

EPIC CURRENT AFFAIRS

Online Video Classes NOVEMBER 2025

Legal Aid Is
Constitutional Obligation

Niyamgiri Case: India's First
Environmental Referendum

Gen-Z Protests in Mexico

UNESCO's Neurotechnology
Ethics Framework

Nayi Chetna 4.0 Campaign

Vikram-3201
Microprocessor

EPIC UPSC
Classes

by **EDUCASIUM** IAS Academy

www.educasiumiasacademy.com



EPIC UPSC Classes

Online Video Courses

FOREWORD

The December Edition of EPIC UPSC Current Affairs, covering **key developments of November**, continues our commitment to move beyond routine news compilation and towards **exam-oriented understanding**. Each topic in this issue has been carefully curated and mapped to the UPSC syllabus, helping aspirants clearly grasp **what happened, why it matters, and how it connects to both Prelims and Mains perspectives**.

This edition reflects our sustained effort to **simplify complexity, prioritise relevance, and distil current affairs into high-yield, concept-driven insights**. The content is designed not merely to inform, but to strengthen conceptual clarity, deepen analytical thinking, and encourage aspirants to approach issues with the mindset of future administrators – marked by precision, balance, and purpose.

Note from the Team

To ensure **faster loading and seamless offline access**, we have intentionally kept visual elements minimal in this edition. Additionally, Team Educasium has undergone a **strategic internal restructuring** this month to support the expansion of upcoming academic initiatives, all aimed at enhancing the overall learning experience. We sincerely appreciate your **trust, patience, and continued support** during this transition phase.

Our Continuing Vision

At Educasium IAS Academy, our vision remains unwavering: **to empower every serious UPSC aspirant with structured, reliable, and meaningful guidance**. Under the direction and mentorship of **Purushoth Sir**, we remain committed to delivering **innovative, value-driven learning experiences** that nurture academic excellence, resilience, and a deep sense of purpose.

On behalf of the **EPIC UPSC Team**, we reaffirm our pledge to uphold **consistency, academic integrity, and thoughtful innovation**, ensuring that each edition of this magazine stands as a **trusted and substantive companion** in your civil services journey.

Team EDUCASIUM
EPIC UPSC Classes – Educasium IAS Academy

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.

Table of Content

Unit 1	POLITY GOVERNANCE	004
Unit 2	International Affairs	029
Unit 3	Defence and Internal Security	062
Unit 4	India and World Economy in News	088
Unit 5	Environment	137
Unit 6	Science and Technology	197
Unit 7	Geography & Disaster Management	257
Unit 8	Health, Social Issues and Misc.	275
Unit 9	History, Art and Culture	317

NOVEMBER 2025

INDIAN POLITY GOVERNANCE

1. SC Uses Article 142 to Quash POCSO Case
2. Arrest Illegal If Grounds Not Understood
3. SC: Minor Can Repudiate Guardian's Sale
4. SC Strikes Down Tribunal Reforms Act Parts
5. SC Clarifies Governor's Assent Powers Limits
6. SC Moves to Regulate Harmful Online Content
7. CJI Gavai Revives Creamy Layer Debate
8. Centre: Vote Statutory, Voting Freedom Fundamental
9. Contempt Debate Rekindled After Remarks on CJI
10. SC: Legal Aid Is Constitutional Obligation
11. CJI-Designate Surya Kant Outlines Reform Agenda
12. Justice Surya Kant Becomes 53rd CJI
13. Undertrial Injustice Persists in Indian System
14. Constitution 131st Amendment Bill Introduced
15. Constitution Day 2025 Celebrated in Samvidhan Sadan
16. Nomination Stage Emerging as Democratic Bottleneck
17. Assam Approves Polygamy Ban with Sixth Schedule Exemption
18. Red Fort Car Blast Labeled Terrorist Act
19. Explosion Reported at Nowgam Police Station
20. Southeast Asia Cybercrime Hubs Threaten India
21. Niyamgiri Case: India's First Environmental Referendum
22. India Launches Scientific Recycling of National Flags
23. UIDAI Deletes Two Crore Deceased Aadhaar Numbers



1. SC Uses Article 142 to Quash POCSO Case



In a rare decision, the Supreme Court exercised its **extraordinary powers under Article 142** to set aside a **POCSO conviction**, emphasising that the order was passed to ensure “complete justice” and should **not be treated as precedent** in sexual offences cases.

Plenary Powers Under Article 142

Objective: Allows the Supreme Court to issue any order necessary to do **complete justice**.

Scope: Overrides statutory limitations in extraordinary, fact-specific scenarios.

Nature: Discretionary and exceptional – cannot be routinely invoked or cited as general precedent.

Caution: The Court clarified its use must not dilute the strict statutory mandate of POCSO.

About the POCSO Act, 2012

Objective & Design : Protects children **below 18 years** from sexual assault, harassment, and exploitation. **Gender-neutral** protections.

Strict liability: Consent of minor is legally irrelevant.

Institutional Structure : **Special Courts:** Every district must establish a designated POCSO Special Court (Sessions Court) in consultation with the Chief Justice of the High Court. **Monitoring:** NCPNR and SCPCRs monitor implementation.

Penalties : Severe punishments up to **life imprisonment or death** (aggravated cases). 2019 amendment enhanced penalties and criminalised **child pornography**.

Procedural Safeguards: **Time-bound trial:** Completion within **one year** from reporting of offence. **Child-friendly procedures:** In-camera trial, child protection support, and psychological care.

Juvenile Offenders: If the **accused is a minor**, the case is handled under the **Juvenile Justice Act, 2015**, focusing on **rehabilitation** rather than punitive punishment.



UPSC Relevance: **Prelims:** Article 142, POCSO Act provisions, NCPNR, Special Courts. **Mains GS-II:** Judiciary, statutory safeguards for children, judicial discretion.



HOT Question: “Article 142 gives the Supreme Court wide discretionary powers, but its use in sexual offences cases raises complex ethical and legal questions. Discuss in light of the recent POCSO case.”



2. Arrest Illegal If Grounds Not Understood



An arrest becomes **illegal** if written grounds of arrest are **not provided in a language understood** by the arrestee. Earlier rule (written grounds) applied only to UAPA and PMLA cases – now extended to **all arrests**, including IPC/BNS.

Article 22(1): Arrestee must be informed of grounds of arrest “*as soon as may be*”. **Oral communication alone is insufficient;** reading out grounds does not meet constitutional standards.

Language requirement: Giving the document in a language the arrestee does not understand violates:

- Article 21 – personal liberty
- Article 22 – right to know grounds of arrest

Purpose of written grounds:

- Enable the accused to **seek legal counsel**
- Facilitate **bail applications**
- Allow the person to **challenge custody**

3. SC: Minor Can Repudiate Guardian's Sale



A person, upon turning 18, **can repudiate** (reject) a property sale made by their guardian **without court approval**.

Key Points of the SC Ruling

- **Repudiation Without Suit:**
 - A formal lawsuit is **not compulsory**.
 - Clear conduct showing rejection (e.g., **reselling the property**) is enough.
- **3-Year Limitation:**
 - Repudiation must occur **within 3 years** of attaining majority (as per **Limitation Act, 1963**).
- **Effect of Repudiation:**
 - The guardian's sale becomes **void ab initio** (invalid from the start).
 - The buyer gets **no legal title**.
- **Section 8(3), HMGA 1956:**
 - Confirms that a guardian's sale without court approval is **voidable**, and the child can reject it after majority.
- **Evidence Rule:**
 - A **Power of Attorney holder** cannot testify about facts known only to the principal.
 - Only the **actual person** can depose on personal knowledge.
- **Legal Continuity:**
 - Reinforces long-standing jurisprudence on minor property protection.



4. SC Strikes Down Tribunal Reforms Act Parts



In November 2025, the Supreme Court invalidated multiple provisions of the Tribunals Reforms Act, 2021, holding that the government had **reintroduced previously struck-down clauses**, undermining judicial independence. The Court directed the Union Government to establish a **National Tribunal Commission (NTC)** within four months

Key Observations by the Supreme Court

1. Legislative Override of Judicial Directions

Parliament had **re-enacted** provisions previously struck down in *Madras Bar Association (MBA)* cases with cosmetic changes.

The Court held this as constitutionally impermissible.

2. Executive Dominance

The executive often appears as a **litigant** before tribunals.

Allowing it to control **appointments, tenure, service conditions** creates conflict of interest → violates judicial independence.

3. National Tribunal Commission (NTC) Ordered

NTC must be established within **four months**.

Mandate: appointments, finances, infrastructure, performance review → uniform and independent tribunal administration.

Struck-Down Provisions (with reasons)

Provision (Act, 2021)	Supreme Court Reason for Striking Down
4-year tenure	Too short; creates dependency on govt. for reappointment. Court mandated minimum 5-year term.
Minimum age 50	Arbitrary & discriminatory; excludes meritorious young advocates.
Two-name panel per vacancy	Gives govt. the final say; undermines judicial primacy in appointments.
Service parity with civil servants	Converts tribunal members into quasi-bureaucrats; violates separation of powers & judicial independence.

About the Tribunals Reforms Act, 2021

- Aimed to **streamline tribunal administration**.
- Dissolved several appellate bodies; shifted jurisdiction to High Courts.
- Fixed **4-year tenure**, age 50 minimum.
- Gave Centre wide **rule-making authority** over service conditions.
- Central Government made appointments based on **SCSC recommendations**.
- Removal** only after SC judge-led inquiry.

Search-cum-Selection Committee (SCSC): Composition

Chairperson: CJI or SC judge nominated by CJI.

Members:

Two Central Government secretaries

One retired SC/HC judge (where applicable)

Member-Secretary: Ministry Secretary (no voting rights)



5. SC Clarifies Governor's Assent Powers Limits



The 5-judge Constitution Bench examined a Presidential Reference arising from the Supreme Court's earlier ruling that prolonged inaction by Governors on Bills is unconstitutional. That ruling had even invoked Article 142 to give "deemed assent" – a move now clarified and limited by the Constitution Bench.

1. Scope of Article 200 (Governor's Assent)

Three Constitutional Options Only When a Bill is presented, the Governor may:

Grant Assent

Withhold and Return the Bill (except Money Bills)

Reserve the Bill for the President

No other option exists.

No Indefinite Delay: Constitution does **not** permit stalling by inaction. Withholding a decision is **not** a permissible constitutional option.

Ministerial Advice Not Binding

The Governor is **not bound** by the Council of Ministers when choosing among these three options, since Article 200 creates an independent constitutional responsibility.

2. Limits of Judicial Review

Review Only on Delay, Not on Merits

- Courts may examine **prolonged or unjustified inaction**.
- But courts **cannot question the correctness** of the Governor's decision (assent/withhold/reserve).

President's Decision Is Non-Justiciable

- Courts cannot review the merits of Presidential assent or withholding under **Article 201**.

Article 361 Immunity Not Absolute

- Governors/President have personal immunity,

But their offices and actions (like inaction) can still be examined by courts.

3. Constitutional Timelines

"As Soon As Possible" = Flexible

- Article 200 does **not permit rigid, court-imposed deadlines**.
- Courts may remind constitutional authorities but **cannot legislate timelines**.

Same for President (Article 201)

- SC cannot set a deadline for Presidential assent either.



4. Judicial Role in the Assent Process

Review of Laws Only, Not Bills

- Courts review **laws, not Bills.**
- Bills are part of the legislative process, hence sub-judice review is impermissible.

Article 142 Cannot Override the Constitution

- SC cannot:
 - substitute its own decision for gubernatorial or presidential assent
 - declare “deemed assent” by judicial order

No Concept of “Deemed Assent”

- Delay **does not** convert a Bill into law automatically.
- Explicit assent is required.

President's Reference Under Article 143 Not Mandatory

- President is **not compelled** to seek SC advice every time a Bill is reserved.
- Reserved Bills remain within her constitutional discretion.

Assent Is Mandatory for a Bill to Become Law

- A Bill becomes law **only after explicit assent** of Governor/President.

Relevant Constitutional Articles

Article	Subject
Article 200	Governor's assent, return, or reservation of Bills
Article 201	Presidential consideration of reserved Bills
Article 361	Personal immunity of President/Governors
Article 142	SC power to do “complete justice”
Article 143	Presidential Reference to SC for advisory opinion



6. SC on Regulating Harmful Online Content



The Supreme Court directed the Centre to develop effective guidelines to regulate abusive, obscene, and harmful user-generated content on digital platforms.

Key Observations & Directions

- **Independent Regulator:** Existing self-regulation is inadequate; need for a **neutral authority** to oversee online content.
- **Prevention Over Reaction:** Current systems act only *after* harmful content goes viral; Court calls for **preventive mechanisms**.
- **Free Speech Limits:** Article 19(1)(a) protected, but restrictions under Article 19(2) must uphold **decency, morality, public order**.
- **Vague Terms Misused:** Broad labels like “anti-national attitude” must be **precisely defined** using established judicial standards.
- **Strong Age-Verification:** Suggests **Aadhaar-based or equivalent** verification since disclaimers do not block minors effectively.
- **Protection of PwDs:** Recommends a **strict law** penalising ridicule of persons with disabilities, on lines of the SC/ST Act.

Existing Regulatory Framework

- **MEITY & MIB:** Primary ministries overseeing online content regulation.
- **IT Act 2000:**
 - Sec 79 → Safe-harbour if due diligence followed.
 - Sec 69A → Govt power to block content.
 - Sec 67 → Punishes obscene material online.
- **IT Rules 2021:**
 - Due diligence, grievance officers, content classification.
 - Stricter norms for **significant social media intermediaries**.
- **DPDP Act 2023:** Controls consent-based personal-data processing.
- **Other Relevant Laws:**
 - IRWA Act 1986 (indecent representation of women).
 - POCSO Act 2012 (child protection in online spaces).
- **Shreya Singhal Judgment (2015):**
 - Struck down **Sec 66A** (vague criminalisation of online speech).
 - Held that intermediaries remove content **only upon court order or govt direction**.
 - Upheld **Sec 69A** blocking powers.



7. CJI Gavai Revives Creamy Layer Debate



In November 2025, Chief Justice of India B.R. Gavai reiterated that the **creamy layer principle should apply to SC reservations**, similar to the OBC framework established in *Indra Sawhney* (1992). The statement reignited a national debate on inequality within Scheduled Castes and the constitutional foundations of affirmative action.

Why Creamy Layer Is Being Suggested for SC Quota

1. Intra-Group Inequality

- NSS & IHDS: Top 10-15% SC households show near-national socio-economic outcomes, while most remain in low-income labour.

2. Benefit Concentration

- TISS/ICSSR studies: A small elite repeatedly secures government jobs/education seats → **inter-generational capture**.

3. Persistent Structural Backwardness

- PLFS 2022-23: SC unemployment rate consistently **above national average**; 50%+ still in low-productivity jobs.

4. Education Access Gaps

- AISHE: Rural/low-income SC youth lag significantly behind urban/elite SC families in enrolment & completion.

Counterarguments Against Extending Creamy Layer to SCs

1. Untouchability Persists Across Income Levels

- Social stigma affects even economically better-off SCs, unlike OBCs.

2. Constitutional Rationale

- SC reservation primarily addresses **caste-based social discrimination**, not just economic backwardness.

3. Administrative Difficulty

- Defining "creamy layer" for SCs is challenging because stigma is **universal**, not selective.

Constitutional Basis for SC Reservation

- **Articles 15(4) & 16(4):** Enable special provisions & reservations for socially and educationally backward classes, including SCs.
- **Article 46:** Mandates promotion of SC/ST educational & economic interests.
- **Article 14:** Allows reasonable classification; internal disparities may justify exclusions to prevent elite domination.

Key Supreme Court Judgments on SC Creamy Layer Debate

1. *E.V. Chinnaiah v. State of Andhra Pradesh* (2004)

- Held SCs are a **homogeneous class** under Article 341 → states cannot subdivide or redistribute reservation benefits internally.

2. *M. Nagaraj v. Union of India* (2006)

- Upheld reservation in promotion for SC/ST.
- Required **quantifiable data** on backwardness, representation & efficiency.

3. *Jarnail Singh v. Union of India* (2018)

- Removed requirement to “re-prove backwardness” of SC/ST.
- **Allowed creamy layer exclusion** for SCs/STs – to avoid **elite capture** in promotions.

Keywords (UPSC-oriented)

Creamy layer, Indra Sawhney, SC reservation, Article 341, Jarnail Singh, E.V. Chinnaiah, affirmative action, social stigma.



UPSC Relevance: Prelims: Articles 15(4), 16(4), 46; key judgments; creamy layer concept. Mains GS-II: Reservation reforms, social justice, inequality within groups. Essay: “Equality vs Equity in affirmative action.”



HOT Question: “Should the creamy layer principle be applied to Scheduled Caste reservations? Evaluate the constitutional, social, and administrative implications

8. Centre: Vote Statutory, Voting Freedom Fundamental



During hearings on uncontested elections and the role of NOTA, the Centre informed the Supreme Court that while the **right to vote arises only from statute (RPA 1951)**, the **act of voting is protected under Article 19(1)(a)** as a form of political expression – applicable only when a poll actually takes place.

Background of the Case

- **Section 53(2), RPA 1951:** If the number of candidates equals the number of seats, the Returning Officer declares them elected without polling.
- **Petitioners' Claim:** This denies voters the ability to use NOTA, violating freedom of expression (Art. 19(1)(a)).
- **Historical Context:** India has seen only **9 uncontested Lok Sabha elections** from 1951–2024; only **one since 1991**, showing the rarity of such events.

Centre's Arguments

1. Right to Vote = Statutory

- Based on **Section 62, Representation of the People Act (RPA) 1951**.
- Thus Parliament can regulate it through laws (disqualifications, procedures).
- Reaffirmed in **Anoop Baranwal (2023)** and earlier in **PUCL v. Union of India (2003)**.

2. Freedom of Voting = Fundamental Right

- Casting a vote is an **expression of preference**, protected under Article 19(1)(a).
- This freedom exists **only when an actual poll takes place**.
- No poll → no occasion for the exercise of this fundamental expression.

3. NOTA Has No Legal Personality

- Under **Section 79(b)** of the RPA, NOTA is **not a 'candidate'**.
- It cannot demand or trigger a poll; it is only a **means for expressing dissent**.

4. EC Supports the Centre

- Making NOTA a candidate or requiring polls even in uncontested seats would need **legislative amendments** to RPA 1951 & Conduct of Election Rules 1961.

Right to Vote: Constitutional Position

- **Article 326:** Ensures **universal adult franchise**, subject to disqualifications imposed by law.
- **Nature:** The right is **not a fundamental right**, but the **act of voting is protected expression**.



9. Contempt Debate Rekindled After Remarks on CJI



Following alleged derogatory statements targeting the Chief Justice of India and the Supreme Court, legal questions have resurfaced regarding what constitutes **civil and criminal contempt**, the limits of free speech, and the judiciary's constitutional authority to punish contempt.

Contempt of Court in India: Constitutional & Legal Framework

1. Purpose

Preserve **judicial authority**, uphold **public confidence**, and protect the **integrity of justice delivery**.

2. Constitutional Basis

Article 129: Supreme Court → Court of Record with power to punish for contempt.

Article 215: High Courts → same inherent power.

Article 19(2): Permits reasonable restrictions on free speech for contempt of court.

3. Statutory Basis

Contempt of Courts Act, 1971 (based on H.N. Sanyal Committee).

Types of Contempt Under the 1971 Act

A. Civil Contempt (Sec. 2(b))

- Wilful disobedience of a court judgment/order or breach of an undertaking.

B. Criminal Contempt (Sec. 2(c))

Acts that:

- Scandalise** or lower the authority of the court.
- Prejudice** or interfere with judicial proceedings.
- Obstruct** administration of justice in any manner.

2006 Amendment

- Punishment only when the act **substantially interferes** or is likely to interfere with justice.

Initiation of Proceedings

- Suo motu** by courts.
- By petition → requires AG's (SC) or Advocate General's (HC) consent.

Punishment

- Up to 6 months simple imprisonment, or ₹2,000 fine, or both.
- A genuine, bona fide apology may lead to discharge.



HOT Question: “Critically analyse whether India's contempt of court framework strikes the right balance between judicial authority and freedom of expression.”



10. SC: Legal Aid Is Constitutional Obligation



At the National Conference marking 30 years of NALSA, Chief Justice of India B.R. Gavai stated that **legal aid is not charity but a constitutional and ethical duty** of the State, underscoring reforms needed in India's legal aid ecosystem.

Key Messages from the CJI

- 1. Constitutional Duty & Moral Responsibility :** Legal aid ensures the constitutional promise of justice for all under Article 39A. CJI emphasised that it is not benevolence but an **administrative and ethical obligation** of the State.
- 2. Institutional Continuity :** Suggested creating **advisory committees** comprising present and future heads of NALSA/SLSAs to support **long-term planning** beyond changing tenures.
- 3. Strengthening Institutions:** Called for greater synergy between **judiciary, executive, civil society**, and use of **technology with human sensitivity** for expanding access.
- 4. Dignity of Legal Aid Workforce:** Stressed respectful treatment of **paralegals, volunteers, and panel lawyers**, who sustain the legal aid movement at the grassroots.

Legal Aid Framework in India

- 1. Constitutional Basis :** Article 39A (DPSP): State must provide **free legal aid** and ensure equal justice.

Linked with **Articles 14 & 21** (equality & fair trial) via SC judgments such as *Hussainara Khatoon* (1979).

- 2. Statutory Framework : Legal Services Authorities Act, 1987:** Provides for free and competent legal services for weaker sections.

Came into force on **9 November 1995**, commemorated as **Legal Services Day**.

3. Three-tier Institutional Structure

- NALSA:** Apex body chaired by the **Chief Justice of India**.
- SLSAs:** Headed by Chief Justices of High Courts.
- DLSAs:** Chaired by District Judges.

- 4. Eligibility for Legal Aid :** Women, children, SC/STs, victims of trafficking, persons with disabilities, industrial workmen, disaster victims, and those below State-specified **income ceilings**.

Major Government Initiatives

- Tele-Law (2017):** Legal advice via CSCs.
- Nyaya Bandhu (2018):** Pro bono services connecting lawyers with citizens.
- Pan-India Awareness Campaigns (2021-2025):** Boosting legal literacy nationwide.



11. CJI-Designate Surya Kant Outlines Reform Agenda

Top Priority

- Reduce backlog and clear long-pending constitutional cases.
- SC pendency at **90,225 cases** (Nov 22, 2025) – **highest ever** (NJDG).

About NJDG

- Public dashboard under **e-Courts**.
- Shows real-time data on **pendency, disposal, and case institution** across courts.

Why Pendency is Rising

1. Heavy Constitutional Docket

- Massive inflow of **Article 136 Special Leave Petitions (SLPs)**.
- Makes India's SC **one of the world's most overloaded apex courts**.

2. High Court Bypass

- Litigants approach SC directly due to **online access and perceived faster relief**.
- Weakens HC's role as a **filtering layer**.

3. Vacancies & Bench Shortage

- Delay in filling SC vacancies → **lower bench strength** → slower disposal.

4. Accumulation of Legacy Cases

- Constitutional, land, tax, and service matters stuck due to **irregular Constitution Bench sittings**.

5. Procedural Overload

- Increase in **interim applications, reviews, curative petitions**, and repeated listings increases judge workload.

Key Concepts

Article 136 – SLP

- SC's **discretionary power** to hear appeals from any court/tribunal (except military courts).

Constitution Bench (Article 145(3))

- **5+ judges** to decide **substantial constitutional questions**.

12. Justice Surya Kant Becomes 53rd CJI



Oath Ceremony

- Sworn in on 23 November 2025 as the 53rd CJI.
- Oath administered by President Droupadi Murmu at Rashtrapati Bhavan.
- Attendees: Vice President C.P. Radhakrishnan, PM Narendra Modi, Lok Sabha Speaker Om Birla, and Union Ministers Amit Shah, Rajnath Singh, J.P. Nadda.

Profile of Justice Surya Kant

- **Born:** 1962, Hisar, Haryana.
- **Legal Career Start:** 1984, Hisar District Court.
- **Specialisation:** Constitutional, Service, and Civil law.

Career Milestones

- 2000: Youngest Advocate General of Haryana.
- 2004: Elevated as Permanent Judge, Punjab & Haryana High Court.
- 2018: Appointed Chief Justice, Himachal Pradesh High Court.
- 2019: Elevated to the Supreme Court (May 2019).
- 2025: Becomes the 53rd Chief Justice of India.

EDUCASIUM IAS Academy
EPIC UPSC Classes



13. Undertrial Injustice Persists in Indian System



SC Justice **Vikram Nath** highlighted that thousands of undertrials suffer due to weak legal aid, delays, and inability to secure bail.

Scale of the Crisis

- **70% of prisoners** (≈ 4 lakh out of 5.6 lakh) are undertrials – NCRB 2023.
- Many spend **longer in jail than the maximum sentence** for the alleged offence.
 - *Maharashtra: 11%* have exceeded maximum sentence duration.
- **25%** remain jailed **only because they cannot afford bail bonds** – India Justice Report 2022.
- **60%+** unaware of the **right to free legal aid** – NALSA-UNDP 2023.
- **SC/ST/OBC = 66%** of undertrials → clear socio-economic vulnerability.
- **1 legal aid lawyer per 55 prisoners** → poor case follow-up (NALSA audit 2023).

Way Forward

- **Fast-Track Relief**
 - Strengthen Undertrial Review Committees; set up fast-track courts.
 - *Example: Delhi HC cleared 2,000 petty cases in 6 months (2023).*
- **Strengthen Legal Aid**
 - Expand NALSA's oversight; enforce quality standards.
 - *Global model: UK's Legal Aid Quality Mark.*
- **Bail Reforms**
 - Automatic bail in bailable offences.
 - Release when detention exceeds $\frac{1}{2}$ **the maximum sentence** (LCI Report 268).
- **Tech Integration**
 - AI dashboards to track detention, representation, and case pendency.
 - *Example: Telangana's e-Prison Project cut detention errors by 25%.*
- **Use Law Schools**
 - Mandate legal aid clinics under BCI guidelines; link students with DLSA.
- **Support Vulnerable Groups**
 - Special programs for women, SC/ST, mentally ill inmates.
 - *Example: Kerala's Parivarthanam outreach.*

14. Constitution 131st Amendment Bill Introduced



Govt clarified it **will not introduce** the draft Constitution (131st Amendment) Bill, 2025, in the upcoming Parliament session. Draft aimed to **bring Chandigarh under Article 240** → enabling Presidential regulations for governance.

Article 240 – Key Points

- Empowers **President** to issue regulations for UTs **without legislatures**.
- Such regulations = **Parliamentary laws** (same legal force).
- Parliament can **amend or repeal** President's regulations.
- Currently applicable to:
Andaman & Nicobar Islands, Lakshadweep, Dadra & Nagar Haveli & Daman & Diu, Ladakh.

Chandigarh – Existing Governance Structure

- **Administrator:** Punjab Governor holds additional charge.
- **Governance:** Directly under **Ministry of Home Affairs**.
- **Legislative Powers:** Parliament legislates for Chandigarh.
- **Local Body:** Chandigarh Municipal Corporation handles civic administration.

Implications of the Proposed Amendment

- **Presidential Regulations:** Faster law-making for Chandigarh.
- **Uniform UT Model:** Aligns Chandigarh with other UTs **without legislatures**.
- **New Administrator/LG:** Ends reliance on Punjab Governor's dual role.
- **Reduced Punjab Oversight:** Punjab MPs lose indirect influence over Chandigarh-linked laws.
- **Historical Shift:** Alters status set by the **Punjab Reorganisation Act (1966)**; raises federal sensitivity concerns.

Why Punjab Opposed the Bill

- **Historical Claim:** Chandigarh built on Punjab's acquired land post-Partition; Punjab asserts ownership.
- **1970 Commitment:** Centre had publicly stated Chandigarh "should go to Punjab".
- **Fear of Dilution:** Article 240 inclusion seen as weakening Punjab's administrative link → reducing chances of future transfer.
- **Symbolic Value:** Chandigarh is tied to Punjab's cultural and political identity.



15 . Constitution Day 2025: National Event in Samvidhan Sadan



On 26 November 2025, India will observe Constitution Day with a national ceremony in the **historic Central Hall of Samvidhan Sadan**, commemorating the Constitution's adoption in 1949.

National Function Led by the President

- **Presiding Dignitary:** The **President of India** will lead the national Constitution Day function.
- **Addresses:** Vice-President and Lok Sabha Speaker will address the gathering before the President's keynote speech.
- **National Reading of the Preamble:** Led by the **President**, reaffirming India's commitment to constitutional values.
- **Digital Launch:** The Legislative Department will digitally release the **Constitution of India in nine regional languages:** *Malayalam, Marathi, Nepali, Punjabi, Bodo, Kashmiri, Telugu, Odia, Assamese.*
- **Commemorative Release:** A special booklet "**The Art and Calligraphy of India's Constitution**", showcasing artwork and calligraphy from the original manuscript, will be unveiled.

About Constitution Day (Samvidhan Diwas)

- Observed on **26 November**, marking the day in **1949** when the Constituent Assembly *adopted* the Constitution of India.
- The Constitution came into effect on **26 January 1950**, aligning with the **Purna Swaraj Declaration (1930)**.
- Notified as Constitution Day in **2015**, during Dr. B.R. Ambedkar's **125th birth anniversary year**, to promote constitutional literacy.
- Honours the **Constituent Assembly** chaired by **Dr. Rajendra Prasad** and the Drafting Committee chaired by **Dr. B.R. Ambedkar**.



16. Nomination Stage Emerging as Democratic Bottleneck



Nomination scrutiny under Sections 33–36 of the Representation of the People Act (1951) has increasingly led to candidates being eliminated before voting even begins. Recent incidents across states show wrongful rejections on trivial technicalities, raising concerns about procedural misuse and RO discretion without adequate checks.

Multiple candidates in recent Assembly and local body elections have alleged that Returning Officers (ROs) rejected nominations on flimsy grounds, effectively narrowing electoral choice even before polling.

Key Issues with Nomination Scrutiny (RPA 1951)

1. Excessive RO Discretion

- ROs have wide powers under Sections 33–36 to accept or reject nominations.
- Section 36(2) permits rejection for “defects of a substantial character,” but this term is **undefined**, enabling arbitrary interpretation.

2. Wrongful Rejection Cannot Be Challenged Immediately

- Article 329(b) bars judicial intervention until the *entire election process* is complete.
- A wrongful rejection becomes final, leaving the candidate without remedy during the election.

3. Technical & Procedural Rejections

- Missing signatures, clerical slips, minor affidavit errors, or incorrect formatting have resulted in rejection, despite not affecting eligibility.

4. Lack of Transparency & Accountability

- ROs are not legally bound to issue detailed written reasons.
- No appellate mechanism exists *before* the rejection becomes final.

Constitutional Angle

- **Right to Vote = Statutory Right** but
- **Right to Contest = Democratic counterpart of Article 19(1)(a) political expression.**
- Arbitrary exclusion violates:
 - Article 14 (non-arbitrariness),
 - Article 21 (fair procedure),
 - Basic structure doctrine (free & fair elections).



17. Assam Approves Polygamy Ban with Sixth Schedule Exemption



The Assam Cabinet has approved the **Assam Prohibition of Polygamy Bill, 2025**, seeking to criminalise polygamy across the State. The Bill excludes areas governed under the **Sixth Schedule** and aims to protect women's rights in line with **Articles 14, 15(3), and 44**.

Key Provisions of the Assam Prohibition of Polygamy Bill, 2025

- **Punishment:** Rigorous imprisonment up to 7 years and fine.
- **Nature of Offence:** Cognizable & non-bailable; tried under **Sections 494–495 IPC**.
- **Compensation Fund:** Creation of a **State Victim Relief Fund** for women affected by polygamous unions.
- **Applicability:** All of Assam except **Sixth Schedule tribal areas** governed by autonomous councils.
- **Legal Basis:**
 - **Article 44** – Uniform Civil Code directive.
 - **Article 15(3)** – Special provisions for women.

Legal Status of Polygamy Across Religions in India

- **Hindus, Buddhists, Jains, Sikhs:** Prohibited under **Hindu Marriage Act, 1955**; second marriage void → **Section 494 IPC**.
- **Christians:** Banned under **Indian Christian Marriage Act, 1872**.
- **Parsis:** Monogamy mandated under **Parsi Marriage and Divorce Act, 1936**.
- **Muslims:** Permitted to marry up to **four wives** under **Muslim Personal Law (Shariat) Act, 1937**, subject to equal treatment.

Prevalence of Polygamy in India (NFHS-5, 2019–21)

- **National Level:** **1.4%** (down from 1.9% in NFHS-4).
- **By Religion:** Muslims (1.9%), Hindus (1.3%), Christians (1.0%), Tribal groups (2.4%).
- **Regional Trends:** Higher prevalence in the Northeast (Meghalaya, Mizoram, Assam) due to tribal customs/ matrilineal systems.

Need for Prohibition

- **Gender Equality:** Aligns with **Articles 14 & 15**, protecting women from discrimination.
- **Constitutional Morality:** Advances the goal of **Article 44 (UCC)**.
- **Judicial Precedent:** *Javed v. State of Haryana* (2003) held polygamy is **not an essential religious practice**.
- **Women's Rights:** Reduces emotional, economic, and social vulnerabilities of women.
- **Global Context:** Several Islamic-majority countries (Turkey, Tunisia, Indonesia) regulate or ban polygamy to protect women.



18. Red Fort Car Blast Labeled Terrorist Act

Red Fort Car Blast Classified as Terrorist Act (Union Cabinet Decision)

What Happened?

- **Date:** 10 November 2025
- **Location:** Near the Red Fort, Old Delhi
- **Impact:** Multiple fatalities and injuries after a car exploded near the monument.

Key Investigation Findings

- **Terror Module Identified:**
 - Classified as a **white-collar terror module** – involving educated professionals.
 - Direct link to **Jaish-e-Mohammad (JeM)**.
- **Professional Involvement:**
 - Several **doctors from Al-Falah University** found actively participating in planning and logistics.
- **Planned Attacks:**
 - The group planned **six explosions across NCR on December 6** – the Babri Masjid demolition anniversary.
- **Premature Blast:** The device detonated early when operatives panicked amid police crackdowns on connected module members.

Emerging Security Concerns

- **White-Collar Radicalisation:**
 - The involvement of doctors challenges the assumption that terror recruitment is limited to socio-economically vulnerable groups.
- **Urban Terror Bases:**
 - Safehouses were located in **middle-class neighbourhoods of Faridabad**, signalling a shift of terror infrastructure from border/conflict zones to metropolitan interiors.
- **End of Long Calm:**
 - The incident breaks Delhi's **long lull since the 2011 High Court blast**, raising concerns about gaps in urban surveillance and intelligence coordination.

Major Terror Attacks in Delhi (Background Context)

- **2011 Delhi High Court Blast:**
 - Perpetrator: **HuJI**
 - Casualties: 14
- **2008 Serial Blasts:**
 - Perpetrator: **Indian Mujahideen**
 - Five coordinated blasts across markets.
- **2005 Diwali Blasts:**
 - Linked to **Lashkar-e-Taiba**
 - Three market explosions during festive shopping.
- **2001 Parliament Attack:**
 - Joint operation by **Jaish-e-Mohammad & Lashkar-e-Taiba**.



19. Explosion Reported at Nowgam Police Station



What Happened?

- A major explosion occurred at the **Nowgam Police Station (Srinagar)** due to improper handling of **seized explosives**.
- **Cause:** Accidental detonation of stored materials — ammonium nitrate, potassium nitrate, and other explosive compounds seized earlier from **Faridabad**.
- **Terror Link:** These explosives were part of the larger **Jaish-e-Mohammed (JeM)** “white-collar” **terror module**, which was also connected to the **Red Fort blast** case.
- **False Claim:** A claim of responsibility by the **People's Anti-Fascist Front (PAFF)** — a JeM proxy — was **rejected**. The incident was officially termed an **accident during evidence handling**, not a terror attack.

Why It Matters?

- Highlights critical **lapses in explosive-handling protocols** inside police facilities.
- Raises questions on **evidence storage safety, oversight, and inter-agency coordination** when dealing with high-risk materials.

Standard Protocols for Handling Seized Explosives

1. Legal Framework: Governed by:

- **Explosives Act, 1884**
- **Explosives Rules, 2008**
- **PESO (Petroleum and Explosives Safety Organisation)** guidelines

2. Who Can Handle Explosives?

- Only **certified Explosive Ordnance Disposal (EOD)** personnel trained under the Explosives Act.
- Regular police staff **cannot** open, test, sample, or shift explosive material.

3. Seizure & Inventory Rules

EPIC UPSC Classes

- All seized explosives must be:
 - Recorded in a **sealed, tamper-proof inventory**
 - In the presence of a **police officer and/or magistrate**
- **Storage:**
 - Preferably transported to authorised storage facilities.
 - Temporarily kept in **malkhana** (police station storeroom) only if safe.

4. Forensic Requirements

- **Mandatory forensic sample dispatch within 24 hours** of seizure.
- Agencies (FSL/NIA/NSG) collect and test, but police retain custody until sampling is complete.

5. Rules for Destruction of Explosives : Police must obtain:

- **Court permission** for destruction,
- **AND approval from the competent government authority.**
- Destruction may only be performed by certified EOD units in controlled environments.



20. Southeast Asia Cybercrime Hubs Threaten India



How the Scam Hubs Operate

- Concentrated in **Myanmar, Cambodia, Laos** inside SEZ-style enclaves with **private militia security**.
- Controlled by **warlords** such as Myanmar's *Saw Chit Thu*, aligned with junta forces.
- Fake IT job ads** lure youth from India, China, Vietnam with high-salary promises.
- Forced to run "**pig-butcher**ing" scams (romance + crypto fraud + extortion).
- Profits finance **Myanmar junta operations** and local armed militias.
- After China's **Operation 1027 (2023)**, networks shifted deeper into Myanmar's southeast and into Cambodia.

Impact on India



1. Human Trafficking

- Large-scale trapping of Indians via fake overseas job offers.
- 1,600+ Indians repatriated since July 2022**, including **283 from Thailand** and **500 from KK Park (MEA)**.

2. Dual Vulnerability

- India is both a **labour source** for traffickers **and a target market** for cyber scams.
- UNODC (2024): India among **top five global targets** for transnational cyber fraud.

3. Surge in Online Financial Scams

- Rapid rise in crypto, investment, impersonation, and phishing attacks on Indians.
- CERT-In (2025): **250% spike in crypto scam complaints** post *Operation Sindo*.

4. Diplomatic & Consular Burden

- Continuous need for **evacuation missions and cross-country coordination**.
- Embassy in Yangon led multiple rescue operations under **Operation Safe Return**.



21. Niyamgiri Case: India's First Environmental Referendum



About the Dongria Kondh Tribe

Location: Niyamgiri Hills in **Kalahandi & Rayagada**, Odisha.

Name Origin: *Dongria* from *dongar* (hill); also called **Jharnia** = “protectors of streams.”

- **Belief System:** Animism; worship **Niyam Raja**, the supreme hill deity.
- **Language:** **Kuyi/Kuvi**, a Dravidian language (not Odia).
- **Livelihood:** **Podu (shifting) cultivation**, horticulture, and dependence on NTFPs.

Significance of the Niyamgiri Case (2013)

- **Environmental Referendum:** First time Gram Sabhas democratically decided a mining project.
- **Strengthened PESA + FRA:**
 - **PESA 1996 (Sec 4d):** Gram Sabhas' authority in Scheduled Areas.
 - **FRA 2006 (Sec 6):** Final say of forest-dwelling communities over forest land use.
- **FPIC Precedent:** SC upheld **Free, Prior and Informed Consent (FPIC)**, giving tribals veto power over mining.
- **Cultural Rights Protection:**
 - Affirmed **Article 21** (life with dignity) and
 - **Article 25** (freedom of religion tied to sacred landscapes).
- **Ecological Value:** Niyamgiri forms the watershed for **Vamsadhara & Nagavali** rivers; home to dense forests and habitats sustaining ~8,000 Dongria Kondhs.

22. India Launches Scientific Recycling of National Flags



India has unveiled its **first-ever scientific and dignified recycling system** for retired national flags and advanced aramid fibres – marking a major step in sustainability, cultural preservation, and high-tech textile innovation.

Ministry: Ministry of Textiles

Mission: National Technical Textiles Mission (NTTM)

1. Atal Centre of Textile Recycling and Sustainability – Panipat

- Established under IIT Delhi.
- India's **first dedicated research hub** for advanced textile recycling, circularity, and sustainability.
- Focus on high-performance textiles (**aramids, composites, geotextiles, defence fibers**).

2. National Flag Recycling Initiative

A first-of-its-kind, scientifically validated system that ensures:

- **Dignified disposal or repurposing** of retired national flags, in compliance with the *Flag Code of India*.
- Prevention of disrespectful destruction, waste burning or landfill dumping.
- Processes include: fibre separation, colour-safe treatment, preservation protocols and controlled recycling pathways.
- Supports the **Har Ghar Tiranga** movement by reinforcing *responsible national flag stewardship*.

Significance:

India previously lacked a formal mechanism for scientifically approved flag recycling. This closes a major ceremonial, cultural and environmental gap.

EDUCASIUM IAS Academy
EPIC UPSC Classes

3. Aramid Fibre Recycling Programme

Aramid fibres (like **Kevlar®**, **Nomex®**) are used in:

- defence protective gear,
- fire-retardant clothing,
- space and aviation components,
- high-performance industrial textiles.

NTTM has created India's **first process** for:

- chemical and mechanical recovery of aramid fibres,
- preservation of tensile strength during recycling,
- reuse in defence, transport and industrial applications.

This reduces import dependence and strengthens India's **technical textiles and defence manufacturing ecosystem**.



23. UIDAI Deletes Two Crore Deceased Aadhaar Numbers



About Aadhaar

- **12-digit Unique ID** issued by UIDAI to all *residents*, linked with biometric + demographic data.
- **Launched:** 2009; **Legal Backing:** Aadhaar Act, 2016.
- **Not proof of citizenship.**
- **Coverage:** 133+ crore enrolments; ~99.9% adult coverage.
- **Usage:** PAN-Aadhaar linking, income-tax filing, DBT transfers, welfare targeting.
- **myAadhaar Portal:** Single platform for e-KYC, updates, Aadhaar download, and *death reporting* (integrated with Civil Registration Systems in many States).

Deactivation Drive

- UIDAI has deactivated **over 2 crore Aadhaar numbers** of deceased individuals.
- Goal: **Prevent identity theft, impersonation, and misuse** of Aadhaar-linked services.

About UIDAI

- **Statutory body** under Aadhaar Act 2016; functions under **MEITY**.
- **Roles:**
 - Issue & manage Aadhaar.
 - Authentication services (biometric/OTP).
 - Data security & grievance redressal.
 - Regulate Aadhaar use across govt and private entities.
- **Security Measures:** Encryption, tokenisation, Virtual ID, limited KYC, and prohibition of Aadhaar re-assignment.

NOVEMBER 2025

INTERNATIONAL AFFAIRS

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

1. President's State Visit to Angola and Botswana
2. India and Georgia Strengthen Sericulture Cooperation
3. India Deepens Trade Ties with Latin America
4. India-Angola Relations
5. India-Bhutan Bilateral Relations
6. India-UAE Third CEPA Joint Committee Meeting
7. India-Nepal Connectivity Pact
8. India Sends 20 Tonnes of Hurricane Relief Aid to Jamaica
9. India Secures Six-Month US Waiver for Chabahar Port
10. India Backs Afghanistan's Kunar Dam Plan
11. Iran's Crypto Push With BRICS
12. Venezuela Seeks Cooperation on Critical Minerals
13. 20th G20 Leaders' Summit 2025
14. BIMSTEC-India Marine Research Network Conference
15. International Institute for Democracy & Electoral Assistance
16. Trump-Xi Bonhomie
17. US-China 'G2' Revival
18. Threat of US Secondary Sanctions on Russian Oil Producers
19. Civil War in Sudan
20. Former Bangladesh PM Sheikh Hasina Sentenced to Death
21. Gen-Z Protests in Mexico
22. Canada's New Citizenship-by-Descent Bill
23. U.S. Government Shutdown Ended
24. Poseidon Underwater Drone
25. 15th India-Vietnam Defence Policy Dialogue
26. India's First-Ever LPG Import Deal with United States
27. Mandatory 'Country of Origin' Filter for E-Commerce Platforms
28. Global Virus Network
29. UNESCO's Neurotechnology Ethics Framework
30. OpenAI Launches 'IndQA' Benchmark
31. Australia's AI Copyright Policy
32. Maldives Becomes First to Impose Generational Tobacco Ban

1. President's State Visit to Angola and Botswana



India's President will undertake a **six-day state visit to Angola and Botswana**, marking the **first time** an Indian head of state is visiting either country. This visit significantly strengthens India's engagement with Africa, particularly with two fast-growing economies in Southern Africa.

Key Highlights of the Visit

Angola's 50th Independence Day: The President will attend the golden jubilee celebrations — a **rare diplomatic honour** extended by Angola.

Address to Angolan Parliament: She will address a joint session of Parliament — signalling high political trust and deepening bilateral ties.

Botswana Engagement: First-ever Indian head of state visit will emphasise cooperation in **democracy, mining, defence, education, pharmaceuticals, digital public infrastructure**, and wildlife conservation.

- The visit consolidates India's **Africa Outreach**, complementing initiatives like:
 - India-Africa Forum Summit (IAFS)
 - Voice of Global South Summit
 - G20 cooperation following AU's **inclusion as a permanent G20 member (2023-24)**.

About the African Union (AU)

Basic Facts

- The **African Union (AU)** is a **continental organisation of 55 member states** across Africa.
- **Established:** 2002, replacing the **Organisation of African Unity (OAU)** founded in 1963.
- **Headquarters:** Addis Ababa, Ethiopia.
- **Most recent major milestone:** AU was granted full permanent membership in the G20 (India's G20 Presidency, 2023).

Agenda 2063 – Africa's Development Blueprint

A long-term framework aimed at:

- **Socio-economic transformation** of Africa.
- **Continental integration** (free movement, trade, Pan-African institutions).
- **Inclusive growth**, gender equality, and people-driven development.
- Strengthening African ownership of its development path ("African solutions to African problems").

Flagship programmes include:

- African Continental Free Trade Area (**AfCFTA**)
- Integrated High-Speed Rail Network
- Great Green Wall Initiative
- Silencing the Guns by 2030

2. India and Georgia Strengthen Sericulture Cooperation



An Indian delegation from the **Ministry of Textiles** concluded a multi-sectoral engagement in **Georgia** to boost cooperation in **sericulture, textiles, apparel, and carpet trade**.

Delegates participated in the **11th BACSA International Conference – CULTUSERI 2025**.

Key outcomes included stronger bilateral sericulture ties, showcasing India's **5-in-1 Silk Stole innovation**, and widening trade collaboration through the **BACSA platform**. The visit enhanced India's **textile diplomacy** and reinforced its global role in sericulture.

About Sericulture

- Sericulture is an **agro-based industry** involving silkworm rearing and silk production, generating steady rural employment, especially for **women**.
- India is the **2nd-largest silk producer** globally; **Karnataka** contributes about **32%** of national output.
- India is the **only country** producing all **five commercial silks**: **Mulberry, Tropical Tasar, Oak Tasar, Eri, Muga**

Institutional Framework

- The **Central Silk Board (CSB)**—a statutory body under the **Ministry of Textiles**, set up in **1948**—oversees the development of sericulture and implements national schemes such as **Silk Samagra**.

EDUCASUM
EPIC UPSC Classes

3. India Deepens Trade Ties with Latin America



India strengthens Latin America outreach through advanced FTA/CEPA negotiations to secure markets, minerals, and strategic partnerships.

1. Latest Trade Negotiation Rounds

India-Peru Trade Agreement

- **9th Round** held in Lima (Nov 2025).
- Progress in **goods, services, origin rules & critical minerals**.
- **Next round:** New Delhi, Jan 2026.
- Aims to secure deeper access for Indian **pharma, textiles, machinery**.

India-Chile CEPA

- **3rd Round** held in Santiago (Oct 2025).
- Focus: **Investment, IPR, services, supply-chain resilience**.
- Seeks expansion beyond the 2007 India-Chile PTA.

2. India-Latin America Trade Snapshot

- **Bilateral trade:**
 - **USD 50 billion (FY 2024)** – a record high.
 - Exports: **Pharma, engineering goods, textiles, auto parts**.
 - Imports: **Minerals, oil, copper concentrates, lithium**.
- **Investment:**
 - Indian firms invested **USD 12 billion** (IT, auto, steel, energy).
 - Latin American companies increasingly investing in India's **IT & pharma** sectors.
- **Policy Push:**
 - India aims to seal major **CEPA/FTA frameworks by 2026**.
 - Objective: secure **tariff parity** and deepen **South-South cooperation**.

3. Strategic Significance of India-Latin America Relations

A. Defence & Strategic Cooperation

- India-Brazil deepening ties through:
 - **Joint Defence Committee**,
 - **2+2 Political-Military Dialogue**.
- Collaboration in **defence manufacturing, naval systems & cybersecurity**.

B. Critical Minerals Security

- **Lithium:**
 - India's **KABIL-CAMYEN** partnership in **Argentina** → India's first lithium mining venture.
 - The **Lithium Triangle** (Chile-Argentina-Bolivia) holds **75%+ of global reserves**.
- Essential for **EV batteries, grid storage & renewable transition**.

C. Food & Energy Security

- **Food imports:**
 - Argentina → major **soybean oil** supplier.
 - Latin America → pulses, sugar, grains.
- **Energy imports:**
 - Brazil, Mexico, Venezuela → key crude suppliers.
 - Collaboration in **biofuels** under the **Biofuture Platform** (India-Brazil).

4. India–Angola Relations

President Droupadi Murmu addressed Angola's Parliament during her state visit, marking **40 years of diplomatic ties**.

Key Areas of Cooperation

Energy

- Angola = **India's 2nd-largest crude oil supplier** from Africa after Nigeria.
- Petroleum = ~90% of bilateral trade.

Trade

- India = **Top 3 trading partners** of Angola; currently **2nd after China**.
- Accounts for ~10% of Angola's global trade.

Defence

- India extended **\$200 million Line of Credit** for armed forces modernisation (equipment upgrades, training, maintenance facilities).

Agriculture

- May 2025 MoU** → expands cooperation for Angola's diversification and food security.

Global Alliances

- Angola joined India-led global platforms:
 - International Solar Alliance (ISA)**
 - Global Biofuels Alliance (GBA)**
 - International Big Cat Alliance (IBCA)**

About Angola – Quick Facts

- Location:** Southwestern Africa; **7th largest** in Africa.
- Natural Wealth:** Rich in **oil, diamonds, minerals**.
- Borders:** Congo (north), DR Congo (NE), Zambia (SE), Namibia (south), Atlantic Ocean (west).
- Capital:** **Luanda** (also main seaport).
- Geography:**
 - Narrow coastal plain → rises to central plateau.
 - Mount Moco** = highest peak.
 - Major rivers: **Cuanza, Cunene**.

5. India-Bhutan Bilateral Relations



PM Narendra Modi recently inaugurated the **1,020 MW Punatsangchhu-II Hydropower Project** during his state visit to Bhutan.

He also attended the **70th birthday celebrations of Jigme Singye Wangchuck**, the Fourth King.

Punatsangchhu-II Hydropower Project

- **Type:** Run-of-the-river hydropower project.
- **Status:** *Inaugurated and commissioned* during PM Modi's visit (Nov 2025).
- **Location:** Right bank of the **Punatsangchhu River** in central Bhutan.
- **Funding:** Fully financed by India – **30% grant + 70% loan** model.

Installed Capacity: **1,020 MW**, expected to boost Bhutan's generation capacity by

~40%. India is Bhutan's largest investor in hydropower.

~70% of Bhutan's electricity is exported to India.

- **Significance:** Strengthens the India-Bhutan hydropower cooperation model: *Build by India → Use + Export by Bhutan → Buyback by India.*

Evolution of India-Bhutan Relations

1. Treaty of Punakha (1910)

- Made Bhutan a *protected state* of British India.
- Britain controlled Bhutan's external affairs amid Tibetan instability.

2. Treaty of Peace & Friendship (1949)

- Recognised Bhutan's sovereignty.
- Established lasting peace & cooperation.
- Bhutan agreed to be **guided by India in external affairs**.

3. Agreement on Trade, Commerce & Transit (1972)

- Created a **free-trade regime**.
- Enabled **duty-free movement** of Bhutan's goods through India.

4. Hydropower Cooperation Agreement (2006)

- Framework for India to develop Bhutan's hydropower projects.
- India imports surplus power at pre-agreed rates.

5. Revised India-Bhutan Friendship Treaty (2007)

- Removed the "guidance clause" of 1949.
- Reaffirmed **sovereign equality** and mutual friendship.

Marked Bhutan's more independent foreign policy role.

6. India-UAE Third CEPA Joint Committee Meeting



India and the UAE held the **third Joint Committee meeting** under the **Comprehensive Economic Partnership Agreement (CEPA)** in New Delhi. CEPA (2022) is the flagship framework to liberalise goods, services, investments, and regulatory cooperation.

Key Highlights of the Meeting

- **Trade Target Reaffirmed:** Commitment to reach **USD 100 bn in non-oil, non-precious metal trade by 2030.**
- **Gold TRQ:** India updated UAE on the **online competitive bidding system** for **Gold Tariff Rate Quota (TRQ)** allocations under CEPA.
TRQ = A system allowing a fixed quantity of imports at lower/zero tariffs; normal duties apply beyond the quota.
- **Regulatory Coordination:**
 - Streamlining **pharmaceutical approvals** and fast-track market entry.
 - Early finalisation of the **Food Safety MoU**.
 - Discussion on **anti-dumping** and trade-remedy issues for smoother trade flows.

India-UAE Relations

1. Trade

- UAE = India's **3rd-largest trading partner** and **2nd-largest export destination**.
- Bilateral trade **crossed USD 100 bn** in 2024-25 (↑ 19.6% YoY).

2. Investment

- UAE sovereign funds committed **USD 75 bn** to Indian infrastructure.
- Backed by the **Bilateral Investment Treaty (BIT), 2024**.

3. Energy Security

- UAE = India's **4th-largest crude supplier**.
- Only nation storing crude in **India's Strategic Petroleum Reserves (SPR)**.

4. Defence & Security

- High-level dialogues + joint exercises **Desert Cyclone, Zayed Talwar**.
- Maritime coordination in Western Indian Ocean & Gulf.

5. Climate Cooperation

- Co-launch of **Global Green Credit Initiative (GGCI)** to promote sustainable, measurable green actions globally.

6. People-to-People Ties

- **3.5 million Indians** = largest expatriate community in UAE.
- The **BAPS Hindu Temple, Abu Dhabi** symbolises deep cultural diplomacy.

7. India–Nepal Treaty of Transit: Amendment Through Letter of Exchange (LoE)



India and Nepal signed a **Letter of Exchange (LoE)** to amend the **India–Nepal Treaty of Transit**, expanding rail-based trade and enhancing regional connectivity.

About the Treaty of Transit

- A foundational bilateral agreement that **guarantees Nepal – a landlocked nation – access to Indian territory and ports** for third-country trade.
- Ensures uninterrupted movement of goods through Indian rail, road, and port networks.

Key Features of the Amendment

1. Rail Connectivity Expansion

- New provision enables movement of **containerised and bulk cargo** between **Jogbani (India) ↔ Biratnagar (Nepal)** railway stations.

2. Liberalised Trade Corridors

The LoE facilitates Nepal's international trade via:

- **Kolkata → Jogbani**
- **Kolkata → Nautanwa (Sunauli)**
- **Visakhapatnam → Nautanwa (Sunauli)**

These corridors support **third-country imports/exports** more efficiently.

3. Strategic Significance

- Enhances India–Nepal **regional connectivity architecture**.
- Advances India's **Neighbourhood First** and **Act East** policies.
- Reduces Nepal's logistics costs and port dependency.
- Strengthens **South Asian economic integration**.

India–Nepal Relations: Key Pillars

1. Trade & Investment

- India is **Nepal's largest trading partner** and top investor.
- Accounts for $\sim\frac{2}{3}$ of Nepal's **total merchandise trade**.
- India is a major source of **FDI**, technology, and project assistance.

2. Connectivity Cooperation

- **Motihari-Amlekhgunj Petroleum Pipeline**: South Asia's first cross-border oil pipeline.
- **Integrated Check Posts (ICPs)** at Raxaul–Birgunj, Jogbani–Biratnagar, Sunauli, etc.
- **Rail links**: Jaynagar–Kurtha–Bijalpura; Bathnaha–Biratnagar; Jogbani–Biratnagar.

3. Defence & Security

- Annual bilateral military exercise **Surya Kiran**.
- Close cooperation on **border management**, intelligence sharing, and counter-terrorism.
- India supports training and capacity building of Nepal Army personnel.

4. Energy Partnership

- India has committed to **importing 10,000 MW** of Nepalese hydropower over the next decade.
- Multiple **cross-border transmission lines** under construction or expansion.

5. Cultural & Civilisational Ties

Deep religious and cultural linkages: **Kathmandu–Varanasi, Lumbini–Bodhgaya, Janakpur–Ayodhya** twinning agreements.

8. India Sends 20 Tonnes of Hurricane Relief Aid to Jamaica



India dispatched a **20-tonne humanitarian assistance consignment** to Jamaica to support recovery efforts after **Hurricane Melissa**, reaffirming India's global humanitarian commitment aligned with **Vasudhaiva Kutumbakam** ("the world is one family").

Key Details of the Relief Operation

- **Transport:** The relief was delivered by an **Indian Air Force C-17 Globemaster III** aircraft.
- **Handover:** The cargo was formally handed over to Jamaican authorities by the **High Commission of India in Kingston**.

Contents of the Relief Package

1. BHISHM Medical Trauma Unit

- The **Bharat Health Initiative for Sahyog, Hita, and Maitri (BHISHM)** is a rapidly deployable, modular trauma care system.
- Contains **72 cube-shaped modules** with:
 - Surgical instruments
 - Emergency medical supplies
 - Patient care systems
- Can be assembled on-site to form a **fully functional field trauma facility**.

2. Other Emergency Supplies

- Power generators
- Family tents & shelter materials
- Bedding and mats
- Kitchen kits
- Solar lanterns
- Personal hygiene kits
- Other essential rehabilitation items

Significance

- Humanitarian Diplomacy
- Disaster Response Capability
- Soft Power & Diplomacy

UPSC Pointers: BHISHM = BHarat Initiative for Sahyog, Hita & Maitri → 72-box modular trauma system. Use of **IAF C-17** reflects India's HADR (Humanitarian Assistance & Disaster Relief) capability. Part of India's **"disaster diplomacy"** outreach (similar missions to Nepal, Türkiye, Fiji, Madagascar, Maldives etc.). Demonstrates operationalisation of **Soft Power + Foreign Aid + Global South Engagement**.

9. India Secures Six-Month US Waiver for Chabahar Port



The U.S. granted India a **six-month exemption** from *Iran sanctions*, allowing India to continue operational + developmental work at **Chabahar Port** without facing penalties.

About the Sanctions (IFCA - Section 1244)

Legal Basis

- **Iran Freedom and Counter-Proliferation Act (IFCA), 2012**
- Targets Iran's **energy, shipping, ship-building, and port** sectors.

Who Gets Sanctioned?

- Any **entity/individual** doing business with:
 - Iran's Oil & Gas sector
 - Iranian ports (incl. Chabahar)
 - Shipping lines (e.g., IRISL)

Penalties Include

- Freezing U.S.-linked assets
- Blocking access to U.S. banking
- Visa and travel restrictions
- Prohibition on U.S. persons transacting with sanctioned entities

Objectives

- Reduce Iran's economic resilience
- Pressure Iran to modify nuclear & missile programmes
- Curb support for militant proxies (Hezbollah, Houthis, militias)
- Force renegotiation of a **tougher nuclear agreement**

EDUCASIUM IAS Academy
EPIC UPSC Classes

Timeline of Waivers

2018 - First Waiver Granted

- Recognised Chabahar's role in:
 - Afghanistan's reconstruction
 - India's humanitarian supplies
 - Providing a Pakistan-bypass route to Central Asia

Sept 29, 2025 - Waiver Revoked

- Context:
 - Taliban takeover
 - U.S. policy recalibration
 - Diminished Afghanistan-centric justification

Oct 29, 2025 - New Six-Month Waiver Granted

- Allows:
 - Operations at **Shahid Beheshti Terminal**
 - Investment, equipment procurement, shipping activities
 - Cargo movement to Iran, Afghanistan, Central Asia

Chabahar Port - Strategic Significance

1. Geography

- Located in Iran's Sistan-Baluchistan province
- On the Gulf of Oman — outside the Strait of Hormuz chokepoint
- Close to Gwadar Port (Pakistan), run by China
 - Gives India a counterbalance

2. Economic & Strategic Access

- India's only direct route to:
 - Afghanistan
 - Central Asia
 - Caspian Region
 - Russia and Eastern Europe
- Bypasses Pakistan, enabling secure connectivity

3. Role in INSTC

- Major node in the International North-South Transport Corridor (INSTC)
 - Connects Indian Ocean → Iran → Caspian Sea → Russia → Europe
- Cuts freight cost by ~30% and transit time by ~40%

Port Structure

1. Shahid Kalantari Terminal

- Developed 1980s
- Conventional cargo handling
- Helps Iran diversify away from Strait of Hormuz dependency

2. Shahid Beheshti Terminal (India's Role)

- Being developed & operated by India Ports Global Ltd. (IPGL)
- Deep-draft modern berths
- Gateway for Indian exports to landlocked Afghanistan & Central Asia

Why the Waiver Matters for India

Strategic

- Sustains India's connectivity diplomacy
- Counters China's expanding footprint (Gwadar + OBOR)
- Strengthens India's presence in Eurasia

Economic

- Ensures continuity of:
 - Fertilizer imports
 - Trade with Iran & Central Asia
 - INSTC logistics reliability

Geopolitical

- Signals:
 - U.S. recognition of India's regional role
 - Flexibility in U.S. sanctions to accommodate India
 - De-risking of India-Iran relations after earlier uncertainties

UPSC Keywords

- IFCA Sanctions, Chabahar-Gwadar Rivalry, INSTC,
- Strategic Autonomy, India-Iran Connectivity,
- U.S.-India Alignment, Geoeconomic Corridors

10. India Backs Afghanistan's Kunar Dam Plan



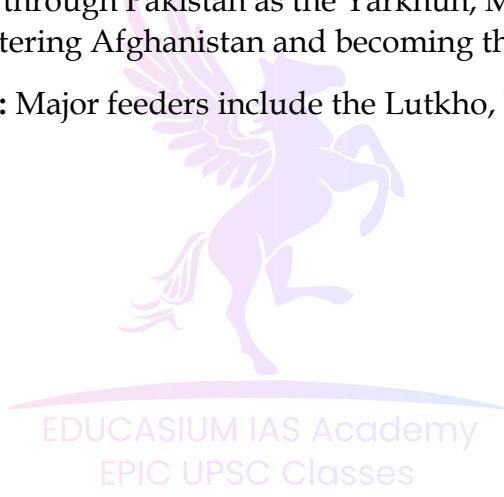
India has declared its support for **Afghanistan's plan to construct a dam on the Kunar River**, offering to assist with sustainable water management and hydroelectric development.

This endorsement is seen as a reinforcement of **India's sovereignty and regional cooperation policy**, occurring amidst **rising tensions between Afghanistan and Pakistan**.

About the Kunar River

The Kunar River is a vital **transboundary waterway** that flows through **northern Pakistan (where it is known as the Chitral River)** and **eastern Afghanistan**.

- **Origin:** It originates from the **Chiantar glacier** in the **Hindu Kush mountains**, near the border of Gilgit-Baltistan and Chitral, Pakistan.
- **Course:** It flows through Pakistan as the Yarkhun, Mastuj, and Chitral Rivers before entering Afghanistan and becoming the Kunar River.
- **Key Tributaries:** Major feeders include the Lutkho, Landai Sin, Shishi, and Pech rivers.



II. Iran's Crypto Push With BRICS



Iran is exploring **cryptocurrency and blockchain-based trade settlements** with BRICS to reduce reliance on the U.S. dollar-centric system. EU triggered the **JCPOA snapback mechanism** (Aug 2025), reinstating global sanctions for alleged enrichment violations. U.S. sanctions have been in place since **1979**.

