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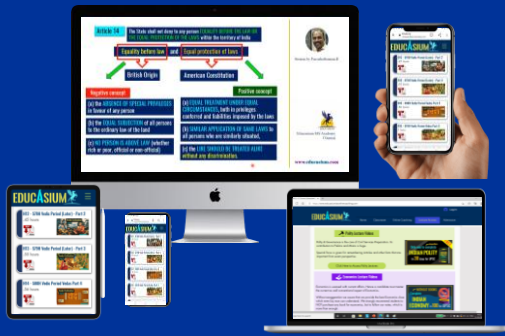
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FOREWORD

The **March Edition of EPIC UPSC Current Affairs**, covering **key developments of February 2026**, 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.

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FEBRUARY 2026

INDIAN POLITY GOVERNANCE

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1. Menstrual Health Declared a Fundamental Right by Supreme Court



In *Dr Jaya Thakur v. Government of India (2026)*, the Supreme Court recognised menstrual health and hygiene as part of the Fundamental Right to Life under Article 21. The Court issued directions to ensure free sanitary pads, adequate sanitation infrastructure, and menstrual awareness in schools.

Concept: Menstrual Health & Menstrual Hygiene Management (MHM)

- **Menstrual Health:** A state of physical, mental, and social well-being related to menstruation.
- **Menstrual Hygiene Management (MHM):** Access to safe sanitary products, adequate sanitation facilities, water, awareness, and proper disposal systems during menstruation.

Key Directions Issued by the Supreme Court

Direction	Details
Infrastructure Mandate	All government and private schools must ensure functional, gender-segregated, disabled-friendly toilets with continuous water supply and soap.
Free Sanitary Pads	Schools must provide free oxo-biodegradable sanitary napkins (ASTM D-6954 standard) for girls in Classes VI-XII .
MHM Corners	Schools must create Menstrual Hygiene Management corners with emergency supplies and safe disposal systems.
Awareness & Training	NCERT and SCERTs must integrate menstruation education into curricula and train teachers.
Accountability	District Education Officers (DEOs) must conduct annual inspections; non-compliant private schools may face de-recognition .
Monitoring	National Commission for Protection of Child Rights (NCPCR) and State Commissions will oversee implementation.

UPSC Exam Relevance

Prelims: Articles 21, 21A, 14, 15(3); Right to Education Act (Sections 3 & 19); NCPCR; Menstrual Hygiene Management.

Mains: GS-II - Fundamental Rights, gender justice, education policy, social justice.

2. Right to be Forgotten vs Freedom of Press: Supreme Court Examines Digital Privacy



The Supreme Court of India is examining whether the “Right to be Forgotten” (RTBF) can require removal of accurate news reports from the internet. The case raises a constitutional conflict between the **Right to Privacy** under Article 21 and the **Freedom of Speech and Press** under Article 19(1)(a).

Concept: Right to be Forgotten (RTBF)

The **Right to be Forgotten (RTBF)** allows individuals to request the **removal or delinking of personal information from online platforms** when it becomes **irrelevant, outdated, or harmful**.

It mainly applies to **search engines, digital archives, and online platforms storing personal data**.

Constitutional & Legal Background

K.S. Puttaswamy v. Union of India (2017)

The Supreme Court recognised the **Right to Privacy** as a **Fundamental Right under Article 21**.

RTBF was identified as a **component of informational privacy**, though not explicitly codified.

Relevant Constitutional Provisions

Article 21: Right to Life and Personal Liberty → includes **privacy and informational autonomy**.

Article 19(1)(a): Freedom of speech and expression → includes **freedom of press and public access to information**.

Legal Framework in India

Law / Policy	Status
Digital Personal Data Protection (DPDP) Act, 2023	Provides Right to Erasure (Section 12)
Operational Status	Rules and enforcement still evolving
Applicability to News Archives	Legally unsettled
IT Rules, 2021	Do not empower intermediaries to decide RTBF disputes

3. “Bulldozer Justice” Must Follow Due Process: Allahabad High Court



The Allahabad High Court ruled that **punitive demolitions** (“bulldozer justice”) cannot bypass **due process of law**. The Court held that demolitions must comply with **constitutional safeguards under Articles 14 and 21**, and cannot be used as a substitute for criminal punishment.

Concept: Bulldozer Justice

Bulldozer justice refers to the **demolition of property belonging to individuals accused of crimes**, often immediately after allegations arise.

These demolitions are carried out under the guise of **municipal anti-encroachment actions**, but critics argue they function as **extra-legal punishment without judicial trial**.

Legal Standard for Demolition

Requirement	Explanation
Prior Notice	Authorities must notify property owners before demolition.
Opportunity of Hearing	Individuals must be allowed to challenge the demolition.
Reasoned Administrative Order	Authorities must issue a written order citing legal grounds.
Municipal Law Basis	Demolition is permitted only for illegal constructions or encroachments , not as punishment for crimes.

Constitutional Concerns

Article 14 – Equality Before Law

• Selective targeting of individuals violates the principle of **non-arbitrariness and equal protection of laws**.

Article 21 – Right to Life and Personal Liberty

• Demolition without due process undermines **fair trial and procedural justice**.

Doctrine of Separation of Powers

• Punishment for crimes must be decided by **courts**, not the **executive branch**.

UPSC Exam Relevance : Prelims: Articles 14 and 21, doctrine of separation of powers, municipal governance powers.

Mains: GS-II – Rule of law, constitutional governance, separation of powers, civil liberties. GS-IV – Ethics in governance and misuse of state authority.

4. Death Penalty Debate: No Supreme Court Confirmation for 3rd Straight Year



A recent annual death penalty statistics report revealed that the Supreme Court has not confirmed any death sentence for three consecutive years (2023–2025). The findings highlight growing judicial caution and systemic concerns in capital sentencing in India.

Concept: Death Penalty (Capital Punishment)

The **death penalty** is the **highest criminal punishment** awarded for the most serious offences such as **terrorism, murder, and certain aggravated crimes**.

In India, the Supreme Court has held that it can be imposed **only in the “rarest of rare cases.”**

Key Findings of the Death Penalty Statistics Report

Indicator	Findings
Supreme Court Trend	No death sentence confirmed during 2023–2025
Acquittals in 2025	10 death row prisoners acquitted , highest in a decade
Sessions Courts	1,310 death sentences awarded (2016–2025); 128 in 2025
High Court Review	Out of 842 cases , only 70 confirmed (8.31%) , 285 acquitted , 411 commuted
Death Row Population	574 prisoners on death row by end-2025 , highest since 2016

Judicial Framework for Death Penalty in India

Bachan Singh v. State of Punjab (1980)

Supreme Court upheld the **constitutionality of the death penalty**.

Established the **“rarest of rare” doctrine**, requiring courts to consider **mitigating circumstances** and alternatives like life imprisonment.

Machhi Singh v. State of Punjab (1983)

Category	Description
Manner of Crime	Brutal or grotesque manner of murder
Motive	Depraved or heinous motive
Nature of Crime	Socially abhorrent crimes
Magnitude	Large-scale killings
Victim Profile	Vulnerable victims such as children

5. Sabarimala Case Revisited: Supreme Court to Review Temple Entry Verdict



The Supreme Court has scheduled review petitions in the Sabarimala Temple Entry case for April. The review will examine broader constitutional questions on judicial intervention in religious practices and the balance between equality and religious freedom.

Background of the Sabarimala Temple Entry Case

The Sabarimala Temple in Kerala traditionally barred women aged 10–50 years (considered “menstruating age”) from entering the shrine dedicated to Lord Ayyappa.

In 2006, the Indian Young Lawyers Association (IYLA) filed a Public Interest Litigation (PIL) challenging the restriction as unconstitutional.

Supreme Court Judgment (2018)

Aspect	Court’s Ruling
Verdict	4:1 majority struck down the restriction on entry of women
Rule Invalidated	Rule 3(b) of Kerala Hindu Places of Public Worship Rules, 1965
Fundamental Rights	Violates Articles 14, 15 and 21
Freedom of Religion	Infringes Article 25(1) (right of women devotees to worship)
Religious Denomination	Ayyappa devotees not a separate religious denomination under Article 26

Doctrine Applied: Essential Religious Practices

Courts determine whether a practice is **essential to a religion**.

The majority held that **excluding women was not an essential religious practice of Hinduism**.

Key Constitutional Issues in the Review

Equality vs Religious Freedom: Balancing Articles 14 and 15 with Article 25.

Judicial Review of Religious Practices: Limits of court intervention in faith matters.

Essential Religious Practices Doctrine: Debate on whether courts should determine religious essentials.

UPSC Exam Relevance

Prelims: Articles 14, 15, 17, 21, 25, 26; Essential Religious Practices Doctrine; Sabarimala case.

Mains: GS-II – Fundamental Rights, secularism, judiciary and religious freedom.

6. Judicial Diversity Debate: Proposal for Inclusive Bench & Regional SC Benches



A **Private Member's Bill** has been introduced in Parliament proposing a constitutional amendment to promote judicial diversity and establish regional benches of the Supreme Court. The proposal aims to address under-representation of social groups and improve access to justice across regions.

Concept: Judicial Diversity

Judicial diversity refers to the representation of different social, gender, caste, and regional groups within the judiciary.

A diverse bench is believed to enhance legitimacy, inclusiveness, and contextual understanding in judicial decision-making.

Current Status of Representation in Indian Judiciary

Category	Representation in Higher Judiciary
Women Judges	~13-14% in High Courts; only one woman judge in the Supreme Court (Justice B.V. Nagarathna)
Upper/General Castes	About 77% of High Court appointees since 2018
OBC Representation	Around 12% of higher court appointments
SC Representation	Approximately 3% of appointments
ST Representation	Around 2% of appointments
Religious Minorities	Around 5% representation

Need for Judicial Diversity

1. Jurisprudential Enrichment

Judges from varied backgrounds can better understand gender justice, discrimination, and social inequalities.

2. Institutional Legitimacy

A judiciary reflecting social diversity strengthens public trust in constitutional adjudication.

3. Constitutional Morality

Promotes substantive equality under Articles 14 and 15.

4. Historical Redress

Helps correct the historical exclusion of marginalized communities from decision-making institutions.

5. Role-Model Effect

Encourages first-generation lawyers and women to pursue judicial careers.

7. NCERT Textbook Row Rekindles Debate on Judicial Accountability



An NCERT revised Class VIII Social Science textbook referencing judicial corruption and case backlog was withdrawn after controversy. The episode has revived debates on transparency, accountability, and institutional self-correction within the higher judiciary.

Concerns Regarding Judicial Corruption

Indicator	Key Details
Public Perception	Transparency International's Global Corruption Report (2007) found 77% of surveyed Indians perceived the judiciary as corrupt
Complaints Received	Around 8,630 complaints against higher judiciary judges in the past decade (as per Ministry of Law and Justice data)
Inquiry Outcomes	Only a small fraction resulted in formal in-house inquiry committees
Forms of Misconduct	Includes abuse of discretion, conflict of interest, nepotism, and misuse of authority, not just financial corruption

Structural Accountability Gaps

Impeachment Mechanism

- Articles 124(4) and 217 provide for removal of Supreme Court and High Court judges through **Parliamentary impeachment**.
- Requires a **special majority**, making removal politically difficult.

Initiation Threshold

- Impeachment proceedings require signatures of:
 - 100 Lok Sabha MPs, or
 - 50 Rajya Sabha MPs.

In-House Inquiry Mechanism

- The judiciary has an **internal disciplinary system**, but it:
 - Lacks **statutory backing**.
 - Operates with **limited transparency**.

Contempt Powers

- Broad **contempt of court provisions** may discourage criticism or whistleblowing against judicial misconduct.

Other Related Issues

- Judicial Backlog:** Over 5 crore pending cases across Indian courts.
- Opacity in Collegium System:** Limited transparency in judicial appointments and transfers.

Lack of Independent Oversight: India lacks a **judicial complaints authority** with statutory powers.

Mains Question : "Judicial independence is essential for democracy, but it must be balanced with mechanisms ensuring accountability." Examine the structural challenges in ensuring judicial accountability in India. (15 Marks)

8. Opposition Moves Notice to Remove Lok Sabha Speaker

118 opposition MPs submitted a notice seeking a resolution to remove Lok Sabha Speaker Om Birla. The motion alleges **partisan conduct and denial of opportunities for opposition members to raise issues of public importance**, triggering discussion on the constitutional process for removing a Speaker.

Constitutional Basis for Removal of the Speaker

Provision	Explanation
Article 94(c)	The Speaker may be removed by a resolution passed by a majority of all the then members of the House.
Article 96	The Speaker cannot preside over the House while a resolution for their removal is under consideration.

Effective Majority:

More than **50% of the "then members of the House"** (Total strength **minus vacancies**).

Procedure for Removal of the Speaker

Step	Requirement
Notice Submission	Written notice submitted to the Secretary-General of Lok Sabha
Signature Requirement	Typically signed by at least two MPs
Notice Period	Minimum 14 days' notice required (as per proviso to Article 94)
Admission of Motion	Motion requires support of at least 50 MPs to be admitted
Presiding Officer	Deputy Speaker or member of the Panel of Chairpersons presides (Article 96)
Speaker's Rights	Speaker may participate in debate and defend themselves
Voting Rights	Speaker may vote in the first instance, but cannot exercise a casting vote

Historical Precedents

Speaker	Year	Outcome
G.V. Mavalankar	1954	Motion admitted and debated but defeated
Hukam Singh	1966	Notice moved but not admitted
Balram Jakhar	1987	Notice moved but not admitted

Key Fact: No Lok Sabha Speaker has ever been removed from office.

Mains Question

"The neutrality of the Speaker is fundamental to the functioning of parliamentary democracy." Examine the constitutional provisions and challenges associated with the removal of the Lok Sabha Speaker. (15 Marks)

9. Substantive Motion Filed Against Leader of Opposition



A notice of a substantive motion has been filed against the Leader of the Opposition, Rahul Gandhi, alleging unethical conduct in recent parliamentary speeches. The development highlights the procedural mechanism in Parliament for discussing the conduct of persons holding high authority.

Concept: Substantive Motion

- A substantive motion is a self-contained and independent proposal placed before Parliament seeking a formal decision of the House.
- It allows the House to express its opinion or take action on a specific issue of public importance.

Key Characteristics

- **Independent Proposal:** Not linked to other parliamentary business.
- **Focused Issue:** Must address a single, clearly defined matter.
- **Decisive Nature:** Designed to enable the House to take a clear decision or express its view.

Use of Substantive Motion in Conduct Scrutiny

- The conduct of persons in high authority can be discussed in Parliament only through a substantive motion.

Protected Constitutional Offices

Substantive Motion vs Resolution

Office	Aspect	Substantive Motion	Resolution
President	Nature	Independent proposal before the House	A specific type of substantive motion
Vice-President			
Judges of Supreme Court and High Courts	Relationship	Broad category	Subset of substantive motions
Governor	Repetition Rule	Cannot be repeated in the same session	Cannot be moved again for one year on the same subject
Chief Election Commissioner			
Comptroller and Auditor General (CAG)	Voting	May or may not be voted upon	Always put to vote

Type of Motion

Nature

Substantive Motion	Independent, original proposal
Substitute Motion	Replaces a substantive motion
Subsidiary Motion	Depends on another motion

Mains Question

“Substantive motions serve as an important mechanism for accountability and debate in parliamentary democracy.” Examine their role and procedural safeguards in the Indian Parliament. (15 Marks)

10. Breach of Privilege Notice Revives Debate on Parliamentary Privileges

A breach of privilege notice against stand-up comedian Kunal Kamra led to his summons before the Maharashtra Legislative Council's Privileges Committee. The incident has drawn attention to parliamentary privileges and the role of the Privileges Committee in protecting legislative authority.

Concept: Parliamentary Privileges

- Parliamentary privileges are special **rights, immunities, and exemptions** enjoyed by legislatures and their members to ensure **independent functioning without external interference**.
- These privileges protect the **authority, dignity, and autonomy of the House**.

Constitutional Basis

Provision	Applies To
Article 105	Privileges of Parliament (Lok Sabha & Rajya Sabha)
Article 194	Privileges of State Legislatures

Key Point: Parliamentary privileges in India remain **largely uncodified**, relying on constitutional provisions, parliamentary rules, conventions, and judicial interpretations.

Privileges Committee : Nature and Role

- A **Privileges Committee** is a parliamentary body that examines **cases of breach of privilege or contempt of the House**.
- It investigates whether actions have **violated the rights or authority of the legislature, its members, or committees**.

Composition of the Privileges Committee

Legislature	Composition
Lok Sabha	15 members nominated by the Speaker; chaired by a member appointed by the Speaker
Rajya Sabha	10 members nominated by the Chairman; traditionally chaired by the Deputy Chairman
State Legislatures	Members nominated by the Speaker (Assembly) or Chairman (Council); strength varies by House rules

Powers and Functions

Function	Description
Investigative Role	May summon individuals, call for documents, and record statements
Fact-Finding Inquiry	Conducts detailed examination of alleged breaches
Recommendatory Authority	Submits recommendations to the House, which decides on punishment
Quasi-Judicial Character	Provides opportunity for the accused to present their defence
Advisory Role	Reports may suggest procedural steps for implementing recommendations

11. Debate on Permanent Framework for State Reorganisation



A Private Member's Bill introduced in Parliament proposes a permanent institutional framework for State Reorganisation in India. The proposal seeks to create a structured, objective mechanism for creating or altering states instead of ad-hoc political decisions.

Existing Constitutional Framework for State Reorganisation

Provision	Explanation
Article 3	Parliament can form new states, alter boundaries, or change the name of existing states
Article 4	Laws under Article 3 may include supplemental and consequential provisions, and do not require a constitutional amendment
Presidential Recommendation	A reorganisation bill can be introduced in Parliament only on the recommendation of the President
Consultation with State Legislature	The concerned State Legislature's views are sought but are advisory and not binding
Voting Requirement	Bill passed by simple majority in Parliament

Proposal: Permanent State Reorganisation Framework

The Private Member's Bill suggests creating a permanent "States and Union Territories Reorganisation Commission" to assess demands for new states based on objective criteria.

Rationale in Favour of a Permanent Framework

Permanent Framework for State Reorganisation - Arguments

Aspect	Rationale in Favour	Arguments Against
Administrative Perspective	Shift from linguistic basis (1950s) to modern governance efficiency	Risk of Balkanisation due to rising demands (e.g., Bodoland, Gorkhaland)
Decision-Making Mechanism	Establish an objective, census-based institutional framework instead of ad-hoc decisions	May lead to constitutional conflict as Article 3 gives exclusive power to Parliament
Economic Dimension	Ensure fiscal sustainability and economic viability before creating new states	Smaller states may intensify inter-state disputes (water, resources)
Regional Equity	Address sub-regional imbalances and "internal colonialism" in large states	Economic criteria may fail to resolve identity-based and emotional demands
Political Stability	Provide a legal channel for regional aspirations, reducing violent movements	States may perceive it as central overreach, weakening cooperative federalism

12. India Expands Parliamentary Diplomacy with 64 Parliamentary Friendship Groups



The Lok Sabha Speaker constituted 64 Parliamentary Friendship Groups (PFGs) to strengthen inter-parliamentary cooperation with over 60 countries. The initiative aims to promote parliamentary diplomacy through continuous political, cultural, and legislative engagement.

Key Features of Parliamentary Friendship Groups

Feature	Details
Number of Groups	64 Parliamentary Friendship Groups established
Membership	More than 700 MPs participating across groups
Country Coverage	Groups linked with over 60 countries
Composition	Each group has 11 MPs from Lok Sabha and Rajya Sabha representing different parties
Leadership	Lok Sabha Speaker appoints the President of each group
Institutional Framework	Operate under the Indian Parliamentary Group (IPG)

Indian Parliamentary Group (IPG)

Aspect	Details
Nature	Autonomous, non-statutory body
Established	1949
Purpose	Promote inter-parliamentary relations globally
Global Role	Serves as India's National Group in the Inter-Parliamentary Union (IPU)
Commonwealth Link	Acts as the Indian branch of the Commonwealth Parliamentary Association (CPA)

Membership

- **Voluntary membership** for all sitting MPs of Lok Sabha and Rajya Sabha.
- **Former MPs** can join as **Associate Members**.

Leadership

- **Lok Sabha Speaker - Ex officio President**
- **Deputy Speaker of Lok Sabha and Deputy Chairman of Rajya Sabha - Ex officio Vice-Presidents**

Mains Question : "Parliamentary diplomacy has emerged as an important complement to traditional diplomacy." Discuss its role in strengthening India's international engagement. (15 Marks)

13. Rebalancing Indian Federalism: From Centralised Control to Cooperative Governance



Recent debates on **Centre-State relations and fiscal federalism** have revived discussions on the **need to rebalance India's federal structure**. Experts argue that while India's Constitution initially emphasised **strong centralisation after Partition**, a mature democracy now requires **greater State autonomy and cooperative federal governance**.

Constitutional Framework of Indian Federalism

Provision	Key Feature
Article 1	Declares India as a "Union of States", ensuring unity while recognising States
Seventh Schedule	Divides legislative powers into Union List, State List, and Concurrent List
Article 246	Defines legislative competence of Parliament and State Legislatures
Article 254	Union law prevails over State law in case of conflict on Concurrent List
Article 280	Establishes the Finance Commission to recommend tax devolution
Basic Structure Doctrine	Federalism recognised as a basic feature of the Constitution (S.R. Bommai v. Union of India, 1994)

Need to Restore Federal Balance

- 1. Fiscal Centralisation :** Increasing reliance on **cesses and surcharges**, which are **excluded from the divisible pool under Article 270**, reduces States' share of taxes.
- 2. Scheme Rigidity :** Centrally Sponsored Schemes (CSS) often impose **uniform guidelines**, limiting regional flexibility.
 - Example: **MGNREGA implementation norms** restricting drought-specific adjustments.
- 3. Concurrent List Encroachment :** Union policies increasingly shape areas traditionally influenced by States.
 - Example: **National Education Policy (NEP) 2020** affecting curriculum and language policy.
- 4. Executive Overreach :** Expansion of central agencies into State domains.
 - Example: **BSF jurisdiction expansion in border states like Punjab**.
- 5. State Innovation :** States often pioneer **policy innovations later adopted nationally**.

Example: **Tamil Nadu's Noon Meal Scheme** inspiring PM POSHAN.

Mains Question : "India's federalism has historically been characterised by strong centralisation. In the context of contemporary governance challenges, examine the need to rebalance Centre-State relations." (15 Marks)

14. Frontier Nagaland Territorial Authority: New Autonomy Model for Eastern Nagaland



The Centre signed a tripartite agreement with the Government of Nagaland and the Eastern Nagaland Peoples' Organisation (ENPO) to establish the Frontier Nagaland Territorial Authority (FNTA). The Authority grants enhanced administrative and financial autonomy to six eastern districts of Nagaland.

What is the Frontier Nagaland Territorial Authority (FNTA)?

- FNTA is a new **autonomous administrative mechanism** designed to address regional grievances in eastern Nagaland.
- It grants **greater local governance powers** without altering the territorial boundaries of Nagaland.

Districts under FNTA

Kiphire
Longleng
Mon
Noklak
Shamator
Tuensang

Background of the ENPO Demand

- **Separate Statehood Demand:** The Eastern Nagaland Peoples' Organisation (ENPO) sought a separate "Frontier Nagaland" state citing long-standing neglect.
- **Development Gap:** Eastern districts lag behind western Nagaland in connectivity, institutions, and public services.
- **Political Pressure:** ENPO called for a **Lok Sabha election boycott in 2024**, highlighting dissatisfaction.

