hominids in Wallacea**, reshaping migration timelines in Asia-Pacific prehistory.

Key Artefacts:

- Small chipped **stone tools** for cutting animals and carving rocks.
- Attributed to **Homo erectus** or related archaic hominins, not *Homo sapiens*.

Significance:

- Pushes back evidence of Wallacean human presence by ~500,000 years.
- Suggests **advanced sea crossings** from mainland Asia much earlier than thought.
- Revises models of migration into Australia and Southeast Asia.

About Wallacea:

- **Biogeographical transition zone** between **Sunda Shelf (Asia)** and **Sahul Shelf (Australia)**.
- Includes islands: Sulawesi, Flores, Timor, Sumbawa, Lombok.

Known for distinct flora, fauna, and early human dispersal studies.

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UPSC Relevance: Prelims: Location of **Wallacea** & Sulawesi island. Early hominins → **Homo erectus**. Mains: Role of Wallacean finds in **revising human migration models**. Significance of sea crossings in **prehistoric human dispersal**



HOT Question “The discovery of Wallacean hominid artefacts in Indonesia challenges existing migration models. Analyse its implications for our understanding of early human dispersal in Asia.” (150 words)



4. INS Guldar to be India's First Underwater Museum & Artificial Coral Reef



India is developing its **first underwater museum** around the decommissioned warship **INS Guldar** off the Maharashtra coast, blending **naval heritage, eco-tourism, and marine biodiversity promotion**.

About INS Guldar

- **Class:** Kumbhir-class Landing Ship Tank (LST).
- **Role:** Amphibious operations – transporting troops, tanks & equipment.
- **Origin:** Built in Poland, commissioned in **1985**, decommissioned in **2024**.

Underwater Museum Project

- **Implementation:** Maharashtra Tourism Development Corporation (MTDC) with **Ministry of Tourism** support.
- **Concept:** Warship sunk & preserved to form a marine attraction and artificial coral reef.
- **Objective:**
 - Preserve **naval heritage**.
 - Boost **tourism & diving economy**.
 - Promote **marine biodiversity** by fostering coral colonisation.

Environmental Significance

- Artificial reefs replicate natural habitats, supporting fish breeding.
- Enhances ocean ecosystem resilience amid climate-driven coral loss.



UPSC Relevance:

Prelims: INS Guldar → first underwater museum in India. Artificial coral reefs – role in marine biodiversity.



HOT Question “Critically examine how projects like the INS Guldar underwater museum can balance heritage conservation with marine ecology and tourism development.” (150 words)



5. 64th National Exhibition of Art in New Delhi



On **5th August 2025**, the Lalit Kala Akademi inaugurated the **64th National Exhibition of Art (NEA)** in New Delhi. For the first time, award-winning artworks will be **open for public purchase**, marking a major step in empowering artists and boosting India's creative economy.

About NEA & Lalit Kala Akademi

- **NEA:** India's premier art exhibition showcasing excellence in painting, sculpture, graphics, photography, ceramics, and installations.
- **Lalit Kala Akademi:** Established in 1954 as India's **national academy of visual arts**, under the Ministry of Culture.
- **Mandate:** To promote understanding of Indian art, encourage young artists, and preserve heritage.

Highlights of 2025 Edition

- **Market Access:** For the first time, select award-winning works are available for **public purchase**.
- **Awards:** 20 artists received the **Lalit Kala Akademi Award for Excellence in Visual Arts**.
- **Lifetime Achievement:** Honours to **Krishen Khanna** (painter), **Ram V. Sutar** (sculptor of Statue of Unity fame), and **Ira Chaudhari** (ceramicist).

Significance

- **Empowering Artists:** Direct commercial access for artists beyond state patronage.
- **Cultural Economy:** Strengthens India's creative industries and global art market presence.
- **Heritage Preservation:** Recognises senior artists for shaping modern & contemporary Indian art.

Keywords: Lalit Kala Akademi, National Exhibition of Art, Creative Economy, Krishen Khanna, Ram V. Sutar, Ira Chaudhari.



UPSC Relevance:

GS1 – Indian Heritage & Culture: Institutions promoting art. **GS2 – Governance:** Role of autonomous bodies in cultural promotion.



HOT Question “The 64th National Exhibition of Art marks a shift towards linking cultural heritage with market access. Discuss how India can balance cultural preservation with promotion of its creative economy.”



6. 71st National Film Awards (2023) Announced



The **71st National Film Awards (2023)**, India's highest film honours, were recently announced, recognising excellence in cinema across categories.

About the Awards:

- Instituted in **1954** to honour films contributing to **Indian cinema and culture**.
- Presented annually by the **President of India**.
- Considered India's most prestigious government-backed film awards.

Key Awards 2023:

- **Best Feature Film** → *12th Fail*.
- **Best Actor (Joint)** → Shah Rukh Khan (*Jawan*) & Vikrant Massey (*12th Fail*).
- **Best Actress** → Rani Mukerji (*Mrs. Chatterjee Vs Norway*).
- **Best Short Film** → *Giddh – The Scavenger*.
- **Best Non-Feature Film** → *Flowering Man*.

Significance:

- Encourages socially relevant cinema.
- Reflects diversity of Indian filmmaking (feature, non-feature, short films).
- Adds cultural soft power by showcasing Indian stories globally.



UPSC Relevance:

Prelims: National Film Awards → started 1954, presented by President.
Best Feature Film (2023) = *12th Fail*



HOT Question “Cinema is a mirror of society as well as an agent of social change.” Discuss the role of the National Film Awards in promoting socially impactful cinema. (150 words)

7. Manika Vishwakarma Crowned Miss Universe India 2025



On **18th August 2025**, **Manika Vishwakarma from Rajasthan** was crowned *Miss Universe India 2025* at Jaipur. She received the crown from **Rhea Singha**, Miss Universe India 2024. Manika will represent India at the **74th Miss Universe pageant in Thailand (21 Nov 2025)**.

Platform: Annual beauty pageant selecting India's representative to the Miss Universe contest.

Organiser: Miss Universe India Organisation.

Global Stage: Miss Universe, founded in 1952, is one of the "Big Four" international beauty pageants (others: Miss World, Miss International, Miss Earth).

Cultural & Social Significance

Enhances India's **soft power** by showcasing talent, culture, and diversity.

Promotes debates on **gender empowerment, beauty standards, and social representation**.

Past Indian winners (Sushmita Sen 1994, Lara Dutta 2000, Harnaaz Sandhu 2021) boosted India's global profile.

Keywords: Miss Universe, Soft Power, Gender Empowerment, Cultural Diplomacy

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UPSC Relevance:

Prelims: Miss Universe winners from India; cultural diplomacy platforms. **Mains (GS1 – Culture / GS2 – IR):** Role of international cultural events in shaping India's global image.



HOT Question “How do international cultural platforms like Miss Universe contribute to India's soft power and global image?”



8. Traditional Monsoon Ploughing Race



The **Naangarni Spardha**, a **traditional monsoon ploughing race**, was recently held in **Dervan village, Ratnagiri (Maharashtra)**, celebrating agrarian heritage and farmer solidarity.

About the Event:

- Farmers run with **oxen yoked to a wooden plough** on a **horseshoe-shaped mud track**.
- Conducted during the **monsoon season**, symbolising the onset of the agricultural cycle.

Cultural Significance:

- Preserves **agrarian traditions** and strengthens **community bonds**.
- Serves as both a **ritual** and a **festive sporting event**.
- Reflects the **integration of agriculture, sport, and local identity** in rural India.

Comparable Traditions:

- **Jallikattu** (Tamil Nadu) – bull-taming festival.
- **Kambala** (Karnataka) – buffalo race in slushy paddy fields.
- **Maramadi** (Kerala) – bullock race in paddy fields.

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UPSC Relevance:

Prelims: Naangarni Spardha → Maharashtra (Ratnagiri). Similar events: Jallikattu – TN; Kambala – Karnataka; Maramadi – Kerala.



HOT Question Agrarian traditions like Naangarni Spardha reflect the deep cultural link between farming, festivals, and community identity in India.” Elaborate. (150 words)



9. Despite a 1997 ban, Dhirio bullfights continue illegally in Goa, raising concerns under animal cruelty laws.



Reports indicate the **continuation of illegal Dhirio bullfights** in Goa, despite a **1997 ban** by the Goa Bench of Bombay High Court under the **Prevention of Cruelty to Animals (PCA) Act, 1960**.

About Dhirio

- **Nature:** A traditional Goan bullfighting practice.
- **Arena:** Staged post-harvest in **paddy fields** or on **football grounds**.
- **Method:** Two bulls are deliberately provoked into **head-to-head combat**, with **no human entry** in the arena.
- **Cultural Link:** Often associated with **church festivals** in Goa.

Legal Status

- **Ban:** Prohibited in 1997 by the Goa Bench of the Bombay HC.
- **Grounds:** Violation of the **Prevention of Cruelty to Animals Act, 1960**.
- **Current Status:** Still conducted illegally due to lack of clear **SOPs for permissible traditional sports**.

Similar Traditions in India

- **Jallikattu (Tamil Nadu):** Bull-taming sport, upheld as cultural heritage (2017 SC-constitutional amendment protection).
- **Kambala (Karnataka):** Buffalo-race in slushy fields, given cultural exemptions.
- **Maramadi (Kerala):** Ox-racing tradition, often criticised for cruelty concerns.

Significance & Concerns

- **Cultural Heritage:** Local communities regard it as a symbol of tradition and festivity.
- **Animal Welfare:** Criticised for cruelty, stress, and injuries caused to bulls.
- **Legal Ambiguity:** Absence of national-level clarity on traditional vs. cruel animal sports.
- **Governance Challenge:** Balancing cultural rights with constitutional duty under **Article 51A(g)** to protect animals.



UPSC Relevance:

Prelims: Dhirio location (Goa); PCA Act, 1960 provisions; similar traditional animal sports.



HOT Question “Traditional sports like Jallikattu and Dhirio raise ethical and legal questions on animal rights. Critically analyse how India should reconcile cultural heritage with constitutional principles of compassion towards animals.” (150 words)

10. Bihar Hosts Asia Rugby U-20 Championship 2025; India Women's Team Wins Bronze



The **Asia Rugby U-20 Championship 2025** concluded at the **Rajgir Sports Complex, Bihar**, marking the **first-ever international rugby tournament hosted in the state**

About the Championship

- **Hosting Debut:** Bihar hosted its maiden international rugby event.
- **Mascot:** '*Ashoka*' the rabbit – symbolising agility and determination.
- **Participants:** China, Hong Kong, UAE, Uzbekistan, Kazakhstan, Sri Lanka, Malaysia, Nepal, and India.

Winners

- **Men's Category:**
 - Gold – Hong Kong 🥇
 - Bronze – Malaysia 🥉
- **Women's Category:**
 - Gold – China 🥇
 - Bronze – India 🥉 (defeated Uzbekistan).