Snapback Mechanism (JCPOA)

- Allows **automatic re-imposition** of UN sanctions if Iran is accused of non-compliance.
- **Bypasses UNSC veto** – any participant can trigger it.
- Ensures **quick restoration** of sanctions.

Why Iran Is Turning to Crypto

1. Sanctions Circumvention

- Cryptos enable **non-SWIFT**, decentralised cross-border payments.
- Limits Western ability to **track, freeze or block** transactions.

2. Supports BRICS De-Dollarisation

- Fits BRICS push for **alternative payment systems** and reduced USD dominance.
- Potential use of **CBDCs, blockchain rails, and BRICS settlement tokens**.

3. Trade Continuity Under Sanctions

- Helps sustain imports/exports in **energy, metals, machinery, pharma, etc.**
- Mitigates repeated **financial blockades**.

4. Geopolitical Signalling

- Shows Iran's **technological and diplomatic defiance**.
- Builds **multipolar financial pathways** outside Western control.

12. Venezuela Seeks Cooperation on Critical Minerals



Venezuela has expressed strong intent to partner with India in **critical minerals**, seeking to diversify its economy beyond oil.

About Critical Minerals

- **Definition:** Critical minerals are metals or non-metals that are essential for economic growth, high-tech manufacturing, and national security but face **supply chain vulnerabilities**.
- **India's List:**
India (2023–24 update) has identified **30 critical minerals**, such as:
 - Nickel, Titanium, Vanadium, Tungsten
 - Cobalt, Lithium, Graphite
 - Rare Earth Elements (REEs)
 - Platinum Group Metals (PGMs)
- **Significance for India:**
 - Supports EV batteries, green hydrogen, solar PV manufacturing, and electronics.
 - Critical for India's **Net-Zero target (2070)**.
 - Reduces dependence on geopolitically risky supply chains dominated by China.
- **Policy Architecture:**
 - **National Critical Mineral Mission (NCMM)** under Ministry of Mines coordinates exploration, processing, recycling, and strategic partnerships.
 - **KABIL (Khanij Bidesh India Ltd)** is India's overseas mining arm for securing critical minerals.

About Venezuela

EPIC IAS Academy
EPIC UPSC Classes

- **Location:** Northern coast of **South America**.
- **Borders:**
 - **North:** Caribbean Sea & Atlantic Ocean
 - **East:** Guyana
 - **South:** Brazil
 - **West/Southwest:** Colombia
- **Major Physical Features:**
 - **Andes Mountains** in the west
 - **Llanos** – vast tropical grassland plains
 - **Guiana Highlands** in the southeast
 - Caribbean coastline
 - **Angel Falls** (979 m), the *world's highest waterfall*
- **Natural Resources:**
 - Holds the **world's largest proven oil reserves**.
 - Large reserves of **natural gas, gold, bauxite, diamonds, coltan**, and other mineral resources – key for critical mineral cooperation.

13. 20th G20 Leaders' Summit 2025



20th G20 Leaders' Summit (2025) held for the first time in Africa – Johannesburg, South Africa. Theme rooted in “Ubuntu” – Nguni Bantu concept meaning “I am because we are”, emphasising human interdependence and collective well-being.

Major Outcomes of the Summit

1. Johannesburg Leaders' Declaration

Adopted earlier than usual – signalling consensus-building.

Strong emphasis on **Voice of the Global South**.

Shift toward **development justice**, avoiding geopolitical polarisation.

2. Critical Minerals Framework (Landmark Decision)

G20 members agreed to:

Promote **domestic processing & value addition** in resource-rich nations.

Reduce raw-mineral export dependence.

Build **resilient, transparent critical-mineral supply chains**.

3. Multilateral Development Bank (MDB) Reform

Approval of:

Concessional financing for LDCs.

Debt restructuring and relief for debt-distressed countries.

Governance changes to improve MDB responsiveness.

4. African Union (AU) Integration

2025 Summit fully operationalised AU's permanent G20 membership (granted in 2023).

5. Digital Public Infrastructure (DPI) Push

Collective pledge to:

Provide **financial + technical support** to developing nations.

Bridge the **global digital divide**.

Scale DPI as a *public good*.

6. Global AI Governance

- Endorsement of a **human-centric, inclusive AI model**.
- Core principles: fairness, access, risk safeguards, and transparency.

7. Debt Sustainability Focus

- First standalone G20 declaration on debt since COVID-19.
- Acknowledged:
 - Rising debt-servicing burdens.
 - Resource diversion away from development finance.
 - Required systemic reforms in global debt architecture.

Other Working Group & Sideline Outcomes

A. Women's Economic Empowerment (via EWWG)

Three pillars adopted:

1. **Care Economy**
2. **Gender-Based Violence**
3. **Financial Inclusion**

B. Digital Innovation Alliance

C. Cultural Heritage Repatriation

D. Ubuntu Legacy Initiative

E. Green Tourism

F. Global Bioeconomy Principles

G. Disaster-Risk Governance

14. BIMSTEC-India Marine Research Network Conference



The first biennial BIMReN conference was held in Kochi, reviewing progress in marine cooperation under BIMSTEC and exploring new avenues for **blue economy research** in the Bay of Bengal region.

Why This Matters

- The Bay of Bengal contributes 6% of global fish catch and hosts one-third of the world's fishing fleet, making collaborative marine research crucial.
- BIMReN strengthens India's maritime diplomacy and regional leadership.

About BIMReN (BIMSTEC-India Marine Research Network)

- **Purpose:** A multilateral platform to promote marine science research, innovation, and sustainable development of the **blue economy** among BIMSTEC nations.

- **Announcement:** First proposed by India at the **2022 Colombo BIMSTEC Summit**.

- **Official Launch:** 2024.

- **Implementing Agencies:**

Ministry of External Affairs (MEA), India

Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO)

- **Key Features:**

- Collaborative research grants for joint studies (oceanography, fisheries, climate impacts, marine biodiversity).
- **Split-site PhD fellowships** linking Indian institutions with BIMSTEC partner universities.
- Development of shared databases, monitoring tools, and blue economy best practices.

- **Strategic Significance:** EPIC UPSC Classes

- Advances India's **Neighbourhood First, Act East, and MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions)** maritime strategy.
- Enhances regional maritime security, sustainability, and climate resilience.

About BIMSTEC: Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation.

- **Nature:** Regional organisation connecting South Asia and Southeast Asia through the Bay of Bengal.

- **Established:** 1997 via **Bangkok Declaration**.

- **Secretariat:** Dhaka (established 2014).

- **Member States:**

Bangladesh, Bhutan, India, Nepal, Sri Lanka, Myanmar, Thailand

- **Objective:** Promote cooperation in areas like trade, connectivity, energy, environment, counter-terrorism, coastal security, science & technology.

- **Chairmanship:** Rotates alphabetically; **Bangladesh assumed chairmanship in April 2025**, succeeding Thailand.

15. International Institute for Democracy & Electoral Assistance

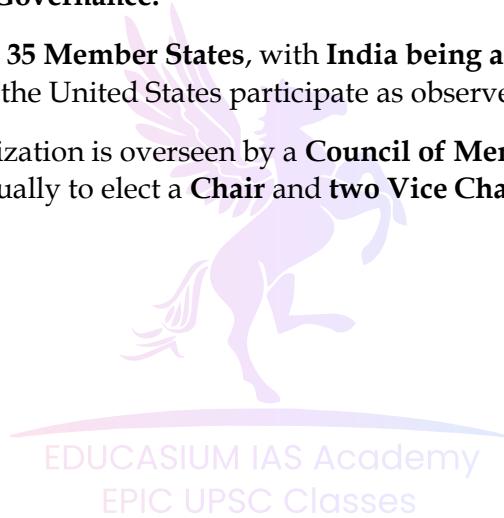


Gyanesh Kumar, the current Chief Election Commissioner, is set to chair the International Institute for Democracy and Electoral Assistance (International IDEA) in 2026. He will officially take on this role at the 2025 Council of Member States meeting in Stockholm, Sweden.

About International IDEA

International IDEA is a key **intergovernmental organization** focused on strengthening **democratic institutions and electoral processes** worldwide.

- **Establishment:** Founded in **1995**, its headquarters are in **Stockholm, Sweden**.
- **Mission:** Its primary function is to support **global sustainable democracy** by sharing expertise and assisting with reforms.
- **Membership & Governance:**
 - It includes **35 Member States**, with **India being a founding member**. Japan and the United States participate as observers.
 - The organization is overseen by a **Council of Member States**, which meets annually to elect a **Chair** and two **Vice Chairs**.



16. US–China ‘G2’ Revival



At the **2025 Busan Summit**, U.S. President Donald Trump and China’s President Xi Jinping revived the idea of a “**G-2**” **condominium** – a joint great-power management of global affairs.

They agreed on:

- A **tariff truce**, lowering punitive tariffs.
- Limited **rare-earth cooperation**.

This marks a temporary **accommodation** between Washington and Beijing after years of strategic rivalry.

Implications for India

1. Trade & Tariff Disadvantage

- India remains stuck in the **highest 50% U.S. tariff slab**, while:
 - U.S.–China tariffs eased to **47%**.
- **Outcome:** India becomes commercially disadvantaged in global supply chains.

2. Strategic Marginalisation

- A revived G-2 risks **reducing India’s centrality** in U.S. Indo-Pacific strategy.
- India’s **balancing role** weakens if Washington & Beijing choose selective cooperation.

3. Regional Geopolitical Realignment

- A functional G-2 could divide Asia into **zones of influence**:
 - China → East Asia, Western Pacific
 - U.S. → Maritime Indo-Pacific
- This expands the “great-power bargain” at India’s expense. **UPSC Keywords**

4. Technology Access Constraints

- Softening U.S.–China tensions may:
 - **Slow India’s access** to advanced semiconductors, defence tech, and AI systems.
 - U.S. chip export controls continue for India.
- India’s ambition to become a **trusted tech hub** faces fresh hurdles.



UPSC Keywords: G-2 Condominium, Tariff Truce, Indo-Pacific Realignment, Quad Coherence, Strategic Autonomy, Great-Power Bargain, Tech Decoupling, Geoeconomic Fragmentation

17. Threat of US Secondary Sanctions on Russian Oil Producers

U.S. sanctions on Russian oil majors **Rosneft** and **Lukoil** raised fears of **secondary sanctions** on Indian refiners. India's Russian oil imports fell from **1.95 million bpd** → **1.19 million bpd** (late Oct).

Sanctions – Quick Basics

- **Primary Sanctions:** Ban U.S. persons/companies from dealing with sanctioned entities.
- **Secondary Sanctions:** Punish *non-U.S.* entities (e.g., Indian refiners) by restricting access to U.S. **dollar payments, banks, markets, insurance**.

Why India Is Concerned

1. Energy Security Risk

- India gets **35%+** of its crude from Russia.
- Any disruption hits supply stability.

2. Higher Import Costs

- Loss of discounted Russian crude → India may lose savings (~\$13 bn saved during 2022–24).
- Raises fiscal pressure and widens CAD.

3. Refinery Reconfiguration

- Indian refineries adapted to Russian heavy blends.
- Shifting feedstock reduces efficiency, increases cost, lowers margins.

4. Strategic-Diplomatic Tightrope

- Sanctions complicate India's balancing between:
 - **Russia** (energy, defence)
 - **U.S.** (strategic tech, trade)
- Secondary sanctions could restrict Indian banks, oil traders, and shipping access to U.S. financial systems.

18. El Fasher Massacre & Sudanese Civil War (2025)



Keyword Focus: Darfur • RSF • SAF • Proxy War • Ethnic Cleansing • Famine

Background - Sudan

- Located in **Northeast Africa**, bordering the **Red Sea**.
- **3rd largest African country** after Algeria & DRC.
- World's leading producer of **gum arabic**, crucial for food & pharma industries.

Sudanese Civil War - Overview : A violent internal conflict between:

1. Sudanese Armed Forces (SAF)

Led by Gen. Abdel Fattah al-Burhan
Controls **North & East Sudan**,
including Port Sudan

2. Rapid Support Forces (RSF)

Paramilitary led by Mohamed Hamdan
Dagalo "Hemedti"
Controls **Darfur, most of Western & Central Sudan**

What Happened at El Fasher? (October 2025)

- RSF forces captured **El Fasher**, capital of **North Darfur**.
- Resulted in:
 - **Mass killings**
 - **Ethnic cleansing** of non-Arab communities
 - Destruction of hospitals, markets, and civilian shelters
 - **A de facto partition** of Sudan between RSF and SAF zones

Factors Driving the Civil War

1. **Leadership Power Struggle** : Clash over integrating RSF into the national army
2. **Peripheral Marginalisation**: Long-standing grievances in **Darfur, Kordofan, Blue Nile**
3. **Resource Conflicts**: Sudan's conflict belt is rich in: **Gold deposits**
4. **Militia Legacy (Janjaweed → RSF)** Omar al-Bashir armed Arab militias in the 2000s
5. **Regional Proxy War**: UAE accused of supporting RSF (weapons, funds)
Egypt & Iran backing SAF : Turning Sudan into a **geopolitical battleground**

Consequences of the Civil War

1. World's Worst Humanitarian Crisis

- **24+ million** in acute food insecurity
- Famine-like conditions across **Darfur & Kordofan**

2. Largest Displacement Crisis Globally

- **14 million+** displaced internally or as refugees
- Entire cities ethnically cleansed and depopulated

3. Collapse of State Authority

- Sudan effectively split into two competing administrations
- Democratic transition after 2019 revolution has collapsed

4. Regional Destabilisation

- Spillover into:
 - **Chad** (refugees + militia infiltration) **South Sudan** (arms flows)
 - **Egypt** (border pressure) **Sahel region** (terror networks)

19. Former Bangladesh PM Sheikh Hasina Sentenced to Death



Former Bangladesh Prime Minister **Sheikh Hasina** has been **sentenced to death in absentia** by the **International Crimes Tribunal (ICT)** in Dhaka, triggering major geopolitical, legal and diplomatic implications for India-Bangladesh relations.

Why Was Sheikh Hasina Convicted?

Charge: The ICT found her **guilty of crimes against humanity** for the state **crackdown on student-led protests** in **July-August 2024**, which witnessed severe violence, casualties and allegations of abuse.

Status: She is currently outside Bangladesh; the sentence was delivered **in absentia**.

Bangladesh's Request to India : Dhaka has **formally requested India** to extradite Sheikh Hasina under the **India-Bangladesh Extradition Treaty, 2013**.

Can India Extradite Her?

Yes, but **India may legally refuse** if:

1. The extradition request is **politically motivated**.
2. The alleged offence is a **political offence** under Article 6.
3. The request is **not made in good faith** or is unjust.
4. The charge amounts to a **military offence**.
5. Extradition may result in **discrimination** based on political opinion (customary international law standard).

Given the nature of the case and the political climate in Bangladesh, India's refusal grounds are strong.

About the India-Bangladesh Extradition Treaty (2013)

1. Dual Criminality : Extradition applies **only if the offence is punishable in both countries with a minimum of 1-year imprisonment**.

2. 2016 Amendment : Removed the earlier requirement for **extensive prima facie evidence**. Now, an **arrest warrant** is adequate to initiate extradition.

3. Political Offence Bar (Article 6): India **must refuse** extradition if the alleged offence is: Political in nature, Or if extradition is sought for political persecution.

4. Exceptions: Some offences **cannot** be classified as political: Murder, Abduction, Terrorism, Crimes covered under internationally accepted serious-offence categories

5. Safeguards : India can also refuse if extradition may: Lead to an unfair trial, Violate human rights protections, Endanger the person's life due to political motives.

20. Gen-Z Protests in Mexico

 Nationwide youth-led protests erupted across Mexico against rising cartel violence and the government's ineffective security strategy.

Gen-Z Profile

Born 1997–2012.

High digital literacy, rapid social-media mobilisation, decentralised organising.

Cartel Violence in Mexico

- 30,000+ violent deaths/year since 2018 (CFR).
- 110,000+ people missing (Govt of Mexico, 2024).
- Kidnapping and forced disappearances widespread.
- Militarisation (since 2006) worsened conflict → cartel fragmentation (Sinaloa, CJNG).
- Targeted political killings: mayors & officials assassinated (e.g., Michoacán, 2024).
- Policy criticism: Govt continues "Hugs, Not Bullets" (social programmes + intelligence), but violence remains high.

About "Hugs, Not Bullets" Policy

- Launched in 2018.
- Focus on social programmes, intelligence, prevention, not military force.
- Criticised for failing to contain cartel-dominated areas.

Global Wave of Gen-Z Protests

Bangladesh (2024)

- Anti-reservation protests → 1,400+ deaths (UN).
- Led to fall of PM Sheikh Hasina.

IAS Academy
EPIC UPSC Classes

Nepal (2025)

- Youth anger over corruption + social-media restrictions.
- Resulted in resignation of PM K.P. Sharma Oli.

Sri Lanka (2022)

- "Aragalaya" youth protests during economic crisis.
- Forced resignation & exile of President Gotabaya Rajapaksa.

Kenya (2024)

- Finance Bill protests → Govt withdrew major clauses.

France (2023)

- Youth-led strikes against pension reform; nationwide disruption.



UPSC Angle: GS-II (IR, Polity): State capacity, internal security, governance failures. **GS-III (Internal Security):** Organised crime, policing strategies. **Essay/Ethics:** Youth mobilisation, legitimacy crisis.

21. Canada's New Citizenship-by-Descent Bill



Canada has introduced **Bill C-3** to reform its citizenship laws by addressing long-standing inequities in citizenship by descent.

Key Features of Bill C-3

1. Removal of the First-Generation Limit (FGL)

- Earlier, under the **First-Generation Limit rule**, Canadian citizens **born or adopted abroad could not** pass citizenship to their children born outside Canada.
- This created multiple cases of “statelessness” or exclusion across generations.

2. Automatic Citizenship Restored

- The bill grants **automatic Canadian citizenship** to individuals:
 - Born abroad, or
 - Adopted abroad
before the law comes into force,
provided their parent was a Canadian citizen.

This effectively restores citizenship to thousands of people previously excluded.

3. Addresses “Lost Canadians”

- “Lost Canadians” refers to people who were denied citizenship due to:
 - restrictive older laws,
 - the FGL rule, or
 - gaps in adoption and descent policies.

Bill C-3 provides them **retroactive inclusion**.

4. Substantial Connection Test

To pass citizenship to a child born abroad, a Canadian citizen parent must show:

- **Minimum physical presence in Canada:**
3 years (1,095 days) before the child’s birth or adoption.

This ensures a real connection between the family and Canada.

Benefits for Indian Diaspora

Why this matters for Canadians of Indian origin

- Many Indian-origin Canadian citizens work abroad (Middle East, Asia, Africa).
- Under the old FGL rule, if they had children while posted abroad, their children **did not automatically receive Canadian citizenship** unless birth took place inside Canada.

New Bill = Major Relief

- No need to **return to Canada for childbirth** to secure citizenship for children.
- Children born abroad will now be eligible as long as the parent meets the **3-year residency requirement**.

22. U.S. Government Shutdown Ended



US President Donald Trump signed a government funding bill on **12 November 2025**, ending the **43-day shutdown**.

Longest in US History: Shutdown began on **1 October 2025**, surpassing the previous **35-day shutdown (Dec 2018–Jan 2019)** during Trump's first term.

About Government Shutdowns in the United States

Definition

- A **government shutdown** occurs when the **US Congress** and the **President** fail to pass:
 - Annual **appropriation bills**, or
 - A temporary funding measure called a **Continuing Resolution (CR)** required to keep federal agencies operating.

Legal Basis

- Governed by the **Antideficiency Act (1884)**, which:
 - Prohibits federal agencies from spending money **without Congressional approval**.
 - Requires non-essential federal activities to cease during a funding lapse.

Fiscal Timeline

- The **US fiscal year begins on 1 October**.
- Funding must be approved **before this date**.
- If appropriations are not passed in time, a **funding gap** occurs → triggering a **shutdown**.

EDUCASIUM IAS Academy
EPIC UPSC Classes

23. Poseidon Underwater Drone



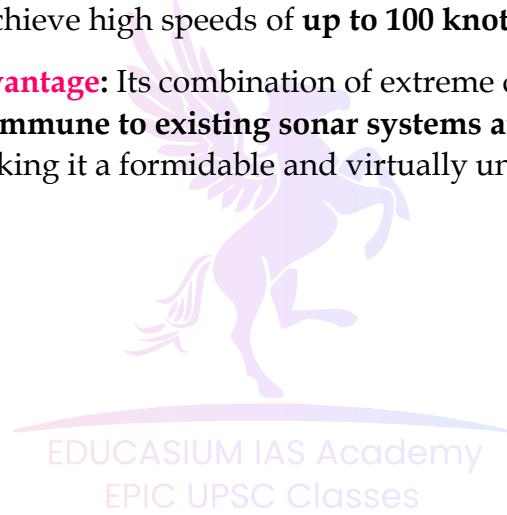
Russia's Poseidon Nuclear UUV Test

Russia has successfully tested its **Poseidon** – a nuclear-powered, nuclear-armed **unmanned underwater vehicle (UUV)**.

This strategic weapon is designed to carry either conventional or **nuclear payloads**, with the objective of triggering devastating **radioactive tsunamis** near enemy coastlines.

The UUV's capabilities are highly advanced:

- **Nuclear Propulsion:** It utilizes a **compact nuclear reactor** for nearly **unlimited range**, allowing for extended missions without needing to surface.
- **Performance:** Poseidon can operate at extreme **depths exceeding 1,000 meters** and achieve high speeds of **up to 100 knots**
- **Strategic Advantage:** Its combination of extreme depth and speed renders it effectively **immune to existing sonar systems and anti-submarine weapons**, making it a formidable and virtually undetectable threat.



24. 15th India–Vietnam Defense Policy Dialogue



Held in Hanoi; reviewed progress under the **Joint Vision Statement 2030**, which places defence cooperation at the core of the Comprehensive Strategic Partnership.

MoU signed for mutual support in submarine Search & Rescue (SAR)—enhances coordinated response capacity in the **Indo-Pacific**.

Letter of Intent on defence industrial cooperation signed—focus on:

- Joint research & development
- Defence production partnerships
- Transfer of technology (ToT)

India–Vietnam Relations: Key Points

- Ties elevated to **Comprehensive Strategic Partnership (2016)**; strong cooperation in defence, trade, and emerging technologies.
- **June 2025:**
 - 13th Political Consultation & 10th Strategic Dialogue held in New Delhi.
 - Reviewed progress under **Plan of Action 2024–2028**.
- **Cultural Diplomacy**: Vietnam hosted the **Holy Relics of Lord Buddha exposition** in May 2025.
- **Defence Exports**:
 - The **\$700 million BrahMos missile deal (2025)** is India's biggest defence export to date.
 - Strengthens Vietnam's maritime deterrence in the **South China Sea**, particularly against Chinese assertiveness.

25. India's First-Ever LPG Import Deal with United States



India's public-sector refiners signed a **one-year agreement** to import **2.2 MMT of LPG from the United States in 2026**, marking the **first structured LPG supply contract** between the two nations. The deal shifts price benchmarking from **Saudi Aramco CP** to the **US Mont Belvieu index**.

Significance of the India-US LPG Deal

- **Diversification:** US supplies will now contribute nearly **10%** of India's annual LPG imports.
- **Benchmark Shift:** Price linked to **Mont Belvieu** strengthens India's negotiating flexibility, reducing dependence on Gulf-linked **Saudi CP** pricing.
- **Energy Security:** Less reliance on Middle Eastern producers (UAE, Qatar, Saudi Arabia, Kuwait).
- **Strategic Partnership:** Deepens India-US trade and energy cooperation.

India's LPG Landscape

- **Consumption:** ~32 MMT annually – **world's 2nd largest after China**.
- **Sectoral Use:**
 - Domestic cooking ≈ **90%**
 - Commercial/Industrial
 - Automotive (Auto-LPG)
- **Import Dependence:** Over **60%** of national demand is imported.
- **Key Scheme:**
 - **PM Ujjwala Yojana:** Deposit-free LPG connections + subsidy for up to **9 refills/year** for eligible poor women.

About LPG (Liquefied Petroleum Gas)

- **Composition:** Primarily **propane (C₃H₈)** and **butane (C₄H₁₀)**.
- **Liquefaction:** Converts to liquid under moderate pressure/cooling; liquid occupies **1/250th** of gaseous volume.
- **Safety:**
 - Naturally odourless → **ethyl mercaptan** added for leak detection.
 - Vapour is **heavier than air**, accumulates in low-lying areas, posing explosion/asphyxiation risks.
- **Global Producers:**
 - **US** (largest), followed by **Saudi Arabia** and **China**.
 - Major exporters: **US** and **Qatar**.

Mont Belvieu Benchmark (UPSC Angle)

- Pricing hub in **Texas (USA)**.
- Daily spot price used globally for US-origin LPG.
- Differentiates US supply pricing from Arabian Gulf's Saudi CP system.

Keywords (UPSC-oriented)

Mont Belvieu, Saudi CP, PMUY, LPG imports, energy diversification, propane, butane.

26. Mandatory 'Country of Origin' Filter for E-Commerce Platforms



The Department of Consumer Affairs proposed mandatory **searchable and sortable 'Country of Origin' filters** for all packaged commodities sold online.

1. Draft Amendment Released

- Issued under **Legal Metrology (Packaged Commodities) (Second) Amendment Rules, 2025**.
- Objective: Strengthen transparency and consumer choice in online marketplaces.

2. Mandatory Filters

- E-commerce platforms must provide:
 - **Searchable** filters for country of origin.
 - **Sortable** options (e.g., sort by India/foreign origin).
- Applies to all **imported packaged goods** listed online.

3. Consumer Empowerment

- Allows buyers to quickly identify product origin.
- Enables informed purchase decisions, especially for imported items.

4. Stakeholder Consultation

- Comments invited from industry and citizens **till 22 November 2025**.

5. Alignment with National Missions

- Supports **Atmanirbhar Bharat** and **Vocal for Local** by:
 - Increasing visibility of **Made in India** products.
 - Level playing field for domestic manufacturers in e-commerce.

6. Impact on E-Commerce Governance

- Enhances **marketplace transparency**,
- Strengthens **consumer trust**,
- Promotes a **fair and competitive digital ecosystem**.

27. Global Virus Network



The **Global Virus Network (GVN)** has recently added **three new Centres of Excellence across the Americas**, significantly enhancing its global capacity for virology research.

GVN is a **voluntary international alliance** that brings together leading medical virology laboratories and scientists worldwide to **combat viral threats** and **minimize the global impact of pandemics** through collaborative research on vaccines and antiviral therapies.

GVN's Global Footprint

- **Reach:** The GVN now includes **63 Centres of Excellence and Affiliates** spread across **35 countries**.
- **India's Contribution:** **India** is a key contributing partner to the network. Its official GVN Centre of Excellence is the **Manipal Institute of Virology (MIV)** in Karnataka, supported by various other affiliate centers.



28. UNESCO's Neurotechnology Ethics Framework



UNESCO released the **world's first global ethics framework on neurotechnology**, entering into force on **12 November 2025**. The framework provides global norms to regulate brain-related technologies and protect emerging human rights like **mental privacy** and **freedom of thought**.

About Neurotechnology

- **Definition:** Devices or procedures that access, read, or modulate neural activity.
- **Scope:** Brain-computer interfaces (BCIs), neuroimaging tools, deep-brain stimulation, AI-driven neural analytics.
- **Uses:** Medical rehabilitation, paralysis assistance, neurological diagnostics, and cognitive enhancement.

Key Recommendations of the UNESCO Framework

1. Ethical Governance

Promote **autonomy**, **beneficence**, **privacy**, safety checks, and institutional accountability in R&D.

2. Ban on Misuse

- Prohibits use of brain data for **political manipulation**, **employment screening**, or coercive surveillance.
- Protects individuals from neuro-profiling and behavioural prediction abuses.

3. Human Rights & "Neurorights"

- **Freedom of Thought**
- **Mental Privacy**
- **Personal Identity**
- **Protection from algorithmic manipulation**

4. Open Science & Transparency

5. Responsible Research & Innovation (RRI)

6. Safeguards for Vulnerable Groups

7. Industry Self-Regulation

Global Precedents

- **Chile (2021):** First nation to constitutionally guarantee "mental integrity" and neurorights.
- **California (2024):** Law protecting citizens' brain data from corporate misuse.
- **OECD (2019):** First international guidelines for responsible corporate neurotechnology.

29. OpenAI Launches 'IndQA' Benchmark



OpenAI launched **IndQA**, a benchmark to evaluate AI systems on Indian languages and cultural understanding.

1. Collaborative Development

- Created with inputs from **250+ Indian experts**.
- Contains **2,278 questions**, covering **12 Indian languages** and **10 cultural domains**.

2. Covered Languages

- **Bengali, English, Hindi, Kannada, Marathi, Odia, Telugu, Gujarati, Malayalam, Punjabi, Tamil, Hinglish.**

3. Cultural Domains

- Architecture & Design
- Arts & Culture
- Everyday Life
- Food & Cuisine
- History
- Law & Ethics
- Literature & Linguistics
- Media & Entertainment
- Religion & Spirituality
- Sports & Recreation



4. Why India First

EDUCASIUM IAS Academy
EFC UPSC Classes

- India's linguistic diversity.
- **ChatGPT's second-largest user base** is from India.
- Strong AI adoption in education, govt services, and industry.

5. Performance Evaluation

- IndQA used to measure OpenAI model accuracy across languages and cultural contexts.
- OpenAI reports **major improvements** in Indian language performance but notes **further scope for strengthening regional language depth**.

31. Australia's AI Copyright Policy



Australia's Attorney-General has rejected a proposal to allow tech companies **unrestricted access** to copyrighted content for AI model training – firmly prioritising **creator rights over tech-sector demands**.

Australia's AI Copyright Policy

Government Position

- AI development **cannot come at the expense of creators**.
- Rejects U.S.-style “fair use” and China’s “data-first” AI strategy.
- Copyright protections remain central to AI governance.

CAIRG Formation

- **Copyright and AI Reference Group (CAIRG)** created to draft balanced, rights-based AI guidelines.
- Includes government, industry, creators, and legal experts.

Proposed Regulatory Reform

- Considering a **mandatory paid licensing system** under the Copyright Act.
- Ensures:
 - **Creator consent**
 - **Fair compensation**
 - Transparency in AI training datasets

Significance of Australia's Approach

- **Upholds Creator Rights:** Aligns with UNESCO's AI Ethics (2021) emphasizing dignity, equity, and cultural protection.
- **Human-Centric AI Model:** Shows democratic nations can pursue AI innovation without weakening IP rights.
- **Global Influence:** Positions Australia as a frontrunner in shaping **ethical AI policy**, potentially influencing EU, UK, and other democracies.

32. Maldives Becomes First to Impose Generational Tobacco Ban



Keyword Focus: Tobacco Endgame • Tobacco-Free Generation • WHO FCTC
• Public Health • Global First

What Maldives Did?

- Became **world's first country** to implement a **nationwide generational tobacco ban**.
- **Ban applies to all born on/after 1 Jan 2007** – for both **residents and tourists**.
- Covers **all tobacco forms**: cigarettes, cigars, bidi, smokeless tobacco, heated tobacco products, etc.
- Separate provision: **Complete ban on e-cigarettes and vaping** (import, sale, possession, use) **for all age groups**.

Policy Framework

- Implemented under the **Tobacco-Free Generation (TFG)** model.
- Part of the global **Tobacco Endgame** movement – aims to eliminate tobacco use, reducing smoking prevalence **below 5%**.
- Fully aligned with **WHO Framework Convention on Tobacco Control (WHO FCTC)**.

About the Tobacco Endgame Movement

What is it?

A global initiative to **eliminate commercial tobacco use**, not just reduce it.

Key Strategies

- **TFG Laws**: Permanent generational bans.
- **Nicotine Reduction**: Mandatory low-nicotine cigarettes.
- **Sinking-Lid Policies**: Annual caps on tobacco supply.
- **High Excise Taxes**: Making tobacco financially inaccessible.

Countries involved

Maldives, New Zealand, UK, Finland, Canada, Australia, Malaysia etc.

India has **not adopted** an official Tobacco Endgame goal yet.

WHO FCTC – Global Tobacco Treaty

- **Adopted**: 2003 | **Came into force**: 2005
- **India ratified**: 2004
- First international treaty negotiated under WHO.
- **Objective**: Protect present and future generations from harms of tobacco.

Supplementary Protocol (2012)

- **Protocol to Eliminate Illicit Trade in Tobacco Products**
- Introduces global **tracking & tracing** to fight smuggling.

NOVEMBER 2025

DEFENCE & INTERNAL SECURITY

1. India's Maritime Vision
2. INS Savitri
3. INS Mahe Commissioned
4. Indian Navy Commissions INS Ikshak in Kochi
5. Man-Portable Autonomous Underwater Vehicles
6. High-Level Consultations on Maritime Cooperation
7. Colombo Security Conclave
8. AUSINDEX 2025 (India–Australia Naval Exercise)
9. Exercise Malabar 2025 (Quad-level maritime drill)
10. Exercise Poorvi Prachand Prahar
11. Mitra Shakti-XI (India–Sri Lanka Army Exercise)
12. Exercise Garuda 25 (with France)
13. Exercise Suryakiran (India–Nepal)
14. Rudra Brigade and Exercise Trishul
15. Meteor Missiles
16. ASMPA-R Missile
17. HAMMER Weapon System
18. BvS10 Sindhu Armoured Vehicle
19. Induction of Women Soldiers in the Territorial Army
20. ITBP to Establish 10 All-Women Border Outposts
21. New Military Garrisons Near the Siliguri Corridor
22. India's Defence Manufacturing Landscape
23. Cyber Security Innovation Challenge (CSIC) 1.0
24. Mandatory IMEI Registration
25. White-Collar Terrorism



1. India Unveils Twin Maritime Visions to Become a Global Maritime Power by 2047



India's maritime sector is undergoing a major transformation under **Maritime India Vision (MIV) 2030** and the long-term **Maritime Amrit Kaal Vision 2047**. These visions aim to modernise ports, expand inland waterways, strengthen shipbuilding, and position India among the world's top maritime nations.

India handles **95% of trade by volume** and **70% by value** through its maritime network of **12 major and 200+ non-major ports**. To accelerate global competitiveness, the government has set two strategic roadmaps – **MIV 2030** and **Amrit Kaal Vision 2047**.

Maritime India Vision (MIV) 2030

- **Launched:** 2021
- **Goal:** Make India a **Top 10 Maritime Nation** by 2030.
- **Investment:** ₹3–3.5 lakh crore; **150+ initiatives** across ports, shipping, shipbuilding and inland waterways.
- **Guiding Principles:** Challenge analysis, Innovation, Time-bound execution, Global benchmarking, Human capital, **Waste-to-Wealth**.
- **Integration:** Complements **Sagarmala Programme**; acts as precursor to Vision 2047.
- **Key Mechanisms:**
 - **Maritime Development Fund (MDF)** – long-term infra financing.
 - **Financial Assistance Scheme** – supports domestic shipbuilding.
 - **Digital Systems:** *Sagarmanthan dashboard & National Logistics Portal (Marine)*.

EDUCASIUM IAS Academy
EPIC UPSC Classes

Key Focus Areas under MIV 2030

- **Shipbuilding & Repair, Port Modernisation, Coastal Shipping, Cruise Tourism, Maritime Safety.**
- **Inland Waterways:** 23 National Waterways prioritized for low-cost cargo movement.
- **Maritime Heritage:** **National Maritime Heritage Complex (NMHC), Lothal, Gujarat** to promote India's ancient maritime legacy.



UPSC Relevance: **Prelims:** Port infrastructure, Sagarmala vs Bharatmala, Inland Waterways, National Logistics Portal, Lothal NMHC. **Mains:** GS-II (Maritime governance, Sagarmala), GS-III (Infrastructure, Blue Economy, Logistics Efficiency, Employment), Essay (Growth & development through maritime power).



HOT Question “Evaluate how Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047 together can transform India into a leading maritime power. Discuss the challenges that could impede their full realisation.”



2. INS Savitri Reaches Mauritius for Long-Range Maritime Deployment



INS Savitri arrived at **Port Louis, Mauritius** during a long-range operational deployment in the South-West Indian Ocean Region.

Key Points

- **About INS Savitri**
 - Sukanya-class **Offshore Patrol Vessel (OPV)**; commissioned 7 June 1990.
 - Built indigenously; operates under **Eastern Naval Command**, Visakhapatnam.
- **Roles & Capabilities**
 - Maritime surveillance, **EEZ patrol**, coastal security, **search and rescue**.
 - Equipped with a 40 mm gun and a helicopter deck for extended surveillance.
- **Mauritius Deployment**
 - Conducting **joint EEZ surveillance** with Mauritius National Coast Guard.
 - Aims to strengthen **maritime cooperation** and regional security in the IOR.
 - Includes training exchanges, professional interactions, and outreach activities.
- **Strategic Significance**
 - Enhances India's presence in the **South-West Indian Ocean**.
 - Supports India's **SAGAR & Neighbourhood First** maritime objectives.
 - Boosts partnerships with island nations through low-intensity, high-utility OPVs.

Keywords: Offshore Patrol Vessel, EEZ Surveillance, Indian Ocean Region, SAGAR, Maritime Cooperation.

3. INS Mahe Commissioned – India's First Mahe-Class ASW Shallow Water Craft



The Indian Navy has commissioned INS Mahe, the **first Mahe-class Anti-Submarine Warfare Shallow Water Craft (ASW-SWC)**, significantly boosting India's littoral (near-coast) anti-submarine capabilities.

About INS Mahe

Naming: Named after **Mahe**, a former French enclave on the **Malabar Coast** (now part of Puducherry).

Key Features

- **Builder:** Cochin Shipyard Limited (CSL).
- **Class:** First of 8 ASW-SWC vessels ordered by the Navy.
- **Length:** ~78 metres.
- **Propulsion:** Diesel engines.
- **Indigenisation:** 80%+ indigenous content (weapons, sensors, communication systems).

Capabilities

- **Primary Role:** Coastal and shallow-water anti-submarine operations.
- **Depth Suitability:** Optimised for shallow waters (less than 200 metres).
- Equipped with:
 - Advanced hull-mounted sonar
 - Fire-control systems
 - Modern communication suites
 - ASW weapons (light torpedoes, depth charges)
- **Operational Roles:**
 - Littoral ASW surveillance
 - Sub-surface target detection & tracking
 - Search-and-attack missions
 - Mine laying
 - Escort duties in coastal waters

Why ASW-SWC Matters?

- India faces increasing submarine activity in the Indian Ocean, especially near trade routes and coastal infrastructure.
- Shallow waters (<200m) require **specialised crafts** with high manoeuvrability and sensitive sonar – roles not ideal for large warships.
- ASW-SWCs form the **first line of defence** in India's coastal security architecture.

Replacement for Ageing Fleet

Abhay-Class (Soviet Pauk-Class)

- Inducted in the 1980s.
- Performed coastal ASW roles for decades.
- Now being **phased out**, with the Mahe-class as their modern successor.



4. INS Ikshak Commissioned – Indian Navy's New Hydrographic Survey Vessel



On 6 November 2025, the Indian Navy commissioned **INS Ikshak** at Naval Base Kochi. It is the **third vessel** of the **Survey Vessel (Large)** class and marks a major step in strengthening India's hydrographic and maritime domain awareness capabilities.

About INS Ikshak

- **Class:** Survey Vessel (Large) – third in a series of four.
- **Builder:** Garden Reach Shipbuilders & Engineers (GRSE) in collaboration with L&T under **Make in India**.
- **Base:** **Southern Naval Command**, Kochi (Navy's premier training and hydrographic command).
- **Meaning of Name:** *Ikshak* = "Guide" in Sanskrit, signifying the ship's role in enabling safe navigation.

Role & Capabilities

INS Ikshak is designed for:

- **High-precision hydrographic surveys** of ports, harbours, coastal waters, and EEZ.
- **Nautical chart preparation** and updating for both defence and civil maritime use.
- **Oceanographic & geophysical data collection** to support route planning and naval operations.
- **Search and Rescue (SAR)** support and **HADR (Humanitarian Assistance & Disaster Relief)** missions when required.

EDUCASIUM IAS Academy

Technological Features

- Modern **survey motor boats** and **autonomous survey crafts**.
- Advanced sensors:
 - Multi-beam echo sounders (MBES)
 - Side-scan sonars
 - Sub-bottom profilers
 - DGPS for precise navigation
- Capability to operate in both **deep sea and shallow waters**.
- Helicopter landing facility for enhanced operational reach.

Significance

1. **Maritime Safety & Navigation** : Provides updated **hydrographic charts** essential for merchant shipping, naval operations, and coastal security.
2. **Indo-Pacific Strategy** : Enhances India's role as a **net security provider**, supporting SAGAR (Security and Growth for All in the Region) through charting assistance to friendly nations.
3. **Indigenous Shipbuilding Push** : Reflects India's strengthening defence industrial base under **Aatmanirbhar Bharat**.
4. **Strengthening Southern Naval Command** : With Kochi as the base, INS Ikshak will integrate closely with India's training and operational network in the Arabian Sea.



5. Man-Portable Autonomous Underwater Vehicles (MP-AUVs)



Context

- DRDO developed new-generation **Man-Portable Autonomous Underwater Vehicles** for naval **mine-countermeasure (MCM)** operations.

What "Man-Portable" & "Autonomous" Mean

- Man-Portable:** Light and compact; can be carried, deployed, and recovered by personnel without specialised vehicles.
- Autonomous:** Conducts navigation, detection, and classification using onboard sensors & AI, without continuous human control.

Features of DRDO's New-Gen MP-AUVs

Platform

- Lightweight AUVs for mine detection in **littoral waters, harbour zones, and coastal defence**.

Sensors

- Side-Scan Sonar:** Maps seabed using sound waves; detects objects in low-visibility underwater environments.
- Electro-Optical Cameras:** High-resolution imaging for visual confirmation.
- AI Algorithms:** Deep-learning models for real-time threat classification.

Autonomy

- Autonomous navigation & obstacle avoidance.
- Mission-planning algorithms reduce operator workload and shorten mission time.

Networking

- Underwater **acoustic communication** enables:
 - Multi-AUV coordination
 - Collaborative mapping
 - Real-time data sharing

Operational Advantages

- Rapid deployment
- Low logistics footprint
- Lower risk to naval divers
- Aligned with global trends in **unmanned smart mine-warfare systems**

About Underwater Mines

Overview

- Submerged explosive devices placed on **seabed, moored in water columns, or drifting**, used to deny access or damage vessels.

Deployment

- Laid by submarines, ships, aircraft, or unmanned platforms.
- Over **30 naval powers** maintain active mine-warfare capabilities.

Security Threat

- Mines can be covertly placed in coastal waters, ports, and harbour entrances.
- Continuous MCM operations are essential to keep **shipping lanes, energy terminals, and naval bases** safe.



6. India–Russia Hold High-Level Maritime Cooperation Talks in New Delhi



On 17 November 2025, India and Russia held **interagency consultations on maritime cooperation** in New Delhi.

Key Points

Review of Maritime Cooperation

- Both sides reviewed the **entire spectrum** of maritime engagement.
- Reaffirmed their **Special and Privileged Strategic Partnership**, based on long-standing political trust and defence ties.

Leadership-Level Guidance

- Acknowledged key leadership roles of **PM Narendra Modi** and **President Vladimir Putin** in steering bilateral maritime strategy.

Focus Areas of Collaboration

- Shipbuilding** and naval platform cooperation.
- Maritime trade**, logistics, and improved sea-connectivity.
- Port infrastructure development** and joint capacity-building.
- Scientific and technical exchanges** in marine technology.

Arctic & Research Cooperation

- Detailed talks on:
 - Arctic operations**, navigation, and resource-sharing.
 - Polar research**, oceanography, and climate studies.
 - Training and scientific collaboration in cold-region maritime capabilities.

Significance

www.educasiumiasacademy.com

- Strengthens India–Russia maritime cooperation beyond defence.
- Enhances connectivity, shipbuilding capacity, and blue-economy partnerships.
- Supports India's interest in the **Arctic**, critical for energy security, polar research, and emerging shipping routes.

Keywords: India–Russia Relations, Maritime Cooperation, Arctic Collaboration, Shipbuilding, Strategic Partnership.



7. Colombo Security Conclave Expands as Seychelles Joins India-Led Regional Security Framework



India hosted the **7th National Security Adviser-level meeting** of the **Colombo Security Conclave (CSC)** in New Delhi, where **Seychelles was admitted as the sixth full member**. Malaysia also participated for the first time as a guest state, reflecting CSC's growing relevance in the Indian Ocean Region (IOR).

About the Colombo Security Conclave (CSC)

The CSC is a **regional security grouping** focused on strengthening maritime and transnational security cooperation in the Indian Ocean. It originated as **Trilateral Maritime Security Cooperation** among India, Sri Lanka, and the Maldives in 2011, and was formally institutionalised as the CSC in 2020.

Membership & Structure

- **Founding Members:** India, Sri Lanka, Maldives
- **Subsequent Members:** Mauritius (2020), Bangladesh (2024), Seychelles (2025)
- **Total Members:** 6
- **Secretariat:** Permanent Secretariat located in **Colombo, Sri Lanka**.

Core Focus Areas

CSC works through **five thematic pillars**:

1. **Maritime Safety & Security**
2. **Counterterrorism**
3. **Cyber Security**
4. **Human Trafficking & Narcotics Control**
5. **Humanitarian Assistance & Disaster Relief (HADR)**

Its agenda aims to create a **secure, stable, and rules-based maritime order** in the IOR.

Mechanisms of Cooperation

- **NSA and Deputy NSA-level meetings** for strategic coordination
- **CSC Joint Exercises** for maritime operations
- **Coastal security drills** and **maritime domain awareness sharing**
- **Capacity-building programmes**, including cyber security training and counter-narcotics cooperation
- **Information-sharing networks** to enhance interoperability and real-time coordination



HOT Question: "Examine the strategic significance of the Colombo Security Conclave for India's maritime security architecture in the Indian Ocean. How does CSC complement India's broader Indo-Pacific strategy?"

8. India–Australia Conduct AUSINDEX 2025 in the Northern Pacific



AUSINDEX 2025, the bilateral maritime exercise between India and Australia, was held in the **Northern Pacific Ocean**.

About AUSINDEX 2025

- **Nature:** Biennial India–Australia naval exercise.
- **Aim:** Strengthen **interoperability**, maritime cooperation, and Indo-Pacific security alignment.
- **Indian Asset:** INS Sahyadri (stealth frigate).
- **Australian Asset:** HMAS Ballarat (frigate).

Training Focus Areas

- **Anti-submarine warfare** drills.
- **Gunnery exercises** and coordinated firing practices.
- **Advanced flying operations** involving ship-borne helicopters.

Significance

- Reinforces India–Australia commitment to a **free, open, inclusive Indo-Pacific**.
- Enhances operational understanding between two key regional navies.

AUSTRAHIND 2025

- Fourth edition of the annual India–Australia Army exercise.
- Recently conducted in **Perth, Australia**.
- Focuses on **joint tactical drills**, sub-conventional operations, and strengthening land-force cooperation.

Keywords: AUSINDEX, Indo-Pacific, INS Sahyadri, HMAS Ballarat, AUSTRAHIND, India–Australia Defence Cooperation

9. Quad Navies Conduct Exercise Malabar 2025 in Guam



Exercise Malabar 2025 is underway in **Guam (Northern Pacific)** with participation from all **Quad nations**.

About the Exercise

- Annual **multilateral naval drill** of **India, US, Japan, Australia**.
- Enhances **interoperability, coordination, and communication** among Quad navies.
- Supports a **free, open, secure Indo-Pacific**.

• 2025 Edition

- Location: **Guam, Northern Pacific**.
- Indian asset: **INS Sahyadri**, an indigenously designed guided-missile stealth frigate.
- **Harbour Phase**: Planning, coordination meetings, communication drills, cross-training, sports.
- **Sea Phase**: Fleet manoeuvres, **anti-submarine, anti-air, and maritime warfare** exercises.

• Evolution

- Started in **1992** as a **bilateral** India-US exercise.
- Became **trilateral** with Japan in **2015**.
- Became **quadrilateral** with Australia in **2020**.

• Quad Background

- Informal security forum of **India, US, Japan, Australia**.
- Established **2007**, revived **2017** to promote Indo-Pacific security.

Keywords: Quad, Indo-Pacific, Interoperability, INS Sahyadri, Anti-Submarine Warfare, Guam.

EDUCASIUM IAS Academy

EPIC UPSC Classes

www.educasiumiasacademy.com



10. India Conducts 'Poorvi Prachand Prahar' in Arunachal's High-Altitude Sector



Indian Armed Forces carried out **Exercise Poorvi Prachand Prahar** in **Mechuka Valley, Arunachal Pradesh**, near the LAC.

Key Points

- **Type of Exercise:** Multi-domain, **tri-service** high-altitude military drill.
- **Objective:** Enhance **interoperability**, **joint combat readiness**, and rapid response in a possible **multi-front scenario**.
- **Assets Used:** Special Forces, drones/UAVs, precision-strike systems, ISR tools, and networked command centres.
- **Location Significance: Mechuka Valley** – strategically vital eastern sector bordering China; limited infrastructure; high-altitude conditions.
- **Series Linkage:** Continues India's joint exercise line – **Bhala Prahar (2023)** and **Poorvi Prahar (2024)**.
- **Broader Context:** Supports India's shift toward **multi-domain operations (MDO)** and strengthens posture against PLA mobilisation.

Keywords: Mechuka Valley, Tri-Service Exercise, High-Altitude Warfare, Multi-Domain Ops, LAC Security.

EDUCASIUM IAS Academy
EPIC UPSC Classes

www.educasiumiasacademy.com



11. India–Sri Lanka Begin 11th Joint Military Exercise 'Mitra Shakti-XI' in Karnataka



The 11th edition of Exercise Mitra Shakti began at the **Foreign Training Node, Karnataka**, involving the armies and air forces of India and Sri Lanka.

Key Points

- **Aim of the Exercise**

- Enhance coordination in **sub-conventional operations**, especially under **UN peacekeeping** mandates.
- Strengthen **interoperability** between both militaries.

- **Participants**

- India: **RAJPUT Regiment** and Air Force personnel.
- Sri Lanka: **GAJABA Regiment** and Air Force personnel.

- **Training Focus Areas**

- **Counter-terror operations**, close-quarter battle, and area domination.
- **Heliborne operations, drone deployment**, and **C-UAS (Counter-Unmanned Aerial Systems)** drills.
- **AMAR (Army Martial Arts Routine)** and yoga sessions for physical conditioning.

- **Significance**

EDUCASIUM IAS Academy

- Deepens India–Sri Lanka **defence cooperation**.
- Boosts joint capability for **UN peacekeeping** roles.
- Promotes **regional stability and mutual trust**.

Keywords: Mitra Shakti, Counter-Terrorism, UN Peacekeeping, C-UAS, RAJPUT Regiment, GAJABA Regiment.

12. India–France Conduct ‘Exercise Garuda 25’ at Mont-de-Marsan Air Base



Exercise Garuda 25 has begun in **Mont-de-Marsan, France**, involving the Indian Air Force (IAF) and the French Air and Space Force (FASF).

Key Points

- **About the Exercise**
 - 8th edition of the bilateral air exercise between India and France.
 - Aims to enhance interoperability, tactical coordination, and joint air combat proficiency.
- **Indian Assets Deployed**
 - **Su-30MKI** fighter aircraft.
 - **C-17 Globemaster** transport aircraft.
 - **IL-78** aerial refuelling tankers.
- **Training Focus Areas**
 - **Air-to-air combat** and beyond-visual-range engagements.
 - **Integrated air defence** missions and joint strike operations.
 - Realistic high-threat and multi-domain operational scenarios.
- **Significance**
 - Deepens India–France **strategic air cooperation**.
 - Boosts IAF’s exposure to **NATO-standard** operational environments.
 - Reinforces long-standing bilateral defence ties.

Keywords: Garuda, IAF–FASF, Su-30MKI, Air Combat, Aerial Refuelling, France–India Defence.

www.educasiumiasacademy.com

13. India–Nepal Conduct 19th Edition of Exercise Suryakiran in Uttarakhand



India and Nepal are conducting **Exercise Suryakiran XIX** from Nov 25 - Dec 8 in Pithoragarh, Uttarakhand.

About Exercise Suryakiran

- Annual **bilateral military exercise** between India and Nepal.
- Hosted **alternately** by the two countries.
- One of India's **longest-running** military engagements with a neighbouring nation.

Aim & Training Focus

- Boost **operational synergy** between the two armies.
- Focus on **jungle warfare, counter-terrorism, and mountainous terrain operations**.
- Emphasises use of **niche technologies**, surveillance tools, and joint tactical drills.
- Includes exchange of **best practices** and training methodologies.

Significance

- Enhances **interoperability**, joint planning, and coordination.
- Reinforces **India-Nepal defence cooperation** and army-to-army ties.
- Contributes to shared goals of **regional stability** and **global peacekeeping**.
- Strengthens mutual trust and operational familiarity due to traditional cross-border military bonding.

Keywords: Suryakiran, India-Nepal Military Exercise, Jungle Warfare, Mountain Operations, Interoperability, Pithoragarh.



14. India Tests New 'Rudra' Integrated Brigade During Tri-Service Exercise Trishul



India tested its newly raised **integrated all-arms 'Rudra Brigade'** during **Exercise Trishul (Nov 3–13, 2025)** on the western front. Southern Command chief hinted at a doctrinal shift from **Cold Start → Cold Strike**.

Exercise Trishul 2025

- Large tri-service drill led by the **Indian Navy**, involving Army & Air Force.
- Conducted across **creek and desert sectors of Rajasthan & Gujarat**.
- Validates **joint operational procedures**, multi-domain coordination & effect-based operations.
- Includes **amphibious operations, EW, cyber warfare, and maritime power projection** in the North Arabian Sea.

Testing of Rudra Brigade

- Newly raised **integrated all-arms brigade** tested for the first time.
- Designed for **rapid mobilisation**, integrated firepower & seamless multi-domain operations.
- Represents India's shift to faster, more flexible war-fighting formations.

About Rudra Brigade

- Conversion of select **single-arm brigades** into **all-arms, self-contained battle groups**.
- Components: **Infantry, mechanised infantry, tanks, artillery, air defence, engineers, signals, logistics, drones, combat-support units**.
- Mission-tailored for specific operational theatres.
- Two Rudra brigades already active in **Ladakh** and **Sikkim** along the China border.

Cold Start → Cold Strike

- **Cold Start Doctrine**: Pro-active limited war strategy developed after slow mobilisation in **Operation Parakram (2001–02)**.
- **Cold Strike**: Upgraded version emphasising:
 - **Faster mobilisation**,
 - **Deeper thrusts**,
 - **Integrated tri-service operations**,
 - **Multi-domain synchronisation** (land-air-cyber-EW).

Significance

- Strengthens India's readiness for **swift, coordinated operations** on the western front.
- Enhances **jointness and multi-domain capability** – key reforms under theatre command restructuring.
- Reduces reaction time in high-tempo India–Pakistan contingencies.

Keywords: Rudra Brigade, Exercise Trishul, Cold Strike, Cold Start, Multi-Domain Operations, Western Theatre, Operation Parakram.

15. India Eyes More MBDA Meteor Missiles to Cement Air-Superiority Post-Operation Sindoor



After the success of Operation Sindoor, India has proposed procurement of additional Meteor air-to-air missiles to strengthen the air combat capability of the Indian Air Force (IAF). The deal, reportedly worth around ₹1,500 crore, is in advanced stages of approval.

What is Meteor Missile?

- Meteor is a **Beyond-Visual-Range Air-to-Air Missile (BVRAAM)** developed by the European consortium MBDA.
- **Propulsion:** Uses a ramjet (solid-fueled ducted rocket / air-breathing engine) – allowing high-speed cruise and mid-course acceleration.
- **Speed:** Over Mach 4.
- **Range:** Official range ~120 km, but estimates – and many defence-analysis sources – put it at **200 km+**, giving truly long-range BVR reach.
- **No-Escape Zone:** Its effective “no-escape zone” (i.e. within which target has little chance to evade) is significantly larger than typical BVRAAMs, often cited as **60 km+**.
- **Guidance:** It uses inertial guidance with mid-course updates via datalink, and terminal phase active radar homing (active radar seeker). This enables high accuracy, multi-shot capability, and engaging maneuvering targets – including fast jets, UAVs, or cruise missiles – even in dense electronic-warfare environments.

Meteor in Indian Context & What Changed Now

- The IAF currently operates Meteor missiles on its existing fleet of 36 Dassault Rafale fighters acquired earlier.
- The planned procurement would likely add missiles for both existing Rafales as well as future naval Rafales (ordered for the Navy).
- The decision follows the operational lessons from Operation Sindoor (May 2025), where long-range standoff weapons played a role in targeting Pakistani positions. The Meteor acquisition aims to consolidate India’s “first-shot, first-kill” capability and deter adversary air action.



UPSC Relevance: Prelims: Key missile types (BVRAAM), missiles in IAF inventory (Meteor, Astra), concept of No-Escape Zone, countries/manufacturers of advanced missiles like MBDA.

HOT Question: “Analyse how the proposed acquisition of Meteor missiles enhances India’s aerial combat capabilities. To what extent can such procurement contribute to long-term air power dominance in the South Asia/Indo-Pacific region? Critically discuss potential limitations



16. France Test-Fires ASMPA-R Nuclear Cruise Missile



Context : France successfully test-fired the **ASMPA-R** air-to-surface cruise missile from a **Rafale-M** fighter jet and formally inducted it into service.

Rafale-M → Naval version of Rafale; selected by India for **INS Vikrant** to replace MiG-29K.

Key Concepts

Cruise Missile

- Guided missile flying within the atmosphere.
- Uses **jet/ramjet propulsion** for low-altitude, precision strikes.

Ramjet Propulsion

- Air-breathing engine; compresses air using **forward motion**, not compressors.
- Enables **sustained supersonic speeds** for missiles.

ASMPA-R Missile: Key Features

- **Upgraded Variant:** Second modernised version of France's ASMPA series.
- **Induction:** Entered Strategic Air Forces (2023) & Nuclear Aeronaval Force (2025).

Technical Specs

- **Range:** ~600 km
- **Speed:** ~Mach 3 (supersonic)
- **Propulsion:** Liquid-fuel ramjet + solid booster for launch acceleration.
- **Warhead:** Nuclear-capable; believed to carry an enhanced variant of the earlier 100-300 kt warhead.

EDUCASIUM IAS Academy

EPIC UPSC Classes

Design Improvements

- Reversed fin layout: **larger rear fins, smaller front fins.**
- Retains **central ramjet air intake** for high-speed performance.

Future Developments

- France is developing **ASN4G (Air-Sol Nucléaire 4th Generation)** – successor to ASMPA-R.
- ASN4G will arm **Rafale F5** and its naval derivative.

17. BEL–Safran Joint Venture to Manufacture HAMMER Precision Weapon Systems in India



India's Bharat Electronics Limited (BEL) has signed a **joint venture** with France's Safran Electronics & Defence to manufacture the **HAMMER precision-guided air-to-ground weapon system** in India. The move strengthens indigenous defence manufacturing and enhances precision-strike capability of Indian combat aircraft.

What is the HAMMER Weapon System?

HAMMER (Highly Agile Modular Munition Extended Range) is a **precision-guided, all-weather, air-to-ground strike weapon** designed to convert conventional unguided bombs into high-accuracy smart munitions.

Key Features

1. Modular Configuration (Two-Part Kit)

- **Nose Section:**
 - Houses the **Guidance Kit**, enabling autonomous flight navigation and precise target engagement.
- **Tail Section:**
 - Includes the **Range Extension Kit (REK)** with a **solid rocket booster**, allowing extended stand-off range.

2. Guidance System

- **Hybrid Guidance:** GPS-aided INS guidance.
- Optional add-ons: **infrared seeker** or **laser seeker**, improving terminal accuracy.

3. Range & Performance

- **Range:** Over 70 km, enabling stand-off strikes from safe distances.
- **Launch Flexibility:** Effective from **very low altitudes**.
- **Operational Advantages:**
 - Resistant to **GPS jamming**
 - **Fire-and-forget** capability
 - Supports **multiple simultaneous launches** (up to six)

Platform Compatibility

While originally designed for **Rafale** aircraft, HAMMER is flexible enough to integrate with various aircraft:

- **Indian platforms:** LCA Tejas (planned), Mirage-2000, Rafale
- **Global platforms:** F-16, Su-27, and other NATO/Warsaw Pact fighters

This modularity boosts India's interoperability and rapid deployment options.



UPSC Relevance: **Prelims:** HAMMER features, modular weapon systems, guidance types, BEL & Safran collaboration. **Mains:** GS-III (Defence technology, indigenisation, Atmanirbhar Bharat), GS-II (India-France defence partnership).



HOT Question "Discuss the strategic significance of the HAMMER weapon system for India's precision-strike capabilities. How does the BEL-Safran joint venture contribute to India's defence indigenisation goals?"

18. India to Indigenously Produce BvS10 'Sindhu' All-Terrain Armoured Vehicles



L&T and BAE Systems have secured a contract to supply the Indian Army with **BvS10 Sindhu** all-terrain armoured vehicles, to be manufactured in India.

About BvS10 Sindhu

- Indian variant of **BvS10 Viking** all-terrain armoured vehicle.
- To be produced by **L&T at Hazira, Gujarat** with ~60% indigenous content.
- Developed with design support from **BAE Systems**.

Role & Operational Use

- Built for **high-mobility operations** in:
 - **Snow-bound regions** (Ladakh, Siachen).
 - **Mountains, swamps, deserts, and soft ground.**
- Ideal for **Eastern Command** and **Northern theatre** conditions where wheeled vehicles struggle.

Key Capabilities

- **Twin-cabin articulated design:** Front and rear protected modules.
- **Amphibious capability;** can traverse rivers and marshy terrain.
- **Mobility Performance:**
 - Climbs 45° inclines.
 - Handles 60% gradients and deep snow.
- **Payload & Troop Capacity:**
 - Carries 10-12 personnel.
 - Payload of approx. 5 tonnes.

EDUCASIUM IAS Academy

EPIC UPSC Classes

Significance

- Boosts **Atmanirbhar Bharat** in defence mobility systems.
- Enhances Army's capability in **extreme terrain warfare**.
- Strengthens India's readiness for **high-altitude and multi-terrain operations**.

Keywords: BvS10 Sindhu, All-Terrain Vehicle, L&T, BAE Systems, Ladakh

Mobility, High-Altitude Warfare, Atmanirbhar Bharat.



19. Women to Be Inducted as Soldiers in the Territorial Army for the First Time

The government has approved the induction of women into the '**other ranks**' category of the Territorial Army (TA), marking a historic expansion of women's roles in the armed forces. Until now, women served only as officers in limited TA units (since 2019).

About the Territorial Army (TA)

The Territorial Army is a **part-time, volunteer reserve force** that supports the regular Army during war, national emergencies, internal security duties, and disaster response. It operates on the "**citizen-soldier**" principle, where ordinary civilians with regular jobs volunteer for national defence tasks.

Key Features:

- Origin:** Evolved from the Indian Territorial Force (1920) → became the modern TA under the **Territorial Army Act, 1948**, formally launched in 1949.
- Eligibility:** Indian citizens aged 18–42, medically fit, and with civilian employment.
- Training:** Annual training camps of ~2 months; periodic refresher training.
- Role & Deployment:** Logistics support, rear-area security, guarding critical infrastructure, specialised engineering/railway/ECG units. TA units have historically supported the Army during the **1962, 1965, 1971 wars, and Kargil conflict (1999)**.

Significance of Women's Induction into Other Ranks

1. Gender Inclusion & Military Reform
2. Operational Advantage
3. Citizen-Soldier Social Impact



UPSC Relevance: **Prelims:** Territorial Army Act 1948, eligibility, reserve vs regular force, citizen-soldier principle. **Mains:** GS-II (Governance, Women Empowerment), GS-III (Internal Security, Role of Armed Forces),



HOT Question "The induction of women into the 'other ranks' of the Territorial Army marks a significant shift in India's gender-inclusion policy within the armed forces. Analyse its implications for operational effectiveness and social change."

20. ITBP to Establish 10 All-Women Forward Posts Along the India-China LAC



ITBP announced creation of 10 all-women forward Border Outposts (BOPs) along the 3,488 km India-China LAC, starting with Lukung (Ladakh) and Thangi (Himachal Pradesh).