Key Features of FNTA

Feature	Details
Governance Model	Example of asymmetric federalism granting autonomy within a state
Administrative Structure	Creation of regional administrative institutions and mini-secretariat
Jurisdiction	Authority over 46 development-related subjects
Financial Support	Initial funding from the Ministry of Home Affairs
Resource Allocation	Development funds based on population and area metrics
Constitutional Safeguards	Does not affect protections under Article 371(A)

Article 371(A) - Special Provision for Nagaland

- Protects **Naga customary laws and traditional institutions**.
- Parliament cannot legislate on **religious practices, social customs, and ownership of land and resources** without approval of the State Assembly.

15. Kerala to “Keralam”? Cabinet Clears Proposal to Change State’s Official Name



The Union Cabinet approved a proposal to change the official name of the State from “Kerala” to “Keralam.” The move initiates the constitutional procedure under Article 3, which empowers Parliament to alter the name, boundaries, or area of States.

Constitutional Framework for Altering a State’s Name

Provision	Key Feature
Article 3	Parliament can alter the name, area, or boundaries of a State through legislation
Article 4	Laws made under Articles 2 and 3 may modify the First Schedule without requiring a constitutional amendment under Article 368
First Schedule	Contains the official list and names of States and Union Territories

Procedure for Changing the Name of a State

Step	Process
Presidential Recommendation	A Bill for altering the name of a State can be introduced only on the recommendation of the President
State Legislature Consultation	The President refers the Bill to the concerned State Legislature for its views within a specified period
Advisory Role of State	The State Legislature’s opinion is not binding
Parliamentary Approval	Parliament has the final authority to pass the Bill by a simple majority
Constitutional Update	The change requires modification of the First Schedule of the Constitution

Examples of Similar Name Changes

Previous Name	New Name	Year
Orissa	Odisha	2011
Uttaranchal	Uttarakhand	2007
Pondicherry	Puducherry	2006

These changes also required **Parliamentary legislation under Article 3**

Mains Question : “The Constitution provides flexibility for altering the name and boundaries of States through Article 3.” Discuss the constitutional procedure and its implications for India’s federal structure

16. NOTA's Limited Impact on Electoral Quality: Supreme Court Observation



The Supreme Court observed that the None of the Above (NOTA) option has had limited impact on improving the quality of candidates in elections. The Court also noted that educated and affluent citizens often show lower voter turnout compared to economically weaker sections.

Concept: None of the Above (NOTA)

- NOTA allows voters to reject all contesting candidates while maintaining ballot secrecy.
- It was introduced in 2013 following the Supreme Court judgment in *PUCI vs. Union of India*.

Pre-NOTA System

- Under Rule 49-O of the Conduct of Elections Rules, 1961, voters could refuse to vote.
- However, voters had to inform the Presiding Officer, which compromised ballot secrecy.

Supreme Court Judgment (2013)

- The Court directed the Election Commission of India (ECI) to include a NOTA option in Electronic Voting Machines (EVMs).
- Aim: Strengthen voter choice and democratic participation.

Key Features of NOTA

Feature	Details
Purpose	Allows voters to formally reject all candidates
Secrecy	Preserves secret ballot, unlike Rule 49-O
Vote Counting	NOTA votes are counted but treated as invalid in determining the winner
Electoral System	India follows First-Past-The-Post (FPTP)
Applicability	Used in Lok Sabha and State Assembly elections
Exception	Not allowed in Rajya Sabha elections (SC ruling, 2018)

Mains Question: "The introduction of the None of the Above (NOTA) option was intended to enhance democratic participation and improve candidate quality." Critically examine its effectiveness in the Indian electoral system.

17. Freebies vs Welfare: Supreme Court Flags Fiscal & Productivity Risks



The Supreme Court criticised indiscriminate election-linked freebies, warning that universal handouts may weaken labour participation and productivity culture. The Court emphasised prioritising development spending and targeted welfare schemes over unsustainable populist subsidies.

Freebies vs Welfare

Aspect	Welfare Schemes	Freebies
Nature	Structural social investment	Short-term populist benefit
Objective	Human capital development	Electoral appeal
Examples	Education, health, skill development	Free consumer goods or utilities
Economic Impact	Enhances productivity and long-term growth	May create fiscal burden

Constitutional and Legal Framework

Provision / Case	Key Idea
Articles 38 & 39 (DPSP)	Mandate the State to reduce inequalities and promote welfare
Article 282	Allows governments to spend funds for public purposes
FRBM Act	Sets limits on fiscal deficit and debt levels
S. Subramaniam Balaji v. State of Tamil Nadu (2013)	Supreme Court held that manifesto promises are not "corrupt practices" under the Representation of the People Act, 1951

Arguments in Favour of Freebies	Arguments Against Freebies
Social Safety Net: Subsidies and transfers protect vulnerable populations from poverty	Fiscal Stress: Excessive subsidies increase debt and fiscal deficit
Capability Expansion: Improves access to education, mobility, and opportunities	Crowding Out Capex: Reduces investment in infrastructure and long-term growth
Demand Stimulus: Raises disposable income, boosting consumption and economic activity	Electoral Distortion: Encourages competitive populism affecting decision-making
Market Correction: Addresses agrarian distress and unemployment in weak markets	Resource Mispricing: Leads to overuse (e.g., groundwater depletion, DISCOM losses)
Equity Promotion: Helps reduce regional and social inequalities	Credit Discipline Issues: Loan waivers weaken repayment culture and financial stability

18. Administrative Scorecards Introduced to Evaluate Union Secretaries



The Cabinet Secretariat introduced 'administrative scorecards' to evaluate the performance of Union Secretaries for the first time. The initiative aims to reduce administrative delays and strengthen accountability, aligning with the government's "Minimum Government, Maximum Governance" vision.

Key Features of the Assessment Framework

Feature	Details
Evaluation Scale	Performance assessed on a 100-mark scale
Core Indicators	File disposal rate, scheme expenditure, grievance redressal efficiency
Highest Weightage	File disposal (20%) to ensure faster decision-making
Negative Marking	Penalties for delayed MSME payments or excessive foreign visit expenditure
Discretionary Marks	Cabinet Secretary may award marks for innovation or exceptional contributions
Benchmarking	Departments can compare current performance with past records and other ministries

Objectives of the Reform

- **Reduce Bureaucratic Delays:** Ensure faster movement of files and decisions.
- **Strengthen Accountability:** Make senior officials responsible for measurable outcomes.
- **Promote Performance-Based Governance:** Shift from qualitative reporting to quantitative evaluation.
- **Improve Administrative Efficiency:** Encourage better utilisation of resources and schemes.

Mains Question : "Performance-based evaluation systems are increasingly being adopted to improve administrative efficiency." Examine the potential benefits and challenges of introducing performance scorecards for senior civil servants in India. (15 Marks)

19. Rashtriya Karmayogi Programme Expands Civil Service Capacity Building



The **Rashtriya Karmayogi Large Scale Jan Seva Programme (Phase-II)** concluded under the **Ministry of Personnel, Public Grievances and Pensions**. The initiative, implemented by the **Capacity Building Commission (CBC)** under **Mission Karmayogi**, aims to transform the behaviour and capacity of civil servants.

Rashtriya Karmayogi Large Scale Jan Seva Programme

- A **national behavioural transformation initiative** designed to strengthen citizen-centric governance.
- It seeks to instil “**Seva Bhav**” (spirit of service) and “**Svadharm**” (sense of duty) among government officials.
- The programme emphasises a shift from **rule-based administration to role-based and purpose-driven governance**.

Implementation Phases

Phase	Period	Coverage
Phase I	January 2025	Officials in Delhi-NCR
Phase II	April 2025 – February 2026	Expanded nationwide to organisations under Central Ministries

Scale: Around 10.5 lakh government servants trained across India.

Key Features of Mission Karmayogi

Feature	Description
Digital Platform	iGOT Karmayogi enables training anytime and anywhere
Competency Framework	Uses Framework of Roles, Activities, and Competencies (FRAC)
Institutional Structure	Includes PM’s Public Human Resources Council, Capacity Building Commission, Karmayogi Bharat SPV, and a Coordination Unit
Training Ecosystem	Encourages continuous learning across ministries

Mains Question : “Mission Karmayogi represents a paradigm shift from rule-based administration to competency-driven governance.” Examine its significance in improving the effectiveness of India’s civil services. (15 Marks)

20. SC Warns States on Delays in DGP Appointments



The Supreme Court directed the UPSC to take action against State governments that delay appointing Directors General of Police (DGPs). The Court reiterated that appointing acting or ad hoc DGPs violates the guidelines laid down in the *Prakash Singh v. Union of India (2006)* judgment.

Background: Prakash Singh Case (2006)

- A landmark **Supreme Court judgment on police reforms** aimed at insulating the police from **political interference**.
- The Court issued **seven binding directives**, including transparent DGP appointments and fixed tenure.

Key Directions of the Supreme Court

Directive	Explanation
Contempt Authorisation	UPSC may initiate contempt proceedings if States delay sending proposals
Direct Communication	UPSC can directly write to defaulting State governments demanding proposals
Ad hoc Appointment Ban	Appointment of "Acting" or temporary DGPs discouraged
Compliance Enforcement	Reaffirmation of 2006 Prakash Singh police reform guidelines

Procedure for Appointment of State DGP

Stage	Process
Proposal Submission	State governments submit list of eligible IPS officers 3 months before DGP retirement
Empanelment Committee	Chaired by UPSC Chairman
Committee Members	Union Home Secretary, State Chief Secretary, outgoing DGP, and a CAPF head nominated by MHA
Panel Preparation	UPSC prepares a panel of three senior officers
Final Appointment	State government appoints one officer from the UPSC panel

Eligibility Criteria for DGP

- Must be of **Additional Director General (ADG) rank**.
- **Minimum 25 years of service in the IPS**.
- **At least 6 months of residual service remaining**.

Minimum 10 years of experience in critical policing areas, including law and order

Tenure Security

- Once appointed, the **DGP must serve a minimum fixed tenure of two years**, even if the officer reaches the retirement age during the period.

21. UIDAI Launches New Aadhaar App for Secure Digital Identity Sharing



The Unique Identification Authority of India (UIDAI) launched a new Aadhaar mobile application to simplify identity verification and enhance digital privacy. The app enables secure sharing of limited Aadhaar details and offline verification through encrypted QR codes, aligned with the Digital Personal Data Protection (DPDP) Act, 2023.

About Aadhaar

- Aadhaar is a 12-digit unique identity number issued by the UIDAI, based on biometric and demographic data of residents of India.
- It functions as a digital identity framework used for authentication and delivery of government services.

Key Features of the New Aadhaar App

Feature	Description
Selective Data Sharing	Users can share only essential information, ensuring data minimisation
Offline Verification	Identity can be verified using encrypted QR codes, useful in low-connectivity areas
Multiple Profiles	Allows management of up to five Aadhaar profiles on one device ("One Family - One App")
Mobile Update Feature	Registered mobile numbers can be updated within the app for a nominal fee
Digital Contact Card	Aadhaar-based QR digital identity card enables sharing verified identity details
AI Face Authentication	Uses AI-powered face ID verification to prevent impersonation and identity fraud

Institutional Framework

Institution	Role
UIDAI	Statutory authority responsible for Aadhaar under the Aadhaar Act, 2016
Ministry	Functions under the Ministry of Electronics and Information Technology (MeitY)
DPDP Act, 2023	Ensures data protection, consent-based sharing, and privacy safeguards

Mains Question

"Digital identity systems can improve governance efficiency but raise privacy concerns." Examine the role of Aadhaar-based digital identity platforms in balancing service delivery and data protection in India. (15 Marks)

22. Denotified Tribes Demand Census Recognition and Constitutional Status



Denotified, Nomadic and Semi-Nomadic Tribes (DNTs) have demanded a separate Census column in 2027 and constitutional recognition through a distinct Schedule. The demand aims to address their historical stigma, lack of accurate enumeration, and exclusion from targeted welfare policies.

Who are Denotified Tribes (DNTs)?

- **Denotified Tribes** are communities that were labelled as “criminal tribes” under the **Criminal Tribes Act, 1871** during British rule.
- The colonial law presumed certain communities to be **hereditary criminals** and subjected them to surveillance and restrictions.
- After Independence, the **Criminal Tribes Act was repealed in 1952** following the recommendations of the **Ayyangar Committee**, and these communities were “denotified.”
- However, several states enacted the **Habitual Offenders Act**, which continued similar policing practices.

Aspect	Details
Total Communities	Around 1,500 DNT, Nomadic and Semi-Nomadic groups across India
Unclassified Groups	About 267 communities remain outside SC/ST/OBC categories (Idate Commission, 2017)
SEED Scheme Utilisation	Only ₹69.3 crore of ₹200 crore allocated funds utilised due to identification issues

Need for Separate Recognition

- **Historical Stigmatisation:** Colonial branding as “criminal tribes” created enduring **social discrimination and police prejudice**.
- **Policy Exclusion:** Several communities remain outside **reservation categories and welfare benefits**.
- **Administrative Blind Spot:** Lack of **reliable population data** hinders policy planning and resource allocation.
- **Implementation Gap:** Poor identification has led to **underutilisation of targeted schemes** such as the **SEED Scheme**.

Mains Question

“Denotified, Nomadic and Semi-Nomadic Tribes remain among the most marginalised communities in India.” Examine the historical reasons for their exclusion and discuss the need for constitutional and policy recognition. (15 Marks)

23. Film Certification Faster: CBFC Cuts Approval Time to 18 Days



The Central Board of Film Certification (CBFC) reduced the film certification processing time to 18 working days, significantly lower than the statutory limit of 48 working days under the Cinematograph Act, 1952. The move aims to improve efficiency in the film certification process.

About Central Board of Film Certification (CBFC)

- The CBFC is a **statutory body** responsible for regulating the **public exhibition of films in India**.
- It functions under the **Ministry of Information and Broadcasting (MIB)**.
- Any film must obtain a **certificate from the CBFC before public screening in cinemas or on television**.

Legal Framework

Aspect	Details
Parent Legislation	Cinematograph Act, 1952
Constitutional Basis	Reflects reasonable restrictions on freedom of speech under Article 19(2)
Purpose	Regulate film exhibition while balancing creative freedom and public order concerns

Structure of CBFC

Component	Description
Composition	Chairperson + 12-25 members
Appointment	Appointed by the Central Government
Tenure	Three years
Headquarters	Mumbai
Regional Presence	9 regional offices across India
Support System	Advisory Panels assist certification decisions

Types of Film Certification


Certificate	Meaning
U	Unrestricted public exhibition
UA	Parental guidance for children below 12
A	Restricted to adults
S	Restricted to a specific professional group

(The Cinematograph Amendment Act, 2023 also introduced age-based UA categories such as UA 7+, UA 13+, and UA 16+.)

Recent Institutional Changes : The **Film Certification Appellate Tribunal (FCAT)**, which earlier heard appeals against CBFC decisions, was **abolished in 2021**.

Filmmakers must now approach **High Courts** for legal remedies.

24. Centre Blocks OTT Platforms Over Obscene Content

 The Ministry of Information and Broadcasting (MoIB) blocked five OTT platforms for allegedly streaming **obscene and vulgar content**. The action was taken under **Section 69A of the IT Act, 2000 and the IT Rules, 2021**, highlighting regulatory scrutiny over digital streaming platforms.

Legal Basis for Blocking Online Content

Provision	Key Features
Section 69A, IT Act 2000	Empowers the Central Government to block online content in the interest of sovereignty, defence, national security, friendly relations with foreign states, public order, or prevention of cognizable offences
IT Rules, 2021	Require digital intermediaries and OTT platforms to follow due diligence and a Code of Ethics
Safe Harbour Principle	Intermediaries retain protection from liability only if they comply with government rules

Note: Section 69A does **not explicitly mention obscenity**, creating a legal debate over its scope

Obscenity Laws in India

Law / Provision	Key Provision
Bharatiya Nyaya Sanhita (BNS), 2023 - Section 294	Penalises sale or distribution of obscene material
BNS - Section 296	Punishes obscene acts or songs in public places
IT Act, 2000 - Section 67	Punishes publication or transmission of obscene material in electronic form
IT Act - Section 67A	Prescribes stricter punishment for sexually explicit content
IT Act - Section 67B	Criminalises child sexual abuse material (CSAM)
Indecent Representation of Women Act, 1986	Prohibits derogatory depiction of women in media

Regulation of OTT Platforms

- IT Rules, 2021 introduced a **three-tier grievance redressal mechanism**:
 - Self-regulation by OTT platforms
 - Self-regulatory bodies of publishers
 - Oversight mechanism by the Government
- Platforms must comply with a **Code of Ethics**, including **age classification and content warnings**.

25. Global Corruption Watch: CPI 2025 Signals Declining Transparency



Transparency International released the Corruption Perceptions Index (CPI) 2025, a global ranking that measures perceived levels of public-sector corruption. The report shows a global average score of 42, with India ranked 91st with a score of 39.

About Corruption Perceptions Index (CPI)

- The Corruption Perceptions Index (CPI) is the most widely used global indicator of perceived public-sector corruption.
- It is published annually by Transparency International, a global anti-corruption organisation.
- The index measures corruption perception among politicians and public officials.

Methodology

Feature	Details
Countries Covered	182 countries and territories
Score Range	0 (highly corrupt) - 100 (very clean)
Data Sources	Aggregates 13 datasets and surveys
Institutions Used	Includes data from organisations like the World Bank, World Economic Forum, and other governance surveys

Key Findings of CPI 2025

Indicator	Observation
Global Average	42, the lowest recorded average
Countries Below 50	Over two-thirds of nations scored below 50
Top Performers	Denmark (89), Finland (88), Singapore (84)
Lowest Ranked	South Sudan and Somalia
Democracy Concerns	Declines recorded in USA, UK, and Canada due to weakened institutional oversight
Asia-Pacific Trend	Stagnation in anti-corruption progress

Mains Question: "Corruption perceptions significantly influence governance outcomes and economic development." Examine the significance and limitations of global indices such as the Corruption Perceptions Index in evaluating corruption. (15 Marks)

26. Industrial Relations Code Amendment Bill 2026 Introduced to Clarify Labour Law Repeal

On 11 February 2026, the Union Minister for Labour and Employment introduced the Industrial Relations Code (Amendment) Bill, 2026 in the Lok Sabha. The Bill seeks to clarify that earlier labour laws were automatically repealed under Section 104 of the Industrial Relations Code, 2020, avoiding legal ambiguity.

Background: Labour Code Reforms in India

- India consolidated 29 central labour laws into four labour codes to simplify compliance and improve labour market efficiency.
- The Industrial Relations Code, 2020 is one of the four major labour codes aimed at regulating trade unions, industrial employment, and dispute resolution.

Four Labour Codes

Labour Code	Focus Area
Code on Wages, 2019	Minimum wages, wage payment and equal remuneration
Industrial Relations Code, 2020	Trade unions, industrial disputes and employment conditions
Code on Social Security, 2020	Social security benefits for workers
Occupational Safety, Health and Working Conditions Code, 2020	Workplace safety and working conditions

Labour Laws Replaced by the Industrial Relations Code, 2020

Repealed Law	Year	Subject
Trade Unions Act	1926	Registration and functioning of trade unions
Industrial Employment (Standing Orders) Act	1946	Conditions of employment in industrial establishments
Industrial Disputes Act	1947	Mechanisms for industrial dispute resolution

Mains Question

“Labour law consolidation through labour codes represents a major structural reform in India’s labour governance.” Examine the objectives and challenges of the Industrial Relations Code, 2020.

27. PAC Flags Underutilisation of Funds in SANKALP Skill Development Scheme



The Public Accounts Committee (PAC) criticised the **slow implementation and underutilisation of funds in the SANKALP scheme**, citing findings from a **Comptroller and Auditor General (CAG) report**. The observations highlight concerns about the effectiveness of India's **skill development initiatives**.

About the SANKALP Scheme

- SANKALP (Skill Acquisition and Knowledge Awareness for Livelihood Promotion) is a **Centrally Sponsored Scheme** under the **Ministry of Skill Development and Entrepreneurship (MSDE)**.
- It was **launched in 2018** to strengthen India's skill development ecosystem and improve industry-relevant training.

Duration

- Originally scheduled: **2018–March 2023**

Extended: **Till March 2025** due to implementation delays.

Objectives

- Strengthen **institutional frameworks for skill development**.
- Improve **short-term vocational training quality**.
- Build stronger **industry linkages** to enhance employability.

Funding Mechanism

Feature	Details
Funding Model	World Bank-assisted programme
Instrument Used	Program for Results (PforR)
Disbursement Method	Funds released only after achieving Disbursement Linked Indicators (DLIs)

Role of CAG and PAC

Institution	Role
Comptroller and Auditor General (CAG)	Constitutional authority auditing public finances; known as the "Guardian of the Public Purse"
Public Accounts Committee (PAC)	Parliamentary committee examining CAG audit reports and government expenditure

Mains Question : "Skill development programmes are central to India's demographic dividend strategy." Examine the role of schemes like SANKALP in strengthening India's vocational ecosystem. Also discuss the implementation challenges highlighted by oversight institutions. (15 Marks)

FEBRUARY 2026

INTERNATIONAL AFFAIRS

1. India-Tanzania 4th Joint Defence Cooperation
2. PM Modi's Official Visit to Malaysia
3. India and Seychelles Adopted the Joint Vision for SESEL
4. India-Greece Joint Declaration
5. India-France Ties Upgraded
6. India-France Defence Cooperation Gets 10-Year Extension
7. India-Brazil Increases Bilateral Trade Target to \$30 Billion
8. India-Israel Elevated Bilateral Ties to Special Strategic Partnership
9. Diplomatic Reset in India-Canada Relations
10. India-Germany Climate Resilience Initiative
11. 2nd India-Arab Foreign Ministers' Meeting Adopted Delhi Declaration 2026
12. India Joins BRICS Centre for Industrial Competencies (BCIC)
13. India Signs MoU with the World Food Programme (WFP)
14. International Energy Agency (IEA)
15. India Joins Board of Peace as an Observer
16. FTA with the Gulf Cooperation Council (GCC)
17. UAE-India Corridor
18. Evolving Architecture of Contemporary Trade Agreements
19. U.S. Supreme Court Struck Down President Trump's Global Tariffs
20. 15% Global Import Surcharge under Trade Act, 1974
21. Chabahar Port
22. US-Russia Nuclear Arms Control Crisis
23. Khorramshahr-4 Ballistic Missile
24. Sayyad-3G Missile
25. Fissile Material Cut-off Treaty (FMCT)
26. Ethiopia-Eritrea Conflict
27. Pakistan Declares 'Open War' on Afghan Taliban
28. Accelerating Electricity Demand Growth
29. U.S.A. Launched 'Project Vault' to Stockpile Critical Minerals
30. India and the UK Launched Offshore Wind Taskforce
31. Cybercrime and the Crisis of Global Governance
32. Development Aid Cuts and Global Health Crisis
33. Power Gap Index
34. Global Teacher Prize 2026 Awarded at World Government Summit
35. BNP Secures Victory in Parliamentary Election
36. Jeju Island
37. FORGE Initiative
38. Takeshima Dispute *



1. India–Tanzania Defence Ties Strengthen at 4th JDCC Meeting



India and Tanzania held the **4th Joint Defence Cooperation Committee (JDCC) meeting** in Zanzibar to deepen bilateral defence and security cooperation. The meeting focused on **maritime security, emerging technologies, and defence industry collaboration.**

Joint Defence Cooperation Committee (JDCC)

The JDCC is an institutional mechanism for **reviewing and expanding defence cooperation between India and Tanzania.**

Key Highlights of the 4th JDCC Meeting

Area	Outcome
Air Force Cooperation	Agreement to initiate collaboration between the two Air Forces
Emerging Technologies	Focus on Artificial Intelligence (AI), Cyber Security, and Electronic Warfare
New Engagement Areas	Military medicine identified as a new cooperation domain
Counter-terrorism	Expanded training collaboration
Maritime Security	Review of Indian Ocean security cooperation

India–Tanzania Defence Cooperation

Area	Details
Defence roadmap	Five-year defence roadmap (2023–2027)
Maritime cooperation	Joint EEZ surveillance operations
Military exercise	India–Tanzania–Mozambique trilateral exercise (IMT-TRILAT)
Service-to-service cooperation	Collaboration between naval, army, and air forces

This partnership supports maritime stability in the Indian Ocean Region (IOR).