India's Performance

- **Women's Team:** Bronze medal – notable contribution by **4 players from Bihar**:
 - Gudia Kumari, Anshu Kumari, Alpana Kumari, and Aarti Kumari.

Significance: Showcases Bihar's growing role in **grassroots rugby talent**.

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UPSC Relevance:

Prelims: Location (Rajgir Sports Complex, Bihar), Mascot, Participating nations. **Mains (GS I / GS II):** Role of sports diplomacy, women's empowerment through sports



HOT Question: Discuss the significance of hosting international sporting events like the Asia Rugby U-20 Championship for India's soft power and regional integration. How do such events promote grassroots sports development in states like Bihar?" (150 words)

11. India Hosts First Khelo India Water Sports Festival at Dal Lak



On **21 August 2025**, India launched its **first-ever Khelo India Water Sports Festival** at **Dal Lake, Jammu & Kashmir**, promoting grassroots participation in water sports and building an Olympic sports culture.

About the Festival

- **Organisers:** J&K Sports Council, Ministry of Youth Affairs & Sports, and Sports Authority of India (SAI).
- **Participation:** 400+ athletes from **36 States/UTs**.
- **Duration:** 3 days.
- **Objective:** Develop water sports as a mainstream discipline under the **Khelo India Initiative**.

Significance

- **Sports Promotion:** Encourages youth participation in **rowing, canoeing, kayaking, and sailing**.
- **Tourism Boost:** Showcases Dal Lake as a national & international sports destination.
- **Grassroots Development:** Identifies and nurtures local talent for Olympic preparation.
- **National Integration:** Athletes from across India competing in J&K strengthens unity.

About Khelo India Scheme

- **Launch:** 2018, Ministry of Youth Affairs & Sports.
- **Objective:** Revive sports culture at grassroots, identify talent, and provide infrastructure & scholarships.
- **Funding:** Central Sector Scheme.
- **Scholarship:** ₹5 lakh per annum for 8 years for selected athletes.



UPSC Relevance:

GS Paper 2 – Governance & Social Justice: Government schemes for youth and sports promotion. **GS Paper 1 – Culture:** Role of sports in promoting national integration and tourism in J&K.



HOT Question Discuss the role of initiatives like *Khelo India* in developing Olympic-level sports culture in India. How can water sports festivals contribute to both tourism and national integration?



12. India celebrates National Sports Day 2025 (Aug 29–31) as a three-day nationwide fitness movement under the theme 'Ek Ghanta, Khel ke Maidan Main'



The **Ministry of Youth Affairs and Sports** has announced a 3-day celebration (29–31 August 2025). Marks **Major Dhyan Chand's birth anniversary (29 August)**. First observed in **1995**, and in **2019** it marked the launch of the **Fit India Movement**.

Key Highlights of 2025

- **Theme:** *Ek Ghanta, Khel ke Maidan Main* (One Hour in the Playground).
- **Objective:** Link fitness campaigns to **India's 2036 Olympic vision** by popularising both modern and indigenous sports.
- **New Initiatives:**
 - *National Conclave on Sports Manufacturing* under **Aatmanirbhar Bharat**.
 - *Fit India App* upgrade with **Carbon Savings Incentive** (linking health with sustainability).

Significance

- **Health & Fitness:** Encourages citizens to adopt sports as part of daily routine.
- **Olympics Mission 2036:** Lays foundation for India's aspiration to host and excel in the Games.
- **Atmanirbhar Push:** Boosts sports equipment manufacturing, reducing import dependence.
- **Environmental Linkage:** Carbon-saving feature integrates sustainability with fitness.
- **Cultural Recognition:** Honours *Major Dhyan Chand*, India's legendary hockey player.



UPSC Relevance:

GS1: Contributions of *Major Dhyan Chand* and India's sports legacy. **GS2:** Government programmes (Fit India Mission, Khelo India, National Sports Policy).



HOT Question Discuss the significance of National Sports Day in the context of India's Olympic aspirations and the promotion of indigenous sports.



GEOGRAPHY

DISASTER Management

1. Magnitude 8.8 Megathrust Earthquake
2. Cascadia Subduction Zone: Study Warns of
3. 117-million-year-old mud waves
4. Cold Pools in Ocean-Atmosphere Interactions
5. District Flood Severity Index
6. Deodar Felling Linked to Uttarkashi Flash Floods
7. NW-57 on Kopili River in Assam
8. Unchecked Water Hyacinth Spread Threatens
9. Landslide near Vaishno Devi Shrine in J&K
10. African Union pushes "Correct the Map" campaign
11. Kabak Yano Scales Europe's Highest Peak

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1. Magnitude 8.8 Megathrust Earthquake Strikes Kamchatka, Triggers Tsunami Warnings



In **August 2025**, a **magnitude 8.8 megathrust earthquake** struck near Russia's Kamchatka peninsula, generating **trans-Pacific tsunami alerts** for Japan, Hawaii, and the Americas. Despite its scale, tsunami damage remained limited due to unique geophysical factors.

Tectonic Context:

- Occurred at the **Pacific Plate–Okhotsk microplate subduction zone** along the **Kuril–Kamchatka Trench**.
- **Hypocentre depth**: ~21 km; rupture length ~450 km.
- Pacific Plate slipped **~10 metres**, showing **reverse faulting** with vertical seabed uplift.

Tsunami Formation:

- Megathrust quakes vertically displace seawater; over **80% of global tsunamis** originate this way.
- Conditions: Magnitude >6.5, shallow depth (<70 km), vertical seabed uplift.

Why Tsunami Impact Was Limited:

- Broad **continental shelf gradient** absorbed wave energy.
- **Narrow trench geometry** restricted uplift spread.
- **Segmented rupture** scattered energy.
- Maximum slip was far offshore; no submarine landslide.

Regional Importance of Kamchatka:

- Part of the **Pacific Ring of Fire**, hosting ~150 volcanoes (incl. **Klyuchevskoy**, tallest active volcano in Eurasia).
- **UNESCO World Heritage Site**: Volcanoes of Kamchatka.
- Geopolitically sensitive: Kuril Islands disputed between Russia & Japan.



UPSC Relevance: Prelims : Kamchatka → Pacific Ring of Fire; UNESCO WHS (Volcanoes of Kamchatka). Megathrust earthquakes = major source of global tsunamis. Magnitude, shallow depth, and vertical slip = critical tsunami triggers.



HOT Question “Megathrust earthquakes are the primary source of trans-oceanic tsunamis. Using the 2025 Kamchatka event as a case study, discuss the geophysical factors that influence tsunami intensity and spread.” (150 words)

2. Cascadia Subduction Zone: Study Warns of Mega-Tsunami Risk off US Pacific Coast



A recent study highlighted that a potential mega-tsunami from the Cascadia Subduction Zone could cause unprecedented waves up to 1,000 feet high, far exceeding typical tsunamis.

Definition & Context

- **Cascadia Subduction Zone (CSZ):** A ~600-mile (965 km) fault line stretching from Northern California to Vancouver Island (Canada).
- **Plate Interaction:** The Juan de Fuca Plate subducts beneath the North American Plate, creating immense tectonic stress.

Tsunami Risk

- A large earthquake (M8.0+) could suddenly release centuries of accumulated stress.
- Potential effects: Sea level drop of ~6.5 feet, giant waves up to 1,000 feet.
- Estimated **15% probability of M8.0+ earthquake within 50 years.**

Significance

- **Geological Insight:** Enhances understanding of convergent plate boundaries and tectonic hazards.
- **Climate & Society:** Helps refine early warning systems and global disaster models.
- **Comparisons:** Similar to the **2004 Indian Ocean Tsunami** (Sumatra earthquake) and **2011 Japan Tsunami** (Tohoku earthquake).

Keywords for UPSC

- Subduction Zone
- Mega-thrust Earthquake
- Tsunami Genesis
- Juan de Fuca Plate
- Disaster Preparedness

Pros (Preparedness Gains)

- Early detection through ocean-bottom seismographs and pressure sensors.
- Provides a test case for global tsunami modelling.
- Raises awareness on coastal resilience planning.

Cons (Risks)

- Threatens densely populated cities like Seattle, Portland, and Vancouver.
- Disrupts trans-Pacific trade routes.
- Could cause catastrophic loss of life and infrastructure.



UPSC Relevance:

GS1 (Geography): Plate tectonics, earthquakes, and tsunami formation.
GS3 (Disaster Management): Risk mitigation, resilience, and early warning systems.



HOT Question “Mega-thrust earthquakes in subduction zones pose catastrophic tsunami risks. Evaluate the preparedness lessons India can learn from the Cascadia Subduction Zone for its own coastal disaster management.”

3. 117-million-year-old mud waves under the Atlantic shed light on ancient ocean currents and climate change



Scientists discovered **Cretaceous-era mud waves** beneath the Atlantic Ocean. These features show that **salty North Atlantic waters flowed south much earlier** than thought, reshaping currents, carbon cycles, and global climate during the mid-Cretaceous.

Mud Waves (Contourites): Submarine sedimentary structures formed by persistent deep-sea currents transporting and depositing fine-grained sediments.

Geological Context: Found to be **117 million years old** (Early Cretaceous).

Significance for Climate:

- Early southward saltwater flow → altered **thermohaline circulation**.
- Affected **carbon burial & oxygen levels**, influencing long-term climate stability.

Modern Relevance:

- Helps refine **Earth System Models** for predicting ocean–climate interactions today.
- Offers insights into **carbon sequestration capacity** of oceans.

Keywords: Thermohaline circulation, Cretaceous period, carbon burial, palaeoceanography, contourite.

Pros (scientific gain): Better reconstructions of past climates, stronger predictive models.

Cons/Limitations: Dating precision challenges, reliance on core samples, limited geographic coverage.



UPSC Relevance:

Prelims: Terms like **contourite/mud wave**, thermohaline circulation, Cretaceous period timelines. **Mains (GS-I / GS-III):** Ocean currents & their role in global climate regulation



HOT Question “Discuss how palaeoclimate evidence such as ancient mud waves and contourite systems can improve our understanding of present-day climate change and carbon sequestration.”

4. Study Highlights Role of 'Cold Pools' in Ocean-Atmosphere Interactions



A **University of Washington study** reported that rainfall can make the ocean surface **heavier and more stable** due to the formation of **Cold Pools**, influencing local weather and storm dynamics.

Definition:

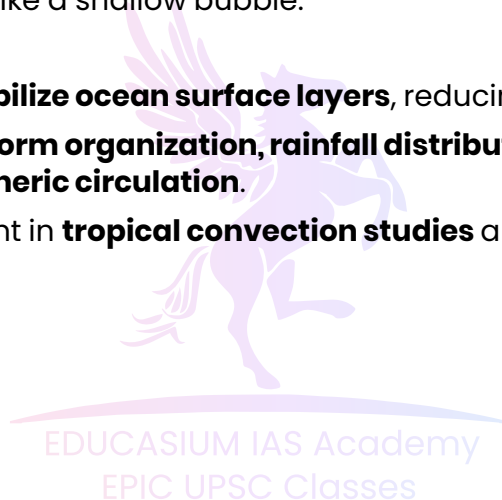
- Cold Pools are **small-scale zones** of cooled, dense air formed beneath precipitating clouds.