About the Announcement

- All-women deployment:** First-ever all-women high-altitude BOPs on the LAC.
- Forwardisation Increase:** ITBP posts increased from 180 → 215 since the 2020 Ladakh crisis.
- Upcoming Expansion:** 41 new posts approved for phased deployment.
- Force Augmentation:** Govt sanctioned 7 battalions + 1 sector HQ (≈9,400 personnel).
- Modernisation:** Use of logistics drones, smart-border systems, and sustainable housing for 9,000–14,000 ft terrains.

Background: 2020 Ladakh Crisis

- Triggered by **PLA intrusions** and violent clashes in **Galwan Valley** and other friction points.
- Led to India strengthening infrastructure, surveillance, and forward deployment along the LAC.

About ITBP

- Mandate:** Central Armed Police Force (1962), under **MHA**, guarding the LAC from **Karakoram Pass (Ladakh)** → **Jachep La (Arunachal)**.
- Operational Conditions:** High-altitude frontier of 9,000–14,000+ ft, with harsh cold, rugged terrain, and thin air.
- Primary Roles:** Border vigilance, mountain warfare, intelligence gathering, disaster response, convoy protection, and securing key installations.
- Internal Security Role:** Also supports anti-Naxal operations; contributed to **kills, captures & surrenders** in ongoing Naxalism-eradication efforts.

Significance

- Boosts **women-led defence presence** in high-altitude sectors.
- Enhances **border surveillance**, morale, and forward-post resilience.
- Signals India's long-term commitment to **LAC modernisation and readiness**.

Keywords: ITBP, All-Women BOPs, LAC, Lukung, Thangi, Ladakh Crisis, Smart Border Tech.



21. India Sets Up Three New Garrisons to Secure the Siliguri Corridor



India has established **three new military garrisons** near the **Siliguri Corridor** to strengthen eastern defence, surveillance, and rapid response capacity along the India-Bangladesh border.

New Garrisons

- **Bamuni Garrison, Assam**
 - Known as the **Lachit Borphukan Military Station**.
 - First major Army base close to the **Bangladesh border**.
 - Enhances monitoring and coordination with **BSF**.
- **Kishanganj Base, Bihar**
 - Supports **rapid troop mobilisation** and logistics.
 - Critical for reinforcing the Siliguri Corridor in emergencies.
- **Chopra Base, West Bengal**
 - Focus on **quick-reaction forces** and **intelligence integration**.
 - Strengthens multi-agency coordination in the eastern sector.

About the Siliguri Corridor

- A narrow land stretch: **~60 km long and ~22 km wide**.
- Connects mainland India to the **eight northeastern states**.
- Acts as a **trade and transit route** with **Nepal and Bhutan**, aligning with India's **Act East Policy**.
- High-risk zone due to proximity to **China-controlled Chumbi Valley** near the India-Bhutan-China tri-junction.
- Vulnerability highlighted during the **2017 Doklam standoff**.

Significance

- Strengthens **eastern theatre preparedness**.
- Enhances **surveillance, deterrence, and rapid response**.
- Reduces strategic vulnerability of the "**Chicken's Neck**" corridor.

Keywords: Siliguri Corridor, Chicken's Neck, Chumbi Valley, Doklam, Eastern Command, Rapid Deployment, India-Bangladesh Border.



22. India's Defence Manufacturing



Defence Minister Rajnath Singh inaugurated the DPSUs Bhavan in New Delhi, reaffirming the pivotal role of **Defence Public Sector Undertakings (DPSUs)** in India's defence industrial ecosystem.

Performance Highlights (FY 2024–25)

1. Record Defence Production

- India's defence production reached an **all-time high of ₹1.51 lakh crore**.
- **18% growth** over FY 2023–24.
- Output has **nearly doubled** since FY 2019–20, reflecting rapid indigenisation.

2. Sectoral Contribution

- **DPSUs: 71.6%** of total defence manufacturing output.
- **Private sector: 23%**, signalling expanding private participation.

3. Defence Exports

- Total exports touched **₹23,622 crore** in FY 2024–25 – **12% increase YoY**.
- **DPSU exports: ₹8,389 crore**, registering a **43% year-on-year growth**.

4. DPSU Structure

- India now has **16 DPSUs** under the Ministry of Defence.
- Includes **7 new companies carved out of the Ordnance Factory Board (OFB)** after its corporatisation in **2021**.

EPIC UPSC Classes

www.educasiumiasacademy.com

www.educasiumiasacademy.com

23. MeitY Launches Cyber Security Innovation Challenge 1.0



MeitY launched CSIC 1.0 to boost India's **indigenous cybersecurity research and innovation ecosystem**.

About CSIC 1.0

- Aims to expose students to **real-world cyber threats** and encourage **research-led solutions**.
- Operates under the **ISEA Project**, implemented through 50 academic institutes, **C-DAC Hyderabad**, and **DSCI**.

Structure & Support

- **Five-stage challenge** guiding teams from **ideation** → **MVP**.
- Focuses on **10 priority cybersecurity domains** critical for national security.
- **Top 20 teams** receive **₹50,000 seed funding** and **industry mentorship**.

About ISEA Project

- Promotes **information security education**, skill development, and **cyber hygiene awareness** nationwide.

About C-DAC

- Established **1988**; premier R&D organisation under MeitY for **IT, electronics, cybersecurity, and high-performance computing**.

About DSCI

www.educasiumiasacademy.com

- Founded **2008** by NASSCOM; works to enhance **data protection, cybersecurity standards**, and industry collaboration.

Significance

- Strengthens **Atmanirbhar Bharat** in cybersecurity.
- Builds **skilled manpower**, indigenous tools, and future-ready defence against cyber threats.
- Enhances India's capability in securing a rapidly expanding digital economy.

Keywords: CSIC 1.0, MeitY, ISEA, C-DAC, DSCI, Cybersecurity Innovation, Digital Resilience.



24. DoT Issues Strict Advisory on Mandatory IMEI Registration Under New Telecom Laws



On 17 November 2025, the Department of Telecommunications (DoT) issued a strict advisory to manufacturers, brand owners, importers, and resellers, reminding them of **mandatory IMEI registration**. The advisory warns of strong penalties for **IMEI tampering** under the **Telecommunications Act, 2023** and **Telecom Cyber Security Rules, 2024**.

What is IMEI and Why Is It Regulated?

The **International Mobile Equipment Identity (IMEI)** is a unique 15-digit identifier assigned to every mobile or cellular device.

Proper IMEI management is crucial to:

- Prevent counterfeit or cloned devices
- Track stolen devices and curb cybercrime
- Protect telecom networks from security threats
- Support India's expanding digital security architecture

Devices Covered Under IMEI Rules

Any telecom device with an IMEI must comply with mandatory rules, including:

- Mobile phones
- Tablets
- Modems
- Dongles
- SIM Boxes
- IoT modules and embedded communication devices

Mandatory Registration Requirements

As per the **Telecom Cyber Security Rules, 2024**:

- Manufacturers must **register IMEIs** before production, sale, testing, or research use.
- Importers must ensure all IMEIs are recorded before customs clearance.
- Resellers and distributors must sell only registered IMEI devices.

Legal Penalties Under Section 42 of the Telecommunications Act, 2023

IMEI tampering or sale/possession of devices with altered identifiers is:

- A **cognizable, non-bailable** offence
- Punishable with:
 - **Imprisonment up to 3 years**
 - **Fines up to ₹50 lakh**, or both
- Repeat offenders face enhanced penalties and permanent business blacklisting.

IMEI Blacklist & Second-Hand Device Compliance

- The government maintains a **central IMEI blacklist** of tampered/stolen devices.
- Second-hand sellers must verify IMEIs using the **national database** prior to any transaction.
- Telecom networks can auto-block blacklisted IMEIs, preventing misuse.



HOT Question "India's digital security architecture increasingly depends on strong device-level regulation. Evaluate how IMEI governance under the Telecommunications Act, 2023 enhances cyber safety, and identify gaps that still need policy attention."



25. Red Fort Blast Triggers National Debate on Rising White-Collar Terrorism in India



The recent Red Fort car blast investigation revealed the alleged involvement of multiple medical professionals, reigniting concerns about a growing trend of **white-collar terrorism** – where educated individuals use their expertise to plan, support, or execute terror activities.

What is White-Collar Terrorism?

White-collar terrorism refers to **educated professionals** – such as doctors, engineers, IT specialists, researchers, or financial experts – using their professional knowledge, legal status, and clean public image to facilitate or participate in terrorism.

Keywords: *clean skins, insider threat, digital radicalisation, urban anonymity, self-funded terror, professional enablers.*

Why Professionals Are Increasingly Drawn into Terror Modules

1. Veil of Respectability

High social standing allows operatives to operate openly, rent facilities, or procure materials without suspicion.

2. Clean Financing

White-collar incomes enable self-funding, reducing reliance on hawala networks and bypassing financial surveillance.

3. Urban Anonymity

Metro cities provide privacy, multiple residences, and ease of movement – making detection harder.

4. Digital Radicalisation

Encrypted online platforms, private chat rooms, and extremist echo chambers allow self-radicalisation without physical networks.

Core Challenges Posed by White-Collar Terrorism

1. Profiling Limitations

Traditional anti-terror profiling relies on behavioural or socio-economic markers, which do not apply to highly integrated professionals.

2. Financial Blind Spots

Self-funded attacks evade detection by Financial Intelligence Units as transactions appear legitimate.

3. Deradicalisation Gaps

Current rehabilitation models focus on economic distress and social vulnerability, not ideology-driven professionals.

4. Insider Threats

Professionals embedded in hospitals, labs, IT systems, transport networks, or universities may misuse privileged access for reconnaissance or sabotage.



HOT Question: “White-collar terrorism represents a new frontier of internal security threats in India. Analyse the structural vulnerabilities that enable such actors, and suggest reforms in detection, digital surveillance, and deradicalisation.



NOVEMBER 2025

ECONOMY

1. India's \$30 Trillion Economy Projection
2. World's First \$5 Trillion Company
3. 16th Finance Commission Report
4. MoSPI's New CPI Framework for Inclusive Price Indexing
5. India's Retail Inflation & CPI Historic Low of 0.25%
6. IMF Gives India 'C' Rating for GDP Data
7. India's Trade Deficit Surge
8. Indian Household Debt Rising Faster than Assets
9. India's Highest-Ever Foodgrain Production
10. SEBI Warns Against Digital Gold Investments
11. SEBI Proposes Overhaul of BSDA Eligibility Rules
12. Supreme Court Allows Reassessment of AGR Dues
13. India's Push for Large, Globally Competitive Banks
14. Mandatory 'Country of Origin' Filter on E-commerce
15. India's Development Cooperation & South-South Leadership
16. Export Promotion Mission
17. Credit Guarantee Scheme for Exporters
18. India's Fortified Rice Kernel Export to Costa Rica
19. New Special Economic Zones (SEZ) Norms for Exporters
20. US Tariffs Impact on India
21. India's Electronics Export Surge
22. Rationalizing Royalty on Critical Minerals
23. Rare Earth Permanent Magnet Manufacturing Scheme
24. China's Rare Earth Export Restrictions
25. Tungsten Mining in Andhra Pradesh
26. Deendayal Antyodaya Yojana – NRLM
27. India's Urea Consumption Hits Highest-Ever Levels
28. Adam Chini Rice – BHU Develops 23 Mutant Varieties
29. Surge in Quarrying After Sand Mining Ban
30. Agriculture and Carbon Markets
31. Draft Shram Shakti Niti 2025
32. MGNREGS Work Demand Falls Across States
33. PLFS Quarterly Bulletin (Jul-Sep 2025)
34. Indian Railways Uniform Freight Policy
35. National Industrial Classification (NIC) 2025
36. Tex-RAMPS Scheme
37. India to Open Civil Nuclear Power Sector to Private Firms
38. Draft Guidelines for UCG Mining & Mine Closure Plan, 2025
39. First Real-Time Black Spot Data Using e-DAR & iRAD
40. Digital Personal Data Protection (DPDP) Rules, 2025
41. SARAL SIMS for easy steel-import registration.
42. New Digital System for Public Distribution Systems
43. IndQA Benchmark Launched by OpenAI
44. Makhananomics
45. Enshittification
46. Water Budgeting in Aspirational Blocks
47. Amul & IFFCO Top Global Cooperatives



1. India's \$30 Trillion Economy Projection

The Commerce & Industry Minister stated that India could become a **\$30 trillion economy in 20-25 years**, though RBI and historical data show the timeline depends heavily on **nominal GDP growth** and the **rupee-dollar exchange rate**.

Understanding the Projection

- Economic size measured via **Nominal GDP in USD** = domestic output + USD conversion effect.
- Two determinants:
 - **Nominal GDP growth (in ₹)**
 - **Rupee-dollar exchange rate**

Historical Trends

- **25-year trend (2000-2024):**
 - Nominal GDP CAGR: **11.9%**
 - Rupee depreciation CAGR: **2.7%**
 - Outcome: India can reach **\$30 trillion by ~2048** (≈25 years).
- **Recent 11-year trend (2014-2025):**
 - Nominal GDP growth slowed to **10.3%**
 - Rupee depreciation accelerated to **3.1%**
 - Revised timeline: **2055**, nearly a **decade later**.

Factors Influencing the Projection

- **Exchange Rate Volatility:** A stable/stronger rupee speeds up dollar-denominated GDP; continuous depreciation delays the target.
- **Growth Moderation:** Emerging economies slow over time — India must sustain high growth through manufacturing, services, infrastructure.
- **Structural Reforms:** Ease of Doing Business, labour reforms, tech adoption, logistics upgrades, and high investment rates are crucial.
- **Macroeconomic Stability:** Low inflation, prudent fiscal management, and strong financial sector health determine long-term growth.

Compounding Effect: Small changes in decade-level growth drastically shift long-term economic size due to exponential compounding.



UPSC Relevance: Growth projections, nominal vs real GDP, exchange rate effects, structural reforms, macroeconomic risks — relevant for **GS-III Economy, Prelims, and Essay**.



2. World's First \$5 Trillion Company



Nvidia has become the **world's first company** to achieve a **market capitalization of \$5 trillion**.

Core Business: A global leader in **graphics processing units (GPUs)**, vital for large language models (LLMs) and data centres.

Strategic Partnerships:

- Collaborating with **Nokia** on **AI-enabled 5G-6G networks**.
- Working with the **US government** to build **seven AI supercomputers**, underscoring the expanding dependence on AI-driven computing.

GPU Technology:

- Composed of **thousands of processors** operating simultaneously to render **images and videos**.
- Equipped with **parallel processing capabilities**

3. 16th Finance Commission Report



The **16th Finance Commission (2026–31)**, chaired by **Dr Arvind Panagariya**, submitted its report to President Droupadi Murmu on 17 Nov 2025, after receiving a one-month extension. The recommendations will **apply for five years starting 1 April 2026**, succeeding the **15th FC (2021–26)** headed by **N.K. Singh**.



4. MoSPI's New CPI Framework for Inclusive Price Indexing



The Ministry of Statistics and Programme Implementation (MoSPI) has proposed significant changes to the **Consumer Price Index (CPI)** methodology to make the **housing inflation index more accurate and representative**, especially by including rural housing data for the first time.

Background

- Housing has a **21.67% weight in urban CPI** and **10.07% in all-India CPI**.
- Current methodology uses only **urban rents**, often relying on **HRA of government employees** – a poor proxy for actual market rents.
- Economists have criticised this system for failing to capture real rental conditions, particularly in **small towns and rural areas**.

Key Proposed Reforms

1. Rural Housing Data Included

- CPI will now measure housing inflation in **both urban and rural areas**.
- Based on **HCES 2023-24**, which collects actual rents and **imputed rent** for owner-occupied homes.

2. Exclusion of Employer-Provided Housing

- Government/PSU employer-provided dwellings and HRA-linked rents to be **removed** to avoid distorted inflation readings.

3. Monthly Rent Collection (Instead of Six-Monthly)

- All sampled dwellings will now report **monthly rent data**, improving inflation sensitivity and real-time accuracy.

4. Expanded Sample + IMF-backed Methodology

- Incorporates IMF technical advice for **panel-based, consistent rent tracking**, reducing bias and enhancing statistical reliability.



UPSC Relevance: Inflation measurement, statistical reforms, CPI methodology changes, HCES data use, and IMF consultation – important for **GS-III Economy, Prelims, and Mains (Inflation & Price Stability)**.

5. India's Retail Inflation & CPI Historic Low of 0.25%



India's **retail inflation** dropped to a record low of 0.25% in October 2025, driven by GST rate reductions and a sharp correction in key food items. The **Consumer Food Price Index (CFPI)** registered **-5.02%**, while rural India witnessed deflation for the first time.

Key Findings: Retail Inflation – October 2025

1. Headline Inflation

- CPI inflation: **0.25% (YoY)** – lowest since the CPI series began.
- CFPI: **-5.02%**, led by declines in vegetables, cereals, pulses, and edible oils.

2. Rural-Urban Divergence

- **CPI-Rural:** -0.25% (India's first rural deflation episode).
- **CPI-Urban:** 0.88% (down from 1.83% in September).

3. Core Inflation (Non-food, Non-fuel)

- Stable at **~4.4%**, influenced by elevated prices of **gold and silver** due to global market volatility.

About the Consumer Price Index (CPI)

- CPI tracks changes in **retail prices** of a representative consumption basket.
- Published by **NSO** (CPI-R, CPI-U, CPI-Combined).
- Labour Bureau publishes **CPI-IW, CPI-AL, CPI-RL** for wage indexation.

Technical Features

- **Base Year:** 2012 (to be revised to 2024).
- **Formula:** Modified **Laspeyres** index (fixed-base).
- **Coverage:** Prices from **1,181 villages** and **1,114 urban markets**.
- **Frequency:** Monthly index; perishables collected weekly.

Major CPI Groups (6): www.educasiumiasacademy.com

1. Food & Beverages
2. Pan-Tobacco-Intoxicants
3. Clothing & Footwear
4. Housing
5. Fuel & Light
6. Miscellaneous (transport, health, education, etc.)

Weight Structure

- Food highest in **CPI-Rural (54.18%)** and **CPI-Combined (45.86%)**.
- Miscellaneous highest in **CPI-Urban (29.53%)**.

Policy Role

- **CPI-Combined** is the **official inflation indicator** under the **Flexible Inflation Targeting (FIT)** framework of the **RBI Act, 1934**.



6. IMF Gives India 'C' Rating for GDP Data



IMF graded India's national accounts 'C', the **second-lowest** rating in its Data Quality Assessment Framework (DQAF). Used globally to benchmark credibility of national statistics

Grade	Meaning	Transparency & Serviceability	Example Countries
A	Advanced – "A = Advanced" Fully meets global statistical standards; highly professional systems	Very high transparency, detailed disclosures; very timely releases, strong revision policy	USA, UK, Japan, Germany, Australia
B	Basic but Acceptable – "B = Basic but OK" Meets most standards with minor gaps	Mostly transparent; generally timely but occasional delays; moderate public metadata	Brazil, South Africa, Malaysia, Turkey
C	Compromised – "C = Compromised" Partially meets standards; noticeable methodological weaknesses	Limited transparency; irregular updates; weak revision documentation	Bangladesh, Sri Lanka, Egypt, Vietnam
D	Deficient – "D = Deficient / Dysfunctional" Does not follow required standards; serious data quality issues	Very low transparency; severe delays; data may be missing or politically restricted	Afghanistan, Sudan, Somalia, North Korea

Key Issues in India's GDP & National Accounts

- **MCA-21 Dependence:**
 - GDP heavily relies on company filings.
 - Only ~65% firms file complete returns on time → incomplete datasets.
- **Informal Sector Under-coverage:**
 - Contributes 45%+ of GVA but measured via **extrapolated ratios**, not direct surveys.
- **Survey Lags:**
 - Major surveys delayed or unreleased.
 - Example: **Consumer Expenditure Survey 2017-18** withheld → weak consumption estimates.
- **Outdated Base Year (2011-12):**
 - Does not capture post-2020 digital economy, services, platform economy.

Leads to **distorted price deflators** and real GDP estimates.



7. India's Trade Deficit Surge



Trade deficit jumps 141% to \$21.8 bn in Oct 2025 due to weak merchandise exports and surging gold-silver imports.

Key Highlights

- Trade deficit: **\$21.8 bn**, up from **\$9.05 bn** (Oct 2024).
- Merchandise exports: $\downarrow 11.8\%$.
- Services exports: $\uparrow 11.9\%$ (major cushion).
- Apr-Oct 2025 overall exports: $\uparrow 4.8\%$.
- Q1 & Q2 exports: **Highest-ever**, driven by IT & GCC exports.

Why the Deficit Widened

- **U.S. Tariff Shock:**
 - U.S. **50% tariffs** cut India's merchandise exports.
 - Exports to U.S.: $\downarrow 20.4\%$ (Sept 2025).
- **Festive Metal Surge:**
 - Gold imports: $\uparrow 200\%$ (Dhanteras-Diwali).
 - Silver imports: $\uparrow 530\%$.
- **Labour-Intensive Sectors Hit:**
 - Gems & jewellery: $\downarrow 29.5\%$.
 - Leather: $\downarrow 15.7\%$.
- **Merchandise vs Services Gap:**
 - Services booming (+11.9%) while goods shrinking (-11.8%).
- **Currency Hedge Buying:**
 - Investors bought more gold due to rupee volatility.

Way Forward

www.educasiumiasacademy.com

- **Resolve U.S. Tariffs:**
 - Fast-track bilateral negotiations to restore export access.
- **Diversify Markets:**
 - Expand into ASEAN, Africa, Latin America.
 - Use **TIES** for export-linked infrastructure.
- **Support Labour-Intensive Sectors:**
 - Raise **RoDTEP** rates for textiles, leather, chemicals.
- **Manage Festival Metal Imports:**
 - Use calibrated duty/quantity norms (Turkey-style gold quota).

8. Indian Household Debt Rising Faster than Assets



RBI's comparison of **FY 2019–20 vs FY 2024–25** reveals a widening **debt-asset imbalance**, with households borrowing more rapidly than they are saving or investing.

- **Debt-Asset Gap:** Financial liabilities up **102%**, while asset creation rose only **48%** since FY20.
- **GDP Ratios:**
 - Household financial assets: **12% → 10.8%** of GDP.
 - Household liabilities: **3.9% → 4.7%** of GDP.
- **Net Savings:** At a **five-decade low**, indicating consumption-driven borrowing replacing traditional savings.
- **Asset Mix:**
 - Bank deposits: **32% → 33.3%** (marginal rise).
 - Mutual funds: **2.6% → 13.1%** (sharp increase).
 - Currency holdings: **11.7% → 5.9%** (decline).
 - Insurance, PF, pensions, small savings → **largely unchanged**.
- **Borrowing Pattern:** Rise attributed to housing loans, personal loans, and consumption credit.

IMPLICATIONS

- **Household Financial Stress:** Higher EMIs reduce disposable income and raise vulnerability to job loss, interest-rate hikes, inflation.
- **Weak Long-Term Security:** Lower savings reduce retirement preparedness, wealth creation, and economic resilience.
- **Macroeconomic Risks:**
 - Lower household savings → reduced domestic capital formation.
 - Rising household debt → potential systemic risk for lenders in case of income shocks.



UPSC Relevance: Savings-investment trends, household balance sheets, macroeconomic stability, financial inclusion, RBI data analysis – relevant for **GS-III, Prelims, and Economic Survey-linked questions**.



9. India's Highest-Ever Foodgrain Production (2024–25) – 357.73 Million Tonnes



India has recorded its **highest-ever foodgrain production** in 2024–25, reflecting **~8% growth** over the previous year and marking the strongest agricultural expansion phase in a decade.

Key Highlights of the Record Output

1. Total Foodgrain: 357.73 MT

- Increase of **106 MT** since 2015–16.

2. Rice: 1501.84 lakh tonnes

- **Rise of 123.59 lakh tonnes** over 2023–24.
- Best-ever rice output in India's history.

3. Wheat: 1179.45 lakh tonnes

- Higher by **46.53 lakh tonnes** versus the previous year.

4. Pulses: 256.83 lakh tonnes

- Driven by:
 - **Chickpea (Chana): 111.14 lakh tonnes**
 - **Moong: 42.44 lakh tonnes**

5. Coarse Cereals: 639.21 lakh tonnes

- **Maize alone: 434.09 lakh tonnes.**

6. Oilseeds: 429.89 lakh tonnes

- Supported by:
 - **Soybean: 152.68 lakh tonnes**
 - **Groundnut: 119.42 lakh tonnes**

7. Sugarcane: 4546.11 lakh tonnes

8. Fibre Crops

- **Cotton: 297.24 lakh bales**

Jute: 88.02 lakh bales

Drivers Behind the Record Production

1. MSP Support & Procurement Expansion

- Boosted farmer confidence → higher acreage.
- Schemes:
 - ✓ **PM-AASHA**,
 - ✓ **Price Stabilisation Fund**,
 - ✓ Aggressive tur-urad-chana procurement.

2. Mission-Mode Productivity

- Dedicated crop missions accelerated yield increases:
 - **Self-Reliance in Pulses Mission**
 - **National Mission on Oilseeds & Oil Palm (NMOOP)**

3. Improved Technology Adoption

- Widespread use of:
 - Hybrid seeds
 - Biofertilisers
 - **Drone-based nutrient spraying**
 - Better seed-treatment practices
- Supported by: **Sub-Mission on Seeds & Planting Material (SMSP)**.

4. Water Management Gains

5. Successful Crop Diversification

6. Favourable Monsoon Distribution



10. SEBI Warns Against Digital Gold Investments



SEBI issued a **public advisory** warning investors not to invest in **digital gold/e-gold** sold through online platforms, as these products remain **completely unregulated** and outside SEBI's jurisdiction.

What is Digital Gold?

- Online purchase of gold without physical possession; value mirrors physical gold prices.
- Allows buying/selling in small quantities and later converting to physical gold.
- Often marketed through fintech apps and sometimes linked with blockchain-based storage claims.

Why Did SEBI Issue a Warning?

- Several platforms are promoting digital gold as a “safe investment” despite **no regulatory oversight**.
- Digital gold is **neither a security nor a commodity derivative**, hence not covered under SEBI laws.

Risks for Investors

- **Unregulated Product:** No grievance redressal, no investor protection framework.
- **Counterparty Risk:** Entirely dependent on the platform's credibility; insolvency = total loss.
- **Operational Risks:** Fake vaulting claims, mismanagement, price manipulation, platform shutdowns.
- **No Transparency:** No mandatory audits, uniform pricing, or disclosure standards.
- **Misleading Marketing:** Influencer-driven promotion hides inherent risks.

SEBI-Approved Safe Alternatives

- **Gold ETFs:** Exchange-traded, SEBI-regulated, backed by physical gold.
- **Sovereign Gold Bonds (SGBs):** RBI-issued; offer fixed interest + capital appreciation.
- **Electronic Gold Receipts (EGRs):** Exchange-tradeable receipts backed by actual gold.
- **Gold Commodity Derivatives (MCX/NSE):** Regulated exposure with clearing guarantees.



UPSC Relevance: Financial regulation, investor protection, fintech governance, role of SEBI, and comparison of regulated vs unregulated investment products – relevant for GS-III Economy, Prelims, and Essay.



11. SEBI Proposes Overhaul of BSDA Eligibility Rules to Enhance Investor Protection



On 25 November 2025, SEBI released a **draft circular** proposing changes to the eligibility norms for **Basic Services Demat Accounts (BSDA)** to empower small investors, ensure fair valuation, and expand financial inclusion.

Key Proposals by SEBI (2025)

1. Exclusion of ZCZP Bonds

- **Zero-Coupon Zero Principal (ZCZP) Bonds** – instruments with **no coupon payment or principal redemption** – will be **excluded from BSDA eligibility calculations**.
- **Rationale:** Their valuation is complex and may distort the true value of a small investor's holdings.

2. Delisted = Suspended Securities

- SEBI proposed **treating delisted securities at par with suspended securities** for BSDA valuation.
- **Reason:** Both exhibit **very low liquidity**, no transparent price discovery, and uncertain monetisation.

3. Comprehensive Review Underway

SEBI is reviewing:

- BSDA eligibility criteria
- Conversion of existing accounts to BSDA
- Applicable account charges
- Valuation rules for thinly traded or illiquid securities

4. Objective of Reforms

- **Financial Inclusion:** Simplify access to demat accounts for low-income and new investors.
- **Investor Protection:** Prevent overvaluation of dormant or illiquid securities.
- **Fair Valuation:** Align BSDA norms with investor risk, reducing unintended exclusions.

About Basic Services Demat Account (BSDA)

- Introduced by SEBI in **2012** to make demat services affordable.
- Designed for **small/first-time investors** with limited market exposure.

Key Features (Current Framework)

- **No annual maintenance charge (AMC)** for holdings up to ₹50,000.
- **Low AMC** for holdings up to ₹2 lakh.
- Only **one BSDA** allowed per investor across all DP accounts.
- Intended to promote **equity participation** among low-income households.



UPSC Relevance: BSDA, ZCZP bonds, delisted securities, suspended securities, investor protection, SEBI regulations, financial inclusion.



12. Supreme Court Allows Reassessment of AGR Dues



Supreme Court permitted **full reassessment** of Vodafone Idea's AGR dues up to FY 2016-17. Reassessment includes **principal, interest, penalties**; applies **only to Vi**.

About AGR (Adjusted Gross Revenue)

- AGR = **Revenue base** used by DoT to calculate **licence fee + spectrum usage charges**.
- India shifted to **revenue-sharing model** in 1999 → operators pay a **percentage of AGR** instead of fixed licence fees.

AGR Dispute – Core Issues

DoT's View

- AGR = **Total revenue**, including
 - **Telecom income** (calls, SMS, data)
 - **Non-telecom income** (interest, dividends, rent, asset sales)

Telcos' View

- AGR should include **only core telecom revenue**; exclude non-telecom income.

Key Judgements

EDUCASIUM IAS Academy
EPIC UPSC Classes

- **2019 SC Ruling:**
 - Upheld DoT's **broad definition** of AGR.
 - Directed telcos to pay **full dues based on total revenues**.
- **2025 SC Ruling:**
 - Allowed **reassessment of Vi's dues only**.
 - Does **not** reopen the AGR case for other operators.



13. India's Push for Large, Globally Competitive Banks



Finance Minister: Govt + RBI working on a framework to build **large, globally competitive banks**. Follows earlier rounds of **PSB consolidation** (2017-2020).

Why India Needs Big Banks?

1. Global Financial Scale

- India expected to reach **\$7 trillion GDP by 2030** (IMF).
- Large banks needed to fund **mega infrastructure**, industrial corridors, and global-scale projects.

2. Growing Credit Demand

- Bank credit reached **₹192.19 lakh crore (Oct 2025)** – double last year's growth.
- Stronger institutions required to support **credit deepening**.

3. International Competitiveness

- No Indian bank** in the world's top 25 by market cap.
- Need stronger balance sheets for **foreign branches, acquisitions, and global operations**.

4. Private Capex Revival

- Post-GST and PLI-driven recovery → demand for financing **manufacturing, renewable energy, digital infrastructure**.

5. Benefits of Past Consolidation

- SBI associates merger; Vijaya + Dena + BoB; 10 PSBs → 4 (2020).
- Result: **better capital adequacy**, unified tech platforms, improved governance.
- Provides a base for creating **large universal banks**.



14. Mandatory 'Country of Origin' Filter on E-commerce Platforms

- The Ministry of Consumer Affairs has released the **Draft LM (Packaged Commodities) (Second) Amendment Rules, 2025** for stakeholder comments.
- This follows the **First Amendment Rules, 2025** (October 2025), which aligned labelling norms for packaged medical devices with the **Medical Devices Rules, 2017**.

Key Features of the Second Amendment Rules, 2025

1. Mandatory "Country of Origin" Filters on E-Commerce Platforms

- E-commerce platforms must provide a **searchable and sortable filter** clearly showing the **country of origin** for every packaged product sold online.
- Especially required for **imported products**, allowing users to identify origin before purchase.

2. Legal Provision : The rule will be added under **Rule 6(10)** of the **Legal Metrology (Packaged Commodities) Rules, 2011**.

3. Objective : Strengthen **consumer empowerment**, transparency and informed decision-making. Helps buyers distinguish between **Indian and imported goods**, especially in competitive categories.

4. Wider Impact : Supports Indian MSMEs and artisans facing competitive pressures – particularly after the **U.S. doubled tariffs on select Indian goods to 50% (effective 27 August 2025)**.

Background: Legal Metrology (Packaged Commodities) Rules, 2011

Issued under the **Legal Metrology Act, 2009**, they regulate:
Labelling, Price declarations, Quantity accuracy, Consumer protection against deceptive packaging

Dual MRPs (multiple prices on the same product) are **prohibited**.

Enforcement: State Legal Metrology Departments + Department of Consumer Affairs.

Offers grievance redressal for violations.

Key Features of the First Amendment (October 2025)

- Harmonised labelling requirements for **packaged medical devices**.
- Removed duplication between:
 - Legal Metrology (Packaged Commodities) Rules, 2011
 - Medical Devices Rules, 2017
- Ensures **uniform compliance** and simplifies regulation for manufacturers.

15. India's Development Cooperation & South-South Leadership

India has transitioned from a major aid recipient to a **leading development partner**, strengthening **South-South Cooperation (SSC)** through grants, capacity-building, and digital public goods.

Current Status of India's Development Cooperation

1. India-UN Development Partnership Fund

- **Established:** 2017 under UNOSSC.
- **Commitment:** US\$150 million over 10 years.
- **Coverage:** 85+ projects in 65 countries, especially LDCs, LLDCs, SIDS.
- **Themes:** Renewable energy, digital governance, climate-resilient farming, women enterprises, ecosystem restoration.

2. India-UN Global Capacity-Building Initiative (2025)

- Focus on **training, institutional learning, and knowledge exchange**.
- Complements the grant-based project funding of the Partnership Fund.

3. Demand-Driven Model

- Projects are **proposed by partner governments** → ensures **ownership & alignment with national priorities**.

4. Implementation

- Execution through **UN agencies** → transparency, monitoring, scalability.

5. Institutional Anchor

- UNOSSC: UN Office for South-South Cooperation promotes SSC + triangular cooperation worldwide.

Significance of India's Distinct SSC Model

www.educasiumiasacademy.com

1. Blended Financing

- Mix of **grants + technical expertise** → sustainable, capacity-building oriented.

2. Knowledge Transfer

- Exports India's own strengths:
 - **Digital Public Infrastructure (DPI):** UPI, Aadhaar, DigiLocker
 - **Renewable energy missions**
 - **Agritech, women-led SHG enterprises**

3. Global Credibility & Recognition

- India's SSC Fund endorsed during **G20 Presidency (2023)** as a model of **equitable, evidence-based partnership**.

4. Values-Based Approach

- Guided by **Vasudhaiva Kutumbakam - "One Earth, One Family, One Future."**
- Prioritises **solidarity over conditionalities** (unlike many traditional donors).

www.educasiumiasacademy.com



16. Export Promotion Mission



The Union Cabinet has approved the **Export Promotion Mission (EPM)** – a flagship central sector scheme under the Ministry of Commerce – to create a unified, flexible, and digital framework to strengthen India's export competitiveness. The mission is aligned with India's goal of reaching **USD 2 trillion in exports by 2030**.

About the Export Promotion Mission (EPM)

- A **central sector scheme** announced in the **Union Budget 2025-26**.
- Nodal Implementing Agency: **Directorate General of Foreign Trade (DGFT)**.
- Duration: **FY 2025-26 to FY 2030-31**.
- Financial Outlay: **₹25,060 crore**.
- Target Outcomes:
 - Raise India's total exports to **USD 2 trillion by 2030**.
 - Increase the **export-to-GDP ratio to 15%**.

Core Features of the EPM

1. Scheme Consolidation & Simplification

- Integrates fragmented schemes like:
 - **Interest Equalisation Scheme (IES)**
 - **Market Access Initiative (MAI)**
- Offers a **unified support mechanism** for exporters.

2. Digital & Outcome-Oriented Framework

- A dedicated **digital portal** for end-to-end online submissions and disbursals.
- Data-driven monitoring to track exporter performance, utilisation, and impact.

3. Priority Focus

- Special emphasis on **MSMEs, new exporters, and labour-intensive sectors** such as:
 - Textiles
 - Gems & Jewellery
 - Leather
 - Marine Products
- Encourages risk diversification and global market penetration.

Components of the Mission

A. NIRYAT PROTSAHAN (Financial Support)

- Objective: Reduce the **cost of trade finance** and improve access to credit.
- Tools Provided:
 - **Interest subvention**
 - **Collateral-free credit guarantees**
 - **Export factoring support**
- Benefits MSMEs facing high capital costs.

B. NIRYAT DISHA (Non-Financial Support)

Objective: Improve exporters' **market readiness and competitiveness**.

Support Areas:

- Quality certification
- Branding & packaging
- International trade fairs & buyer-seller meets
- Warehousing and logistics support
- Inland transport reimbursements.”



17. Credit Guarantee Scheme for Exporters



About the Scheme

- **Launched by:** Ministry of Finance
- **Objective:** Boost global competitiveness of Indian exporters and support market diversification.

Coverage: Provides a **100% credit guarantee** to **Member Lending Institutions (MLIs)** for additional credit extended to exporters.

Key Features

- **Collateral-Free Credit:** Up to **₹20,000 crore** credit support for eligible exporters, including **MSMEs**.
- **Implementing Authority:**
 - **Department of Financial Services (DFS)**
 - Through **National Credit Guarantee Trustee Company Ltd (NCGTC)**
- **Purpose:** Reduce risk for banks, improve credit flow, and reduce dependence on collateral-heavy loans.

Significance

- Strengthens India's progress toward the **USD 1 trillion export target**.
- Enhances the Aatmanirbhar Bharat vision by supporting small exporters.

Eases credit bottlenecks and increases liquidity in export-focused sectors.

India's Export Landscape

EDUCASUM IAS Academy

EPIC UPSC Classes

- **Record Exports:** USD **824.9 billion** in FY 2024–25 (~21% of GDP).
- **Employment Impact:** Export-linked sectors employ **45 million+** people.
- **Export Composition:**
 - **Services:** 46.91% of total exports.
 - **MSMEs:** Nearly **45%** of total exports.
- **Global Standing:**
 - **7th** in commercial services exports.
 - **2nd** in telecom, computer & information services exports.



18. India's Fortified Rice Kernel Export to Costa Rica



APEDA enabled India's first-ever export of FRK from Chhattisgarh to Costa Rica.

About Costa Rica

- Central American nation; borders: **Nicaragua (N), Panama (SE), Pacific Ocean (W), Caribbean Sea (E)**.
- Capital: **San José**; Language: **Spanish**.

Fortified Rice Kernels (FRK) - Key Facts

- **Definition:** Reconstructed rice grains made from **rice flour + micronutrients** (iron, folic acid, vitamin B12).
- **Purpose:** Combat **hidden hunger**, especially **anaemia** in rice-consuming populations.
- **Production:**
 - **Hot extrusion** → rice flour + nutrients mixed, cooked, and shaped into grain-like kernels.
- **Blending Ratio:** 1:100 (FRK : regular rice).
- **Mandated Nutrients (FSSAI):**
 - **Iron, Folic Acid, Vitamin B12** (mandatory).
 - Zinc, Vitamin A, other B-vitamins (optional).
- **Regulation:** Governed by **Food Safety and Standards (Fortification of Foods) Regulations, 2018**.

www.educasiumiasacademy.com

www.educasiumiasacademy.com



19. New Special Economic Zones (SEZ) Norms for Exporters

Why in News?

- Govt panel (Commerce Ministry + NITI Aayog + exporters) drafting new SEZ rules allowing:
 - Limited domestic sales, and
 - Reverse job work (SEZ units doing job-work for DTA firms)
- Aim: Boost low SEZ utilisation and revive competitiveness.



What is Reverse Job Work?

- SEZ units provide manufacturing services to DTA companies.
- Helps use idle capacity when export orders dip.

Current SEZ Performance (India)

- Exports: \$172 bn in FY25 (~30% of India's exports)
- Operational SEZs: 276
- Domestic Sales Cap: Only 2% of output
- Declining Units: Gems & Jewellery units fell 500 → 360 (2018–2022)
- FDI: < 3% of India's total FDI
- R&D: Only 4/14 surveyed units invested in R&D
- DESH Bill: Still pending

Problems with Outdated SEZ Norms

- Export slowdown: <4% YoY growth
- Idle capacity: 25–30% unused
- Global competition: Vietnam attracts 3x more FDI
- Revenue loss: ₹2,800 crore annual shortfall
- De-notification: 35+ units exited since 2023
- Employment hit: 12,000 job losses in Gems & Jewellery SEZs

Key Challenges

- Restricted DTA access → limits sales during export dips
- High US dependence: 40% exports; facing 10–25% US tariff barriers
- Loss of incentives: Section 10AA withdrawn; MAT + DDT imposed
- Skill gap: Only 28% firms get tech training
- Weak FDI: Just 3% of India's inflows
- Rising raw material imports: Gold, diamonds +12% YoY; exports stagnant

Way Forward (Crisp Recommendations)

- Reverse Job Work: Allow domestic subcontracting with fair-duty rules
- Duty Neutrality: Align SEZ-DTA tax treatment (Malaysia model)
- R&D/Skill Boost: Launch SEZ Innovation & Skill Mission
- Digital Processes: Integrate with National Single Window System
- FDI Promotion: Investment treaties + global branding
- Performance-based Incentives: Link benefits to exports, jobs, value-addition, not blanket tax holidays



20. US Tariffs Impact on India

Context



- From **August 2025**, the US imposed:
 - 50% tariff** on select Indian goods.
 - 25% penalty** on India's Russian oil purchases.
 - Additional 25% import duty** on specific categories.

Major Impacts on India

Trade Effects

- Exports fell sharply:**
 - October: **-9%**
 - September: **-12%**
 - Overall: **-11.8%**
- Trade deficit hit all-time high: \$41.68 billion (Oct 2025)** due to high gold imports + falling exports.
- India's trade surplus with the US shrank by 54%.**

Sectoral Stress

- Loss of price competitiveness vs **ASEAN + China**.
- Key declines (Oct 2025):
 - Engineering goods:** -16%
 - Textiles & apparel:** -8.34%
 - Gems & jewellery:** -25%

Sectoral Resilience

EDUCASIUM IAS Academy

- Electronics exports up 25%.**
- Pharmaceuticals** continued stable growth.

Domestic Relief Measures (Government Response)

- Export Promotion Mission (EPM):** ₹25,060 crore (2025–30) to boost export capability & competitiveness.
- Credit Guarantee Scheme for Exporters (CGSE):** ₹20,000 crore collateral-free credit support.
- RBI Moratorium:** 4-month freeze on loan repayment + interest for affected exporters.
- QCO Rollback:** Quality Control Orders on chemical intermediaries withdrawn to cut compliance costs.



21. India's Electronics Export Surge (FY2024–25 & FY2025–26)



Status: Electronics emerged as India's third-largest export category, driven by PLI schemes, policy reforms, and global supply-chain diversification.

Performance:

- Exports crossed \$40 billion in FY25.
- **\$22.2 billion in H1 FY26**, marking a **41.9% YoY growth**.

Significance: Electronics have become a **new frontier of India's export growth**.

Electronics Export Overview

Rapid Rise: Share in total exports rose to **10.1% (FY26 H1)** from **3.5% (FY17)**.

Rank Progression: 8th (FY17) → 6th (FY22) → **Top 3 by FY25**, surpassing **gems, pharma, textiles**.

Major Market: U.S. remains the largest destination; exports to U.S. grew **100%**, aided by **50% tariff exemption**.

Comparative Growth:

- Electronics exports **doubled** vs FY20–FY24 average.
- Engineering goods ↑20.1%, Pharma ↑24.1%.

Dominant Segment: **Telecom equipment (mainly smartphones)** accounted for **64.1% of electronics exports (FY25)**, up from **51% in FY23**.

EDUCASIUM IAS Academy
EPIC UPSC Classes

www.educasiumiasacademy.com

www.educasiumiasacademy.com



22. Rationalizing Royalty on Critical Minerals



The Union Cabinet has approved **revised royalty rates** for Graphite, Caesium, Rubidium, and Zirconium under the **MMDR Act, 1957**, enabling their auction as critical mineral blocks. India aims to strengthen domestic supply chains crucial for green energy and advanced technologies.

Revised Royalty Rates (2025)

Mineral	Revised Royalty Rate
Caesium	2% of ASP (metal content in ore)
Rubidium	2% of ASP (metal content in ore)
Zirconium	1% of ASP (metal content in ore)
Graphite	2% of ASP ($\geq 80\%$ fixed carbon) 4% of ASP ($< 80\%$ fixed carbon)

Significance of the Royalty Revision

1. Promotes Auctions & Valuation

Standardised rates enable transparent valuation, helping states auction critical-mineral blocks efficiently.

2. Enhances Domestic Supply & Self-Reliance

- India imports $\sim 60\%$ of its graphite demand.
- Revised royalties incentivise exploration and reduce foreign dependence.

3. Supports High-Tech Sectors

- Graphite:** EV batteries, anodes
- Zirconium:** Nuclear reactors, aerospace
- Caesium:** Atomic clocks, GPS, drilling fluids
- Rubidium:** Telecom, fibre optics, biomedical applications

4. Employment & Regional Development

Exploration and mining of critical minerals support DMF-funded welfare and create local jobs.

5. Green Energy Transition

Critical minerals are essential for **renewables, EVs, semiconductors, and strategic technologies**.



23. Rare Earth Permanent Magnet Manufacturing Scheme



The Cabinet cleared a 7-year national programme combining Production-Linked Incentives (PLI) and capital subsidies to create a 6,000 MTPA domestic REPM supply chain.

India currently imports almost all Rare Earth Permanent Magnets (REPMs), despite their critical role in EVs, wind turbines, defence systems, and electronics. To counter Chinese dominance (90% global share), the Union Cabinet approved a landmark scheme to build domestic REPM manufacturing capacity.

Key 4 Points

- Integrated REPM Supply Chain:** The scheme incentivises mining, refining, alloy making, and magnet production to reduce import dependence.
- 7-Year Structure:** First 2 years for plant establishment + 5 years of sales-linked incentives under Ministry of Heavy Industries.
- Strategic Significance:** Strengthens EV, renewable energy, defence and space ecosystems; crucial for Net Zero 2070 and Viksit Bharat 2047.
- National Security Angle:** Reduces reliance on China-dominated market (90% global REPM production).

Keywords (UPSC Ready)

Rare Earth Elements (REEs), NdFeB magnets, SmCo magnets, strategic minerals, EV supply chain, PLI scheme, import substitution

EPIC UPSC Classes

www.educasiumiasacademy.com

www.educasiumiasacademy.com



24. China's Rare Earth Export Restrictions



China imposed **export restrictions** on seven rare earth elements (REEs) citing **national security, non-proliferation**, and control over dual-use technologies. This has triggered global market volatility and renewed strategic concerns.

About Rare Earth Elements (REEs)

Composition

- Total 17 elements → 15 lanthanides + scandium + yttrium
- Key strategic REEs: Neodymium (Nd), Praseodymium (Pr), Dysprosium (Dy), Terbium (Tb), Yttrium (Y).

Unique Properties

- Permanent magnetism, high catalytic activity, luminescence.
- Indispensable for:
 - Wind turbines, EV motors (NdFeB magnets)
 - Smartphones, lasers, fibre optics
 - Fighter jets, missile guidance, sonar, radars
 - Catalytic converters, hydrogen storage systems

Global Production

- China controls:
 - ✓ 85-95% of refining & processing (USGS 2024)
 - ✓ ~70% of mining
- Other major sources: Australia, USA, Myanmar.

India's Position

- 5th-largest REE reserves (mainly in coastal monazite sands of Kerala, Odisha, Andhra)
- < 2% of global production due to limited downstream processing & regulatory constraints.
- Key institution: Indian Rare Earths Limited (IREL).

Impacts of China's Export Restrictions

1. Global Supply Shock

- Immediate price surge; dysprosium projected to touch \$300/kg.
- Market volatility similar to the 2010 China-Japan REE crisis.

2. Defence Sector Vulnerability

- REEs essential for:
 - Jet-engine heat-resistant alloys
 - Precision-guided munitions
 - Stealth coatings
 - Radar & sonar systems
- Western defence supply chains face strategic risk.

3. Supply Diversification Push

Japan reduced dependence on China from 90% (2010) → 60% (2023) by investing in Australia/Vietnam.

United States reviving domestic refining under the **Mineral Security Partnership (MSP)**.

EU advancing Critical Raw Materials Act (CRMA).



25. Tungsten Mining in Andhra Pradesh



Hindustan Zinc Ltd. (HZL) has been granted a **composite licence** by the Andhra Pradesh government to explore and potentially mine a *tungsten mineral block*. This is significant because **tungsten** is **one of India's most critical strategic minerals**, with limited domestic availability and a heavily China-dependent global supply chain.

What is a Composite Licence?

Under the **MMDR Act**, a composite licence gives:

1. **Prospecting licence** – rights to explore minerals; and
2. **Mining lease** – automatic right to mine *if exploration establishes commercially viable reserves*.

Thus, it accelerates discovery → extraction → production cycles.

About Hindustan Zinc Ltd. (HZL)

- World's largest integrated zinc producer.
- One of the top five silver producers globally.
- Operates **Rampura Agucha (Rajasthan)** – the world's largest underground zinc mine.
- A key player in India's critical mineral security strategy.

About Tungsten (Wolfram)

Basic Facts

- Symbol: W
- Category: **Transition metal**
- Colour: Steel-grey
- Rarity: One of the least abundant industrial metals.

Classification in India

EDUCASIUM IAS Academy

EPIC UPSC Classes

- Listed as a **Major Mineral** under the MMDR Act, 1957.
- Under **MMDR Amendment Act 2023**, tungsten is categorised as:
 - **Critical mineral**
 - **Strategic mineral**
(Part D, First Schedule)

This places tungsten on par with lithium, cobalt, and rare earths in national mining priority.



Exceptional Physical & Chemical Properties

1. Thermal Properties

- **Highest melting point of any metal:** 3422°C
- **Lowest vapour pressure** at high temperatures
→ Ideal for extreme-heat applications.

2. Mechanical Strength

- Retains **maximum tensile strength above 1650°C.**
- Pure single-crystal tungsten is **ductile** under controlled conditions.

These properties make tungsten irreplaceable in:

- rocket nozzles
- armour-piercing projectiles
- plasma-facing materials in fusion reactors

Occurrence & Global Supply

Natural Occurrence

- Found mainly in **wolframite** and **scheelite** ores.

Global Reserves & Production

- **China:**
 - 50% of global reserves
 - 80% of global output
 - Supplies ~30% of world exports

China's dominance in mining + refining makes tungsten a *geopolitical mineral*.

Other Reserve Holders : Russia, Vietnam, Canada, Austria

India's Tungsten Scenario

India has very limited high-grade reserves.

State-wise Resource Share:

- **Karnataka - 42%**
- **Rajasthan - 27%**
- **Andhra Pradesh - 17%**

India currently imports nearly all its tungsten needs, mainly from:

- China, Russia, Vietnam

Hence, domestic exploration by agencies like HZL is strategically important.

Health & Safety

- Tungsten metal is **generally non-toxic**.
- **Dust inhalation** can irritate respiratory pathways.
- **Soluble tungsten compounds** may pose higher health risks.

26. Deendayal Antyodaya Yojana – NRLM



The Ministry of Rural Development highlighted major achievements of the **Deendayal Antyodaya Yojana – National Rural Livelihoods Mission (DAY-NRLM)**, one of the world's largest poverty eradication and women-led livelihood promotion programmes.

About DAY-NRLM

- Launched in **2011** (restructured from SGSY) and renamed in **2016** to reflect **Pandit Deendayal Upadhyaya's Antyodaya philosophy**.
- **Aim:** Mobilise rural households – especially women – into **Self Help Groups (SHGs)** for financial inclusion, livelihood diversification, and social empowerment.
- **Scheme Type:** Centrally Sponsored Scheme →
 - **75:25** Centre-State sharing
 - **90:10** for NE and Special Category States

How DAY-NRLM is Transforming Rural India

1. Women-Led Mass Mobilisation

- **10 crore rural women** organised into **90 lakh SHGs**, creating the world's largest women-collective network.

2. Financial Inclusion

- SHGs accessed **₹11 lakh crore** in collateral-free bank credit.
- Repayment rate: **98%+**, reflecting strong credit discipline.

3. Community Cadres for Last-Mile Services

- **3.5 lakh Krishi & Pashu Sakhis** supporting agriculture and livestock livelihoods.
- **48,000 Bank Sakhis** offering doorstep financial services in rural areas.

4. Market Linkages

- **SARAS Aajeevika Melas** promote SHG products nationwide.

Branding & marketing support through **NIRDPR**.

5. Livelihood Diversification

Agriculture: 4.62 crore Mahila Kisans trained in climate-smart & sustainable practices.

Entrepreneurship: 3.7 lakh+ microenterprises supported under **SVEP**.

Skill Training:

DDU-GKY: 17.5 lakh trained; 11.48 lakh placed in wage jobs.

RSETIs: 56.69 lakh trained; 40.99 lakh in self-employment.



27. India's Urea Consumption Hits Highest-Ever Levels — Nearing 40 MT (FY 2025-26)



India's urea consumption is projected to **touch 40 million tonnes** in FY 2025-26 — the highest ever — raising concerns about **imbalanced fertiliser use, subsidy burden, and import dependence**.

Key Drivers Behind Rising Urea Demand

Record Consumption: 2024-25 sales reached **38.8 MT**, with rabi trends pushing consumption toward **40 MT**.

Severe Price Distortion: Urea MRP unchanged since **2012 (₹5,360/tonne; ₹5,628 after neem-coating)**. Other fertilisers cost **2-7× more**, causing farmers to **overapply urea**.

Government Interventions (limited impact):

- **Neem-coating** (2015) – reduced diversion, slowed nitrogen release.
- **45-kg bags** (2018) – disguised price rise.
- **Nano urea** (2021) – minimal effect on bulk urea demand.

Yet consumption rose from 29.9 MT (2017-18) → 35+ MT (2020-21) → 40 MT (2025-26).

Supply-Side Constraints

- **Domestic Production Plateau:**
Output fell from 31.4 MT (2023-24) → **30.6 MT** (2024-25).
- **Plant Utilisation Issues:**
Six new plants (2019-22) expanded capacity, but many run below 100% due to gas shortages & technical issues.
- **Permanent Shutdowns:** Closure of **Kakinada & Panki** units reduced effective national capacity.
- **Import Dependence Rising:**
Government wants imports capped at **10 MT**, but demand pressures may push imports beyond that.

Consequences

Subsidy Stress: India's fertiliser subsidy (₹1.75+ lakh crore annually) will rise further.

Soil Imbalance: Excess nitrogen → micronutrient depletion → stagnant yields.

Trade Deficit Worsening: Rising urea imports increase forex pressure.

Environmental Harm: Nitrous oxide emissions + groundwater contamination.

28. Adam Chini Rice – BHU Develops 23 Mutant Varieties



BHU scientists developed 23 new mutant varieties of Adam Chini rice through Mutagenesis to improve yield, height, and maturity.

Why in News?

- BHU scientists developed 23 new mutant varieties of Adam Chini rice through Mutagenesis to improve yield, height, and maturity.

Mutagenesis - Quick Definition

- Plant-breeding method using **physical/chemical mutagens** to induce useful genetic variations.
- Enhances traits **without altering core characteristics**.

About Adam Chini Rice

- Traditional aromatic black rice from eastern Uttar Pradesh.
- Known for **sugar-crystal appearance**, strong **fragrance similar to Basmati**, and premium cooking quality.
- **GI Tag (2023)** – second GI rice from UP after **Kalanamak**.

Challenges of Original Variety

- Very tall (165 cm) → prone to lodging (crop falling).
- Long maturity (155 days).
- **Low yield:** 20–23 quintals/ha.
- Limits commercial cultivation despite high domestic and export demand.

Breakthrough by BHU – Mutant Varieties

- **Reduced plant height** → e.g., Mutant-14 only 105 cm.
- **Early maturity** → e.g., Mutant-19 matures in 120 days.
- **Higher yields** → Mutant-14, 15, 19 & 20 yield 30–35 quintals/ha.
- Retain aroma, colour, and cooking characteristics of original Adam Chini.

Significance

- Enables large-scale cultivation of a premium aromatic rice.
- Strong export potential, especially to **Australia & New Zealand**, where demand is high.



29. Surge in Quarrying After Sand Mining Ban

A study shows stone quarries near protected areas expanded sharply after Kerala's **2016 river-sand mining ban**, driven by construction demand and reliance on **M-sand**.

India's Sand Mining Landscape

- Annual Demand:** ~1 billion tonnes; projected **1.77 billion tonnes by 2034**.
- Legal Status:** Sand = **minor mineral** under **MMDR Act, 1957** (Sec 3(e)).
- State Powers:** States regulate permits, extraction rules, and curb illegal mining.
- SC Rule (2012):** EC mandatory for **all minor mineral** mining, including sand.
- No National Ban:** Sand-mining bans/restrictions are **state-specific**.

Impact of Kerala's River-Sand Mining Ban

Positive Outcomes

- Habitat Recovery:** Riverbeds stabilise; fish spawning & breeding zones revive.
- Groundwater Recharge:** Sand layer improves percolation & aquifer recharge.
- Lower Turbidity:** Healthier aquatic systems; reduced water treatment costs.
- Saltwater Buffer:** Higher riverbed levels curb coastal saltwater intrusion.
- Sediment Balance:** Reduced erosion; better flood mitigation.

Negative Outcomes

- Higher Costs:** Construction delays, soaring sand prices, project escalation.
- Job Losses:** Daily-wage workers in mining & transport impacted.
- Illegal Mining:** Bans push the trade underground; criminal networks expand.
- Revenue Loss:** Lower royalty collection; increased corruption.
- Environmental Damage:** Quarry expansion near PAs → habitat loss, terrain alteration, watershed disruption, erosion.

About Manufactured Sand (M-Sand)

Definition: Artificial sand made by crushing hard rocks into fine aggregates.

Purpose: Sustainable and legal alternative to river sand.

Texture: **Angular, rough**, unlike smooth natural river sand.

Advantages:

- Uniform particle size (controlled screening).
- Free from silt, clay, organic impurities.
- Ensures consistent quality for construction.

Limitations:

- Lower workability due to angular grains.
- May require **more water or cement** in concrete mix.

30. Agriculture and Carbon Markets



Why Carbon Markets Matter for Agriculture

- **Income Source:** Farmers can earn from carbon credits by adopting climate-friendly practices; India's voluntary market potential is **US\$20–40 bn by 2030**.
- **Climate Mitigation:** Practices reduce methane/CO₂ emissions and increase soil carbon.
- **Global Market Presence:** India has **242 registered agri-food projects**, strengthening carbon-credit exports.

Major Challenges in Agri-Carbon Projects

1. Price & Market Volatility

- Carbon-credit prices vary sharply (**US\$4–200**), making investments risky.

2. Credibility & Trust Deficit

- Agricultural credits considered **low-quality** due to:
 - Reversal risks (loss of stored carbon).
 - Difficult monitoring and verification.
- Market uptake is low – only **1.9 million of 3.19 million** credits retired (2024).

3. Delayed Approvals

- Complex methodologies and verification:
 - India's AFOLU (Agriculture, Forestry, Land Use) projects take **1,689 days** for approval vs **623 days** in the rest of Asia.

4. Farmer-Level Barriers

- Fragmented landholdings.
- High cost of measurement and certification.
- Lack of transparent benefit-sharing mechanisms.

Way Forward

1. Policy Integration

- Align carbon markets with: **Green Credit Programme, State climate missions, Payment for ecosystem services**

2. Digital, Low-Cost Verification

- Use **AI-based sensors, satellite imagery, and blockchain** for:
 - Accurate monitoring,
 - Reduced cost,
 - Faster verification.
- Align methods with FAO's EX-ACT global standards.

3. Strengthen Farmer Collectives

- Empower FPOs for land aggregation, lower compliance costs.

4. Transparent Contracts & Benefit Sharing

- Standardise norms so farmers receive predictable and fair income.
- Adopt global **Payment for Environmental Services** principles.



31. Draft Shram Shakti Niti 2025



The Ministry of Labour & Employment released the **Draft Shram Shakti Niti 2025**, a landmark document to modernise labour governance and shift India toward a “**labour facilitation**” model rather than a purely regulatory one.

Key Features of Draft Shram Shakti Niti 2025

1. Universal Social Security Account (USSA)

- Central proposal: A **lifelong, portable** social security account.
- Integrates major schemes/databases:
- **EPFO, ESIC, PM-JAY, e-Shram, State Welfare Boards**
- Ensures seamless transfer of benefits as workers change jobs, sectors, or states.

2. Workplace Safety & OSH Modernisation

- Operationalises the **Occupational Safety & Health (OSH) Code 2020**.
- Integrates **AI-based risk inspections** to pre-empt hazards.
- Target: **Near-zero workplace fatalities by 2047**.

3. Future Workforce & Skill-Employment Linkage

- Converges **Skill India + PMKVY** with an enhanced **National Career Service (NCS)** portal.
- Focus: Better job matching, future skills, demand forecasting.

4. Labour & Employment Stack (Digital Backbone)

- A unified digital architecture connecting:
- Worker IDs
- Enterprise databases
- Social security entitlements
- Designed to function as **Employment DPI**, similar to UPI/ABDM logic.

5. Women's Labour Participation

- Target: **35% Female Labour Force Participation Rate (FLFPR) by 2030**.
- Provisions:
- Flexible work arrangements
- Safe transport and workplaces
- Expanded childcare support and creches

6. Ease of Compliance for Enterprises

- **Single-window digital portal** for all labour compliances.
- Promotes **self-certification and transparent, risk-based inspections**.
- Aim: Reduce procedural burden on firms, especially MSMEs.

7. Governance Reform

- Establishes a **Labour & Employment Policy Evaluation Index**.
- Allows real-time monitoring across states and ministries through dashboards.
- Intended to benchmark performance and guide fiscal incentives.



Challenges & Concerns

1. Financing Ambiguity

- No clear funding model for USSA.
- Sustainability concerns for **informal, gig, platform, migrant** workers.

2. Digital Exclusion

- Rural workers, older workers, women may be excluded due to digital illiteracy.
- Heavy digital-first approach risks widening inequities.

3. Regulatory Dilution

- The shift from regulator → facilitator may weaken enforcement capacity.
- Oversight gaps could harm worker protections.

4. Informal Sector Gaps

- Limited clarity on:
 - Dispute redressal
 - Representation
 - Enforcement mechanisms
- Gig workers still fall outside classical labour law protections.

5. Weakening of Tripartism

- No formalised tripartite consultation system (Government-Employers-Trade Unions).
- Risks undermining social dialogue.

6. AI Risks

- Algorithmic bias risks: caste, gender, region based skew.
- No strong safeguards or grievance processes in the draft.

Why This Policy Matters

- First-ever comprehensive labour & employment policy in India.
- Links **social security + skilling + employment + digital DPI** in one framework.
- Aims to transition India's labour ecosystem toward **productivity, formalisation, and worker protection**.



32. MGNREGS Work Demand Falls Across States



A LibTech report (academics + activists consortium) shows a sharp decline in person-days under MGNREGS.

Key Findings (LibTech Report)

- **Person-days analysed:** April-September 2025 across **20 major MGNREGS states**.
- **Total person-days (Apr-Sept 2025):** 132.5 crore
 - ↓ 11.7% from **150 crore** (FY 2024–25).
 - ↓ 25.6% from **178 crore** (FY 2023–24).
- **11 of 20 states** recorded a decline.
- **Steepest falls:**
 - **Uttarakhand:** -54.3%
 - **Telangana:** -47.6%
- **Outliers (growth):**
 - **Jharkhand:** +56.4%
 - **Madhya Pradesh:** +30.5%

What Are Person-Days?

Total number of workdays performed by a registered worker under MGNREGS in a year.

About MGNREGS

- **Legal Backing:** Mahatma Gandhi National Rural Employment Guarantee Act, 2005.
- **Guarantee:** 100 days of **unskilled manual work** per rural household.
- **Coverage:** All rural districts except fully urban districts.
- **Workers:** 8.32 crore workers engaged annually (FY 2023–24).
- **Wage Indexation:** Wages linked to **CPI-Agricultural Labourers (CPI-AL)**.
- **Nodal Ministry:** Ministry of Rural Development + State governments.
- **Core Works:**
 - Water conservation
 - Soil productivity enhancement
 - Rural connectivity
 - Drought-proofing
- **Accountability:** Social audits mandatory.