SAGAR Vision

India’s cooperation with Tanzania aligns with the **SAGAR (Security and Growth for All in the Region)** vision which promotes:

- **Maritime security cooperation**
- **Blue economy development**

Regional capacity building



2. India–Malaysia Relations Deepen During PM Modi’s Official Visit

Prime Minister Narendra Modi concluded a **two-day official visit to Malaysia**, aimed at strengthening the **India–Malaysia Comprehensive Strategic Partnership**. The visit resulted in agreements across **defence cooperation, digital technology, semiconductor supply chains, labour welfare, and disaster management**.

Key Outcomes of the Visit

Defence and Security Cooperation

Area	Outcome
Su-30 Forum	Joint technical cooperation for maintenance and upgrades of Sukhoi-30 fleets
Strategic Planning	Strategic Affairs Working Group under Malaysia India Defence Cooperation Committee (MIDCOM)
Security Dialogue	Institutionalised Malaysia–India Security Dialogue
Anti-Corruption Cooperation	MoU signed to combat financial crimes and transnational corruption
National Security Exchange	Exchange of Notes on cooperation in sensitive security matters

Economy and Technology Partnership

Initiative	Details
Malaysia–India Digital Council (MIDC)	Cooperation in AI, Fintech, and Digital Public Infrastructure (DPI)
Payment Connectivity	Linking India’s Unified Payments Interface (UPI) with Malaysia’s PayNet
Local Currency Trade	Trade settlement using INR and Malaysian Ringgit
Semiconductor Cooperation	Partnership between IIT Madras and Malaysia’s semiconductor academy

Social, Cultural and Welfare Cooperation

Sector	Initiative
Worker welfare	Agreement between ESIC and PERKESO ensuring social security benefits for Indian workers
Cultural exchange	Establishment of Thiruvalluvar Centre for Indian Studies at Universiti Malaya
Film collaboration	Audio-visual co-production agreement for joint film production
Healthcare cooperation	Mutual recognition of drug regulation and pharmacopoeia standards
Disaster management	MoU on search-and-rescue cooperation and disaster resilience
Wildlife conservation	Malaysia joined the International Big Cat Alliance (IBCA)

3. India–Seychelles SESEL Vision: Deepening Strategic Partnership in the Indian Ocean



India and Seychelles released a joint strategic document titled “**India–Seychelles Joint Vision for Sustainability, Economic Growth and Security through Enhanced Linkages (SESEL)**”. The announcement coincided with the **50th anniversary of diplomatic relations** during the visit of Seychelles President **Patrick Herminie** to New Delhi.

Key Highlights of the SESEL Vision

Area	Outcome
Regional Security	Seychelles joined the Colombo Security Conclave (CSC) as a full member
Disaster Resilience	Seychelles agreed to join the Coalition for Disaster Resilient Infrastructure (CDRI)
Development Finance	India announced a \$175 million economic package, including a \$50 million grant
Blue Economy	Creation of a Seychelles Hydrographic Unit (SHU) with Indian support
Healthcare Cooperation	Seychelles recognised Indian Pharmacopoeia (IP) for generic medicines
Digital Cooperation	Adoption of India’s Digital Public Infrastructure (DPI) model

About India–Seychelles Relations

Dimension	Details
Location	Western Indian Ocean near the Mozambique Channel
Policy framework	Key partner in India’s SAGAR (Security and Growth for All in the Region) vision
Maritime security	Cooperation in monitoring sea lines of communication (SLOCs)

Area	Details
Maritime security	India acts as a net security provider
Military assistance	India gifted patrol vessel PS Zoroaster
Surveillance	Installation of Coastal Surveillance Radar Systems
Joint exercise	Lamitiye (counter-piracy and counter-terrorism exercise)

Mains Practice Question : Small island nations in the Indian Ocean play a significant role in India’s maritime strategy. Analyse the importance of India–Seychelles relations in the context of India’s SAGAR vision.

4. India–Greece Defence Industrial Cooperation Pact



India and **Greece** signed a **Joint Declaration of Intent for Defence-Industrial Cooperation**, marking a new phase in their **Strategic Partnership**. The agreement focuses on **defence manufacturing collaboration, maritime security, and technological cooperation**.

Key Features of the Joint Declaration

Area	Outcome
Defence Industrial Cooperation	Collaboration in defence manufacturing and technology development
Five-Year Roadmap	Align India’s Aatmanirbhar Bharat defence manufacturing initiative with Greece’s Agenda 2030 defence reforms
Maritime Security	Greece will deploy a liaison officer at the Information Fusion Centre Indian Ocean Region (IFC-IOR)
Operational Coordination	Improved information sharing for maritime domain awareness

About Information Fusion Centre - Indian Ocean Region (IFC-IOR)

Feature	Details
Location	Gurugram
Established by	Indian Navy
Function	Maritime information sharing and monitoring of the Indian Ocean Region (IOR)
Objective	Enhance maritime domain awareness and regional security cooperation

India–Greece Bilateral Relations

The relationship was elevated to a **Strategic Partnership in 2023** during the visit of **Narendra Modi** to Greece.

Economic Relations

Indicator	Details
Bilateral trade	\$1.4 billion (FY 2024–25)
Trade target	Double trade by 2030
Trade balance	Strongly in India’s favour

Diplomatic Convergence

Issue	Position
Kashmir issue	Greece supports India’s stance
UN Security Council	Greece backs India’s bid for permanent membership
Cyprus issue	India supports Greece

5. India–France Ties Elevated to a Special Global Strategic Partnership



Emmanuel Macron visited **India** on a three-day official trip in 2026. During the visit, both countries **elevated their relationship to a “Special Global Strategic Partnership”**, signalling deeper cooperation in **defence, Indo-Pacific security, technology, and innovation.**

Key Outcomes of Macron’s 2026 Visit

Sector	Initiative
Diplomatic elevation	Relationship upgraded to Special Global Strategic Partnership
Institutional mechanism	Annual Foreign Ministers Dialogue to monitor Horizon 2047 roadmap
Defence production	Joint venture between Bharat Electronics Limited and Safran to manufacture HAMMER missiles in India
Military interoperability	Deployment of liaison officers between Indian Army and French Land Forces
Skill development	National Centre of Excellence for Aeronautics Skilling
Tax cooperation	Protocol amending Double Taxation Avoidance Agreement (DTAA)
Digital collaboration	Launch of Indo-French Centre for Digital Sciences
Postal logistics	Partnership between India Post and La Poste
Innovation ecosystem	Launch of India-France Year of Innovation 2026
AI healthcare cooperation	Indo-French Centre for AI in Health at AIIMS New Delhi
Mobility agreement	Five-year Schengen visa facility for Indian Master’s graduates from France

Evolution of India–France Relations

Phase	Development
1998	First Strategic Partnership established
2023	Horizon 2047 Roadmap announced (25 years of partnership)
2026	Upgraded to Special Global Strategic Partnership

Mains Practice Question

India and France share one of the most stable strategic partnerships in the Indo-Pacific region. Analyse the evolving dimensions of India–France cooperation in defence, technology, and global governance. (10 Marks)

6. India–France Defence Pact Extended for 10 Years



India and **France** renewed their **Defence Cooperation Agreement (DCA)** for another **10 years** during the **6th India–France Annual Defence Dialogue** held in **Bengaluru**. The move aims to transform the bilateral relationship from a **buyer–seller model** into a **long-term defence-industrial partnership**.

Key Outcomes of the 6th Defence Dialogue

Area	Outcome
Agreement renewal	Defence Cooperation Agreement extended for 10 years
Industrial partnership	Focus on co-development and defence manufacturing
Indigenisation demand	India requested 50% indigenous content in the proposed 114 Rafale jets
Maintenance ecosystem	Proposal to establish local MRO (Maintenance, Repair & Overhaul) facilities for French aero engines in India

About the Defence Cooperation Agreement (DCA)

Feature	Details
Year	2006
Strategic foundation	Built upon the 1998 India–France Strategic Partnership
Objective	Institutionalise defence cooperation across military, technology and industry

Major Components of the Defence Cooperation Framework

Technology Transfer

Project	Details
Project 75 Scorpene Submarine Programme	India built six Scorpene submarines using French technology

Institutional Oversight Mechanism

Institution	Role
High Committee on Defence Cooperation (HCDC)	Oversees defence collaboration, technology transfer and industrial partnerships
Leadership	Headed by Defence Secretaries of both countries

Mains Practice Question : India’s defence cooperation with France has evolved from a buyer–seller relationship into a strategic industrial partnership. Examine the significance of this shift for India’s defence modernisation and strategic autonomy. (10 Marks)

7. India–Brazil Strategic Push: Trade, Aviation & Critical Minerals Cooperation



Prime Minister Narendra Modi met Luiz Inacio Lula da Silva on the sidelines of the AI Impact Summit in New Delhi. Both countries agreed to **strengthen strategic cooperation and counter rising global trade protectionism**, with a focus on **trade expansion, defence cooperation, aviation manufacturing, and critical minerals supply chains**.

Key Outcomes of the Meeting

Area	Outcome
Trade expansion	Target to increase bilateral trade to \$30 billion by 2030
Aviation manufacturing	Embraer and Adani Defence and Aerospace to establish E175 regional jet assembly line and MRO facility in India
Naval cooperation	Agreement between Mazagon Dock Shipbuilders Limited, Indian Navy and Brazilian Navy to exchange technical data on Scorpene submarines
Pharmaceutical cooperation	MoU between Central Drugs Standard Control Organisation (CDSCO) and National Health Surveillance Agency

India–Brazil Critical Minerals Pact

Objective	Details
Supply diversification	Secure minerals for EVs, defence, and steel industries
Key minerals covered	Rare earths, lithium, graphite, niobium, nickel
Upstream investment	Indian firms allowed to acquire mining assets in Brazil
Joint exploration	Collaboration in geoscientific surveys and mineral processing

Strategic Mineral Advantage of Brazil

Mineral Resource	Significance
Niobium	Brazil holds 94% of global reserves
Iron ore	Second-largest producer globally
Other minerals	Major deposits of manganese and rare earth elements

Mercosur Trade Engagement

India and Brazil are working to expand the India Mercosur Preferential Trade Agreement (PTA).

Mercosur Members

Brazil

Argentina

Paraguay

Uruguay

Objectives of Expansion

Reduce agricultural non-tariff barriers

Increase market access for Indian exports

8. India–Israel Relations Upgraded to a *Special Strategic Partnership*



Prime Minister **Narendra Modi** completed his **second State Visit to Israel**, after his historic first visit in **2017**. During the visit, India and Israel **elevated their ties to a “Special Strategic Partnership for Peace, Innovation and Prosperity.”**

Key Outcomes of PM Modi’s Visit

Sector	Outcome
Diplomatic elevation	Bilateral ties upgraded to Special Strategic Partnership
Parliamentary honour	PM Modi received the Speaker of the Knesset Medal, the highest honour of the Israeli Parliament
Historic address	First Indian Prime Minister to address the Knesset
Digital payments	Unified Payments Interface (UPI) to be operational in Israel
Labour mobility	Israel to recruit 50,000 Indian workers over five years
Financial cooperation	Launch of India–Israel Financial Dialogue for fintech collaboration
Cybersecurity cooperation	Establishment of Indo-Israel Cyber Centre of Excellence in India
Agricultural innovation	Creation of India-Israel Innovation Centre for Agriculture (IINCA)
Rural development	Expansion of Villages of Excellence programme for modern agriculture
Emerging technologies	NSA-led initiative on Critical and Emerging Technologies (CET)
Multilateral cooperation	Commitment to advance India Middle East Europe Economic Corridor (IMEC) and strengthen I2U2
Academic cooperation	Launch of India–Israel Academic Cooperation Forum (I2I Forum)

Agricultural Cooperation

India–Israel agricultural cooperation is one of the most successful aspects of bilateral ties.

Programme	Purpose
Centres of Excellence (CoEs)	Transfer of Israeli technologies such as drip irrigation and protected cultivation
Villages of Excellence	Scaling Israeli best practices to Indian villages
IINCA	Promote precision agriculture, satellite irrigation monitoring, and climate-resilient farming

Mains Practice Question : India–Israel relations have evolved from defence cooperation to a comprehensive technology partnership. Analyse the significance of this transformation for India’s economic and strategic interests. (10 Marks)

9. India–Canada Diplomatic Reset After 2023 Crisis



The visit of **Mark Carney** to **India** signalled a **formal reset in India–Canada relations** after the diplomatic crisis triggered by the **2023 Nijjar assassination allegations**. Both countries have initiated steps to **restore diplomatic channels, revive trade talks, and enhance security cooperation**.

The crisis began when the Canadian government linked Indian agents to the killing of **Hardeep Singh Nijjar**, a claim strongly rejected by India.

Major Factors Behind the Diplomatic Rift

Factor	Explanation
Vote-bank politics	Canada’s perceived tolerance of Khalistani separatist groups strained relations
Policy divergence	Differences on terrorism, free speech and human rights
Intelligence tensions	Escalation through involvement of the Five Eyes Intelligence Alliance
Migration friction	Canada introduced visa caps, while India temporarily suspended e-visa services
Extradition disputes	Canada did not act on Interpol Red Corner Notices issued by India

Key Developments in the Diplomatic Reset

Area	Development
Political relations	Reinstatement of High Commissioners in both countries
Trade engagement	Revival of negotiations on the Comprehensive Economic Partnership Agreement India Canada (CEPA)
Business cooperation	Revival of the India–Canada CEO Forum
Security cooperation	Renewal of NSA-level dialogue on intelligence sharing and counter-terrorism
Technology partnership	Collaboration on Artificial Intelligence, critical minerals and Digital Public Infrastructure (DPI)
Energy cooperation	Re-establishment of Canada India Ministerial Energy Dialogue (CIMED) and long-term uranium supply agreements

Strategic Importance of Canada for India

Dimension	Significance
Indian diaspora	Canada hosts one of the largest Indian-origin populations globally
Critical minerals	Canada is a key supplier of lithium, cobalt, and nickel
Energy security	Canada is a major supplier of uranium for India’s nuclear power sector
Education hub	Canada is among the top destinations for Indian students

10. India–Germany Climate Resilience Initiative under IKI



Germany announced a €20 million grant for India under the **International Climate Initiative (IKI)** to strengthen **ecosystem-based climate resilience** across vulnerable ecological regions.

About the International Climate Initiative (IKI)

Feature	Details
Launch	Initiated in 2008 by the Government of Germany
Nature	Flagship international climate finance instrument
Objective	Support climate mitigation and climate adaptation in developing and emerging economies
Global Alignment	Linked with commitments under the Paris Agreement and the Convention on Biological Diversity (CBD)
Funding Source	Germany's federal budget and climate-related revenue streams
Geographical Coverage	Projects across Asia, Africa and Latin America

Key Features of the India–Germany Climate Resilience Initiative

The initiative targets **high climate-risk ecosystems in India.**

11. 2nd India-Arab Foreign Ministers' Meeting Adopted Delhi Declaration 2026



The **2nd India-Arab Foreign Ministers' Meeting**, held in **New Delhi**, adopted the **Delhi Declaration 2026** to strengthen cooperation between **India** and the **Arab world**. The meeting was **co-chaired by India and the United Arab Emirates**, with participation from foreign ministers of Arab states and the Secretary-General of the **League of Arab States**.

Key Takeaways of the Delhi Declaration 2026

Counter-Terrorism Cooperation

- The declaration **explicitly condemned the Pahalgam terror attack**.
- It emphasised a **zero-tolerance approach to cross-border terrorism**.
- Ministers endorsed the **Algeria Guiding Principles** to combat terror financing through new technologies.

Maritime and Blue Economy Cooperation

The Arab side introduced the **STREAM initiative**.

STREAM Initiative

Suez Canal-Red Sea Economic and Maritime Development Initiative

Objectives

- Improve **maritime safety**
- Promote **blue economy development**
- Restore **secure navigation routes** in the Red Sea region

About the League of Arab States

Feature	Details
Establishment	1945
Headquarters	Cairo
Members	22 Arab states
Decision-making body	Council of the League (each state has one vote)

Key Characteristics

- Formed to promote **Arab unity and independence**.
- Membership is based on **Arabic linguistic and cultural identity**.
- Countries such as **Iran, Turkey, and Pakistan** are excluded due to linguistic differences.

African Arab Members

- **Somalia, Djibouti, Comoros**

These are members despite their distance from the Arabian Peninsula because **Arabic is a major language**.

12. India Joins BRICS Centre for Industrial Competencies (BCIC)



India has joined the **BRICS Centre for Industrial Competencies (BCIC)** to strengthen its manufacturing ecosystem and support **Micro, Small and Medium Enterprises (MSMEs)**.

The **Department for Promotion of Industry and Internal Trade (DPIIT)** signed a **Trust Fund Agreement** with the **United Nations Industrial Development Organization (UNIDO)** to facilitate India's participation.

Key Institutional Arrangements

Institution	Role
DPIIT	Signed Trust Fund Agreement with UNIDO
National Productivity Council (NPC)	Designated as the nodal India Centre
UNIDO	Provides technical support and coordination
BCIC	Platform for industrial technology cooperation among BRICS nations

About the BRICS Centre for Industrial Competencies (BCIC)

Feature	Details
Establishment	2025
Initiators	BRICS countries in collaboration with UNIDO
Headquarters	Vienna, Austria
Core Objective	Strengthen Industry 4.0 competencies in BRICS economies

Key Functions of BCIC

Industrial Modernisation

MSME Capacity Building

Global Competitiveness

BRICS and South-South Cooperation

BCIC reinforces **BRICS leadership in South-South cooperation** by promoting:

- Technology sharing
- Industrial innovation
- Sustainable industrialisation

This aligns with the broader BRICS goal of **reducing technological dependence on developed economies**.

13. India–WFP MoU: Strengthening Global Food Security



The Food Corporation of India (FCI) signed a **Memorandum of Understanding (MoU)** with the **World Food Programme (WFP)** to support **global humanitarian food assistance programmes**.

Under this agreement, India will supply **2 lakh metric tonnes of rice** to WFP over the next **five years**.

Key Features of the MoU

Feature	Details
Supply quantity	2 lakh metric tonnes of rice
Duration	Five years
Quality specification	Rice may contain up to 25% broken grain
Implementing agency	Food Corporation of India (FCI)
Purpose	Support WFP's global humanitarian food relief programmes

Significance

- Reinforces **India's role as a reliable global food supplier**
- Supports **international humanitarian assistance efforts**

Strengthens **India's contribution to global food security**

About the World Food Programme (WFP)

Feature	Details
Establishment	1961
Founded by	Joint initiative of Food and Agriculture Organization (FAO) and United Nations General Assembly (UNGA)
Headquarters	Rome
Nature	Largest global humanitarian organisation addressing hunger

WFP received the **Nobel Peace Prize 2020**

Key Functions of WFP

Function	Role
Emergency food assistance	Supports populations affected by conflicts and disasters
Nutrition programmes	Tackles child and maternal malnutrition
School feeding programmes	Provides meals to improve child nutrition and education outcomes
Humanitarian logistics	Supports emergency supply chains and humanitarian operations
Publishes	Global Report on Food Crises

14. State of Energy Innovation 2026 Report – International Energy Agency (IEA)



The **International Energy Agency (IEA)** recently released the “**State of Energy Innovation 2026**” report highlighting global trends in **clean energy technologies, innovation, and energy transition pathways.**

About the International Energy Agency (IEA)

Feature	Details
Establishment	1974
Background	Created in response to the 1973 global oil crisis
Nature	Autonomous intergovernmental organisation
Institutional framework	Works within the Organisation for Economic Co operation and Development (OECD)
Headquarters	Paris

Evolution of IEA’s Mandate

Initially, the agency focused mainly on **oil supply security**, but its scope has expanded significantly.

Phase	Focus Area
1970s–1990s	Oil supply security and energy markets
2000s onward	Energy efficiency and renewable energy
Recent focus	Net-zero transition, critical minerals, and clean technologies

Key Functions of the IEA

- Oil Supply Security
- Energy Transition and Climate Policy
- Energy Data and Research

Membership Structure

Category	Details
Full members	32 countries
Latest member	Colombia joined in 2026
Association countries	Non-OECD countries collaborating with IEA

Membership Criteria

To become a **full IEA member**, a country must:

1. Be a **member of the OECD**
2. Maintain **strategic oil reserves equal to 90 days of the previous year’s net imports**

15. India Joins the *Board of Peace* as an Observer



India participated as an **observer** at the inaugural meeting of the **Board of Peace** in Washington D C. India adopted a **calibrated observer role** to maintain **strategic autonomy**, avoiding full endorsement of a platform operating outside the **United Nations** system.

Observer Status: Meaning and Limits

Aspect	Explanation
Participation	Can attend meetings and discussions
Monitoring role	Observes diplomatic proceedings
Voting rights	Cannot vote on resolutions
Decision-making	Cannot participate in binding decisions

This allows India to **engage diplomatically without formal commitment**.

About the Board of Peace

Feature	Details
Establishment	January 2026
Origin	Announced at the World Economic Forum Annual Meeting Davos 2026
Membership	27 countries
Leadership	Permanent chairmanship by Donald Trump
Nature	Operates outside UN institutional frameworks

Key Features of the Board of Peace

Membership Requirement : Countries seeking **permanent membership** must contribute: **\$1 billion mandatory membership fee**

This fund supports the organisation's **peace operations and stabilisation missions**.

Gaza Peace Plan Mandate : Initially, the body was linked to the implementation of **United Nations Security Council Resolution 2803**.

Expanded Role

Its mandate now covers:

Conflict mediation

Post-conflict stabilisation

Peacekeeping coordination

16. India–GCC Free Trade Agreement Negotiations Resume



India and the Gulf Cooperation Council (GCC) are signing the Terms of Reference (ToR) to formally restart negotiations on a Free Trade Agreement (FTA). This step aims to strengthen trade, energy cooperation, and strategic connectivity between India and the Gulf region.

Background: India’s Bilateral Trade Pacts with GCC Members

Agreement	Partner Country	Year
Comprehensive Economic Partnership Agreement (CEPA)	United Arab Emirates	2022
CEPA	Oman	2025

About the Gulf Cooperation Council (GCC)

Feature	Details
Establishment	1981
Headquarters	Riyadh
Nature	Regional political and economic union of Arab states
Objective	Promote unity based on shared political, cultural, and Islamic identity

Member Countries

The GCC consists of six monarchies:

- Saudi Arabia
- United Arab Emirates
- Qatar
- Kuwait
- Oman
- Bahrain

Exception:

Iraq is the only Arab state bordering the Persian Gulf that is not a GCC member.

Security Framework

Peninsula Shield Force: The Peninsula Shield Force is the bloc’s joint defence arm.

Objective

- Deter external aggression

Maintain regional stability

Regional Mobility Initiative

GCC Grand Tours Visa

Approved in 2023, this is a Schengen-style visa system enabling travellers to visit multiple GCC countries with one visa.

Economic and Strategic Features of the GCC

Feature	Details
Oil reserves	Controls around 30% of global proven oil reserves
Customs Union	Established in 2003
Common Market	Launched in 2008
Free movement	GCC citizens can work, live, and own property across member states

17. UAE–India Corridor: A New Engine of Strategic Economic Growth

The UAE–India corridor is emerging as a major driver of **strategic economic growth**, combining **policy alignment, investment flows, and technological cooperation** between India and the United Arab Emirates.