Formation Mechanism:

- Rainfall **partially evaporates** during a storm.
- This evaporation **cools surrounding air**, increasing density.
- The cooled, heavy air **sinks** and spreads outward along the surface like a shallow bubble.

Impacts:

- Can **stabilize ocean surface layers**, reducing vertical mixing.
- Affect **storm organization, rainfall distribution, and atmospheric circulation**.
- Important in **tropical convection studies** and climate models.



UPSC Relevance:

Prelims: Cold Pools = evaporatively cooled, dense air beneath storm clouds. Influence ocean-atmosphere energy exchange. **Mains:** Significance of small-scale weather phenomena (like Cold Pools) in **climate modelling**.



HOT Question "Explain the process of Cold Pool formation. How do Cold Pools influence local weather and storm dynamics in the tropics? (150 words)"

5. District Flood Severity Index Ranks Patna as India's Most Flood-Affected District



The **District Flood Severity Index (DFSI)** was developed as a **data-driven tool** to assess flood impact across districts in India, helping guide **disaster preparedness and policy prioritisation**.

About DFSI:

- Based on **IMD flood records (since 1967)** focusing on large riverine floods.
- Parameters:
 - Mean flood **duration (days)**.
 - **% area** historically flooded.
 - **Deaths & injuries**.
 - **Population exposed**.
- Excludes: Crop area damage (data gaps).

Key Findings:

- **Patna (Bihar)** → highest flood severity ranking.
- **Indo-Gangetic & Assam districts** dominate top severity ranks.
- **Assam clusters:** Dhemaji, Kamrup, Nagaon → avg. **3+ floods annually**.
- **Thiruvananthapuram paradox:** High flood frequency but low severity due to limited impact on population.

Significance:

- Moves beyond frequency → measures **human impact**.
- Enables **targeted mitigation planning**, prioritising high-risk districts.
- Useful for **NDMA, SDRFs, and district administrations** in resource allocation.



UPSC Relevance: Prelims: DFSI = based on IMD flood data (since 1967). Patna = highest severity district. **Mains:** DFSI as a tool for **disaster risk reduction & climate resilience**.



HOT Question “Flood management in India has long focused on frequency, not impact. How does the District Flood Severity Index (DFSI) mark a paradigm shift in disaster preparedness?” (150 words)

6. Deodar Felling Linked to Intensified Uttarkashi Flash Floods



The **Uttarkashi flash flood** was aggravated by decades of **deodar tree (*Cedrus deodara*) felling**, which reduced slope stability and weakened the natural flood-buffering system in the Himalayas.

About Deodar (*Cedrus deodara*)

- **Evergreen Conifer:** Tall coniferous tree of the cedar genus.
- **Habitat:** Western Himalayas (1,500–3,200 m), from **Afghanistan to Tibet**.
- **Distribution in India:** J&K, Himachal Pradesh, Uttarakhand.
- **Climatic Needs:** Cool, moist climate; tolerates monsoon rains and snow.
- **Traits:**
 - Height: Up to 50 m with conical crown & drooping branches.
 - **Root System:** Dense, intricate roots anchor soil, preventing erosion.
- **Uses:**
 - Timber (rot-resistant, used in temples & construction).
 - Aromatic oils (incense, repellents, medicines).
- **IUCN Status:** Least Concern.

Mitigation Role in Floods

- **Slope Stability:** Roots hold soil, reducing landslides and erosion.
- **Water Infiltration:** Enhances groundwater recharge, lowers surface runoff.
- **Canopy Buffering:** Slows rainfall impact, moderates downstream flood peaks.
- **Flow Obstruction:** Trunks & debris reduce floodwater velocity, lessening destruction.

Case Insight – Uttarkashi Flood

- Historical felling reduced **slope anchorage** and **rainwater absorption**.
- Resulted in **faster surface runoff** and **higher flood intensity**, worsening disaster impact.



UPSC Relevance:

Prelims: Species habitat, ecological role of Himalayan vegetation, IUCN status. **Mains (GS III – Environment / Disaster Mgmt):** Role of deforestation in worsening Himalayan floods and landslides.



HOT Question “Discuss how large-scale deforestation in the Himalayas, particularly deodar felling, has aggravated the frequency and intensity of flash floods. Suggest ecological restoration measures.” (150 words)

7. NW-57 on Kopili River in Assam Operationalised for Cargo Trials



The **Kopili River (NW-57)** in Assam was operationalised with cargo trials under **Maritime India Vision 2030** and **PM Gati Shakti**, making it the **4th National Waterway in Assam**.

Operational National Waterways in Assam:

- **NW-2:** Brahmaputra
- **NW-16:** Barak
- **NW-31:** Dhansiri
- **NW-57:** Kopili

About Kopili River:

- Major **left-bank tributary of Brahmaputra**.
- **Interstate river:** flows through Meghalaya & Assam.
- **Origin:** Saipong Reserve Forest, South-East Meghalaya.
- Importance: Supports hydropower (Kopili HEP), irrigation, and now inland navigation.

Significance of NW-57:

- Boosts **cargo movement & trade** in NE India.
- Reduces transport costs under **PM Gati Shakti multimodal logistics framework**.
- Promotes **eco-friendly inland waterways** as alternative to road/rail.

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UPSC Relevance: Prelims: NW-57 = Kopili River, Assam. Assam → 4 operational NWs (Brahmaputra, Barak, Dhansiri, Kopili). Kopili = left-bank tributary of Brahmaputra, origin in Meghalaya.



HOT Question “Inland waterways are a cost-effective and eco-friendly mode of transport. Evaluate the significance of operationalising NW-57 on the Kopili River for Assam and the Northeast region.” (150 words)

8. Unchecked Water Hyacinth Spread Threatens India's Wetlands and Livelihoods



During the 2025 monsoon, the **unchecked spread of water hyacinth** severely impacted Kerala's backwaters, clogging canals, threatening biodiversity, and affecting paddy cultivation and inland transport.

About Water Hyacinth

- **Scientific Name:** *Eichhornia crassipes*
- **Origin:** Native to South America; introduced in Bengal during colonial times as an ornamental plant.
- **Nicknames:** "Terror of Bengal," "Blue Devil," "Lilac Devil."
- **Growth Traits:** Doubles biomass within 14 days; forms dense floating mats.
- **Habitat:** Warm, nutrient-rich, stagnant freshwater bodies.
- **Appearance:** Violet-blue flowers, broad waxy leaves, bulbous stalks.

Impacts of Invasion

1. Ecological

- Dense mats block sunlight → photosynthesis collapse.
- Oxygen depletion → fish kills & aquatic biodiversity loss.
- Alters wetland ecosystem functioning.

2. Economic & Livelihood

- Reduces paddy yield in Kerala's Kuttanad.
- Decline in fish catch → hits fisherfolk.
- Damages inland navigation & traditional transport.

3. Disaster & Climate Risks

- Clogs drainage → worsens **urban floods** during monsoons.
- Decomposing mats emit **methane** (25× stronger than CO₂).

4. Tourism & Heritage

Kerala's **Vembanad Lake (Ramsar site)** faces declining eco-tourism.



UPSC Relevance: GS3 (Environment & Disaster Management): Invasive species, wetland degradation, livelihood challenges. **GS1 (Geography):** Human–environment interaction in river basins and wetlands.



HOT Question "Water hyacinth is both an ecological threat and a socio-economic challenge in India's wetlands. Examine its impacts and suggest integrated strategies for its sustainable management."

9. Landslide near Vaishno Devi Shrine in J&K



A **major landslide** near the Vaishno Devi Shrine in Jammu & Kashmir, triggered by torrential rains, caused multiple deaths and injuries, underscoring the Himalayan region's high vulnerability to disasters.

About Landslides

- Downslope movement of rock, soil, and debris under **gravity**.
- **Triggers:** Heavy rainfall, earthquakes, deforestation, unscientific construction, and mining.
- **Impacts:** Fatalities, loss of property, infrastructure damage, transport disruption, and environmental degradation.

India's Vulnerability

- Himalayas (tectonically active, fragile geology).
- Western Ghats (intense monsoons, slope cutting).
- Northeast (deforestation, seismic activity).

Factors behind Vaishno Devi Landslide

- **Extreme Rainfall:** Continuous heavy rains saturated slopes, leading to collapse.
- **Fragile Geology:** Young Himalayan terrain is naturally unstable.
- **Anthropogenic Stress:** Expansion of pilgrimage routes, deforestation, and slope modification worsened risks.

Mitigation Measures

- **Structural:** Retaining walls, bio-engineering, slope stabilisation, proper drainage.
- **Non-structural:** Afforestation, land-use zoning, regulating construction.
- **Technology:** Remote sensing, GIS mapping, and early warning systems.
- **Preparedness:** NDMA guidelines, mock drills, community awareness.

Keywords: Landslide, Himalayas, Vaishno Devi, torrential rains, NDMA, slope stability, afforestation, early warning.



UPSC Relevance:

GS1 – Geography: Landslides, natural hazards in the Himalayas. **GS3 – Disaster Management:** NDMA guidelines, mitigation strategies.



HOT Question “Landslides are as much a man-made problem as they are natural hazards. Analyse in the context of Himalayan pilgrimage sites

10. African Union pushes “Correct the Map” campaign against Mercator projection’s distortions



The **African Union endorsed the “Correct the Map” campaign** to replace the Mercator world map, which exaggerates northern landmass sizes and diminishes Africa, with more size-accurate projections like Gall-Peters or Equal Earth.

About Map Projections

- A **map projection** is the mathematical method of converting Earth’s spherical surface into a flat map.

Types:

- *Conformal (Mercator)* – preserves angles, distorts size.
- *Equal-Area (Gall-Peters, Mollweide)* – preserves area, distorts shapes.
- *Compromise (Winkel Tripel, Robinson)* – balances shape, size, distance.
- *Conic (Lambert Conformal Conic)* – used in aeronautical charts.
- *Azimuthal (Stereographic, Polar)* – useful for polar navigation.

Mercator Projection (1569)

- Developed by **Gerardus Mercator** for maritime navigation.
- Features: Meridians & parallels intersect at right angles; spacing increases near poles.
- Advantage: Preserves direction, aiding sea navigation.
- Limitation: **Grossly distorts land area**, especially at higher latitudes.

Problems with Mercator Map

- **Size Distortion:** Greenland appears larger than Africa, though Africa is ~14 times bigger.
- **Africa’s Diminution:** Smaller portrayal reinforced colonial exploitation and marginalisation.
- **Eurocentric Bias:** Inflates Europe/North America, shrinking equatorial nations.
- **Educational Bias:** School atlases using Mercator shape worldviews unfairly.