33. PLFS Quarterly Bulletin (Jul–Sep 2025)



1. Labour Force Participation Rate (LFPR) – Improvement Continues

- Overall LFPR: ↑ to 55.1% (from 55.0%).
- Rural LFPR: ↑ from 57.1% → 57.2%.
- Urban LFPR: ↑ from 50.6% → 50.7%.

2. Female Labour Force Participation – Key Driver

- Female LFPR: ↑ to 33.7% (from 33.4%).
- Driven mainly by **rural women**, whose LFPR rose from 37.0% → 37.5%.

3. Worker Population Ratio (WPR)

- WPR: ↑ to 52.2% (from 52.0%).
- Indicates improved absorption of labour into productive employment.

4. Unemployment Rate (UR) – Marginal Decline

- UR (15+ years): ↓ to 5.2% (from 5.4%).
- Reflects moderate strengthening of labour demand.

5. Employment Composition

- Self-employment (Rural): ↑ sharply to 62.8% (from 60.7%).
 - Indicates a rise in own-account work and family labour.

6. Sectoral Patterns

EDUCASIUM IAS Academy

- **Agriculture:** Continued to dominate rural employment, engaging 57.7% of the rural workforce – reflecting seasonal agricultural activity.

www.educasiumiasacademy.com



34. Indian Railways Unveils Uniform Freight Policy to Boost Bulk Cement Transport and Cut Costs

Indian Railways has launched a new freight policy introducing a uniform ₹0.90/tonne/km rate for cement transport. The policy aims to shift the sector from bagged to bulk movement, reduce logistics costs, and support India's high-growth construction and housing demand.

The policy replaces the slab-based freight system with a single nationwide tariff, removing pricing anomalies and encouraging cement companies to adopt bulk logistics via rail.

Key 4 Points (Most Important Takeaways)

- Uniform Rate Introduced:** Flat ₹0.90/tonne/km for all distances, replacing earlier slab-based rates and lowering freight cost by up to 30%.
- Bulk Cement Push:** Targets raising bulk share from ~10% to 30% in five years, aided by specialised wagons and pollution-free containers.
- Railway Infrastructure Support:** Land, concessions, and facilities like silos and hoppers offered to firms to build bulk-handling systems.
- Cost Efficiency & Decarbonisation:** Rail is 20–25% cheaper and cleaner than road; bulk systems reduce dust emissions by 90% (CONCOR estimates).

Good Angle vs Bad Angle

Good Angle (Pros)

- Cuts cement logistics costs → lowers construction prices for consumers.
- Encourages shift from road (83% share) to rail → lower emissions, safer movement.
- Supports India's 7–8% annual cement demand growth (housing + infra).
- Boosts Railways' freight revenue and improves cement sector efficiency.

Bad Angle (Cons)

- Smaller regional plants may struggle to invest in silos, hoppers, and bulk infrastructure.
- Uniform pricing may disadvantage producers closer to consumption centres.
- Requires significant capex from CONCOR and Railways for specialised wagons.
- Implementation challenges in states with poor last-mile connectivity.

35. National Industrial Classification (NIC) 2025



MoSPI released NIC 2025 during the 75th NSS anniversary ceremony.

About the NIC Code

- **Standard framework** for classifying economic activities by *primary activity*.
- **Aligned globally** with UN's **ISIC** classification.
- **Purpose:** Supports policy design, budget allocation, and sectoral trend analysis.
- **History:** Introduced in **1962**, periodically updated as economy evolves.
- **Published by:** National Statistical Office (NSO), MoSPI.
- **Technology-neutral:** Classifies *what* is produced, not *how* it is produced.

Key Changes in NIC 2025 (Most Important)

- **Shift to Six-Digit Codes:**
 - From 5 digits → **6-digit** classification.
 - Subclasses expanded to ~1,900 for finer detailing.
- **Global Harmonisation:**
 - Fully aligned with **UN-ISIC Rev. 5** up to the **4-digit** level.
- **Digital & New-Economy Coverage:**
 - New codes for **cloud services, blockchain, e-commerce, fintech, web portals**.
- **Platform & Gig Economy Recognised:**
 - Explicit inclusion of **online intermediaries, aggregators, gig work platforms**.
- **Indigenous Sectors Included:**
 - Dedicated classifications for **Ayush healthcare** and handloom activities.
- **Green Economy Expansion:**
 - Broader coverage of **renewables, recycling, sustainability-linked services**.
 - Aligned with **SDGs** and **SEEA** environmental accounting standards.



36. Tex-RAMPS Scheme

About the Scheme



- **Tex-RAMPS** = *Textiles-Focused Research, Assessment, Monitoring, Planning & Start-up.*
- **Objective:** Future-proof India's Textiles & Apparel (T&A) sector through R&D, data systems, and start-up support.
- **Type:** Central Sector Scheme (100% funded by Ministry of Textiles).
- **Period:** 2025-26 to 2030-31 (aligned with next Finance Commission cycle).

Key Components

1. Research & Innovation

- Smart textiles, sustainable materials, technical textiles.
- Improving manufacturing efficiency & technology adoption.

2. Data, Analytics & Diagnostics

- Sector-wide data systems for employment, supply chains, productivity.
- Support to India-Size survey & evidence-based policy design.

3. Integrated Textiles Statistical System (ITSS)

- Real-time analytics dashboard for monitoring sector performance.
- Enables targeted interventions & strategic planning.

4. Capacity Development & Knowledge Ecosystem

- State-level planning support.
- Best practices sharing, workshops, textile industry events.

5. Start-up & Innovation Support

- Funding for incubators, hackathons & textile-tech entrepreneurship.
- Promote academia-industry collaboration for high-value textile start-ups.



37. India to Open Civil Nuclear Power Sector to Private Firms



India's Current Nuclear Landscape

- **Capacity:** 25 reactors, 8,880 MW; contributes ~3% to electricity (2024–25).
- **Targets:** 22.5 GW by 2031–32, 100 GW by 2047.
- **Reactor Types:** Mostly PHWRs (indigenous) + some LWRs (Russia, U.S.).

Uranium Supply

- **Imports:** Kazakhstan ~80%; also Russia, Uzbekistan, Canada, Australia.
- **Domestic Reserves:** ~4.25 lakh tonnes (Jharkhand, Andhra Pradesh).
- **Global Mining:** Exploring stakes in Namibia, Mongolia, Kazakhstan.

Legal & Policy Framework

- **Atomic Energy Act 1962:** Nuclear generation restricted to Centre + PSUs.
- **CLNDA 2010:** Includes **supplier liability** – a major barrier.
- **Regulator:** AERB handles safety and licensing.
- **Fuel Cycle:** India uses **closed fuel cycle** (reprocessing spent fuel).

Why Private Participation Matters

- **Capital Mobilisation:** Helps bridge \$26 bn funding gap for 11,000 MW expansion.
- **Faster Execution:** Fleet-mode construction can cut timelines 10–12 yrs → ~5 yrs.
- **Tech Scale-up:** Boosts **Small Modular Reactors (SMRs)** and factory-built units.
- **Manufacturing Strength:** Expands domestic capacity for **RPVs, steam generators**.
- **Lower Tariffs:** Competition could move nuclear tariffs to ₹4–5/unit.

Key Barriers to Private Entry

- **Liability Risks:** CLNDA Section 17(b) → unlimited supplier liability.
- **High Financing Costs:** Not part of **Green Taxonomy** → no Green Bonds.
- **FDI Restrictions:** Nuclear generation prohibited for foreign investors.
- **Revenue Issues:** Nuclear cost ₹6–8/unit; DISCOMs avoid PPAs above ₹4.5.
- **Land Protests:** Local opposition (e.g., Jaitapur) delays projects.
- **Legal Limits:** Current law permits only **construction roles**, not **Build-Own-Operate**.

Government's Recent Moves

- **Amend Atomic Energy Act 1962:** To allow **private Build-Own-Operate** plants.
- **Reform CLNDA 2010:** To ease supplier liability and align with global norms.
- **Nuclear Energy Mission (Viksit Bharat):**
 - ₹20,000 crore for SMRs + advanced nuclear R&D.
- **PPP Models:** Private firms bring **capital, land, water**; NPCIL retains operation & ownership.



38. Draft Guidelines for UCG Mining & Mine Closure Plan, 2025

The Ministry of Coal has issued draft guidelines to regulate **Underground Coal Gasification (UCG)** projects, ensuring technical feasibility, environmental safety, responsible extraction, and strict mine closure discipline.

Key Provisions

1. Mandatory Pilot Feasibility Study

- Every UCG project requires a **pilot feasibility study** by an *accredited institution* before approval.
- Assessment parameters:
 - Geological viability
 - Environmental impacts
 - Hydrogeological & seismic risks
 - Gasification efficiency
 - Safety and long-term stability

2. Environmental & Geological Safeguards

- Target seams must be **below 300 metres** and located in **low-permeability strata** to prevent gas leakage.
- Projects must avoid:
 - Eco-sensitive areas
 - Aquifers or water-bearing zones
 - High seismic hazard zones
- Ensures minimal risk to groundwater, ecosystems, and surface structures.

3. Gasification Process Requirements

- Focus on **optimal syngas output** with high thermal efficiency.
- Minimise: – Waste generation – Greenhouse emissions – Subsurface instability
- Promote **sustainable resource utilisation** and improved carbon efficiency.

Mine Closure & Financial Accountability

4. Escrow-Linked Mine Closure Fund

- A dedicated closure fund must be deposited **before operations begin**.
- **Base contribution:** ₹50,000 per hectare, **indexed to WPI** for inflation neutrality.
- Withdrawal: – **Up to 75%** permitted after verified progressive mine closure
 - Remaining 25% released after final closure certification
- Penalties: Non-compliance can lead to **licence cancellation**, forfeiture of escrow funds, or revocation of project approval.

Institutional Oversight Mechanism

5. Coal Controller Organisation (CCO)

- Nodal agency for evaluating project proposals and granting approvals.

7. Appellate Authority

- **Secretary (Coal)** will hear appeals against decisions of CCO.

39. India to Release First Real-Time Black Spot Data Using e-DAR & iRAD



The Ministry of Road Transport and Highways (MoRTH) will release **2023-24 black spot data** using e-DAR and iRAD, marking India's **first real-time digital accident mapping initiative**.

What's New?

- Black spot data now generated through **Electronic Detailed Accident Report (e-DAR)** and **Integrated Road Accident Database (iRAD)**.
- Replaces earlier **manual submissions** by states and physical verification done by MoRTH's Transport Research Wing (TRW).
- Last available data was up to 2022 → causing delays in mitigation measures.
- 2023-24 list** = India's **first real-time**, system-driven accident hotspot identification.

What Are Black Spots?

- A **500-metre stretch** on a National Highway with **high accident concentration**.
- Identified when, over 3 years, there are:
 - ≥5 accidents causing death/grievous injury, or
 - ≥10 fatalities.
- 2016-2022:** 13,795 black spots identified → **5,036 rectified** via engineering improvements (e.g., redesign, signage, barriers).

National Road Safety Council (NRSC)

- Statutory body under **Section 215, Motor Vehicles Act 1988**.
- Chairperson:** Union Minister of Road Transport & Highways.
- Members include State/UT Transport Ministers, senior officials, and road-safety experts.
- Advises on national road safety policies, standards, and accident mitigation strategies.



UPSC Relevance: Road safety governance, digital public infrastructure, accident data reforms, MoRTH mandates – relevant for **GS-II (Governance), GS-III (Infrastructure)**.



40. Digital Personal Data Protection (DPDP) Rules, 2025

Completes the operational framework of the Digital Personal Data Protection Act, 2023. Marks India's shift to an enforceable, citizen-centric data protection regime.

Key Points

1. Unified Data Protection Framework

- Replaces fragmented sector-specific guidelines with one consolidated, enforceable system.
- Ensures uniform standards for all data fiduciaries.

2. Wide Public Consultation

- 6,915 stakeholder inputs from startups, MSMEs, civil society, industry groups, and individuals shaped the final rules.

3. Eighteen-Month Phased Rollout

- Staggered compliance window for organisations.
- Mandatory requirements include:
 - Clear consent notices.
 - Specific purpose limitation.
 - India-based consent managers.

4. Strong Breach-Notification System

- Organisations must immediately inform individuals of any personal data breach.
- Enhances transparency and rapid risk mitigation.

5. Expanded Rights for Citizens (Data Principals)

- Individuals can:
 - Seek information on data processing.
 - Request correction or updating of personal data.
 - Request deletion under defined conditions.
- Data fiduciaries must respond within 90 days.

6. Additional Safeguards for Children & Persons with Disabilities

- Processing requires **verifiable guardian consent**.
- Ensures higher protection for vulnerable groups.

7. Operationalisation of the Data Protection Board (DPB)

- Fully digital board with **four members**.
- Citizens can:
 - File complaints online.
 - Track case status through a portal and mobile app.

41. Ministry of Steel launched SARAL SIMS, a simplified digital system for easy steel-import registration.



About SARAL SIMS Portal

- **Simplified Registration:** One annual declaration of intended quantity → **one SARAL SIMS number** usable for multiple consignments.
- **Small Import Category:**
 - Consignments **≤10 MT**.
 - Annual limit **1,000 MT** (temporary **500 MT** till April 2026).
- **Export-Linked Category:**
 - For **Advance Authorisation, SEZ, EOU** units.
 - **No quantity limit** for imports.
- **Validity:** SARAL SIMS number valid till **30 April of next FY**.
- **Annual Return:** Importers must file actual-import details by **30 April** every year.
- **Threshold Breach:** If importer exceeds **1,000 MT**, they must shift to regular SIMS for rest of the year; **cannot revert** back.

Related Concepts (Crisp Definitions)

- **Advance Authorisation:** Duty-free import of raw materials for producing goods meant for export.
- **SEZ (Special Economic Zone):** Duty-free industrial enclave for export-focused manufacturing/services.
- **EOU (Export Oriented Unit):** Units producing largely for export; allowed duty-free import of inputs and capital goods.



42. New Digital System for Public Distribution Systems

The Union Minister for Consumer Affairs launched major **digital platforms** and inaugurated a **modern steel-based hub silo** at **Malout, Punjab** to modernise grain storage, logistics, and Public Distribution Systems (PDS).

Key Digital Initiatives

1. Bhandaran 360

- Cloud-based **ERP system** for Central Warehousing Corporation (CWC).
- Integrates with **FCI, NAFED** and other agencies for end-to-end digital visibility.
- Streamlines procurement, storage, stock movement, and reporting.

2. Enterprise Resource Planning (ERP)

- Integrates key operational functions: **finance, HR, supply chain, procurement, manufacturing**.
- Ensures seamless, real-time coordination across departments.

3. Anna Darpan

- Microservices-based cloud platform for **FCI**.
- Digitises procurement → storage → movement → sales.
- Mobile-first design for monitoring field operations.

4. Smart EXIM

- AI + IoT-driven system for **automated gate control and inventory management** at CWC warehouses.
- Improves accuracy, transparency, and turnaround time.

5. ASHA Platform

- Multilingual AI platform for **PDS grievance and feedback collection**.
- Uses automated calls to reach beneficiaries in their native language.

Modern Silo Infrastructure

- Steel-based **hub silo** inaugurated in Malout, Punjab.
- Enables scientific grain storage, reduces losses, improves shelf life and efficiency in bulk handling.

Public Distribution System (PDS) - Snapshot

- India's primary food security mechanism under Ministry of Consumer Affairs.
- Ensures subsidised access to foodgrains through a network of **Fair Price Shops**.
- **Centre:** Procurement, storage, transportation, allocation.
- **States:** Beneficiary identification, ration card issuance, FPS monitoring.
- **Objectives:** **Food & nutrition security, price stabilisation, poverty relief, buffer stock management.**

43. IndQA Benchmark Launched by OpenAI

A landmark AI evaluation framework focused on Indian languages & cultural intelligence.



Key Highlights

1. Collaborative Development

- IndQA was created with inputs from **250+ Indian linguists, domain experts, and cultural scholars**.
- The final dataset includes **2,278 questions** assessing deep cultural, linguistic, and contextual understanding.

2. Languages Covered (12)

- **Indian Languages (11):** Bengali, Hindi, Kannada, Marathi, Odia, Telugu, Gujarati, Malayalam, Punjabi, Tamil, Hinglish
- **Plus:** English

These reflect India's multilingual digital ecosystem and ensure wide representational testing.

3. Cultural & Knowledge Domains (10)

IndQA evaluates AI systems across culturally rich and knowledge-sensitive areas: Architecture & Design, Arts & Culture, Everyday Life, Food & Cuisine, History, Law & Ethics, Literature & Linguistics, Media & Entertainment, Religion & Spirituality, Sports & Recreation

This makes IndQA one of the **most culturally grounded AI benchmarks** in the world.

4. Why India First?

OpenAI stated that **India was the natural starting point** due to:

- Exceptional **linguistic diversity** (122 major languages, 22 Eighth Schedule languages).
- Huge digital ecosystem with rapid AI adoption.
- **ChatGPT's second-largest global user base** located in India.
- India's strategic value in shaping multicultural AI training and safety.

EDUCASIUM IAS Academy

www.educasiumiasacademy.com

5. Purpose & Performance Evaluation

- IndQA will serve as a **continuous evaluation suite** to track improvements in OpenAI's frontier models.
- Early results show "significant performance gains" in Indian languages across GPT-5 series – but OpenAI acknowledges **large scope for improvement** in:
 - idiomatic expressions
 - regional dialects
 - cultural subtleties
 - multilingual code-switching (e.g., Hinglish, Tanglish)



44. Makhanomics

Bihar – producing **90% of India's makhana (foxnut)** – is now the centre of the government's renewed focus, following the launch of the **National Makhana Board** in Purnea to strengthen production, processing, and exports.

Economic Significance

- Major cultivation in **Mithilanchal** – Darbhanga, Madhubani, Purnea, Katihar ($\approx 80\%$ output).
- Global makhana market: **USD 43.56 million (2023)** → projected **USD 100 million by 2033**.
- Rising global demand as a **superfood**, boosting export potential & rural employment.

Challenges

- Poor Processing Infrastructure:** Bihar lacks food parks & export units; raw makhana sold cheaply to other states, losing value-add margins.
- Low Farmer Income:** Dominance of middlemen; MSP demand still pending.
- Labour-Intensive Cultivation:** Manual pond-diving increases cost and inefficiency.
- Low Productivity:** Traditional yields **1.7-1.9 t/ha** vs improved varieties **Swarna Vaidehi, Sabour Makhana-1** (3-3.5 t/ha).

National Makhana Board

UCASIUM IAS Academy

EPIC UPSC Classes

- Launched on **15 September 2025** by PM in **Purnea, Bihar**.
- Budget: **₹100 crore** to drive production, processing, value addition, branding, and export linkages.
- Will support farmer training, cluster development, and convergence with Central & State schemes.
- A proposed **Food Processing Institute** will enable R&D, innovation, entrepreneurship, and strengthen the makhana supply chain.



45. Enshittification

Global digital platforms – once symbols of openness and creativity – are increasingly criticised for becoming **exploitative, profit-maximising ecosystems**. This decline is widely described using the term “**enshittification**.”



What is Enshittification?

- **Definition:** Coined by technologist **Cory Doctorow**, it refers to the *systematic deterioration* of digital platforms as they prioritise profits over users.
- **Three Stages:**
 1. **User-first phase** (high-quality services to attract users)
 2. **Advertiser-first phase** (monetisation through ads & data)
 3. **Profit-maximisation phase** (platform exploits both users & businesses)

Key Symptoms

- **Ad Saturation:** Rise of unskippable ads, intrusive paywalls. *Ex:* YouTube Premium, Netflix ad tiers.
- **Algorithmic Manipulation:** Algorithms push sponsored/viral content over genuine connections. *Ex:* Instagram prioritising reels.
- **Self-Preferencing:** Platforms push their own products over competitors. *Ex:* Amazon's sponsored listings (FTC, 2024 case).
- **Data Exploitation:** Personal data used for opaque micro-targeting. *Ex:* Cambridge Analytica political profiling scandal (2018).
- **Loss of Authenticity:** Paid verifications, bots, fake engagement dilute trust. *Ex:* X (Twitter) selling verification to any account.



UPSC Relevance: Digital platform governance, algorithmic ethics, data protection, competition policy, Big Tech regulation – relevant for **GS-II (Governance & Digital Rights)**, **GS-III (Economy & Cyber Issues)**, and **Essay**.



46. Water Budgeting in Aspirational Blocks

Context



- NITI Aayog released a report on “**Water Budgeting in Aspirational Blocks**”.
- Prepared with **GIZ India** using field assessments and multi-institutional datasets.
- Supports **Viksit Bharat@2047** vision for sustainable, equitable water security.

What is Water Budgeting?

- A structured approach to quantify:
 - **Water Demand:** domestic, livestock, agriculture, industry.
 - **Water Supply:** rainfall runoff, surface water, groundwater, inter-basin transfers.
- Compares **demand vs supply** to identify:
 - Gaps & stress zones.
 - Surplus pockets.
- Helps shift from **reactive crisis management** to **proactive water governance** at the block level.

Varuni App – The Digital Backbone

- **Varuni** is a web-based platform used to run water budgets.
- Integrates field data + secondary data for **block-level water analysis**.
- Helps officials:
 - Visualise water availability.
 - Assess interventions (recharge, storage, crop diversification, demand reduction).
 - Track progress over time.

Focus on Aspirational Blocks

- Study covers **18 blocks** under the **Aspirational Blocks Programme (ABP)**.
- ABP extends the Aspirational Districts model to the **most development-challenged blocks**.
- Water budgeting is seen as a critical tool for addressing multidimensional gaps in these areas.



47. Amul & IFFCO Top Global Cooperatives



Amul and IFFCO secured **Rank 1** and **Rank 2** globally in the **World Cooperative Monitor (WCM) 2025**, released at the ICA CM50 Conference in Doha.

Key Highlights

Top Rankings:

Amul (GCMMF) – Rank 1

IFFCO – Rank 2

WCM 2025 Report: Annual global study assessing cooperatives on **GDP per capita performance**, economic contribution & social impact.

Released by **International Cooperative Alliance (ICA) + Euricse**.

ICA CM50 Conference:

Global platform to showcase cooperatives as solutions to global economic & social challenges.

About Amul

- India's iconic dairy cooperative; foundation of **Operation Flood**.
- Managed by **GCMMF**.
- Network: **18,600+** village dairy societies; **3.6 million** milk producers.

About IFFCO

- Major multi-state cooperative producing & marketing fertilisers.
- Supports **50 million farmers** through **35,000** cooperative members across India.

About Cooperatives

EDUCASIUM IAS Academy
EPIC UPSC Classes

- Definition:** Member-owned, democratic, voluntary enterprises.
- Constitutional Status:**
 - 97th Constitutional Amendment Act, 2011 → added **Part IXB** (Cooperatives).
- Legal Structure:**
 - State cooperatives → State Cooperative Acts
 - Multi-State cooperatives → **MSCS Act, 2002**
- Institutional Support:**
 - Ministry of Cooperation (2021) as dedicated ministry.
- Global Recognition:**
 - 2025 declared **UN International Year of Cooperatives (IYC)**.

Keywords (UPSC Linkage)

Cooperative federalism, Part IXB, Operation Flood, GCMMF, MSCS Act 2002, ICA, Euricse, International Year of Cooperatives, fertiliser cooperatives, dairy revolution.



NOVEMBER 2025

ENVIRONMENT

1. UNEP Emissions Gap Report 2025
2. CCPI 2026: India Falls to 23rd Rank
3. CRI 2025: India 9th Most Affected Country
4. India to Submit Updated 2035 NDC
5. COP30 (2025) – Belém, Brazil
6. Belém Political Package
7. Integrated Forum on Climate Change
8. Joint Crediting Mechanism (JCM)
9. UNEP Report at COP30 Flags
10. 'Tropical Forest Forever Facility'
11. Forest Advisory Committee Recommends
12. Supreme Court Holds Uttarakhand Liable for Illegal Constructions
13. Reconciling Conservation & Community Rights
14. National Biodiversity Authority Releases
15. Tiger Returns to Ratanmahal Wildlife Sanctuary
16. Tigress Spotted Swimming Across Denwa River
17. Khangchendzonga National Park Rated "Good"
18. New Jumping Spider Species *Pilia malenadu*
19. New Flowering Plant *Crassicaulis middletonii*
20. *Protidricerus albocapitatus* Owlfly
21. New Fruit Fly Species: *Euphranta undulata*
22. *Taningia silasii* (Indian Octopus Squid)
23. Ginkgo-Toothed Beaked Whales
24. Scientists Discover Potent Natural Herbicide
25. Smooth-Coated Otter Recorded
26. Discovery of a New Wolf Snake Species
27. Climate Change Disrupts Hibernation
28. Hawfinch Sighting in India
29. Chile Reclassifies Humboldt Penguin
30. Grey Seal – Complex Mammalian Milk
31. Bihar's Gogabehal Lake Declared India's 94th Ramsar Site
32. Push to Declare Assam's Rowmari–Donduwa
33. Study Shows Climate Change Influences
34. Dariya Bahadur Island
35. Study Finds High Heavy Metal Levels in Cauvery River Fish
36. Road Dust Emerges as Major PM₁₀ Source
37. India May Generate 11 Million Tonnes of Solar Waste by 2047
38. MoHUA Launches DRAP to Fast-Track Legacy
39. CREA Report: 60% of India's PM2.5 Crosses District Borders
40. SC Recalls Vanashakti Verdict
41. CAFE-III Norms Spark Debate as Small Cars
42. India to Host International Green Hydrogen conference
43. ICGH 2025: India Announces ₹100 Cr Pilot Scheme
44. MNRE Inaugurates Biomass Pellet Plant
45. India to Add 6 GW of New Wind Capacity
46. ICAR Study Warns of Rapid Soil Organic Carbon Decline
47. Nauradehi Wildlife Sanctuary
48. India–Botswana Cheetah Translocation Pact
49. India to Host Global Big Cats Summit 2026
50. CITES Report Flags India's Wildlife Import Verification
51. Water Lettuce Identified as Invasive Freshwater
52. Ambaji Marble from Gujarat Awarded
53. India Ranks 3rd in Asia Power Index 2025
54. WFP Study Warns: A 1°C Temperature Rise
55. New Guidelines for Underground Coal Gasification
- 56.

1. UNEP Emissions Gap Report 2025 Warns World is “Off Target” for 1.5°C; India’s Emissions Rise 3.6%

UNEP released its 16th Emissions Gap Report 2025, themed “Off Target”, assessing the gap between current NDCs and the emission cuts required to meet the Paris Agreement.

Global Progress & Temperature Outlook

- **Minimal progress** in keeping warming within 1.5°C-2°C.
- Even with full NDC implementation → 2.3-2.5°C warming expected this century (slightly lower than 2024).
- **One-third of improvement** due to **methodological changes**, not real emission cuts.

Political & Institutional Factors

- **US exit from Paris Agreement (planned 2026)** would add ~0.1°C to warming.
- As of Sep 2025: **Only 60 countries** (63% of global emissions) submitted updated **2035 NDCs**.
- **G20 emissions rising**: +0.7% in 2024; far off track.

Emission Trends & Gaps

- Global GHG emissions rose **2.3% in 2024**, hitting **57.7 GtCO₂e** – four times faster than the 2010s average.
- **Largest emitters in 2024**: India (highest absolute rise), followed by China, Russia, Indonesia, US.
- **2035 Pledge Gap**:
 - Current pledges → **15% reduction** from 2019.
 - Needed for 1.5°C → **55% reduction**.
- **1.5°C overshoot inevitable** in next decade; urge to minimise duration and severity.

India-Specific Findings

- **GHG increase**: +3.6% in 2024 (second-highest among major economies after Indonesia).
- **Per capita emissions**: ~3 tCO₂e (below global avg 6.4 tCO₂e).
- **Missed deadline**: India did not submit updated **2035 NDC** by Sep 30, 2025.
- **2030 targets**: India remains on track for its goals → **45% emissions intensity reduction** from 2005 levels.
- **Concerns**: Lack of clarity on **carbon removal** and absence of **annual progress reports**.

About the Emissions Gap Report

- UNEP's **flagship annual report** (since 2010).
- Measures gap between **current pledges, projected emissions**, and the pathway needed to meet **1.5°C/2°C targets**.

Significance

- Reinforces urgent need for **stronger NDCs, accelerated mitigation**, and **global leadership** – especially by major emitters and G20 nations.
- Highlights India's delicate balance: rising emissions but **low per capita footprint**.

2. CCPI 2026: India Falls to 23rd Rank; Top Three Positions Remain Vacant



Germanwatch released the Climate Change Performance Index (CCPI) 2026 on the sidelines of COP30 (Belém, Brazil).

CCPI 2026 – Major Findings

Top 3 ranks vacant – no country met the “very high” climate performance threshold.

- **Best performers:**
 - Denmark (4th)
 - United Kingdom (5th)
 - Morocco (6th)
- **India's Performance:**
 - Dropped 13 places → now 23rd.
 - Categorised as a **medium performer**.
 - Reasons: No **coal phase-out timeline**, continued **coal block auctions**, rising emissions.
- **Worst performers:**
 - Iran (66th), Saudi Arabia (67th).
- **G20 Snapshot:**
 - UK is the **only “high performer”** in G20.
 - **Russia (64th), U.S. (65th), Saudi Arabia (67th)** are the lowest performers in the group.

About the Climate Change Performance Index (CCPI)

Independent tool to assess climate mitigation performance of:

63 countries + EU (account for 90% global emissions).

Published annually since 2005 by:

Germanwatch

NewClimate Institute

Climate Action Network International

Assessment Framework

Covers **14 indicators** under four categories:

GHG Emissions – 40%

Renewable Energy – 20%

Energy Use – 20%

Climate Policy – 20%

Countries ranked under five performance levels:

Very High, High, Medium, Low, Very Low

3. CRI 2025: India 9th Most Affected Country by Climate Disasters (1995–2024)



At COP30 (Belém, Brazil), Germanwatch released the Global Climate Risk Index (CRI) 2025, covering climate impacts from 1995 to 2024.

India's Performance

- Rank: 9th globally among nations worst affected by climate disasters (1995–2024).
- Deaths: Over 80,000 lives lost – 9.6% of global deaths from extreme weather.
- Extreme Events: ~430 events (floods, droughts, cyclones, heatwaves).
- Economic Losses: Estimated USD 170 billion over 30 years.
- Improvement: India's annual CRI rank improved from 10th (2023) → 15th (2024), showing rising resilience.

Global Highlights

- Most affected countries (1995–2024):
 - Pakistan, Philippines, Bangladesh, Haiti, Myanmar.
- Major events shaping the index:
 - 1999 Odisha Super Cyclone
 - 2013 Uttarakhand Flash Floods
 - Cyclone Hudhud (2014)
 - 2015 Heatwave
 - Cyclone Amphan (2020)

About Climate Risk Index (CRI)

- Published annually by Germanwatch.
- Assesses human and economic impacts of extreme weather events based on:
 - Death toll
 - Economic losses
 - Frequency & severity of disasters
 - Per capita impact
- Reflects past vulnerability, not future risk.

Significance

- Highlights India's high exposure to climate extremes despite progress in early warning systems & disaster preparedness.
- Critical for shaping policies under NDMA, National Action Plan on Climate Change (NAPCC), and state climate missions.

4. India to Submit Updated 2035 NDC and First Biennial Transparency Report by December 2025



At COP30 in Belém, India announced that it will submit its **updated Nationally Determined Contribution (NDC) for 2035** and its **first Biennial Transparency Report (BTR)** by December 2025. This aligns with global deadlines under the Paris Agreement for the **third NDC cycle (2031–2035)** and first BTR submissions.

Global Context

- Countries must submit:
 - **First BTR:** By 2024
 - **Third-round NDCs:** By 2025 (targets for 2031–2035)
- No penalties exist for delays; the Paris Agreement uses a **facilitative, non-adversarial compliance mechanism**.

1. Nationally Determined Contributions (NDCs)

Definition & Legal Framework

- NDCs are **national climate action plans** for mitigation and adaptation submitted under the Paris Agreement.
- **Article 4** mandates preparation, communication, maintenance, and progression over time.

Five-Year Submission Cycle

- New NDCs submitted **every five years**, aligned with the **Global Stocktake (GST)** cycle.
- First NDCs (to 2025/2030) → submitted 2015–16
- Second NDCs (2030) → due 2020
- **Third NDCs (2035)** → due 2025

2. India's NDC Progress (Updated August 2022)

Target (2030)	Status
45% reduction in emissions intensity of GDP (2005–2030)	On track; 36% achieved by 2020
50% installed power capacity from non-fossil sources	Achieved early; exceeded 50% by June 2025
Create additional 2.5–3 billion tonnes CO ₂ -eq carbon sink	On track; 2.29 billion tonnes created (2005–2021)

3. Biennial Transparency Report (BTR)

Definition: A mandatory, standardised report submitted every two years under the Enhanced Transparency Framework (ETF) to track:

- National GHG emissions
- Progress toward NDCs
- Adaptation actions
- Climate finance provided/received

Exemptions

- LDCs and SIDS → flexible timing; not bound to biennial submissions.

Replaces Earlier Reports

- Supersedes Biennial Reports (BRs) and Biennial Update Reports (BURs).

Components of the BTR

Mandatory

- National GHG Inventory Report (NIR)
- National Inventory Arrangements
- Tracking progress of NDC
- Structured Summary of NDC progress
- Information on climate finance provided (developed countries)
- Technical Expert Review (TER) + areas for improvement

Optional

- Loss & Damage
- Adaptation actions/metrics
- Support needed/received (technology, capacity, finance)
- Mitigation co-benefits
- Voluntary information under Article 13.8

Significance (UPSC Keywords)

Paris Agreement, NDC cycle, Enhanced Transparency Framework, Global Stocktake, mitigation-adaptation balance, climate governance, climate finance, GHG inventory.



UPSC Relevance: Prelims: Paris Agreement, NDC cycle, BTR vs BUR, ETF, MoEFCC roles. Mains: GS-II (global environmental governance), GS-III (climate change strategy), Essay (climate responsibility & transparency).



HOT Question: “Transparency lies at the heart of the Paris Agreement. Analyse how the Biennial Transparency Report (BTR) strengthens global climate trust and how India can leverage it to build credibility in its 2035 NDC

5. COP30 (2025) – Belém, Brazil: The “COP of Truth / Implementation COP



The 30th UN Climate Change Conference (COP30) is being held in Belém, Brazil, marking the first COP ever hosted in the Amazon region. Brazil aims to shift global climate negotiations from **pledges** → **measurable implementation**.

Theme & Vision

- Known as: “COP of Truth” or “Implementation COP”
- Purpose: Move from symbolic commitments to **time-bound, measurable, finance-backed climate action**.
- Structure: Action organised across **Six Axes**.

Six Axes of COP30

1. Energy, Industry & Transport Transitions
2. Stewardship of Forests, Oceans & Biodiversity
3. Transformation of Food Systems
4. Resilient Cities, Infrastructure & Water Systems
5. Human & Social Development
6. Cross-Cutting Enablers – finance, technology, capacity building.

Key Agendas of COP30

1. Implementation & Commitments

Implementation COP : Convert earlier climate pledges into **concrete national plans** with monitoring & accountability.

NDCs 3.0 (for 2035) : Countries must finalise updated **Nationally Determined Contributions (NDCs)**
 → clearer emission targets
 → stronger reporting & transparency systems.

New Climate Finance Architecture : Adoption of **New Collective Quantified Goal (NCQG)** replacing the outdated \$100 bn promise. Expected: **\$300 billion per year** in new climate finance.

2. Adaptation & Resilience

Global Adaptation Push

- Implement the **UAE Framework for Global Climate Resilience** under the **Global Goal on Adaptation (GGA)**.
- Focus: reducing climate vulnerability through sector-wide adaptation.

Finance Roadmap

- Advance the **Baku-to-Belém Finance Roadmap**
 → Target: **\$1.3 trillion mobilised annually** for mitigation + adaptation.

Forest Protection

- Scale up the **Tropical Forest Forever Facility (TFFF)**
 → long-term conservation finance
 → blended capital for Amazon, Congo Basin, Southeast Asia.

3. Equity & Global Cooperation

Super Pollutant Reduction

- Accelerate the Super Pollutant Country Action Accelerator
- Target: Reduce methane, HFCs, black carbon in 30 developing nations by 2030.

Fair Trade & Carbon Adjustments

- Reform global Carbon Border Adjustment Mechanisms (CBAMs)
- Goal: prevent carbon leakage + ensure fair treatment of developing-country exports.

Global Just Transition

- Advance the Belém Action Mechanism (BAM)
 - ensures rights-based, equitable energy transition
 - stronger worker and community safeguards.

Global Partnership for Innovation

- Expand technology transfer, capacity building & South-South collaboration.

Global Ethical Stocktake (GES)

- Institutionalise a moral/ethical dimension into climate policy:
 - cultural perspectives
 - justice-based climate accountability
 - indigenous rights (critical in the Amazon COP).

Significance of Hosting COP30 in the Amazon

- **Symbolic + strategic:** Amazon houses the world's largest tropical forest and critical carbon sink.
- Brings urgency to:
 - forest protection
 - indigenous rights
 - global south leadership
- Expected to catalyse data-sharing agreements on forest health, carbon flux, and climate modelling.

6. COP30 (Belém, Brazil) – Key Outcomes & Analysis | 'Belém Political Package'



I. Core Outcome: Belém Political Package

The final outcome document adopted at COP30 reflected the Brazilian principle of **mutirão** (collective effort), signalling renewed commitment to **stronger multilateral climate action**.

II. Key Outcomes of COP30

1. Tripling Adaptation Finance

- Countries agreed to work toward **tripling adaptation finance**.
- Target: At least **USD 1.3 trillion annually by 2035** for climate action.

2. Climate Finance Work Programme (Article 9.1)

- A **two-year work programme** established to examine and implement obligations under **Article 9.1**, which mandates **developed countries** to provide financial support.

Significance: → Moves climate finance closer to being a **legal obligation**, not charity.

3. Loss and Damage Fund – Further Operationalised

- Mechanisms created for **faster, predictable access** for climate-vulnerable nations.
- Implementation structures clarified (funding windows, eligibility).

4. Belém Action Mechanism (BAM) – A Just Transition Mechanism

- A new global mechanism to ensure **fair and equitable transition** for workers, coal communities, local industries, and developing countries.

5. Global Goal on Adaptation (GGA) – Indicators Agreed

- Countries endorsed a **voluntary framework of 60 indicators**, across:
 - 7 thematic targets
 - 4 dimensions of adaptation

Importance:

This operationalises the GGA for the first time since the Paris Agreement.

6. Indigenous Rights Affirmed

- Package highlights:
 - Land rights
 - Protection of Indigenous knowledge
 - Inclusion in climate planning
- **Important because COP30 was held in the Amazon region.**

7. Climate Disinformation Recognised

For the first time, the UNFCCC text **acknowledged climate disinformation** and its harmful influence on:

- Public policy
- Scientific integrity
- Global climate action

III. Major Sideline Outcomes of COP30

1. Tropical Forests Forever Facility (TFFF) - Brazil-Led

- A **blended-finance mechanism** providing long-term, performance-based payments for tropical forest conservation.

2. Global Ethical Stocktake (GES)

- Complements the technical GST.
- Evaluates **moral, ethical, equity dimensions** of climate action.

3. FINI Initiative (Fostering Investible National Implementation)

- Goal: Make adaptation projects **investment-ready**.
- Aim: Unlock **USD 1 trillion** in adaptation investments by **2028**.

4. Belém Declaration on Fertilisers

- Reduce **5% global GHG emissions** from fertiliser production.
- Promote nutrient-use efficiency & soil health.

5. Global Implementation Accelerator

- Designed to **bridge the gap** between current NDCs and the **1.5°C path**.

6. Unilateral Trade Measures Dialogue

- Addresses concerns around CBAM (Carbon Border Adjustment Mechanism).
- Important for defending **CBDPR-RC** principles.

7. Blue NDC Challenge

- 17 nations commit to integrating **ocean-based climate actions** into their 2025 NDCs.

8. Super Pollutant Country Action Accelerator

- Supports rapid reduction of **short-lived climate pollutants (SLCPs)**:
 - Methane
 - Black carbon
 - HFCs
 - Tropospheric ozone

IV. Shortcomings & Challenges of COP30

1. No Roadmap for Fossil Fuel Phase-Out

- The package lacked:
 - A **time-bound** plan
 - Global targets
- Transition language remains **weak**.

2. Absence of the United States

- No official US delegation → weakened developed-country bargaining power created a leadership vacuum.

3. Non-Binding Commitments

- Key mitigation actions were shifted to **voluntary** roadmaps.
- Defeats the purpose of enforceable climate governance.

4. Limited Outcome on Deforestation

- Despite being held in the **Amazon**, no strong commitments.
- Reliance on voluntary efforts.

5. Adaptation Finance Pushed to 2035

- Vulnerable nations demanded **2030**, but deadline pushed to 2035.

6. Loans Still Dominant Over Grants

- No structural reforms to reduce loan-based climate finance.
- Increases **debt burden** of developing nations.

7. Weak NDC Updates

- Many countries did not update their NDCs to align with the **1.5°C trajectory**.

V. UPSC Value Add

Likely Prelims Themes

- Belém Action Mechanism
- Tropical Forests Forever Facility
- Article 9.1 obligations
- Global Ethical Stocktake vs Global Stocktake
- Blue NDC Challenge
- Loss & Damage operationalisation

7. Integrated Forum on Climate Change and Trade (IFCCT) – Launched at UN COP30 (Belém, Brazil)



About IFCCT

- **Nature:** A *permanent, politically backed, non-negotiating* global platform for structured climate–trade dialogue.
- **Purpose:**
 - Harmonise **trade policies, climate commitments, and development priorities**.
 - Prevent global trade fragmentation arising from climate-related regulations.
- **Process:**
 - **Open-ended consultations until 2026** to finalise mandate, themes, participation rules.
- **Location:**
 - Early consultations in **Geneva**, linking discussions with the **WTO-centred trading system**.

Significance of the Forum

- **Developing Country Equity:**
 - Offers a platform to contest and balance unilateral measures like **Carbon Border Adjustment Mechanisms (CBAMs)**.
 - Supports **CBDPR-RC**, ensuring fairness in climate-linked trade rules.
- **Trade Predictability:**
 - Reduces risks of **policy fragmentation, retaliatory tariffs, and supply-chain shocks** triggered by differing climate–trade rules.
- **Voice for the Global South:**
 - Expands participation space for developing nations, reducing rule-making dominance by large economies.
 - Ensures climate–trade governance reflects **inclusive, multi-polar perspectives**.

8. India Highlights Joint Crediting Mechanism (JCM) at COP30 (26 Nov 2025)



India called the JCM a *pivotal instrument* for fair, technology-driven climate action during the **11th JCM Partner Countries' Meeting** held on the sidelines of COP30 in Belém, Brazil.

About the JCM

- A bilateral mechanism enabling countries – including India – to collaborate with Japan on low-carbon projects.
- Carbon credits generated are **shared** between partner countries and Japan to help meet their respective **Nationally Determined Contributions (NDCs)**.

Technology Transfer & Finance

- Encourages deployment of **advanced Japanese low-carbon technologies** (energy efficiency, renewables, waste-to-energy, industrial decarbonisation).
- Mobilises **green finance** and supports sustainable development in partner countries through measurable emission reductions.

Growing Global Mechanism

- Japan announced:
 - **31 partner countries** now in the JCM network.
 - **280+ operational mitigation projects**, aligned with **Article 6** of the Paris Agreement.

India-Japan Cooperation (2025)

- The **MoC signed in August 2025** strengthens the JCM as a transparent and collaborative mechanism for:
 - Joint mitigation projects
 - Finance mobilisation
 - Clear rules for credit generation and allocation
 - Technology diffusion

Contribution to India's Climate Strategy

- JCM projects will directly feed into:
 - India's **NDC targets** (emissions intensity reduction, non-fossil capacity).
 - **Long-Term Low Emission Development Strategy (LT-LEDS)**.
- All technologies and credits will be overseen by **India's Article 6 National Designated Agency** to ensure alignment with domestic climate priorities.

9. UNEP Report at COP30 Flags India as Global Methane Hotspot

A UNEP report released at COP30 (Belém, Brazil) identified India as a global methane hotspot, mainly due to stubble burning, waste burning, and agriculture

UNEP Report - Key Findings

- India emitted 31 Mt methane in 2020 → 9% of global emissions → 3rd-largest emitter.
- Waste-burning methane rose 64% (1995–2020), far above global rise of 43%.
- India generates 12% of global agricultural methane; rice methane projected to rise 8% (2020–2030).
- Sectoral emissions (2020):
 - Agriculture:** 20 Mt
 - Energy sector:** 4.5 Mt
 - Waste burning:** 7.4 Mt
- G20 accounts for 65% of global methane output; India is a major contributor.

India's Methane Profile

- Livestock (Enteric fermentation):** ~20 Mt – India's largest source.
- Rice cultivation:** Major paddy methane emitter; emissions rising.
- Waste burning:** Rapid surge due to poor waste segregation and open dumping.
- Energy sector:** Coal mining, biomass use, and leakages from oil/gas.

Why India Avoided Methane Mention at COP30

- Agriculture sensitivity:** 54% of India's workforce dependent on sectors that emit methane (rice & livestock).
- Food security:** Aggressive methane cuts seen as risk to staple food production.
- NDC gap:** India's NDC does **not commit** to methane reduction, focusing instead on renewables, hydrogen & forests.
- Past stance:** India earlier declined the **Global Methane Pledge (2021)**, citing agricultural realities and adaptation priorities.

Way Forward

Crop diversification: Shift from paddy → millets/pulses; leverage **Shri Anna Mission**.

- Straw Management:** Promote **Happy Seeders**, balers, **PUSA bio-decomposer** to stop stubble burning.
- Methane capture:** Expand **CBG plants** under **SATAT** for landfill gas utilisation.
- Waste reform:** Segregation, biomethanation, landfill capping – e.g., **Indore model**.
- Satellite monitoring:** Use methane-tracking models integrated with **ISRO systems**.
- Policy integration:** Add methane targets to updated NDCs and state action plans; follow examples like **New Zealand's agri-methane roadmap**.

Significance

Addresses **India's fastest-rising climate pollutant** with high short-term warming impact. Supports global climate goals while balancing **agriculture, livelihoods, and food security**. Positions India for cleaner agriculture and improved waste management systems.

10. India Joins Brazil-Led 'Tropical Forest Forever Facility' as Observer at COP30

At COP30 in Belém, Brazil, India announced it will join the **Tropical Forest Forever Facility (TFFF)** as an **Observer**. The platform aims to create a long-term, predictable global finance mechanism for conserving tropical forests – crucial for climate mitigation and biodiversity protection.

What is the Tropical Forest Forever Facility (TFFF)? : TFFF is an international climate finance mechanism launched by Brazil to support **tropical forest countries (TFCs)** with performance-based payments for conserving and restoring **tropical and subtropical moist broadleaf forests (TSMBF)**.

Member Countries & Scope

- **Founding Members:** Brazil, Colombia, Ghana, Democratic Republic of Congo (DRC), Indonesia, Malaysia
- **Coverage:** ~1.2 billion hectares of eligible tropical forests across 70+ developing countries

Institutional Structure : TFFF functions as an **umbrella facility** with two key components:

1. **Tropical Forest Investment Fund (TFIF)**
 - Mobilises resources from public and private investors
 - Pools capital and invests in secure, clean fixed-income assets
 - Generates stable financial returns
2. **Tropical Forest Forever Facility (operational arm)**
 - Sets incentive rules, eligibility criteria
 - Manages monitoring, verification, and disbursement

Interim Institutional Host: **World Bank**, which acts as trustee and hosts the Secretariat.

Funding Model

- Aim to mobilise **\$25 billion** from member governments and up to **\$100 billion** from private investors.
- Annual conservation payments funded through TFIF's investment returns.
- **Payment Structure:**
 - Countries earn **\$4 per hectare per year** for maintaining forest cover.
 - Payments reduced in cases of **deforestation or forest fires**.

Support for Indigenous Communities

- **≥20%** of funds earmarked for **Indigenous Peoples and Local Communities (IPLCs)** participating in forest stewardship and monitoring.

Monitoring & Verification : Satellite-based real-time monitoring of:

- Canopy cover
- Deforestation
- Forest degradation

This ensures transparent, measurable, outcome-based payments.

11. Forest Advisory Committee Recommends Uniform Penal Provisions for Violations Under Van Adhiniyam, 1980



The Forest Advisory Committee (FAC) under the Union Environment Ministry has recommended **standardised penal action** for violations of the **Van (Sanrakshan E�am Samvardhan) Adhiniyam**, citing inconsistent penalties across states for similar offences in forest land diversion.

What Constitutes Violation?

Any **use of forest land for non-forestry purposes without prior approval** of the Central Government, including:

- De-reservation of forest land
- Assigning forest land on lease
- Clear-felling of trees
- Construction and infrastructure activities
- Any diversion not conforming to the Act's approval process

Key Recommendations of the Forest Advisory Committee

1. Uniform Penal Compensatory Afforestation (CA)

- Apply **penal CA on an equal area** of forest land that was illegally used.
- Ensures consistency in penalties across all states and UTs.

2. Combine Penal CA with Penal NPV

For proportionate punishment, combine **penal CA** and **penal Net Present Value (NPV)**. Makes violators compensate both in terms of **area restored** and **ecological service loss**.

3. Accountability & Reporting

- States must send **detailed violation reports** to MoEFCC regional offices or HQ.
- Reports must include **names of responsible officials**, enhancing accountability.

Important Concepts

EDUCASIUM IAS Academy
EPIC UPSC Classes

Penal Compensatory Afforestation (CA)

- Additional afforestation mandated **over and above** normal CA.
- Aims to restore ecological loss from **illegal** forest use.

Penal Net Present Value (NPV)

- Origin: Based on Supreme Court's directions (2017).
- Up to **5x NPV penalty** may be levied for illegal diversion.
- NPV = Monetary valuation of **ecosystem services** (carbon sequestration, biodiversity, soil & water protection) lost due to deforestation.

About the Van (Sanrakshan E�am Samvardhan) Adhiniyam, 1980

- Formerly the **Forest (Conservation) Act, 1980**.
- Regulates diversion of forest land for **mining, industry, agriculture, and infrastructure**.
- Mandates **prior Central Government approval** before any non-forestry use.
- Allows appeals before the **National Green Tribunal (NGT)**.
- Establishes the **Forest Advisory Committee (FAC)** for expert advice.
- **2023 amendment** introduced:
 - Land-use rationalisation provisions
 - **Penal NPV** mechanism
 - **Van Adhiniyam Rules 2023**, aligning conservation with developmental priorities.

12. Supreme Court Holds Uttarakhand Liable for Illegal Constructions in Corbett; Issues Nationwide Tiger Conservation Directives



The Supreme Court has held the **Uttarakhand government** responsible for illegal constructions in **Jim Corbett National Park**, ordering demolition, ecological restoration, and recovery of costs from involved officials. The Court also issued **pan-India directives** on tiger tourism, Eco-Sensitive Zones (ESZs), and human-wildlife conflict management.

Background of the Case

- **Massive Violation:** Uttarakhand sought approval to cut only **163 trees** but illegally felled **6,000+ trees** in Corbett's Pakhrau range for an unauthorised safari project.
- **Collusion:** Investigations revealed involvement of the **then Forest Minister** and **DFO**.
- **Legal Breach:** Violated the **Forest Conservation Act, 1980** and **Wildlife Protection Act, 1972** by converting protected forests into tourism zones.
- **Godavarman Case Link:** Tagged to the landmark **T.N. Godavarman case**, which expanded the meaning of "forest" and mandated rigorous scrutiny of forest diversion.

Supreme Court's Key Directives

1. Accountability & Restoration

- **Demolition within 3 months** of all unauthorised structures.
- **Ecological restoration** monitored by the **Central Empowered Committee (CEC)**.
- **Polluter Pays:** Full restoration cost to be recovered from responsible officials and private individuals.

2. New Rules for Tiger Safaris (Pan-India)

Core Ban: No tiger safaris in core areas, Critical Tiger Habitats (CTH), or tiger corridors.

Permitted Areas: Only on **non-forest or degraded forest patches** in buffer zones.

Rescue Linkage: Safaris may house only **injured, conflict, or orphaned animals** from the same landscape.

No Zoo Transfers: Animals cannot be sourced from zoos for tourist display.

3. National Tourism & Conservation Norms

- **ESZ Mandatory:** All states must notify **Eco-Sensitive Zones** around every tiger reserve within **one year**.
- ESZs should include **all buffer and fringe areas** or at least **1 km radial distance** where buffers are absent.
- **Eco-tourism Only:** Night tourism banned; noise & light pollution must be minimised.
- **Mobile Ban:** Tourists prohibited from using phones during safaris.

13. Reconciling Conservation & Community Rights – MoTA Policy Brief (2025)

The Ministry of Tribal Affairs (MoTA) has issued a policy brief to the Ministry of Environment, Forest & Climate Change (MoEFCC) proposing a **national framework** to balance wildlife conservation with the rights of forest-dwelling communities, especially within **tiger reserves**.

1. Key Recommendations of the Policy Framework

A. National Governance & Transparency

- **National Framework:** Joint MoTA-MoEFCC guidelines to standardise procedures, timelines, and accountability for relocation or coexistence.
- **Public Database:** A *National Database on Conservation–Community Interface* documenting:
 - relocation cases
 - compensation received
 - outcomes after resettlement
- **Independent Audits:** Yearly verification by accredited agencies to ensure compliance with:
 - Forest Rights Act (FRA) 2006
 - Wildlife Protection Act (WLPA) 1972
 - Human rights standards

B. Relocation as an Exceptional, Last-Resort Measure

- **Voluntary Relocation Only:** Must be used *only* when ecological & social evidence justify it.
- **Completion of Rights:**
 - All *Individual Forest Rights* (IFR) & *Community Forest Rights* (CFR) must be recognised **before** starting relocation (Gram Sabha verification mandatory).
- **Consent Safeguard:**
 - **Free, Prior & Informed Consent (FPIC)** monitored by accredited civil society observers.

C. Coexistence as the Preferred Approach

- **Right to Remain:** Forest-dwelling communities can stay within traditional habitats as protected by FRA 2006.
- **In-Situ Development:**
 - Deliver healthcare, education, water supply, housing **within** forest villages to avoid forced migration.
- **Shared Governance:**
 - Gram Sabha representatives included in:
 - Tiger Conservation Foundations (TCFs)
 - Eco-Development Committees (EDCs)

D. Legal Safeguards & Grievance Redressal

- **Compliance Officer:** Each tiger reserve must have a dedicated officer to ensure FRA + WLPA compliance.
- **Three-Tier Grievance System:** District → State → National levels.
- **Legal Protection:**
 - Any coercion or denial of rights attracts penalties under the **SC/ST (Prevention of Atrocities) Act, 1989.**

2. Challenges in Relocating Forest Dwellers

1. Livelihood Collapse

Relocation breaks links to forest-based livelihoods.

- *Example: Sahariya Adivasis, Kuno NP (MP) – >90% fell into debt after losing NTFP income (2019 study).*

2. Compensation Deficit

- NTCA's **₹15 lakh package** bypasses:
 - **LARR Act, 2013** safeguards
 - Social impact assessments
- LARR mandates compensation **up to 4x market value.**

3. FRA Violations & Coercion

Authorities often resettle communities **without granting CFR rights.**

- *Example: Baigas of Achanakmar TR (Chhattisgarh) relocated without CFR recognition.*

4. Decline in Health & Nutrition

Relocation disrupts traditional diets, undermining nutrition.

- *Example: Baiga families from Kanha TR (MP)*
 - Loss of 150+ traditional food sources
 - Rising malnutrition indicators.

5. Conflict Shifting (Not Resolving)

Relocation from core to buffer zones merely **moves** human-wildlife conflict.

- *Example: Tadoba-Andhari TR (Maharashtra)*
 - 40%+ conflict incidents occur in *buffer* areas where relocated villages were settled.

3. Significance of the MoTA Policy Brief

- Reasserts **FRA 2006 supremacy** over conservation displacement.
- Promotes **community-based conservation models** in line with global best practices.
- Demands **transparency, accountability & ethical decision-making** in tiger reserves.
- Reinforces India's constitutional commitments to:
 - Tribal autonomy
 - Social justice
 - Sustainable conservation

14. National Biodiversity Authority Releases ₹43.22 Lakh ABS Funds

The National Biodiversity Authority (NBA) has released ₹43.22 lakh in patent-linked Access and Benefit Sharing (ABS) funds to reward contributors of biological resources. These funds were generated from IPR applications that used Indian biological resources for research or commercial purposes. Andhra Pradesh will receive the largest share for community beneficiaries.

Access and Benefit Sharing (ABS)

- **Meaning:** A legal framework that regulates access to genetic/biological resources and ensures **fair and equitable sharing** of benefits with resource-holding communities.
- **Global Basis:** A core principle of the **Nagoya Protocol (2010)** under the **Convention on Biological Diversity (CBD)**.
- **India's Implementation:**
 - Governed through a **three-tier system** under the **Biological Diversity Act, 2002**:
 - NBA (National level)
 - State Biodiversity Boards (SBBs)
 - Biodiversity Management Committees (BMCs) at local bodies
- ABS enables communities to receive monetary and non-monetary benefits when their biological resources are used in innovation, research or commercial patents.

About the National Biodiversity Authority (NBA)

- **Status:** Statutory autonomous body created in 2003 under the **Biological Diversity Act, 2002**.
- **Headquarters:** Chennai.
- **Ministry:** Functions under the **Ministry of Environment, Forest & Climate Change (MoEFCC)**.
- **Functions:**
 - Regulates access to India's biological resources by foreign and domestic entities.
 - Ensures **benefit-sharing compliance**.
 - Advises the Central Government on biodiversity conservation and sustainable use.
 - Has **civil-court powers** for inquiry and enforcement.

About IPR in This Context

- **Intellectual Property Rights (IPR):** Legal rights that give creators exclusive control over use, reproduction, and commercialisation of their inventions for a defined period.
- When patents use Indian biological material, applicants must pay **ABS fees**, which are then passed to the local communities conserving those resources.

15. Tiger Returns to Ratanmahal Wildlife Sanctuary



A wild tiger has reappeared in Gujarat's Ratanmahal Wildlife Sanctuary, remaining there for **nine months** — the longest recorded stay in the state's modern history.

- With this, Gujarat becomes the only Indian state to host all three big cats: lions, leopards, and tigers.

About Ratanmahal Wildlife Sanctuary

- Alternate Name:** Also called the Ratanmahal Sloth Bear Sanctuary, it shelters the **largest population of sloth bears** in Gujarat.
- Establishment:** Declared a **wildlife sanctuary in 1982**.
- Location:** Situated in **Dahod district**, along the **Gujarat-Madhya Pradesh border**.
- Flora:** Characterized by **dry teak forests, mixed deciduous woodlands, and dry bamboo brakes**. The sanctuary has a **high density of mahua trees**, vital for sloth bears that feed on its flowers.
- Fauna:** Hosts **sloth bears, leopards, hyenas, jackals, four-horned antelopes, jungle cats**, along with diverse **birds and reptiles**.
- Hydrological Role:** Its forests serve as the **catchment area of the Panam River**, supporting regional water systems.

EDUCASIUM IAS Academy
EPIC UPSC Classes

16. Tigress Spotted Swimming Across Denwa River in Satpura Tiger Reserve



A forest patrol team filmed a **tigress swimming across the Denwa River** inside **Satpura Tiger Reserve**, highlighting the reserve's healthy riverine and wildlife habitat.

About Satpura Tiger Reserve

- Located in **Narmadapuram district, Madhya Pradesh**; part of the **Pachmarhi Biosphere Reserve**.
- Recognised as **India's first reserve forest** (historically notified under British rule).
- Represents the **Central Indian highland ecosystem**.

Biogeographical Features

- Called the "**northern extremity of the Western Ghats**" due to species overlap from **Himalayan** and **Nilgiri** regions.
- Rugged terrain: **Mahadeo Hills**, plateaus, deep gorges, ravines, sandstone cliffs, highland meadows.

Vegetation

- Tropical dry & moist deciduous forests.
- Dominant species: **teak, sal, bamboo, tendu**, and mixed hardwoods.

Faunal Diversity

- Tigers, leopards, sloth bear, Indian gaur, dhole, swamp deer.
- **Only stronghold of the Indian giant squirrel** in central India.

About Denwa River

- Perennial tributary of the **Tawa River**; called the "**lifeline**" of Satpura.
- **Origin**: Southern slopes of the **Mahadeo Hills**.
- **Flow**: East-west through Satpura National Park.
- **Confluence**: Meets Tawa near **Ranipur**.
- **Tawa Reservoir**: Confluence zone designated as a **Ramsar Site** (5th in Madhya Pradesh).

Significance

- Indicates robust **riverine connectivity**, essential for tiger movement and prey distribution.
- Reinforces Satpura's status as a key **landscape-level conservation zone** in central India.

Keywords: Satpura Tiger Reserve, Denwa River, Pachmarhi Biosphere Reserve, Mahadeo Hills, Indian Giant Squirrel.

17. Khangchendzonga National Park Rated “Good” by IUCN – Only Indian Site with This Status

In Nov 2025, IUCN rated Khangchendzonga National Park (Sikkim) as “Good” in its global assessment of natural World Heritage Sites – the only Indian site to receive this rating, while the Western Ghats and Sundarbans face serious concern flags.

About Khangchendzonga National Park

- **UNESCO Status:** Declared a **World Heritage Site (2016)**; India's **first “mixed heritage” site** for natural + cultural significance.
- **Area:** 1,784 sq km; ranges from subtropical forests to the 8,586 m **summit of Mount Khangchendzonga**, the world's **3rd-highest peak**.

Biodiversity Highlights

- Contains 280 glaciers and 70+ glacial lakes.
- Key fauna: **Snow leopard, red panda, Himalayan tahr, musk deer, over 550 bird species** including impeyan pheasant and satyr tragopan.

Cultural Significance

- **Lepcha worldview:** The region is **Mayel Lyang**, a sacred hidden paradise.
- **Tibetan Buddhist tradition:** Considered a **beyul** (sacred valley).
- Tholung and other monasteries preserve ancient religious and ecological traditions.

Conservation & Community Integration

- **2018 Biosphere Reserve expansion** added a buffer zone for:
 - Sustainable agriculture
 - Community-managed forests
 - Traditional livelihoods
- Demonstrates **people-nature coexistence** and improved conservation outcomes.

Significance

- Boosts India's global conservation profile.
- Reinforces the Himalayan region's ecological and cultural uniqueness.
- Important for UPSC themes: **World Heritage Sites, Biodiversity Hotspots, Community Conservation**.

Keywords: Khangchendzonga National Park, IUCN Rating, UNESCO Mixed Heritage, Sikkim, Snow Leopard.

18. New Jumping Spider Species *Pilia malenadu* Discovered in Karnataka's Western Ghats



Researchers identified a new jumping spider species, *Pilia malenadu*, in Chikkamagaluru district, Karnataka.

About *Pilia malenadu*

- Newly discovered **jumping spider species** of the genus *Pilia*.
- **Etymology:** “Malenadu” in Kannada means “**land of the rain**”.
- First *Pilia* discovery in **123 years** – last recorded in **Kerala (1902)**.
- First study to document **both male and female** specimens of the genus.

Habitat & Ecology

- Found **exclusively** on two plant species:
 - *Memecylon umbellatum* (Anjan / Ironwood).
 - *Memecylon malabaricum*.
- Highlights the **microhabitat specialization** of Western Ghats arthropods.

Physical Characteristics

- Size: **Under 5 mm**.
- Colour: **Brown with white markings**.
- Distinct **V-shaped abdominal patterns**.

Significance

EDUCASIUM IAS Academy
EPIC UPSC Classes

- Enhances understanding of **Western Ghats biodiversity**, a global hotspot.
- Shows the importance of **microhabitat protection** in conservation planning.
- Reinforces the need for continued taxonomic surveys in understudied regions.

Keywords: *Pilia malenadu*, Western Ghats, Jumping Spider, Biodiversity, *Memecylon*, Endemic Species.



19. New Flowering Plant *Crassicaulis middletonii* Discovered in Arunachal Pradesh

The Botanical Survey of India (BSI) discovered a **new plant species and new genus record for India** in Arunachal Pradesh's West Siang district.