The partnership is increasingly shaping **trade, investment, energy cooperation, and technology collaboration** across the Global South.

India–UAE Economic Upswing

Trade Expansion

Indicator	Details
Trade agreement	India UAE Comprehensive Economic Partnership Agreement (CEPA)
Trade target	\$100 billion by 2030
Achievement	Target achieved five years ahead of schedule
New target	\$200 billion trade by 2032

Financial Integration

Major financial developments include:

- **Emirates NBD** acquisition of **RBL Bank** (largest FDI in Indian banking)

DP World committing **\$5 billion** for Indian infrastructure projects

Regional Trade Platform

Bharat Mart

A new logistics and trade hub designed to serve:

- **Africa**
- **West Asia**
- **Eurasia**

This initiative is expected to **double India's exports to these regions**.

Energy Collaboration

The Abu Dhabi National Oil Company (ADNOC) signed **multi-billion-dollar LNG agreements** with:

- **Indian Oil Corporation**

Hindustan Petroleum Corporation Limited

Major Industrial Projects

Project	Description
Reliance–TA'ZIZ project	\$2B low-carbon chemicals facility
Ashok Leyland	Shifted electric bus production to UAE
Larsen & Toubro solar project	Solar-plus-storage infrastructure in Abu Dhabi

18. Architecture of Contemporary Trade Agreements



Recent trade agreements signed by the **United States** under the **Agreements on Reciprocal Trade (ART)** framework indicate a **structural shift in global trade governance**, moving away from traditional multilateral norms.

Reciprocal tariffs refer to a trade strategy where a country **matches the tariff rates imposed by trading partners**.

Objectives

- Reduce **trade deficits**
- Pressure foreign governments to **lower tariffs**
- Ensure **reciprocal market access**
- Counter perceived **unfair trade practices**

Multilateral Trade Foundation

The modern global trading system was built on **multilateral principles**.

Institutional Basis

Institution	Role
General Agreement on Tariffs and Trade (GATT)	Created rules for reducing tariffs and trade barriers
World Trade Organization (WTO)	Established in 1995 to oversee global trade rules

Key Multilateral Principle

Most-Favoured-Nation (MFN)

The **MFN principle** ensures:

- Equal tariff treatment to **all WTO members**

No discrimination between trading partners

Developing Country Agency

A key feature of the WTO is the **“one-country-one-vote”** principle.

This provides **smaller economies with bargaining space**, even though economic power remains uneven.

Preferential Trade Agreements (PTAs)

Preferential trade agreements represent **exceptions to the MFN principle**.

Legal Basis

Article XXIV of GATT allows the creation of:

- **Free Trade Agreements (FTAs)**

Customs Unions

19. U.S. Supreme Court Strikes Down Trump’s Global Tariffs



The **Supreme Court of the United States** invalidated global tariffs imposed by **Donald Trump** under the **International Emergency Economic Powers Act (IEEPA)**. The Court ruled that the **President exceeded constitutional authority** by imposing tariffs through emergency powers.

Key Findings of the U.S. Supreme Court Judgment

Aspect	Explanation
Core verdict	A 6–3 majority ruling declared the tariff policy unconstitutional
Constitutional authority	The U.S. Congress alone has the power to levy tariffs
Executive overreach	The President cannot bypass Congress by declaring an emergency
Statutory interpretation	IEEPA allows regulation of commerce, but not imposition of tariffs as revenue measures
Emergency justification rejected	Trade deficits were deemed structural economic issues, not a national emergency

Refund Implications

The ruling requires the government to refund tariffs collected.

Impact	Details
Beneficiaries	Domestic importers
Financial exposure	Refunds may exceed \$175 billion
Affected institutions	U.S. Customs and Treasury

About the International Emergency Economic Powers Act (IEEPA)

Feature	Details
Year enacted	1977
Purpose	Allow the President to regulate international commerce during national emergencies
Authority granted	Freeze foreign assets and impose economic restrictions

Historical Context

IEEPA was enacted to **limit excessive presidential powers** previously exercised under the **Trading with the Enemy Act**.

Enforcement Authority

IEEPA powers are primarily implemented through the **Office of Foreign Assets Control (OFAC)**.

Key Functions of OFAC

- Administer **economic sanctions**
- Implement **export control restrictions**
- Freeze assets linked to foreign threats

20. U.S. Imposes 15% Global Import Surcharge under Trade Act, 1974

After the **Supreme Court of the United States** struck down tariffs imposed under the **International Emergency Economic Powers Act (IEEPA)**, **Donald Trump** invoked the **Trade Act of 1974** to impose a **temporary global import surcharge**.

Key Features of the New Global Tariff

Feature	Details
Legal basis	Section 122 of the Trade Act, 1974
Tariff rate	15% global surcharge
Effective date	24 February 2026
Tariff type	Ad valorem tariff

What is an Ad Valorem Tariff?

An **ad valorem tariff** is a trade tax calculated as:

- A **fixed percentage of the value of the imported good**
- Not based on **quantity, weight, or volume**

Example:

If a product worth **\$100** is imported, a **15% ad valorem tariff** means a **\$15 duty**.

Strategic Design of the Tariff

Uniform Global Surcharge

Unlike earlier tariffs under IEEPA that targeted specific countries, the new tariff applies:

- **Equally to imports from all trading partners**

As a **non-discriminatory baseline surcharge**

Strategic Exemptions : Certain sectors are exempt to prevent supply shocks.

Exempt Category	Reason
Critical minerals	Maintain supply for high-tech industries
Agricultural goods	Avoid food price inflation
Pharmaceuticals	Protect healthcare supply chains
Select vehicles	Prevent disruptions in automobile production

Impact on India

Aspect	Impact
Tariff faced by Indian exporters	15%
Previous tariff (IEEPA)	18% reciprocal tariff
Net effect	Slight reduction but still higher trade barriers

This could affect **Indian exports in sectors such as textiles, engineering goods, and chemicals**.

21. Chabahar Port: India Completes \$120 Million Commitment



The Government of **India** informed Parliament that it has **fully paid its \$120 million commitment** for the development of **Chabahar Port** in **Iran**. The project is a crucial component of India's **connectivity and strategic outreach to Central Asia and Afghanistan**.



Location and Geographic Importance

Feature	Details
Location	Sistan-Balochistan Province, Iran
Water body	Mouth of the Gulf of Oman
Strategic proximity	Near Gwadar Port in Pakistan

Key Features of Chabahar Port

Iran's Only Oceanic Port

- Chabahar is **Iran's only oceanic port**.
- It is also **Iran's first deepwater port**, providing **direct access to international shipping lanes**.

This allows Iran and partner countries to **bypass the narrow and strategically sensitive Strait of Hormuz**.

Port Terminals

Terminal	Details
Shahid Kalantari Terminal	Developed in the 1980s to diversify Iranian trade routes
Shahid Beheshti Terminal	Developed and operated by India Ports Global Limited (IPGL)

The **Shahid Beheshti Terminal** is the main facility used for **India's regional trade operations**.

Connectivity Infrastructure

Corridor	Role
International North South Transport Corridor (INSTC)	Connects India to Russia and Europe via Iran
Zaranj-Delaram Highway	Built by India in Afghanistan
Afghan access	Connects to Kabul and Mazar-e-Sharif

Mains Practice Question

Chabahar Port plays a pivotal role in India's connectivity and geopolitical strategy in Eurasia. Analyse its economic and strategic significance. (10 Marks)

22. US–Russia Nuclear Arms Control Crisis: Expiry of New START



The **New Strategic Arms Reduction Treaty (New START)** between the **United States** and **Russia** is set to **expire on 4 February 2026**, raising fears of a **renewed global nuclear arms race**. New START is currently the **last remaining nuclear arms control treaty** between the two largest nuclear powers.

About the New START Treaty

Feature	Details
Full name	New Strategic Arms Reduction Treaty
Nature	Bilateral nuclear arms control agreement
Signed	2010
Location of signing	Prague
Signatories	Barack Obama and Dmitry Medvedev
Entry into force	February 2011
Extension	Extended in 2021 for five years

Treaty Lineage

New START replaced earlier nuclear agreements.

Treaty	Year	Significance
START I	1991	First major nuclear arms reduction treaty
Strategic Offensive Reductions Treaty (SORT)	2002	Reduced deployed strategic warheads
New START	2010	Established stricter verification and limits

Core Objectives of New START

The treaty aimed to **limit the strategic nuclear arsenals** of the two countries.

Strategic Nuclear Weapons Covered

These include long-range weapons capable of targeting:

- Major cities
- Military bases
- Critical infrastructure

Examples include:

- Intercontinental Ballistic Missiles (ICBMs)
- Submarine-Launched Ballistic Missiles (SLBMs)
- Strategic bombers

Mains Practice Question

The weakening of nuclear arms control agreements poses significant risks to global strategic stability. Analyse the implications of the possible expiry of the New START treaty. (10 Marks)

23. 🚀 **Khorranshahr-4 Ballistic Missile: Iran's Strategic Deterrence Weapon**



Amid rising tensions between **United States** and **Iran**, Iran released footage of its advanced **Khorranshahr-4 ballistic missile**, signalling its growing missile capability.

🚀 **Khorranshahr-4 Ballistic Missile (Kheibar)**

Feature	Details
Type	Medium-Range Ballistic Missile (MRBM)
Alternate Name	Kheibar missile
Developer	Aerospace Industries Organization (AIO)
Range	~2,000 km
Purpose	Strategic deterrence and long-range strike capability

⚙️ **Technical Specifications**

Parameter	Details
Height	~13 metres
Diameter	~1.5 metres
Total weight	~20 tonnes
Payload capacity	Up to 1,800 kg

⚡ **Speed and Propulsion**

Feature	Details
Fuel type	Liquid-fuelled
Speed outside atmosphere	~Mach 16
Speed within atmosphere	~Mach 8

This high velocity significantly **reduces interception time by missile defence systems**.

🌐 **Strategic Range Impact**

With a **2,000 km range**, the missile can reach:

- U.S. military bases in the **Middle East**
- Strategic maritime zones in the **Persian Gulf**
- Aircraft carriers operating in nearby waters

This strengthens Iran's **regional deterrence capability**.

24. Sayyad-3G Missile: Iran's Naval Air-Defence Shield in the Strait of Hormuz



Iran recently tested the **Sayyad-3G missile** in the **Strait of Hormuz**, one of the world's most critical routes for global energy transportation.

Sayyad-3G Missile

Feature	Details
Type	Naval Surface-to-Air Missile (SAM)
Origin	Developed by Iran
Base system	Maritime adaptation of the Sayyad-3 land-based air defence system
Purpose	Protect naval assets against aerial threats

Key Technical Features

Parameter	Details
Operational Range	~150 km
Defence Role	Medium-to-long-range naval air defence
Launch System	Vertical Launch System (VLS)
Guidance	Inertial navigation + radar terminal homing

Vertical Launch System (VLS).

The missile uses a **Vertical Launch System (VLS)**.

Advantages of VLS

- **360-degree engagement capability**
- Faster response time
- No need to rotate the launch platform
- Ability to launch multiple missiles in quick succession

This makes it suitable for **naval combat environments**.

Guidance Technology

The Sayyad-3G uses a **two-stage guidance system**:

Stage	Guidance Method	Purpose
Mid-course phase	Inertial guidance	Navigates missile toward the target area
Terminal phase	Radar homing	Precisely locks onto and intercepts the target

The radar homing system is designed to function effectively even with **sea-surface clutter**, which can interfere with detection.

25. Fissile Material Cut-off Treaty (FMCT): Global Effort to Halt Nuclear Weapon Material Production



At the **Conference on Disarmament, India** reiterated its support for beginning negotiations on the **Fissile Material Cut-off Treaty (FMCT)**. The treaty is viewed as a **key step toward global nuclear disarmament and non-proliferation**.

What is the Fissile Material Cut-off Treaty (FMCT)?

Aspect	Details
Nature	Proposed multilateral nuclear disarmament treaty
Objective	Prohibit future production of fissile material for nuclear weapons
Scope	Applies to all states, including nuclear weapon states
Status	Still under negotiation; not yet adopted

The treaty aims to **cap the amount of material available for nuclear weapons production**

Targeted Fissile Materials

The treaty focuses on materials capable of sustaining nuclear chain reactions.

Fissile Material	Use
Highly Enriched Uranium (HEU)	Used in nuclear weapon cores
Separated Plutonium	Produced in nuclear reactors and used in warheads

By halting new production, FMCT would **freeze the global stockpile growth of nuclear weapon materials**.

Permitted Uses (Exemptions)

The treaty **does not ban all fissile material production**.

Production is allowed for **peaceful and strategic non-weapon uses**, including:

- Civilian nuclear energy
- Nuclear research reactors
- Naval propulsion reactors (submarines)

Universal Applicability

Unlike some nuclear agreements, FMCT is intended to apply **equally to all countries**, including:

- States recognised under the **Nuclear Non-Proliferation Treaty (NPT)**
- Countries outside the NPT framework

Nuclear Weapon States under NPT

- **United States**
- **Russia**

26. 🌍 Ethiopia–Eritrea Conflict: Strategic Rivalry in the Horn of Africa



Ethiopia recently accused **Eritrea** of military aggression and demanded the withdrawal of Eritrean forces from Ethiopian territory, raising concerns about renewed instability in the **Horn of Africa**.

🌍 Ethiopia–Eritrea Conflict: Historical Evolution

Eritrean Independence and Border War (1998–2000)

- Eritrea gained independence from Ethiopia in **1993** after a long liberation struggle.
- Independence made Ethiopia **landlocked**, increasing its strategic dependence on neighbouring ports.
- Disputes over the **Badme border region** triggered the **Ethiopia–Eritrea War (1998–2000)**.

Outcome

- The conflict ended with the **Algiers Agreement** in 2000.
- An international boundary commission was established to demarcate the border.

“No War, No Peace” Stalemate (2002–2018)

Despite the Algiers Agreement:

- Both countries **refused to accept certain boundary decisions**.
- Troops remained deployed along the border.

This created a **two-decade military standoff**, often described as a “**no-war, no-peace**” situation.

⚠️ Current Flashpoint (2024–2026)

Recent tensions revolve around two strategic issues.

🏢 Ethiopia’s Red Sea Access Demand

- Ethiopia seeks access to the **Red Sea** to overcome its **landlocked status**.
- It has expressed interest in access through **Assab port** in Eritrea.

🕵️ Allegations of Proxy Support

- Ethiopia accuses Eritrea of **supporting insurgent groups** inside Ethiopian territory.

These issues have revived fears of **another regional conflict**.

27. ✂️ **Pakistan–Afghanistan Escalation: ‘Open War’ Declared Against the Afghan Taliban**



On 27 February 2026, Pakistan declared an “open war” against the Taliban-led government of Afghanistan following intensified cross-border clashes, airstrikes, and retaliatory military operations along their shared border.

✂️ Latest Escalation in Pakistan–Afghanistan Conflict

Operation *Ghazab Lil Haq*

- Pakistan launched **Operation “Ghazab Lil Haq”** on 26 February 2026.

It was described as a **retaliatory military operation** targeting Afghan Taliban forces.

Pakistani Airstrikes in Afghanistan

Pakistan conducted airstrikes targeting alleged Afghan military positions in:

- **Kabul**
- **Kandahar**
- **Paktia Province**

Islamabad claimed the strikes were aimed at **Taliban military infrastructure**.

Afghan Retaliatory Offensive

The Taliban-led Afghan government announced:

- **Cross-border attacks on Pakistani positions**
- Retaliation for earlier Pakistani airstrikes along the border region.

Casualty Claims

Side	Claim
Pakistan	133 Afghan fighters killed
Afghanistan	55 Pakistani soldiers killed
Afghan Losses	8 soldiers reportedly killed

Casualty figures remain **unverified due to limited independent access**.

Pakistan accuses Afghanistan of sheltering:

- **Tehrik-i-Taliban Pakistan (TTP).**

The TTP has conducted multiple attacks inside Pakistan.

Durand Line Dispute

- The border between the two countries is the **Durand Line**.
- Afghanistan historically **does not recognise it as a legitimate international border**.

28. Age of Electricity: Global Power Demand Set to Surge by 2030



A report by the **International Energy Agency (IEA)** projects the **fastest sustained rise in global electricity demand through 2030**, driven primarily by **data centres, electric vehicles (EVs), and cooling demand**.

Global Electricity Demand Projections

Indicator	Projection
Annual growth rate (2026–2030)	~3.6% per year
Additional demand each year	~1,100 TWh
Total global electricity consumption by 2030	~33,600 TWh

Structural Shift

- Electricity demand **outpaced global GDP growth in 2024**.
- This is the **first time in three decades outside crisis periods**.
- Experts describe the transition as the beginning of the **“Age of Electricity.”**

🌐 Drivers of Rising Electricity Demand

Data Centres and Digital Economy
Electric Vehicles (EVs)
Cooling Demand

Opportunities in the “Age of Electricity”

Opportunity	Significance
Renewable energy expansion	Solar and wind can meet rising demand
Battery storage	Helps balance intermittent power supply
Smart grids	Improve energy efficiency and grid resilience
Energy efficiency technologies	Reduce electricity consumption growth

🏢 About the International Energy Agency (IEA)

Feature	Details
Established	1974
Origin	Created after the 1973–1974 oil crisis
Headquarters	Paris
Members	32 member countries
Association members	13 (including India)

Key Focus Areas

- Energy security
- Economic development
- Environmental sustainability

Major Publications

- World Energy Outlook
- India Energy Outlook
- World Energy Investment Report

Energy Technology Perspectives

29. Project Vault: U.S. Strategic Stockpile for Critical Minerals



The **United States** has launched **Project Vault**, a strategic initiative to build a **national stockpile of critical minerals** to support its industrial base and reduce dependence on **China**, which dominates global mineral processing supply chains.



What is Project Vault?

Project Vault is a **strategic mineral stockpiling programme** designed to ensure secure supplies of essential minerals for U.S. industries.

Feature	Details
Programme type	Strategic critical mineral reserve
Launch objective	Reduce dependence on foreign supply chains
Strategic inspiration	Modelled on the Strategic Petroleum Reserve
Target sectors	Manufacturing, defence, and clean-energy industries



Mineral Scope

The programme targets **60 critical minerals** identified in the **2025 list of the United States Geological Survey (USGS)**.

Examples include:

- **Lithium** – batteries and EVs
- **Cobalt** – energy storage and electronics
- **Rare earth elements** – magnets, electronics, defence technologies



Pricing and Supply Mechanism

Commitment-Based Model

Participating companies:

- Pay a **commitment fee**
- Reserve **60 days of mineral supply**

Purchase Terms

- Companies sign a **binding agreement** to repurchase minerals
- Prices are **fixed at the original purchase cost**

This protects firms from **future price spikes**.

Inventory Rotation System

Rule	Explanation
Withdrawal allowed	Companies can use stockpiled minerals
Mandatory replenishment	Equivalent quantities must be restored
Stockpile buffer	Maintains a 60-day reserve level

30. India–UK Offshore Wind Taskforce: Boosting India’s Marine Renewable Energy



India and the United Kingdom have launched an **Offshore Wind Taskforce** under the **India–UK Vision 2035 framework** during the Fourth Energy Dialogue to accelerate India’s offshore wind energy sector.

Objective: The taskforce aims to **fast-track India’s offshore wind sector** by coordinating:

- Policy frameworks
- Infrastructure development
- Financial mobilisation

The collaboration leverages:

- **UK’s mature offshore wind industry**
- **India’s large renewable energy market and offshore potential**

Institutional Framework

Institution	Role
Ministry of New and Renewable Energy (MNRE)	Nodal ministry
National Institute of Wind Energy (NIWE)	Resource assessment and technical evaluation

🌐 Core Pillars of the Collaboration

Ecosystem Planning

Focus areas include:

- **Seabed leasing reforms**
- Creating **revenue certainty mechanisms**
- Establishing regulatory frameworks for offshore wind projects

Infrastructure Development

Key infrastructure initiatives include:

- **Port modernisation**
- Development of **marine logistics**
- Promotion of **domestic manufacturing of turbines and components**

Financial Risk Mitigation

Measures to mobilise investment include:

- **Blended finance structures**
- **Risk mitigation instruments**
- Large-scale **capital mobilisation**

The taskforce will prioritise offshore wind zones along the:

State	Key Area
Gujarat	Gulf of Khambhat
Tamil Nadu	Gulf of Mannar

These regions have **high wind potential and favourable marine conditions**.

31. Cybercrime Governance Crisis: Debate over the UN 'Hanoi Convention'



Global cyber governance is facing a legitimacy crisis after the adoption of the **United Nations Convention Against Cybercrime**, also called the **Hanoi Convention**. Several major democracies – including **United States, Japan, Canada, and India** – have **declined to sign the treaty**, highlighting deep divisions in global cyber governance.

UN Convention Against Cybercrime (Hanoi Convention)

Feature	Details
Nature	First global legally binding treaty dedicated exclusively to cybercrime
Adoption	2024
Opening for signature	Hanoi
Countries adopting	72 countries
Alternative name	Hanoi Convention

Origins of the Treaty

- The treaty was **proposed by Russia in 2017**.
- It was conceived as a **sovereignty-focused alternative** to the **Budapest Convention on Cybercrime**.

Budapest Convention

- Currently the **dominant global cybercrime framework**
- Led primarily by Western countries.

Key Provisions of the Convention

The treaty obligates signatory states to criminalise **ten major cyber offences**, including:

- **Ransomware attacks**
- **Phishing and digital fraud**
- **Money laundering using digital platforms**
- **Online child sexual exploitation**

Cross-Border Data Sharing

One of the treaty's most debated provisions allows:

- **Cross-border collection and sharing of electronic evidence**
- Applicable to **serious crimes punishable by at least four years imprisonment**

This provision raises concerns about:

- Data sovereignty
- Privacy protection

State surveillance powers.

32. Global Development Aid Cuts: Risk of 22.6 Million Preventable Deaths by 2030



Recent global estimates warn that **sharp reductions in development assistance by high-income countries** could result in **22.6 million preventable deaths in Low- and Middle-Income Countries (LMICs) by 2030**, triggering a potential **global health crisis**.

Major Donor Retreat

The world's largest donors – including the **United States, Germany, France, United Kingdom, and Japan** – accounted for **about 70% of global Official Development Assistance (ODA)** in 2023.

However, most of these donors **began reducing aid commitments after 2024**.

Historic Decline

- 2024 marked the **first decline in development aid in nearly three decades** among major donors (except Japan).
- Additional cuts are planned for **2025 and 2026**, signalling prolonged funding pressure.

Projected Reduction

Indicator	Projection
Global ODA decline (2025–2026)	Over 11% reduction
Impact	Severe strain on health systems in LMICs

What is Official Development Assistance (ODA)?

Official Development Assistance

Key Features

- Provided by **high-income governments**
- Targets **economic development and poverty reduction**
- Includes **grants, concessional loans, and technical assistance**

ODA plays a crucial role in **health, education, and infrastructure development**.

Global Significance

Dimension	Impact
Health security	Weak systems increase epidemic risks
Global inequality	Wider health disparities between rich and poor countries
Sustainable Development Goals	Threatens progress toward SDG-3 (Good Health and Well-Being)
Humanitarian crisis risk	Increased vulnerability in fragile states

33. Power Gap Index (PGI): Measuring How Countries Convert Resources into Influence



The Economic Survey of India 2025-2026 referenced the Power Gap Index (PGI) for the first time to assess India's global strategic standing.

What is the Power Gap Index (PGI)?

The Power Gap Index (PGI) is an analytical tool used to evaluate how effectively a country converts its national resources into geopolitical influence.

It is derived from the Asia Power Index produced by the Lowy Institute.