Alternatives

- **Gall-Peters Projection:** Equal-area, restores Africa’s proportional size.
- **Equal Earth Projection (2018):** Designed for educational purposes, balances shape & area.
- **Mollweide Projection:** Elliptical, equal-area, good for global thematic maps.
- **Winkel Tripel Projection:** Used by *National Geographic*, minimises overall distortion.



UPSC Relevance:

GS1 (Geography): Map projections, distortions in representation. **GS2 (IR):** Africa’s demand reflects **decolonisation of knowledge** & global equity.



HOT Question “Critically analyse how Eurocentric cartographic practices, such as the Mercator projection, shaped global geopolitics and perceptions of the Global South. Should India also endorse a ‘Correct the Map’ initiative?”

11. Arunachal's Kabak Yano Scales Europe's Highest Peak



On **16th August 2025**, Arunachal Pradesh mountaineer **Kabak Yano** successfully summited **Mount Elbrus (Russia/Europe)**, continuing her pursuit of the **Seven Summits Challenge**

About Mount Elbrus

- **Location:** Caucasus Mountains, southwestern Russia, near Georgia.
- **Height:** 18,510 feet (5,642 m) – **highest peak in Europe**.
- **Geological Nature:** Dormant stratovolcano, also the **highest volcano in Eurasia**.
- **Global Standing:** Among the world's **Top 10 most prominent peaks**.

Seven Summits Challenge

- A mountaineering quest to climb the tallest peak in each continent.
- Kabak Yano recently scaled **Mount Kilimanjaro (Tanzania, Africa)** on **4th August 2025** –
 - Height: 5,895 m.
 - Tallest free-standing mountain in the world.

Significance

- Promotes **women's representation in adventure sports**.
- Inspires youth from India's North-East in **sports and tourism development**.
- Enhances India's presence in global mountaineering achievements.

Keywords: Kabak Yano, Mount Elbrus, Kilimanjaro, Seven Summits Challenge, Arunachal Pradesh.



UPSC Relevance: **Prelims:** Highest peaks by continent; Mount Elbrus facts; Kilimanjaro unique features. **Mains (GS1/GS2):** Role of adventure sports in national integration, women empowerment



HOT Question *"Discuss the role of adventure sports like mountaineering in strengthening India's soft power, youth aspirations, and women empowerment."*

HEALTH & Nutrition

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1. NMC Directs Medical Colleges to Record ABHA ID for All Patients



The **National Medical Commission (NMC)** has mandated that all medical colleges and institutions record patients' **ABHA ID (Ayushman Bharat Health Account)** during registration, integrating them into India's digital healthcare system.

About ABHA ID:

- A **14-digit unique health identifier** under the Ayushman Bharat Digital Mission (ABDM).
- Enables access to **longitudinal electronic health records** across providers.
- **Voluntary**: Patients may **opt out**, deactivate, or delete their ID anytime.

About ABDM:

- Objective: Create a **national digital health ecosystem** ensuring interoperability of records, smoother patient care, and telemedicine integration.
- Functions as backbone for **universal health coverage** with digital access.

Significance:

- Ensures **continuity of care** across institutions.
- Facilitates **health data portability** for patients.
- Strengthens **health research, monitoring, and policymaking** through anonymized datasets.



UPSC Relevance: GS Paper 2 & 3 – Prelims: ABHA ID = 14-digit health ID, voluntary, under ABDM. ABDM launched to build integrated digital health infrastructure.



HOT Question: "Examine the significance of the Ayushman Bharat Health Account (ABHA ID) in India's healthcare digitalisation. What challenges must be addressed to ensure equity and privacy? (150 words)"



2. India crosses 79.91 crore ABHA registrations, strengthening digital health ecosystem under ABDM



As per **PIB (Aug 2025)**, India surpassed **79.91 crore Ayushman Bharat Health Account (ABHA) registrations**, highlighting progress in the **Ayushman Bharat Digital Mission (ABDM)**.

Expansion of **Health Facility Registry (HFR)** and **Healthcare Professionals Registry (HPR)** ensures wider integration of digital healthcare.

Key Data Highlights

- **79.91 crore ABHA IDs** issued.
- **67.19 crore linked health records** → enabling treatment continuity across facilities.
- **4.18 lakh+ facilities** on HFR (hospitals, clinics, labs, etc.).
- **6.79 lakh+ professionals** on HPR (verified doctors, nurses, practitioners).

About Ayushman Bharat Health Account (ABHA)

- **Nature:** A **14-digit unique health ID** for every Indian resident.
- **Purpose:** Enables secure, portable, and longitudinal digital health records.
- **Governance:** Implemented by **MoHFW** and managed by the **National Health Authority (NHA)**.
- **Key Features:**
 - Secure digital identity for health services.
 - Voluntary with **opt-out/data deletion options** (protects autonomy).
 - Enables authorised access for doctors/hospitals → ensures data privacy and interoperability.

Significance of ABHA & ABDM

- **Continuity of Care:** Patients' past health data accessible across facilities.
- **Efficiency:** Reduces duplication of diagnostics and treatment delays.
- **Equity:** Bridges gaps between urban & rural healthcare delivery.
- **Accountability:** Verified professional registry ensures regulation of service quality.
- **Digital Governance:** Strengthens India's digital public infrastructure in health alongside Aadhaar, UPI, DigiLocker.

Challenges Ahead

- **Digital Divide:** Rural/low-income households face access barriers.
- **Data Privacy Concerns:** Requires robust safeguards under **Digital Personal Data Protection Act, 2023**.
- **Integration:** Legacy health records and private hospital participation remain uneven.
- **Awareness Gap:** Citizens and smaller facilities lack awareness on usage and benefits.



UPSC Relevance: GS Paper 2 & 3 – Prelims: ABHA ID, ABDM, HFR, HPR.
Mains (GS II): Health sector reforms, digital governance, service delivery.



HOT Question: “India’s push for digital health through the Ayushman Bharat Digital Mission has created an ambitious platform for Universal Health Coverage. Discuss its potential and challenges.” (150 words)



3. Strengthening Decentralised Diagnostics Key to Universal Health Coverage in India



India's push towards **Universal Health Coverage (UHC)** requires strengthening **affordable, decentralised diagnostic services**, as inequities persist between rural and urban areas in healthcare access.

Diagnostic Landscape in India

- **Market Size:** ₹1.54 trillion (FY2024).
- **Dominance:** Pathology + In-Vitro Diagnostics lead the market.
- **Urban Bias:** 75% revenue from cities; rural access constrained.
- **Quality Gap:** Only **1.2% of 1 lakh labs accredited by NABL**, limiting reliability.
- **Workforce Deficit:** Rural doctor-population ratio ~1:11,082.

Importance of Diagnostics for UHC

- **Early Detection:** Enables timely treatment and reduces disease burden.
- **Cost Efficiency:** Prevents expensive late-stage treatment.
- **Equity:** Strengthens rural-urban parity in health outcomes.
- **Epidemic Control:** Local testing helps contain outbreaks quickly.

Challenges

- **Infrastructure Deficit:** Weak PHCs and diagnostic units.
- **Cost Barriers:** High private test costs, insurance gaps.
- **Skilled Manpower:** Shortage of trained lab technicians.
- **Regulatory Weakness:** Voluntary NABL accreditation → poor quality control.

Government Efforts

- **NLED:** National List of Essential Diagnostics ensures tier-wise standardisation.
- **ICMR Guidelines:** Evidence-based protocols for test selection.
- **PHC/CHC Strengthening:** Semi-auto analysers & dental X-ray units deployed.
- **Molecular Testing:** Universal TB testing, district-level molecular diagnostics.
- **Tele-diagnostics:** Connects rural centres to urban specialists.



UPSC Relevance: GS Paper 2 & 3 – Prelims: NLED, NABL, ICMR guidelines.
Mains (GS II/III): Health governance, UHC, insurance reforms, role of diagnostics in disease control.



HOT Question: "Affordable and decentralised diagnostics are the backbone of Universal Health Coverage in India. Critically analyse the challenges and policy measures required to strengthen diagnostic access." (150 words)



4. MoHFW launches SHRESTH Index to strengthen state drug regulatory systems



The **Ministry of Health and Family Welfare (MoHFW)** recently launched the **SHRESTH (State Health Regulatory Excellence) Index**, India's first benchmark for assessing and improving state and UT drug regulatory systems.

About SHRESTH Index

- **Full Form:** *State Health Regulatory Excellence Index.*
- **Objective:** Benchmark and strengthen state/UT drug regulatory capacity → ensure access to safe, quality, effective medicines nationwide.
- **Nodal Agency:** **Central Drugs Standard Control Organisation (CDSCO).**
- **Self-Assessment:** Online tool allows states to identify and bridge regulatory gaps.
- **Categories & Indicators:**
 - **Manufacturing states** → regulate production (**27 indicators**).
 - **Distribution states** → regulate retail/wholesale sales (**23 indicators**).
- **First-of-its-kind:** Focuses on accountability, uniform compliance, and efficiency across India.

Significance

- **Quality Assurance:** Strengthens India's reputation as "Pharmacy of the World."
- **Public Health:** Safer medicines reduce adverse events & health risks.
- **Regulatory Uniformity:** Bridges disparities among state regulators.
- **Global Alignment:** Aligns with WHO standards & supports pharma exports.
- **Ease of Business:** Predictable, efficient regulation promotes innovation & investment in pharma sector.

Challenges

- **Capacity Gaps:** States vary widely in regulatory manpower, labs, and infrastructure.
- **Enforcement Issues:** Counterfeit/substandard drugs remain a persistent threat.
- **Training Deficit:** Regulatory staff often lack updated technical expertise.



UPSC Relevance: GS Paper 2 & 3 – Prelims: SHRESTH Index, CDSCO role, Drug regulation framework. **Mains (GS II/GS III):** Health governance, pharmaceutical regulation, cooperative federalism in drug safety



HOT Question:

"The SHRESTH Index is a step towards strengthening India's drug regulatory ecosystem. Examine its potential to address public health and pharma industry challenges." (150 words)



5. Parliamentary Committee Flags Affordability and Access Gaps in Cancer Drug Regulation



The **163rd Report of the Committee on Petitions** has highlighted critical issues in **cancer medicine affordability, pricing, and access**, recommending systemic reforms in drug regulation and research oversight.

Committee on Petitions

- **Oldest Committee:** Established in **1924**, predates independence.
- **Purpose:** Examines petitions submitted to either House of Parliament & takes necessary action.
- **Composition:**
 - Lok Sabha: 15 members.
 - Rajya Sabha: 10 members.
 - Members nominated annually; tenure of **1 year**, eligible for re-nomination.
- **Chairperson:** Appointed by Presiding Officer of respective House.
- **Role:** Provides **detailed scrutiny of grievances**, beyond floor debates.