About *Crassicaulis middletonii*

- Newly identified **flowering plant** belonging to the genus **Crassicaulis**.
- First-ever record of this **genus in India**.
- Extends the plant's known global range ~**12,000 km westward** from its previously known distribution in China.

Habitat & Ecology

- Occurs along **stream banks** and near **small waterfalls**.
- Found in **evergreen forests** at around **800 m elevation**.
- Indicates high ecological sensitivity and microhabitat specialization.

Physical Description

- Grows up to **30 cm tall**.
- Has slender stems with **white flowers tinged with pink**.

Threats

- Vulnerable to:
 - **Pollution**
 - **Landslides**
 - **Flash floods**
- Threats linked to changing rainfall patterns and local disturbances.

Biogeographical Significance

- Highlights the **Eastern Himalaya** as a "biogeographical bridge" connecting Indian and Southeast Asian plant lineages.
- Reinforces Arunachal Pradesh's role as a **global biodiversity hotspot**.

Significance

- Enhances India's botanical database and conservation priorities.
- Strengthens understanding of Himalayan floristic links and endemism.

Keywords: *Crassicaulis middletonii*, BSI, Eastern Himalaya, New Genus, Arunachal Pradesh, Biodiversity Hotspot.

20. *Protidricerus albocapitatus* Owlfly



Protidricerus albocapitatus is a newly discovered species of owlfly found by scientists in the Western Ghats of Kerala, India.

Key Highlights

- **Discovery Location:** Western Ghats of Kerala, India.
- **Significance:** It is only the **second species** from the genus *Protidricerus* recorded in India, highlighting the region's biodiversity.
- **Appearance:** The species is distinctive for having a long **tuft of white hairs on its head** and a **white club** at the tip of its antennae.
- **Etymology:** Owlflies get their common name from their **crepuscular** (active during twilight/dawn) behavior and their **large, owl-like eyes**.

21. Discovery of New Bush Frog Species



The Wildlife Institute of India (WII) has documented **13 new species** of bush frogs in the Northeastern states.

- The Wildlife Institute of India (WII) has documented **13 new species** of bush frogs in the Northeastern states.
- **Species Distribution:**
 - Arunachal Pradesh: 6 species
 - Meghalaya: 3 species
 - Assam, Mizoram, Nagaland, Manipur: 1 species each
- **Total Count:** With this taxonomic update, **India now hosts 95 species** of bush frogs.

About Bush Frogs (Genus *Raorchestes*)

- **Nature:** Nocturnal, arboreal frogs noted for **direct development** and **high endemism**.
- **Appearance:** Small, slender-bodied frogs with **wide variation in colour and pattern**, even within a single population.
- **Life Cycle:** Exhibit **direct development** – skipping the tadpole stage, with froglets hatching directly from eggs.
- **Habitat Needs:** Thrive in **humid environments** with **consistent moisture**, essential for the survival of their **delicate, shell-less eggs**.
- **Distribution:** Found across the **Indo-Burma and Western Ghats biodiversity hotspots**, typically restricted to **highly localised habitats**.

22. New Fruit Fly Species: *Euphranta undulata*



A new species of fruit fly, *Euphranta undulata*, was recently discovered in the Ri-Bhoi district of Meghalaya, India.

Discovery Location: Ri-Bhoi district of Meghalaya, India.

Appearance: It is a slender-bodied insect featuring a brown or grey abdomen and patterned **transparent (hyaline) wings**.

Ecological Role: This fruit fly is **frugivorous** (fruit-eating) and **monophagous** (feeding only on a single type of food). It is native to the **bamboo ecosystem** of Northeast India.

Etymology: The name *undulata* means "wavy" in Latin, referring specifically to the **wavy margin** found on the tip of the **female's aculeus** (egg-laying structure).



23. *Tanigia silasii* (Indian Octopus Squid) – New Deep-Sea Species Discovered

A new deep-sea squid species named *Tanigia silasii*, commonly called the **Indian octopus squid**, has been discovered in the Arabian Sea at ~390 m depth by researchers of CMFRI (ICAR).

About *Tanigia silasii*

1. Taxonomy & Classification

- **Genus:** *Tanigia*
- **Family:** *Octopoteuthidae*
- **Only the second species** in the genus after *Tanigia danae* (Atlantic).

2. Why called the “Octopus Squid”?

- Members of *Octopoteuthidae* lack the two long feeding tentacles found in most squid species.
- Thus, they possess **8 arms (like octopuses)** instead of the typical 10 arms of squid.

3. Key Distinguishing Features

- Compared to *T. danae*, the Indian species has:
 - **Fewer gill lamellae**
 - **Oval funnel-mantle locking cartilage** (important taxonomic character)

4. Genetic Confirmation

- **DNA barcoding shows 11% divergence** from the Atlantic species.
- This level of divergence confirms it is a **distinct species**.

5. Habitat & Discovery

- Depth: ~390 m (Upper bathypelagic zone)
- Location: **Arabian Sea**
- Research Body: **Central Marine Fisheries Research Institute (CMFRI)**, under **ICAR, Ministry of Agriculture & Farmers' Welfare**.

About CMFRI – UPSC Point

- Headquartered in **Kochi, Kerala**.
- India's premier **marine fisheries research institution**.
- Functions under **ICAR** (Department of Agricultural Research and Education).

UPSC Prelims Keywords

- *Octopoteuthidae*
- Deep-sea species discovery
- CMFRI (ICAR)
- DNA barcoding divergence
- Funnel-mantle locking cartilage

24. Ginkgo-Toothed Beaked Whales

Researchers observed live individuals of the extremely rare ginkgo-toothed beaked whale for the first time along the Baja California coast, Mexico – previously known only from stranded carcasses.

About Ginkgo-Toothed Beaked Whale (*Mesoplodon ginkgodens*)

- Deep-diving, elusive cetacean named after its ginkgo leaf-shaped teeth in adult males.
- Part of the beaked whale family (Ziphidae) – 24 species, the second-most diverse cetacean group after dolphins.

Physical & Biological Traits

- **Appearance:**
 - Males: Dark grey/blue-black.
 - Females: Light grey.
 - Males show **fewer scars** than other beaked whales.
- **Teeth:** One pair of large, ginkgo-shaped teeth in lower jaw (adult males only).
- **Behaviour:**
 - Highly elusive; surface briefly.
 - Spend majority of life in **deep offshore waters**.

Distribution

- Found in warm, deep tropical & temperate waters of:
 - Indian Ocean
 - Pacific Ocean
- Strandings reported from **Japan, Sri Lanka, Australia, California, New Zealand**.

Threats

- **Anthropogenic noise** (naval sonar, seismic surveys).
- **Fishing gear entanglement**.
- **Plastic ingestion & marine debris**.
- **Chemical pollution** in deep-sea food webs.

Conservation Status

- IUCN: Data Deficient
- CITES: Appendix II

Significance

- First live documentation improves understanding of **behaviour, distribution, and conservation needs**.
- Highlights importance of monitoring **deep-sea megafauna** threatened by human activities.

Keywords: Ginkgo-Toothed Beaked Whale, Deep-Sea Cetacean, Baja California, Marine Biodiversity, Ziphidae.

25. Scientists Discover Potent Natural Herbicide in Manchurian Walnut Leaves



Researchers identified strong **weed-killing properties** in the **Manchurian Walnut** (*Juglans mandshurica*), due to the allelopathic compound **juglone** and a newly noted natural herbicide **2Z-decaprenol**.

Weed-Killing Compounds

- **Juglone:** Common to all walnut species; suppresses growth of nearby plants (allelopathy).
- **2Z-decaprenol:** Newly identified natural herbicide in Manchurian Walnut leaves; shows strong weed-control potential.

About the Manchurian Walnut Tree

- **Type:** Fast-growing, deciduous, cold-resistant walnut species.
- **Native Range:** Northeast China, Korean Peninsula, eastern Russia, northern Japan.
- **Preferred Habitat:** Temperate broadleaf forests, riverbanks, moist valleys, shaded slopes.
- **Soil Need:** Deep, moist, well-drained loamy soils with high organic matter.

Morphology & Ecological Traits

- **Leaves:** Large compound leaves (60–80 cm).
- **Nut Shell:** Thick, heavily textured, characteristic of the species.
- **Cold Tolerance:** Survives -40°C winters – the most cold-resistant walnut species.
- **Growth Pattern:**
 - Rapid early growth: **1-2 m/year** for first 20 years.
 - Lifespan: Up to **300 years**.

Human Uses

- **Wood:** Durable hardwood used in furniture, cabinetry, and decorative craft.
- **Nuts:** Provide edible kernels and high-quality oil.

Significance

- Opens pathways for developing **eco-friendly herbicides**, reducing dependence on synthetic chemicals.
- Important for **sustainable agriculture**, agroforestry, and natural weed management research.

Keywords: Manchurian Walnut, Juglone, Natural Herbicide, 2Z-Decaprenol, Allelopathy, Temperate Forests.

26. Smooth-Coated Otter Recorded After 25 Years in Indravati Tiger Reserve



Researchers documented **smooth-coated otters** inside **Indravati Tiger Reserve (Chhattisgarh)** – the first confirmed sighting in **25 years**.

About Smooth-Coated Otter (*Lutrogale perspicillata*)

- Highly social, semi-aquatic mammal found across **South & Southeast Asia**; an isolated population exists in **Iraq marshlands**.
- Physical Traits:** Large otter species with short, smooth, glossy **reddish-brown coat**.
- Habitat:** Prefers **freshwater rivers, lakes, wetlands**; tolerates estuaries but needs fresh water for drinking.
- Dens:** Dug under tree roots, between boulders, or dense riverside vegetation.
- Diet & Behaviour:**
 - Carnivorous; mainly **fish-eater**.
 - Forms coordinated **V-shaped formations** to herd fish.
 - Diurnal; lives in **family groups up to 11**.

Ecological Role & Threats

- Functions as an **apex predator** regulating fish populations.
- Indicator of **healthy freshwater ecosystems**.
- Threats: Habitat loss, water pollution, pesticides, poaching, illegal wildlife trade.

Conservation Status

- IUCN:** Vulnerable
- CITES:** Appendix I
- WPA (India):** Schedule I

About Indravati Tiger Reserve

- Located in **Bijapur district, Chhattisgarh**; tropical moist & mixed deciduous forest.
- Flagship species:** Wild Asian Buffalo (critically endangered).
- Other fauna: Tigers, leopards, Indian gaur, nilgai, blackbuck, sloth bear, dhole.
- Flora:** Teak, Sal, Bamboo, Mahua, Tendu.
- Indravati River:** Perennial river forming the **northern boundary** and the **border with Maharashtra**.

Significance

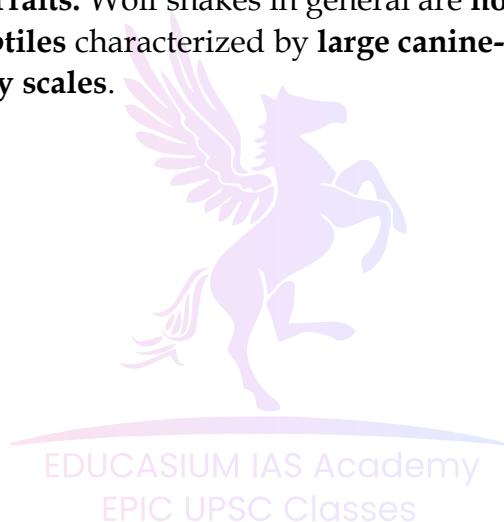
- Rediscovery indicates improving **freshwater habitat quality**.
- Adds conservation urgency for otters and river ecosystems in central India.

Keywords: Smooth-Coated Otter, Indravati Tiger Reserve, Wild Asian Buffalo, Vulnerable Species, Freshwater Biodiversity.

27. Discovery of a New Wolf Snake Species



- A newly identified species of wolf snake, **Lycodon irwini**, has been found on the **Great Nicobar Island**.
- Commonly called **Irwin's wolf snake**, it is a **non-venomous, nocturnal species** named in honor of the late Australian conservationist **Stephen Robert Irwin**.
- **Distinctive Features:** The snake displays a **uniform, glossy black dorsal surface** without any bands or spots, and can reach a length of **up to 1.2 meters**.
- **Habitat:** This species is **endemic to the moist evergreen forests** of Great Nicobar Island.
- **Wolf Snake Traits:** Wolf snakes in general are **non-venomous, nocturnal reptiles** characterized by **large canine-like teeth** and **smooth, shiny scales**.



28. Climate Change Disrupts Hibernation of Himalayan Black Bears



Erratic weather patterns caused by climate change are altering the **hibernation cycles** of Himalayan Black Bears, making them unusually active and aggressive in winter, leading to rising conflict incidents.

Impact of Climate Change

- Warmer winters reduce the need for **deep hibernation** (normally 5–7 months).
- Bears remain active longer → **more encounters** with people and livestock.
- Increase in **crop raiding**, livestock attacks, and human injuries.
- Shifts linked to **disturbed food cycles**, reduced snowfall, and habitat stress.

About Himalayan Black Bear (*Ursus thibetanus laniger*)

- Subspecies of **Asiatic Black Bear**; called “**moon bear**” due to its white crescent chest mark.
- Range: **India, Nepal, Bhutan, China, Pakistan** across **1,500–3,700 m** elevations.
- Physical traits: Glossy black coat, V-shaped chest patch, rounded ears, elongated snout.
- Behaviour:
 - Nocturnal, solitary, excellent climbers.
 - Spend long durations in trees; omnivorous diet.
- Ecological role: **Keystone species** and major **seed disperser**, essential for forest regeneration.
- Threats: Habitat loss, human encroachment, poaching (especially **gall bladders** for traditional medicine).

EDUCASIUM IAS Academy

Asiatic Black Bear (Parent Species) UPSC Classes

- Medium-sized, arboreal bear native to Asia.
- **Conservation Status:**
 - IUCN: Vulnerable
 - CITES: Appendix I
 - WPA (India): Schedule I

Significance

- Highlights how **climate disruption** directly affects wildlife behaviour.
- Calls for improved **conflict mitigation**, early warning systems, habitat restoration, and community awareness.
- Important for UPSC under **Climate Change** → **Biodiversity** → **Human-Wildlife Conflict**.

Keywords: Himalayan Black Bear, Hibernation Shift, Climate Change, Human-Animal Conflict, Keystone Species.

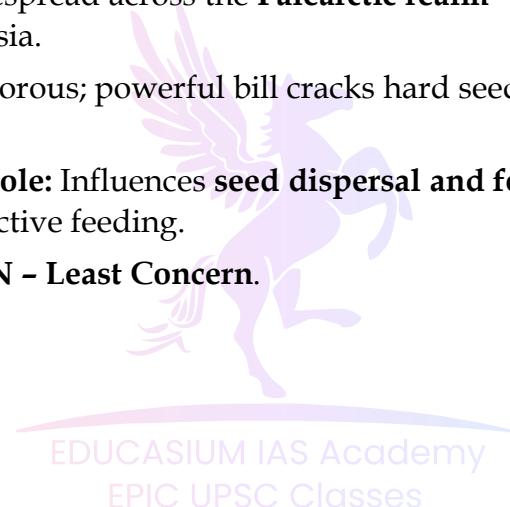
29. Hawfinch Sighting in India



A Hawfinch was recently recorded at Jim Corbett National Park, Uttarakhand, marking the first confirmed sighting in India.

Hawfinch (*Coccothraustes coccothraustes*)

- **Largest finch** of Europe and Asia, noted for its **massive conical beak**.
- **Appearance:** Large round head, thick neck, black throat patch; bill changes colour seasonally.
- **Habitat:** Mature deciduous and mixed forests with cherry, hornbeam, maple, and other hard-seed trees.
- **Migration:** European populations largely resident; Asian populations migrate south in winter.
- **Range:** Widespread across the **Palearctic realm** – Europe, North Africa, temperate Asia.
- **Diet:** Granivorous; powerful bill cracks hard seeds and fruit pits (cherry, olive, plum).
- **Ecological Role:** Influences seed dispersal and forest regeneration through selective feeding.
- **Status:** IUCN – Least Concern.



30. Chile Reclassifies Humboldt Penguin as 'Endangered'



Chile's Ministry of Environment has reclassified the **Humboldt penguin** as *endangered* after its population declined by **over 50% since the late 1990s**.

Humboldt Penguin (*Spheniscus humboldti*)

Overview

- Medium-sized penguin native to the **Pacific coasts of Chile and Peru**.
- Named after the **Humboldt Current**, a cold, nutrient-rich ocean current.

Habitat

- Occupies **rocky shores**, offshore islands, and nests in **burrows, caves, or crevices**.

Distribution

- Population follows the Humboldt Current.
- ~80% of the global population is found along **Chile's Pacific coast**.

Key Traits

- **Behaviour:** Social, monogamous; both parents share incubation and chick-rearing.
- **Appearance:** Black head, white face stripe, pink bare skin around the bill.
- **Adaptations:**
 - **Tongue spines** grip slippery prey.
 - **Bare skin patches** help dissipate heat.

Ecological Role

- Acts as a **mid-level marine predator**, regulating populations of small schooling fish.

Major Threats

- Bycatch in fishing nets
- Guano extraction destroying nesting sites
- Food competition with fisheries
- Avian influenza outbreaks
- Habitat disruption and climate-driven changes in prey availability

Conservation Status

- **IUCN:** Vulnerable
- **CITES:** Appendix I
- **Chile (2025):** *Endangered* at national level

31. Grey Seal – Complex Mammalian Milk



Researchers have discovered that **grey seal (Halichoerus grypus)** milk contains 332 distinct oligosaccharides, the highest ever recorded among mammals. Human milk has around 100. These complex sugars are crucial for immunity and gut microbiome development in seal pups.

Scientific Significance of the Discovery

- Grey seals produce **rapid-growth, high-fat milk** due to their short lactation window (typically 2-3 weeks).
- **332 oligosaccharides** support:
 - Strong **antiviral and antibacterial protection**
 - Rapid establishment of **microbial flora**
 - Enhanced immunity during vulnerable early life stages
- Highlights **mammalian lactation diversity** and offers insights for **infant nutrition research**, probiotics, and veterinary science.

About Grey Seal (Halichoerus grypus)

- A large marine seal native to **North Atlantic** and **Baltic Sea**.
- **Only species in the genus Halichoerus**.
- Recognisable by its **long, straight "horse-like" nose**.

Physical & Biological Characteristics

- **Appearance:** Grey-brown coat with mottled blotches; males larger and darker with prominent noses.
- **Haul-out Sites:** Rocky shores, ice edges, sandy beaches, offshore islands – used for resting, breeding, moulting.
- **Diet:** Opportunistic predator feeding on fish, crustaceans, cephalopods; uses **vibrissae (whiskers)** to detect water vibrations.

Behaviour & Ecology

- **Bottling Behaviour:** Seals float vertically with only the head exposed – conserves energy and maintains vigilance.
- **Ecological Role:** Apex predator stabilising coastal food webs and regulating prey populations.

Conservation Status & Threats

- **IUCN Status: Least Concern**
- **Threats:**
 - Fishing gear entanglement
 - Marine pollution
 - Habitat disturbance
 - Declining prey stocks
 - Climate-related impacts on coastal breeding sites

Distribution

Major populations in:

- **UK, Ireland, Iceland, Norway**
- **Canada, northeastern USA**
- **Baltic Sea subpopulations**

32. Bihar's Gogabeel Lake Declared India's 94th Ramsar Site



Gogabeel Lake, located in Katihar district, Bihar, has been designated as India's 94th and Bihar's 6th Ramsar Site.

About Gogabeel Lake

- **Type:** Permanent **oxbow lake**, spread across **86.63 hectares**.
- Formed by old channels of the **Kankhar** and **Mahananda** rivers.
- **Hydrology:** Receives floodwaters from the **Mahananda, Ganga**, and **Kankhar** rivers.
- **Protection Status:**
 - Bihar's first **Community Reserve** (2019).
 - Identified as an **Important Bird and Biodiversity Area (IBA)**.
- **Avifauna:** Habitat for species like:
 - **Lesser Adjutant Stork**
 - **Pallas's Fish Eagle**
 - **Black-necked Stork**
 - Other migratory and resident waterbirds.

Ramsar Context (India)

- **Top states:** Tamil Nadu (20 sites) > Uttar Pradesh (10) > Bihar (6).
- **First designations (1981):**
 - Chilika Lake – Odisha
 - Keoladeo National Park – Rajasthan
- **Largest Ramsar site:** Sundarbans Wetland, West Bengal.
- **Smallest:** Renuka Wetland, Himachal Pradesh.

Significance

- Enhances wetland conservation in the **Gangetic floodplain**.
- Supports biodiversity, migratory pathways, and climate resilience.
- Boosts eco-tourism and community-led conservation initiatives.

Keywords: Gogabeel Lake, Ramsar Site, Oxbow Lake, IBA, Wetland Conservation, Bihar.

33. Push to Declare Assam's Rowmari–Donduwa Wetland Complex as a Ramsar Site



Conservationists and researchers are advocating for **Ramsar designation** for the **Rowmari Donduwa wetland complex** in central Assam.

About Rowmari Donduwa Wetland Complex

- An **interconnected floodplain-marsh ecosystem** comprising **Rowmari Beel** and **Donduwa Beel**.
- Located inside **Laokhowa Wildlife Sanctuary**, on the **southern bank of the Brahmaputra**, Nagaon district.
- Acts as a **buffer zone** for the **Kaziranga Tiger Reserve**, enabling wildlife movement between **Kaziranga** and **Orang National Parks**.

Avian Diversity

- Hosts **120+** bird species.
- **Kaziranga Waterbird Census** recorded **47,000+** birds, surpassing counts from Ramsar sites like **Deepor Beel** and **Loktak**.
- Key species:
 - **Knob-billed Duck**
 - **Lesser Adjutant Stork**
 - **Black-necked Stork**
 - **Ferruginous Pochard**
 - **Common Pochard**



Ecological Importance

- Supports:
 - **Flood regulation**
 - **Groundwater recharge**
 - **Carbon storage**
 - **Fisheries and local livelihoods**
 - **Ecotourism potential** in the Brahmaputra floodplains

Ramsar Context

- **Ramsar Convention (1971)** designates wetlands of international importance.
- India has **94 Ramsar Sites**, third globally after the UK and Mexico.
- **Tamil Nadu (20)** has the most sites.
- **Assam currently has only one** Ramsar site – **Deepor Beel**.

Significance

- Ramsar status would boost **conservation priority**, funding access, and long-term protection.
- Supports Assam's wetland biodiversity and enhances India's global wetland commitments.

Keywords: Rowmari Donduwa, Laokhowa Sanctuary, Wetland Conservation, Brahmaputra Floodplain, Ramsar, Assam.

34. Study Shows Climate Change Influences Earthquakes & Magma Activity at Lake Turkana



A new study reveals that **climate-driven changes** in Lake Turkana's water levels directly impacted **fault movement** and **magma generation** in the East African Rift Valley.

Key Findings

- **Climate-Rift Interaction:** Water-level changes altered **crustal pressure**, affecting fault slip rates and earthquake frequency.
- **Dry Phase (Low Water):**
 - Reduced water weight → **crustal unloading**.
 - Faster **fault movement** and **higher earthquake activity**.
 - **Magma melts & rises faster**, increasing eruption potential.
- **Wet Phase (High Water):**
 - Increased water weight → **crustal loading**.
 - Slower fault slipping, fewer earthquakes.
- **Geological Record:** Indicates **intensified tectonic activity** after ~5,000 years ago when the region entered a prolonged dry phase.

About Lake Turkana (UPSC Facts)

- **Largest permanent desert lake & largest alkaline lake** in the world.
- Located mainly in **Kenya's Great Rift Valley**; northern end extends into **Ethiopia**.
- Nicknamed the "**Jade Sea**"; declared a **UNESCO World Heritage Site (1997)**.
- Major paleoanthropological zone → "**Cradle of Humankind**" (rich hominin fossils).
- Fed by **Omo River (90% inflow)**, Turkwel, and Kerio rivers.
- Hosts the world's **largest breeding colony of Nile crocodiles**, mainly on Central and South Islands.

Significance

- Demonstrates how **climate variability** can directly influence **geological processes** over millennia.
- Helps refine models of **earthquake forecasting**, **rift evolution**, and **volcanic hazard assessment**.
- Reinforces the interconnection between **hydrology**, **climate change**, and **tectonics**.

Keywords: Lake Turkana, East African Rift, Climate-Tectonic Link, Magma Uplift, Earthquakes.

35. Dariya Bahadur Island



Context (TOI): The Udupi Police have filed a case against individuals accused of **trespassing** on the restricted Dariya Bahadur Island.

Location: This island is a **small, rocky landmass** situated off **Malpe beach in Karnataka**.

- **Geography:** Positioned in the **Arabian Sea**, it is one of the **four islands** located near the **Malpe port region**.
- **Alternate Names:** The island is also known as **Bhadragada Island** or **Lighthouse Island**.
- **Historical Significance:** It contains remnants of the **Daria Bahadurgarh Fort**, constructed by **Basavappa Naik of Bidanur**.



36. Study Finds High Heavy Metal Levels in Cauvery River Fish, Raises Health Risk Concerns



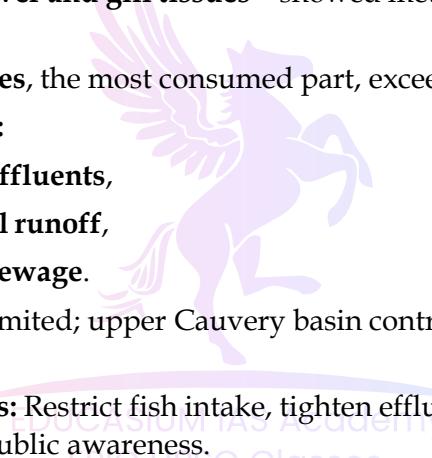
A recent scientific study detected **dangerous concentrations of heavy metals** in fish from the **Cauvery River**, indicating major **human health risks** from long-term consumption.

About the Study

- Sampling covered **18 sediment sites** and **10 fish collection sites**.
- Analysed key metals: **chromium, cadmium, copper, lead, zinc**.
- Used **Geoaccumulation Index, Ecological Risk Index**, and statistical models to identify natural and anthropogenic sources.

Key Findings

- Cadmium (Cd)** and **Lead (Pb)** were the most concerning contaminants.
- Fish—especially **liver and gill tissues**—showed metal concentrations well above safe limits.
- Even **muscle tissues**, the most consumed part, exceeded health standards.
- Pollution Sources:**
 - Industrial effluents,
 - Agricultural runoff,
 - Untreated sewage.
- Natural inputs:** Limited; upper Cauvery basin contributes mineral-derived metals (mainly iron).
- Recommendations:** Restrict fish intake, tighten effluent controls, continuous monitoring, and public awareness.



Significance

- Highlights the need for **river pollution control**, stricter monitoring, and safer fish consumption advisories.
- Supports India's broader goals under **SDG 6 (Clean Water)** and **public health protection**.

Keywords: Cauvery Pollution, Heavy Metals, Cadmium, Lead, Health Risk, River Ecology.

37. Road Dust Emerges as Major PM₁₀ Source; Key Challenge for NCAP's 40% Reduction Target



Road dust is now identified as a **major contributor** to PM₁₀ pollution in Indian cities, posing a challenge to the **National Clean Air Programme (NCAP)** target of **40% PM₁₀ reduction by 2025–26**.

Consequences of Road Dust

- **Health Impact:** Triggers respiratory diseases, eye irritation; ICMR notes higher OPD cases during PM spikes.
- **Pollution Share:** Contributes **20–52% of PM₁₀** and **8–25% of PM_{2.5}**, worsening AQI and winter smog.
- **Heat Stress:** Bare verges raise local temperatures; IPCC AR6 shows greening cuts heat by **2–4°C**.
- **Economic Loss:** Lowers labour productivity; World Bank estimates **1.4% GDP loss** from air pollution.

Why Dust Reduction Matters

- **Largest PM₁₀ Segment:** 20–52% share across major cities; key to meeting NCAP goals.
- **Regional Urgency:** North Indian cities have high silt loads; Delhi averages **14.47 g/m²**.
- **Budget Priority:** ~64% of NCAP funds already used for dust mitigation.
- **Mobility Gains:** Mechanised sweeping improves road performance and reduces accidents.

Challenges

- **Fragmented Governance:** Multiple agencies manage roads; Delhi alone has **12 authorities**.
- **Machine Shortage:** Severe gap in mechanised sweepers (e.g., Delhi needs **200**, has **85**).
- **Poor Road Quality:** Damaged roads trap silt; CAQM found **24%** in poor condition.
- **Weak SOPs:** No national standards for sweeping, dust disposal, or suppressant use.

Way Forward (UPSC-Relevant)

- **Single Nodal Agency:** City-level unified authority (like **CAQM model**) for coordinated action.
- **Verge Greening:** Expand roadside plantation/paving (Bengaluru model) to stabilise dust.
- **Right Machinery:** Deploy sweepers suited to road width & debris types (EU best practice).
- **Validated Suppressants:** Scale up chemical/natural agents after Indian trials (CSIR-CRRI pilots).

38. India May Generate 11 Million Tonnes of Solar Waste by 2047: CEEW Study



A CEEW report projects India could generate ~11 million tonnes of solar waste by 2047, driven mainly by end-of-life **crystalline-silicon modules**.

Key Findings

- India will need ~300 specialised recycling plants to process projected waste.
- Recovered materials (**silicon, copper, aluminium, silver**) could create a **₹3,700 crore circular-economy** opportunity by 2047.
- Effective recycling can meet **38% of raw material demand** for domestic solar manufacturing and avoid ~37 million tonnes of CO₂ emissions.

Current Concerns

- Solar recycling ecosystem is **nascent**; only a few commercial units.
- Recycling is currently **loss-making** (₹10,000–12,000 per tonne).
- Module buyback costs** make up two-thirds of recycler expenditure.
- Risk of large volumes landing in **landfills**, causing environmental pollution.

Policy Recommendations (CEEW)

- Introduce Extended Producer Responsibility (EPR) for solar modules under **E-Waste Management Rules, 2022**.
- Provide **EPR certificate trading**, tax incentives, and fund **R&D** for better silicon/silver recovery.
- Create a **centralised solar inventory** to track waste hotspots and improve data transparency.
- Establish a **Circular Solar Taskforce** under MNRE for coordinated policy and industry action.

Significance

- Ensures sustainable growth of India's **renewable energy sector**.
- Reduces raw material dependence and promotes **Atmanirbhar Bharat** in solar manufacturing.
- Prevents emerging environmental risks from rapidly expanding solar installations.

Keywords: Solar Waste, CEEW, Circular Economy, EPR, Solar Recycling, MNRE.

39. MoHUA Launches DRAP to Fast-Track Legacy Waste Remediation Under SBM-U 2.0



The Ministry of Housing & Urban Affairs (MoHUA) launched the **Dumpsite Remediation Accelerator Programme (DRAP)** to speed up the clearance of legacy waste dumps across Indian cities

Current Dumpsite Situation in India

- **1,428 active dumpsites**; nearly 23 crore MT of legacy waste.
- 80% concentrated in **214 high-impact sites** across **202 ULBs**.
- **Progress so far:**
 - 1,048 sites remediated; **14.33 crore MT** waste processed.
 - **7,580 acres** of urban land reclaimed (~50%).
- **Financial Support:**
 - Centre provides **₹550/tonne**.
 - **₹4,181 crore CFA** approved for **₹10,228 crore** projects.

Objectives & Features of DRAP

- **Accelerated Remediation:** Fast-track biomining, bio-remediation, scientific capping to meet the **2026 deadline**.
- **Land Reclamation:** Repurpose cleared land for **green zones**, utility assets, or infrastructure.
- **Pollution Reduction:** Lower **methane emissions**, leachate seepage, and improve groundwater quality.
- **Institutional Strengthening:**
 - Creation of **SBM Knowledge Management Unit (KMU)** at NIUA.
- **Financing & PPP:**
 - Launch of **Urban Invest Window (UiWIN)** by HUDCO to draw private and multilateral investments.

Challenges

- **Technical Gaps:** Most ULBs lack skilled workforce; only 30% have functional waste processing facilities.
- **Funding Shortfall:** Remediation cost (~₹10,000 crore) > available CFA; need stronger state & PPP support.
- **Fresh Waste Issue:** Low segregation (~60%) risks **re-creation of dumps**.
- **Compliance Weakness:** Only 68% ULBs notified SWM Rules by-laws; <45% achieve full source segregation.
- **Monitoring Delays:** Only 35% ULBs submit timely progress data, slowing fund release.

40. CREA Report: 60% of India's PM2.5 Crosses District Borders, Calls for Airshed-Level Regulation



The Centre for Research on Energy and Clean Air (CREA) released the report "Beyond City Limits: A Satellite-Based PM2.5 Assessment", analysing India's pollution load through an **airshed** approach.

What is an Airshed?

- As per **World Bank**: A **geographic area** where pollutants accumulate and create **shared air quality** for all regions within it.

Key Findings of the Report

- National PM2.5:** India's annual average **55–60 $\mu\text{g}/\text{m}^3$** ;
 - 60% of districts** exceed NAAQS ($40 \mu\text{g}/\text{m}^3$).
 - Zero districts** meet WHO guideline ($5 \mu\text{g}/\text{m}^3$).
- Cross-Border Pollution:** Over 60% of PM2.5 travels across district boundaries → city-level policies insufficient.
- Worst Airshed:** Indo-Gangetic Plains – due to winter inversions, dense emissions, and cross-border flows.
- Most Polluted Regions:**
 - Delhi:** Highest PM2.5 at **101 $\mu\text{g}/\text{m}^3$** .
 - Assam & Delhi each contribute **11 of top 50 polluted districts**.
- Lower PM2.5 States:** Southern India; Puducherry lowest at **25 $\mu\text{g}/\text{m}^3$** .
- Seasonal Trends:**
 - Winter → **40% of annual load**.
 - Monsoon → lowest concentrations.
- Northeast Finding:** Persistently high PM2.5; **Assam-Tripura airshed** exceeded NAAQS even in peak monsoon.

JUM IAS Academy

EPIC UPSC Classes

Policy Recommendations

- Airshed Governance:** Create unified **airshed-level authorities** for coordinated emission control across states.
- Shared Emission Budgets:** Set **common emission caps** for entire airsheds with equitable state responsibilities.
- Hybrid Monitoring:** Integrate **satellite + ground data** to address rural gaps and enable high-resolution PM2.5 mapping.
- Seasonal Planning:** Use meteorological models to predict pollutant transport and synchronise winter mitigation measures.
- NCAP Reform:** Convert NCAP into a **legally binding, airshed-based framework** instead of city-centric voluntary targets.

Significance

- Shifts India's air pollution strategy from **city-level management** to **regional airshed governance**.
- Essential for achieving **sustainable PM2.5 reduction**, improving health outcomes, and meeting clean air targets.

41. SC Recalls Vanashakti Verdict; Allows Ex-Post-Facto Environmental Clearances in Exceptional Cases



On 18 November 2025, the Supreme Court (2:1 majority) recalled its May 2025 Vanashakti judgment, which had completely barred ex-post-facto Environmental Clearances (ECs).

Vanashakti Judgment (May 2025) – What It Held

- Declared post-facto ECs a “gross illegality” and violation of the Environment (Protection) Act, 1986.
- Struck down the 2017 Notification and 2021 Office Memorandum allowing retrospective ECs.
- Said regularising illegal construction defeats the purpose of prior-EC requirement under the EIA Notification, 2006.

Why the Judgment Was Recalled (2:1 Majority)

- Legal Consistency:** Earlier SC rulings –
 - Pahwa Plastics* (2022), *D. Swamy* (2021) – allowed post-facto ECs in exceptional circumstances.
- Economic Impact:** Vanashakti ruling would force demolition/closure of projects worth ~₹20,000 crore.
- Public Interest:** Hospitals, airports, medical colleges & public infrastructure would be stalled.

Justice Bhuyan's Dissent (Against the Recall)

- Per incuriam argument:** Earlier rulings permitting post-facto ECs ignored binding precedents like:
 - Common Cause* (2017)
 - Alembic Pharmaceuticals* (2020)
- Precautionary Principle:** Post-facto ECs violate core environmental principles; environmental protection must have primacy.
- Legal Stand:** Post-facto ECs undermine deterrence against violators and reward non-compliance.

Environmental Clearance (EC) – UPSC Essentials

- Legal Basis:** EIA Notification, 2006 under the Environment (Protection) Act, 1986.
- Mandatory Prior-EC:** Required for 39+ project types (mining, industry, infrastructure, river valley, thermal power).
- Two-Tier Appraisal:**
 - Category A:** MoEFCC (Central).
 - Category B:** SEIAA (State).
- Technical Bodies:**
 - EAC/SEAC evaluate EIA reports & recommend EC.
- Public Hearing:** Required for Category A & B1 (except defence, national security & small-scale projects).
- Validity:**
 - Mining: 30 years
 - River valley: 10 years
 - Industry & infrastructure: 7 years

42. CAFE-III Norms Spark Debate as Small Cars Face Tougher CO₂ Targets Than Heavy SUVs



India's proposed CAFE-III fuel-efficiency norms (FY28-FY32) use a **weight-based CO₂ formula**, tightening targets annually. This has triggered industry concerns because lighter small cars face disproportionately higher efficiency requirements compared to heavier SUVs, creating a structural compliance divide.

What Are CAFE Norms?

Corporate Average Fuel Efficiency (CAFE) norms set **average fleet fuel-efficiency/CO₂** limits for all passenger vehicles manufactured or sold in India.

Aim: Reduce oil imports, cut emissions, and accelerate hybrid + EV pathways.

Coverage: M1 category passenger cars (≤ 9 seats, $\leq 3,500$ kg).

Enforcement: Bureau of Energy Efficiency (BEE) under the Energy Conservation Act, 2001.

Introduced: 2017 (CAFE-I), followed by CAFE-II; CAFE-III covers FY28-FY32.

Manufacturers can **earn/trade/carry forward** CAFE credits.

How CAFE-III Works (New Formula)

$$\text{CO}_2 \text{ Target} = 0.002 \times (W - 1170) + c$$

W = vehicle weight

c decreases annually from **3.7264 (FY28)** to **3.0139 (FY32)** → stricter targets every year.

This weight-based formula places heavier vehicles in a more relaxed category.

Why Small Cars Are Penalised

1. Steep Efficiency Demands: A 740-kg hatchback must improve efficiency by $\sim 48\%$. Compliance pressure is much higher compared to heavier vehicles.

2. Technology Constraints: Small cars have limited space for hybrid/EV components. Thin margins make expensive tech upgrades difficult without raising prices.

3. Affordability Impact: Upgraded powertrains may significantly increase prices, pushing **first-time buyers** out of the market.

Risk of shrinking India's **mass-market segment**, which drives overall car ownership.

Why Bigger Cars Benefit

1. Lower Improvement Burden: A 2,500-kg SUV needs only $\sim 25\%$ efficiency improvement despite higher emissions.

2. Tech Readiness: Larger vehicles can absorb hybrid/EV systems due to higher price bands and more space.

3. Competitive Advantage: SUV-heavy OEMs find compliance easier, reducing cost burden and strengthening market dominance.

Key Issues in CAFE-III Norms

1. "Brick in the Boot" Incentive: Manufacturers may add weight to vehicles to qualify for an easier target band.

2. Technology Bias: Hybrid/EV-friendly mid-sized SUVs are advantaged. Compact hatchbacks are disadvantaged.

3. No Global Alignment

EU, US, Japan provide **relaxed limits for lighter cars** or segment-based norms. India's norms apply uniformly across weight segments → competitive imbalance.

43. India to Host International Green Hydrogen Conference (ICGH 2025) in New Delhi



The Ministry of New & Renewable Energy (MNRE) will host the 3rd International Conference on Green Hydrogen (ICGH 2025) at Bharat Mandapam, New Delhi.

About ICGH 2025

- A global platform launched by India in 2023 to advance green hydrogen technologies & markets.
- Focuses on **scaling production**, infrastructure development, and market creation under the **National Green Hydrogen Mission (NGHM)**.
- Participation includes:
 - Government officials, industries, researchers, academia.
 - International bodies such as IRENA and **Port of Rotterdam Authority**.

What Is Green Hydrogen?

- Hydrogen produced through **electrolysis of water** using **renewable energy** (solar, wind, hydro).
- Zero-emission fuel with applications in **industry, mobility, power storage, and exports**.

About National Green Hydrogen Mission (NGHM)

- Flagship mission to make India a **global hub** for green hydrogen production and exports.
- Key Targets (by 2030):
 - **5 MMT** of annual green hydrogen production.
 - **~125 GW** of renewable energy capacity dedicated to hydrogen.
- Aims to boost industrial decarbonisation, reduce fossil fuel imports, and make India competitive in clean energy markets.

Significance

- Positions India as a major player in the **global hydrogen economy**.
- Attracts global investment, fosters research collaboration, and supports energy transition goals.
- Strengthens India's climate commitments and long-term net-zero pathway.

Keywords: ICGH 2025, Green Hydrogen, Electrolysis, NGHM, Energy Transition, IRENA.



44. ICGH 2025: India Announces ₹100 Cr Pilot Scheme for Biomass-Based Green Hydrogen

The **National Green Hydrogen Mission (NGHM)**, launched in 2023 with a total outlay of ₹19,744 crore, targets decarbonisation of **hard-to-abate sectors** (refineries, fertilisers, steel, mobility, shipping).

At the **3rd International Conference on Green Hydrogen (ICGH 2025)**, the Ministry of New & Renewable Energy (MNRE) announced:

- A fresh ₹100 crore **Call for Proposals** to support pilot projects using **biomass and waste materials** for green hydrogen production.
- The initiative will be implemented through **BIRAC** (Biotechnology Industry Research Assistance Council), strengthening biotech-energy convergence.

An additional ₹100 crore allocation is earmarked for **startups** under NGHM to scale innovation.

43 hydrogen-related skill qualifications have been approved to build a specialised workforce for hydrogen economy.

Two major regulatory frameworks already operational:

- **Green Hydrogen Standard (2023)** – defines emissions threshold for “green” hydrogen.
- **Green Hydrogen Certification Scheme (2025)** – provides traceability & certification for producers.

Progress Under NGHM (Achievements So Far)

1. SIGHT Programme Milestones

The **Strategic Interventions for Green Hydrogen Transition (SIGHT)** scheme has awarded incentives for:

- 3,000 MW/year of **domestic electrolyser manufacturing capacity**.
- 8.62 lakh metric tonnes/year of **green hydrogen production**.

2. Global Competitiveness

- India achieved the **world's lowest green ammonia price** at ₹49.75 per kg for a capacity of 7.24 lakh MTPA, signalling cost-leadership in global hydrogen markets.

Why Biomass + Hydrogen? (Value-Add for Mains)

- Biomass-to-hydrogen integrates **waste management**, **decentralised energy**, and **rural economy** with **GHG reduction**.
- Offers **continuous feedstock**, unlike intermittent solar/wind, improving hydrogen plant utilisation.
- Helps India utilise agricultural residues – critical for reducing **stubble burning**.

45. MNRE Inaugurates Biomass Pellet Plant in Haryana to Boost Biomass-Co-Firing



The Union MNRE Minister inaugurated a biomass pellet plant in Haryana, supporting India's mandate for 5-10% biomass blending in thermal power plants.

About Biomass Pellets

- Definition:** Solid renewable fuel made from compressed agricultural residue, energy crops, industrial bio-waste, or untreated wood.
- High Energy Density:** Compression reduces moisture → improves combustion efficiency and transportability.

Types

- Torrefied Pellets:**
 - Biomass heated at 250-350°C without oxygen (torrefaction).
 - Hydrophobic, high-calorific value, long storage life.
 - More expensive but performs closest to coal.
- Non-Torrefied Pellets:**
 - Shredded and pelletized with binders (sawdust, molasses).
 - Cheaper, but less durable and more moisture-prone.

Usage in Power Plants

- Thermal stations mandated to co-fire 5-10% biomass pellets with coal.
- Refined pellets help reduce stubble burning and diversify fuel mix.

Benefits

- Air Quality:** Cuts emissions from crop burning.
- Farmer Income:** Creates a market for crop residue.
- Rural Jobs:** Pellet manufacturing drives local employment.
- Energy Transition:** Replaces part of coal with cleaner, renewable fuel

Environmental Impact

- Lower NOx, SOx, VOCs vs coal.
- However, combustion may still emit fine particulate matter (PM) → requires proper handling and boiler optimisation.

Significance

- Helps India meet clean-energy targets, reduce agricultural waste burning, and align with net-zero commitments.

Keywords: Biomass Pellets, Co-Firing, Torrefaction, MNRE, Stubble Burning, Renewable Energy.

46. India to Add 6 GW of New Wind Capacity by FY 2025–26: MNRE



MNRE Minister Pralhad Joshi announced a target to add **6 GW of new wind capacity** by FY 2025–26.

India's Wind Energy Status

- **4th largest** wind power capacity globally (after China, US, Germany).
- **Installed capacity: 54 GW**; 30 GW under implementation.
- Contributes **4.43%** of India's electricity generation (FY 2024–25).
- India progressing toward **100 GW wind target by 2030**.

Regional Distribution

- Concentrated in **southern and western India**.
- **Gujarat leads**, followed by **Tamil Nadu, Karnataka, and Rajasthan**.

Government Initiatives

- **National Wind-Solar Hybrid Policy:**
 - Promotes grid-connected hybrid parks to optimise land use and grid stability.
- **National Offshore Wind Energy Policy:**
 - Framework for offshore wind development within India's EEZ under MNRE.
- **VGF Scheme for Offshore Wind:**
 - ₹7,453 crore support for 1 GW initial offshore wind (500 MW each in Gujarat & Tamil Nadu).
- **ISTS Charge Waiver:**
 - 100% waiver for wind/solar projects commissioned before **July 2025** (valid for 25 years).

Significance

- Strengthens India's **energy transition**, grid diversity, and climate commitments.
- Expands domestic manufacturing, offshore capability, and renewable integration.

Keywords: Wind Energy, MNRE, Offshore Wind, VGF, ISTS Waiver, Renewable Target 2030.

47. ICAR Study Warns of Rapid Soil Organic Carbon Decline Due to Climate Change and Fertiliser Misuse

A recent ICAR study found that **climate change, rising temperatures, and unbalanced fertiliser use** are accelerating the loss of **Soil Organic Carbon (SOC)** in India's farmland. The study mapped agro-ecological zones to assess how cropping systems and fertilisers affect carbon retention.

1. Geographic Pattern of SOC

- SOC increases with elevation (cooler climates slow decomposition).
- SOC declines in plains, arid regions, and high-temperature zones.

2. Nutrient Link

- Low SOC → micronutrient deficiencies in crops.
- High SOC → better nutrient retention, soil fertility, and crop productivity.

3. Regional Hotspots of Decline

- **Punjab, Haryana, Western Uttar Pradesh:** severe SOC depletion due to:
 - Excess urea and phosphorus-rich fertilisers
 - Continuous monocropping
 - Low residue return and over-tillage

What is Soil Organic Carbon (SOC)?

- SOC is the **carbon fraction** of Soil Organic Matter (SOM), usually **1-6%** of soil weight in healthy soils.
- Composition: SOM is **50-60% carbon**.
- Forms: fresh residues, humus, root matter, microbes, fungal biomass, soil biota.

Determinants of SOC Levels

- **Temperature:** Cold regions preserve carbon; warm/tropical soils lose carbon quickly.
- **Rainfall:** Moderate rainfall increases SOC; arid/flooded soils retain less.
- **Soil Texture:** Clay-rich soils bind carbon; sandy soils lose carbon via leaching.
- **Vegetation:** Grasslands build deep-root carbon; forests lose carbon faster due to surface litter decay.
- **Topography:** Low-lying areas accumulate SOC; steep slopes suffer erosion.
- **Soil Depth:** SOC is concentrated in topsoil and decreases with depth.

Benefits of SOC

- **Soil Structure:** Better aggregation, infiltration, and erosion resistance.
- **Microbial Life:** Supports nutrient recycling, soil immunity, and organic matter breakdown.
- **Soil Fertility:** Enhances CEC, nutrient retention, and balanced fertility.
- **Water Retention:** Improves moisture storage and drought resilience.
- **Nutrient Supply:** Slow-release N, P, S → cuts fertiliser dependency.
- **Climate Regulation:** Acts as a **natural carbon sink**, storing atmospheric CO₂.

Factors Accelerating SOC Loss

- **Intensive Tillage:** Exposes carbon to oxidation and microbial decay.
- **Excess Fertiliser Use:** Especially nitrogen → faster decomposition + soil acidification.
- **Residue Burning:** Removes the primary source of fresh organic matter.
- **Land Conversion:** Forest/grassland to agriculture → SOC collapse.
- **Warming Temperatures:** Higher microbial respiration → CO₂ loss.
- **Erosion:** Removes carbon-rich topsoil, degrading soil health.



48. Nauradehi Wildlife Sanctuary Selected as India's Third Site for Cheetah Reintroduction



The Madhya Pradesh government has approved Nauradehi Wildlife Sanctuary as the **third cheetah reintroduction site** under Project Cheetah, following Kuno National Park and Gandhi Sagar Wildlife Sanctuary. It will be the first site where cheetahs will share habitat with multiple apex predators like **Indian wolves** and **Bengal tigers**.

About Nauradehi Wildlife Sanctuary

- **Largest sanctuary in Madhya Pradesh:** 1,197 sq km spanning Sagar, Damoh, and Narsinghpur districts.
- **Topography:** Plateau in the **Upper Vindhyan range**, elevation **400–600 m**.
- **Forest Type:** **Southern Tropical Dry Deciduous Forest**, dominated by **teak**, with **Amla, Tendu, Mahua, and Sal**.
- **Dual River Basins:**
 - $\frac{1}{4}$ drains into the **Narmada basin**
 - $\frac{3}{4}$ drains into the **Yamuna basin** via Kopra, Bamner & Bearma rivers
- **Key Fauna:**
 - Keystone species: **Indian wolf**
 - Others: Bengal tiger, leopard, dhole, hyena, sloth bear
 - Rare bird: **Spotted Grey Creeper**
- **Ecological Connectivity:**
 - Vital corridor linking **Panna Tiger Reserve** and **Satpura Tiger Reserve**
 - Indirectly connects **Bandhavgarh TR** via Rani Durgavati WLS

Significance for Project Cheetah

- First site where cheetahs will co-exist and **compete with other apex predators**, offering a more natural predator-prey dynamic.
- Located strategically within central India's connected landscape → better dispersal and gene flow.
- Provides an alternative to reduce pressure on **Kuno NP**, where carrying capacity is limited.

India's Cheetah Reintroduction Programme

- **Project Cheetah** aims to revive India's extinct cheetah population (extinct in **1952**).
- **Launched: 2022**
- **World's first intercontinental wild carnivore translocation.**
- **Primary Site: Kuno National Park**
 - Received **8 cheetahs from Namibia (2022)**
 - Received **12 from South Africa (2023)**
- **Second Site: Gandhi Sagar WLS**
 - Received **2 males and 1 female from Kuno in 2025**
- **Third Site: Nauradehi WLS** (new addition in 2025)

49. India–Botswana Cheetah Translocation Pact



India and Botswana announced an agreement to translocate **eight cheetahs** during President Droupadi Murmu's state visit.

The move supports India's cheetah restoration programme under **Project Cheetah**.

The cheetahs will undergo quarantine at **Mokolodi Nature Reserve, Botswana**, before being brought to India.

Project Cheetah (launched 2022) aims to reintroduce cheetahs in India, where they were declared extinct in **1952**.

It is the **world's first intercontinental large carnivore translocation project**.

About Botswana – UPSC Facts

- **Landlocked country in Southern Africa**; capital: **Gaborone**.
- Borders: **Namibia** (W, N), **Zambia & Zimbabwe** (NE), **South Africa** (S, SE).
- **Kalahari Desert** covers over 70% of its land area.
- Home to the **Okavango Delta** (UNESCO World Heritage Site).
- Hosts the **world's largest African elephant population**.



EDUCASIUM IAS Academy
EPIC UPSC Classes

50. India to Host Global Big Cats Summit 2026 | COP30 Announcement

At COP30 in Belém (Brazil), India announced that it will host the **Global Big Cats Summit** in New Delhi in 2026. The summit will be organised under the umbrella of the International Big Cat Alliance (IBCA).

India's Big Cat Landscape (IBCA-Aligned Species)

IBCA recognises **7 big cats** → *tiger, lion, leopard, snow leopard, cheetah, jaguar, puma*. **India hosts 5** of them → *tiger, lion, leopard, snow leopard, cheetah* (Jaguar & Puma not found in India).

India's Big Cat Population

Big Cat	Population (Latest)	Key Details	Top States / Locations	Notes / Milestones
Tiger	3,682 (2024)	India hosts 75% of global wild tigers	1. Madhya Pradesh - 785 (Tiger State) 2. Karnataka 3. Uttarakhand	Achieved Tx2 goal in 2018, ahead of 2022 deadline
Asiatic Lion	891 (2025)	Only country with wild Asiatic lions	Gir Landscape, Gujarat (only habitat)	Population grew from 327 (2001) → 891 (2025) → 172% rise
Leopard	13,874	Widely distributed across forest landscapes	1. Madhya Pradesh 2. Maharashtra 3. Karnataka	Stable but threatened by habitat loss & conflict
Snow Leopard	718 (2024)	Based on India's first systematic survey	Ladakh, Uttarakhand, Himachal Pradesh	First-ever scientific population estimate
Cheetah (Project Cheetah)	27 (incl. 16 cubs born in India)	Reintroduction programme since 2022	Kuno National Park, MP	20 adults translocated: 8 Namibia + 12 South Africa; 8 more expected from Botswana

International Big Cat Alliance (IBCA)

Overview

- A **treaty-based intergovernmental alliance** dedicated to conserving the world's **seven major big cats**.
- **Launched in 2023** by PM Modi during the 50th anniversary of **Project Tiger**.

Governance Structure (Modelled on International Solar Alliance - ISA)

1. **Assembly of Members** – Apex decision-making body.
2. **Standing Committee** – Oversight & operational review.
3. **Secretariat** – Permanent administrative body.

Secretariat Location: New Delhi, India.

- Open to all UN member states, including both range and non-range countries.

51. CITES Report Flags India's Wildlife Import Verification Gaps; Recommends Suspension of Appendix-I Imports



A CITES Secretariat report (2025) warned India about inadequate verification of wildlife imports and recommended suspending **Appendix-I species imports** until stronger checks are in place.

About the CITES Report

- Released after an official CITES verification mission to India in 2025.
- Triggered by concerns over large-scale imports of CITES-listed species by:
 1. **Green Zoological Rescue & Rehabilitation Centre (GZRRC), Jamnagar**
 2. **Radha Krishna Temple Elephant Welfare Trust (RKTEWT), Jamnagar**
- Mission evaluated whether India's wildlife import approvals followed **CITES norms** and ensured **non-commercial intent**.

Key Findings

- **Facility Standards:**
 - Jamnagar facilities maintained high welfare standards, proper documentation, and valid permits.
- **Verification Gaps:**
 - Indian authorities accepted import permits without verifying origin or cross-checking with exporting countries.
- **Permit Irregularities:**
 - Contradictory records, misuse of **CITES purpose codes**, and instances of forged permits detected.

Recommendations for India

EDUCASIUM IAS Academy EPIC UPSC Classes

- **Suspend Appendix-I imports** until stronger verification systems are operational.
- Establish transparent, risk-based verification of animal origins and captive-breeding claims before approving imports.
- Conduct a retrospective review of past imports from countries such as **Germany, Iraq, and Guyana**, and act on any detected violations.

Significance

- Strengthens India's compliance with **CITES Convention (1973)**.
- Addresses illegal wildlife trade risks and improves global conservation credibility.
- Ensures imported animals are genuinely captive-bred and not taken from the wild.

Keywords: CITES, Appendix-I, Wildlife Import, Verification, Jamnagar Facilities, Illegal Wildlife Trade.

52. Water Lettuce Identified as Invasive Freshwater Weed with Dual Ecological Role



Water lettuce (also called **water/Nile cabbage**) is drawing attention due to its invasive spread in freshwater bodies and its usefulness in **phytoremediation**.

About Water Lettuce

- Free-floating freshwater plant with leaves resembling a **head of lettuce**.
- Widely used as an **ornamental plant**, but globally recognised as an **invasive weed**.

Habitat & Traits

- Thrives in **still or slow-moving waters** – ponds, lakes, reservoirs.
- Prefers **tropical and subtropical** climates.
- Features:
 - Soft, green, velvety leaves with **fine white hairs** that trap air.
 - **Unbranched, fibrous roots** with a hair-like appearance.

Invasive Behaviour

- Forms **dense mats** on the water surface.
- Blocks sunlight → reduces photosynthesis in native plants.
- Causes **oxygen depletion**, harming fish and aquatic fauna.
- Disrupts **local biodiversity** and water flow.

Ecological & Human Aspects

- Provides **temporary refuge** for fish and aquatic organisms.
- Helps suppress **algal blooms** by absorbing excess nutrients.
- **Not edible** due to high calcium oxalate crystals (irritants).

Phytoremediation Potential

- Effective in **hyperaccumulating pollutants**, including heavy metals.
- Used in **wastewater treatment** and **oil-spill cleanup**.

Conservation Status

- **IUCN Status: Least Concern**

Significance

- Highlights the challenge of managing **invasive aquatic weeds** while leveraging their **environmental services** in pollution control.

Keywords: Water Lettuce, Pistia stratiotes, Invasive Species, Phytoremediation, Freshwater Ecology.

53. Ambaji Marble from Gujarat Awarded Geographical Indication (GI) Tag



Ambaji Marble, famed for its shine, purity, and cultural value, has been granted a **GI tag** by the Ministry of Commerce & Industry.

About Ambaji Marble

- Known for **pure white colour**, strength, high **calcium content**, and unique shine.
- Sourced from Ambaji, a major **Shaktipeeth** and pilgrimage town in **Banaskantha district, Gujarat**, near the **Aravalli hills**.
- Used in major temple constructions:
 - Dilwara Jain Temples (Mount Abu)**
 - Ayodhya Ram Mandir (potential)**
 - Temples in **Miami, Los Angeles, Boston, England, New Zealand**.
- Economic base for ~200 MSMEs engaged in quarrying and processing.

Impact of GI Tag

- Provides **legal protection** against misuse and counterfeit marble.
- Enhances **brand identity**, authenticity, and **premium pricing**.
- Supports local quarrying communities and boosts **export potential**.

About GI Tag (UPSC Facts)

- Granted by **Geographical Indications Registry** under **DPIIT**, Ministry of Commerce & Industry.
- Legal basis: **Geographical Indications of Goods (Registration & Protection) Act, 1999**.
- Validity:** 10 years; renewable indefinitely.
- Eligible goods: Agricultural, natural, handcrafted, manufactured items linked to **specific geographic origin**.
- Benefits: Market differentiation, protection of traditional knowledge, rural development.

Significance

- Strengthens India's portfolio of GI-certified cultural and natural products.
- Promotes **heritage-based livelihoods** and supports "**Vocal for Local**" and export-oriented growth.

Keywords: Ambaji Marble, GI Tag, Banaskantha, Aravalli, DPIIT, Cultural Heritage.

54. India Ranks 3rd in Asia Power Index 2025, Strengthening Regional Influence



The Lowy Institute (Australia) released the Asia Power Index 2025, where India secured 3rd place, behind the U.S. (1st) and China (2nd).

India's Performance

- Rank 3: India maintains upward momentum in regional strategic influence.
- Power Gains: Improvements noted across several metrics, though the overall power gap with China remains large.
- Major Power Status: Report states India will enter the “major power” category in 2025 based on rising capabilities and diplomatic weight.

About the Asia Power Index 2025

- Publisher: Lowy Institute, Australia.
- Edition: 7th annual release.
- Coverage: 27 countries & territories across Asia.
- Indicators: 131 parameters grouped into eight pillars of power:
 - Military Capability
 - Defence Networks
 - Economic Capability
 - Economic Relationships
 - Diplomatic Influence
 - Cultural Influence
 - Resilience
 - Future Resources

Global Snapshot

- U.S. remains the most influential actor in Asia.
- China retains 2nd rank but continues to widen capabilities despite internal slowdowns.
- India's rise is marked by greater military partnerships, economic outreach, and global diplomacy.

Significance

- Reinforces India's expanding role in Indo-Pacific power dynamics.
- Important for UPSC topics on India's foreign policy, strategic relations, and regional power balance.

Keywords: Asia Power Index 2025, Lowy Institute, India Rank, Indo-Pacific, Regional Influence.

55. WFP Study Warns: A 1°C Temperature Rise Could Push 70 Million More People into Food Insecurity

The World Food Programme (WFP) released a major 2025 analysis covering **45 countries (2017–2025)** showing a **direct, quantifiable link between rising temperatures and global food insecurity**. The report highlights severe vulnerability in regions like Eastern Africa, Haiti, and Yemen.

Key Findings of the WFP Study

- **+1°C Temperature Rise → 70 Million Additional Food-Insecure People**
- At **0°C anomaly**: Food-insecure population = **252 million**
- At **+1°C anomaly**: Food-insecure population = **322 million (28% increase)**
- **Regional Sensitivity:**
 - Eastern Africa is **twice as sensitive** to temperature rise compared to Western Africa.
 - Haiti & Yemen show highest vulnerability, with **8% rise** in food-insecure population per +1°C warming.

Broader Implications of Rising Temperatures

1. **Food System Fragility**: With the global population projected to reach **9.7 billion by 2050**, agriculture – already stressed by climate change, water scarcity, pests, and land degradation – faces systemic collapse risks in low-income nations.
2. **Economic Impact**: Climate-linked crop failures and food shocks lead to **\$80–100 billion annual GDP losses** globally.
3. **Inequality & Vulnerability**: Smallholder farmers bear the brunt of climate shocks.
 - Regions dependent on **rain-fed agriculture** face severe yield variability.
 - **India**: Over **55%** of net sown area is rain-fed. Yield losses during drought years can reach **25–30%**.

About World Food Programme (WFP)

- Established in **1961**, headquartered in **Rome**.
- **World's largest humanitarian organisation** focusing on hunger relief and food security.
- Key roles: food aid, cash transfers, logistics, humanitarian air services, and nutrition support.
- Works across **17 SDGs**, with priority on **SDG 2 – Zero Hunger**.
- Awarded the **Nobel Peace Prize (2020)** for combating hunger and preventing the use of food as a weapon of war.

56. New Guidelines for Underground Coal Gasification



The Ministry of Coal released the **Draft Guidelines for Mining and Mine Closure Plan for Underground Coal and Lignite Gasification (UCG) Blocks, 2025**, setting stringent conditions for pilot studies, aquifer safety, financial accountability, and regulatory oversight.

Key Provisions of the Draft Guidelines (2025)

1. Mandatory Pilot Feasibility Study

- Conducted by an **accredited technical institution**.
- Evaluates **technical viability**, syngas quality, environmental impacts, and operational risks before approval.

2. Environmental & Geological Safeguards

- Gasification limited to **seams below 300 metres in low-permeability strata**.
- Projects prohibited near **aquifers, seismic zones**, and **eco-sensitive areas**.
- Objective: Prevent groundwater contamination and subsidence.

3. Gasification Standards

- Focus on **optimal syngas generation**, minimal waste, efficient resource utilisation, and safe combustion management.

4. Financial Accountability via Closure Escrow Fund

- Mandatory deposit **before operations begin**.
- Base contribution:** ₹50,000 per hectare, indexed annually to **WPI**.
- Up to 75%** can be released after certified progressive mine closure; non-compliance triggers licence forfeiture or revocation.

5. Institutional Oversight

- Coal Controller Organisation (CCO):** Final evaluator & project approval body.
- Technical Committee** includes officials from:
 - Ministry of Coal
 - Directorate General of Mines Safety (DGMS)
 - Ministry of Petroleum & Natural Gas
- Appeal Authority:** Secretary (Coal).