Core Purpose

The PGI measures the gap between a country's potential power and actual strategic influence.

Parent Framework: Asia Power Index

The Asia Power Index evaluates 27 countries across 131 indicators. Eight Thematic Measures

Category	Examples
Economic capability	GDP, trade influence
Military capability	Defence spending, force structure
Technological capability	Innovation, digital infrastructure
Diplomatic influence	Global diplomatic networks
Cultural influence	Soft power and global cultural reach
Economic relationships	Investment and trade networks
Defence networks	Strategic alliances
Future resources	Demographics, long-term potential



How the Power Gap Index Works

The PGI compares two key variables:

Measure	Meaning
Expected Power (Potential)	Power predicted from national resources
Comprehensive Power (Achievement)	Actual geopolitical influence achieved

Power Gap Formula (Conceptual)

$$PGI = \text{Comprehensive Power} - \text{Expected Power}$$

Interpretation of PGI Scores

Score Type	Meaning
Positive PGI	Country is overperforming relative to its resources
Negative PGI	Country is underperforming relative to its potential

34. Global Teacher Prize 2026 Awarded at World Government Summit



Indian educator **Rouble Nagi** has won the **Global Teacher Prize 2026** at the **World Government Summit** in Dubai. She was recognised for her innovative “**Living Walls of Learning**” initiative aimed at educating children in marginalised communities.

Why Rouble Nagi Won the Award

Living Walls of Learning Project

The project converts **unused or neglected walls in urban slums** into **educational murals**.

Educational Themes Included

- Literacy (alphabets and language skills)
- Numeracy (basic arithmetic)
- Hygiene and sanitation awareness

These murals function as **informal classrooms for underprivileged children**.

Impact of the Initiative

Indicator	Impact
Learning centres established	Over 800 centres across India
Target group	Children from marginalised and slum communities
Educational model	Community-based informal learning spaces

The initiative focuses on **inclusive education and grassroots literacy development**.

About the Global Teacher Prize

Feature	Details
Nature	International teaching award
Launch year	2015
Founder	Varkey Foundation
Partners	UNESCO

Recognition

The prize is widely known as the “**Nobel Prize of Teaching.**”

35. BNP Victory in Bangladesh Elections 2026: Political Reset with Regional Implications



The **Bangladesh Nationalist Party (BNP)** led by **Tarique Rahman** secured a decisive victory in **Bangladesh's 2026 parliamentary elections**.

The election marks a major political shift as the **Awami League**, previously led by former Prime Minister **Sheikh Hasina**, was barred from contesting due to suspension of its registration.

Referendum on the "July Charter"

A **constitutional reform referendum** was held alongside the election.

Outcome	Result
Approval rate	~70–73% voted "Yes"
Purpose	Institutional reforms to reshape Bangladesh's governance system

Key Proposed Reforms

Prime Minister Term Limits

- Introduction of a **two-term limit** for the Prime Minister to prevent long-term concentration of power.

Bicameral Legislature

Bangladesh may move from a **unicameral parliament** to a **bicameral system**.

Chamber	Role
Lower house	Directly elected legislature
Upper house	Review and oversight of legislation

Caretaker Election System

A **neutral caretaker government** will supervise elections to ensure fairness.

This system previously existed but was abolished in **2011**.

Democratic and Institutional Reforms

Additional reforms include:

- Increased **women's representation** in parliament
- Strengthening **judicial independence**
- Electoral transparency mechanisms

36. Jeju Island: South Korea's Volcanic UNESCO Heritage Island



India issued a travel advisory clarifying **visa-free entry rules for Jeju Island** after an Indian traveller was reportedly detained under the visa waiver scheme of the **South Korea**. The advisory highlighted that **visa-free entry does not guarantee admission**, which remains subject to immigration clearance.

Feature	Details
Type	Volcanic island
Country	South Korea
Location	Near the Korean Strait
Significance	Largest island of South Korea

Jeju is located south of the Korean Peninsula and lies between **South Korea and Japan's Tsushima Islands**.

Geographic Characteristics

Volcanic Origin

Jeju Island was formed through **volcanic eruptions millions of years ago**, making it one of the most distinctive geological landscapes in East Asia.

Major Landforms

- Lava tubes
- Basalt cliffs
- Volcanic craters

Highest Peak: Mount Hallasan

Feature	Details
Name	Hallasan
Height	1,950 metres
Type	Dormant shield volcano

Mount Hallasan forms the **central volcanic cone of Jeju Island**.

Administrative Status

Feature	Details
Province status	Jeju Special Self-Governing Province
Autonomy granted	1 July 2006



The island enjoys **greater administrative autonomy** compared to other provinces in South Korea.

37. **FORGE Initiative: Global Effort to Secure Critical Mineral Supply Chains**



India supported the **FORGE Initiative** during the **Critical Minerals Ministerial held in Washington, D.C.** hosted by the **United States**.

The meeting brought together **delegations from more than 50 countries** to coordinate strategies for securing global supply chains of critical minerals.

What is the FORGE Initiative?

FORGE (Forum on Resource, Geostrategic Engagement) is a **multilateral initiative** aimed at strengthening global cooperation in critical mineral supply chains.

Feature	Details
Full Name	Forum on Resource, Geostrategic Engagement
Nature	International cooperation platform
Purpose	Secure and diversify critical mineral supply chains
Launch Context	Announced at the Critical Minerals Ministerial in Washington, D.C.

Key Objectives of FORGE

The initiative aims to address the growing geopolitical risks surrounding critical minerals.

Core Goals

Supply Chain Diversification : Reduce reliance on a few dominant suppliers.

Strategic Mineral Security : Ensure reliable supply for key industries.

Global Collaboration : Coordinate policies among participating countries.

Sustainable Mining and Processing : Promote environmentally responsible mineral extraction

Why Critical Minerals Matter

Critical minerals are essential for modern technologies.

Sector	Key Minerals
Electric vehicles	Lithium, cobalt, nickel
Renewable energy	Rare earth elements
Electronics	Gallium, germanium
Defence technologies	Rare earth magnets

FORGE and the Mineral Security Partnership (MSP)

The **FORGE Initiative** builds on the earlier **Mineral Security Partnership (MSP)**.

Feature	MSP	FORGE
Launch year	2022	2026
Participants	14 countries + EU	Expanded multilateral cooperation
Focus	Develop diverse mineral supply chains	Broader geostrategic coordination

38. Takeshima / Dokdo Dispute: Territorial Conflict Between Japan and South Korea



South Korea protested “Takeshima Day” (22 February) observed by Japan, objecting to Tokyo’s renewed sovereignty claims over the disputed islets. South Korea rejects the existence of any dispute and maintains **effective administrative control**, while Japan continues diplomatic and symbolic assertions.

The disputed territory is a **cluster of rocky islets in the Sea of Japan (East Sea)**.

Feature	Details
South Korean name	Dokdo
Japanese name	Takeshima
International name	Liancourt Rocks
Type	Volcanic rocky islets

The name **Liancourt Rocks** was given by **French whalers in 1849**

Location and Geography

Feature	Details
Sea	Sea of Japan (called East Sea by Korea)
Position	Between Korean Peninsula and Japanese archipelago
Distance from Korea	~87 km from Ulleungdo
Distance from Japan	~157 km from Oki Islands

The islands are **physically closer to South Korea** than Japan.

Physical Composition

The territory consists mainly of **two volcanic islets**:

Islet	Meaning
Dongdo	East Island
Seodo	West Island

Geographic Features

- Steep volcanic cliffs
- Sea caves
- Harsh maritime climate
- Very limited vegetation

FEBRUARY 2026

INTERNAL SECURITY

1. V-BAT Autonomous Drones
2. SCALP (Storm Shadow) Missiles
3. India Clears Procurement of 114 Rafale Jets
4. India Procures Dornier-228
5. India's First Private Helicopter Assembly Line
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18. VAJRA PRAHAR: India-US Special Forces High-Altitude Drill
19. Exercise DHARMA GUARDIAN 2026
20. Exercise Agni Varsha



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1. V-BAT Autonomous Drones: Indian Army Boosts AI-Driven Surveillance Capability



The Indian Army has approved emergency procurement of V-BAT unmanned aerial systems equipped with Hivemind autonomy software to strengthen autonomous surveillance and reconnaissance capabilities. These drones enhance AI-enabled battlefield awareness, particularly in difficult terrains and contested environments.

V-BAT Drone - Key Features

The V-BAT Drone is a Group-3 Unmanned Aerial System (UAS) designed for long-endurance intelligence and surveillance missions.

Feature	Details
Category	Group-3 Unmanned Aerial System
Take-off capability	Vertical Take-Off and Landing (VTOL)
Design	Ducted-fan enclosed rotor system
Endurance	Over 12 hours continuous flight
Engine	Heavy-fuel single engine suitable for harsh terrains
Launch flexibility	Can operate from rooftops, ship decks, confined spaces, and remote areas

Operational Advantages

- Runway-independent operations
- Suitable for mountainous and maritime environments
- High endurance for long-range surveillance missions

Hivemind Autonomy Software

Feature	Explanation
Core capability	Enables drones to sense, decide, and act autonomously
Adaptive intelligence	Allows real-time threat avoidance and mission adjustments
Minimal human control	Supports semi-autonomous or autonomous operations
Software Development Kit (SDK)	Allows Indian forces to develop customised mission applications

This system helps maintain sovereign control over AI-enabled military technologies.

Significance for India's Defence Preparedness

- Enhanced ISR capability: Improves Intelligence, Surveillance, and Reconnaissance (ISR).

- **AI-enabled warfare:** Integrates artificial intelligence into unmanned systems.
- **Operational flexibility:** Effective in mountains, border areas, and maritime zones.
- **Reduced human risk:** Minimises exposure of personnel in high-risk missions.

Unmanned Aerial System (UAS) Classification (General)

Category	Weight	Typical Role
Group 1	< 20 kg	Tactical reconnaissance
Group 2	20–55 kg	Short-range surveillance
Group 3	55–1320 kg	Long-range ISR missions
Group 4–5	>1320 kg	Strategic UAV operations

V-BAT falls into the **Group-3** category, suitable for **medium-altitude long-endurance missions**.

Mains Practice Question

Autonomous unmanned systems are transforming modern warfare. Examine the advantages of AI-enabled drones such as the V-BAT system and discuss their implications for India's defence preparedness. (10 Marks)

Value-added UPSC keywords:

Autonomous drones, **AI-enabled warfare**, VTOL UAV, ISR missions, military autonomy systems.

2. SCALP (Storm Shadow) Missiles: India Strengthens Deep-Strike Capability



The **Indian Air Force** is finalising a **€300 million deal with France** to procure additional **SCALP Missile** for its **Dassault Rafale** fleet. The procurement will enhance India's **long-range precision strike capability against high-value enemy targets**.

SCALP / Storm Shadow - Overview

The **SCALP (Système de Croisière Autonome à Longue Portée)**, also known as **Storm Shadow**, is a **long-range air-launched cruise missile** jointly developed by **MBDA**, with collaboration between **France and the United Kingdom**.

Key Specifications

Feature	Details
Missile type	Air-launched cruise missile
Operational range	~ 560 km
Speed	High subsonic (Mach 0.8–0.95)

Warhead	450 kg BROACH warhead
Mission role	Deep strike against hardened targets
Launch platform	Fighter aircraft such as Rafale

BROACH Warhead

BROACH (Bomb Royal Ordnance Augmented Charge) is a **dual-stage tandem warhead** designed for hardened targets.

Stage	Function
Penetrator charge	Breaks through reinforced concrete or soil
Main charge	Detonates inside the structure for maximum damage

This makes the missile effective against **bunkers, underground facilities, and command centres**.

Guidance and Navigation System

Guidance Mode	Role
Inertial Navigation System (INS)	Maintains trajectory using onboard sensors
GPS navigation	Provides precise mid-course correction
Terrain Reference Navigation (TRN)	Compares terrain data to avoid detection

Terminal Guidance

- Uses an **Imaging Infrared (IIR) seeker**.
- Matches real-time target images with stored reference images for **pinpoint accuracy**.

Stealth and Survivability

- **Low observable airframe** reduces radar detection.
- **Terrain-hugging flight profile** allows it to fly at **very low altitudes** to evade enemy radar and air defence systems.

Strategic Significance

- Enhances **deep-strike capability** against strategic targets.
- Improves **stand-off attack capability**, allowing aircraft to strike without entering heavily defended airspace.
- Strengthens India's **precision warfare capability** in modern combat scenarios.



Mains Practice Question

Precision-guided cruise missiles have become a key component of modern warfare. Discuss the technological features of air-launched cruise missiles and evaluate their strategic significance for India's defence preparedness. (10 Marks)

✈️ 3. India Clears Procurement of 114 Rafale Jets to Strengthen Air Power



The Defence Acquisition Council (DAC) has cleared a proposal to procure **114 Rafale fighter jets** for the Indian Air Force (IAF). Under the plan, **96 aircraft will be manufactured in India through a strategic partnership model**, and the fleet will integrate **indigenous weapons** such as Astra and BrahMos-NG missiles.

About Rafale Fighter Jet

The Dassault Rafale is a **4.5-generation multirole combat aircraft** developed by Dassault Aviation.

Feature	Details
Aircraft type	4.5-generation multirole fighter
Design	Canard-delta wing configuration
Engine	Twin-engine configuration
Maximum speed	Mach 1.8
Service ceiling	~50,000 ft
Special capability	Supercruise (supersonic flight without afterburners)

Operational Role

The aircraft functions as an **“Omnirole” platform**, capable of performing multiple missions in a single sortie:

- Air superiority
- Ground attack
- Reconnaissance
- Nuclear deterrence

Key Technological Systems

System	Description
RBE2 AESA Radar	Active Electronically Scanned Array radar for simultaneous multi-target tracking
SPECTRA EW Suite	Electronic warfare system for threat detection, jamming and self-protection
Data fusion capability	Integrates sensor inputs for improved situational awareness

India-Specific Enhancements

The Indian Rafale fleet includes **13 customised modifications**, such as:

- **Helmet-mounted display systems**


- Low-band jammers
- Cold-start capability for high-altitude bases
- Integration of Indian weapons systems

Weapon Systems Integrated with Rafale

Category	Weapon	Capability
Air-to-Air	Meteor missile	Ramjet-powered Beyond Visual Range (BVR) missile (>150 km)
	MICA missile	Short-to-medium range interception
Deep-Strike	SCALP / Storm Shadow	Long-range cruise missile against fortified targets
Precision strike	HAMMER	Rocket-assisted precision air-to-ground weapon
Indigenous integration	Astra, BrahMos-NG	Future integration with Indian missile systems

Strategic Significance

Dimension	Importance
Air superiority	Enhances India's capability against advanced fighter aircraft
Strategic deterrence	Strengthens the air component of India's nuclear triad
Indigenisation push	Domestic production of 96 aircraft boosts defence manufacturing ecosystem
Network-centric warfare	Advanced sensors and data fusion improve battlefield awareness

 **Mains Practice Question : Modern multirole combat aircraft are central to air power projection in contemporary warfare. Examine the technological features of the Rafale fighter jet and analyse its significance for India's defence preparedness. (10 Marks)**

✈️ 4. India Procures Dornier-228 Aircraft to Strengthen Maritime Surveillance



The Ministry of Defence India signed a contract with Hindustan Aeronautics Limited (HAL) to procure eight Dornier-228 aircraft for the Indian Coast Guard. The deal was approved under the “Buy (Indian)” defence procurement category, with over 71% indigenous content, reinforcing Aatmanirbhar Bharat and Make-in-India initiatives.

About Dornier-228 Aircraft

The Dornier Do 228 is a multi-role twin-engine turboprop aircraft capable of performing surveillance, transport, and reconnaissance missions.

Feature	Details
Aircraft type	Multi-role turboprop aircraft
Engine configuration	Twin-engine
Passenger capacity	Up to 19 passengers
Key capability	Short Take-Off and Landing (STOL)
Manufacturer	HAL (India)
Original designer	Dornier GmbH

STOL Capability

Short Take-Off and Landing (STOL) allows the aircraft to operate from:

- Short or semi-prepared runways
- Remote islands
- Rough terrain airstrips

Operational Roles in India

Force	Role
Indian Coast Guard	Maritime surveillance, coastal monitoring, search-and-rescue
Indian Navy	Maritime reconnaissance and patrol
Indian Air Force	Transport, surveillance, disaster relief

Civilian Variant

HAL also produces a civilian version called Hindustan 228, used for regional connectivity.

Programme	Role
UDAN Scheme	Expands air connectivity in remote areas
Key regions	North-East India and island territories

Defence Diplomacy


India has used the Dornier-228 as a tool of defence diplomacy, gifting aircraft to:

- Sri Lanka
- Seychelles

These initiatives strengthen **maritime cooperation in the Indian Ocean Region (IOR)**.

Strategic Significance

Dimension	Importance
Maritime security	Enhances surveillance of India's long coastline and EEZ
Search and rescue capability	Faster response during maritime emergencies
Indigenisation	71% indigenous content supports domestic aerospace industry
Regional diplomacy	Strengthens India's influence in the Indian Ocean Region

 **Mains Practice Question : Indigenous defence manufacturing plays a key role in strengthening India's strategic autonomy. Discuss the importance of aircraft platforms such as Dornier-228 in enhancing India's maritime security and defence indigenisation. (10 Marks)**

5. India's First Private Helicopter Assembly Line Launched in Karnataka



The Prime Minister of India **Narendra Modi** and the President of France **Emmanuel Macron** virtually inaugurated **India's first private-sector Helicopter Final Assembly Line (FAL)** at **Vemagal**. The facility is a joint venture between **Tata Advanced Systems Limited (TASL)** and **Airbus Helicopters** to manufacture the **Airbus H125 helicopter**.

What is a Final Assembly Line (FAL)?

A **Final Assembly Line (FAL)** is the stage in aircraft manufacturing where **all major components – fuselage, engines, avionics, and systems – are integrated, assembled, tested, and certified** before delivery. This project marks the **first instance of a private Indian company undertaking end-to-end helicopter manufacturing, integration, and testing.**

Global Significance of the Facility

Aspect	Details
Location	Vemagal, Karnataka
Partnership	TASL – Airbus Helicopters
Aircraft produced	Airbus H125
Global status	4th H125 manufacturing facility worldwide
Other locations	France, USA, Brazil

The project strengthens **India's aerospace manufacturing ecosystem.**

About Airbus H125 Helicopter

Feature	Details
Type	Single-engine light utility helicopter
Range	340 nautical miles (~630 km)
Endurance	~4.5 hours
Performance	Designed for high-altitude and hot environments


Aviation Record : The **Airbus H125** holds the record as the **only helicopter to land and take off from the summit of Mount Everest (29,029 ft).**

Operational Uses

Sector	Application
Law enforcement	Surveillance and policing
Search and rescue	Emergency rescue missions
Air ambulance	Medical evacuation
Firefighting	Aerial firefighting support
Infrastructure	Construction and power-line inspection

Strategic Significance

Dimension	Importance
Defence indigenisation	Boosts domestic aerospace manufacturing
Make-in-India initiative	Expands private-sector role in defence production
Global supply chain integration	India becomes a key hub for Airbus helicopter manufacturing
High-altitude operations	Helicopters suitable for Himalayan and border areas

 **Mains Practice Question :** The expansion of private-sector participation in defence manufacturing is a key pillar of India's strategic autonomy. Examine the significance of the Helicopter Final Assembly Line (FAL) established in Karnataka for India's aerospace ecosystem. (10 Marks)

6. Defence Budget 2026–27: India Strengthens Capability-Based Deterrence



The Union Budget 2026–27 announced a significant increase in India's defence allocation, reflecting a shift toward capability-driven national security planning. The budget emphasises modernisation of armed forces, indigenous defence production, and enhanced deterrence capabilities.

Key Budgetary Changes

Indicator	2025–26	2026–27	Change
Total Defence Budget	₹6.81 lakh crore	₹7.85 lakh crore	+15.19%
Capital Outlay	—	₹2.19 lakh crore	+21.8%
Indigenous procurement share	—	~75% of modernisation spending	Boost to domestic industry

The capital expenditure increase will support procurement of fighter aircraft, submarines, drones, and next-generation defence systems.

Strategic Rationale Behind Higher Spending

1 Strengthening Deterrence

Higher investment improves deterrence credibility by strengthening military capabilities and readiness.

2 Addressing Capability Gaps

The Indian Air Force currently operates around 30–32 fighter squadrons, compared to the sanctioned strength of 42, highlighting operational shortfalls.

3 Military Modernisation

The armed forces are transitioning toward **network-centric warfare, AI-enabled systems, drones, and advanced missiles.**

📌 Regional Security Dynamics

Strategic Factor	Implication
China's military modernisation	Expansion of PLA capabilities and border infrastructure
China-Pakistan coordination	Possibility of two-front security scenario
Indo-Pacific maritime competition	Need for stronger naval presence and sea-lane security

Maritime Security Imperatives

India's defence spending also reflects growing responsibilities in the **Indo-Pacific region**, including:

- Protection of **Sea Lines of Communication (SLOCs)**
- Expansion of **naval force projection capability**
- Security cooperation with regional partners

Criticisms of Rising Defence Spending

Concern	Explanation
Arms race narrative	Some analysts argue increased spending could intensify regional militarisation
Development trade-offs	Critics fear reduced fiscal space for welfare sectors
Security dilemma	Military build-up may trigger reciprocal responses by rival states

🧠 Mains Practice Question : India's rising defence expenditure reflects changing security dynamics in the region. Analyse the strategic rationale behind increased defence spending and discuss the challenges associated with defence modernisation. (10 Marks)

🔒 7. New Defence Publication Rules: MoD Tightens Oversight Under Official Secrets Act



The Ministry of Defence India is framing new guidelines for book publications by armed forces personnel, incorporating provisions of the Official Secrets Act 1923. The move follows controversy surrounding the unpublished memoir of former M. M. Naravane, which reportedly contained sensitive military information.

Official Secrets Act (OSA), 1923 - Overview

The Official Secrets Act, 1923 is a colonial-era law aimed at safeguarding national security by preventing espionage and unauthorised disclosure of classified information.

Historical Background

Year	Development
1889	First Official Secrets Act introduced in British India
1904	Strengthened during Lord Curzon's tenure
1923	Consolidated into the present Official Secrets Act

Initially used to suppress nationalist newspapers and dissent during the colonial period, it continues to regulate handling of classified information in India.

Objective of the Act

The Act seeks to protect:

- India's sovereignty and security
- Defence establishments
- Intelligence and strategic infrastructure

It applies to all Indian citizens, government officials, and even private individuals or corporate executives.

Key Legal Provisions

Section	Provision	Punishment / Authority
Section 3	Espionage: Collecting or sharing information useful to the enemy	Up to 14 years imprisonment
Section 4	Communication with foreign agents considered evidence of wrongdoing	Presumption of prejudicial action
Section 5	Unauthorised sharing or retention of official documents or codes	Up to 3 years imprisonment
Section 10	Harbouring individuals involved in espionage	Penal offence
Section 11	Magistrate empowered to issue search warrants	Investigation authority
Section 12	Most offences are cognizable, allowing arrest without warrant	Police powers

What are “Prohibited Places”?

Under the Act, **prohibited places** include:

- Defence installations
- Military bases
- Arsenals and naval dockyards
- Certain notified infrastructure (ports, railways, communication facilities)


Unauthorized entry, photography, or information gathering in these areas can be treated as **espionage-related offences**.

Significance of New MoD Guidelines

- Ensures **controlled disclosure of military information in memoirs and publications**.
- Strengthens **national security safeguards in the digital and information age**.
- Prevents **leakage of sensitive operational details**.
- Clarifies **responsibilities of serving and retired armed forces personnel**.