Key Findings of the Committee Report

- **NLEM Expansion:** Anti-cancer drugs under **National List of Essential Medicines (NLEM)** rose from **40 (2011) → 63 (2022)**.
- **Pricing Gaps:** Many oncology drugs remain outside **Drugs (Prices Control) Order (DPCO 2013)** → no statutory price ceiling.
- **Impact:** High out-of-pocket burden; many families pushed into poverty.
- **Generics Quality:** Questions raised over generic cancer drugs not certified under **WHO-GMP** (Good Manufacturing Practices).
- **Regulatory Bottlenecks:** Weak R&D ecosystem and slow drug approvals delay access to affordable cancer care.
- **Public Health Recommendation:** Declaring **cancer a notifiable disease** across India to improve surveillance.
- **Research Accountability:** Cancer research bodies/consortia to submit **annual outcome-based reports** to Parliament.

Keywords & Concepts

- **NLEM (National List of Essential Medicines)** – drugs listed for statutory price regulation.
- **DPCO (Drugs Prices Control Order)** – empowers Union govt. to fix ceiling prices.



UPSC Relevance: **GS Paper 2 & 3** – **GS Paper 2:** Health policy, regulation, role of parliamentary committees. **GS Paper 3:** Affordable healthcare, pharma sector, R&D in biotechnology.



HOT Question: “Critically evaluate the challenges in regulating cancer drug prices in India. How can Parliament’s Committee on Petitions contribute to strengthening affordability and access?”



Breakthrough RATIONS Study

- ## Global Burden (2023)

- ## WHO's Call for Action

- ### Significance for India

- Keywords:** RATIONS Study, ICMR, End TB Strategy, Nutritional Support, Digital Adherence, South-East Asia TB Burden.



HOT Question: “The RATIONS study demonstrates that food security is integral to disease control. Discuss how integrating nutrition into India’s TB elimination strategy can accelerate progress towards SDG-3.

7. Revised National Action Plan on Glanders



The **Ministry of Fisheries, Animal Husbandry & Dairying** has issued the **Revised National Action Plan on Glanders** with a **One Health approach**, addressing risks at the human–animal–environment interface

About Glanders

- A **life-threatening zoonotic disease** caused by the bacterium *Burkholderia mallei*.
- **Hosts:** Mainly horses, mules, donkeys; can also infect humans and other animals.
- **Transmission:** Through contaminated food, water, aerosols, fomites, and direct contact with skin or mucosa.
- **Symptoms:**
 - *Animals:* Nodules & ulcers in lungs, respiratory tract, and skin ("farcy").
 - *Humans:* Fever, pneumonia, abscesses, multiple organ failure (rare but fatal).

Status & Significance

- Listed as a **notifiable disease** under the **WOAH Terrestrial Animal Health Code**.
- **Public Health Risk:** Occupational hazard for vets, farmers, and equine handlers.
- **Economic Impact:** Hampers equine trade and rural livelihoods dependent on horses/mules.

National Action Plan Highlights

- **One Health Framework:** Integrated surveillance across animal & human health sectors.
- **Diagnosis:** Strengthening labs for serological and molecular tests.
- **Control:** Culling infected animals, movement restrictions, awareness drives.
- **Global Commitment:** Aligns with WOA standards for international trade safety.

Keywords: Zoonotic, *Burkholderia mallei*, One Health, WOA, notifiable disease, farcy, occupational hazard.



UPSC Relevance: **GS Paper 2 & 3 – GS2 – Governance & Health:** One Health approach, zoonotic diseases. **GS3 – Environment & Disaster Management:** Zoonoses affecting humans, livestock economy.



HOT Question: "Discuss the significance of adopting a One Health approach in managing zoonotic diseases in India, with reference to Glanders."



8. India Becomes 3rd Largest in Global Organ Transplantation, Leads in Living Donors



India ranked **3rd globally** (after USA & China) in total organ transplants and **1st in living donor organ transplantation**, reflecting both progress and persistent challenges in organ donation.

Legal Framework:

- Governed by the **Transplantation of Human Organs and Tissues Act, 1994** (amended 2011).
- Regulates removal, storage, and transplantation of organs/tissues.
- **Commercial dealings prohibited.**

Institutional Setup – National Organ Transplant Program (NOTP):

- **NOTTO** – National Organ & Tissue Transplant Organisation.
- **ROTTOs** – Regional Organ & Tissue Transplant Organisations.
- **SOTTOs** – State Organ & Tissue Transplant Organisations.
- Aims: Enhance **infrastructure, awareness, and equitable access.**

Challenges:

- **Deceased donor rate** <1 per million population vs **Spain's 48 pmp** (global leader).
- Cultural hesitancy, lack of awareness, and logistical hurdles.

Recent Initiatives:

- **One Nation One Policy:** Removed domicile, age limits, and registration fees for recipients of deceased donor organs.
- **Aadhaar-linked pledge portal (2023):** 3+ lakh citizens registered for organ donation.
- **Angdaan Jan Jagrukta Abhiyan (2024):** Nationwide awareness campaign.



UPSC Relevance: GS Paper 2 & 3 – Prelims: THOTA Act = 1994 (amended 2011). NOTTO = national coordinating body under NOTP. India = 3rd globally in organ transplants, 1st in living donors.



HOT Question: “Despite legal safeguards and institutional mechanisms, India’s deceased organ donation rates remain abysmally low.” Critically evaluate the reasons and suggest measures to address this gap. (150 words)



9. WHO Classifies Hepatitis D Virus as a High-Risk Carcinogen



The **World Health Organization (WHO)** classified **Hepatitis D virus (HDV)** as a **carcinogen**, citing its aggressive disease course, immune evasion, and strong association with **liver cancer (hepatocellular carcinoma)**.

About Hepatitis D:

- A **circular, single-stranded RNA virus** with limited protein-coding ability.
- **Requires Hepatitis B (HBV)** for replication → occurs as **coinfection** (with HBV together) or **superinfection** (in existing HBV patients).
- **Transmission:** Blood, shared needles, unprotected sex, rarely mother-to-child.
- **Clinical progression:** May lead to chronic hepatitis, **liver cirrhosis**, or acute liver failure.

Treatment & Prevention:

- No specific antiviral; **pegylated interferon** offers modest benefit.
- **Hepatitis B vaccination** indirectly prevents Hepatitis D.

Global Burden:

- **~10 million people** infected worldwide.
- Highest prevalence in **Central Asia & Africa**.
- India: Official prevalence low but likely underreported due to **limited testing**.

Why Carcinogenic?

- **Cancer Risk:** 2–6 times higher risk of **hepatocellular carcinoma**.
- **Cirrhosis link:** Chronic HDV accelerates **fibrosis** → cancer-prone environment.
- **Genomic instability:** Chronic inflammation → DNA damage, mutations.
- **Immune disruption:** Weakens antiviral surveillance → malignant transformation.



UPSC Relevance: GS Paper 2 & 3 – Prelims: HDV requires **Hepatitis B** for replication. Prevention via **Hepatitis B vaccine**.



HOT Question: “The classification of Hepatitis D as a carcinogen highlights the hidden cancer risks in chronic viral infections.” Examine its implications for public health policy in India. (150 words)



Key Statistics:

- ## Risk Beyond Smoking:

- ## Public Health Concern:

- 



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11. India Crosses 6 Crore Screenings under National Sickle Cell Anaemia Elimination Mission (NSCAEM)



India achieved a major milestone by screening over **6 crore people** under NSCAEM (launched in July 2023), identifying **2 lakh cases** and **16.7 lakh carriers** of Sickle Cell Disease (SCD), nearing the FY26 target of 7 crore screenings.

About Sickle Cell Disease (SCD)

- **Nature:** A **genetic disorder** caused by abnormal haemoglobin leading to misshapen (sickle-shaped) red blood cells.
- **Inheritance:** Occurs when both parents carry the trait → higher chance of affected child.
- **Symptoms:** Anaemia, pain crises, jaundice, stroke, organ damage.
- **Treatment:** Blood & bone marrow transplant (curative, but limited by donors and risks).

National Sickle Cell Anaemia Elimination Mission (NSCAEM)

- **Launch:** July 2023 under the **National Health Mission (NHM)**.
- **Goal:** Eliminate SCD as a **public health problem by 2047**.
- **Components:** Screening, counselling, awareness, genetic cards, and centres of excellence.

Key Achievements

- **Mass Screening:** 6.07 crore screened across 300+ districts in 17 states.
- **Geographic Concentration:** 95% cases in *Odisha, Madhya Pradesh, Gujarat, Chhattisgarh, Maharashtra*.
- **Cost Reduction:** Diagnostic kit cost reduced from ₹100 → ₹28.
- **Health Cards:** 2.63 crore **Sickle Cell Status Cards** issued (Normal, Carrier, Diseased).
- **Centres of Excellence:** 15 institutions designated for specialised care.

Future Action Plan

- **Awareness Drive:** Expand community campaigns & counselling.
- **Health Infrastructure:** Scale-up genetic card coverage and patient care access.
- **Research Push:** Promote genetic & clinical research for improved interventions.



UPSC Relevance: GS Paper 2 & 3 – GS2 (Health, Governance, Social Justice): Public health missions, NHM integration, vulnerable communities (tribals). **GS3 (Science & Technology, Biotechnology):** Genetic testing, diagnostic innovation, cost-effective healthcare.



HOT Question: India's National Sickle Cell Anaemia Elimination Mission aims for disease elimination by 2047. Critically analyse its challenges and opportunities in addressing genetic disorders within vulnerable tribal populations."



12. Kerala's Kannapuram Model: A Community-Led Success in Cancer Control



The **WHO South-East Asia Journal** highlighted the **Kannapuram Grama Panchayat model** of Kerala as a replicable, community-driven initiative for cancer prevention and control.

About the Kannapuram Model

- **Launch Year:** 2016, focusing on "Awareness First, Screening Next".
- **Objective:** Break cancer stigma, encourage early detection, and save lives.
- **Partnership:** Collaborated with **Malabar Cancer Centre**.
- **Milestone:** Established **Kerala's first Early Cancer Detection Clinic (2017)**.
- **Community Mobilisation:**
 - ASHA workers & Kudumbashree members drove awareness.
 - Achieved **96% participation** in cancer screening.
- **Impact:** All detected cases identified **at early stages**, ensuring effective treatment.

Significance

- **Community-Led Health Governance:** Shows how *local bodies can lead public health*.
- **Early Detection Advantage:** Reduces mortality, treatment costs, and improves survival rates.
- **Replicable Model:** Can be scaled nationwide to tackle India's growing cancer burden.

Alignment with SDGs: Supports **SDG 3 (Good Health and Well-Being)**.

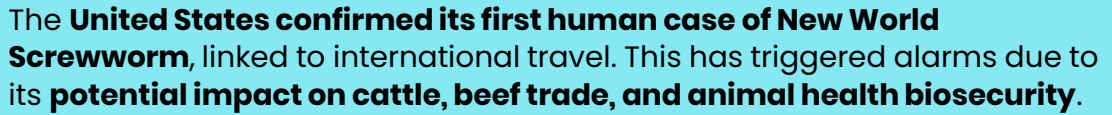


UPSC Relevance: **GS Paper 2 & 3 – GS2:** Health policies, Panchayati Raj in social development, role of local self-government. **GS1:** Social empowerment via Kudumbashree and community-led models.