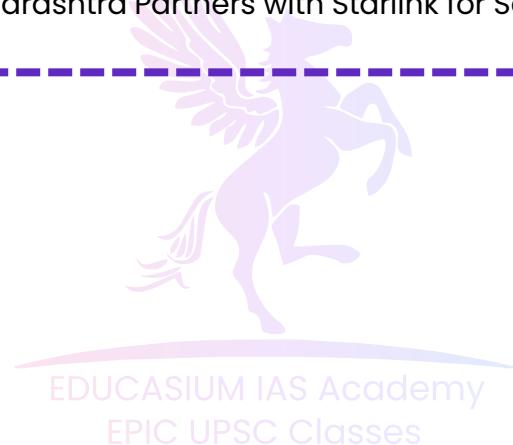
NOVEMBER 2025

SCI & TECH

1. Transfer of PSLV Development to Industry Consortium
2. India's First Private Orbital Rocket Vikram-1
3. ISRO Launches India's Heaviest Satellite CMS-03
4. Parachute System Test for Gaganyaan Mission
5. ISRO's Production Expansion and Upcoming Missions
6. CE20 Cryogenic Engine
7. NISAR Satellite to Become Operational
8. H-II Transfer Vehicle-X (HTV-X)
9. ESCAPEADE Mission to Mars
10. Sentinel-6B Satellite
11. Shenzhou-20 Astronauts
12. Transient Lunar Phenomena
13. Magnetic Waves Explaining the Sun's Super-Hot Atmosphere
14. Coronal Mass Ejection Outside the Sun
15. NASA Confirms Strongest Geomagnetic Storm of 2025
16. Black Hole Morsels
17. Catalogue of Young Stellar Objects (YSO)
18. MeITY Unveils India AI Governance Guidelines
19. CBSE Draft Curriculum for AI & Computational Thinking
20. Digital Sovereignty
21. Shaping the Deep-Tech Revolution in Agriculture
22. Emerging Science & Technology Innovation Conclave
23. Vikram-3201 Microprocessor & India's Semiconductor Ecosystem
24. India Develops First Indigenous Quantum Diamond Microscope
25. Scintillometer
26. Indigenous Gene-Editing Tool Based on TnpB Protein
27. Precision Biotherapeutics
28. 'BIRSA 101' Gene Therapy
29. DNA Pioneer James Watson (contextual reference)
30. National Action Plan on Antimicrobial Resistance 2.0
31. India's Superbug Surge
32. Negative Effects of Antibiotic Combination Therapy
33. Encephalomyocarditis Virus (EMCV)
34. Scrub Typhus
35. H5N5 Bird Flu
36. ICMR Invites EoI for Nipah Antibody Development
37. Hepatitis A Vaccine Needs Inclusion in UIP
38. India Needs to Include Typhoid Conjugate Vaccine (TCV) in UIP
39. India's Rare Disease Community



40. Juvenile Huntington's Disease Brain Donation
41. India Achieves Major Milestone in TB Reduction
42. RICIN and Ammonium Nitrate Fuel Oil
43. Auramine O
44. Sulfadiazine
45. Global Phase-Out of Mercury-Based Dental Amalgams
46. Bioremediation Project in Hussain Sagar Lake
47. Sustainable Harnessing of Fisheries in the EEZ Rules, 2025
48. Kwar Hydroelectric Project
49. Indian Hydropower Projects in Nepal
50. India's First Vanadium Redox Flow Battery System
51. India Ends Ayni Air Base Presence
52. Safran Aircraft Engine Services India Facility
53. Global Nuclear Testing Consensus
54. India to Chair International IDEA in 2026
55. Maharashtra Partners with Starlink for Satellite Internet



1. ISRO to Transfer PSLV Development to Private Sector



About the Initiative

- ISRO will **partially transfer PSLV development** to an **Indian industry consortium**.
- **PSLV:** Four-stage, medium-lift, third-generation launch vehicle; first Indian LV with liquid stages.
- Private industry already supplies **80–85%** of ISRO's mission components.

Objective

- Expand private sector role in launch vehicle production.
- Boost India's **annual satellite launch capacity**.
- Move towards full **industry-built launch vehicles**.

Industry Consortium

- Led by **HAL + L&T**.
- First fully industry-built PSLV scheduled for **launch by Feb 2026**.
- ISRO to transfer **50% of PSLV development work** after two successful industry-led launches.

Other Enablers for Private Participation

1. IN-SPACe (2020)

- Single-window body for approving & promoting private space activities.

EPIC UPSC Classes

2. Indian Space Policy 2023

- Allows private players to execute **complete space missions** (design → build → launch).

3. NSIL Reforms

- NewSpace India Ltd now operates on **demand-driven commercial model**.
- Responsible for **technology transfer & large-scale production** of ISRO-developed systems.



2. Vikram-I: India's First Private Orbital Rocket



Launch Highlight

- PM Narendra Modi unveiled **Vikram-I**, India's **first private orbital rocket**, built by **Skyroot Aerospace, Hyderabad**.
- Follows the success of **Vikram-S (2022)**, India's first private sub-orbital rocket.

Rocket Specifications

- **Type:** Four-stage, **20-metre-tall** small-satellite launch vehicle.
- **Payload Capacity:**
 - **350 kg** → Low Earth Orbit (LEO)
 - **260 kg** → Sun-Synchronous Orbit (SSO)

Design & Technology

- **All-carbon fibre body** → lighter, stronger structure.
- **3D-printed engines** → faster production, reduced mass.
- **Propulsion:**
 - Stages 1-3: '**Kalam**' solid-fuel motors
 - Upper stage: '**Raman**' hypergolic engine

Operational Capabilities

- **Rapid launch turnaround:** Can be fully assembled & launched within **24 hours** from any authorised site.
- Designed to serve the **global small-satellite launch market**.

BASIC CONCEPTS

Orbital Rocket

- Places payload into a **stable orbit**.
- Requires **~28,000 km/h (17,500 mph)** horizontal velocity.

Suborbital Rocket

- Flies a **ballistic arc**, re-enters Earth without reaching orbit.
- Lacks speed/trajectory needed for sustained orbital motion.



3. ISRO Launches CMS-03 (GSAT-7R)



ISRO successfully launched CMS-03 (GSAT-7R) using LVM3-M5 from Sriharikota. Marks another 100% success mission for LVM3 ("Bahubali").

About CMS-03 / GSAT-7R

- **Type:** Multi-band military communication satellite.
- **Users:** Indian Navy.
- **Coverage:** Provides secure, high-bandwidth communication across the **entire Indian Ocean Region (IOR)**.
- **Purpose:** Enhances maritime domain awareness, real-time data links, and encrypted communication.
- **Replacement:** Upgrades the older **GSAT-7 (Rukmini)** launched in 2013.

About LVM3-M5 Launch Vehicle

- **Most powerful operational ISRO rocket;** heavy-lift vehicle.
- **Payload capacity:** ~4 tonnes to GTO.
- **Success Rate:** 100% in operational missions.
- **Nickname:** "Bahubali" for its lifting capability.
- **Height:** 43.5 metres; ISRO's heavy-lift rocket.
- **Stages:**
 - S200 solid strap-ons
 - L110 liquid core
 - C25 cryogenic upper stage
- **Payload Capacity:**
 - 4,000 kg to GTO
- **8,000 kg to LEO**

Three-Stage Propulsion

- **Stage 1:** Solid strap-on boosters (S200).
- **Stage 2:** Liquid core stage (L110).
- **Stage 3:** Cryogenic upper stage (C25) for high-efficiency orbital insertion.

Significance

- **Indigenous Capability:** Reduces dependence on **Arianespace** launches from French Guiana for heavy satellites.
- **Fifth Operational Flight:** Earlier launched **Chandrayaan-3**, enabling India's first soft landing near the lunar South Pole.



4. ISRO – Integrated Main Parachute Airdrop Test (IMAT) | Gaganyaan Mission



IMAT Test Highlights

- ISRO conducted an **Integrated Main Parachute Airdrop Test (IMAT)** as part of qualification trials for the **Gaganyaan Crew Module's** parachute system.
- A **mass-simulated test article** (same weight as the real crew module) was airdropped from an **IAF IL-76 aircraft**.
- The test successfully demonstrated:
 - Stable descent capability** of the crew module
 - Even if **one of the four main parachutes fails or deploys late** ("failure-tolerant parachute system").
- This validates **redundancy and reliability**, critical for crew safety during atmospheric re-entry.

About Gaganyaan Mission

Overview

- India's **first human spaceflight programme** led by ISRO.

Mission Goal

- Send a **crew of 3 astronauts** into **Low Earth Orbit (LEO)** at ~400 km altitude.
- Mission duration:** ~3 days.
- Ensure **safe re-entry, deceleration, splashdown, and recovery** in the Indian Ocean.

Launch Vehicle

EDUCASIUM IAS Academy

EPIC UPSC Classes

- Human-Rated LVM3 (HLVM3)**
 - India's heaviest operational rocket
 - Formerly known as **GSLV Mk-III**
 - Modified for human-rating with enhanced safety margins and reliability.

Mission Timeline

- Uncrewed Flight-1:** Late 2025
- Uncrewed Flight-2 + Vyommitra:** 2026
- First Crewed Mission:** 2027 (planned)



5. ISRO Expansion Plan & Upcoming Missions (2025–2035)



ISRO's Strategic Vision

- ISRO aims to **triple its annual spacecraft production** within the next **three years**.
- Target: Increase India's share in the **global space economy** from **2%** → **8%** by **2030**.

UPCOMING ISRO MISSIONS

1. Industry-Built PSLV (2026)

- First PSLV fully assembled by an Indian private consortium.**
- Consortium led by: **Hindustan Aeronautics Ltd (HAL) + Larsen & Toubro (L&T)**.
- Launch timeline: **February 2026**.
- Significance: Marks India's transition toward **industry-led launch vehicle production**.

2. Gaganyaan (2027) - India's First Human Spaceflight

- Crewed mission** planned for **Q1 2027**.
- Will send **three astronauts** to **400 km Low Earth Orbit** for a ~3-day mission.
- Launch vehicle: **Human-rated LVM3 (HLVM3)**.

3. Chandrayaan-4 (2028) - Lunar Sample Return Mission

- India's **first lunar sample-return mission**.
- Objective: Land on the Moon → Collect samples → Return them to Earth.
- Would place India among a select group of nations capable of **sample-return technology**.

EDUCASIUM IAS Academy

EPIC UPSC Classes

4. LUPEX (2028)

Lunar Polar Exploration Mission (India-Japan)

- Joint mission with **JAXA (Japan)**.
- Goal: Explore **permanently shadowed regions** near the lunar south pole.
- Focus: **Water-ice detection**, mobility systems, drilling and sub-surface analysis.

5. Bharatiya Antariksh Station (Indian Space Station)

- First module launch: 2028**
- Full operational capability: 2035**
- Vision: Make India the **third major power** (after Russia/China & the U.S.) to run an **independent orbital space station**.
- Purpose:
 - Microgravity experiments
 - Human spaceflight continuity
 - Long-duration habitation
 - Technology demonstration for deep-space missions



6. ISRO Achieves Bootstrap-Mode Restart of CE20 Engine, Enabling Multi-Orbit LVM3 Missions



ISRO successfully conducted an in-flight simulated test of **bootstrap mode start**, proving the CE20 engine can restart autonomously in space – critical for multi-orbit payload releases and future deep-space missions.

India's CE20 cryogenic engine, used in the upper stage of LVM3, previously required external start-up systems for ignition. ISRO has now validated a bootstrap-mode restart, a capability only a handful of space agencies possess.

- No External Starter Needed:** Bootstrap mode allows the engine to ignite using only its internal fuel flow and turbopump energy.
- Multi-Orbit Capability:** Enables LVM3 to deploy multiple satellites in different orbits without additional ignition hardware.
- Payload Advantage:** Eliminates extra start-up systems, reducing mass penalties and improving mission efficiency.
- Gaganyaan Relevance:** Strengthens reliability of the human-rated LVM3, which uses an upgraded CE20.

Keywords (UPSC Keywords)

Bootstrap Mode, CE20 Cryogenic Engine, LVM3, Gas-Generator Cycle, Cryogenic Propulsion, Multi-Orbit Injection, ISRO Heavy-Lift Launcher.

EDUCASIUM IAS Academy Good Angle vs Bad Angle EPIC UPSC Classes

Good Angle

- Enhances India's commercial launch competitiveness for multi-orbit deployment missions.
- Boosts autonomy in high-end cryogenic technologies.
- Critical enabler for lunar, interplanetary, and human spaceflight missions.
- Improves payload margin and mission flexibility.

Bad Angle

- Cryogenic restart reliability must be extensively validated for crew missions.
- Complex thermal dynamics make bootstrap restarts risk-sensitive.
- Requires additional testing before certification for manned flights.
- Still dependent on imported exotic alloys for some cryogenic subsystems.



7. NISAR Satellite Becomes Operational (7 Nov 2025)



NASA-ISRO Synthetic Aperture Radar Mission

Key Facts

- **Launch Date:** 30 July 2025
- **Launch Vehicle:** GSLV-F16
- **Mass:** 2,400 kg
- **Developed by:** NASA + ISRO
- **Event:** Declared operational on **7 November 2025** after full data calibration.
- **Platform:** Announced by ISRO Chairman V. Narayanan at the Emerging Science, Technology and Innovation Conclave (ESTIC).

Why NISAR is Unique

- World's most expensive Earth-observation satellite built to date.
- First satellite globally to carry **dual-frequency SAR**:
 - L-Band SAR (NASA)
 - S-Band SAR (ISRO)
- Provides **all-weather, day-night, cloud-penetrating imaging**.

RADAR CAPABILITIES

L-Band SAR

- Penetrates forest canopies.
- Measures:
 - Soil moisture
 - Forest biomass
 - Ice-sheet movement
 - Land deformation

S-Band SAR

- Sensitive to fine vegetation structures.
- Suitable for:
 - Agriculture monitoring
 - Grassland mapping
 - Snow-moisture detection

Coverage & Mission Performance

- Repeats coverage of **most land and ice surfaces** twice every 12 days.
- High-resolution imaging across large swath widths.

Scientific and National Significance

- Tracks **climate change, glacial dynamics, and forest carbon**.
- Maps **earthquake-prone zones, land subsidence, and volcano deformation**.
- Enhances early warning for **cyclones, floods, landslides, and droughts**.
- Strengthens India's **disaster-management and environmental monitoring** architecture.



8. JAXA Launches H3 Rocket with HTV-X Cargo Spacecraft



Japan Aerospace Exploration Agency (JAXA) successfully launched its **flagship H3 rocket**, carrying the **HTV-X unmanned cargo spacecraft** to the **International Space Station (ISS)**.

About HTV-X

- **Successor:** Upgraded, modular, cost-effective version of HTV-Kounotori.
- **Capacity:** Can deliver **up to 5.85 tonnes** of cargo to the ISS.
- **Docking Duration:** Can stay attached to the ISS for **up to 6 months**.
- **Solar Arrays:** Deployable arrays support power-heavy and **temperature-sensitive payloads**.

About H3 Rocket

- **Type:** Flagship **modular medium-lift launch vehicle** by JAXA & Mitsubishi Heavy Industries.
- **Mission Flexibility:** Designed for Earth observation, cargo, defence, and interplanetary missions.
- **Dual-Payload Capability:** Can launch **two payloads simultaneously**.

EDUCASIUM IAS Academy
EPIC UPSC Classes



9. NASA's ESCAPE Mars Mission – Launched on Blue Origin's New Glenn Rocket



NASA launched the **ESCAPE** twin-spacecraft Mars mission aboard **Blue Origin's New Glenn** rocket from Cape Canaveral Space Force Station, Florida.

About ESCAPE Mission

- **Full Form:** *Escape and Plasma Acceleration and Dynamics Explorers*
- **Type:** Twin-spacecraft Mars mission under **NASA's SIMPLEx** (Small Innovative Missions for Planetary Exploration) programme.
- **Cost Philosophy:** Small, low-cost, independent planetary science missions.

Scientific Objectives

- Study **how the solar wind erodes Mars' atmosphere** over time.
- Examine Mars' **hybrid magnetosphere** and how solar-wind interactions drive atmospheric loss.
- Improve understanding of long-term **planetary habitability** and **climate evolution**.

Spacecraft Configuration

- Two identical satellites → "Blue" and "Gold".
- Launched together on New Glenn.

Unique Mission Architecture

1. Launch & Loiter Strategy

- Spacecraft inserted into a **fuel-efficient holding orbit** around the **Earth-Sun Lagrange Point L2**.
- Designed to "wait" for optimal Earth-Mars alignment.

2. Gravity Assist

- When alignment occurs, they perform an **Earth gravity-assist slingshot** to reach Mars with **minimal propellant**.

Science Timeline (Mid-2028 → ~11 Months)

Phase 1: "String of Pearls"

- Both spacecraft fly in nearly identical orbits.
- Captures **short-timescale variations** in Mars' plasma and magnetic environment.

Phase 2: Complementary Phase

- Spacecraft shift to **different orbits**.
- Enables **simultaneous multi-region** study of Mars' magnetosphere.

Key Scientific Instruments

: Each spacecraft carries:

- **EMAG (Magnetometer):** Measures magnetic fields.
- **EESA (Electrostatic Analyzer):** Measures plasma energy & particle distributions.
- **ELP Suite:** Monitors electron density, temperature & plasma behaviour.



10. Sentinel-6B Satellite Launched – Strengthening Global Sea-Level Monitoring



About Sentinel-6B

- **Purpose:** High-precision monitoring of **sea-level rise, ocean temperature, and ocean circulation** for climate science and early-warning systems.
- **Developed By:** NASA + NOAA + ESA under the EU **Copernicus Programme**.
- **Twin Mission:** Works alongside **Sentinel-6 Michael Freilich** (launched 2020) for uninterrupted global records.
- **Orbit:** Low Earth Orbit (LEO); travels ~7.2 km/s; completes **one orbit in ~112 minutes**.
- **Heritage:** Extends the 30-year satellite record – **TOPEX/Poseidon** → **Jason-1** → **Jason-2** → **Jason-3** → **Sentinel-6** series.

Why Sentinel-6B Matters

- **Climate Science Backbone:** Provides the world's most accurate long-term **sea-level and ocean-climate dataset**.
- **Disaster Forecasting:** Improves prediction of **cyclones, storms, storm surges, floods, and coastal inundation**.
- **Blue Economy:** Supports safety of ports, shipping lanes, **subsea cables, offshore infrastructure, pipelines, etc.**

European Union Copernicus Programme Academy

- **Launch:** 1998; earlier known as **GMES (Global Monitoring for Environment and Security)**.
- **Role:** EU's primary **Earth-observation system**, providing real-time environmental, climate, land, ocean, and disaster-monitoring data.
- **Name Origin:** Honours **Nicolaus Copernicus**, who proposed the **heliocentric model**.



11. Shenzhou-20 Crew Returns After Debris Strike – Renewing Global Alarm Over Space Junk



China's Shenzhou-20 astronauts returned to Earth using the Shenzhou-21 spacecraft after their original return capsule was damaged by orbital debris. The damaged capsule has been left in orbit for experiments, raising major concerns about the rising risks from uncontrolled space debris in Low Earth Orbit (LEO).

Rising Space Debris Threat

More than **1 million debris pieces >1 cm** now orbit Earth, each capable of disabling satellites, tearing spacecraft hulls, or triggering **Kessler Syndrome** – a cascading chain reaction of collisions that can render whole orbits unusable.

Global Mitigation Efforts

Zero Debris Charter 2030: ESA + 12 nations pledge debris-neutral space operations, focusing on safe disposal and end-of-life deorbiting.

UN COPUOS Guidelines (2007): International norms for limiting debris creation.

Liability Convention 1972 & Registration Convention 1976: Provide legal pathways for responsibility, compensation, and registration of space objects.

Active Debris Removal Missions (ADR):

- Japan's Adras-J (approach demo),
- ESA's ClearSpace-1 (robotic capture),
- UK RemoveDEBRIS (nets, harpoons, tethering).

National Tracking Systems:

- NASA Orbital Debris Office, ESA's SSA network, and
- India's NETRA, plus MOTR radar, & ISRO's participation in IADC.

About China's Space Programme

- **Shenzhou Missions:** Human spaceflight capsules rotating crews to **Tiangong Station** every ~6 months.
- **Tiangong Space Station:** Modular LEO station supporting long-duration life sciences, materials research, and engineering experiments.
- **Chang'e & Tianwen Missions:** Far-side lunar landing, lunar sample return, and Mars exploration missions.

Significance for Global Security

- Debris strikes raise threats to crewed missions, navigation satellites, telecom infrastructure, and global weather monitoring.
- Shared orbits create **collective-action** challenges, requiring coordinated global governance.

Keywords

Kessler Syndrome, Active Debris Removal (ADR), COPUOS, Zero Debris Charter 2030, NETRA, Tiangong, Shenzhou Capsule, LEO Safety.



12. Transient Lunar Phenomena (TLPs)



Context: NASA and ESA lunar monitoring systems have renewed focus on mysterious, short-lived luminous events on the Moon.

What Are TLPs?

- Short, unexplained **flashes, glows, colour changes, or mists** on the Moon.
- Duration ranges from **seconds to hours**.
- Recorded for over **1,000 years**, including observations by **Apollo 11 astronauts (1969)**.
- Common near geologically active areas like **Aristarchus** and **Plato craters**.

Possible Causes (Theories)

- **Gas Outgassing:** Release of radon/argon from below the lunar crust creating brief luminescence.
- **Meteoroid Impacts:** High-speed impacts generating visible flashes.
- **Electrostatic Dust Lifting:** Charged lunar dust rises and reflects sunlight.
- **Atmospheric Distortion:** Optical distortions from Earth's atmosphere misinterpreted as lunar events.

EDUCASIUM IAS Academy
EPIC UPSC Classes



13. Magnetic Waves Explaining the Sun's Super-Hot Atmosphere



Temperature Contrast

- **Photosphere:** $\sim 5,500^{\circ}\text{C}$ ($10,000^{\circ}\text{F}$)
- **Corona:** ~ 1.1 million $^{\circ}\text{C}$ (2 million $^{\circ}\text{F}$)
- Long-standing solar physics mystery: *How can the outer layer be hotter than the surface?*

About the New Study

- Conducted using the **Daniel K. Inouye Solar Telescope (DKIST), Hawaii** – world's most powerful ground-based solar telescope.
- **Key Discovery:** Clear detection of *Alfvén waves* twisting through coronal magnetic fields.
- **Doppler Signals:** Tiny periodic Doppler shifts showed these waves carry large energy loads.
- **Conclusion:** Alfvén waves deposit energy into the corona \rightarrow **major cause of extreme coronal heating.**
- **Importance:**
 - Provides *direct observational evidence* of wave-driven heating.
 - Strengthens *space-weather prediction models* important for satellite safety.

Alfvén Waves – Quick Facts

- **Type:** Low-frequency, transverse electromagnetic waves.
- **Medium:** Found only in **electrically conducting fluids** – plasma, liquid metals, electrolytes.
- **Behaviour:** Travel along magnetic field lines; accelerate solar wind.
- **Impact on Earth:** Strong waves \rightarrow faster solar wind \rightarrow potential disruption to **satellites, GPS, communication systems, power grids.**
- **Origin:** Proposed in 1942 by **Hannes Alfvén**, Nobel laureate.



14. First CME Detected on Another Star – 2025 Nature Study



Key Finding

- Scientists detected the **first-ever coronal mass ejection (CME)** beyond our Sun.
- The CME originated from **red dwarf star StKM 1-1262**.
- Discovery made using Europe's **LOFAR (Low Frequency Array)** radio telescope network.

About Coronal Mass Ejections (CMEs)

- Huge blasts of **hot plasma + magnetised charged particles** ejected from a star's corona.
- Triggered by **magnetic reconnection** – when magnetic field lines suddenly break and reconnect, releasing intense energy.
- **Earth-directed CMEs** can cause:
 - Geomagnetic storms
 - Disruption of satellites, GPS, power grids
 - Radio blackouts and communication failures
 - Auroras (Northern/Southern Lights)

About LOFAR (Low Frequency Array)

- A **European radio interferometric telescope network** operating at **10-240 MHz**.
- Run by **ASTRON (Netherlands Institute for Radio Astronomy)**.
- Consists of thousands of antennas spread across Europe.
- Capabilities: **EDUCASIUM IAS Academy**
 - Detect faint radio bursts from **stars, planets, black holes**
 - Study cosmic magnetic fields and plasma behaviour
 - Track space-weather events beyond the Solar System



15. NASA Confirms Strongest Geomagnetic Storm of 2025



In November 2025, NASA confirmed that Earth was struck by a **G5-level geomagnetic storm** – the **strongest of the year** and among the most powerful in the current solar cycle.

Cause of the Storm

- **Multiple CMEs (Coronal Mass Ejections)** erupted from the Sun in rapid succession.
- These CMEs **merged into a single massive solar plasma wave** (a CME “cannibalisation event”).
- This merged CME collided head-on with **Earth’s magnetosphere**, triggering a severe magnetic disturbance.

Scientific Observations

- Dst (Disturbance Storm Time) Index recorded a *sharp fall*, signalling intense geomagnetic depression.
- A highly **southward Interplanetary Magnetic Field (IMF-Bz)** allowed solar charged particles to deeply penetrate Earth’s magnetic shield.
- This increased coupling between the solar wind and Earth’s magnetic field, intensifying auroral activity.

Auroras at Unusually Low Latitudes

- The G5 storm pushed **aurora borealis** (Northern Lights) and **aurora australis** (Southern Lights) far beyond polar regions.
- Auroras became visible in **lower-latitude countries**, including parts of Europe, Central Asia, East Asia, and even northern India (upper atmosphere glow).

EDUCASIUM IAS Academy

Impact on Technology and Infrastructure

- **Satellite disruptions:** Navigation errors, communication blackouts, temporary shutdown of sensitive instruments.
- **Airlines rerouted polar flights** to avoid radiation exposure and communication breakdown over high-latitude routes.
- Potential effects on:
 - Power grids
 - GPS timing
 - HF radio communication
 - Oil and gas pipeline currents

Future Risks

- Scientists warn that this event signals an increase in solar activity as the Sun approaches its **solar maximum (2025–26)** in its **11-year solar cycle**.
- More **frequent, intense CMEs** – and possibly additional G4/G5 storms – are expected.



16. Black Hole "Morsels" – New Theoretical Insight



About Black Hole Morsels

- **Black hole morsels** are *hypothetical micro-black holes* created during extreme events like **black hole mergers**.
- They are **asteroid-mass objects** but extremely **dense, hot, and short-lived**.
- They radiate intensely via **Hawking radiation**, far stronger than large black holes.
- **Lifetime:** From a few milliseconds to several years, depending on mass.
- Their high-energy **gamma-ray emissions** may offer the **first observable evidence of quantum gravity**.

Why They Matter

- Could bridge the gap between **General Relativity** (gravity, spacetime) and **Quantum Mechanics** (subatomic laws).
- Provide a new window into physics near the **Planck scale**, where both theories interact.

KEY SCIENTIFIC CONCEPTS

Hawking Radiation

- Proposed by **Stephen Hawking (1974)**.
- Black holes emit faint thermal radiation due to **quantum effects** near the event horizon.
- Causes gradual loss of mass → eventual evaporation.
- Connects **quantum mechanics, thermodynamics, and general relativity**.

Einstein's Relativity

- Formulated by **Albert Einstein** (early 20th century).
- Describes gravity as the **curvature of spacetime** created by mass and energy.
- Underpins models of **cosmic motion, black holes, and the universe's structure**.



17. India Compiles One of the Largest Catalogues of Young Stellar Objects (YSOs)



About Young Stellar Objects (YSOs)

- A YSO is a *forming star* still surrounded by disks of gas & dust.
- It becomes a **main-sequence star** once stable **hydrogen fusion** begins.
- **Protostar energy source:** Gravitational collapse + mass accretion (not fusion).

About WISE & NEOWISE Missions

- **WISE:** NASA infrared space telescope that mapped the entire sky in four IR wavelengths.
- **NEOWISE:** Repurposed mission to track and study **near-Earth asteroids & comets**.

KEY FINDINGS OF THE INDIAN STUDY

Stellar Energy & Behaviour

- **Protostar Heating:** Comes from gravitational contraction and disk material falling onto the star.
- **Episodic Accretion:** Causes brightness fluctuations – bright bursts followed by quiet phases.

Six Variability Categories Identified

1. **Linear** – steady brightness change.
2. **Curved** – nonlinear gradual change.
3. **Periodic** – repeating cycles.
4. **Burst** – sudden brightening.
5. **Drop** – abrupt dimming.
6. **Irregular** – chaotic and unpredictable (most common).

Major Statistical Insights

- 26% of all YSOs showed detectable brightness variation.
- **Irregular variability** was the most frequent type.
- **Age Correlation:**
 - **Class I (youngest):** 36% show variability.
 - **Class III (more evolved):** 22% show variability.
- **Colour Change:**
 - Most YSOs → become **redder** when brighter.

Some very young stars → become **bluer** due to intense accretion spikes



18. MeitY Unveils India AI Governance Guidelines



MeitY released the **India AI Governance Guidelines** under the **IndiaAI Mission** to ensure safe, inclusive, transparent, and responsible AI deployment across sectors

Framework Components

- Seven **AI Governance Sutras** (principles for ethical, accountable, and responsible AI).
- Recommendations across **six governance pillars** (design, deployment, safety, accountability, oversight, and transparency).
- Action Plan** with short-, medium-, and long-term milestones.
- Practical implementation guidelines for:
 - AI developers
 - Industry
 - Regulators and public authorities

Committee Leadership

- Drafted by a **High-Level Expert Committee** chaired by:
 - Prof. Balaraman Ravindran (IIT Madras)**
- Members included experts from:
 - MeitY
 - NITI Aayog
 - Microsoft Research India
 - Trilegal
 - iSPIRT Foundation

EDUCASIUM IAS Academy

EPIC UPSC Classes

Inclusive Drafting Process

- Document underwent **public consultation**.
- Cross-sector feedback (academia, industry, civil society) incorporated.
- Core aim: keep AI **accessible, affordable, and trustworthy** for all.

Global Collaboration Vision

- India aims for the guidelines to become a **reference model** for:
 - Governments
 - Researchers
 - Developers
 - Global policymakers
- Supports international cooperation for **safe and inclusive AI adoption**.

IndiaAI Hackathon Winners

- Winners of the **IndiaAI Hackathon for Mineral Targeting**, conducted with the **Geological Survey of India (GSI)**, were announced alongside the launch.

www.educasiumiasacademy.com



19. CBSE Draft Curriculum for AI & Computational Thinking (CT)



CBSE has released a **draft AI and Computational Thinking curriculum** for Classes **III to XII**, integrating CT across subjects and building AI literacy from early grades.

About Computational Thinking (CT)

- A **systematic problem-solving method** based on core computer-science principles.
- Applies decomposition, pattern recognition, abstraction, and algorithmic thinking to academic and real-life problems.

About the Curriculum

Objective

- Build an **AI-ready mindset and skill set**, strengthening critical thinking, ethics, creativity, and future career preparedness.

Teacher Training

- Delivered through structured **NISHTHA** modules to upskill teachers in AI-CT pedagogy.

Implementing Agencies

- Department of School Education & Literacy (DoSE&L)
- CBSE
- NCERT

Timeline

- **2026-27:** AI-CT introduced for Classes 3-6.
- **2027-28:** Expansion to Classes 9-10.
- Senior-secondary AI electives to follow.

Significance

- India's **first nationwide integrated AI-literacy framework**, aligned with NEP 2020.

Key Features

1. Early Integration

- CT concepts expanded beyond mathematics into **all subjects** for Classes 3-5.

2. Phased AI Learning

- **Classes 6-8:** AI awareness + foundational CT.
- **Classes 9-10:** Advanced AI applications and real-world problem-solving.

3. Senior Secondary Electives

- **Classes 11-12:** Elective modules on:
 - Core AI concepts
 - Neural networks
 - Machine learning techniques
 - Data pipelines

4. Experiential Learning

- Practical AI exposure through:
 - Projects, Games, Activities, AI project cycle
 - Data analysis & model evaluation



20. Digital Sovereignty or Digital Submission? India Faces Global Pressure on Data & Big Tech Rules



India is facing intensifying geopolitical pressure from major powers over data flow regulations, digital taxes, and Big Tech oversight. These pressures coincide with India's rapid digital expansion, raising concerns about whether India can safeguard digital sovereignty in an era of global digital dependencies.

India's Digital Landscape Today

- **850+ million internet users**, world's 2nd largest online base.
- **Digital economy = \$500 bn**, projected **\$1 trillion by 2030**.
- **1.3 million cyber incidents in 2024 (CERT-In)** show escalating vulnerability.
- **Digital Public Infrastructure (Aadhaar-UPI-DigiLocker-ONDC)** is a global benchmark for inclusive digital governance.

Why India Needs Digital Sovereignty

- **Data Power**: Control over national data = control over economic value; global data economy worth **\$3 trillion+** (OECD).
- **Policy Autonomy**: Protects India's right to levy digital taxes; OECD's Pillar-1 already stresses national flexibility.
- **Security**: Reduces dependency on foreign-controlled digital rails; SWIFT exclusions of Russia/Iran show geopolitical risks.
- **Tech Ecosystems**: Sovereignty boosts domestic AI, semiconductors, cloud, and DPI-linked innovation worth **\$100 bn+ annually** (World Bank).

EDUCASIUM IAS Academy

Challenges to Achieving Digital Sovereignty

- **US Dominance**: Big Tech controls search, social media, mobile OS, online ads (90% from US platforms).
- **FTA Pressures**: Digital trade chapters push against data localisation, digital taxes, algorithm transparency rules.
- **Talent Leakage**: India produces **12% of global AI talent**, but value creation occurs offshore.
- **Digital Dependency**: 80% Indian cloud market dominated by three US companies; foreign OS/payment infrastructures dominate device ecosystems.

Keywords for UPSC

Digital Sovereignty, Data Localisation, Pillar-1 Digital Taxation, Cross-Border Data Flows, Big Tech Regulation, SWIFT Chokepoint, Digital Public Infrastructure (DPI).



21. WEF Maps the Deep-Tech Revolution: AI, CRISPR & Robotics to Transform Global Agriculture



The World Economic Forum released its report **“Shaping the Deep-Tech Revolution in Agriculture”** under the **AI4AI Initiative**, outlining how emerging deep-tech domains – from robotics to gene editing – will reshape global agriculture for sustainability, productivity and climate resilience.

Overview : The report identifies **seven deep-tech pillars** – Generative AI, Robotics, Computer Vision, Edge IoT, Remote Sensing, CRISPR, and Nanotech – whose convergence can redefine farm operations, reduce losses, and improve climate adaptation.

How Deep-Tech is Transforming Agriculture

- **Generative AI:** Predicts pests, plans cropping patterns, provides decision support.
- **Computer Vision:** Automated disease detection and produce grading.
- **Robotics & Drones:** Precision spraying, harvesting, and labour substitution.
- **Edge IoT:** Real-time irrigation/fertiliser control without strong internet.
- **Remote Sensing:** Satellite-based soil moisture & crop health mapping.
- **CRISPR:** Climate-resilient crops with higher yield and low methane.
- **Nanotech:** Targeted fertiliser/pesticide delivery reducing chemical misuse.

Converging Technologies

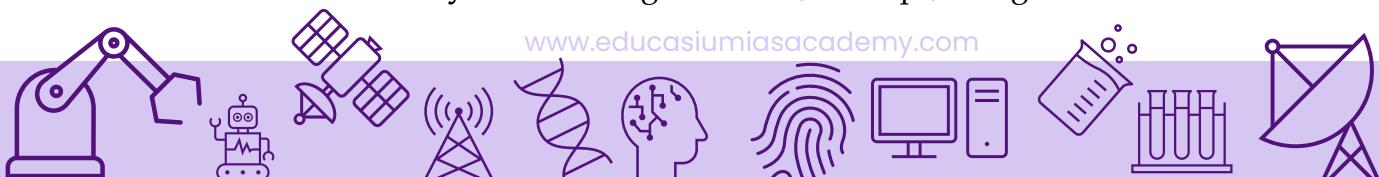
- **Swarm Robotics:** Coordinated small robots for weeding/harvesting.
- **Precision Farm Management:** Sensors + AI + satellites for water/nutrient optimisation.
- **Agentic AI:** Autonomous farm decision-making across entire crop cycles.
- **Carbon Measurement:** AI + satellite data for soil carbon credits.

Case Studies (India)

- **CRISPR rice by ICAR** → 30% higher yield, drought & salinity tolerant.
- **PMFBY** → Drone & satellite-based crop loss assessment.
- **Bhashini** → Vernacular AI tools supporting small farmers.

Five Pillars for Implementation

1. **Adaptive regulation** (AI, CRISPR, data).
2. **Blended finance** to support small farmers.
3. **Human capital** bridging agronomy & tech.
4. **Digital infrastructure** with rural connectivity.
5. **Innovation ecosystems** linking academia, startups, and governments.



22. ESTIC 2025 & ₹1 Lakh Crore RDI Scheme Fund



PM Narendra Modi inaugurated the first Emerging Science, Technology and Innovation Conclave (ESTIC) 2025 at Bharat Mandapam, New Delhi, and launched the ₹1 lakh crore Research, Development & Innovation (RDI) Scheme Fund.

About ESTIC 2025

- **Annual Flagship Event:** ESTIC is institutionalised as a yearly national platform to drive India's S&T leadership.
- **Objective:** Strengthen India's research, innovation and high-tech ecosystem through cross-sector collaboration.
- **Participation:**
 - 3,000+ delegates, including Nobel Laureates, global policymakers, industry leaders, scientists, and students.
- **11 Priority Focus Areas** include:
 - Artificial Intelligence (AI)
 - Quantum Science & Technology
 - Space Technologies
 - Bio-Manufacturing
 - Semiconductor Design
 - (plus advanced materials, sustainability tech, medical innovation, next-gen computing, etc.)
- **Innovation Milestones Shared by PM:**
 - India's R&D spending has doubled in the last decade.
 - Patent filings increased 17-fold, signalling strong innovation growth.

About the RDI Scheme Fund (₹1 lakh crore)

A major national programme to catalyse **private-sector R&D investment in strategic and emerging sectors**.

Key Features

- **Long-term Financing:**
 - Low-cost / zero-interest loans
 - Equity investment in high-technology startups
- **Deep-Tech Fund of Funds:**
 - Supports deep-tech ventures in areas like quantum, AI, semiconductors, biotech, materials, space tech.
- **Special Purpose Fund (SPF):**
 - Managed by **Anusandhan National Research Foundation (ANRF)**.
 - Allocates resources to **secondary fund managers** for targeted disbursal into R&D-heavy industries.
- **Goal:**
 - Reduce R&D risks for industry
 - Increase India's private-sector R&D share (currently <40%)
 - Strengthen self-reliance in critical technologies



23. Semiconductor Debate: Selection of Assam & Gujarat After Vikram 3201 Launch



About Vikram 3201

- **India's first fully indigenous 32-bit space-grade microprocessor**, engineered for extreme environments.
- **Developer**: ISRO's Vikram Sarabhai Space Centre (VSSC).
- **Fabrication**: Semiconductor Laboratory (SCL), Chandigarh.
- **Applications**: Avionics, navigation, guidance and control systems in launch vehicles and satellites.
- **Architecture**:
 - General-purpose 32-bit design
 - **152 custom instructions**
 - **64-bit floating-point support**
 - Operates at **100 MHz**
- **Upgrade**: Successor to **16-bit Vikram 1601** (in ISRO vehicles since 2009).
- **Ruggedisation**: Radiation-hardened; tolerates **-55°C to +125°C**, high vibration, mechanical stress.

India's Semiconductor Landscape

Current Status

- **Market Size**: \$52 billion (2024–25); projected to cross **\$100 billion** by 2030.
- **Pipeline**: **10 semiconductor projects** worth ₹1.6 lakh crore approved under ISM across six states.
- **Import Dependence**: India imports **90–95%** of chips – mainly from China, Taiwan, South Korea, the U.S.
- **Global Context**:
 - **TSMC (Taiwan)** produces **>90%** of advanced chips.
 - East Asia accounts for **~75%** of global chip manufacturing.
 - **Japan & the Netherlands** lead in semiconductor equipment (EUV/DUV tools, photolithography).

India's Strength: Chip Design

- **~20% of global chip design talent** resides in India.
- Hosts design/R&D centres of leading global semiconductor firms.

India's Manufacturing Strategy

- Focus on **mature-node chips (28 nm and above)** used in:
 - Automobiles
 - Consumer electronics
 - Industrial equipment
 - Power devices
- Advanced nodes (3–5 nm) reserved for high-end computing are not India's immediate priority due to high capex and steep technology barriers.



Government Initiatives

1. Semiconductor Integrated Circuits Layout-Design Act, 2000

- Protects IP rights for circuit layouts; encourages domestic innovation.

2. Semicon India Programme (₹76,000 crore)

- Up to 50% fiscal support for semiconductor and display fabs.

3. India Semiconductor Mission (ISM)

- Nodal body under MeitY
- Evaluates fab proposals, coordinates incentives, drives ecosystem development.

4. Modified Scheme for Semiconductor Fabs

- 50% fiscal support for silicon fabs (28 nm and below).

5. Scheme for Compound Semiconductors

- 50% capital support for units making:
 - GaN/GaAs chips
 - Silicon photonics
 - Sensors
 - ATMP/OSAT (assembly, testing, packaging)

6. Design Linked Incentive (DLI) Scheme

- Up to ₹15 crore + access to design infrastructure for domestic startups.

7. SPECS Scheme (2020)

- 25% incentive on capital expenditure for electronic components & sub-assemblies.

8. Chips to Startup (C2S) Programme

- Trains 85,000 engineers in VLSI, chip design, and embedded systems.

EDUCASIUM IAS Academy

EPIC UPSC Classes



24. India Develops Its First Indigenous Quantum Diamond Microscope (QDM)



(Announced at ESTIC 2025; Developed by IIT Bombay's P-Quest Group under the National Quantum Mission)

What is the Breakthrough?

- India has built its **first indigenous Quantum Diamond Microscope (QDM)** — a dynamic magnetic-field imaging system based on quantum sensing.
- This marks a major technological milestone under the **National Quantum Mission (NQM)**.

1. Quantum Basis of the Device

- QDM uses **nitrogen-vacancy (NV) centres in diamond**, which are:
 - Atomic-scale defects replacing carbon atoms.
 - Able to maintain **quantum coherence at room temperature**.
 - Extremely sensitive to **magnetic, electric and thermal variations**.

2. ODMR-Based Magnetic Imaging

- Operates on **Optically Detected Magnetic Resonance (ODMR)**.
- Enables:
 - Optical readout of magnetic fields**.
 - 3D nanoscale magnetic-field mapping**.
 - Widefield imaging**, similar to an optical microscope.
- Achieves *dynamic magnetic imaging* without cryogenic cooling.

3. Why It's a Breakthrough

QDM can be used for cutting-edge applications:

- Neuroscience**: Mapping neural activity via magnetic signatures.
- Materials Science**: Studying magnetic textures, defects and stresses.
- Semiconductor Diagnostics**:
 - Non-destructive evaluation of chips.
 - Visualization of **buried current paths** in 3D multilayer architectures.
- Energy Devices**: Magnetic mapping of batteries, supercapacitors, and next-gen storage systems.

4. Advantage Over Traditional Tools

- Modern chips have **3D stacked layers, nanoscale interconnects, and cryogenic superconducting circuits**.
- Conventional diagnostic tools cannot accurately capture **subsurface magnetic patterns**.
- QDM overcomes this gap** by offering:
 - High-resolution quantum imaging.
 - Non-destructive subsurface analysis.
 - Room-temperature operation.



25. Scintillometer



Scintillometer Installed at Tamil Nadu Rice Research Institute (TRRI), TRRI is now part of India's Critical Zone Observatory (CZO) network – only three CZOs exist in India, and this is the only one in Tamil Nadu.

What is a Scintillometer?

- A high-precision optical instrument used to measure heat and moisture exchange between land and atmosphere.
- **How it works:**
 - Sends a light beam (infrared or laser) between two fixed points.
 - Air turbulence causes tiny intensity fluctuations (scintillations).
 - These fluctuations are analysed to calculate:
 - Sensible heat flux
 - Latent heat flux
 - Evapotranspiration

Why It Matters

- Provides continuous microclimate data essential for:
 - Irrigation scheduling
 - Water-use planning
 - Crop modelling
 - Climate-resilience research

Evapotranspiration (ET)

- The combined process of:
 - Evaporation → water turns to vapour from soil/water surfaces
 - Transpiration → water vapour released by plants
- ET is a key indicator of crop water needs.

About Tamil Nadu Rice Research Institute (TRRI) – Aduthurai

- Functions under Tamil Nadu Agricultural University (TNAU).
- Developed with support from the National Centre for Earth Science Studies (NCESS).
- Fully operational since 2022.
- Generates long-term datasets on:
 - Weather parameters
 - Soil moisture
 - Crop canopy characteristics
 - Hydrology and water balance

Why TRRI's CZO Matters

- Located in the Cauvery Delta, one of India's most climate-sensitive, water-stressed agricultural zones.
- Helps create:
 - Precision irrigation models
 - Climate adaptation strategies
 - Rice yield optimisation tools



26. Indigenous Gene-Editing Tool Developed Using TnpB Proteins



Indian scientists at ICAR-Central Rice Research Institute (CRRI) have developed a **patented, indigenous gene-editing system** using **TnpB proteins**, offering India its own alternative to globally patented **CRISPR-Cas technologies**.

About the New Indigenous Gene-Editing System (TnpB)

- **Molecular Scissors**

- Uses **Transposon-associated TnpB proteins**, ancient evolutionary predecessors of Cas enzymes.
- Functions similarly to **Cas9/Cas12a**, enabling **precise DNA cuts** at targeted gene sites.

- **Hyper-Compact Size**

- TnpB proteins are **~400-500 amino acids**.
- Much smaller than Cas9 (**1,000-1,400 aa**) and Cas12a (**1,200 aa**).
- Small size improves efficiency and reduces off-target effects.

- **Better Delivery Efficiency**

- Ultra-compact TnpB enables **viral-vector delivery directly into plant cells**.
- Reduces dependence on **tissue-culture methods** (long, costly, labour-intensive).
- Enables cheaper, scalable gene editing.

- **Source Organism**

- Uses **TnpB (408 aa)** cloned from *Deinococcus radiodurans*, an extremophile bacterium known for radiation resistance, enhancing enzyme stability.

Why India Needs an Indigenous Gene-Editing Platform

- **High Costs of Foreign Technologies**

- India depends heavily on imported CRISPR tools.
- **CRISPR licensing can add 10-20% to R&D and commercialisation costs of GE crops.**
- Delays public research outputs, particularly in ICAR institutes.

- **Strategic Autonomy**

- Indigenous TnpB system supports **Atmanirbhar Bharat** in biotechnology.
- Removes foreign IP restrictions blocking faster public-sector innovation.
- Enables Indian regulators to frame **India-specific low-cost licensing frameworks**.

- **Reduce Foreign Control Over GE Crop Pipelines**

- Multiple CRISPR components are controlled by US/EU patent holders.
- Example:
 - **ICAR's CRISPR-edited stress-tolerant rice varieties** are stuck due to unresolved licensing terms.
- Indigenous TnpB avoids such bottlenecks and speeds deployment.



What is Gene Editing?

Gene editing **modifies the plant's own genes** without inserting foreign DNA.

- A protein (scissors) cuts DNA at a chosen site.
- A guide RNA directs the scissors to the correct location.
- The plant repairs the break, creating a **natural-like mutation** – similar to what would occur in evolution but far more precise.

Advantages

- Faster than conventional breeding
- No foreign gene insertion
- Precise and predictable
- Lower regulatory load
- Suitable for climate-resilient agriculture

Gene Editing vs GMOs – Key Differences

1. Source of DNA

- **GMOs:** Insert foreign genes from other species.
- **Gene Editing (TnpB/CRISPR):** Only modifies *native* DNA; no foreign gene added.

2. Regulatory Burden

- **GMOs:** Strict biosafety, multi-year approvals.
- **GE Crops:** Treated as *non-GMO* if no foreign DNA is present (per India's 2022 Rules under Environment (Protection) Act).

3. Technology Approach

- **GMO:** Transgenic insertion, random integration points.
- **Gene Editing:** Site-specific edits using CRISPR-Cas or TnpB systems.

4. Commercial Landscape

- **GMO seeds:** Dominated globally by a few big corporations.
- **GE crops:** Cheaper tools like TnpB empower **public institutions + Indian startups**.



27. DBT–BIRAC Prioritises Precision Biotherapeutics under BioE³ Policy



The Department of Biotechnology (DBT) and Biotechnology Industry Research Assistance Council (BIRAC) have officially prioritised Precision Biotherapeutics under the national BioE³ Policy, signalling a major push toward **personalised, gene-based, and molecular medicine** in India.

What are Precision Biotherapeutics?

Precision biotherapeutics are **personalised medical interventions** tailored to an individual's **genetic, proteomic, metabolic, or molecular profile**.

They shift treatment from *symptom management* → *root-cause correction* at the **cellular or gene level**.

Core Technology Pillars

1. Genomic & Proteomic Profiling

- Mutation mapping, biomarker discovery → personalised drug design.

2. Gene & Cell Editing Platforms

- CRISPR-Cas9, base editors, CAR-T, siRNA, AAV vectors, prime editing.

3. mRNA & Nucleic-Acid Therapeutics

- Programmable biological instructions for transient or durable gene modulation.

4. AI-Driven Drug Discovery

- ML models for target validation, molecular docking, toxicity prediction.

Significance for India

• Targeted Cure Potential

- Treats root-cause mutations rather than symptoms.
- Example: Casgevy (CRISPR-based β-thalassemia therapy) – FDA approval in 2023.

• NCD Burden Mitigation

- ~65% of India's total deaths from non-communicable diseases require precision therapies where standard drugs fail.

• Indian Genetic Diversity

- India's multi-ethnic genomic variation demands India-specific genotype and biomarker panels for accurate treatment.

• Economic & Innovation Opportunity

- Global precision-medicine market projected >\$22 billion by 2027.
- Strong opportunity for Indian biotech startups to build IP, reduce import dependence.



28. India Launches First Indigenous CRISPR Gene Therapy – BIRSA 101



India launched its first **indigenous CRISPR-based gene therapy 'BIRSA 101'** for **Sickle Cell Disease (SCD)**. Named after **Birsa Munda**, marking his 150th birth anniversary.

About BIRSA 101

- India's first CRISPR gene therapy, developed by **CSIR-IGIB**.
- Supports **Sickle Cell-Free India 2047** and **Atmanirbhar Bharat** in advanced therapeutics.
- **Cost Breakthrough:** Aims to replace foreign therapies costing **₹20–25 crore** with affordable Indian treatment (manufactured by Serum Institute).
- **Target Regions:** High SCD burden in **Central & Eastern tribal belts** (10–40% prevalence).

What is Gene Therapy?

- Technique that **adds, removes or edits genes** inside human cells to treat or prevent disease.

CRISPR Technology (Basics)

- **CRISPR** = Clustered Regularly Interspaced Short Palindromic Repeats.
- Uses **guide RNA + Cas enzyme** to precisely cut/modify DNA.
- Works like **genetic scissors** with high accuracy.

About Sickle Cell Disease (SCD)

- Caused by mutation in **HBB** gene affecting haemoglobin.
- RBCs become **rigid, sickle-shaped**, block blood flow → pain, organ damage, anaemia.
- Inherited disorder – both parents must carry the **sickle cell trait**.
- India holds the **2nd-largest SCD burden globally**, heavily concentrated among **Scheduled Tribes** due to endogamy.



29. Death of Nobel Laureate James Watson



Nobel Prize-winning molecular biologist **James Watson**, co-discoverer of the **double-helix structure of DNA**, has passed away.

Key Facts

- Awarded the **1962 Nobel Prize in Physiology or Medicine** with Francis Crick and Maurice Wilkins for discovering the **structure and self-replication mechanism** of DNA.
- Their 1953 model revolutionised genetics, molecular biology, and biotechnology.

About DNA (Deoxyribonucleic Acid)

Definition : DNA is the **hereditary molecule** carrying genetic instructions required for the **growth, reproduction, and functioning** of all living organisms.

Structure

- **Double helix** resembling a twisted ladder.
- Backbone: **Sugar + phosphate**.
- Rungs: **Nitrogen bases** –
 - **Adenine (A)** pairs with **Thymine (T)**
 - **Guanine (G)** pairs with **Cytosine (C)**

Location

- **Eukaryotes:** Nucleus & mitochondria.
- **Prokaryotes:** Circular chromosomal DNA in the cytoplasm.

Function

- DNA sequences called **genes** code for **proteins** that determine traits and regulate biological processes.

Applications

- **DNA fingerprinting:** Forensic identification, paternity testing.
- **Genome sequencing:** Detects genetic disorders, supports precision medicine.
- **Evolutionary biology:** Traces lineage, speciation, and population history.



30. National Action Plan on AMR 2.0 Launched



About NAP-AMR 2.0 (2025-2029)

- **Five-year plan** launched by Union Health Minister J. P. Nadda.
- Designed to address **gaps** in NAP-AMR 1.0 (2017-2021).
- Aligned with **World AMR Awareness Week (WAAW)**.

One-Health Approach

- Multi-sectoral participation: **Human health, animal husbandry, food safety, environment, research**, private sector & civil society.
- Focus on coordinated surveillance and responsible antimicrobial use across human-animal-environment interfaces.

Key Framework Features

- Ministry/department-specific **action plans**, with **goals, budgets, timelines**, and inter-sectoral coordination mechanisms.
- Emphasis on **governance, monitoring**, and cross-ministerial collaboration.

Priority Focus Areas

- Strengthening **infection prevention & control (IPC)** in healthcare.
- Expanding **laboratory and surveillance capacity**.
- **Optimising antimicrobial use** in humans, animals, and agriculture.
- **Training & education** for healthcare and veterinary sectors.
- **R&D** for new diagnostics, vaccines, and antimicrobials.

World AMR Awareness Week (WAAW)

- WHO-led global campaign: **18-24 November** every year.
- **Theme 2025:** "Act Now: Protect Our Present, Secure Our Future."

Recap: NAP-AMR 1.0 (2017-2021)

- India's first national AMR strategy using a **One-Health** approach.
- Achievements included:
 - Antibiotic stewardship programmes.
 - IPC guidelines for healthcare facilities.
 - **Surveillance network of 60 labs** across 33 States/UTs.
 - Environmental and waste-management initiatives.
 - Workforce capacity building.



31. India's Superbug Surge



- India recorded the world's highest MDRO prevalence: 83.1% of patients carried at least one superbug.
- Comparison: Italy - 31.5%, US - 20.1%, Netherlands - 10.8%.
- **ESBL-producing bacteria** detected in 70.2% of Indian patients → common antibiotics (penicillins, cephalosporins) ineffective.
- **Carbapenem-resistant organisms (CROs)** found in 23.5% of cases.
- **Carbapenem-producing Enterobacteriales (CPE)** were almost absent in the Netherlands.

Resistance Types

- **ESBL (Extended-Spectrum Beta-Lactamase):** Breaks down major antibiotic classes → routine infections become harder to treat.
- **Carbapenem Resistance:** Organisms withstand last-resort antibiotics → high mortality risk in critical care.

Why India Has the World's Highest MDRO Burden

- **OTC Antibiotic Misuse:** >50% of antibiotic sales happen without prescription → incomplete dosing, random self-medication.
- **Weak AMSP Adoption:** Only 15-20% tertiary hospitals run effective Antimicrobial Stewardship Programmes.
- **Poor Infection Control:** 70-80% hospitals/clinics lack proper effluent treatment → resistant organisms spread into water systems.
- **Excessive Animal Antibiotic Use:** India among top 5 users; 60-70% poultry samples show residues/resistance.
- **Low Diagnostic Testing:** <30% of hospital infections undergo culture tests → doctors rely on broad-spectrum, unnecessary antibiotics.



32. Antibiotic Combinations Can Sometimes Worsen AMR



A new study shows that **combining antibiotics does not always improve treatment**. Instead, some combinations **reduce effectiveness and increase antimicrobial resistance (AMR)**.

1. Antibiotic Antagonism

- Combining two antibiotics may cause **antagonism** → one drug **interferes** with the action of the other.
- This lowers treatment success and promotes resistant bacterial strains.

2. Different Mechanisms, Opposing Actions

- Bacteriostatic antibiotics** (e.g., **tetracycline**)
 - Stop bacterial growth
 - Slow metabolism and cell division
- Bactericidal antibiotics** (e.g., **ciprofloxacin**)
 - Kill bacteria **only when they are actively dividing**

When combined:

- The bacteriostatic drug stops division →
- The bactericidal drug **can't act** →
- Overall killing power drops sharply.**

3. Evidence from the Study

In experiments on *E. coli*, tetracycline slowed metabolic activity so much that **ciprofloxacin could not effectively destroy bacterial cells**.

Result: **Higher bacterial survival**, even under strong antibiotic exposure.

4. Increased AMR Risk

- Poorly designed combinations allow bacteria to survive → mutation, adaptation, and resistance accelerate.
- Leads to **superbugs** resistant to multiple antibiotic classes.

UPSC Keywords

- ✓ Antibiotic antagonism
- ✓ Bactericidal vs bacteriostatic
- ✓ Sub-lethal exposure
- ✓ Resistance selection pressure
- ✓ Superbugs / MDROs



33. Delhi Zoo Elephant Dies of Rare EMCV Infection



The only male African elephant at Delhi Zoo died due to **Encephalomyocarditis Virus (EMCV)**, a rare **rodent-borne** viral disease.

About EMCV

- **Virus Type:** Positive-sense, non-enveloped, single-stranded **RNA virus**.
- **Nature:** **Zoonotic**; causes **myocarditis** (heart inflammation) and **encephalitis** (brain inflammation) in mammals.
- **Human Impact:** Can cause mild, flu-like illness; severe cases are rare.

Transmission

- **Primary Hosts:** Rodents (rats, mice) carry the virus asymptotically.
- **Spread:**
 - Faecal-oral route via contaminated food/water.
 - Ingestion of infected rodent carcasses.

Susceptible Species

- Domestic pigs (especially piglets)
- African elephants
- Non-human primates

Treatment & Prevention

- **No specific treatment** or commercial vaccine.
- Management depends on:
 - Strong **rodent control**
 - Hygiene in enclosures
 - Strict **biosecurity** in zoos and wildlife facilities



34. First Scrub Typhus Case Detected from Gulf Region



- A 52-year-old man returning to Kerala from Dubai tested positive for **scrub typhus**, marking the **first reported case from the Gulf**.
- Indicates **geographic expansion** of the disease beyond its typical endemic belt in **South and Southeast Asia**.

About Scrub Typhus

- **Causative Agent:** *Orientia tsutsugamushi*
- **Vector:** Bite of infected larval mites (**chiggers**).
- **Distribution in India:** Common in **southern** and **northeastern** States.

Clinical Features

- Incubation: **6–20 days**
- Symptoms: High fever, chills, myalgia, headache, dry cough, chest discomfort.
- **Eschar:** Black, scab-like lesion in moist areas (armpits, groin) – a key diagnostic clue.

Diagnosis

- Confirmed using **IgM ELISA** for scrub typhus-specific antibodies.

Treatment

EDUCASIUM IAS Academy

- **Doxycycline** is highly effective when given early.
- Mortality can reach ~50% if untreated.

Prevention

- Use **insect repellents**, wear **protective clothing**, and avoid **mite-infested vegetation**.



35. First-Ever Human Death from H5N5 Avian Influenza Reported in the USA



About H5N5 Avian Influenza

- **Type:** A subtype of **Influenza A** virus found mainly in **wild waterfowl and poultry**.
- **Surface Proteins (Define the Strain):**
 - **H5** = **Haemagglutinin** (entry into host cells)
 - **N5** = **Neuraminidase** (virus release from infected cells)

How It Differs from H5N1

- **Genetically distinct** despite sharing the H5 subtype.
- **N-subtype difference:** H5N5 (N5) vs H5N1 (N1).
- **Epidemiology:**
 - **H5N1:** >860 human infections worldwide since 2003 (WHO).
 - **H5N5: Only one confirmed human infection** – the 2025 U.S. case (first ever fatality).

Human Transmission

- **Extremely rare.**
- Infection occurs through **direct contact with infected birds**, contaminated environments, or aerosols in poultry facilities.
- **No evidence** yet of **human-to-human transmission**.

Symptoms Noted in the Case

- High-grade fever
- Severe respiratory distress (pneumonia-like symptoms)
- **Neurological manifestations**
- Rapid deterioration despite hospital care

Treatment Protocol

- **Early administration** of neuraminidase inhibitors:
 - **Oseltamivir (Tamiflu) - first line**
- Supportive treatment for:
 - Hypoxia
 - Respiratory failure
 - Secondary bacterial infections
- Isolation and surveillance of close contacts recommended.



36. ICMR Invites Indian Manufacturers to Develop Monoclonal Antibodies for Nipah Virus



About Monoclonal Antibodies (mAbs)

- **Laboratory-engineered proteins** designed to act like human immune antibodies.
- Target **specific antigens** on pathogens or diseased cells.
- Applications include:
 - **Infectious diseases** (e.g., Ebola, COVID-19)
 - **Cancer therapy** (HER2, PD-1/PD-L1 inhibitors)
 - **Autoimmune disorders** (e.g., rheumatoid arthritis)
 - **Diagnostics** (ELISA, rapid tests)
- mAbs offer **high specificity**, making them ideal for life-threatening viral diseases like Nipah with no approved antiviral treatment.

About the Indian Council of Medical Research (ICMR)

- India's **apex body** for biomedical research.
- Functions under the **Department of Health Research**, Ministry of Health & Family Welfare.
- **History:**
 - Started in **1911** as *Indian Research Fund Association (IRFA)*.
 - Renamed **ICMR** in **1949**.
- **Mandate:**
 - Conduct, coordinate & promote health research aligned with national priorities.
 - Translate scientific evidence into **public health interventions**.
- **Governance:**
 - **Health Minister** chairs the Governing Body.
 - **Scientific Advisory Board** provides technical oversight.

About Nipah Virus (NiV)

- **Type:** Single-stranded, negative-sense RNA virus of the *Paramyxoviridae* family (*Henipavirus* genus).
- **Disease:** Causes **severe encephalitis and respiratory illness**, with case fatality rates between **40-75%**.
- **Zoonotic Origin:**
 - Natural hosts: **Fruit bats** (*Pteropus* species), also called flying foxes.
- **Transmission Routes:**
 - **Animal-to-human:**
 - Contact with infected bats, pigs, or contaminated fruit/tree sap.
 - **Human-to-human:**
 - Contact with bodily fluids (saliva, respiratory droplets, urine).
 - Nosocomial (hospital-based) transmission is common.
- **Symptoms:** Fever, headache → rapid neurological deterioration → seizures, coma.



37. Experts Push for Hepatitis-A Vaccine in UIP as India Faces New Outbreak Patterns



Public health experts have urged the Government of India to add the **Hepatitis A vaccine** to the **Universal Immunisation Programme (UIP)** after rising outbreaks, falling natural immunity, and an epidemiological shift showing higher vulnerability among adolescents.

What is Hepatitis A?

- HAV is a **non-enveloped RNA virus** causing acute but **self-limiting** liver inflammation.
- Spread via **faecal-oral route**, contaminated water/food, or close contact.
- Symptoms include fever, nausea, abdominal pain, **dark urine**, pale stools, and **jaundice**; children may be asymptomatic.
- **No antiviral treatment exists** – management is supportive; **vaccination is the most effective prevention**.

Why Inclusion in UIP is Needed

- **Disease Burden:** Causes 10–30% of acute viral hepatitis & 5–15% acute liver failure cases in India.
- **Epidemiological Shift:** Better sanitation reduced early childhood exposure → more **susceptible adolescents**, as seen in recent outbreaks in Kerala, Maharashtra, Delhi, UP.
- **Declining Natural Immunity:** Urban seroprevalence fell from 90%+ to 50–60%, expanding the at-risk population.
- **Vaccine Benefits:** India's **Biovac-A** offers 90–95% **protection**, single-dose regimen, and 15–20 years immunity.

Universal Immunisation Programme (UIP)

- Launched **1985**; world's largest free vaccination program.
- Covers **12 vaccine-preventable diseases** for children & pregnant women.
- **Digital Tools:**
 - **eVIN** (Electronic Vaccine Intelligence Network): Real-time cold chain monitoring.
 - **U-WIN**: Tracks pregnancy & newborn immunisation digitally.



38. Why Is India Still Without TCV in UIP While Neighbours Roll It Out?



Bangladesh has introduced the **Typhoid Conjugate Vaccine (TCV)** nationwide, joining Pakistan and Nepal. India – despite being a major global manufacturer – has still not introduced TCV under the **Universal Immunisation Programme (UIP)**, even though NTAGI recommended it in 2022.