Criticisms of the Official Secrets Act

- **Colonial legacy:** Critics argue it is outdated and restrictive.
- **Conflict with transparency laws:** Potential overlap with the **Right to Information (RTI) Act, 2005**.
- **Broad definitions:** Terms like “secret” and “prejudicial information” may be interpreted widely.

 **Mains Practice Question : The Official Secrets Act, 1923 remains a key law governing national security in India. Critically examine its provisions and discuss the need for balancing secrecy with transparency in a democratic system. (10 Marks)**

8. PRAHAAR: India's First National Counter-Terrorism Policy



The Ministry of Home Affairs released PRAHAAR, India's first comprehensive national counter-terrorism policy. The framework institutionalises a "zero-tolerance" approach to terrorism and establishes an integrated intelligence-driven system to counter both conventional and emerging security threats.

Objective of PRAHAAR

The policy aims to:

- Dismantle terrorist infrastructure
- Cut off terror financing and logistics
- Strengthen inter-agency coordination
- Address new threats such as drone-based attacks and cyber-terrorism

It also emphasises that terrorism is not linked to any religion, ethnicity, or nationality, reinforcing India's secular approach to counter-terrorism.

Institutional Mechanism

Institution	Role
Multi Agency Centre (MAC)	Intelligence sharing among security agencies
Joint Task Force on Intelligence (JTFI)	Multi-agency intelligence coordination
Intelligence Bureau (IB)	Central intelligence coordination
National Investigation Agency (NIA)	Investigation and prosecution of terror cases
National Security Guard (NSG)	Tactical response to terror incidents

Critical Infrastructure Protection

The policy strengthens protection of key sectors:


- Power infrastructure
- Railways
- Civil aviation
- Space assets
- Atomic installations


It also targets emerging threats such as drone misuse and cyber-terrorism.

Seven Pillars of PRAHAAR

Pillar	Focus
P - Prevention	Intelligence-led early detection and disruption of threats
R - Response	Rapid counter-terror action by coordinated agencies
A - Aggregating	Integration of capabilities across central and state institutions
H - Human Rights	Ensuring rule-of-law and legal safeguards during operations

A - Attenuating	De-radicalisation and addressing socio-economic vulnerabilities
A - Aligning	International cooperation against transnational terrorism
R - Recovery & Resilience	Community recovery and resilience after terror incidents

 **Mains Practice Question :** A comprehensive counter-terrorism strategy requires coordination across intelligence, law enforcement, and community engagement. Discuss the significance of India's PRAHAAR policy in strengthening the country's counter-terrorism architecture. (10 Marks)

 **Value-added UPSC keywords:**
Counter-terrorism architecture, intelligence fusion, de-radicalisation, critical infrastructure protection, drone-based threats, cyber-terrorism.

9. Regulating IPS Deputation: New Law Proposed for CAPFs



The Ministry of Home Affairs (MHA) informed the Supreme Court of India that it is considering a new law to regulate the deputation of IPS officers to Central Armed Police Forces (CAPFs). The proposal follows contempt petitions alleging non-compliance with court directives to reduce IPS deputation quotas in CAPFs.

Current Deputation Structure in CAPFs

Rank	IPS Deputation Quota
Inspector General (IG)	50% posts reserved for IPS officers
Deputy Inspector General (DIG)	20% posts reserved for IPS officers

CAPF cadre officers argue that this structure **limits promotion opportunities and creates a career ceiling**.

Career Progression Disparity

Service	Time to Reach Senior Rank
IPS officers	~13-15 years
CAPF cadre officers	~20-25 years

This disparity has led to demands for **greater representation of CAPF cadre officers in leadership roles**.

Central Armed Police Forces (CAPFs)

CAPFs function under the **Ministry of Home Affairs** and play a key role in **internal security and border management**.

Major CAPFs

Force	Primary Role
Central Reserve Police Force (CRPF)	Internal security and counter-insurgency
Border Security Force (BSF)	Guarding India's international borders
Indo Tibetan Border Police (ITBP)	Border security along India-China frontier
Central Industrial Security Force (CISF)	Security of critical infrastructure
Sashastra Seema Bal (SSB)	Border security and internal stability

Key Judicial Decisions

Case	Year	Key Outcome
Harananda vs Union of India	2019	Granted Organised Group 'A' Service (OGAS) status to CAPF officers
Sanjay Prakash vs Union of India	2025	Directed progressive reduction of IPS deputation up to IG rank
Review petition	2025	Supreme Court dismissed Centre's review , reinforcing career progression rights


Organised Group 'A' Service (OGAS)

OGAS status provides:

- **Financial parity with other central services**
- Structured **promotion hierarchy**
- Improved **service benefits and career progression**

Significance of the Proposed Law

- Addresses **long-standing service disputes between IPS and CAPF cadres**.
- Ensures **career mobility and parity for CAPF officers**.
- Strengthens **institutional clarity in command structures**.
- Balances **operational requirements with administrative fairness**.

 **Mains Practice Question :** The issue of IPS deputation to Central Armed Police Forces highlights tensions between operational requirements and career progression within security institutions. Discuss the challenges involved and suggest reforms for a balanced cadre management system. (10 Marks)

 **Value-added UPSC keywords:**

CAPF cadre reforms, IPS deputation policy, OGAS status, administrative justice, internal security governance.

10. SHANTI Act & Nuclear Liability Debate: Opening India's Nuclear Sector to Private Players



The SHANTI Act, passed during the Winter Session of Parliament, introduces reforms in India's nuclear sector by allowing **private sector participation in nuclear power generation** and modifying provisions of the **Civil Liability for Nuclear Damage Act 2010 (CLNDA)**. The move has triggered debate over **nuclear safety, liability caps, and supplier accountability**.

Key Features of the SHANTI Act

Feature	Description
Private sector participation	Ends exclusive government control and allows private companies to operate nuclear power plants
Supplier indemnity	Removes the "right of recourse", preventing operators from suing equipment suppliers
Liability cap (operator)	Between ₹100 crore and ₹3,000 crore
Total accident liability cap	300 million SDR (~₹3,900 crore)
Clause 46 omission	Removes victims' ability to seek compensation through other civil or criminal laws
Regulatory framework	Provides legislative backing to the Atomic Energy Regulatory Board (AERB)

Civil Liability for Nuclear Damage Act (CLNDA), 2010

The CLNDA was enacted to **provide compensation mechanisms in case of nuclear accidents** and align India with the **Convention on Supplementary Compensation for Nuclear Damage (CSC)**.

Key principles included:

- **Operator liability** for nuclear accidents
- **Right of recourse** against suppliers for defective equipment
- Victim compensation provisions

Liability and Safety Concerns

1 Supplier Indemnity Debate

Many major nuclear accidents involved **design flaws or equipment failures**.

Accident	Key Cause
Fukushima Nuclear Disaster	Containment and cooling system vulnerabilities
Chernobyl Disaster	Reactor design instability
Three Mile Island Accident	Control system failures

Critics argue that **supplier indemnity weakens incentives for strict engineering and quality control.**

2 Liability Cap vs Potential Damage

Indicator	Value
Liability cap under SHANTI Act	~₹3,900 crore
Estimated Fukushima damages	~₹46 lakh crore

This gap raises concerns about **compensation adequacy for catastrophic accidents.**

3 **Dilution of Absolute Liability** : Indemnification for “grave natural disasters” may dilute India’s historically strict **hazardous industry liability framework.**

Regulatory Institutions

Atomic Energy Regulatory Board (AERB)


Feature	Details
Established	1983
Legal basis	Atomic Energy Act, 1962
Role	Nuclear safety oversight, licensing and regulation
Administrative control	Department of Atomic Energy

Atomic Energy Commission (AEC)

Feature	Details
Established	1948
Role	Strategic planning of India’s nuclear programme
Oversees	Institutions like BARC, NPCIL and AERB
Chairperson	Secretary of Department of Atomic Energy

Significance of the SHANTI Act

- Encourages **private investment in nuclear power.**
- Supports India’s **clean energy transition and net-zero targets.**
- Enhances **capacity expansion in nuclear energy generation.**
- Raises important debates about **safety, liability, and regulatory independence.**

 **Mains Practice Question** : Opening the nuclear sector to private participation raises questions about safety, liability, and regulatory oversight. Critically examine the implications of the SHANTI Act for India’s nuclear energy policy. (10 Marks)

11. World Defence Show 2026: Global Platform for Future Military Technologies



The third edition of the World Defence Show (WDS 2026) is being held in Riyadh, Saudi Arabia. India participated with its first dedicated defence pavilion, showcasing indigenous military platforms and technologies.

About World Defence Show (WDS)

Feature	Details
Host country	Saudi Arabia
Organising body	General Authority for Military Industries (GAMI)
Frequency	Biennial defence exhibition
Domains covered	Air, Land, Sea, Space, and Security

The event serves as a global platform for defence companies, governments, and militaries to showcase next-generation military technologies.

Theme of WDS 2026

“The Future of Defence Integration”

The theme focuses on **multi-domain integration**, highlighting cooperation across:

- Air warfare
- Land combat
- Maritime security
- Space defence
- Cyber and homeland security

Key Highlights of WDS 2026

Feature	Description
Naval Security Zone	Maritime defence technologies and naval systems
Unmanned Systems Zone	Drones and autonomous combat systems
Future Defence Lab	Innovations in AI, robotics, and quantum technologies

These areas reflect the **technological transformation of modern warfare**.

India's Participation

India showcased indigenous defence technologies through a dedicated pavilion.

Key Systems Displayed

- Indigenous tanks
- Missile systems
- Advanced radar platforms

This aligns with India's **defence export promotion and indigenisation strategy**.


Strategic Significance

Dimension	Importance
Defence diplomacy	Strengthens India–Saudi Arabia strategic relations
Defence exports	Promotes Indian defence manufacturing globally
Technological cooperation	Enables partnerships in emerging defence technologies
Saudi Vision 2030	Supports goal of localising 50% of defence spending

Saudi Arabia's Vision 2030 (Defence Dimension)

Saudi Arabia aims to:

- Reduce dependence on foreign arms imports
- Develop **domestic defence manufacturing capacity**
- Localise **50% of defence procurement spending**

 **Mains Practice Question : Defence exhibitions have emerged as important platforms for defence diplomacy and technology exchange. Discuss the significance of events like the World Defence Show for India's defence exports and strategic partnerships. (10 Marks)**

🐾 12. Indigenous Dog Breeds in Security Forces: Tangkhul Hui & Kombai to Join Assam Rifles



The Assam Rifles plans to induct two indigenous dog breeds – **Tangkhul Hui** and **Kombai** – into its canine unit by **March 2027**.

The move aligns with the **Aatmanirbhar Bharat initiative**, reducing reliance on foreign breeds such as Labradors and German Shepherds in security operations.

Assam Rifles - Institutional Background

Feature	Details
Establishment	1835
Role	Border guarding, counter-insurgency and internal security
Administrative structure	Dual control: operational control by Indian Army , administrative control by Ministry of Home Affairs

It is the **oldest paramilitary force in India**, primarily operating in the **Northeast region**.

About Tangkhul Hui (Haofa)

Feature	Details
Native region	Manipur
Community association	Reared by the Tangkhul Naga Tribe
Appearance	Black coat with muzzle resembling an Asiatic Black Bear
Operational strength	Expert tracker in mountainous terrain
Key traits	Disease resistance and strong olfactory capability

Operational Role

- Tracking insurgents
- Narcotics detection
- Navigating hilly and forested terrain of Northeast India

About Kombai (Indian Boar Hound)


Feature	Details
Native region	Tamil Nadu
Habitat	Foothills of the Western Ghats
Appearance	Short reddish-brown coat with black muzzle
Traditional role	Hunting wild boar and guarding farms
Key traits	High pain tolerance and climate adaptability

Operational Role

- Guard duties
- Combat support in difficult climates
- Surveillance tasks

Significance of Induction

Dimension	Importance
Indigenisation	Promotes use of native breeds under Aatmanirbhar Bharat
Operational suitability	Indigenous breeds better adapted to Indian terrain and climate
Cost efficiency	Reduced training and maintenance costs compared to imported breeds
Biodiversity conservation	Recognition and preservation of indigenous dog breeds

 **Mains Practice Question :** Indigenous resources and local adaptations can play an important role in strengthening internal security capabilities. Discuss the significance of integrating indigenous animal breeds in defence and security operations. (10 Marks)

 **Value-added UPSC keywords:**

Indigenous dog breeds, Assam Rifles, **dual control structure**, Aatmanirbhar Bharat in defence, biodiversity conservation.

13. DPDP Act vs RTI: Supreme Court Examines Section 44(3)



The Supreme Court of India has referred petitions challenging Section 44(3) of the Digital Personal Data Protection Act 2023 to a larger Constitution Bench. Petitioners argue that the provision significantly weakens transparency under the Right to Information Act 2005 by prioritising data privacy over the public's right to information.

Background: DPDP Act, 2023

The Digital Personal Data Protection Act, 2023 establishes a legal framework for:

- Processing and protection of personal data
- Rights of data principals (individuals)
- Obligations of data fiduciaries (entities handling data)

It operationalises the **Right to Privacy** recognised as a fundamental right under Article 21.

What Section 44(3) Does

Section 44(3) modifies Section 8(1)(j) of the RTI Act, 2005, which previously governed disclosure of personal information.

Earlier Provision (RTI Act)

Condition	Explanation
Disclosure allowed	If larger public interest justified it
Privacy safeguard	If disclosure caused unwarranted invasion of privacy , it could be denied
Parliamentary parity	Information available to Parliament/State Legislatures must also be accessible to citizens

Changes Introduced by Section 44(3)

Change	Impact
Absolute exemption for personal data	Converts conditional exemption into blanket denial
Removal of public interest override	Public Information Officers cannot disclose personal data even in larger public interest
Deletion of legislative parity clause	Information accessible to Parliament may not necessarily be available to citizens
Removal of privacy threshold	“Unwarranted invasion of privacy” test eliminated
Public activity criterion removed	Even information linked to public office can be denied

Key Concerns Raised

1 Institutional Shielding

Public officials could label information such as:

- **Asset declarations**
- **Educational qualifications**
- **Disciplinary records**

as “personal data” to deny disclosure.

2 Loss of Discretion

Public Information Officers lose the power to **balance privacy with public interest**.

3 Rights Hierarchy

The amendment gives **statutory primacy to the Right to Privacy (Article 21)** over the **Right to Information derived from Article 19(1)(a)**.

4 Statutory Conflict

Section 44(3) may conflict with **Section 8(2) of the RTI Act**, which mandates disclosure if **public interest outweighs protected interests**.

5 Administrative Chilling Effect

Officials may deny requests due to fear of **financial penalties under the DPDP Act for improper data disclosure**.


Constitutional Context

Right	Article	Meaning
Right to Privacy	Article 21	Recognised in Justice K S Puttaswamy vs Union of India
Right to Information	Article 19(1)(a)	Derived from freedom of speech and expression

The case highlights the **tension between transparency and privacy**.

Significance

- Raises a fundamental question about **balancing privacy with transparency in governance**.
- Could redefine the **future scope of the RTI regime in India**.
- Important precedent for **data governance and democratic accountability**.

 **Mains Practice Question:** The Digital Personal Data Protection Act, 2023 raises important questions about the balance between privacy and transparency in governance. Critically examine the implications of Section 44(3) for the Right to Information regime in India. (10 Marks)

14. Exercise KHANJAR 2026: India–Kyrgyzstan Special Forces Drill



The 13th edition of Exercise KHANJAR began on 4 February 2026 at Misamari, Assam. The 14-day joint military exercise between India and Kyrgyzstan focuses on special forces cooperation, counter-terrorism operations and urban warfare under a UN mandate.

About Exercise KHANJAR

Feature	Details
Nature	Annual Joint Special Forces Exercise
Countries involved	India and Kyrgyzstan
First edition	2011
Venue pattern	Alternates between the two countries
Objective	Enhance interoperability and counter-terrorism capabilities

Participating Units

Country Special Forces Unit

India Parachute Regiment Special Forces

Kyrgyzstan Scorpion Brigade

These elite units train together to **share tactics, doctrines and operational experience.**

Key Training Components

The exercise includes specialised combat training such as:

- Urban warfare drills
- Counter-terrorism operations
- Sniping techniques
- Room intervention and building clearance
- Mountain warfare skills
- Special forces coordination exercises

The training simulates operations under a United Nations peacekeeping or counter-terrorism mandate.

Previous Edition

- 12th edition (2025) was held in Kyrgyzstan.
- Focus areas included:
 - High-altitude warfare
 - Counter-terror operations
 - Cultural exchanges between troops

✈️ 15. Exercise Vayushakti-26: IAF's Mega Firepower Demonstration



The Indian Air Force (IAF) will conduct Exercise Vayushakti-26 at the Pokhran Air-to-Ground Range in Jaisalmer. The exercise is a major triennial firepower demonstration showcasing the IAF's precision-strike capability and integrated operational readiness.

About Exercise Vayushakti

Feature	Details
Nature	Triennial firepower demonstration exercise
Conducted by	Indian Air Force
Venue	Pokhran Air-to-Ground Range, Rajasthan

Objective	Demonstrate precision strike capability and integrated combat readiness
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The exercise highlights the IAF's ability to conduct coordinated air operations in a simulated wartime environment.

Operational Framework

The 2026 exercise will operate through the **Integrated Air Command and Control System (IACCS)**.

Integrated Air Command and Control System (IACCS)

- A **network-centric operational platform** connecting radar stations, airbases and command centres.
- Enables **real-time monitoring and coordination of air operations across India**.
- Strengthens **air defence response and situational awareness**.

Major Platforms Participating

More than **100 aerial assets** will participate.

Aircraft	Role
Dassault Rafale	Air superiority and precision strike
HAL Tejas	Multirole combat missions
Airbus C-295	Tactical transport and logistics


Advanced Weapon Systems Demonstrated

System	Function
Short Range Loitering Munitions (SRLM)	Precision strike drones capable of loitering before attacking targets
Counter-Unmanned Aerial Systems (CUAS)	Systems designed to detect and neutralise hostile drones
Akash Surface-to-Air Missile	Air defence against enemy aircraft and missiles

Operational Scenarios in the Exercise

The drill will simulate **modern battlefield environments** including:

- **Day and night combat missions**
- **Drone swarm operations**
- **Electronic warfare (EW) scenarios**
- **Humanitarian Assistance and Disaster Relief (HADR) operations**

 **Mains Practice Question:** Network-centric warfare and advanced aerial capabilities are transforming modern military operations. Examine the role of exercises like Vayushakti in strengthening India's air power and defence preparedness. (10 Marks)

16. Exercise MILAN 2026 & International Fleet Review: India's Maritime Diplomacy in Action



The Indian Navy is hosting Exercise MILAN 2026 along with the International Fleet Review (IFR) 2026. These events strengthen India's maritime cooperation and operationalise the MAHASAGAR vision, projecting India as a 'Preferred Security Partner' in the Indian Ocean Region (IOR).

Exercise MILAN 2026

Feature	Details
Nature	Multilateral naval exercise
Conducted by	Indian Navy
Edition	13th edition
Participants	Multiple partner navies from across the world

Structure of the Exercise

Phase	Purpose
Harbour Phase	Professional exchanges, seminars, and cultural interactions
Sea Phase	Operational naval drills and maritime exercises

Key Activities

- International City Parade
- International Maritime Seminar
- Cultural exchange programmes at the MILAN Village

New Participants

Naval assets from the following countries are participating for the first time:

- Germany
- Philippines
- United Arab Emirates

International Fleet Review (IFR) 2026

Feature	Details
Theme	"United Through Oceans"
Reviewing authority	Droupadi Murmu
Reviewing platform	INS Sumedha
Total warships	71 warships
Foreign participation	19 foreign naval vessels

Delegations

Representatives from 70+ countries

What is an International Fleet Review?

An **International Fleet Review** is a naval ceremonial event where warships assemble and are reviewed by the **Head of State**, symbolising:


- **Maritime cooperation**
- **Naval strength**
- **Diplomatic engagement among navies**

MAHASAGAR Vision

The events operationalise India's **MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions)** vision, which aims to:

- Strengthen **maritime security cooperation**
- Promote **free, open and inclusive seas**
- Enhance **disaster response and maritime domain awareness**

This vision complements India's **SAGAR (Security and Growth for All in the Region)** doctrine.

 **Mains Practice Question : Multilateral naval exercises play an important role in maritime diplomacy and regional security. Discuss the significance of Exercise MILAN in strengthening India's strategic presence in the Indian Ocean Region. (10 Marks)**

🔥 17. Exercise Vajra Ghaat: Testing the K9 Vajra in Desert Warfare



The Indian Army Southern Command conducted Exercise Vajra Ghaat at the Pokhran Field Firing Range. The exercise tested Tactics, Techniques and Procedures (TTPs) for improving survivability and combat effectiveness in harsh desert warfare conditions, while showcasing the combat capability of the K9 Vajra-T.

About Exercise Vajra Ghaat

Feature	Details
Conducted by	Indian Army Southern Command
Location	Pokhran Field Firing Range, Rajasthan
Objective	Validate desert warfare TTPs and artillery deployment strategies
Focus	Operational effectiveness in sandy desert terrain

The exercise simulated **high-intensity artillery combat operations in desert environments**.

About K9 Vajra-T

Feature	Details
Type	Tracked self-propelled howitzer
Origin	Indigenous version of K9 Thunder
Manufacturer	Larsen & Toubro
Technology partner	Hanwha Defence
Production model	Manufactured in India under Make in India

Key Capabilities of K9 Vajra

Capability	Description
Range	Artillery strike capability up to 40 km
Rapid fire capability	Fires 3 rounds in 15 seconds
Shoot-and-scoot feature	Quickly relocates after firing to avoid counter-battery fire
Mobility	Tracked platform ensures high cross-country mobility
Ammunition compatibility	Compatible with Indian and NATO-standard ammunition

Tactical Importance in Desert Warfare

The K9 Vajra system is particularly suited for **desert combat scenarios** due to:

- **High mobility on sandy terrain**
- **Rapid deployment capability**
- **Long-range precision artillery fire**
- **Protection against enemy counter-bombardment**

🧠 **Mains Practice Question : Modern artillery systems play a critical role in contemporary battlefield dynamics. Examine the significance of platforms like the K9 Vajra in strengthening India's combat preparedness. (10 Marks)**

📌 18. VAJRA PRAHAR: India–US Special Forces High-Altitude Drill



The 16th edition of Exercise VAJRA PRAHAR is being conducted at the Special Forces Training School in Himachal Pradesh between India and the United States. The exercise focuses on mountain warfare, high-altitude tactical operations and joint special forces mission planning.

About Exercise VAJRA PRAHAR

Feature	Details
Nature	Annual India-US Joint Special Forces Exercise
First conducted	2010
Edition	16th edition (2026)
Hosting pattern	Alternates between India and the United States
Participating forces	Special Forces units of both countries

Objectives

The exercise aims to:

- Enhance interoperability between Indian and US Special Forces
- Improve joint mission planning and operational coordination
- Exchange best practices in counter-terrorism operations
- Strengthen defence cooperation between the two countries

Focus Areas of the 2026 Edition

Training Area	Description
Mountain warfare	Combat operations in rugged terrain
High-altitude operations	Tactical manoeuvres under extreme climatic conditions
Counter-terror drills	Special forces operations against terrorist threats
Joint mission planning	Coordinated special operations planning

🧠 **Mains Practice Question:** Joint military exercises play a key role in strengthening strategic partnerships and improving operational capabilities. Discuss the significance of exercises like VAJRA PRAHAR in the context of India-US defence cooperation. (10 Marks)

19. Exercise DHARMA GUARDIAN 2026: India–Japan Military Cooperation



The 7th edition of the India–Japan joint military exercise DHARMA GUARDIAN commenced on 24 February 2026 at the Foreign Training Node Chaubattia in Uttarakhand. The exercise aims to enhance joint operational capabilities in semi-urban combat environments between the Indian Army and the Japan Ground Self Defense Force (JGSDF).