HOT Question: "Discuss the significance of Kerala's Kannapuram Model in strengthening community-led cancer control. How can this approach be scaled up to address India's larger non-communicable disease burden?"



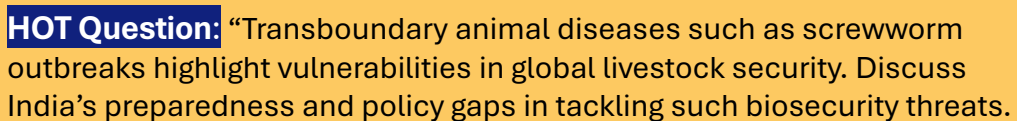
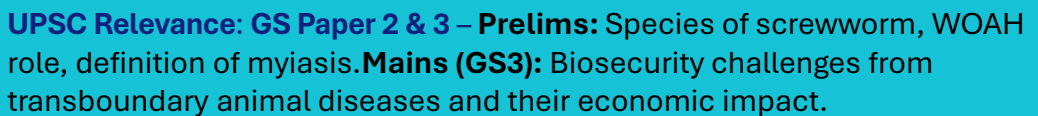


- **Definition:** Parasitic insects whose **larvae feed on the living tissue** of warm-blooded animals.

- ## Impacts

- ## Global & Indian Context

- **Global Spread:** New World Screwworm was eradicated in the 1960s but is resurging since 2023.
- **India:** *Old World Screwworm* is prevalent, especially during **monsoon season**, causing livestock and human myiasis cases.
- **WOAH (World Organisation for Animal Health):** Paris-based body that tracks **transboundary animal diseases (TADs)** and sets global health standards.



14. Kenya Eliminates Sleeping Sickness as Public Health Problem



On **8th August 2025**, the **World Health Organization (WHO)** confirmed that **Kenya has eliminated Human African Trypanosomiasis (HAT)**, or sleeping sickness, as a public health problem – its **second major NTD elimination** after guinea worm in 2018.

About Human African Trypanosomiasis (HAT)

- **Cause:** Parasitic infection by *Trypanosoma brucei*.
- **Transmission:** Spread by the bite of infected **tsetse flies**.
- **Forms:**
 - *Gambiense* (West/Central Africa) – chronic form.
 - *Rhodesiense* (East/Southern Africa, incl. Kenya) – acute, fatal in weeks if untreated.

Historic Progress in Kenya

- First detected: Early 20th century.
- Last indigenous case: 2009.
- Imported cases: 2012.
- Control measures: Surveillance in 12 health facilities across 6 counties (Busia, Siaya, Kisumu, Homa Bay, Migori, Kwale), trained staff, vector control, upgraded diagnostics.

Global Milestone

- Kenya = 10th African country to eliminate HAT.
- Part of WHO's roadmap: **57 countries eliminated at least one NTD**, target is **100 countries by 2030**.

Keywords: Neglected Tropical Disease (NTD), Tsetse Fly, Rhodesiense form, WHO NTD Roadmap 2030.



UPSC Relevance: **GS Paper 2 & 3 – GS2 – International Relations / Health Governance:** WHO milestones & global health diplomacy. **GS3 – Science & Technology / Public Health:** Neglected Tropical Diseases (NTDs), parasite biology, vector control.



HOT Question: “Neglected Tropical Diseases (NTDs) remain a barrier to health equity in the Global South. Discuss how international cooperation can accelerate their elimination, citing Kenya’s example.”



15. FSSAI Notifies 'Ayurveda Aahara' as a Regulatory Food Category



The **Food Safety and Standards Authority of India (FSSAI)** formally recognised **Ayurveda Aahara** as a **regulatory food category**, integrating Ayurvedic nutrition into India's food policy framework.

Definition:

- Foods aligned with **Ayurvedic principles** that promote **health, wellbeing, and dosha balance**.
- Examples: diets based on **seasonal suitability, therapeutic herbs, and classical recipes**.

Regulatory Framework:

- Governed under the **Food Safety and Standards (Ayurveda Aahara) Regulations, 2022**.
- Developed by **FSSAI** in consultation with the **Ayush Ministry & National Institute of Ayurveda, Jaipur**.
- Only recipes from **Ayurvedic texts listed in Schedule A** of the regulations are permitted.

Significance:

- **Institutionalises traditional food wisdom** in modern dietary regulation.
- **Builds consumer trust** in Ayurvedic diets through formal safety and labelling standards.
- Supports India's **soft power in Ayurveda and wellness economy**.



UPSC Relevance: GS Paper 2 & 3 – Prelims: Ayurveda Aahara = governed by **2022 Regulations under FSSAI**. Based on texts listed in **Schedule A**. **Mains:** Role of **traditional knowledge systems** in nutrition & public health.



HOT Question: The institutionalisation of Ayurveda Aahara reflects India's effort to mainstream traditional nutrition knowledge into public health policy." Critically examine. (150 words)



EDUCASIUM

16. Rising Preference for Cast Iron Cookware Amid Concerns Over Non-Stick Pans



Recent studies highlighted health risks from toxic chemical release in overheated **non-stick pans**, prompting consumers to return to safer, traditional **cast iron cookware**.

Cast Iron Cookware

- **Definition:** Cookware (tawas, kadais, pans) made from cast iron – an alloy of **iron and carbon**, moulded and cooled for strength.
- **Health Benefits:**
 - Naturally fortifies food with iron → helps combat anaemia.
 - Provides **even heat distribution**, reducing oil use.
 - Becomes **naturally non-stick** when properly seasoned.
 - Eco-friendly, long lifespan, chemical-free cooking.
- **Challenges:**
 - Heavy and less convenient to handle.
 - Requires **seasoning** (oiling and heating) to maintain surface.
 - Vulnerable to rust if improperly cleaned.
 - Awareness of health/environmental benefits still limited.

Non-Stick Cookware

- **Definition:** Cookware coated with **synthetic (PTFE/Teflon) or ceramic** layers to prevent sticking.
- **Advantages:**
 - Enables **low-oil cooking**.
 - Convenient, easy to clean, and time-saving.
- **Concerns:**
 - **Overheating (>260°C)** releases toxic chemicals (PFOA, PFAS).
 - Short lifespan (2–5 years) vs decades for cast iron.
 - Environmental concerns → microplastics and chemical waste.

Comparative View

Feature	Cast Iron	Non-Stick
Durability	10–50 years	2–5 years
Health Impact	Adds iron; chemical-free	Risk of toxic fumes
Oil Requirement	Moderate → Low (when seasoned)	Very low
Maintenance	Needs seasoning & care	Easy cleaning
Cost (long run)	Economical	Expensive (replacement)



UPSC Relevance: **GS Paper 2 & 3 – GS2 – Health:** Nutrition (iron fortification), public health awareness. **GS3 – Science & Environment:** Sustainable consumption, chemical safety, waste management.



HOT Question: “Traditional cookware such as cast iron offers both health and environmental benefits over modern non-stick pans. Critically analyse in the context of India’s nutrition and sustainability goals.”



17. India emerges as a key driver of global hunger reduction through digital PDS, nutrition schemes, and South-South cooperation.



The **UN's SOFI Report 2025** recorded a fall in global undernourishment to **673 million (8.2%)** in 2024. India contributed significantly, cutting undernourishment from **14.3% (2020) to 12% (2024)** — lifting ~30 million people out of hunger.

Key Drivers of India's Progress

- **Public Distribution System (PDS):**
 - Aadhaar-linked authentication, e-Pos, and **One Nation One Ration Card** for portability.
 - Serves **800+ million people**, ensuring targeted food security.
- **Nutrition Schemes:**
 - **PM POSHAN:** Nutritious school meals.
 - **ICDS:** Maternal and child nutrition, fortified foods, health linkages.
- **Digital Advantage:**
 - **AgriStack, e-NAM,** & geospatial tools improved market linkages, reducing inefficiencies.

Emerging Concerns

- **Malnutrition Paradox:** Hunger falling, but micronutrient deficiencies and obesity are rising.
- **High Diet Costs:** Over **60% of Indians** can't afford healthy diets due to high food prices & weak cold chains.
- **Food Loss:** ~13% lost from farm to market due to poor storage/logistics.

Way Forward

- **Nutrient-Rich Foods:** Increase production & affordability (pulses, millets, horticulture).
- **Infrastructure:** Invest in cold chains, warehouses, rural logistics.
- **FPO Strengthening:** Climate-resilient farmer groups for equitable food access.

South-South Cooperation: Export India's **digital food security model** to Global South, advancing **SDG 2 (Zero Hunger)**.



UPSC Relevance: GS Paper 2 & 3 – GS2 (Governance, Social Justice): Food security, nutrition policies. **GS3 (Economy, Agriculture):** Food supply chains, AgriStack, SDG goals.



HOT Question: *Despite progress in reducing undernourishment, India faces a 'triple burden' of hunger, malnutrition, and obesity. Discuss how India can align food security with nutritional security."*



18. Ayurveda Day to Be Marked on 23rd September Annually



On **26th August 2025**, the Government announced that **Ayurveda Day** will now be observed on **23rd September every year**, instead of the shifting date of **Dhanvantari Jayanti**. This standardisation places Ayurveda firmly on the **global health calendar**.

Key Highlights

- **Fixed Date:** 23rd September chosen for global recognition; aligns with **autumnal equinox**, symbolising **balance** — Ayurveda's core philosophy.
- **Theme 2025:** "Ayurveda for People & Planet" → underscores Ayurveda's role in sustainable living.
- **Earlier Practice:** Ayurveda Day observed on Dhanvantari Jayanti (lunar calendar), causing variability each year.
- **2024 Milestone:** PM inaugurated Phase II of All India Institute of Ayurveda, 4 Centres of Excellence, and launched projects worth ₹12,850 crore.

Significance

- **Global Recognition:** Fixed date makes international observance easier.
- **Health & Sustainability:** Reinforces Ayurveda's role in preventive healthcare and ecological harmony.
- **Soft Power:** Enhances India's cultural diplomacy through wellness and traditional knowledge.

Keywords: Ayurveda Day, Ministry of Ayush, Dhanvantari Jayanti, Autumnal Equinox, Ayurveda for People & Planet.



UPSC Relevance: **GS Paper 2 & 3 – Prelims:** Ayurveda Day date, Autumnal Equinox, Ministry of Ayush initiatives.



HOT Question: "How does the decision to observe Ayurveda Day on 23rd September enhance both India's cultural diplomacy and global healthcare narratives?"