About Typhoid & TCV

- Typhoid is a **water-borne bacterial infection** caused by *Salmonella Typhi*, spread through the **faecal-oral route** – contaminated food, water, or asymptomatic carriers.
- TCV is a **single-dose conjugate vaccine** providing **long-term immunity** (up to 10–15 years) and is **WHO-approved from 6 months of age**.

Why TCV Inclusion in UIP Is Urgently Needed

- **High Disease Burden:** SEFI modelling estimates **4.5 million cases annually** in India with nearly **9,000 deaths**, highest in densely populated urban settlements.
- **Antimicrobial Resistance:** *S. Typhi* shows rising resistance to ciprofloxacin, azithromycin, and ceftriaxone – shrinking treatment options.
- **Public Health Impact:** TCV reduces incidence, decreases antibiotic use, and slows the emergence of drug-resistant strains.
- **Equity Concerns:** High private-sector cost (~₹2,000/dose) limits access for poor and vulnerable groups.
- **NTAGI Recommendation:** India's apex immunisation body recommended TCV inclusion in **2022**, but rollout is still pending.
- **Water & Sanitation Gaps:** Only **6% of urban households** have assured safe water; sanitation deficits continue despite SBM.
- **Regional Alignment:** Pakistan, Bangladesh, and Nepal have already integrated TCV in their national immunisation schedules.



39. National Policy for Rare Diseases: Delhi High Court Orders Activation of ₹974-Crore National Fund

Background



- In 2024, the **Delhi High Court** directed the Union Government to fully operationalise:
 - **National Policy for Rare Diseases (NPRD) 2021**, and
 - The long-pending ₹974 crore National Fund for Rare Diseases (NFRD).
- Context: Over 50 children died since 2023 after treatment stopped when the existing ₹50-lakh therapy ceiling was exhausted.

Current Status of Rare Diseases in India

Epidemiology

- **450+ rare genetic disorders** recognised in India.
- India accounts for **one-third of global rare-disease cases**, affecting **70–96 million citizens** (ICMR 2023).

Common Rare Diseases

- **Spinal Muscular Atrophy (SMA)**
- **Gaucher's Disease**
- **Whipple's Disease**
- Many require continuous, lifelong gene, enzyme, or biologic therapy.

Care Infrastructure

- **12 Centres of Excellence (CoEs)** including AIIMS-Delhi, ICH-Chennai with approved treatment protocols.

Access & Costs

- **95% of orphan drugs are imported**, pushing annual therapy cost to **₹3–5 crore per patient**.
- Families face serious non-medical impacts:
 - 62% caregivers report **depression & burnout** (MoHFW 2024).
 - 78% families incur **catastrophic health expenditure** (>25% of income).
 - 41% forced to sell assets (NHP 2024).

Major Challenges in Rare Disease Governance

1. Administrative Paralysis

- **0% fund utilisation** under NFRD since notification (MoHFW 2024).
- Long bureaucratic delays in approvals and fund routing.

2. Unsustainable Treatment Cost

- Lifesaving therapies cost **80x India's per-capita income**.

3. Low Public Spending

- India spends **1.3% of GDP** on health (NHA 2024), far below OECD levels.

4. Weak Data & Surveillance

5. Fragmented Federal Coordination



Policies & Schemes Already in Place

National Policy for Rare Diseases (2021)

- Framework for screening, diagnosis, and financial support.

National Fund for Rare Diseases (NFRD)

- ₹974 crore fund for high-cost therapies; not yet operationalised.

Tax Exemptions (2022)

- Full customs and IGST exemption for **imported orphan drugs** and specialised medical devices.

National Patient Registry (ICMR-NIMS)

- Database for clinical tracking and research support.

State Rare Disease Cells

- Active in **Kerala, Karnataka, Delhi**, enabling decentralised implementation.

Way Forward (UPSC Mains-Ready Recommendations)

1. Immediate Financial Activation

- Release ₹974 crore directly to CoEs with simplified fund-flow mechanisms.

2. National Rare Disease Mission

- Create a dedicated mission with:
 - Ring-fenced annual budget**
 - Outcome-based metrics**
 - Model: **National Cancer Grid**

3. Legislative Framework

- Enact a **Rare Diseases (Prevention & Treatment) Act** ensuring:
 - Legal entitlement to treatment
 - Mandatory therapy continuity
 - Accountability provisions under **Article 21 (Right to Life)**

4. Domestic R&D & Manufacturing

- Extend the **PLI Scheme** to orphan drugs, gene therapies, and biologics.
- Learn from **South Korea's Orphan Drug Development Programme**.

5. Strengthen State Systems

- Competitive ranking of States on:
 - screening
 - treatment initiation
 - fund utilisation
 - registry completeness

6. Judicial Oversight

- Supreme Court-mandated **quarterly reporting** to prevent policy stagnation.

7. Universal Early Screening

- Add **newborn genetic testing** within Ayushman Bharat, mirroring **Japan's Health Japan 21**.



40. Juvenile Huntington's Disease (JHD) Brain Donation to NIMHANS



For the first time in India, the family of a Juvenile Huntington's Disease (JHD) patient donated his brain to **NIMHANS, Bengaluru**, enabling advanced research on rare neurodegenerative disorders.

About Huntington's Disease (HD)

- **Progressive genetic disorder** causing degeneration of brain neurons.
- Caused by mutation in the **HTT gene**, producing **abnormal huntingtin protein**.
- Mutant proteins form **toxic clumps**, disrupt neuronal activity → neuron death.
- **Inheritance:** Autosomal dominant; each child of an affected parent has **50% risk**.
- **Prevalence:** 3–7 per 100,000 globally.

Juvenile Huntington's Disease (JHD)

- Onset **before 20 years** (vs 30–50 years in adult HD).
- Faster progression with severe:
 - Motor impairment
 - Cognitive decline
 - Speech and behavioural difficulties
- Accounts for **~6% of all HD cases**.

Significance of the JHD Brain Donation

- **NIMHANS Brain Bank** (450+ specimens) gains a rare JHD specimen for molecular and pathological study.
- Supports **drug discovery**, biomarker identification, and understanding of early-onset neurodegeneration.
- Boosts India's participation in **global Huntington's disease research networks** for genetic mapping and therapy development.
- Reflects increasing acceptance of **post-mortem brain donation** for neurological research in India.



41. India Records 21% Decline in TB Incidence – WHO Global TB Report 2025



According to the **WHO Global TB Report 2025** (released 12 Nov 2025), India has recorded a **21% reduction in TB incidence (2015–2024)** – nearly double the global average decline.

1. Sharp Reduction in TB Cases

- TB incidence fell **21% between 2015–2024**, outperforming global decline trends.
- Estimated TB cases (2024): **27 lakh**
Diagnosed & treated: **26.18 lakh (92% coverage)**

2. Major Drop in “Missing Cases”

- Unreported TB cases reduced from **15 lakh (2015)** → **<1 lakh (2024)**
- Achieved through improved surveillance, mandatory notification, and private-sector reporting.

3. MDR-TB Burden & Treatment Success

- MDR-TB levels remain **stable** despite higher testing.
- Treatment success rate under **TB Mukt Bharat Abhiyan** reached **90%**
– higher than global average **88%**.

4. Decline in TB Mortality

- Mortality reduced from **28 per lakh (2015)** → **21 per lakh (2024)**
- Backed by **10x increase in TB programme funding since 2015**.

5. TB Mukt Bharat Screening Impact

- Since launch (2022), **19 crore vulnerable individuals** screened.
- Massive improvement in early case detection.

EDUCASIUM IAS Academy

6. Adoption of New Technologies

- **24.5 lakh TB patients** diagnosed using digital and molecular tools.
- Includes **8.61 lakh asymptomatic cases** detected earlier.
- Technology deployments:
 - **9,391** rapid molecular testing labs (NAAT)
 - **107** Culture & DST labs
 - **500+** AI-enabled handheld X-ray devices
(1,500 more being deployed)

7. Decentralised Care Through Ayushman Arogya Mandirs

- **1.78 lakh AAMs** providing localised diagnostics & treatment.
- Strengthens last-mile delivery in high-burden districts.

8. Enhanced Nutritional Support

- **Ni-kshay Poshan Yojana**: DBT support doubled from ₹500 → ₹1,000/month.
- ₹4,406 crore disbursed to **1.37 crore TB patients (2018–2024)**.



42. Ricin & ANFO: Rising Bioterrorism and Explosives Misuse Concerns



- Gujarat ATS arrested individuals preparing ricin.
- Red Fort blast forensics are examining possible ANFO use.
- Highlights growing **bioterrorism** and **industrial explosive misuse** risks

RICIN : **Source:** Highly toxic glycoprotein from *Ricinus communis* (castor seeds).

Toxicity: Among the deadliest natural toxins; fatal in microgram quantities via inhalation, ingestion, or injection.

Mechanism: Enters cells → binds ribosomes → **blocks protein synthesis** → rapid cell death.

Properties:

- Water-soluble
- Heat-stable at normal temperatures
- Inactivated above 80°C

Symptoms: Route-specific; nausea, vomiting, fever, cough, seizures → multi-organ failure.

Treatment: No antidote; only supportive care.

Regulation: Classified as a **Schedule I toxin** under the Chemical Weapons Convention.

AMMONIUM NITRATE FUEL OIL (ANFO)

Composition: ~94% porous ammonium nitrate + ~6% fuel oil (usually diesel).

Nature: Industrial blasting explosive used in mining, quarrying, construction.

Ammonium Nitrate (AN)

- Chemical formula: NH_4NO_3
- Water-soluble white crystalline solid.
- Non-explosive on its own; becomes explosive when combined with fuel oil and properly initiated.
- Manufactured as *porous prills* to absorb fuel evenly.

Fuel Oil : Petroleum-based fuel that acts as the combustible component enabling detonation.

Why ANFO Is Used Industrially : Cheap, easy to prepare, highly effective for large-scale controlled blasting.

Regulation : Governed by **Ammonium Nitrate Rules 2012** and **Explosives Act 1884**. Any mixture with **>45% ammonium nitrate** is legally classified as an **explosive**.





43. Auramine O – Hazardous Yellow Dye Still Found in Indian Foods

About Auramine O

Synthetic dye made from *dimethylaniline-formaldehyde* condensation; yellow crystalline solid.

Solubility: Dissolves in organic solvents; **not approved** for any food use.

Regulatory Status : Banned in India under FSSAI as a *non-permitted food colour*. Also prohibited by EU, US FDA, and East Asian regulators due to toxicity.

Industrial Uses (Non-Food): Textiles, leather, paper, printing inks. Fluorescent stain in microbiology (e.g., TB bacilli staining).

Health Hazards : Causes **liver-kidney damage**, splenomegaly, and mutagenic effects. Classified **Group 2B (possible carcinogen)** by IARC. Long-term exposure can increase cancer risk.

Adulteration in India : Found in **turmeric, sweets, namkeens, and street foods** to enhance bright yellow colour.

Persists due to:

- Informal supply chains
- Weak enforcement
- Low cost and easy availability

Other Common Banned Adulterants

- Metanil Yellow
- Rhodamine B
- Sudan Dyes
- Argemone Oil
- Calcium Carbide (ripening)
- Urea (milk adulteration)



44. Taiwan Seizes Chinese Mitten Crabs Containing Banned Drug



Why the Seizure?

- Taiwan detected **sulfadiazine**, a *prohibited veterinary antibiotic*, in imported Chinese mitten crabs.
- Violates Taiwan's **food safety laws** that ban sulfonamide residues in seafood.

About Chinese Mitten Crab

- Medium-sized **burrowing crab** native to East Asia.
- Listed among the "**100 Worst Invasive Species**" by IUCN due to ecological damage and fast reproduction.

About Sulfadiazine

- A **sulfonamide antibiotic** used for bacterial infections.
- **Mode of Action:** Blocks folic acid synthesis → inhibits bacterial growth.
- **Risk:** Overuse contributes to **antimicrobial resistance (AMR)**.

Regulation in India

- **Human use:** Prescription-only drug.
- **Food animals & aquaculture:** Usage tightly regulated; residues in edible products prohibited.

Antimicrobial Resistance (WHO Definition)

- AMR is the ability of a microorganism to **survive antimicrobial drugs** that were earlier effective, making infections harder to treat.



45. Minamata Convention Nations Agree to Phase Out Mercury Dental Amalgams by 2034



About Mercury

- **Mercury (Hg):** Naturally occurring heavy metal; environmental levels have risen due to human activity.
- **Health Risks:**
 - Destroys body cells, damages kidneys, lungs, and brain.
 - Chronic vapor inhalation → **neurological, oral, and dermatological disorders.**
- **Global Concern:** WHO lists mercury among the **top 10 hazardous chemicals** affecting public health.
- **Major Anthropogenic Sources:**

Rank	Source of Pollution	Share of Global (%)
1	Artisanal & Small-Scale Gold Mining (ASGM)	37.7%
2	Coal Combustion (Power Plants, Industry)	21%
3	Non-Ferrous Metals Production (e.g., zinc, copper, lead smelting)	15%
4	Cement Production	11%
5	Waste from Products (batteries, bulbs, etc.)	7%

Major producer of Mercury is China followed by Tajikistan in the form of Cinnabar mining.

Minamata Disease: A severe neurological syndrome caused by methylmercury poisoning. First identified in 1950s Japan, linked to consumption of contaminated fish from Minamata Bay.

Minamata Convention on Mercury

- **Nature:** Legally binding UN treaty to protect human health & environment from mercury.
- **Adopted:** 2013 by 92 countries.
- **India:** Ratified in 2018.
- **Lead Agency:** United Nations Environment Programme (UNEP).
- **Key Measures:**
 - Phase-down of mercury-added products.
 - Controls on mercury emissions/release.
 - Environmentally sound storage & waste management.
 - Monitoring & reporting obligations.

Why Dental Amalgams are Being Phased Out

- Mercury-based dental fillings release small quantities of mercury vapour.
- Concerns about cumulative mercury exposure in populations.
- The Minamata Convention's latest decision: **global phase-out by 2034.**



46. HMDA's In-Situ Bioremediation Plan for Hussain Sagar Lake



Bioremediation Method

- Uses **enzyme solutions** + **Bokashi balls** to activate beneficial microorganisms.
- Targets **organic sludge breakdown**, pollutant removal, and ecosystem restoration.

Objectives

- Eliminate **foul odour**.
- Control **algal blooms**.
- Improve **water & sediment quality**.
- Increase **dissolved oxygen (DO)**.
- Restore **lake ecology**.

Bokashi Balls

What They Are

- Tennis-ball-sized **organic spheres** containing **Effective Microorganisms (EM)** for water purification.

How They Work

- Sink to lake bottom → slowly disintegrate → release EM into sediment.
- Microbes degrade **organic waste**, neutralise toxins, and suppress odour-causing decomposition.

Components

- **Organic substrate**: Fermented rice/wheat bran, sawdust, husk.
- **Effective Microorganisms**: Lactic acid bacteria, yeast, photosynthetic bacteria.
- **Energy source**: Molasses or jaggery.
- **Additives**: Biochar/charcoal for pollutant adsorption.

Hussain Sagar Lake : Key Facts

- **Type**: Man-made, heart-shaped lake in Hyderabad, Telangana; built across a Musi River tributary.
- **Built**: 1563 by **Ibrahim Quli Qutb Shah**; named after **Hussain Shah Wali**.
- **Significance**: Historically linked Hyderabad & Secunderabad.
- **Landmark**: 18-m monolithic **Buddha statue** stands at the centre.
- **Recognition**: Declared “**Heart of the World**” by **UNWTO (2012)**.



47. Sustainable Harnessing of Fisheries in the EEZ Rules, 2025



A major reform to promote **sustainable deep-sea fishing**, protect marine ecosystems, and support **coastal and island livelihoods**.

1. Empowering Small Fishers

- Priority access for **small fishers' cooperatives** and **Fish Farmer Producer Organizations (FFPOs)**.
- Support through **PM Matsya Sampada Yojana (PMMSY)** and **FIDF** for training, credit, and deep-sea operations.

2. Modernization of Marine Fisheries

- Push for **value addition, certification, and traceability** to meet global standards.
- Promotion of "**mother-and-child**" vessel models enabling mid-sea transhipment as per RBI norms.

3. Island-Centric Focus

- Special thrust on **Andaman & Nicobar Islands** and **Lakshadweep**.
- These two regions together account for **~50% of India's EEZ**, making them strategic for deep-sea fisheries expansion.

4. Sustainability Regulations

- Complete prohibition** of harmful fishing methods:
 - LED light fishing
 - Pair trawling
 - Bull trawling

5. Digital Governance

EDUCASIUM IAS Academy

- Launch of a **digital Access Pass** for all mechanized and large motorized vessels.
- Implemented through the **ReALCRAFT portal**, enabling online registration, monitoring, and compliance.

6. Curbing IUU Fishing

- Centre to implement a **National Plan of Action** against **Illegal, Unreported, and Unregulated (IUU) Fishing**.
- Objective: protect marine biodiversity and safeguard small fishers from unfair competition.

7. Security & Tracking Measures

- Mandatory **transponders** on vessels for real-time monitoring.
- QR-coded ID cards** for both fishers and vessels to strengthen maritime security and traceability.



48. Kwar Hydroelectric Project Fire Incident



A fire broke out in an **under-construction tunnel** at the Kwar Hydroelectric Project (Kishtwar, J&K). All **workers were rescued safely**, preventing casualties.

About Kwar Hydroelectric Project

- **Type:** 540 MW **run-of-the-river** hydropower project (4×135 MW units).
- **Location:** Chenab River, Kishtwar district, Jammu & Kashmir.
- **Developer:** Chenab Valley Power Projects Pvt. Ltd. (CVPPPL) – a JV between
 - NHPC
 - J&K State Power Development Corporation (JKSPDC)

Significance

- Expected **annual generation:** ~1,975.54 million units (MU).
- **Commissioning target:** March 2028.
- Supports
 - **Grid balancing**, especially for renewable-heavy grids.
 - **Regional development** in Kishtwar.
- Provides ~2,500 **direct & indirect jobs** locally.

What is a Run-of-the-River Project?

- Uses the **natural flow** and **elevation drop** of the river.
- Involves **minimal water storage**, unlike large dams.
- Considered more **environment-friendly**, with reduced submergence.



49. Kwar Hydroelectric Project Fire Incident



A fire broke out in an **under-construction tunnel** at the Kwar Hydroelectric Project (Kishtwar, J&K). All workers were rescued safely, preventing casualties.

About Kwar Hydroelectric Project

- **Type:** 540 MW **run-of-the-river** hydropower project (4×135 MW units).
- **Location:** Chenab River, Kishtwar district, Jammu & Kashmir.
- **Developer:** Chenab Valley Power Projects Pvt. Ltd. (CVPPPL) – a JV between
 - NHPC
 - J&K State Power Development Corporation (JKSPDC)

Significance

- Expected **annual generation:** ~1,975.54 million units (MU).
- **Commissioning target:** March 2028.
- Supports
 - **Grid balancing**, especially for renewable-heavy grids.
 - **Regional development** in Kishtwar.
- Provides ~2,500 **direct & indirect jobs** locally.

What is a Run-of-the-River Project?

- Uses the **natural flow** and **elevation drop** of the river.
- Involves **minimal water storage**, unlike large dams.
- Considered more **environment-friendly**, with reduced submergence.

EPIC UPSC Classes



50. India's First Vanadium Redox Flow Battery System



The **Union Minister of Power** inaugurated India's largest and first MWh-scale Vanadium Redox Flow Battery (VRFB) system.

The system has been installed at **NETRA**, NTPC's R&D centre in Greater Noida, with a capacity of **3 MWh**.

Developed By: NTPC's R&D team under the Ministry of Power.

Significance: It marks a significant step in the country's progress towards **long-duration energy storage (LDES)** solutions to improve renewable energy integration and grid resilience.

About Vanadium Redox Flow Battery (VRFB)

- A VRFB is a **large-scale flow battery** that stores and releases energy using **vanadium ions** in different oxidation states.
- **Key Features:** It offers a **scalable, safe, and long-lasting design**, making it well-suited for extended, grid-level energy storage.
- **Applications:** To integrate renewable energy sources such as **solar** and **wind** into existing power grids.
- **Li-Ion Alternative:** They are increasingly replacing lithium-ion batteries in **stationary grid storage** due to their durability and safety.

Flow batteries are rechargeable storage systems with **two separate liquid electrolytes** stored in external tanks. These solutions are pumped through an **electrochemical cell** where chemical reactions charge or discharge the battery.



51. India Ends Operations at Ayni Air Base, Tajikistan (2022)



India formally ended its presence at **Ayni Air Base** in 2022 after Tajikistan declined to renew the bilateral defence agreement.

About Ayni Air Base

- **Location:** Near Dushanbe, Tajikistan; also called **Gissar Air Base** (Soviet-era facility).
- **Indian Role:**
 - India upgraded the base in **2002** with **~\$100 million**, strengthening runways, air defence, and radar systems.
 - It was India's most significant overseas military facility after **Farkhor Air Base** (1998).

Why India Redeveloped Ayni

- **Support to Northern Alliance** (anti-Taliban forces during early 2000s).
- **Strategic access** to Afghanistan and Central Asia.
- **Counter-balance** to Pakistan and China in the region.

India's Exit (2022)

- India withdrew personnel and assets after Tajikistan **did not renew the defence pact**.
- All Indian operations at Ayni ceased the same year.

Strategic Significance of Ayni for India

- **Central Asian Foothold:** Only Indian military presence in the region; crucial to the **Connect Central Asia** policy.
- **Intelligence Reach:** Close to Afghanistan, Pakistan, and China; enabled monitoring of militant and military movements.
- **Air Access Route:** Provided India an **independent air corridor** to Afghanistan, avoiding Pakistan's airspace.
- **Operational Utility:** Served as a **logistics and humanitarian support hub**, used during **Operation Devi Shakti (2021)** for evacuation from Afghanistan.

Historical Note

- **Farkhor Air Base (1998):** India's first overseas air facility in Tajikistan, supporting the Northern Alliance before Ayni became operational.



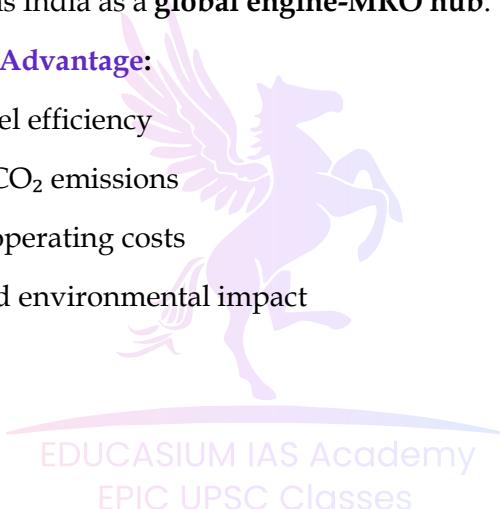
52. PM Modi Inaugurates Safran Aircraft Engine Services India (SAESI), Hyderabad



PM Modi inaugurated the **SAESI engine servicing facility** in Hyderabad. Laid the foundation for a new **MRO facility** for **M88 engines** of Rafale fighter jets.

About SAESI Facility

- **Function:** Provides world-class maintenance, repair, and overhaul for **LEAP engines** (used in Airbus A320neo, Boeing 737 MAX).
- **Capacity:** Will service **up to 300 LEAP engines/year** by **2035**.
- **Significance:**
 - Strengthens **Aatmanirbhar Bharat** in aviation.
 - Positions India as a **global engine-MRO hub**.
- **LEAP Engine Advantage:**
 - High fuel efficiency
 - Lower CO₂ emissions
 - Lower operating costs
 - Reduced environmental impact



53. Weakening Global Nuclear Moratorium & India's Strategic Dilemma



Global Nuclear Context

- **Testing Revival:** U.S. signalled possible resumption of nuclear tests under Trump-era directives.
- **Arms Control Breakdown:**
 - Russia suspended participation in **New START**.
 - U.S. still **non-ratifying** the CTBT → weakens treaty credibility.
- **China's Expansion:**
 - Rapid arsenal growth; new silos at **Lop Nur**.
 - **SIPRI 2024:** China now has **500+ warheads**.

India's Nuclear Posture

- **Voluntary Moratorium (1998):** No further tests since Pokhran-II.
- **Doctrine: Credible Minimum Deterrence** (sufficient capability, not arms race).
- **Technical Gap:** No empirical yield validation beyond 1998 tests.
- **Autonomy:** Moratorium is **self-imposed**, reversible, and not treaty-bound.

Why India May Need Re-evaluation

- **Deterrence Erosion:**
 - Pakistan expanding **tactical** and **sea-based** nuclear systems.
 - China modernising strategic forces.
- **Security Environment Shift:**
 - Rising U.S.-China rivalry; Indo-Pacific militarisation (AUKUS, QUAD).
- **Technology Needs:** MIRV-equipped missiles require **validated yields** and higher design confidence.
- **Strategic-Moral Balance:**
 - India must appear responsible while retaining credible deterrent capability.



54. India Assumes Chairship of International IDEA (2026)



India's Chief Election Commissioner (CEC) Gyanesh Kumar will formally take over as **Chair of International IDEA for 2026** at the Council of Member States meeting in Stockholm.

Appointment reflects **global recognition of India's electoral leadership, credibility, and institutional strength.**

About International IDEA

- **Founded:** 1995, as an inter-governmental organisation to strengthen democracy globally.
- **Membership:** 35 member states; **U.S. and Japan** participate as observers.
- **Mandate:** Supports electoral processes, democratic reforms, political participation, constitution building, and governance.

India's Role

- **Founding Member:** Active since 1995 in shaping IDEA's governance, policy frameworks, and democratic support initiatives.
- **Electoral Expertise:** India conducts one of the world's **largest democratic exercises** with nearly **1 billion voters**, making its participation uniquely valuable.

Responsibilities as Chair (2026)

- CEC will **preside over all Council meetings** throughout the year.
- Expected to:
 - Share India's large-scale election management expertise.
 - Strengthen global electoral standards, capacity building, and democratic cooperation.
 - Promote technology-driven, inclusive, and transparent electoral practices.



55. Starlink–Maharashtra Satellite Internet Expansion



Maharashtra govt signed a **Letter of Intent (LoI)** with **Starlink Satellite Communications Pvt. Ltd.**

Aim: Expand **satellite-based high-speed internet** to remote and underserved regions under the **Digital Maharashtra Mission**.

- **Target Districts:** Gadchiroli, Nandurbar, Dharashiv, Washim – among the most connectivity-deprived regions.
- **Deployment Scope:** Satellite internet for
 - Government institutions
 - Schools & colleges
 - Healthcare centres
 - Public digital infrastructure
 - E-governance service centres
- **Technology Advantage:**
 - Low-Earth Orbit (LEO) satellites reduce latency.
 - Ensures connectivity in **forested, hilly, tribal and Naxal-affected regions** where fibre is difficult to deploy.
- **Commercial Timeline:**
 - **Starlink commercial launch expected in India by early 2026.**
 - Entry into India's broadband market after DoT licensing and security clearances.

Significance

- Bridges digital divide in remote areas.
- Enhances **tele-medicine, online education, digital payments, e-governance access.**
- Supports disaster-response communication in low-network zones.



GEOGRAPHY

DISASTER Management

1. Seed Processing Plants
2. Reimagining Agriculture Roadmap by NITI Aayog
3. Natural Farming in India
4. New Digital Platforms for Warehousing and PDS Operations
5. State of Food and Agriculture Report 2025
6. AMOC Collapse Threat in Iceland
7. Cold Wave in India
8. High Seas Treaty
9. Meghalaya's Umngot River
10. Volcanic Lightning
11. Lewotobi Volcano
12. Hayli Gubbi Volcano Erupts in Ethiopia
13. Avalanche in Nepal
14. Brightest and Most Distant Black Hole Flare
15. Martian Landforms
16. Hurricane Melissa
17. Asian and Pacific Centre for Disaster Information

EDUCASIUM IAS Academy

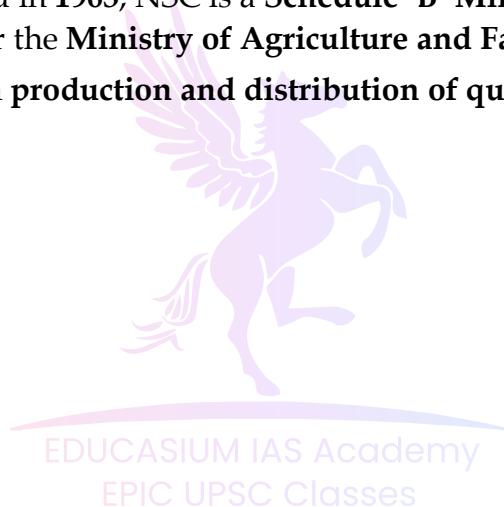
EPIC UPSC Classes

1. National Seeds Corporation (NSC)



NSC inaugurated advanced seed processing plants in New Delhi, Bareilly, Dharwad, Hassan, Suratgarh, and Raichur.

- **Digital Launch:** Introduced **Seed Management 2.0**, featuring an **online seed booking platform** for farmers.
- **Objective:**
 - Enhance **seed quality** and ensure **nationwide availability** of certified seeds.
 - Promote **transparency** and **ease of access** through digital integration.
- **About NSC:**
 - Established in **1963**, NSC is a **Schedule 'B' Mini Ratna Category-I PSU** under the **Ministry of Agriculture and Farmers' Welfare**.
 - Key role in **production and distribution of quality seeds** across India.



2. NITI Aayog Unveils “Reimagining Agriculture” Report to Drive Frontier Tech-Led Farm Transformation



NITI Aayog released its strategic report **“Reimagining Agriculture: A Roadmap for Frontier Technology-Led Transformation”** in Gandhinagar, developed with BCG, Google, and CII.

CORE FEATURES OF THE AGRICULTURE ROADMAP

Objective: Modernise Indian agriculture using **AI, precision farming, remote sensing, and smart mechanisation** to boost sustainability and farmer income.

Digital Agriculture Mission 2.0:

- **Three-pillar framework:**
 1. **Data ecosystems** for last-mile integration
 2. **Innovation systems** for research & product development
 3. **Policy convergence** for scalable reforms

Farmer Segmentation:

- **Aspiring Farmers (70-80%)** – need basic digital access & risk support
- **Transitioning Farmers (15-20%)** – ready for tech adoption & market linkages
- **Advanced Farmers (1-2%)** – capable of integrating high-end frontier technologies

State Model: Gujarat highlighted for **Digital Crop Survey, i-Khedut portal**, and transparent subsidy delivery.

Institutional Backing: Led by NITI Aayog’s **Frontier Tech Hub** with private sector co-development.

Vision: Supports **Viksit Bharat 2047** through data-driven decision-making and improved farmer autonomy.

EDUCASIUM IAS Academy

EPIC UPSC Classes

Current Status of Agriculture in India

- **GDP Share:** ~18% (Economic Survey 2024).
- **Employment:** 43% of workforce (PLFS 2023).
- **Landholding:** 86% are small & marginal farmers (<2 ha).
- **Productivity:** 30-40% lower than global averages (FAO 2024).
- **Climate Vulnerability:** 50% net sown area rainfed; high exposure to rainfall variability & water stress (ICAR 2024).
- **Agri-Tech Rise:** Over 3,000 startups now active in Agri-tech (NASSCOM 2025).

Significance

- Positions India for **tech-driven agricultural modernization**.
- Enhances **precision input use**, reduces climate vulnerability, and improves **market integration**.
- Advances India toward **Viksit Bharat 2047** in the agri-food systems sector.

Keywords: NITI Aayog, Agriculture Transformation, Digital Agriculture Mission 2.0, Frontier Technologies, Viksit Bharat 2047.

3. South India Natural Farming Summit 2025



PM Narendra Modi inaugurated the **South India Natural Farming Summit 2025** in Coimbatore, aimed at advancing climate-smart, regenerative agriculture.

Natural Farming - Overview

- **Definition:** A chemical-free, sustainable farming system relying on biological processes and on-farm inputs rather than synthetic chemicals.
- **Philosophy:** Inspired by **Masanobu Fukuoka's "do-nothing farming"**, emphasising minimal soil disturbance and natural ecosystem functioning.

Why Natural Farming is Needed

- Enhances **soil fertility, water conservation, and biodiversity**.
- Reduces agriculture's **carbon and chemical footprint**.
- Builds **climate resilience** against drought, heat stress, and extreme weather.

Benefits

- Low input costs through **local materials**.
- Higher **profit margins** for farmers.
- Produces **chemical-free, nutritious food**.

Challenges

- Lower or inconsistent yields.
- Weak certification and traceability systems.
- Limited farmer training and pest-management capability.
- Poor market linkages and inadequate premium markets.

State Leaders in Natural Farming

Andhra Pradesh, Karnataka, Himachal Pradesh, Gujarat, Uttar Pradesh, Kerala.

Key Government Initiatives

1. NMNF – National Mission on Natural Farming (2024)

- Main national programme promoting chemical-free agriculture.
- **10 lakh+ farmers** enrolled.

2. BPKP – Bhartiya Prakritik Krishi Paddhati

- Earlier under PKVY; now integrated into NMNF.
- Promotes traditional, low-input natural farming practices.

3. PKVY – Paramparagat Krishi Vikas Yojana

- Focuses on **certified organic farming** using cluster-based models.
- Provides financial support for certification and infrastructure.

4. Namami Gange Initiative

- Encourages natural farming along a **5-km corridor** on both sides of the Ganga to reduce chemical runoff.

4. Digital Push to Modernise India's Warehousing & PDS



The Union Minister of Consumer Affairs launched **five major digital initiatives** – Bhandara 360, Smart EXIM Warehouse, Anna Darpan, ASHA, and a new SILO facility – to modernise warehousing, boost supply chain efficiency, and improve transparency across India's **Public Distribution System (PDS)**.

- **Digital Overhaul:** New platforms integrate procurement, storage, movement, and distribution of grains, reducing delays and leakages across the supply chain.
- **Bhandara 360:** A **cloud-based platform** providing real-time visibility, stock analytics, and automated monitoring for warehousing operations.
- **Anna Darpan:** End-to-end **PDS transparency system** for tracking grain allocation, movement, and lifting by states.
- **ASHA:** An **AI-driven forecasting and automation tool** to optimise storage planning, logistics, and supply chain decision-making.
- **Smart EXIM Warehouse:** Upgrades storage efficiency for **export-import flows**, supporting faster processing at ports and border points.
- **Modern SILO Facility (Malout, Gujarat):** High-capacity, mechanised grain storage designed for **scientific handling**, reduced wastage, and faster turnover.

5. State of Food and Agriculture Report 2025



FAO's *State of Food and Agriculture (SOFA)* report highlights **human-caused land degradation** as a major threat to global agricultural productivity.

EDUCASIUM IAS Academy

EPIC UPSC Classes

Major Findings

- **1.7 billion people** live in regions where **land degradation is reducing crop output**.
- India is among the **worst affected**, with major yield losses in intensively farmed regions.
- **Agricultural expansion** accounts for **~90% of global deforestation**.
- From **2001-2023**:
 - **Cropland +78 million ha**
 - **Permanent pastures -151 million ha**
- Every year, **3.6 million ha of cropland** are abandoned due to degradation.
- **Restoration Benefits:**
 - Restoring **10% degraded cropland** → food for **154 million people/year**
 - Restoring abandoned cropland → food for **292-476 million people**
- **Hotspots:** Southern Asia & Sub-Saharan Africa – overlap of degradation, poverty, hunger.
- **Child Impact:** **47 million children under 5** face stunting due to degraded soils & declining yields.

6. Iceland Declares AMOC Collapse a National Security Threat



Iceland became the **first country in the world** to officially classify a potential **AMOC collapse** as a *national security and existential threat*, citing the risks of extreme climate disruption across the North Atlantic.

What is AMOC? : Atlantic Meridional Overturning Circulation (AMOC)

- A major **ocean circulation system** carrying:
 - **Warm, salty water** → **northwards (surface)**
 - **Cold, dense water** → **southwards (deep ocean)**
- Part of the **thermohaline circulation** driven by temperature–salinity differences.
- Functions as a **global heat conveyor belt**, redistributing tropical heat to the North Atlantic and returning cold water south.

Why It's a Climate Tipping Point

- A collapse could trigger **rapid, irreversible** shifts in global climate.
- Studies indicate AMOC is at its **weakest in 1,600+ years (2021 analysis)**.

Importance of AMOC

1. **Climate Regulator** : Moderates Europe's winters and stabilises global temperature patterns.
2. **Monsoon & Rainfall Systems** : Controls position of **tropical rainfall belts** and strength of **South Asian, African, and Amazonian monsoons**.
3. **Ocean Health** : Vital for **nutrient circulation, deep-ocean ventilation, and carbon storage**, slowing global warming.

Impacts of AMOC Weakening or Collapse

1. **Europe: Extreme Cold & Winter Storms** : Heat transport reduction → **severe winters** and increased storm frequency in NW Europe.
2. **Sea Ice Expansion** : Reduced ocean heat → **sea ice spreads** toward NW European coasts.
3. **Monsoon Weakening**
 - ITCZ shifts **southward** →
 - **Weaker Indian monsoon**
 - Rainfall disruption in **West Africa** and the **Amazon**
4. **Accelerated Ice Melt**
 - Greenland meltwater (freshwater influx) further **slows AMOC**, creating a feedback loop.
5. **Severe Droughts**
 - **Sahel region** faces extreme, long-term drought, worsening food insecurity.
6. **Global Weather Instability**
 - **More marine heatwaves**
 - **Stronger Atlantic hurricanes**
 - **Altered sea-level rise patterns**
 - Disturbed global climate equilibrium

Why Iceland Declared AMOC a National Security Threat

- Iceland lies at the **center of AMOC deep-water formation**.
- A slowdown threatens: **Fisheries, Coastal infrastructure, Weather stability, Energy systems, Public safety & food security**
- Iceland's decision signals rising global concern about imminent tipping points.

7. Cold Wave Warning in Telangana



About Cold Wave

A **cold wave** is a sudden drop in minimum temperature below normal winter averages.

The IMD defines, monitors, and issues colour-coded alerts (Green, Yellow, Orange, Red).

Baseline normals are derived from **1981-2010 climatology**.

Core Cold-Wave Zone: 17 States/UTs; **Telangana is the only South Indian state** included.

IMD Criteria for Declaring Cold Waves

Plains

- **Cold Wave:**
 - Minimum temperature $\leq 4^{\circ}\text{C}$, OR
 - Minimum $\leq 10^{\circ}\text{C}$ AND $4.5^{\circ}\text{C}-6.4^{\circ}\text{C}$ below normal
- **Severe Cold Wave:**
 - Minimum $\leq 2^{\circ}\text{C}$, OR
 - $\geq 6.5^{\circ}\text{C}$ below normal

Hilly Regions : Minimum $\leq 0^{\circ}\text{C}$ and $4.5^{\circ}\text{C}-6.4^{\circ}\text{C}$ below normal.

Coastal Regions

- Minimum $\leq 15^{\circ}\text{C}$ and $\geq 4.5^{\circ}\text{C}$ below normal.

Drivers of Cold Waves in India

- **Western Disturbances:** Post-passage north-westerly winds bring sharp cooling.
- **Siberian High:** Strengthening & southward shift pushes cold continental air into India.
- **Himalayan Snowfall:** Intensifies cold-air advection.
- **Clear Skies:** Promote rapid night-time radiative cooling.
- **Dense Fog:** Blocks daytime solar heating, prolonging cold conditions.
- **La Niña:** Increases frequency and severity of cold waves.
- **Continental Interior Climate:** Areas far from the sea cool faster and more intensely.

Consequences of Cold Waves

Health

- Hypothermia, frostbite, vasoconstriction, asthma, and COPD spikes.
- India records **~824 deaths annually** due to cold exposure.

Agriculture

- Frost damage to crops during flowering/fruiting.
- Reduced livestock productivity and overall yield.

Infrastructure

- Dense fog disrupts aviation, rail, and road transport.
- Higher heating demand → power outages and grid stress.

8. High Seas Treaty Crosses 60 Ratifications; Set to Enter into Force in January 2026



The **High Seas Treaty**, formally known as the *Biodiversity Beyond National Jurisdiction (BBNJ)* agreement, has been ratified by **over 60 countries**, enabling it to come into effect in **January 2026**. India signed the treaty in **September 2024**, signalling commitment to global marine conservation.

What is the High Seas Treaty (BBNJ)?

- Adopted in **2023**, the treaty is the **first legally binding global pact** to protect marine biodiversity in the **high seas** – areas beyond national jurisdiction that cover **~60% of the world's oceans**.
- Often termed the **"Paris Agreement for the Ocean."**
- Aims to prevent a looming open-ocean biodiversity crisis by regulating access, exploitation, and conservation.

Key Provisions

1. Marine Genetic Resources (MGRs)

- Declares MGRs as the **common heritage of humankind**.
- Seeks **equitable benefit sharing** of profits from pharmaceuticals, cosmetics, enzymes, etc., derived from deep-sea organisms.

2. Area-Based Management Tools (ABMTs)

- Mechanism to create **Marine Protected Areas (MPAs)** in the high seas.
- Ensures conservation of **ecologically or biologically significant** marine zones.

3. Environmental Impact Assessments (EIAs)

- Mandatory EIAs for activities with potential **transboundary, cumulative, or long-term ecological impact** (e.g., deep-sea mining, seabed activities, bioprospecting).
- Activities must follow **precautionary** and **ecosystem-based** approaches.

Challenges and Concerns

1. Principle Ambiguity

- Tension between:
 - **Common heritage of humankind**
 - **Freedom of the high seas** (navigation, fishing, scientific research)
- Creates governance and implementation confusion.

2. Weak Benefit-Sharing Framework

- No clearly defined system for sharing MGR-based profits → risk of **biopiracy** and inequitable access for developing nations.

3. Lack of Major Power Participation

- Key ocean powers – **U.S., China, Russia** – have not ratified the treaty.
- Limits enforcement and legitimacy of global marine governance.

4. Institutional Overlap

- Possible conflicts with existing bodies like **UNCLOS, ISA**, and regional fisheries management organisations.
- Risk of **fragmented ocean governance** and duplicated mandates.

9. Meghalaya's Umngot River Turns Murky Due to Hill-Cutting Debris From Road Project



The Umngot River, famous for its crystal-clear waters, turned **brown and muddy** in Oct 2025, raising concerns among local communities and environmental groups.

About Umngot River

- Located in **West Jaintia Hills, Meghalaya**, near the **Bangladesh border**.
- Known for **exceptional water clarity**, once regarded as **one of Asia's cleanest rivers**.
- Major tourism hubs: **Dawki** and **Shnongpdeng**.
- Supports livelihoods of Khasi communities through **fishing, drinking water, agriculture, and eco-tourism**.

Cause of Recent Pollution

- River turned murky due to **soil and debris dumping** from hill-cutting linked to the **Shillong-Tamabil (Dawki) road project**.
- Sedimentation reduced water transparency → affected boating & tourism.
- Raised concerns about impacts on **fish populations**, potable water, and river ecosystems.

Significance

- Highlights risks of **unregulated infrastructure development** in fragile hill ecosystems.
- Critical for discussions on **EIA, sustainable tourism**, and **community rights** in Northeast India.
- Calls for stricter **project monitoring**, controlled excavation, and riverbank protection measures.

Keywords: Umngot River, Dawki, Meghalaya, Hill-Cutting, Sedimentation, Eco-Tourism.

10. Volcanic Lightning



What is Volcanic Lightning?

- Electrostatic discharges inside a **volcanic ash plume** during eruptions.
- Appears as lightning flashes caused by **friction and collision** of ash, rock fragments, and pumice.

How It Forms

- **Ash particle collisions** → **static charge buildup** → **discharge**.
- Occurs near the **vent** and in **upper plumes** where **ice particles** enhance charge separation.
- Volcanic plumes contain **more water vapour** than normal thunderclouds → stronger lightning.

Scientific Importance

- Acts as an **early-warning signal** for eruption detection.
- Helps issue **evacuation** and **aviation safety alerts**.

Volcanoes in India

- **Barren Island (A&N Islands)** – India's **only active volcano**, last major activity in 2017.
- **Narcondam Island** – dormant volcano.
- **Deccan Traps, Maharashtra** – extinct volcanic region formed ~65 million years ago.

EDUCASIUM IAS Academy

EPIC UPSC Classes



11. Indonesia Raises Highest Alert as Mount Lewotobi Laki-laki Erupts Twice



On 12 November 2025, Indonesia's **Mount Lewotobi Laki-laki** erupted twice within hours, forcing authorities to raise the volcanic alert to its **highest level** due to rapidly intensifying magmatic activity.

- **Twin Eruptions:**
 - First eruption: Lasted **9 minutes**, ejecting ash **10 km** high into the atmosphere.
 - Second eruption: Occurred at **9:21 a.m.**, lasted **3 minutes**, spewing ash **8 km** high.
- **Alert Level 4:** Indonesia's volcanology agency upgraded the alert to the **maximum level**, warning of potential larger explosions and pyroclastic hazards.
- **Location:** The volcano lies in **East Nusa Tenggara province**, part of Indonesia's active volcanic belt along the **Pacific Ring of Fire**.
- **Volcanic System:** Rapid escalation indicates significant **magmatic unrest** beneath the volcano.
- **Risk to Communities:** Authorities cautioned residents about ashfall, lava flows, lahars, aviation hazards, and urged evacuation from high-risk zones.

UPSC Relevance

- Demonstrates **Pacific Ring of Fire volcanism**, tectonic plate interactions, and hazard monitoring.
- Links to **Disaster Preparedness**, **Early Warning Systems**, **Aviation safety**, and **Volcanic risk mitigation**.
- Useful in GS-I (Geography), GS-III (Disaster Management), and Environment sections.

12. Hayli Gubbi Volcano Eruption



Recent Event

- Erupted after 10,000–12,000 years of dormancy.
- Sent ash + SO₂ plumes up to 15 km into the atmosphere.
- Caused aviation disruptions across the Red Sea and South Asia.

About Hayli Gubbi Volcano

- **Type:** Long-dormant **shield volcano** with a wide, gently sloping cone.
- **Location:** Afar Region, Ethiopia — southernmost volcano of the **Erta Ale Range**.
- **Tectonic Context:** Lies in the **Afar Triple Junction**, where the **Nubian, Somalian, and Arabian plates** diverge (East African Rift Valley).
- **Eruption Nature:** Explosive, ejecting ash, gases, volcanic glass, and pulverised rock; **no lava flow**.

About Ethiopia

- **Country:** Federal Democratic Republic of Ethiopia; **landlocked** nation in the **Horn of Africa**.
- **Nickname:** “**Roof of Africa**” due to highlands and elevated plateaus.
- **Neighbouring Countries:**
Eritrea (N), Djibouti (NE), Somalia (E), Kenya (S), South Sudan & Sudan (W).
- **Major Geographical Features:**
 - **Ethiopian Highlands**
 - **Mount Ras Dejen** – highest peak
 - **East African Rift System**
 - **Lake Tana** – source of the **Blue Nile**, key to GERD water politics

13. Avalanche at Mount Yalung Ri Nepal



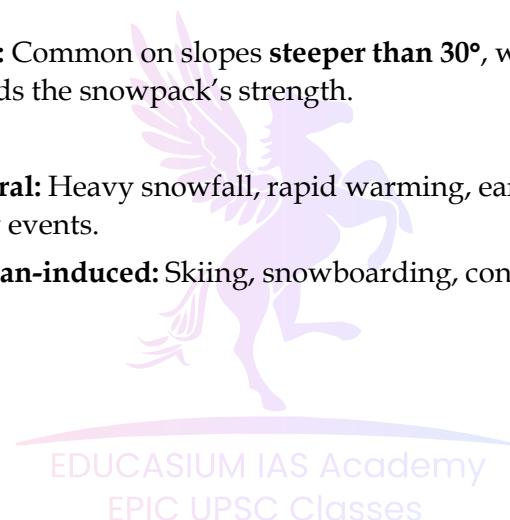
An avalanche struck the base camp of Mount Yalung Ri in Nepal, resulting in the deaths of several climbers.

About Mount Yalung Ri

- **Height:** 5,630 m peak in the Himalayan range.
- **Location:** Remote Rolwaling Valley, northeastern Nepal.
- **Features:** Valley houses the Tsho Rolpa glacial lake, posing high risk of glacial lake outburst floods (GLOF).
- **Conservation Area:** Lies within the Gaurishankar Conservation Area, near the Nepal-Tibet border.

About Avalanches

- **Definition:** Sudden, rapid downslope movement of **snow, ice, and debris**.
- **Conditions:** Common on slopes **steeper than 30°**, when accumulated snow exceeds the snowpack's strength.
- **Triggers:**
 - **Natural:** Heavy snowfall, rapid warming, earthquakes, rain-on-snow events.
 - **Human-induced:** Skiing, snowboarding, construction activities.



14. Astronomers Detect Most Distant and Brightest Black Hole Flare Ever Recorded



Astronomers observed the **brightest and farthest black hole flare** ever detected, originating from **AGN J2245+3743**, ~10 billion light-years away.

Observation

- First detected in **2018** at **Palomar Observatory**, California.
- Confirmed in **2023** at **Keck Observatory**, Hawaii.

Brightness

- Emitted light equal to **10 trillion suns** – brightest flare ever observed from a black hole.

Cause of Flare

- Triggered by a **Tidal Disruption Event (TDE)**.
- A **massive star** (~30 solar masses) was ripped apart by a **supermassive black hole**'s gravity.

Physics of the Event

- **Time Dilation:** Expansion of the universe stretches the flare's light waves; the event appears **slowed down** when seen from Earth.

Scientific Significance

- Provides insights into **early-universe black hole growth**,
- Helps understand **AGN behaviour**,
- Improves models of how **supermassive black holes shaped early galaxies**.

EDUCASIUM IAS Academy

EPIC UPSC Classes

Keywords: TDE, Active Galactic Nucleus (AGN), Supermassive Black Hole, Time Dilation, Early Universe.

Let me know if you want a **Hook Line → Key Points → Keywords → MCQ** format for your CA video script.

15. IAU Approves Kerala-Proposed Names for Martian Landforms

The International Astronomical Union (IAU) has officially approved multiple Martian feature names proposed by two Kerala-based researchers – marking a rare global recognition for Indian contributions in planetary science.

About Martian Landforms

- Mars hosts diverse surface features shaped by **volcanism, meteoritic impacts, wind erosion**, and possible **ancient water/glacial activity** over billions of years.
- These landforms include **craters, valleys (valles), channels, plains (palus), ridges, canyons**, etc.

About the IAU

- Founded:** 1919
- Headquarters:** Paris, France
- Status:** International non-governmental organisation.
- Mandate:** Standardise astronomical nomenclature and promote global astronomical research.
- Authority:** The *only body* authorised to assign official names to planetary and lunar features.

Newly Approved Martian Names (India-Kerala Link)

1. Major Feature

■ Krishnan Crater

- Large, ancient crater in **Xanthe Terra** on Mars.
- Named after **M.S. Krishnan**, the first Indian Director of the Geological Survey of India (GSI).
- Recognises his foundational work in Indian geology.

2. Associated Minor Features

These are smaller landforms surrounding the Krishnan Crater:

Martian Feature Name	Earth Connection (Kerala)	Why Notable
Valiamala	Location of IIIST	India's premier space science institute.
Thumba	Site of TERLS launch (1960s)	Cradle of India's space programme.
Bekal	Bekal Fort, Kasaragod	Iconic cultural heritage landmark.
Varkala	Coastal cliffs	Unique laterite cliff formations.
Periyar Vallis	Kerala's longest river	Martian valley system now named after Periyar.
Krishnan Palus	Linked to Krishnan Crater	Plain inside the crater named in continuation.

IAU Naming Rules for Planetary Features

Craters

- **Large craters:**
 - Named after **deceased scientists/scholars/explorers** with significant achievements.
 - Names must be **internationally recognisable** and **culturally neutral**.
- **Small craters:**
 - Named after **small towns/villages** with populations < 100,000.

Vallis (Valleys) / Channels

- Named after Earth's rivers or **classical geographical names**.

General Rules

- **No living persons** may be honoured.
- Names must be short, widely accessible, and non-offensive.
- Duplication with existing planetary features must be avoided.

UPSC Prelims Pointers

- IAU = the *only* authority for naming extraterrestrial features → important MCQ area.
- Xanthe Terra = Martian highlands near equatorial region.
- "Vallis" = Latin for valley → often linked to rivers on Earth.
- Kerala's space heritage (Thumba, Valiamala) gaining extraterrestrial recognition.

EDUCASIUM IAS Academy
EPIC UPSC Classes

16. Hurricane Melissa – Caribbean Impact



- **Impact:** Hurricane Melissa caused **widespread destruction and multiple fatalities** across the **Caribbean**, with severe effects in **Jamaica, Haiti, and Cuba**.
- **Formation & Strength:** Originated as a **tropical cyclone over the Caribbean Sea**, later intensifying into a **Category 5 hurricane**.
- **Intensity:**
 - **Maximum sustained winds:** 185 mph (298 km/h)
 - **Minimum central pressure:** 892 millibars – among the **lowest ever recorded** in the Atlantic basin.
- **Record:** Melissa became the **strongest hurricane to strike Jamaica**, surpassing **Hurricane Gilbert (1988)**.
- **Naming:** The name “Melissa” was **proposed by the United States** and approved by the **WMO hurricane naming panel**.

About the Saffir-Simpson Hurricane Wind Scale (SSHWS)

- **Classification:** A **five-tier scale** (Categories 1 to 5) based on **maximum sustained wind speed**.
- **Category 5:** Highest level, with winds ≥ 157 mph (252 km/h), capable of **catastrophic damage**.
- **Purpose:** Assesses **potential property damage** and **impact severity** of hurricanes.

EDUCASIUM IAS Academy
EPIC UPSC Classes

17. Asian and Pacific Centre for Development of Disaster Information Management



APDIM Governing Council – 10th Session (New Delhi)

- India hosted the 10th session, reinforcing regional cooperation under the **PM's 10-Point Agenda on Disaster Risk Reduction**.
- Discussions centred on **inclusive disaster risk data governance** in the Asia-Pacific region.
- **Participants:** Bangladesh, Iran, Kazakhstan, Maldives, Mongolia, Turkey, UN ESCAP, and APDIM Secretariat.
- The session advanced APDIM's **2026–2030 Strategic Action Plan**, aligned with the **Sendai Framework** and **2030 Agenda**.

About UN ESCAP

- **Full Form:** United Nations Economic and Social Commission for Asia and the Pacific.
- **Role:** UN's regional development arm for Asia-Pacific.
- **Founded:** 1947
- **Headquarters:** Bangkok, Thailand.

About APDIM (Asian and Pacific Centre for Development of Disaster Information Management)

- **Type:** Regional institution of UN ESCAP.
- **HQ:** Tehran, Iran.
- **Objective:** Reduce disaster losses through **DRR-based data systems** and improved information management.
- **Establishment:** Approved by ESCAP resolutions in **2011 and 2015**; formally set up in **2018**.

Key Functions

- Acts as a **regional disaster data hub**.
- Supports **transboundary hazard cooperation** (e.g., sand & dust storms).
- Facilitates **knowledge sharing and capacity building** in member states.

Governance Structure

- **Governing Council:** **8 elected ESCAP members + Iran**.
- Meets annually to review progress and set work plans.

India's Role

- **Founding member** of APDIM.
- Serving as an **elected Governing Council member (2022–2025)**.

NOVEMBER 2025

HEALTH & Nutrition

1. Ramnami Tribe
2. Abujhmadia Tribe
3. Guru Tegh Bahadur
4. Dr. Verghese Kurien
5. Shaheed Veer Narayan Singh
6. Dharmendra (cinema/culture)
7. Daya Dongre
8. 150th Anniversary of 'Vande Mataram'
9. David Szalay Wins the Booker Prize 2025
10. Indira Gandhi Peace Prize
11. Public Service Broadcasting Day
12. IndiaJoy B2B 2025
13. India Sets Three Guinness World Records
14. PM Jan Vikas Karyakram
15. 50 Years of ICDS Programme
16. India Implements Four New Labour Codes
17. Nayi Chetna 4.0 Campaign
18. Smart Highways in India
19. Two Mobile Applications for Census 2027
20. National Migration Survey 2026
21. National Water Awards 2024
22. Global Inequality Report 2025
23. Surging LPG Consumption of India
24. India's Need for Nutritional Transformation
25. Rift Valley Fever
26. Amyotrophic Lateral Sclerosis
27. Acanthosis Nigricans
28. UN & WHO Warn on Cervical Cancer Deaths
29. National One Health Mission
30. India Records Decline in TB Incidence
31. Advancing Breast Cancer Care
32. EAT-Lancet Commission Report 2025
33. Indian Railways to Install AI Freight Safety System
34. Rising Menace of Digital Arrest
35. Sanchar Saathi
36. Regional Open Digital Health Summit 2025
37. Women's Kabaddi World Cup 2025
38. India Clinches Maiden Women's ODI World Cup Title
39. India to Host 2030 Commonwealth Games
40. India Launches Digital Marine Fisheries Census 2025
41. Codex Alimentarius Commission
42. WHO Declares Indonesia Polio-Free



1. PM Modi Honours Ramnami Tribe



During **Chhattisgarh Foundation Day celebrations**, Prime Minister Narendra Modi paid tribute to the **Ramnami Tribe**, recognizing their unique cultural and spiritual contribution to the state's heritage.

About the Ramnami Tribe

- **Origins:** Emerged in **19th-century Chhattisgarh** as a peaceful resistance against caste discrimination, especially temple entry restrictions.
- **Identity:** Known as the "*living embodiment of faith*" for tattooing the word '**Ram**' across their bodies.
- **Belief System:**
 - *Ramnam* (chanting the divine name) = religion.
 - *Rambhakti* (devotion to Ram) = action.
- **Cultural Practices:**
 - Uphold **gender equality**.
 - Adorn **ghungroos (ankle bells)** and **peacock feather crowns** during devotional performances and bhajans.
- **Attire & Heritage:** Wear **white garments inscribed with 'Ram'**, symbolizing purity and devotion. Their music and rituals form an integral part of **Chhattisgarh's folk heritage**.

EDUCASIUM IAS Academy
EPIC UPSC Classes

www.educasiumiasacademy.com



2. Abujhadiya Tribe & Bastar Olympics



About Abujhadiya Tribe

- **PTVG Status:** One of 7 Particularly Vulnerable Tribal Groups (PTVGs) in Chhattisgarh; population ~40,000 (Census 2011).
- **Location:** Subgroup of Gond tribe; inhabit **Abujhmad** region (Narayanpur & parts of Bijapur) – historically unmapped, remote, and previously a Maoist stronghold.
- **Language:** Speak **Abujhmaria**, an oral variant of **Gondi** (Dravidian family).
- **Livelihood:** Shifting cultivation, forest produce gathering, small-scale farming, livestock; weak linkage to formal markets.
- **Development Gaps:** Low literacy, poor health outcomes, extreme isolation, minimal access to state services.

Bastar Olympics

- **Overview:** ₹5-crore government-backed multi-sport event held across 7 districts of Chhattisgarh.
- **Participation:** 3.91 lakh participants, including **women, PTVGs, and former cadres**.
- **Objective:** Promote sports, strengthen community engagement, and build trust in the **post-insurgency Bastar region**.

www.educasiumiasacademy.com



3. 350th Shaheedi Diwas of Guru Tegh Bahadur



- **Event:** India observed the **350th Shaheedi Diwas** of Guru Tegh Bahadur.
- **Commemoration:** The Prime Minister unveiled a **special coin** and a **commemorative stamp** to honour his sacrifice.

★ About Guru Tegh Bahadur

- **Identity:** Ninth Sikh Guru, born in **Amritsar (1621)**; led the Sikh community from **1665-1675**.
- **Martyrdom:** Publicly **beheaded in Delhi on 24th November 1675** by order of Aurangzeb for resisting forced conversions and religious persecution.
- **Sacred Sites:**
 - **Gurudwara Sis Ganj Sahib** – site of execution.
 - **Gurudwara Rakab Ganj Sahib** – site of cremation.
- **Legacy:**
 - Revered as "*Srisht-di-Chadar*" (Protector of Humanity).
 - Advocated **Ik Onkar** – "There is only one God."
 - Defended **Kashmiri Pandits** against oppression.
 - Inspired his son, **Guru Gobind Singh Ji**, to establish the **Khalsa**, formalising Sikh identity and unity.

EDUCASIUM IAS Academy
EPIC UPSC Classes

www.educasiumiasacademy.com



4. National Milk Day – 26 November



Commemorates the birth anniversary of **Dr. Verghese Kurien (1921–2012)**, celebrated as the “*Father of the White Revolution*” in India.

About Dr. Verghese Kurien

- Born on **26 November 1921**, Kozhikode, Kerala.
- Architect of **Operation Flood**, the world’s largest dairy development programme.
- Transformed India from a **milk-deficit nation** into the **world’s largest milk producer**.

White Revolution / Operation Flood (1970)

- Launched in **1970** by the National Dairy Development Board (NDDB).
- Established a **national milk grid** connecting producers with consumers across regions.
- Boosted rural incomes, improved nutrition, and laid the foundation of India’s cooperative dairy sector.

Anand Cooperative Model

- Empowered farmers to **procure, process, and market** milk themselves.
- Eliminated middlemen → ensured **higher and stable incomes** for rural producers.
- The model scaled nationwide and became the backbone of India’s dairy sector.

Institution Building by Dr. Kurien

- NDB – National Dairy Development Board (1965).
- GCMMF – Gujarat Cooperative Milk Marketing Federation, which manages **Amul**, India’s largest dairy brand.
- Established multiple dairy institutions focused on training, management, and veterinary innovation.

Awards & Honours

- **Ramon Magsaysay Award**
- **World Food Prize**
- **Padma Shri, Padma Bhushan, Padma Vibhushan**



5. Shaheed Veer Narayan Singh Memorial-cum-Tribal Freedom Fighters Museum Inaugurated in Chhattisgarh

About Shaheed Veer Narayan Singh



- **Born:** 1795 in **Sonakhan**, Chhattisgarh; belonged to the **Binjhwar** tribal community.
- Revered for **justice, generosity, and leadership** among local tribal and peasant communities.

Role During the 1856 Famine

- When a severe famine struck Sonakhan, a British-backed trader hoarded grain.
- **Veer Narayan Singh raided the trader's godown and distributed grain to starving villagers** — an act of defiance against colonial exploitation.

Participation in the 1857 Uprising

- Arrested by the British and jailed in Raipur.
- In 1857, he **escaped from prison**, returned to Sonakhan, and mobilised **over 500 tribal and peasant fighters**.
- Led one of the **earliest organised tribal uprisings** against British authority in central India.

Martyrdom

- Captured through betrayal.
- **Executed publicly on 10 December 1857** at Raipur.
- Widely regarded as **Chhattisgarh's first martyr** and honoured as the **"Mahanayak of Sonakhan"**.



6. Demise of Dharmendra (24th November 2025)

- **Event:** Legendary Bollywood actor **Dharmendra** passed away at the age of **89** at his Mumbai residence after prolonged ill health.
- **Legacy:** Fondly remembered as the “*He-Man of Indian cinema*”, he starred in classics like **Sholay**, **Dharamveer**, **Chupke Chupke**, **Jugnu**, **Loha**, and **Seeta Aur Geeta**.
- **Family:** Survived by his first wife **Prakash Kaur**, second wife **Hema Malini**, and **six children**.



7. Demise of Daya Dongre (4th November 2025)

- **Event:** Veteran Marathi actress **Daya Dongre** passed away at the age of **85** due to age-related illness.
- **Birth:** Born on **March 11, 1940**, in **Amravati, Maharashtra**, into an artistic family; her mother **Yamunatai Modak** was a noted Marathi theatre actress.
- **Early Recognition:** Began with a passion for **music**, gaining fame after winning an **All-India Radio singing competition** in her youth.
- **Career Highlights:** Rose to prominence in **Marathi cinema, theatre, and television**, becoming a household name through serials like:
 - *Tuzhi Majhi Jodi Jamli Re*
 - *Nanda Saukhya Bhare*
 - *Yachasathi Kela Hota Atthahas*
 - *Lekure Udand Jali*

EDUCASIUM IAS Academy

EPIC UPSC Classes

www.educasiumiasacademy.com



8. 150th Anniversary of 'Vande Mataram'

Event Highlights



- PM Narendra Modi inaugurated the **year-long national commemoration** of India's National Song '**Vande Mataram**' at Indira Gandhi Indoor Stadium, New Delhi.
- Released a **commemorative stamp and coin** marking 150 years of the composition.
- Launched a **digital portal** to engage citizens, schools, and institutions in the celebration.
- **Mass singing** of the full version of 'Vande Mataram' held across India, symbolising unity and national pride.