About Exercise DHARMA GUARDIAN

Feature	Details
Nature	Annual bilateral military exercise
Participating countries	India and Japan
Edition	7th edition (2026)
Duration	24 February – 9 March 2026
Venue	Foreign Training Node, Chaubattia (Uttarakhand)

The exercise focuses on improving interoperability between the two armies during joint operations.


Participating Units


Country	Military Unit
India	Ladakh Scouts
Japan	32nd Infantry Regiment

Around 120 personnel from each side are participating in the exercise.

Key Training Components

Training Area	Description
Semi-urban warfare	Combat operations in built-up environments
Joint planning	Collaborative operational strategy development
Tactical drills	Coordinated combat manoeuvres
Counter-terror operations	Specialised response to asymmetric threats

 **Mains Practice Question :** India and Japan have steadily expanded defence cooperation in recent years. Discuss the significance of joint exercises such as DHARMA GUARDIAN in strengthening strategic partnership in the Indo-Pacific region. (10 Marks)

 **UPSC keywords:**

India–Japan defence cooperation, Indo-Pacific security, bilateral military exercises, interoperability, semi-urban warfare training.

🔥 20. Exercise Agni Varsha: Indian Army's Integrated Desert Warfare Drill



The Indian Army Southern Command conducted Exercise Agni Varsha at the Pokhran Field Firing Ranges in Rajasthan.

The exercise validated the Army's **integrated firepower and manoeuvre capabilities in desert combat conditions.**

About Exercise Agni Varsha

Feature	Details
Conducted by	Indian Army – Southern Command
Location	Pokhran Field Firing Ranges, Rajasthan
Nature	Large-scale fire-and-manoevre exercise
Objective	Test operational readiness in desert warfare scenarios

The exercise simulated **high-intensity combat situations involving coordinated armour, artillery and aerial support.**

Technological Integration

The drill showcased **modern network-centric warfare capabilities** through the integration of:

Technology	Role
Unmanned Aerial Systems (UAS)	Surveillance and target acquisition
Counter-drone systems	Detection and neutralisation of hostile drones
Networked surveillance assets	Real-time battlefield situational awareness
Modern artillery systems	Long-range precision firepower

Major Military Assets Demonstrated

Platform	Role
T-90 Bhishma	Armoured offensive operations
Infantry Combat Vehicles (ICVs)	Mechanised infantry mobility and support
K9 Vajra-T	Long-range artillery firepower
HAL Dhruv	Air support, reconnaissance and logistics

Operational Concept: Fire-and-Manoeuvre


Fire-and-manoevre is a key military tactic where:


- Firepower suppresses enemy positions
- Manoeuvre forces advance to seize tactical advantage

This doctrine ensures **rapid offensive movement while maintaining battlefield dominance.**

Strategic Significance

Dimension	Importance
Desert warfare preparedness	Strengthens combat readiness in western theatre
Integrated battle groups concept	Demonstrates coordinated armour, artillery and aviation operations
Technological modernisation	Highlights integration of drones and networked surveillance
Deterrence capability	Signals India's ability to conduct high-intensity combined arms operations

 **Mains Practice Question: Integrated combat exercises are essential for validating modern warfare doctrines and operational readiness. Discuss the significance of large-scale drills such as Exercise Agni Varsha for India's defence preparedness. (10 Marks)**

 **UPSC keywords:**

Fire-and-manoevre doctrine, desert warfare preparedness, integrated combat operations, network-centric warfare, unmanned systems in modern warfare.

FEBRUARY 2026

INDIA & WORLD ECONOMY

1. 16th Finance Commission Retains 41% Devolution
2. Budget 2026–27 Drives Viksit Bharat Vision
3. Gender Budget Hits ₹5.01 Lakh Crore
4. Finance Commission Revises Forest Cover Criterion
5. India's Direct Tax Base Doubles
6. Proposal to Convert NITI into Productivity Commission
7. India Can Achieve Viksit Bharat and Net-Zero
8. RBI–ESMA MoU Strengthens Financial Clearing
9. RBI Proposes Digital Fraud Compensation Framework
10. RBI Draft Rules on Loan Recovery Practices
11. RBI Liberalises External Commercial Borrowings
12. CBDC–Based Food Currency Pilot in Gujarat
13. RuPay–UPI Incentives Boost Digital Payments
14. Stable Agri Export Policy for \$100B Target
15. VOPPA Order 2025 Regulates Edible Oil
16. India Becomes Largest Rice Producer Globally
17. Decline in MSP Forest Produce Procurement
18. ACC PLI Scheme Faces Delays
19. Skill Gap in Aerospace Manufacturing
20. India to Produce Rare-Earth Magnets
21. Semiconductor OSAT Unit in Jewar
22. Budget Announces New Chemical Parks Scheme
23. Yantra India Gets Miniratna Category-I Status
24. CCEA Clears Brahmaputra Underwater Tunnel
25. India Launches Namo Bharat RRTS
26. ₹1 Lakh Crore Urban Challenge Fund
27. NMP 2.0 Targets ₹16.72 Lakh Crore
28. India–US Trade Deal Cuts Export Tariffs
29. MSME Export Promotion Expanded
30. India–France Amend DTAC Agreement
31. US–EU Apple Tariff Hits J&K Farmers
32. Government Cuts RoDTEP Incentives by Half
33. US Imposes Duty on Indian Solar Cells
34. India Revises Trade Indices Base Year
35. DISCOMs Show Financial Turnaround
36. Fertiliser Ban Debate in Uttar Pradesh
37. India's Oil Import Dependence Crosses 88%
38. India's E-Commerce to Reach \$300 Billion
39. Content Creator Labs Boost Orange Economy
40. RBI Raises MSME Loan Limit
41. Bharat Taxi: India's Cooperative Ride Platform
42. Bonded Labour Persists in India
43. ESIC Marks 75 Years of Social Security
44. Budget Boosts PM VIKAS Scheme
45. DGCA Proposes Flight Ban for Disruptive Flyers
46. AAIB Probes Jharkhand Air Ambulance Crash
47. SC Reviews WhatsApp–CCI Dispute
48. SBI Launches CHAKRA Finance Centre
49. India Releases New CPI Inflation Series



1. 16th Finance Commission Retains 41% Tax Devolution, Pushes Fiscal Discipline



The 16th Finance Commission (2026–31) retained the States' share of 41% in the divisible tax pool while recommending outcome-linked spending and stricter fiscal discipline. The report also proposed changes in the horizontal devolution formula and fiscal reform measures.

About the Finance Commission

- The Finance Commission (FC) is a constitutional body under Article 280.
- It recommends distribution of tax revenues between the Union and States and among States.
- Constituted every five years or earlier if required by the President.

Component	Details
Chairperson	Appointed by the President
Members	Four other members
Nature	Quasi-judicial advisory body

Key Recommendations of the 16th Finance Commission

Vertical Devolution

- States' share in the divisible pool retained at 41% (same as the 15th Finance Commission).

Transparency Measures

- Annual disclosure of net tax proceeds certified by the CAG under Article 279.

Outcome-Based Spending

- Centrally Sponsored Schemes (CSS) linked to measurable outcomes and real-time monitoring.

Fiscal Reform Recommendations

Reform Area	Recommendation
Scheme Rationalisation	High-powered committee to review and close inefficient schemes
Fiscal Deficit Limits	States capped at 3% of GSDP; Union target 3.5% of GDP
Off-Budget Borrowings	States advised to bring hidden borrowings onto the budget
Subsidy Rationalisation	Introduce sunset clauses and avoid borrowing for transfers
PSU Reforms	Close or restructure loss-making State Public Sector Enterprises

Revised Horizontal Devolution Formula

Criterion	15th FC (2021–26)	16th FC (2026–31)
Per Capita Income Distance	45%	42.5%
Population	15%	17.5%
Demographic Performance	12.5%	10%
Area	15%	10%
Forest Cover	10%	10%
Contribution to GDP (New)	–	10%
Tax & Fiscal Effort	2.5%	–

Key Change: Introduction of GDP contribution criterion replacing tax effort indicator.

Impact of Horizontal Devolution

Southern States

- Increase in devolution shares for all southern states:
 - Andhra Pradesh - 4.217%
 - Karnataka - 4.131%
 - Kerala - 2.382%
 - Tamil Nadu - 4.097%
 - Telangana - 2.174%

Northern States

- Slight decline for large population states:
 - Uttar Pradesh - 17.619%
 - Bihar - 9.948%

(They still remain the largest recipients due to population size.)

Mains Question

“Finance Commissions play a crucial role in maintaining fiscal federalism in India.” Examine the key reforms proposed by the 16th Finance Commission and their implications for Centre–State fiscal relations. (15 Marks)

2. Union Budget 2026–27: Viksit Bharat Vision Powered by Yuva Shakti



The Union Budget 2026–27 was presented by Finance Minister Nirmala Sitharaman, marking her 9th consecutive budget presentation. The Budget outlines a roadmap for Viksit Bharat (Developed India) with a focus on youth-driven growth, fiscal consolidation, manufacturing expansion, and infrastructure-led development.

Strategic Vision of Budget 2026–27

The Budget is anchored around three “Kartavyas” (Duties):

1. Accelerate and sustain economic growth
2. Fulfil citizens’ aspirations
3. Ensure universal access to resources and opportunities

To achieve these, the government identified six key intervention areas:

Area	Focus
Strategic Manufacturing	Scaling frontier sectors like semiconductors and biopharma
Industrial Modernisation	Revitalising legacy industrial clusters
MSME Empowerment	Scaling MSMEs through SME Growth Fund
Infrastructure Investment	Capex-led growth through rail, freight corridors
Energy Resilience	Critical minerals corridors and CCUS technology
Urban Development	Development of City Economic Regions (CERs)

Macroeconomic Framework

Indicator	Budget 2026-27
Fiscal Deficit Target	4.3% of GDP
Debt Target	Stabilise Debt-GDP ratio at ~50% by FY2031
Capital Expenditure	₹12.2 lakh crore
Total Expenditure	₹53.47 lakh crore

Industry, Manufacturing & MSMEs

Initiative	Key Details
Biopharma SHAKTI	₹10,000 crore scheme for biologics & biosimilars
NIPER Expansion	3 new institutes + upgrades to 7 existing NIPERs
Semiconductor Mission (ISM 2.0)	₹1,000 crore allocation
Electronics Component Scheme	Outlay expanded to ₹40,000 crore
Container Manufacturing Scheme	₹10,000 crore to reduce import dependence
Chemical Parks	Three new parks with plug-and-play infrastructure
Rare Earth Corridors	Planned in Odisha, Kerala, Andhra Pradesh, Tamil Nadu
SME Growth Fund	₹10,000 crore to scale global MSME champions
Corporate Mitras	Para-professional support for MSMEs

Infrastructure, Energy & Connectivity

Initiative	Key Feature
High-Speed Rail	7 new corridors including Mumbai-Pune
Dedicated Freight Corridor	Dankuni-Surat corridor
City Economic Regions (CER)	₹5,000 crore each over 5 years
CCUS Mission	₹20,000 crore for carbon capture technologies
Waterways Expansion	20 new national waterways
Coastal Shipping Goal	Increase cargo share to 12% by 2047
Seaplane Scheme	Viability Gap Funding (VGF) for operations

Agriculture & Rural Economy

Initiative	Objective
Bharat-VISTAAR AI Tool	Real-time advisory through AgriStack
Fisheries Investment	₹2,761 crore allocation under PMMSY
High-Value Crop Promotion	Sandalwood, agarwood, walnuts, almonds
Export Branding	Global branding for cashew and cocoa
Veterinary Workforce	Training 20,000 professionals
Mahatma Gandhi Gram Swaraj Initiative	Strengthening rural non-farm economy

Women-Led Development (Nari Shakti)

Initiative	Purpose
SHE-Marts	Retail outlets for women SHGs
Lakhpati Didi Transition	Promote enterprise ownership
STEM Hostels	Girls' hostel in every district

Mission Shakti Allocation	Increased to ₹3,605 crore
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Social Justice & Welfare

Initiative	Focus
Divyang Kaushal Yojana	Skill training for persons with disabilities
Divyang Sahara Yojana	Assistive devices via ALIMCO
NIMHANS-2	Mental health institute in North India
Geriatric Workforce Programme	Train 1.5 lakh caregivers
Purvodaya Initiative	Development of eastern states

Services, Technology & Tourism

Initiative	Details
AVGC Labs	Creator labs in 15,000 schools and 500 colleges
Cloud Tax Holiday	Incentives for global cloud providers till 2047
Safe Harbour Limit	Raised to ₹2,000 crore
Digital Tourism Grid	National tourism knowledge database
Adventure Tourism Trails	Birdwatching, trekking, turtle watching

Financial Sector Reforms

Reform	Key Feature
Banking Reform Committee	“Banking for Viksit Bharat” review
PROI Investment Limit	Increased to 10% (24% aggregate)
Municipal Bonds Incentive	₹100 crore incentive for cities
TReDS Mandate	Mandatory for CPSE procurement from MSMEs
FAST DS Scheme	Disclosure window for overseas assets up to ₹5 crore

Taxation Reforms

Reform	Change
Income Tax Act 2025	New tax code replacing the 1961 Act
TCS on Overseas Remittances	Reduced to 2%
MACT Compensation Interest	Fully tax exempt
Buyback Tax Reform	Taxed as capital gains
STT on F&O	Increased to 0.05% (futures) and 0.15% (options)
MAT Rationalisation	Reduced to 14%
Decriminalisation	Technical defaults converted to civil penalties
ITR Filing Deadline	Extended to August 31

Mains Question

“The Union Budget 2026–27 reflects a strategy of infrastructure-led growth combined with structural reforms.” Examine how the budget attempts to balance economic growth, fiscal discipline, and inclusive development. (15 Marks)

3. Gender Budget 2026–27 Hits Record ₹5.01 Lakh Crore Allocation



The Union Government released the Gender Budget Statement (GBS) 2026–27, reporting the highest-ever allocation of ₹5.01 lakh crore for women and girls. The gender budget now accounts for 9.37% of the total Union Budget, reflecting a stronger focus on gender-responsive governance.

About Gender Budgeting

- Gender Budgeting is a public financial management tool that integrates gender perspectives into budgeting and policy decisions.
- It ensures that government expenditure addresses gender disparities and promotes women's empowerment.
- It does not represent a separate budget, but a framework to assess how budgetary allocations benefit women.

Institutional Framework

Aspect	Details
Introduced in India	Union Budget 2005–06
Budget Statement	Published as Expenditure Statement 13
Nodal Ministry	Ministry of Women and Child Development (MWCD)
Institutional Mechanism	Gender Budgeting Cells (GBCs) established in ministries since 2004–05

Key Highlights of Gender Budget Statement 2026–27

Indicator	Value
Total Allocation	₹5.01 lakh crore
Increase	11.55% rise from previous year
Share in Total Budget	9.37% (up from 8.86% in FY 2025–26)
Institutional Coverage	53 Ministries and 5 UTs reported gender allocations
Leading Ministry	MWCD – 81.73% of its budget gender-focused

Components of Gender Budgeting

Category	Allocation Share	Meaning
Part A	21.50%	Schemes with 100% women beneficiaries
Part B	72.54%	Schemes where 30–99% beneficiaries are women
Part C	~5%	Schemes where less than 30% allocation benefits women (introduced in FY 2024–25)

Mains Question

“Gender budgeting is a powerful tool for achieving inclusive development.” Examine the role of the Gender Budget Statement in promoting gender equality in India's fiscal policy. (15 Marks)

4. 16th Finance Commission Revises Forest Cover Criterion in Tax Devolution



The Sixteenth Finance Commission revised the forest cover criterion used in the horizontal tax devolution formula, expanding the scope to include open forests and density-based valuation. The reform aims to better reflect ecological realities and incentivise forest conservation by states.

Forest Cover in Fiscal Federalism

- Forest cover is used as a **criterion in the Finance Commission's horizontal tax devolution formula** to compensate states for **ecological conservation and opportunity costs of preserving forests**.
- The **15th Finance Commission assigned 10% weight to forest and ecology** in the devolution formula.

Key Changes Introduced by the 16th Finance Commission

Reform	Explanation
Inclusion of Open Forests	Open forests are now included in the forest cover calculation, expanding beyond dense forests
Density-Based Weighting	Forests differentiated by density to reflect ecological value variations
Incentives for Expansion	States increasing forest and tree cover through restoration receive greater fiscal rewards
Support for Fragile Regions	Recognises higher conservation costs in hilly and forest-rich states
Disaster Linkage	Forest fires added to Disaster Risk Index , linking ecological risk with fiscal support

Differences from Previous Forest Formula

Aspect	Earlier System	Revised System
Coverage	Mainly dense and moderately dense forests	Includes open forests
Weight Application	Uniform 10% weight	Density-based differentiation
Policy Incentive	Rewarded existing forest stock	Incentivises forest restoration and expansion

Constitutional Safeguards for Forests

Provision	Significance
Article 48A (DPSP)	State must protect and improve the environment and forests
Article 51A(g)	Fundamental duty of citizens to protect the natural environment
42nd Constitutional Amendment (1976)	Transferred forests to the Concurrent List

Legal and Judicial Safeguards

Law / Case	Key Provision
Forest (Conservation) Act, 1980	Central approval required for diversion of forest land
Forest Rights Act, 2006	Recognises rights of forest-dwelling communities
Environment (Protection) Act, 1986	Umbrella environmental law requiring EIA clearance
T.N. Godavarman Case (1996)	Expanded the legal definition of forests

Mains Question

“Environmental sustainability is increasingly being integrated into fiscal federalism.” Examine the significance of including forest cover as a criterion in Finance Commission tax devolution. (15 Marks)

5. India's Direct Taxpayer Base Doubles in a Decade



Recent Income Tax Department data show sustained expansion in India's direct taxpayer base over the last decade, reflecting improved compliance, digitalisation, and economic formalisation.

Key Trends in India's Taxpayer Base

Indicator	Earlier	Latest	Trend
Total Taxpayers	5.26 crore (AY 2013-14)	12.13 crore (AY 2024-25)	More than doubled
Growth Rate	—	~7.89% CAGR	Sustained structural expansion
Individual Taxpayers	4.96 crore	11.61 crore	~8% CAGR growth
Non-Individual Taxpayers	0.29 crore	0.48 crore	~5% CAGR
Pandemic Impact	—	~9% contraction in AY 2020-21	Temporary dip
Cost of Tax Collection	1.36% (FY 2000-01)	0.41% (FY 2024-25, provisional)	Significant efficiency gain

Drivers of Expansion in the Taxpayer Base

1. Digitalisation of Tax Administration
2. Prefilled Income Tax Returns
3. Faceless Assessment System
4. Economic Formalisation

6. Proposal to Transform NITI Aayog into a “Productivity Commission”



The Vice-Chairman of NITI Aayog, Suman Bery, suggested rebranding or evolving NITI Aayog into a “Productivity Commission” to help India maximise its demographic dividend and achieve the Viksit Bharat 2047 goal.

Context: Productivity and India’s Growth Challenge

- India’s working-age population will continue to expand for about 25 more years.
- However, productivity levels remain relatively low compared to major economies.
- For India to reach ~\$18,000 per capita income by 2047, productivity improvements in labour, capital, and technology are essential.

Arguments for Creating a Productivity Commission

1. Managing the Demographic Dividend

- India’s demographic window can become a **demographic liability** if productivity does not rise.
- Without structural reforms, **labour supply growth may lead to unemployment rather than income growth.**

2. Addressing the Productivity Gap

- **China’s labour productivity (output per hour) is almost twice that of India.**
- A dedicated commission could identify **sector-specific productivity reforms.**

3. Preparing for AI and Technological Change

- A Productivity Commission could identify “**no-regret reforms**” that improve skills, technology adoption, and resilience to **AI-driven labour disruptions.**

4. Supporting MSME Productivity

- Over **90% of Indian MSMEs are informal** and lack:
 - technology adoption
 - benchmarking systems
 - productivity diagnostics
- The commission could provide **technology benchmarking and policy guidance.**

5. Long-Term Economic Planning

- Achieving **Viksit Bharat 2047** requires **long-term productivity strategies**, beyond the **medium-term policy horizon** of NITI Aayog.

Arguments Against Creating a Productivity Commission

1. Institutional Duplication

- Its functions may overlap with: **NITI Aayog, Economic Advisory Council to the Prime Minister (EAC-PM).**

2. Lack of Binding Authority

- Like NITI Aayog, the commission would only have **advisory powers**, limiting implementation impact.

3. Data Limitations

- Nearly **90% of India’s workforce is informal**, making **firm-level productivity measurement difficult.**

4. Automation Concerns

- Focusing heavily on **output per worker** may accelerate **automation**, reducing labour-intensive employment.

5. Federal Concerns

- **Labour is in the Concurrent List**, meaning states may resist **central productivity directives.**

7. India Can Achieve Viksit Bharat (2047) and Net-Zero (2070) Simultaneously: NITI Aayog Study



The study “Scenarios Towards Viksit Bharat & Net Zero” indicates that India can simultaneously become a developed economy by 2047 and achieve net-zero emissions by 2070, provided it undertakes large-scale infrastructure transformation, energy transition, and financial mobilisation.

Core Strategy for Achieving Viksit Bharat and Net-Zero

1. Viksit Bharat @ 2047

Key Factor	Explanation
High Growth Requirement	Sustained 7-8% real GDP growth required for India to become a high-income developed economy
Infrastructure Opportunity	Around 85% of India’s 2047 infrastructure is yet to be built, enabling low-carbon urbanisation
Demographic Dividend	Productive employment of India’s large working-age population will drive productivity and fiscal stability

2. Net-Zero Emissions @ 2070

Key Strategy	Explanation
Electrification Backbone	Electrification across transport, industry, and buildings will be the main driver of emissions reduction
Massive Investment Need	Net-zero transition requires ~\$22.7 trillion investment
Renewable Expansion	Renewable capacity must reach 6,500-7,000 GW, transforming India’s power system

Key Challenges for India

1. Critical Mineral Dependence

- Lithium demand may increase 40 times by 2040 due to EV batteries and clean energy technologies.
- Heavy reliance on imports creates strategic vulnerability.

2. Global Supply Chain Concentration

- China controls 60-70% of global refining capacity for many energy-transition minerals.

3. Climate Investment Gap

- Current annual climate investment: ~\$135 billion
- Required investment is far higher, creating a financing challenge.

4. Rapid Energy Demand Growth

- Electricity demand projected to grow 6-7% annually this decade due to:
 - cooling demand
 - industrial growth
 - digital infrastructure expansion.

5. Financial System Limitations

- Corporate bond market size: ~16% of GDP (relatively shallow).
- Household financialisation: ~60%, limiting long-term capital mobilisation.

8. RBI-ESMA MoU on Central Counterparties to Strengthen Cross-Border Financial Clearing



The Reserve Bank of India (RBI) and the European Securities and Markets Authority (ESMA) signed a Memorandum of Understanding (MoU) to cooperate on the regulation and supervision of Central Counterparties (CCPs). The agreement will facilitate European Union recognition of Indian CCPs, improving cross-border financial market integration.

Key Features of the RBI-ESMA Cooperation

Feature	Explanation
MoU Framework	Establishes cooperation and information sharing between RBI and ESMA
Recognition of Indian CCPs	Enables EU authorities to formally recognise Indian clearing institutions
Reliance Model	ESMA will rely on RBI's supervisory framework instead of conducting direct inspections
Regulatory Coordination	Improves cross-border supervision of clearing institutions
Objective	Ensure financial stability and smooth international clearing operations

Significance of the Agreement

1. Strengthening Cross-Border Financial Markets

- Facilitates **participation of European banks in Indian markets.**
- Improves **global clearing and settlement mechanisms.**

2. Lower Regulatory Costs

- EU institutions can **avoid duplicative regulatory requirements**, reducing compliance costs.