19. Meghalaya Mulls Mandatory Premarital HIV Testing Amid Health–Rights Debate



Meghalaya is considering **mandatory HIV/AIDS testing before marriage**, following Goa's precedent, raising debates on balancing **public health priorities with individual rights and freedoms**

About HIV/AIDS

- **HIV (Human Immunodeficiency Virus):** Destroys CD4 (T) cells, weakening the immune system.
- **AIDS (Acquired Immuno Deficiency Syndrome):** Advanced stage of HIV infection with severe immune deficiency.
- **India's Burden:** ~2.5 million PLHIV (0.2% adult prevalence); ~66,400 new infections & ~69,000 AIDS-related deaths annually (UNAIDS).
- **Hotspots:** North-East states (Mizoram, Nagaland, Manipur) have the highest prevalence.

Arguments for Mandatory Premarital Testing

- **Prevent Transmission:** Ensures early detection & ART treatment → prevents spousal & child infections.
- **Public Health Gain:** Could avert thousands of new cases annually.
- **Women's Protection:** Safeguards women in high-prevalence regions where social stigma deters testing.
- **Awareness Boost:** Encourages mass testing, ART initiation, and viral suppression nationwide.

Arguments against Mandatory Testing

- **Rights Violation:** Contravenes **HIV & AIDS (Prevention & Control) Act, 2017**, which prohibits mandatory testing.
- **Stigma Risk:** May deepen social ostracisation of HIV-positive individuals.
- **Privacy Concerns:** Forced disclosure compromises confidentiality & trust.
- **Practical Limits:** Ignores high-risk behaviours outside marriage (e.g., extramarital sex, unsafe practices).
- **Counterproductive:** Fear of forced testing may reduce voluntary testing uptake.



UPSC Relevance: GS Paper 2 & 3 – GS2 (Health & Polity): Right to privacy vs public health, implementation of HIV Act 2017. **GS3 (Social Justice & Governance):** Disease control, awareness campaigns, ethics in healthcare.



HOT Question:

"Should India make premarital HIV testing mandatory in high-prevalence states, or would this infringe on constitutional rights? Critically examine"



20. Supreme Court Modifies Directions on Stray Dog Management: Humane Control with Municipal Accountability



The **Supreme Court of India** revised its earlier rulings on stray dog management, balancing **animal rights, public safety, and municipal accountability**, and consolidated related High Court cases under a single nationwide framework.

About the One Health Approach

- Definition: Collaborative framework linking human, animal, and environmental health.
- Global Standing: Endorsed by WHO, FAO, UNEP, and WOA.
- India's Anchor: National One Health Mission ensures multisectoral coordination.

Supreme Court Directives

- Sterilised Dogs: To be released back after sterilisation, vaccination, and deworming under ABC Rules, 2023.
- Rabid/Aggressive Dogs: Must be permanently confined in designated shelters.
- Feeding Regulation: Municipalities to earmark safe feeding zones; unsafe feeding penalised.
- Administrative Mandates:
 - Municipal helplines for dog-bite and violation complaints.
 - Periodic compliance reports on sterilisation, rabies control, and adoption.
 - NGOs/citizens may adopt tagged dogs under municipal oversight.

Public Health Significance

- Zoonotic Containment: Controls rabies, Nipah, avian influenza.
- Health Security: Reduces epidemic risks.
- Food & Sanitation Link: Indore case shows poor waste management worsens dog aggression and bites.
- AMR Prevention: Rational antibiotic use in humans and animals prevents resistance.

International Models

- Netherlands → CNVR eliminated strays.
- Singapore/Italy → mandatory microchipping + regulated shelters.
- Bhutan → nationwide veterinary sterilisation teams.



UPSC Relevance: GS Paper 2 & 3 – Prelims: One Health framework; ABC Rules, 2023; WOA.



HOT Question: “How can India integrate the Supreme Court’s directives on stray dog management with the One Health framework to balance public safety, animal welfare, and zoonotic disease prevention?”



SOCIAL ISSUES

Miscellaneous

1. CBSE Approves Open-Book Exams
2. Cabinet Approves MERITE Scheme
3. UDISE+ 2024-25
4. India Faces Rising Concerns Over Smartphone
5. Digital Overload and Competitive Pressures
6. PM Launches ₹1 Lakh Crore Rozgar Yojana
7. Gender Equality in India
8. India's fertility dips below replacement
9. Census 2027 PVTGs
10. UMEED Portal Module for Vulnerable Groups

1. CBSE Approves Open-Book Exams for Class 9 from 2026–27



The **Central Board of Secondary Education (CBSE)** has approved the introduction of **open-book examinations** for Class 9 students starting 2026–27, after a pilot project showed strong teacher support for competency-based learning

About Open-Book Exams:

- Students can consult **textbooks, notes, and authorised resources** during exams.
- Aims to assess **application, analysis, and critical thinking** instead of rote memorisation.

Policy Alignment:

- Anchored in **National Education Policy (NEP) 2020**.
- Supported by **National Curriculum Framework for School Education (2023)**.

Key Features:

- Applicable to core subjects → **languages, mathematics, science, and social science**.
- Optional adoption** for schools; CBSE to provide guidelines.
- Expected outcomes → reduce exam stress, promote conceptual clarity, encourage **competency-based assessment**.



UPSC Relevance: GS Paper 2 & 3 – Open-book exam = part of NEP 2020 reforms. First applied at **Class 9 level under CBSE**. Shift from rote learning to **application-oriented pedagogy**.



HOT Question: “Open-book examinations mark a shift from rote memorisation to competency-based education. Critically evaluate their potential benefits and challenges in India’s school system.” (150 words)



2. Cabinet Approves MERITE Scheme to Boost Quality & Employability in Technical Education



The Union Cabinet approved the **MERITE scheme (Multidisciplinary Education & Research Improvement in Technical Education)** for **275 institutions**, aligning with **NEP 2020** to improve governance, research, and employability.

About MERITE Scheme

- **Type:** Central Sector Programme.
- **Nodal Ministry:** Ministry of Education.
- **Funding:** ₹4,200 crore (2025–30), including ₹2,100 crore **World Bank loan**.

Objectives

- Improve **quality, equity, and governance** in technical institutions.
- Align **curriculum with industry needs** & future skill requirements.
- Establish **research hubs & incubation centres**.
- Promote **faculty training & women's leadership** in STEM.

Implementation

- Collaboration with **IITs, IIMs, AICTE, NBA**.
- Provision for **student internships & research-industry linkages**.

Significance

- Expected to benefit **7.5 lakh+ students** with improved employability skills.
- Tackles **graduate unemployment** in technical education.
- Advances **NEP 2020 vision** of multidisciplinary and innovation-driven education.



UPSC Relevance: GS Paper 2 & 3 – Prelims: Acronym **MERITE**, funding pattern, implementing bodies. **Mains:** Education reforms under **NEP 2020**. Role of **World Bank partnerships** in Indian education.



HOT Question: "Discuss how the MERITE scheme can transform India's technical education sector in line with NEP 2020, while addressing employability and governance gaps." (150 words)



3. UDISE+ 2024–25 Highlights Progress in School Education



On **28th August 2025**, the **Ministry of Education** released the **Unified District Information System for Education Plus (UDISE+)** 2024–25 report, showing improvements in teacher strength, enrolment, retention, and infrastructure.

About UDISE+

- National database covering school education (pre-primary to higher secondary).
- Provides district-wise data on enrolment, teachers, infrastructure, and learning indicators.

Key Findings (2024–25)

- **Teacher Strength:** Crossed **1 crore** teachers (↑6.7% over 2022–23).
- **Pupil–Teacher Ratios (PTR):** Improved at all levels:
 - Foundational: **10:1**, Preparatory: **13:1**, Middle: **17:1**, Secondary: **21:1**.
- **Gross Enrolment Ratios (GER):**
 - Middle level: **90.3%**
 - Secondary level: **68.5%**
- **Transition Rates:** Improved progression across levels → better retention.
- **Infrastructure:**
 - Single-teacher schools ↓ to **1.04 lakh** (from 1.1 lakh).
 - Zero-enrolment schools ↓ to **7,993** (from 12,954).
 - Computer availability: **64.7%**, Internet: **63.5%**.
 - Electricity: **93.6%**, Drinking water: **99.3%**, Handwashing: **95.9%**.
 - Accessibility (ramps & handrails): **54.9%**.
- **Gender Equity:** Female teachers **54.2%**; girls' enrolment **48.3%**.

Significance

- Marks progress under **NEP 2020** goals of universal access and equity.
- Better PTRs align with **SDG 4 (Quality Education)**.
- Infrastructure improvements enhance inclusivity and digital readiness.

Keywords: UDISE+, GER, PTR, NEP 2020, Teacher Strength, School Infrastructure.



HOT Question: “How do the findings of UDISE+ 2024–25 highlight both progress and persisting gaps in India’s school education system?”



4. India Faces Rising Concerns Over Smartphone Overuse Among Youth and Children



Advancing technology and increasing smartphone penetration have turned devices into “memory on demand.” Recent surveys (ASER 2024, LM reports) highlight worrying trends of digital addiction, excessive screen time, and mental health consequences.

Smartphone Penetration in India

- **Rural Access:** 90% of rural teenagers (14–16 yrs) own smartphones.
- **Usage Skills:** 82.2% of rural teens use smartphones fluently.
- **Learning vs. Leisure:** 57% use them for learning; 76% for social media.
- **Screen Time:** Avg. Indian spends ~5 hrs/day, with 69% on entertainment apps.
- **Child Screen Time:** Children under 5 spend ~2.2 hrs/day (double WHO’s safe limit).

Impacts of Excessive Smartphone Use

- **Cognitive Decline:** Notifications reduce focus, memory, and academic performance.
- **Sleep Disruption:** Blue light exposure disturbs circadian rhythm → poor sleep, anxiety, depression.
- **Physical Strain:** Eye strain, fatigue, neck/back pain.
- **Digital Addiction:** Reward-based apps foster compulsive scrolling, reducing face-to-face interactions.

Measures for Healthy Smartphone Use

- **Parental Role:** Supervise usage, set device curfews, encourage digital detox.
- **Educational Intervention:** Include digital literacy & mindful usage in school curricula.
- **Tech Regulation:** App dashboards, do-not-disturb defaults, transparent algorithms.
- **Community Support:** Peer groups and awareness campaigns on balanced usage.
- **Research Push:** Long-term studies on digital addiction in Indian youth.



UPSC Relevance: GS Paper 2 & 3 – GS2 (Governance, Social Justice): Public health, adolescent protection policies. **GS3 (S&T, Effects of Technology):** Digital addiction, AI-driven algorithms.



HOT Question: “With India becoming one of the largest smartphone markets, digital overuse poses a silent public health crisis. Discuss policy and community-level measures needed to balance digital empowerment with digital well-being.”



5. Digital Overload and Competitive Pressures Deepen IQ–EQ Imbalance in India



Rising **digital dependence, urban loneliness, and hyper-competition** are eroding **emotional intelligence (EQ)**, creating an imbalance with **intelligence quotient (IQ)** and leading to **social and mental health challenges**.