Commemoration Timeline

- **7 November 2025 → 7 November 2026**
- Marks **150 years** since the creation of the National Song.

About 'Vande Mataram'

- **Composer:** Bankimchandra Chatterji.
- **Date of Composition:** Akshaya Navami, **7 November 1875**.
- **Published In:** Literary journal *Bangadarshan* and later included in his novel *Anandamath*.
- Served as a **rallying cry during the freedom movement**, symbolising patriotism, sacrifice, and national awakening.

EDUCASIUM IAS Academy

EPIC UPSC Classes

www.educasiumiasacademy.com



9. David Szalay Wins the Booker Prize 2025



- **Winner:** Hungarian-British author **David Szalay** has won the **2025 Booker Prize** for his novel *Flesh*.
- **Recognition:** Celebrated for his **minimalist style** and sharp insights into modern life.
- **Past Achievement:** Previously shortlisted for the Booker Prize in **2016**.

🏆 About the Booker Prize

- **Prestige:** One of the world's most renowned literary awards, honouring the best **English-language fiction** published in the UK or Ireland.
- **Eligibility:** Initially restricted to Commonwealth citizens (1969–2013), now open to **all nationalities** writing in English.
- **Name Change:** Formerly the *Man Booker Prize* until **2019**, now simply *The Booker Prize*.
- **Prize Money:** Winner receives **£50,000** and global recognition.
- **Notable Winners:**
 - First Indian-origin: **VS Naipaul**
 - First Indian citizen: **Arundhati Roy**
 - Others: **Salman Rushdie, Margaret Atwood, Samantha Harvey (2024)**

EDUCASIUM IAS Academy
EPIC UPSC Classes

www.educasiumiasacademy.com



10. Indira Gandhi Peace Prize



Indira Gandhi Prize for Peace, Disarmament and Development 2024

- **Awardee:** Former Chile President **Michelle Bachelet**.
- **Significance:** Recognised for her leadership in **human rights, gender equality, and global peace efforts**.
- **Career Highlights:**
 - First and only **woman President of Chile**.
 - First woman **Director of UN Women Agency** (est. 2010, focused on SDG-5: Gender Equality).
 - Served as **Chief of UN Human Rights** (est. 1993, promotes and protects human rights globally).

>About the Indira Gandhi Peace Prize

- **Established:** 1986 by the **Indira Gandhi Memorial Trust**.
- **Purpose:** To honour contributions in **peace, disarmament, development, and scientific advancement for humanity's greater good**.
- **Award Components:** ₹25 lakh cash prize, a **citation**, and a **trophy** featuring Indira Gandhi's profile.
- **Scope:** Recognises individuals, institutions, and organisations working on **human rights, climate action, poverty reduction, disarmament, and science for social good**.
- **Notable Laureates:**
 - **Mikhail Gorbachev** (Soviet leader)
 - **Jimmy Carter** (39th US President)
 - **ISRO**
 - **Sheikh Hasina** (Bangladesh PM)
 - **UNHCR** (UN Refugee Agency)



11. Public Service Broadcasting Day

Why Observed



- Marks **Mahatma Gandhi's first and only visit** to Broadcasting House, New Delhi, on **12 November 1947**.
- Gandhi delivered a special **All India Radio (AIR) broadcast** addressing **displaced persons from Pakistan** staying in Kurukshetra during Deepawali.

Historical Significance

- **Only radio address** Gandhi ever delivered directly to the nation.
- Considered a **red-letter day** in Indian broadcasting history, highlighting the role of public radio in national integration.

Key Details

- Gandhi initially **hesitated** to speak on radio; agreed after persuasion by **Ghanshyam Das Birla**.
- The AIR studio was specially arranged to **resemble Gandhi's prayer meeting setting** to make him comfortable.
- **Rajkumari Amrit Kaur**, freedom fighter and close associate, accompanied Gandhi during the visit.

EDUCASIUM IAS Academy
EPIC UPSC Classes

www.educasiumiasacademy.com



12. IndiaJoy B2B 2025 Concludes in Hyderabad – Strengthens India's AVGC-XR Ecosystem

Key Highlights



- **Event Date:** 11 November 2025

- **Venue:** Hyderabad, Telangana

Context: IndiaJoy B2B 2025 reaffirmed Hyderabad's position as a major national hub for AVGC-XR (Animation, Visual Effects, Gaming, Comics & Extended Reality) and the **film industry**.

Major Outcomes

- **Participation:**
 - 120 sellers from across India
 - 35 buyers, including global production, distribution, and streaming companies
- **Market Platforms:**
 - Indian Film Market (IFM) – content licensing, co-production negotiations
 - WAVES Animation Bazaar – pitching of animation & gaming IPs
- **Industry Deals:** Enabled co-productions, licensing agreements, talent partnerships, and international distribution pathways.

Investment Boost

- **Sprouts Studio** announced a **₹6 crore fund** dedicated to supporting:
 - New animation & gaming IP development
 - Projects emerging from WAVES Animation Bazaar and Indian Film Market
 - Start-ups and creators in the AVGC-XR ecosystem

Significance

- Strengthens the **AVGC-XR sector**, a sunrise industry projected to grow at **>25% CAGR** in India.
- Enhances Hyderabad's reputation as a **global creative-tech cluster**, backed by:
 - T-Hub
 - IMAGE Tower
 - State AVGC policy
- Encourages domestic IP creation, reducing reliance on outsourced service work and boosting Indian storytelling.



13. Swasth Nari, Sashakt Parivar Abhiyaan – India Creates 3 Guinness World Records (31 Oct 2025)



About the Campaign

- National health initiative held from 17 Sept - 2 Oct 2025.
- Aim: Strengthen women's health, promote preventive screening, and boost digital health participation.

Three Guinness World Records Achieved

1. Highest Registrations on a Health Platform in One Month

- **3.21 crore+** registrations.
- Significance: Demonstrates rapid expansion of **digital health inclusion** under national programmes like ABDM and Ayushman Bharat.

2. Most Online Sign-Ups for Breast Cancer Screening in One Week

- **9.94 lakh** women registered.
- Importance: Reflects large-scale mobilisation for **early cancer detection**.

3. Highest Online Vital Signs Screening Sign-Ups in One Week (State Level)

- **1.25 lakh** participants.
- Shows rising awareness of **routine preventive health monitoring**.

Massive Community Participation

- **5 lakh+** Panchayati Raj representatives involved.
- **1.14 crore** students from schools and colleges.
- **94 lakh** Self-Help Group (SHG) members.
- **5 lakh** participants from additional community platforms.

Core Significance

- Strengthens **preventive healthcare culture**.
- Enhances **digital health ecosystem adoption**.
- Mobilises diverse community groups for **women's health empowerment**.



14. PM Jan Vikas Karyakram (PMJVK) – Nationwide Review by Ministry of Minority Affairs



The Ministry of Minority Affairs conducted a nationwide review of **PM Jan Vikas Karyakram (PMJVK)** to accelerate delivery of development projects in Minority Concentration Areas (MCAs) and improve last-mile outcomes.

About PM Jan Vikas Karyakram

- Centrally Sponsored Scheme (CSS) to bridge development deficits in MCAs.
- Covers 700+ MCAs (urban + rural) where minority population **exceeds 25%** & socio-economic indicators fall below national averages.
- Funding pattern: **90:10 (NE/Hill States), 60:40 (Other States), 100% for UTs.**

Objectives

- Reduce regional development gaps in **education, health, civic amenities & skill infrastructure.**
- Ensure equitable access to public infrastructure for minority communities.
- Promote women-centric and youth-skill facilities.
- Strengthen social inclusion in backward minority clusters.

Achievements

- **12,000+ assets** sanctioned: schools, hostels, PHCs, civic amenities.
- **800+ education facilities**, including smart classrooms.
- **500+ health facilities** upgraded or established.
- **Women-focused assets**: 15–20% of total approvals (hostels, skill centres).
- **Digital transparency**: 100% funds routed through PMJVK Portal & SNA-SPARSH.
- **2,000+ community assets** created, including Sadbhav Mandaps & training centres.

Issues in Implementation educasiumiasacademy.com

- **Low utilisation**: Only 62–65% of funds used on time.
- **Capacity deficit**: 40% MCAs lack project-preparation capacity.
- **Land & permission delays**: 25–30% works stuck.
- **State disparity**: Some States >90% utilisation, others below 50%.

Way Forward

- **Digital Strengthening**: Automated alerts, public dashboards, real-time monitoring (modeled on Geo-MGNREGA).
- **Community Ownership**: Social audits & consultations (Aspirational Districts model).
- **Quality Assurance**: Third-party audits, QR tagging, digital photo evidence.
- **Convergence**: Integrate with PM-SHRI, PM-KVK hubs, NHM health infra, Smart Cities.



15. Integrated Child Development Services (ICDS) – 50 Years (1975–2025)



India's flagship early childhood development programme completes **50 years**.

About ICDS

- **Launched:** 1975; now restructured under **Mission Saksham Anganwadi & Poshan 2.0**.
- **Scheme Type:** Centrally Sponsored Scheme (Ministry of Women & Child Development).
- **Objective:** Improve nutrition, health, early learning, and reduce child mortality & malnutrition.
- **Target Group:** Children **0–6 years**, pregnant/lactating women, adolescent girls.
- **Service Delivery:** Through **Anganwadi Centres (AWCs)**.

Six Core ICDS Services

1. **Supplementary Nutrition**
2. **Pre-school Non-formal Education**
3. **Nutrition & Health Education**
4. **Immunisation**
5. **Health Check-up**
6. **Referral Services**

Key Achievements

- **Massive Coverage:** Serves **9+ crore beneficiaries** via ~ **14 lakh AWCs**.
- **High Uptake:** ~95% of enrolled children receive supplementary nutrition.
- **Learning Gains:** Longitudinal studies show improvement in early literacy & numeracy.
- **Institutional Legacy:** World's largest community-based child development programme.

EPIC UPSC Classes

Key Challenges

www.educasiumiasacademy.com

1. Funding Issues

- New **60:40 Centre-State** cost-sharing (vs earlier 90:10 for many states) strains state budgets.
- Leads to unequal implementation capacity across states.

2. Infrastructure Deficits

- Many AWCs lack **permanent buildings**, toilets, drinking water, storage facilities.

3. Workforce Problems

- Anganwadi workers are **underpaid**, overburdened with **multiple non-ICDS duties**.
- Shortage of trained helpers affects service delivery.

4. Technology & Inclusion Gaps

- **Poshan Tracker**, facial recognition attendance systems often malfunction.
- Risk of exclusion of beneficiaries due to digital errors.

5. Nutrition Outcomes Still Weak

- Persistently high malnutrition:
 - **Stunting:** 35.5%
 - **Wasting:** 18.7% (NFHS-5)
- Quality, diversity, and adequacy of take-home rations/hot cooked meals remain inconsistent.



16. India Implements Four New Labour Codes



The Government has officially implemented all four Labour Codes across India, replacing 29 existing labour laws. The new framework aims to modernise labour governance by simplifying compliance, ensuring uniform wages, expanding social security, and improving working conditions for a diverse and evolving workforce.

What Are the Four Labour Codes?

A comprehensive consolidation enacted between 2019–2020 to unify India's fragmented labour law regime into four pillars:

1. **Code on Wages (2019)**
2. **Code on Social Security (2020)**
3. **Industrial Relations Code (2020)**
4. **OSH & Working Conditions Code (2020)**

Key Provisions

1. Code on Wages, 2019

- **Single Wage Definition:** Basic pay + DA + retaining allowance; reduces litigation & ensures uniformity.
- **Universal Minimum Wage:** Applicable to all workers, removing earlier "scheduled employment" restriction.
- **National Floor Wage:** States cannot fix wages below this benchmark; reduces regional disparity.
- **Timely Payment:** Standardised timelines, compulsory wage slips (physical/digital).
- **Gender Equality:** Strict bar on wage discrimination → "equal pay for equal work".

2. Code on Social Security, 2020

- **Unified Legal Framework:** Merges 9 laws including EPF, ESI, Maternity Benefit, Payment of Gratuity.
- **Gig & Platform Workers:** First attempt globally to create statutory social security coverage for digital labour.
- **National Portal:** Aadhaar-linked registration for unorganised workers, gig workers, platform workers.
- **Coverage Expansion:** Wider EPFO & ESIC applicability; mandatory coverage for hazardous occupations.
- **Social Security Funds:** State + Central schemes for unorganised/gig/platform workers.



3. Industrial Relations Code, 2020

- **Expanded Definition of Worker:** Includes employees earning < ₹18,000/month.
- **Layoff Threshold Raised:** Prior government permission required only if workers >300 (earlier 100).
- **Fixed-Term Employment:** Legal recognition with equal pay & benefits, gratuity after 1 year.
- **Strikes Regulation:** 14-day notice mandatory; “strike” now includes mass casual leave >50% workers.
- **Ease of Doing Business:** Aims to reduce litigation & promote industrial flexibility.

4. OSH & Working Conditions Code, 2020

- **Coverage:** Applies to establishments with ≥10 workers, all mines/docks – significantly widening scope.
- **Health & Safety:** Annual health check-ups for workers aged 40+; mandatory safety committees in large workplaces.
- **Women in Night Shifts:** Permitted with consent + safety safeguards.
- **Migrant Workers:** Broader definition includes self-migrating workers, not just those recruited through contractors.
- **Written Appointment Letters:** Mandatory for all employees to ensure job clarity & entitlements.

EDUCASIUM IAS Academy

EPIC UPSC Classes

Significance of Full Implementation

- Simplifies 75+ years of fragmented labour regulation.
- Ensures uniformity across states, reducing compliance burden and boosting investment sentiment.
- Expands protections for informal, gig, platform and migrant workers – critical as 90% of Indian workforce remains informal.
- Aligns with industry needs for flexibility to improve global competitiveness.



17. Nayi Chetna – Initiative for Change (4th Edition) Launched



The Government of India has launched the **fourth edition** of the nationwide 'Nayi Chetna - Initiative for Change' campaign to empower women and combat gender-based violence (GBV) across rural India.

About the Campaign

1. Implementing Agency

- Led by **Deendayal Antyodaya Yojana – National Rural Livelihoods Mission (DAY-NRLM)**
- Under the **Ministry of Rural Development**

2. Objective

- To **promote gender equality** and
- To **eliminate gender-based violence (GBV)** in rural communities
- To foster wider **community-level behavioural change**

3. Implementation Approach

- Month-long, nationwide campaign
- Uses a "**whole-of-government**" model involving:
 - ✓ Multiple line ministries
 - ✓ Anganwadi workers
 - ✓ Civil society organisations
 - ✓ Panchayati Raj Institutions
 - ✓ **Self-Help Groups (SHGs)** and their federations

4. Key Features

- **Village Certification for GBV-Free Zones**
Villages demonstrating effective prevention and response mechanisms for GBV receive **official certification**, incentivising accountability and local leadership.
- **Community Sensitisation**
Focus on:
 - ✓ Zero tolerance for GBV
 - ✓ Shared domestic responsibilities
 - ✓ Recognition of women's unpaid and economic contributions
 - ✓ Encouraging institutional linkages (police, counselling centres, helplines)

5. Significance

- Strengthens the gender component of **NRLM's social inclusion agenda**.
- Builds village-level support systems for women through SHGs.
- Encourages **behavioural change**, not just service delivery.
- Supports national frameworks like:
 - ✓ **Beti Bachao, Beti Padhao**
 - ✓ **Mission Shakti**
 - ✓ **POSH Act enforcement**
 - ✓ **National Gender Strategy** under MoRD



18. India's Smart Highway Transformation

Context

- India has the **2nd largest road network** globally.
- **National Highways expanded ~60%** in the last decade → need for **digital, data-driven management**.

Key Initiatives

1. Digital Tolling Reform

- **FASTag push:** Cash users charged **2x toll**; UPI users charged **25% extra**.
- **FASTag Pass:** Annual pass with fixed number of trips → lower friction for frequent travellers.

2. MLFF Tolling (Barrier-Free Tolls)

- India's **first MLFF system** launched in **Gujarat**.
- Uses **overhead cameras + sensors** to read FASTag/number plates **without stopping**.
- Enables **in-motion, automatic toll collection** → no queues, reduced emissions.

3. Digital Planning & Monitoring

- **PM Gati Shakti NMP:** Core digital platform for integrated infrastructure planning.
- **NHAI Data Lake:** Real-time data for road construction, traffic, and asset management.
- **NHAI One App:** Streamlines internal workflows and monitoring.

4. Citizen-Centric Services

- **RajmargYatra App:** Allows travellers to
 - report safety issues,
 - check highway amenities,
 - access 24x7 emergency assistance.

5. OFC-Enabled Smart Corridors

- Pilot to deploy **Optical Fibre Cables** along **10,000 km** of highways.
- Supports **5G/6G**, smart traffic systems, connected vehicles, and digital logistics.

6. Sustainable Road Construction

- NHAI uses **fly ash, plastic waste, and recycled materials** to reduce carbon footprint.
- Promotes **circular economy** in road infrastructure.



19. Two Mobile Applications for Census 2027



The Registrar General & Census Commissioner of India launched two mobile apps – **Digital Layout Map (DLM)** and **Census 2027-Houselist** – along with a **self-enumeration portal** for trial use.

New Digital Tools

1. Digital Layout Map (DLM)

- Geo-tags **every building** with latitude-longitude.
- Captures **Houselisting Block (HLB)** details.
- Uses **GIS mapping** to replace hand-drawn layouts.

2. Census 2027-Houselist App

- Digital collection of **housing conditions & amenities** during Houselisting Operations.
- Enables **faster, more accurate** data verification and processing.

3. Self-Enumeration Portal

- Citizens can **pre-fill census details online** before physical verification.
- Enhances participation and reduces enumerator workload.

About Census 2027

- India's **first fully digital census** (mobile-app based enumeration + central server upload).
- **Replaces paper forms** used in all previous censuses.

EDUCASIUM IAS Academy

Major Changes in Census 2027

1. Full Caste Enumeration

- All castes (beyond SC & ST) will be counted.
- First complete caste data collection since **1931**.

2. Universal Geo-Tagging

- Every building mapped using GIS + GPS coordinates.
- Ensures **standardised, verifiable spatial datasets**.



20. MoSPI's National Migration Survey 2026



Launch: July 2026

Tenure: 1-year nationwide survey

Last Full Survey: 2007-08

Current Estimate: Migrants form 28.9% of the population (PLFS 2020-21)

Significance of the 2026 Migration Survey

- **Labour Mobility Mapping:**
Captures work-driven movement. *E.g., 67% of male migrants move for jobs (PLFS 2021).*
- **Gendered Migration Patterns:**
Records female-dominated social migration. *48% of rural women are migrants vs 5.9% men.*
- **Post-COVID Evidence:**
Essential for understanding crisis mobility. *Nearly 11 million reverse migrants during COVID (IGC).*
- **Regional Balance:**
Maps source-destination corridors. *UP-Bihar remains India's largest out-migration belt.*
- **Skill Policy Planning:**
Enables designing skill-mobility corridors. *Kerala model of migration-linked skill training.*

What's New in the 2026 Survey?

1. Revised Short-Term Migration Definition

- New: **15 days-6 months** (earlier 1-6 months).
- Purpose: More accurate capture of **circular, seasonal, gig, festival-season, and agri-labour** mobility.

2. Removal of Household Migration Category

- The “entire household migrated” category (<1% share) is dropped.
- Focus shifts to **individual-level** movement.

3. New Impact Indicators Added

Survey will now measure:

Income change, Access to healthcare, Housing & amenities, Safety & work conditions → Enables **welfare outcome assessment**, not just enumeration.

4. Capturing Migration Intent (Forward-Looking Module)

Adds a new section asking whether migrants **plan to move again**.

→ Helps predict future mobility patterns and labour supply trends.

5. Exclusion of Hard-to-Reach Areas

- Remote villages of **Andaman & Nicobar Islands** excluded due to logistics.
- National representativeness remains intact.



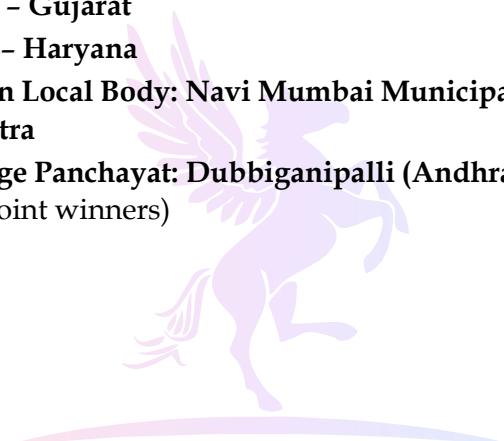
21. National Water Awards 2024



- **Organizer:** Ministry of Jal Shakti
- **Edition:** 6th National Water Awards (instituted in 2018)
- **Objective:** Promote **water conservation**, raise public awareness, and encourage community participation for a “*Jal Samridh Bharat*” (Water-Prosperous India).
- **Scope:** Recognises efforts across **10 categories** including states, individuals, institutions, panchayats, industries, and NGOs.
- **Total Winners:** **46 awardees** announced.

🏆 Key Winners

- **Best State:**
 - 1st – **Maharashtra**
 - 2nd – **Gujarat**
 - 3rd – **Haryana**
- **Best Urban Local Body:** Navi Mumbai Municipal Corporation, Maharashtra
- **Best Village Panchayat:** Dubbiganipalli (Andhra Pradesh) and Payam (Kerala) (joint winners)



EDUCASIUM IAS Academy
EPIC UPSC Classes

www.educasiumiasacademy.com



22. Global Inequality Report

Commissioned by: South African G20 Presidency

Prepared by: G20 Extraordinary Committee of Independent Experts on Global Inequality

Lead: Joseph E. Stiglitz (Nobel Laureate)

1. The Scale of Global Inequality

Wealth Inequality

- **Top 1%** captured **41%** of all new global wealth (2000–2025).
- **Bottom 50%** captured **only 1%**.

Income Inequality

- **83% of countries** (covering **90% of global population**) have **Gini > 0.4**, indicating high inequality.

Food Insecurity

- **2.3 billion people** face moderate/severe food insecurity.
- This is an increase of **335 million** since **2019**.

Inherited Wealth Surge

- **\$70 trillion** expected to be transferred in the next decade → reinforcing intergenerational inequality.

2. Key Structural Drivers of Inequality

Capital vs Labour

- Since 1990:
 - **56% of countries** show *increasing income share for capital*.
 - **Global labour share has fallen significantly.*

Concentration of Capital

- **85% of the world's population** earns **zero capital income** (no stocks, bonds, property returns).
- Capital ownership is highly concentrated among the global elite.

Wage Inequality

- CEO compensation ↑ **50%** (2019–2024)
- Worker wages ↑ **<1%**

Public Wealth Shrinkage

- Private wealth grew rapidly, **public wealth stagnated or declined**.
- Governments face:
 - High net debt
 - Weak investment capacity
 - Limited fiscal space for welfare

3. Consequences of Extreme Inequality

Democracy Under Threat

- Democracies become **7x more likely** to weaken or collapse under high inequality.
- Erodes trust, fuels polarization, and empowers populism.

Health & Social Inequities

- Countries with high inequality show:
 - Lower life expectancy
 - Higher maternal mortality
 - Greater child malnutrition



23. India's Rising LPG Consumption



India's LPG consumption reached **31.3 million metric tonnes (MMT)** in FY25, driven by near-universal household access under **PM Ujjwala Yojana (PMUY)** and rising household + commercial refill demand.

About LPG

- **Liquefied Petroleum Gas:** A pressurised blend of **propane and butane (~40:60)**.
- Used for **cooking, industrial heating, food services, transport, and aerosol manufacturing.**

Key Trends in India's LPG Sector

1. Rising Domestic Demand

- Consumption rose from **21.6 MMT (FY17) → 31.3 MMT (FY25)**.
- Projected to reach **33–34 MMT in FY26**.

2. Impact of PM Ujjwala Yojana

- Rapid expansion of household access.
- Average annual refill rate rose from **3.9 cylinders to 4.5 cylinders per household**.
- Drivers:
 - Increased affordability (subsidised refills)
 - Wider delivery networks
 - Women adopting LPG as primary fuel instead of firewood/kerosene

3. Growing Commercial + Industrial Use

- Share of commercial use rose from **~10% → ~16% of total LPG demand**.
- Growth centres:
 - Restaurants & food chains
 - Institutional kitchens
 - MSME heating applications

4. Domestic Production vs Imports

- **Domestic production:** 11.2 MMT (FY17) → 12.8 MMT (FY25).
- **Imports:** Now **~20.7 MMT**, keeping import dependence at **55–60%**.

5. Import Source Diversification

- **Middle East:** Provides **91–93%** of India's imported LPG (Saudi Arabia, Qatar, UAE).
- **New India-US LPG deal (2.2 MTPA):**
 - Diversifies supply
 - Reduces West Asian dependency
 - Improves energy security



24. India's Shift from Food Security → Nutritional Security



India's food policy is transitioning from ensuring **calorie sufficiency** to guaranteeing **nutrient sufficiency**, with growing focus on **functional foods** and **smart proteins** to address health, economic, and sustainability challenges.

1. Functional Foods & Smart Proteins

Functional Foods

Nutrient-enriched foods providing additional health benefits.

Examples:

- **Zinc-rich rice** (IIRR Hyderabad)
- **Iron-rich pearl millet/bajra** (ICRISAT)
- Bio-fortified staples under ICAR programmes

Smart Proteins (Next-gen sustainable proteins)

Reduce dependence on livestock; produced via plant, microbial, or cellular systems.

Types & Examples:

- **Plant-based proteins:** GoodDot, Blue Tribe
- **Fermentation-derived proteins:** Zydus LifeSciences R&D
- **Cultivated meat:** Cell-based protein created via tissue culture

2. Why India Needs a Nutritional Transformation

Persistent Malnutrition

- **Stunting:** 35.5%
- **Wasting:** 19%
(NFHS-5, 2021)

→ Indicates that improved food quantity ≠ improved nutrition.

Protein Deficit

- India's average: **47 g/day**
- FAO recommended: **60 g/day**
→ Protein gap contributes to low muscle mass, fatigue, weak immunity.

Urban-Rural Divide

- Urban households consume **25-30% more protein** (NITI Aayog, 2023).

Rise of NCDs

- **77 million diabetics, 25 million obese adults** → need for low-sugar, high-nutrient diets.

Environmental Pressures

- Agriculture = **18-20%** of India's GHG emissions (FAO 2022).
- Smart proteins can cut emissions by **70-90%**, reduce land/water footprint.

Economic Potential

- Global alt-protein market projected at **\$240 billion (2030)**.
- India can become a bio-manufacturing hub for smart protein and functional food industries.



25. Rift Valley Fever Outbreak in West Africa



- **WHO Confirmation:** A Rift Valley Fever (RVF) outbreak has been reported in **Mauritania and Senegal**.
- **Impact:** The disease affects both **livestock (sheep, goats, cattle)** and humans, posing risks to public health and agriculture.

About Rift Valley Fever (RVF)

- **Cause:** Viral zoonotic disease caused by a **Phlebovirus (Phenuiviridae family)**.
- **Transmission:**
 - To humans via **mosquito bites** or **direct contact with infected animal fluids**.
 - **No human-to-human transmission** confirmed.
- **Status:** Classified as a **notifiable animal disease** under the **World Organisation for Animal Health (WOAH)**.
- **Symptoms:**
 - In **90% of cases**, presents as mild flu-like illness (fever, headache, muscle pain).
- **Treatment & Prevention:**
 - **No effective antiviral treatment** available.
 - **No licensed human vaccine** exists.
 - **Animal vaccines** are recommended, ideally administered **between outbreaks**.

EDUCASIUM IAS Academy

EPIC UPSC Classes

www.educasiumiasacademy.com



26. Amyotrophic Lateral Sclerosis (ALS)



Global ALS burden projected to rise by 69% by 2040; included under India's National Policy for Rare Diseases (NPRD), 2021.

What is ALS?

- A progressive motor neuron disease (also called Lou Gehrig's Disease).
- Causes degeneration of **upper and lower motor neurons** in the brain and spinal cord.
- Leads to **muscle wasting, paralysis, and eventual respiratory failure**.

Epidemiology

- 90%+ cases are *sporadic* (no family history).
- Usual age of onset: **55–75 years**.
- More common in **males**.
- **Life expectancy:** typically 3–5 years after diagnosis.

Symptoms

Early Signs

- **Fasciculations:** involuntary muscle twitching
- **Limb weakness**
- **Dysarthria:** slurred or distorted speech
- **Dysphagia:** difficulty swallowing

Advanced Stage

- Severe muscle atrophy
- Loss of mobility
- Progressive breathing difficulty → ventilatory failure
- Cognitive involvement possible: **FTD-ALS overlap** (frontotemporal dementia)

Causes / Risk Factors

Exact cause unknown; multifactorial links observed:

- **Genetic mutations:** especially C9ORF72, SOD1, TARDBP, FUS
- **Lifestyle/environment:** smoking, hypertension
- **Cellular hypotheses:** oxidative stress, glutamate toxicity, and **glial cell dysfunction**

Key Terms

- **Fasciculation:** Involuntary muscle twitch due to motor neuron irritation
- **Dysarthria:** Slurred/weak speech from impaired motor control
- **Dysphagia:** Swallowing difficulty due to muscle weakness



27. Acanthosis Nigricans: Early Visible Marker of Insulin Resistance in India



Clinicians across India report a sharp rise in *Acanthosis Nigricans (AN)* among children and young adults, signalling early-onset insulin resistance. This makes AN a valuable *visible screening marker* for India's growing metabolic disease burden.

What is Acanthosis Nigricans?

- A skin condition presenting as **dark, thick, velvety patches** in folds: **neck, underarms, groin, elbows, knuckles, under the breasts**.
- Strongly associated with **insulin resistance, obesity, metabolic syndrome, and prediabetes**.
- **Not infectious, not due to poor hygiene**, and common among Indians due to genetic predisposition + lifestyle factors.
- Reversible when insulin sensitivity improves.

Why It Matters

- Acts as **the earliest external sign** of metabolic dysfunction, often appearing *years before* blood sugar derangement.
- Especially important in **Indian children**, who develop insulin resistance earlier due to genetic "thrifty phenotype," urban diets, and sedentary habits.
- Helps detect high-risk individuals before diabetes develops.

Causes & Association

- **Insulin resistance** → excess insulin → stimulates skin growth & pigmentation.
- Linked disorders:
 - Prediabetes
 - Type-2 Diabetes
 - PCOS
 - Fatty liver disease
 - Metabolic syndrome
 - Obesity

EDUCASIUM IAS Academy
EPIC UPSC Classes

casiumiasacademy.com

About Insulin

- Hormone from the **pancreas** that helps cells absorb glucose for energy.
- Regulates carbohydrate, fat, and protein metabolism.
- When cells stop responding → **insulin resistance** → pancreas produces more insulin → elevated blood glucose → metabolic diseases.

Public Health Concern

Persistent insulin resistance raises risk for:

- **Type-2 diabetes**
- **Non-alcoholic fatty liver disease (NAFLD)**
- **Polycystic Ovary Syndrome (PCOS)**
- **Heart disease & hypertension**



28. World Cervical Cancer Elimination Day – UN & WHO Warning

Background



17 November 2025: First-ever *World Cervical Cancer Elimination Day* observed.

Designated by the **78th World Health Assembly (WHA)** to accelerate global elimination efforts.

Cervical Cancer – Key Facts

- Caused by **persistent infection with high-risk Human Papillomavirus (HPV)**.
- **Preventable & highly curable** with early **HPV vaccination + regular screening**.

Global Burden

- **4th most common cancer** among women.
- Causes **one death every two minutes** (WHO).
- **660,000 cases & 350,000 deaths** (2022).
- **94% of deaths** occur in **low- and middle-income countries** due to low screening and delayed treatment.
- South-East Asia = **~25% of global burden**.

India's Burden

- Accounts for **~20% of global cases** and **~25% of global deaths** (2020).
- **2nd most common cancer** among Indian women (after breast cancer).
- Screening extremely low: **<10% ever screened; only 2% screened in last 5 years** (2019).

EDUCASIUM IAS Academy
EPIC UPSC Classes

About Human Papillomavirus (HPV)

- Small **double-stranded DNA virus** infecting skin and mucosa.
- **200+ types:**
 - *Low-risk* → warts
 - *High-risk* → oncogenic
- **HPV-16 & HPV-18 cause ~99% of cervical cancer cases.**

HPV Vaccination & Prevention

- **Six HPV vaccines** available globally.
- **India's vaccine:** *Cervavac* (quadrivalent HPV vaccine) developed by Serum Institute + DBT.
- Protects against **four HPV types**, including 16 & 18.
- **Target group:** Girls aged **9-14 years** (best protection before sexual exposure).



29. National One Health Mission



Budget: ₹383 crore

Status: To be launched soon by the Government of India

Purpose: Integrate *human–animal–environment* health systems for national health security

About the Mission

- A multi-ministerial flagship initiative led by the **Ministry of Health and Family Welfare (MoHFW)**.
- **Objective:**
 - Integrated disease surveillance
 - Pandemic preparedness
 - Strengthened R&D
 - Addressing antimicrobial resistance (AMR) holistically
- **Implementing Agency:**
 - Indian Council of Medical Research (ICMR)
- **Coordinating Department:**
 - Department of Health Research (DHR)
- **Governance Structure:**
 - **Executive Committee** chaired by the *Union Health Minister*
 - **Scientific Steering Committee** chaired by the *Principal Scientific Adviser (PSA)*

About the One Health Approach

- A collaborative, multisectoral, transdisciplinary framework linking:
 - Human health
 - Animal health
 - Environmental ecology
- Recognises that ~75% of emerging infectious diseases in humans originate from animals (zoonotic).
- **Focus Areas:**
 - Zoonotic disease surveillance
 - Integrated AMR control
 - Food-safety regulation
 - Wildlife & environmental health monitoring
 - Cross-sector data sharing and risk forecasting
- **Outcome:** Reduces spillover risks, strengthens early warning systems, and enables rapid coordinated response.

Global Endorsement

The One Health framework is jointly supported by the **Quadrupartite**:

- **WHO** (World Health Organization)
- **FAO** (Food and Agriculture Organization)
- **WOAH** (World Organisation for Animal Health)
- **UNEP** (UN Environment Programme)





30. Global TB Report 2025 – India Records 21% Decline in TB Incidence

- **TB Incidence:** Fell from **237 per lakh (2015)** to **187 per lakh (2024)** – a **21% decline**, one of the sharpest globally.
- **Treatment Coverage:** Jumped from **53% (2015)** to **92%+ (2024)** due to tech-enabled diagnosis, community support, and decentralised health services.
- **Case Detection:**
 - **26.18 lakh** TB patients diagnosed in 2024.
 - “**Missing cases**” reduced from **15 lakh (2015)** to **<1 lakh**, reflecting stronger notification systems.
- **TB Mortality:** Reduced from **28 per lakh (2015)** to **21 per lakh (2024)**.

About Tuberculosis (TB)

- **Cause:** *Mycobacterium tuberculosis*.
- **Transmission:** Airborne; spreads through coughing/ sneezing.
- **Forms:**
 - **Latent TB:** Infection without symptoms.
 - **Active TB:** Symptomatic and infectious.
- **HIV Link:** HIV is the **strongest risk factor**, weakening immune defence and increasing reactivation risk.
- **India's Burden:**
 - Accounts for **~26% of global TB cases**.
 - Reported **~27 lakh cases (2023)**.

Government Action – TB Mukt Bharat Abhiyan (2024)

- **Nationwide Screening:** Over **19 crore vulnerable individuals** screened.
- **Detection:**
 - **24.5 lakh** TB cases identified.
 - **8.61 lakh** asymptomatic (early-stage) cases detected with AI and rapid diagnostics.
- **Treatment Success:**
 - Achieved **90% success rate**, exceeding global average of **88%**.



31. Oncology Breakthrough: India Shifts from IV to 5-Minute Subcutaneous Breast Cancer Therapy



Oncologists report a major treatment shift for **HER2-positive breast cancer**, replacing long IV infusions of trastuzumab/pertuzumab with **subcutaneous (SC) injections** that deliver comparable outcomes in just 2–5 minutes, reducing hospital time and improving patient comfort.

Background

- Traditional HER2-positive therapy uses **IV infusions** delivered through a chemoport, taking **several hours** and requiring hospital-based monitoring.
- New **SC formulations** combine trastuzumab or pertuzumab with **recombinant human hyaluronidase (rHuPH20)** to enable rapid absorption under the skin.

Scientific Basis

- rHuPH20 enzyme** temporarily breaks down hyaluronan in subcutaneous tissue, allowing large monoclonal antibodies to pass through and be absorbed efficiently.
- HannaH, FeDeriCa & ADEPT clinical trials** showed:
 - ✓ Bioequivalence to IV therapy
 - ✓ Comparable safety outcomes
 - ✓ No loss of therapeutic efficacy
 - ✓ Lower healthcare burden

Why the Shift Matters

- 2–5 minute injections vs hours-long IV sessions**
- Reduced hospital occupancy, lower infection risk (no chemoport access), and better quality of life.
- Enables treatment capacity expansion in oncology centres with limited infusion chairs.

www.educasiumiasacademy.com

Breast Cancer in India

- Most common cancer in Indian women: **28.2% of all female cancers**.
- ASR: 25-32 per 100,000**, highest in urban metros.
- 5-year survival ~52%**, significantly lower than high-income countries due to late detection and access barriers.

Government Initiatives

- NPCDCS**: Screening for breast, cervical & oral cancers for women aged 30+.
- Swasth Nari Sashakt Parivar Abhiyaan (2025)**: Awareness + screening acceleration.
- PM-JAY**: ₹5 lakh cover for 200+ cancer packages including breast cancer surgeries, chemo, radiation.



32. EAT–Lancet Commission 2025: Food Systems & Planetary Boundaries

The 2025 EAT-Lancet Commission warned that **global food systems** are now the **largest contributors to planetary boundary breaches**, threatening ecological and human health.

Planetary Boundaries

Defines **nine biophysical limits** that maintain Earth's stability:

1. Climate Change
2. Ocean Acidification
3. Ozone Depletion
4. Nitrogen Cycle
5. Phosphorus Cycle
6. Freshwater Use
7. Land-System Change
8. Biosphere Integrity (Biodiversity)
9. Chemical Pollution & Aerosol Loading

Key Findings of the 2025 Report

1. Food Systems Are Driving the Ecological Crisis

- Responsible for **5 of the 7 already breached planetary boundaries:**
 - ✓ Nitrogen overload
 - ✓ Phosphorus overload
 - ✓ Biodiversity loss
 - ✓ Land-system change
 - ✓ Freshwater use crisis

2. Emissions Contribution

- Food and agriculture contribute **30% of global GHG emissions**.
- Transforming global food systems could **halve total emissions**.

3 India's Performance

- **High nitrogen fertiliser and pesticide use** → nitrogen boundary breach.
- **Natural land cover loss** below the recommended **50–60% intact threshold**.
- Significant freshwater stress due to water-intensive farming.

4. Social Inequity Insight

- Only <1% of the global population lives within **safe ecological & social limits**.
- **Top 30% richest** account for **70% of food-related environmental degradation**.

Keywords for UPSC

- *Planetary Boundaries, EAT-Lancet Diet, Regenerative Farming, Nitrogen Cycle, Biosphere Integrity, APCNF, Planetary Health, Food-Climate Nexus.*



33. Indian Railways to Install AI Freight Safety System



AI-Based Locking Monitoring System 'DRISHTI'

- **Initiative:** Indian Railways plans to deploy 'DRISHTI', an AI-powered system to enhance freight train safety.
- **Objective:** Detect **unlocked or tampered doors** on moving freight wagons, addressing major security risks.
- **Partnership:** Developed jointly by **Northeast Frontier Railway (NFR)** and **IIT Guwahati Technology Innovation and Development Foundation (IITG-TIDF)**.
- **Key Benefit:** Reduces dependence on manual checks, minimizing **human error** and improving **freight management efficiency**.

👉 Features of DRISHTI

- **Real-Time Monitoring:** AI-driven cameras and sensors continuously track door-lock conditions, even in motion.
- **Automated Alerts:** Instant notifications to operators when doors are **unlocked, open, or tampered**.
- **Digital Analytics:** Maintains logs and provides **data-driven insights** for better operational decisions.

EDUCASIUM IAS Academy
EPIC UPSC Classes

www.educasiumiasacademy.com



34. Supreme Court Flags Rising Menace of “Digital Arrests”



Context: Supreme Court warned of a surge in **digital arrest scams**, with victims – mainly senior citizens – losing **₹3,000 crore** in India.

How Digital Arrest Scams Work

- **Caller ID Spoofing:** Scammers mimic police, CBI, ED, or courier agencies.
- **Intimidation:** Fake crime accusations + forged notices to isolate victims.
- **Psychological Coercion:** Threats of FIR, jail, or custodial interrogation.
- **Payment Extraction:** Demand payments via crypto, gift cards, or mule accounts.
- **Identity Theft:** Steal Aadhaar, PAN, bank access during the fake “investigation.”

Scale & Impact

- **Elderly Most Affected:** 60%+ victims are senior citizens with lower digital literacy.
- **Sharp Surge:** 72% rise in impersonation-based cyber fraud in 2024 (vs 2023).
- **Mental Health Toll:**
 - 85% victims reported trauma;
 - 40% developed anxiety disorders (NIMHANS-CERT-In, 2024).
- **Poor Recovery:** Only 3-4% of stolen funds traced or recovered (I4C 2025)

Why Digital Arrest Scams Are Hard to Tackle

- **Transnational Gangs:** Centres running from **Myanmar, Laos, Cambodia**, limiting legal reach.
- **Deepfake Use:** AI-driven audio/video of “officials” increases believability.
- **Coordination Gaps:** CERT-In, State Police, and MHA portals operate in silos.
- **Outdated Laws:** IT Act 2000 doesn’t cover **AI impersonation, virtual detention, or deepfake threats**.
- **Crypto Laundering:** Money moved via **crypto, prepaid cards, mule networks**; FIU-India flagged **₹800 crore** in cross-border laundering.

Way Forward

- **National Cyber Task Force:** A joint CBI-CERT-In-RBI mechanism on the lines of the U.S. **Cyber Fraud Task Force**.
- **Deepfake Regulation:** Rules under **DPDP Act 2023** to criminalise AI-based impersonation; Watermarking norms like the **EU AI Act (2025)**.
- **Elderly Protection Cells:** Merge cyber vigilance with **14567 senior helpline + district cyber volunteers**.
- **Nationwide Awareness:** CERT-In-led multi-language campaigns on “digital arrest” red flags; Modelled on **Cyber Surakshit Bharat** outreach.
- **Stronger Extradition Links:** India-ASEAN cybercrime cooperation to shut scam hubs in neighbouring regions.



35. Sanchar Saathi – DoT Reports Record Phone Recoveries



Latest Update

- 50,000+ stolen phones recovered in October 2025 – highest monthly recovery.
- Total recoveries crossed 7 lakh, with a 47% rise (June-Oct 2025).
- Top States: Karnataka and Telangana (each 1 lakh+ recoveries).

About Sanchar Saathi

- Citizen-centric **telecom security platform** by DoT to curb mobile theft, fraud, and identity misuse.
- **Portal launched:** 2023 | **Mobile App:** January 2025.
- Detects **new SIM insertion** in blocked devices → alerts user + police for recovery.

Key Features

- **CEIR (Central Equipment Identity Register):** Block/trace lost or stolen phones across all networks.
- **Know Your Connections:** Check all SIMs issued in your name; report unauthorised numbers.
- **Chakshu:** Report suspicious calls/SMS/WhatsApp messages linked to cyber or financial fraud.
- **Know Your Mobile:** Verify handset authenticity using IMEI (detects blacklisted/duplicate devices).
- **ASTR:** AI + Facial Recognition system to block SIMs issued using fake/forged/multiple IDs.

EDUCASIUM IAS Academy

EPIC UPSC Classes

www.educasiumiasacademy.com



36. 2nd Regional Open Digital Health Summit (RODHS) 2025 – India Hosts Regional Health-Tech Leadership



Overview

- **Dates:** 19–21 November 2025
- **Venue:** New Delhi
- **Purpose:** Advance Universal Health Coverage (UHC) in South-East Asia through **Digital Public Infrastructure (DPI)** and **open digital health standards**.

Organisers

- National e-Governance Division (NeGD), MeitY
- National Health Authority (NHA)
- WHO South-East Asia Regional Office
- UNICEF

Objectives of the Summit

1. **Enhance regional capacity** to build interoperable, people-centred digital health ecosystems.
2. **Promote standards-based innovation** and development of digital health tools.
3. **Integrate & modernise legacy health systems** across countries.
4. **Strengthen digital health governance**, regulatory frameworks, and institutional capacity.
5. **Foster regional collaboration** for secure, scalable, and sustainable digital health solutions.

Roadmaps for Scalable Digital Health Systems

- Countries worked on customised digital health roadmaps supporting:
 - **Universal Health Coverage (UHC)**
 - **Health security**
 - **Sustainable Development Goals (SDGs)**
- Builds on momentum from the **1st RODHS held in Nairobi**.

Interoperability Push

- Summit trained delegates to deploy **interoperable, open digital health platforms** based on global and regional standards.
- Focus on:
 - Open APIs
 - Health data exchange frameworks
 - Consent architecture
 - Modular digital building blocks



37. Women's Kabaddi World Cup 2025



- Prime Minister congratulated the Indian women's Kabaddi team for winning the **Women's Kabaddi World Cup 2025**.
- The tournament was held in **Dhaka, Bangladesh**, with **11 participating nations**.
- India defeated **Chinese Taipei 35–28** in the final to claim their **second consecutive World Cup title**.
- India remained **unbeaten throughout** the tournament, showcasing complete dominance and consistency.

38. India Clinches Maiden Women's ODI World Cup Title



For the first time in cricketing history, India's women lifted the **ICC ODI World Cup**, turning decades of hope into destiny on home soil.

Why in News? : On 2 November 2025, India won its **maiden ICC Women's ODI World Cup**, defeating South Africa by **52 runs** at the D.Y. Patil Stadium, Navi Mumbai.

- India had reached two ODI World Cup finals before (2005, 2017) but never clinched the title.
- Hosting the tournament added pressure and expectations.
- Captain **Harmanpreet Kaur**'s leadership and the team's form had signalled India's rising global dominance.

Key Points from the Final

1. **Historic Victory** – India won its first-ever ICC Women's ODI World Cup, beating South Africa by 52 runs.
2. **Opening Stand Masterclass** – Smriti Mandhana and Shafali Verma stitched a **104-run opening partnership**, giving India a powerful start.
3. **Leadership & Mindset** – On the eve of the final, Captain Harmanpreet Kaur spoke about **destiny, belief and visualisation**, which the team translated into a commanding performance.
4. **Venue & Atmosphere** – A packed **D.Y. Patil Stadium** witnessed the electrifying win, marking one of the greatest nights in Indian women's cricket.

Keywords for UPSC : Women's Cricket • ICC ODI World Cup • Harmanpreet Kaur • Smriti Mandhana • Shafali Verma • Sports Milestones • India-South Africa Cricket



39. Ahmedabad to Host 2030 Commonwealth Games



- Delegates at the Commonwealth General Assembly in Glasgow awarded **Ahmedabad** the hosting rights for the **2030 Commonwealth Games**.
- This will be **India's second time** hosting the event; **New Delhi hosted the 2010 Games**.
- The decision aligns with India's broader ambition to bid for the **2036 Olympic Games**.
- The Commonwealth Games is a **quadrennial multi-sport event** featuring athletes from Commonwealth nations.
- Recent Hosts: **Birmingham (2022)**; **Glasgow will host the 2026 edition**.



www.educasumiiasacademy.com



40. Marine Fisheries Census (MFC) 2025 – India's First Fully Digital Fisheries Census

On **31 October 2025**, the Union Minister of State for Fisheries, Animal Husbandry & Dairying launched:



- **Marine Fisheries Census (MFC) 2025 – Household Enumeration**
- **VYAS-BHARAT and VYAS-SUTRA mobile applications** at **Kochi**, initiating a total digital transformation of India's fisheries data ecosystem.

Key Features of MFC 2025

1. Complete Digital Census

- First fisheries census to **eliminate paper-based surveys**.
- Uses **geo-referenced, multilingual mobile applications**.
- Coverage: **1.2 million fisher households, 5,000 marine fishing villages, 13 coastal States/UTs** (incl. A&N Islands & Lakshadweep).

2. Timeline : Conducted over **45 days**: **3 November – 18 December 2025**.

3. Technological Backbone (CMFRI – ICAR Developed Apps)

VYAS-NAV : Validates fishing villages, landing centres, and harbours.

VYAS-BHARAT : Captures household-level and infrastructure-level socio-economic data.

VYAS-SUTRA : Real-time supervision, monitoring, and progress tracking via dashboards.

4. Enhanced Data Accuracy & Transparency

- Geo-tagged data enables:
 - ✓ Real-time monitoring
 - ✓ Multi-tier dashboards
 - ✓ Minimisation of human error

5. Expanded Socio-Economic Data (For the First Time)

MFC 2025 will now capture detailed socio-economic indicators:

- **Family income, assets, home ownership**
- **Debts, credit sources, insurance coverage**
- **Education, occupation diversification**
- **Impact of COVID-19 on livelihoods**
- **Penetration of welfare schemes** such as:
 - PMMSY (Pradhan Mantri Matsya Sampada Yojana)
 - PM-MKSSY

6. Drone-Based Enumeration (First in India) : To ensure **neutral, high-fidelity craft counts**, drones will map vessels at major fishing harbours.



41. India Re-Elected to CCEXEC – Codex Alimentarius Commission (CAC)



India has been **unanimously re-elected** to the **Executive Committee (CCEXEC)** of the **Codex Alimentarius Commission** for the **Asia region** during the **48th session (CAC48)** held at the FAO headquarters, Rome.

About Codex Alimentarius Commission (CAC)

1. Establishment & Purpose

- Created in **1963** by WHO and FAO under the **Joint FAO/WHO Food Standards Programme**.
- Mandate:
 - ✓ Develop **international food standards**
 - ✓ Protect **consumer health**
 - ✓ Ensure **fair practices** in global food trade

2. Membership

- **189 members** (as of 2025):
 - ✓ **188 countries + 1 member organisation (EU)**
- India joined in **1964** (not a founding member).

3. Codex Alimentarius ("Food Code")

- A comprehensive collection of:
 - ✓ Food standards
 - ✓ Guidelines
 - ✓ Codes of practice
- Although **voluntary**, they are:
 - ✓ Adopted by many countries in domestic regulation
 - ✓ Used as **reference standards by the WTO** during trade dispute settlement (especially SPS disputes).

Executive Committee (CCEXEC)

Composition (17 members)

- Chairperson
- Three Vice-Chairs
- **Six Regional Coordinators**
- **Seven elected members** (one from each region)

Term

- Members serve a **two-year term**, guiding Codex work between annual Commission sessions.



42. Indonesia Polio-Free (Type-2) Status – WHO Declaration



WHO declared the end of Indonesia's poliovirus type-2 outbreak after the country met the Global Polio Eradication Initiative (GPEI) criteria.

GPEI Certification Criteria

A country must demonstrate:

1. Zero indigenous wild poliovirus cases for 36 consecutive months
2. High population immunity ($\geq 90\%$ vaccination coverage)
3. Strong AFP (Acute Flaccid Paralysis) and environmental surveillance
4. Robust outbreak response and containment

About Poliomyelitis (Polio)

Disease Profile

- A highly infectious viral disease transmitted via the faecal-oral route.
- Caused by enteroviruses, primarily infecting the gut.
- Causes irreversible paralysis in ~ 1 out of 200 infections.
- Severe complications include respiratory paralysis and death.

Polio Virus Types

- Three serotypes: Poliovirus-1, 2, and 3.
- Wild poliovirus type-2: globally eradicated in 2015.
- Risk today: vaccine-derived type-2 poliovirus (cVDPV2) continues to cause outbreaks.

Global Status (2024-25)

- Wild poliovirus persists only in **Pakistan and Afghanistan**, per WHO surveillance.

EDUCASIUM INSTITUTE
EPIC UPSC Classes

www.educasiumiasacademy.com

Vaccines Used Against Polio

1. Oral Polio Vaccine (OPV)

- Live attenuated, given orally.
- Induces strong mucosal immunity, blocking virus transmission.
- Low cost; easy to administer.
- Risk: can (rarely) cause *Vaccine-Associated Paralytic Poliomyelitis* (VAPP) or result in cVDPV2 in low-immunity populations.

2. Inactivated Polio Vaccine (IPV)

- Killed virus, injectable.
- Produces strong systemic immunity and prevents paralysis.
- No risk of VAPP.
- Costlier; requires trained health workers.

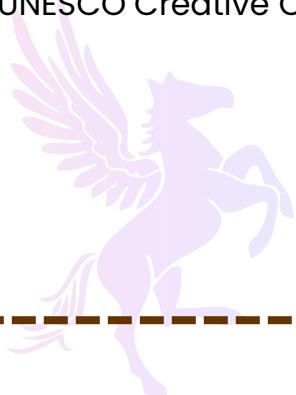




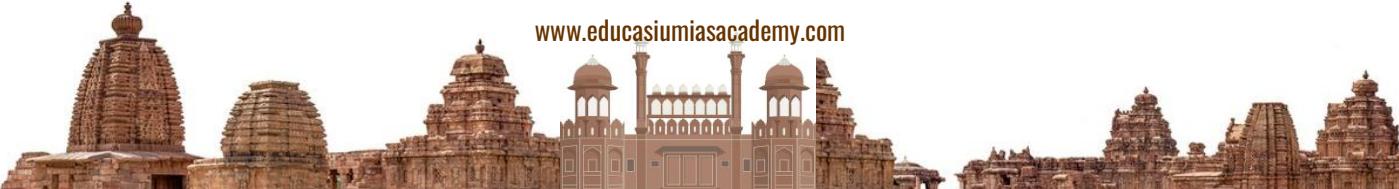
NOVEMBER 2025

HISTORY ART & CULTURE

1. Lachit Borphukan
2. Baliyatra Festival *
3. Raulane Festival
4. Ram Temple Flag Hoisting Ceremony
5. Titanium Windows for Ayodhya Ram Temple
6. Buddha Relics to Visit Bhutan for Peace Festival
7. Chavang Kut Festival
8. Lucknow UNESCO Creative City of Gastronomy
9. Curaçao



EDUCASIUM IAS Academy
EPIC UPSC Classes



1. Lachit Diwas – PM Modi Pays Tribute



Lachit Diwas is observed every year on **24 November** in Assam to honour the birth anniversary of **Lachit Borphukan**, the legendary Ahom general.

Born in **1622** at **Charaideo**, he served as **Commander-in-Chief** of the Ahom army.

Legacy of Lachit Borphukan

- **Battle of Saraighat (1671):**

- Defeated the Mughal forces led by Raja Ram Singh I.
- Famous **naval battle** on the Brahmaputra near Guwahati.
- Used terrain advantage, riverine warfare, and guerrilla tactics to overpower a larger Mughal army.

- **Symbol of Assamese valour**, remembered for his leadership, patriotism, and military strategy.

National Recognition

- The **Lachit Borphukan Gold Medal** is awarded annually (since 1999) to the **best cadet at the National Defence Academy (NDA)**.

Context: The Ahom Kingdom

- Ruled Assam for nearly **600 years (1228-1826)**.
- Known for resisting Mughal expansion.
- Declined after repeated **Burmese invasions**, leading to British annexation under the Treaty of Yandaboo (1826).

IAS Academy
EPIC UPSC Classes

2. Balyatra Festival – Odisha



Meaning: "Balyatra" means *Voyage to Bali*. It is celebrated annually in Cuttack, Odisha, on Kartika Purnima.

Purpose: Commemorates Odisha's **2,000-year-old maritime trade** with Southeast Asia.

Historical Link: Honours the **Sadhabas** (Odia mariners) who sailed from ancient ports like **Tamralipti, Manikpatna, Palur and Pithunda**, trading spices, textiles, precious stones, and handicrafts.

Boita Bandana (Main Ritual)

People float miniature boats (**boitas**) made of paper, cork, or banana bark in water, symbolising the historic send-off given to sailors.

Major Features

Hosts **one of Asia's largest open-air fairs**, with thousands of stalls showcasing handicrafts, textiles, artefacts, and Odia cuisine.

- Attracts lakhs of visitors every year, boosting tourism and local crafts.

Significance

- Celebrates Odisha's maritime legacy and cultural identity.
- Reinforces India's **Act East Policy** by highlighting ancient links with Southeast Asia.

EDUCASIUM IAS Academy
EPIC UPSC Classes



3. Raulane Festival – Himachal Pradesh (Kinnaur)



Location: Celebrated in **Kinnaur district**, Himachal Pradesh.

Purpose: Honours the **Sauni celestial fairies**, revered as *guardian spirits* protecting villages during harsh winters.

Key Rituals & Symbolism

Central Figures: Two selected men portray a divine couple – **groom Raula** and **bride Raulane**.

Attire: They wear **full Kinnauri woollen garments**, heavy silver jewellery, and **completely masked faces** to symbolise spiritual intermediaries.

Ritual Dance: The divine pair performs a **slow ceremonial dance** inside the **Nagin Narayan Temple**, seeking communion with Sauni spirits for protection and blessings.

Nagin Narayan Temple

Architecture: Built using the **Kath-kuni style** – alternating, interlocked layers of wood and stone.

Features: Highly **earthquake-resistant**, traditional to Himachal's mountainous regions.

EDUCASIUM IAS Academy
EPIC UPSC Classes



4. Ram Temple Flag Hoisting Ceremony



Prime Minister Narendra Modi officially marked the completion of the Ram Mandir's construction in Ayodhya by hoisting the **saffron flag**—the **Dharma Dhwaj**—atop the temple.

Key Features of the Ram Mandir

Feature	Details
Architectural Style	Traditional Nagara style of North Indian temple architecture.
Structure	A three-story temple built without using any iron or steel to prevent corrosion and lower the carbon footprint.
Mandap Layout	The complex includes five main halls (Mandaps): Nritya, Rang, Sabha, Prarthana, and Kirtan.
Sanctum	The Garbhagriha (sanctum sanctorum) houses the idol of infant Ram.
Entrance	The main entry is the Singh Dwar (Lion Gate) located on the eastern side.
Construction Material	Primarily uses pink Bansi Paharpur sandstone. Granite is used for the plinths, while White Makrana marble and colored marble are used for inlay work.



5. Titanium Windows for Ayodhya Ram Temple



MIDHANI (Defence PSU) supplied 31 **titanium windows** for the **Pradakshina corridor** – first-ever use of **titanium** as a structural material in any Indian monument. Windows are **gold-coloured** through **anodisation**, an advanced surface-treatment process.

Anodisation

- **Electrochemical process** that thickens the natural oxide layer on metals like **titanium/aluminium**.
- Enhances **durability, corrosion resistance, colour, and lifespan**.
- Common in **premium consumer electronics** (e.g., iPhone aluminium casings).

About Titanium

- **Abundance:** 9th most abundant element in the Earth's crust.
- **Ores:** Found mainly as **Ilmenite ($FeTiO_3$)** and **Rutile (TiO_2)**.
- **Indian Deposits:** Rich placer deposits in **Odisha, Kerala, Andhra Pradesh**.

Key Properties

- **High strength-to-weight ratio** (strong as steel, 45% lighter).
- **Corrosion & heat resistant** (excellent for extreme environments).
- **Biocompatible, non-toxic, non-magnetic** – safe for medical use.
- **Very long lifespan**, suitable for structural and aerospace applications.

Major Applications

- **Aerospace:** Spacecraft, aircraft, missiles.
- **Defence:** Naval ships, armour components.
- **Medical:** Implants, prosthetics.
- **Industrial:** High-performance tools, structural reinforcements.
- **Everyday:** Titanium dioxide used in **paints, sunscreen, toothpaste**.



6. Buddha Relics Exposition in Bhutan



The sacred relics of Lord Buddha from the National Museum, New Delhi, will be taken to **Bhutan** for public exposition during the **Global Peace Prayer Festival** in Thimphu.

The exposition coincides with the **70th birth anniversary** of Bhutan's **Fourth King, Jigme Singye Wangchuk**, revered as the architect of **Gross National Happiness (GNH)**.

Venue

Kuenrey Hall, Tashichho Dzong – Bhutan's most important administrative-monastic complex housing the throne room and the central monastic body.

- The relics will be displayed here for **public viewing and prayers**.

India-Bhutan Cultural Significance

- This is the **second time** the Buddha relics are being taken to Bhutan –
- **First occasion: 2011**, during the wedding celebrations of King **Jigme Khesar Namgyel Wangchuck**.
- The exposition reflects the **deep civilizational, spiritual, and cultural ties** between India and Bhutan, rooted in shared Buddhist heritage.

EDUCASIUM IAS Academy
EPIC UPSC Classes

7. Chavang Kut Festival – Manipur



On 1 November 2025, Manipur will celebrate **Chavang Kut**, the post-harvest festival of the **Chin-Kuki-Mizo communities**, marking the completion of the harvesting season and expressing gratitude to the Almighty for a prosperous yield.

About Chavang Kut

- One of the most vibrant and culturally significant festivals of the **Chin-Kuki-Mizo ethnic groups**, celebrated widely in **Manipur** and other Northeastern states.
- Symbolises **thanksgiving**, prosperity, and the harmonious relationship between people, land, and nature.

Celebrations

- Colourful cultural dances, traditional folk songs, and indigenous games.
- Community feasts, traditional attire, and collective rituals showcasing the unity and rich heritage of the participating groups.

Historical Significance

- Due to its wide cultural importance, Chavang Kut was **declared a State Holiday in 1982** in Manipur, enabling statewide participation in the celebrations.

EDUCASIUM IAS Academy
EPIC UPSC Classes



8. Lucknow Declared UNESCO Creative City of Gastronomy (2025)



During the **43rd session of the UNESCO General Conference in Samarkand, Uzbekistan**, Lucknow was officially designated a **UNESCO Creative City of Gastronomy**. The recognition celebrates Lucknow's **Awadhi culinary heritage**, shaped by centuries of Hindu-Muslim cultural synthesis.

Significance

- Lucknow becomes the **9th Indian city** in the UNESCO Creative Cities Network (UCCN).
- It is the **2nd Indian city in the Gastronomy category**, after Hyderabad (2019).
- The title is expected to boost:
 - Culinary tourism
 - Local food entrepreneurship
 - Preservation of traditional Awadhi recipes
 - Cultural diplomacy and global branding

About UNESCO Creative Cities Network (UCCN)

- **Established in 2004**, UCCN fosters international cooperation among cities that integrate **creativity and culture** into their development strategies.
- **Objective:** Use creative industries to accelerate **sustainable urban development** aligned with the **UN 2030 Agenda**.

Seven Creative Fields

1. Crafts & Folk Art
2. Media Arts
3. Film
4. Design
5. **Gastronomy**
6. Literature
7. Music

EDUCASIUM IAS Academy
EPIC UPSC Classes

The network now includes **350+ cities across 100+ countries**.

About UNESCO

- Full form: **United Nations Educational, Scientific and Cultural Organisation**
- Founded: **1945**
- Purpose: Promote peace through international cooperation in **education, science, culture, and communication**.
- Headquarters: **Paris, France**
- Membership: **194 Member States + 12 Associate Members**
- India: **Founding member**



9. Curaçao: Smallest Nation to Qualify for 2026 FIFA World Cup



Curaçao has made history by qualifying for the **2026 FIFA World Cup**, becoming the **smallest nation by population** to ever achieve this feat.

About Curaçao

Curaçao is a Caribbean island located approximately **60 km north of the Venezuelan coast**, forming part of the "ABC Islands" (Aruba, Bonaire, Curaçao).

Category	Details
Status	Autonomous constituent country within the Kingdom of the Netherlands.
Capital	Willemstad, a UNESCO World Heritage Site famous for its colourful waterfront buildings.
Languages	Official languages are Dutch, Papiamentu (local Creole), and English.
Heritage	Home to the oldest continuously inhabited Jewish community in the Western Hemisphere.
Economy	Based on petroleum refining, tourism, and financial services, and known for the production of Curaçao liqueur.