IQ vs EQ:

- **Intelligence Quotient (IQ)** → logical reasoning, analytical skills, cognitive capacity.
- **Emotional Quotient (EQ)** → empathy, self-awareness, emotional regulation, and social adaptability.
- **Human Quotient (HQ)** = IQ + EQ → holistic ability to think critically and act empathetically.

Consequences of Declining EQ:

- **Global:** EQ scores fell **5.54% (2019–2023)**, linked to stress & burnout.
- **India:** Rising **mental health disorders** (depression, anxiety) + youth apathy.
- **Emotional Deficit:** Tech-driven growth neglects emotional well-being, raising **human cost** of progress.

Way Forward:

- **Education:** Integrate **social-emotional learning (SEL)** in schools.
- **Policy:** Track **well-being indices & Gross National Happiness (GNH)** alongside GDP.
- **Governance:** Policymakers, educators, and frontline workers must blend **knowledge with empathy** to mobilise communities.
- **Development Model:** Move from **GDP-centric to human-centric growth**.



UPSC Relevance: GS Paper 2 & 3 – Prelims: HQ = IQ + EQ. SEL = Social Emotional Learning for curricula. **Mains:** Challenges of **mental health & social cohesion** in India's urbanisation.



HOT Question: “In the age of digital overload and competitive stress, emotional intelligence is as critical as cognitive intelligence.” Discuss with reference to human-centric policymaking. (150 words)



6. PM Launches ₹1 Lakh Crore Rozgar Yojana to Create 3.5 Crore Jobs



In his **Independence Day 2025 speech**, PM Modi announced the **Pradhan Mantri Viksit Bharat Rozgar Yojana** with a ₹1 lakh crore outlay to generate 3.5 crore jobs and formalise the workforce.

About the Scheme

- **Nature:** Central Sector Scheme, successor to the Employment-Linked Incentive Scheme.
- **Nodal Ministry:** Ministry of Labour & Employment.
- **Tenure:** Two years, extendable to four years for the manufacturing sector.
- **Mechanism:** Direct Benefit Transfer (DBT) via **EPFO & PAN-linked accounts**.

Objectives

- Boost **large-scale job creation** across sectors.
- Incentivise **formalisation of workforce**.
- Provide support to **both employees & employers**.

Eligibility & Benefits

- **Employees:**
 - First-time entrants into formal sector.
 - Monthly wage < ₹1 lakh.
 - Incentive: **₹15,000 in 2 instalments** (6 months & 12 months) post financial literacy training.
- **Employers:**
 - Incentive: **Up to ₹3,000/month per new employee**.

Significance

- Encourages hiring in **labour-intensive & MSME sectors**.
- Enhances **social security coverage** via EPFO linkage.
- Reduces unemployment and under-employment.
- Aligns with **Viksit Bharat 2047 vision** of inclusive growth.

Keywords for UPSC

- DBT (Direct Benefit Transfer), Workforce formalisation
- EPFO & PAN-linked accounts, Wage incentives



UPSC Relevance: GS Paper 2 & 3 – GS2: Welfare schemes for vulnerable sections, government policies & their impact. **GS3:** Employment generation, economic growth, inclusive development.



HOT Question: "Schemes like PM-VBRY attempt to formalise employment while incentivising both employees and employers. Critically evaluate whether wage-linked incentives can ensure long-term, sustainable job creation in India"



7. Gender Equality in India: NITI Aayog Report & Global Rankings Highlight Persistent Gaps



NITI Aayog's 2023-24 report places India as an *aspirant* in **SDG 5 (Gender Equality)**. **World Economic Forum's Gender Gap Report 2025** ranks India **131 out of 148 countries**, behind Bangladesh and Nepal.

Education

- **Kerala:** Highest female literacy (**95.2%**).
- **Tamil Nadu:** 80.1%.
- **Lagging States:** Bihar (63.8%) and Rajasthan (65.3%).
- **Improving:** Himachal Pradesh & Uttarakhand have crossed 80%.

Female Labour Force Participation (FLFP)

- **Leaders:** Himachal Pradesh (**56.2%**), Chhattisgarh (**46.1%**), Tamil Nadu (**35.2%**).
- **Declines:** Karnataka & Andhra Pradesh – due to loss of rural jobs & weak support systems.

Health Outcomes

- **Leaders:** Kerala & Tamil Nadu – institutional deliveries >98%, lowest **Maternal Mortality Ratio (MMR)**.
- **Lagging:** Uttar Pradesh, Bihar, Madhya Pradesh – MMR remains high (118–173).

Political Representation

- **Highest:** Chhattisgarh (**21%**), Uttar Pradesh (**15%**).
- **Lowest:** Telangana (5%), Himachal Pradesh (1%).
- **Trend:** Despite 33% quota in local bodies, women underrepresented in legislatures due to party-level reluctance.

Emerging Trends & Insights

- **Shifting Divide:** North-south gender divide narrowing; smaller northern states showing gains.
- **Drivers of Progress:** State-specific strategies, cultural reforms, and local policies.
- **Rapid Gains:** Historically excluded groups catching up faster.
- **Growth vs Inclusion:** Economic growth alone insufficient; southern states must re-focus on women's participation.



UPSC Relevance: GS Paper 2 & 3 – GS1 (Society): Role of women, population issues, social empowerment. **GS2 (Governance, Social Justice):** Health, education, political participation of women. **GS3 (Economy):** Labour force participation and inclusive growth.



HOT Question: “Despite rapid economic and social development, India continues to lag in gender equality indicators. Critically examine the structural barriers to women's participation in education, workforce, health, and politics.”



8. India's fertility dips below replacement, sparking concerns over reproductive agency and demographic sustainability



India's **Total Fertility Rate (TFR)** has dropped to **2.0 (NFHS-5)**, below the replacement level of 2.1. This raises questions about **reproductive agency, family structures, and long-term demographic sustainability**, especially with urban-rural and regional divides.

Fertility Trends in India

- **TFR:** 2.0 (national average); Replacement level = 2.1.
- **Urban-Rural Divide:** Urban TFR 1.6 vs. rural 2.1.
- **Regional Gap:** Southern states (Kerala, Tamil Nadu) < replacement, northern states > replacement.
- **Desired vs Actual Gap:** Desired children = 2.2 (rural), 2.0 (urban).
- **Population Momentum:** Young age structure sustains growth despite decline.

Cultural & Structural Determinants

- **Family Nuclearisation:** Weakens childcare support.
- **Urban Pressures:** High housing costs, costly education discourage large families.
- **Parenting Stress:** High expectations delay childbirth.
- **Patriarchy & Gender Norms:** Restrict women's autonomy in fertility decisions.
- **Son Preference:** Sustains fertility beyond economic need.

Policy Challenges

- **Regional Diversity:** North needs fertility decline; South faces ageing.
- **Family Planning Bias:** Still focuses on control, not rights/choices.
- **Childcare Deficit:** Affordable childcare scarce.
- **Women's Employment:** Low FLFPR (female labour force participation rate) restricts fertility-work balance.
- **Fertility Treatment Access:** Limited and costly.



UPSC Relevance: GS Paper 2 & 3 – GS1 (Society): Population and associated issues, gender roles. **GS2 (Governance):** Welfare policies, family planning programs. **GS3 (Economy):** Demographic dividend, workforce participation.



HOT Question: "India's demographic future hinges not only on fertility levels but on strengthening reproductive agency. Discuss how policy can balance demographic needs with reproductive rights."



9. Census 2027 may separately enumerate Particularly Vulnerable Tribal Groups (PVTGs) for the first time, ensuring targeted policy interventions.



The **Ministry of Tribal Affairs** has requested the **Registrar General & Census Commissioner** to include a **separate enumeration of PVTGs** in **Census 2027**.

Who are the PVTGs?

- **Definition:** Most marginalised among Scheduled Tribes, with declining populations, pre-agricultural practices, and low literacy.
- **Origin:**
 - **Dhebar Commission (1960s)** → suggested special category *Primitive Tribal Groups (PTGs)*.
 - **1975:** PTGs notified.
 - **2006:** Renamed *PVTGs*.
- **Current Status:** **75 PVTGs** out of 705 STs, spread across **18 States + 1 UT (Andaman & Nicobar Islands)**. ⚠️ **Need for Separate Enumeration**
- **Data Gap:** No distinct population count in earlier Censuses → invisibility in policymaking.
- **Clubbing with STs:** Masks their extreme deprivation.
- **Targeting Benefits:** Reliable numbers crucial for schemes like **PM-JANMAN** (shows ~45.56 lakh PVTGs).
- **Policy Precision:** Enables **need-based interventions** in health, nutrition, housing, and education.

Significance

- **Social Justice:** Focus on the most vulnerable within STs.
- **Resource Allocation:** Better utilisation of funds under tribal sub-plans.
- **Governance Reform:** Strengthens welfare outreach in remote & forested regions.
- **Global Alignment:** Supports SDG 10 (reduce inequality) & UNDRIP commitments.



UPSC Relevance: GS Paper 2 & 3 – GS1: Tribal communities, diversity & marginalisation. **GS2:** Welfare of vulnerable sections, Census-based policymaking. **GS3:** Inclusive growth, poverty alleviation.



HOT Question: “Critically evaluate the significance of separately enumerating Particularly Vulnerable Tribal Groups (PVTGs) in Census 2027. How can this step transform India’s tribal welfare policy?”



10. UMEED Portal Module for Vulnerable Groups



On **27th August 2025**, the Ministry of Minority Affairs launched a new **UMEED Portal module** to streamline financial support for widows, divorced women, and orphans through **Waqf alal-aulad properties**, ensuring transparency and faster delivery

About UMEED Portal

- **UMEED = Unified Waqf Management, Empowerment, Efficiency & Development.**
- Digital platform for transparent management of Waqf assets & welfare distribution.
- New **module focuses on vulnerable groups**: widows, divorced women, and orphans.

Key Features of the New Module

- **Aadhaar-based authentication** → ensures accurate identification of beneficiaries.
- **Online applications & approvals** → processed by State/UT Waqf Boards.
- **Direct Benefit Transfer (DBT)**: Funds transferred straight into beneficiaries' bank accounts, reducing delays and eliminating intermediaries.

About Waqf alal-aulad

- A *family Waqf* where property is endowed for the welfare of descendants of the settlor, and later for charitable purposes.
- Plays a role in **community-specific welfare**.

Significance

- Strengthens **social security** for vulnerable groups in minority communities.
- Reduces bureaucratic hurdles, leakage, and exploitation.
- Promotes **digital governance, financial inclusion, and welfare efficiency**.

Keywords: UMEED Portal, Waqf, Direct Benefit Transfer, Minority Affairs, Social Security.



UPSC Relevance: GS Paper 2 & 3 – Prelims: UMEED Portal, Waqf alal-aulad, DBT mechanism



HOT Question: How does the UMEED Portal module for vulnerable groups strengthen welfare governance and ensure inclusive development in India?