3. Financial Stability

- Enhances oversight of **systemically important financial infrastructures.**

4. India-EU Financial Integration

- Complements the **ongoing India-EU Free Trade Agreement negotiations** by strengthening financial sector cooperation.

About Central Counterparties (CCPs)

Definition : Central Counterparties are **financial market institutions that act as intermediaries in trades**, guaranteeing settlement even if one party defaults.

Operational Mechanism

- CCP becomes **buyer to every seller and seller to every buyer.**
- This process is called **novation.**

Functions of CCPs

Function	Explanation
Risk Mitigation	Reduces counterparty credit risk in financial transactions
Default Management	Prevents cascading defaults in financial markets
Trade Settlement	Ensures smooth clearing and settlement of financial trades
Market Stability	Maintains confidence in financial markets

Systemic Importance of CCPs

- CCPs are classified as **Systemically Important Financial Market Infrastructures (SIFMIs)**.
- Failure of a CCP could trigger **widespread financial instability across the economy**.

Regulation of CCPs in India

Market Segment	Regulator
Money Market, Government Securities (G-Secs), Forex Market	RBI
Capital Markets (Equity, derivatives)	SEBI

Major Central Counterparties in India

CCP	Market Segment
Clearing Corporation of India Ltd (CCIL)	Government securities, money market, forex
National Securities Clearing Corporation Ltd	NSE capital market clearing
Indian Clearing Corporation Ltd (ICCL)	BSE capital market clearing

9. RBI Proposes Compensation Framework for Small-Value Digital Fraud Victims



The Reserve Bank of India (RBI) has proposed a **compensation framework for victims of small-value digital frauds**, aiming to strengthen consumer protection in the rapidly expanding digital payments ecosystem.

Key Features of the Proposed Compensation Framework

Feature	Details
Target Fraud Category	Digital frauds below ₹50,000, which constitute ~65% of all digital fraud cases
Compensation Limit	Victims eligible for up to ₹25,000 or 85% of the loss , whichever is lower
Frequency Restriction	One-time relief per customer to discourage repeated negligence
Eligibility Expansion	Covers cases of inadvertent credential sharing , provided there is no mala fide intent

Liability Sharing Mechanism

The framework introduces a **“skin in the game” model**, distributing responsibility among stakeholders.

Stakeholder	Share of Loss
Customer	~15% (deductible) to ensure vigilance
Banks	~15% contribution to incentivise stronger cybersecurity systems
RBI (DEA Fund)	~70% compensation, subject to ₹25,000 cap

This model ensures **shared accountability** between users, financial institutions, and the regulator.

Funding Source: Depositor Education and Awareness (DEA) Fund

Feature	Explanation
Established	2014 by RBI
Legal Basis	Section 26A of the Banking Regulation Act, 1949
Corpus Source	Unclaimed bank deposits inactive for 10 years or more
Current Corpus	Approximately ₹85,000 crore surplus

Key Features of the DEA Fund

1. Transfer of Unclaimed Deposits

- Banks must transfer balances from **inoperative accounts (10+ years)** to the fund.

2. Depositor Rights Protected

- Depositors can **reclaim funds anytime through their bank**, even after transfer to the fund.

3. Interest Payment

- RBI pays interest on these funds, which banks must pass on to the depositor upon claim settlement.

4. Awareness and Consumer Protection

- The fund finances **financial literacy and depositor awareness initiatives**.

5. Digital Fraud Compensation Proposal

- RBI proposes using part of the fund to **compensate victims of small-value digital frauds**.

Supporting Initiative: UDGAM Portal

- RBI launched the **UDGAM (Unclaimed Deposits - Gateway to Access Information)** portal.
- Allows citizens to **search unclaimed deposits across multiple banks in a centralised platform**.

10. RBI Draft Guidelines to Regulate Loan Recovery Practices and Protect Borrowers



The Reserve Bank of India (RBI) has issued **draft guidelines to regulate the conduct of bank employees and loan recovery agents**, aiming to prevent harassment of borrowers and ensure **ethical debt recovery practices**. The directions are proposed to come into effect **from July 1, 2026**.

Scope of the Guidelines

- Applicable to:
 - **Commercial Banks**
 - **Regional Rural Banks (RRBs)**
 - **Small Finance Banks (SFBs)**
- Intended to **standardise recovery practices and strengthen borrower protection**.

Key Highlights of the Draft Guidelines

1. Civil and Ethical Conduct

- Recovery agents must interact with borrowers **politely and professionally**.
- Prohibits:
 - abusive language
 - threats
 - coercive recovery tactics.

2. Time Restrictions on Contact

Activity	Allowed Time
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Recovery calls and visits **8:00 AM - 7:00 PM only**

Agents are prohibited from contacting borrowers during **sensitive occasions** such as:

- bereavement
- weddings
- other family events.

3. Mandatory Authorisation

Banks must: **Inform borrowers in writing** before assigning recovery agents.

- Agents must carry:
 - **Authorisation letter**
 - **Identity card** issued by the bank.

4. Certification and Training

- Recovery agents must complete **ethical debt collection training**.
- Certification to be issued by the **Indian Institute of Banking and Finance (IIBF)**.

5. Borrower Privacy Protection

Agents must respect the **Right to Privacy** of borrowers:

- Communication allowed only with:
 - **Borrower**
 - **Guarantor**
- Agents cannot contact:
 - family members
 - colleagues
 - neighbours.

11. RBI Liberalises External Commercial Borrowing (ECB) Framework



The Reserve Bank of India (RBI) notified the Foreign Exchange Management (Borrowing and Lending) (First Amendment) Regulations, 2026, introducing major reforms to liberalise the External Commercial Borrowing (ECB) framework and improve access to global capital.

About External Commercial Borrowings (ECBs)

Aspect	Details
Definition	Commercial loans raised by eligible Indian resident entities from recognised non-resident lenders
Purpose	Provide access to cheaper international capital for infrastructure, expansion and investment
Legal Basis	Governed by Foreign Exchange Management Act (FEMA), 1999
Regulator	Reserve Bank of India (RBI)
Currency Options	Can be raised in Freely Convertible Foreign Currency (FCY) or Indian Rupees (INR)
Access Routes	Automatic Route (no RBI approval) and Approval Route (RBI permission required)

Key Changes in the ECB Framework

Reform	Earlier Provision	New Provision
Borrowing Limit	USD 750 million annually	Increased to USD 1 billion or 300% of net worth
Interest Rate Structure	Prescribed All-in-Cost ceiling	Replaced with market-determined interest rates
Maturity Structure	Tiered maturity rules	Unified Minimum Average Maturity Period (MAMP) of 3 years
Short-Term Borrowing for Manufacturing	Limited flexibility	Manufacturing firms can raise USD 150 million with 1-3 year maturity
Eligible Borrowers	Limited categories	Expanded to all entities registered under Central or State Acts
On-Lending Provision	Restricted	RBI-regulated entities allowed to lend ECB proceeds to individuals (excluding real estate business)
Use for Acquisitions	Restricted	ECB proceeds can be used for acquiring management control of companies
Operational Requirement	Mandatory current account with designated AD bank	Requirement removed to ease compliance

12. CBDC-Based Digital Food Currency Pilot Launched for PDS in Gujarat



The Government of India has launched a CBDC-based Digital Food Currency pilot in Gujarat for the Public Distribution System (PDS). The initiative uses the Digital Rupee (e₹) to deliver programmable food subsidies directly to beneficiaries.

Key Features of the Digital Food Currency Pilot

Feature	Explanation
Currency Nature	Programmable digital coupon built within India's CBDC (e₹) framework
Regulator	Reserve Bank of India (RBI) issues and regulates the Digital Rupee
Implementing Agency	Ministry of Consumer Affairs, Food and Public Distribution, in coordination with NPCI and State Governments
Restricted Usage	Coupons are locked for use only at authorised Fair Price Shops (FPS)
Non-Convertible	Cannot be converted into cash or used for non-essential purchases
Direct Transfer	Coupons credited directly to beneficiaries' mobile wallets
Transaction Method	Beneficiaries scan QR codes at FPS merchants to claim foodgrain entitlements
Validity Period	Coupons have limited validity (e.g., 30 days) to avoid unused subsidy accumulation

Advantages of the Digital Food Currency System

1. Targeted Subsidy Delivery

- Ensures subsidies are used strictly for food purchases.

2. Reduced Leakages

- Real-time digital tracking prevents diversion of subsidised foodgrains.

3. Reduced Dependence on Biometrics

- Eliminates issues with biometric e-POS failures in rural areas.

4. Efficient Monitoring

- Enables real-time monitoring of subsidy utilisation.

5. Programmable Welfare Delivery

- Demonstrates how programmable CBDCs can be used for targeted welfare schemes.

13. RuPay–BHIM UPI Incentive Scheme Accelerates Digital Payments and Economic Formalisation



An impact analysis by the Department of Financial Services (DFS) shows that the RuPay–BHIM UPI incentive scheme significantly boosted digital payment adoption and economic formalisation in India.

Incentive Scheme for RuPay Debit Cards and Low-Value BHIM-UPI P2M Payments

Feature	Details
Launch	December 2021
Nature	Central Sector Scheme
Administrative Authority	Department of Financial Services (DFS), Ministry of Finance
Nodal Agency	National Payments Corporation of India (NPCI)
Objective	Support Zero-MDR digital payment ecosystem and promote low-value digital transactions
Eligible Transactions	RuPay Debit Card transactions and BHIM-UPI person-to-merchant (P2M) payments up to ₹2,000

UPI Incentives

Stakeholder	Incentive
Acquiring Banks	0.15% of transaction value for eligible UPI P2M payments made to small merchants

RuPay Debit Card Incentives

Transaction Type	Incentive
Standard RuPay Transactions	0.40% incentive (capped at ₹100)
Industry Programmes (Fuel, Insurance etc.)	0.15% incentive (capped at ₹6)

Performance Benchmarks for Banks

Banks must meet operational standards to receive full incentives.

Parameter	Requirement
Technical Decline Rate	Below 0.75%
System Uptime	Minimum 99.5% availability
Final Incentive Disbursement	Last 20% released only if benchmarks are met

Distribution of Incentives

The incentives are shared among multiple entities involved in the payment ecosystem:

- Acquiring Bank
- Issuing Bank
- Payment Service Provider (PSP) Bank
- Third Party Application Providers (TPAPs) such as digital payment apps.

14. Economic Survey Calls for Stable Agri Export Policy to Reach \$100 Billion Target



The Economic Survey 2025–26 recommends a **stable and predictable agricultural export policy** to help India achieve **USD 100 billion in agricultural exports** within the next four years.

Performance of India's Agricultural Exports

Indicator	Data / Trend
Total Agricultural Exports	USD 51.1 billion (FY25)
Growth Rate	8.2% CAGR (FY20–FY25)
Merchandise Export Growth (Comparison)	6.9% CAGR
Processed Food Share	20.4% of agri-food exports (FY25)
Global Share	Only 2.2% of global agricultural exports
Global Ranking	8th largest agricultural exporter
Trade Balance	USD 13.4 billion agricultural trade surplus (FY25)

Major Agricultural Export Commodities

Commodity	Global Position
Rice	1st largest exporter
Spices	1st largest exporter
Buffalo Meat	1st largest exporter
Marine Products	Major export item
Basmati Rice	High-value export
Sugar	Key export commodity

Export Potential

The Economic Survey projects that India can achieve **USD 100 billion exports in agriculture, marine, and food products** within four years by improving policy stability and value addition.

Key Challenges in Agricultural Exports

1. Policy Uncertainty

- Frequent export restrictions on **wheat, rice, and sugar** create uncertainty.
- Damages India's **credibility as a reliable supplier** in global markets.

2. Infrastructure Deficit

- Limited **cold chain infrastructure and post-harvest facilities**.
- Restricts exports of **perishable high-value products like fruits and vegetables**.

3. Climate Risks

- **Erratic rainfall, heatwaves, and water scarcity** threaten production stability.

4. Low Agricultural Productivity

- Crop yields remain **below global averages** due to:
 - fragmented landholdings
 - weak extension services.

5. Market Access Barriers

- Strict **Sanitary and Phytosanitary (SPS) standards** imposed by importing countries.

6. Policy Trade-offs

- Expansion of **maize-based ethanol production** may divert crops from food markets.

15. Government Enforces VOPPA Order 2025 to Regulate Edible Oil Sector



The Government of India issued **show-cause notices to several edible oil companies** for failing to comply with the **Vegetable Oil Products Production and Availability (Regulation) Amendment Order, 2025 (VOPPA Order, 2025)**.

About VOPPA Order, 2025

Aspect	Details
Full Name	Vegetable Oil Products Production and Availability (Regulation) Amendment Order, 2025
Parent Order	Amends the Vegetable Oil Products Order, 2011
Issuing Authority	Department of Food and Public Distribution (DFPD)
Ministry	Ministry of Consumer Affairs, Food and Public Distribution
Legal Basis	Essential Commodities Act, 1955
Data Collection Law	Collection of Statistics Act, 2008

Objectives of the Regulation

- Strengthen **regulatory oversight in the edible oil sector**
- Improve **transparency in production and stock levels**
- Prevent **hoarding and black marketing**
- Stabilise **edible oil prices and availability**

Key Provisions of the VOPPA Order, 2025

1. Mandatory Registration : Entities involved in vegetable oil operations must register through:

- **National Single Window System (NSWS)**
- **VOPPA digital portal**

Applicable entities include:

- Manufacturers
- Processors
- Blenders
- Re-packers

2. Monthly Reporting Requirement : Registered entities must submit **monthly returns** detailing:

Data Category	Information Required
Production Levels	Quantity of oil produced
Stock Position	Inventory held by companies
Sales Data	Volume of oil sold
Imports	Imported edible oil quantities

This data helps the government **monitor supply chains and market conditions**.

3. Coverage of Commodities

The regulation covers several edible oil products:

- **Crude vegetable oils, Refined edible oils, Solvent-extracted oils, Vanaspati, Margarine**

Penalties for Non-Compliance

If companies fail to comply:

- **Show-cause notices may be issued.**
- **Stocks may be confiscated under Section 6A of the Essential Commodities Act, 1955.**

16. India Becomes the World's Largest Rice Producer: Sustainability and Food Security Concerns



India recently overtook China to become the world's largest rice producer, producing 150.18 million tonnes (MT) in 2024–25, accounting for over 28% of global rice output. However, this achievement raises concerns regarding water stress, environmental sustainability, and long-term food security.

Rice Production in India

Indicator	Details
Production (2024–25)	150.18 MT
Global Share	~28% of world rice production
Area Under Cultivation	51–52 million hectares (largest cropped area in India)
Leading States	West Bengal, Uttar Pradesh, Punjab
Highest Yield State	Punjab
Other High Yield States	Tamil Nadu, Telangana, Andhra Pradesh
Global Export Position	Largest rice exporter, accounting for ~40% of global rice trade

Sustainability Concerns

1. Water Stress

- Rice cultivation requires 3,000–4,000 litres of water per kg.
- In Punjab and Haryana, groundwater extraction exceeds recharge by 35–57%, causing falling water tables.

2. Monoculture Risk

- The FAO warns that only nine crops account for 66% of global production, increasing vulnerability.
- Over-dependence on rice reduces agricultural biodiversity.

3. Methane Emissions

- Flooded paddy fields create anaerobic conditions, promoting methanogenic bacteria.
- Paddy cultivation contributes:
 - 15–20% of India's agricultural greenhouse gas emissions
 - ~12% globally.

4. Air Pollution

- Delayed sowing laws shorten harvest windows.
- Farmers resort to stubble burning, worsening winter air pollution in North India.

5. Soil Degradation

- Excess irrigation leads to salinisation and alkalinisation of soil.
- Heavy urea usage distorts NPK ratios, causing micronutrient deficiencies.

17. Sharp Decline in MSP-Based Minor Forest Produce Procurement Raises Tribal Livelihood Concerns



Government data tabled in Parliament shows that procurement of Minor Forest Produce (MFP) at Minimum Support Price (MSP) dropped sharply in 2024-25 across 19 states, raising concerns over tribal income security and forest-based livelihoods.

About Minor Forest Produce (MFP)

Aspect	Details
Meaning	Forest products of plant origin other than timber
Examples	Tendu leaves, bamboo, mahua flowers, tamarind, lac, honey, sal seeds
Livelihood Role	Contributes 20-40% of annual income for many tribal households
Procurement System	Implemented through State agencies with coordination from TRIFED
Legal Empowerment	Tribal rights recognised under PESA Act, 1996 and Forest Rights Act (FRA), 2006

Key Trends in MFP Procurement

Indicator	2023-24	2024-25	Trend
Procurement Volume	~51,400 MT	~3,920 MT	92% decline
Procurement Value	₹124.3 crore	₹16.68 crore	Major income reduction

State-Level Performance

States with Higher Procurement

- Mizoram, Nagaland, Chhattisgarh, Karnataka, Gujarat

States with Significant Decline

- Odisha, Assam, Andhra Pradesh

This uneven performance indicates **operational and implementation challenges** in several forest regions.

Existing Government Support Framework

1. MSP Scheme for MFP

Feature	Details
Initial Coverage	10 MFP items (2013-14)
Current Coverage	87 items
Objective	Provide price support to tribal collectors

2. Van Dhan Vikas Kendras (VDVKs)

Feature	Details
Launch Period	2019-20
Sanctioned Centres	4,125 VDVKs
Funding	₹612.12 crore
Purpose	Promote value addition, processing, and marketing by tribal SHGs

3. TRIFED Marketing Network

- **116 Tribes India outlets** across the country
 - Own stores
 - Franchise outlets
 - Consignment outlets

These outlets market **tribal handicrafts and forest products**.

About TRIFED

Aspect	Details
Full Form	Tribal Cooperative Marketing Development Federation of India
Established	1987
Legal Basis	Multi-State Cooperative Societies Act, 1984
Administrative Ministry	Ministry of Tribal Affairs
Role	Nodal agency for MSP procurement of MFP and tribal product marketing

Pradhan Mantri Janjatiya Vikas Mission (PMJVM)

Aspect	Details
Objective	Enhance tribal income through MFP procurement and value addition
Key Focus Areas	Value chains, entrepreneurship, infrastructure and market access
Implementing Agency	Ministry of Tribal Affairs with TRIFED as nodal body

18. ACC PLI Scheme Faces Delays in India's Battery Manufacturing Push



The **Advanced Chemistry Cell (ACC) Production Linked Incentive (PLI) Scheme**, launched in **October 2021**, has seen **major delays**, with only **1.4 GWh capacity commissioned against the 50 GWh target by 2025**, raising concerns about India's EV and energy storage ambitions.

Advanced Chemistry Cells (ACC) : Advanced Chemistry Cells (ACC) are **next-generation rechargeable batteries** that store electrical energy in chemical form and release it on demand.

They are critical for:

- **Electric Vehicles (EVs)**
- **Grid-scale energy storage**
- **Renewable energy integration**

About the ACC PLI Scheme

Feature	Details
Launch	October 2021
Financial Outlay	₹18,100 crore
Objective	Build a domestic advanced battery manufacturing ecosystem
Incentive Structure	Subsidies up to ₹2,000 per kWh based on performance
Technology Scope	Technology-agnostic: Lithium-ion, LFP, Sodium-ion and future chemistries
Domestic Value Addition (DVA)	25% within 2 years; 60% by year 5

Current Performance Snapshot

Indicator	Status
Target Capacity (2025)	50 GWh
Commissioned Capacity	1.4 GWh
Achievement Level	2.8% of target
Projects Under Development	8.6 GWh
Projects with No Progress	20 GWh
Jobs Created	1,118
Potential Jobs Estimated	~1.03 million
Investment Achieved	25.58% of target
Incentives Disbursed	₹0 (milestones unmet)

Raw Material Bottlenecks

Mineral India's Processing Share

Lithium <1%

Cobalt Minimal

Nickel Limited refining capacity

This constrains **domestic value addition targets**.

19. Engineering Skill Gap in India's Aerospace Manufacturing Ambitions



Despite rapid expansion in the aviation sector, **India faces a critical engineering skill shortage** that could slow the development of its **aerospace manufacturing ecosystem**, including aircraft production, component manufacturing, and MRO services.

India's Aerospace Manufacturing Landscape

Sector	Key Details
Aviation Market	India is the world's third-largest aviation market
Aircraft Demand	Around 3,300 new aircraft required by 2044
Component Manufacturing	Expected to reach \$21.5 billion by 2030
MRO Sector	Projected \$4 billion industry by 2031
Private Assembly	Tata-Airbus C-295 Final Assembly Line (FAL) in Vadodara

Significance

- India is moving from **aircraft importer** → **aerospace manufacturing hub**.
- Expansion includes **component manufacturing, assembly, and maintenance ecosystems**.

Government Initiatives Supporting Aerospace Manufacturing

1. Positive Indigenisation Lists

Feature	Details
Issued by	Ministry of Defence
Coverage	5,000+ defence and aerospace items
Objective	Ban imports and promote domestic production

2. Defence Industrial Corridors

Corridor	State
Defence Corridor	Uttar Pradesh
Defence Corridor	Tamil Nadu

Key Benefits

- Subsidised land
- Plug-and-play manufacturing infrastructure
- Industry clusters for defence and aerospace firms

3. Fiscal Incentives for MRO

Policy Change	Impact
GST on MRO reduced	18% → 5%

Place-of-supply rules aligned Improves **global competitiveness of Indian MRO services**

4. Foreign Direct Investment (FDI)

Policy Details

FDI Limit **Up to 74% under automatic route**

Objective Encourage **foreign OEMs to set up production units in India**

5. SRIJAN Portal

- Digital platform listing **defence and aerospace items previously imported by Defence PSUs**.
- Enables **private sector participation and reverse engineering**.

6. Defence Acquisition Procedure (DAP)

- Procurement rules mandating **domestic manufacturing preference**.
- Supports **Atmanirbhar Bharat in defence and aerospace sectors**.

20. India to Begin Domestic Production of Rare-Earth Permanent Magnets



The Union Mines Minister announced that India will start domestic production of Rare-Earth Permanent Magnets (REPMs) within the year, aiming to reduce heavy import dependence, particularly on China.

About Rare-Earth Permanent Magnets (REPMs)

Aspect	Details
Nature	Strongest commercially available permanent magnets made from rare-earth element alloys
Global Supply	China controls about 90% of global production and processing
Importance	Critical for clean energy, EVs, electronics, aerospace, and defence technologies

Types of Rare-Earth Permanent Magnets

Type	Composition	Key Feature	Typical Uses
NdFeB Magnets	Neodymium-Iron-Boron	Highest magnetic strength	EV motors, wind turbines, electronics
SmCo Magnets	Samarium-Cobalt	High durability and temperature resistance	Aerospace, defence systems, medical devices

Key Applications of REPMs

Rare-earth permanent magnets are used in:

- Wind turbine generators
- Electric vehicle motors
- Smartphones and consumer electronics
- MRI machines
- Precision-guided defence systems

Example: A large wind turbine may require about 500–600 kg of rare-earth magnets.

Rare-Earth Permanent Magnet Manufacturing Scheme

Feature	Details
Scheme Design	Combination of Production-Linked Incentives (PLI) + capital subsidies
Nodal Ministry	Ministry of Heavy Industries
Target Capacity	6,000 Metric Tons per annum (MTPA)
Duration	7 years
Implementation Phases	2 years for plant setup + 5 years sales-linked incentives

Objective

- Develop **domestic REPM manufacturing capacity**
- Build **integrated rare-earth supply chains**
- Reduce reliance on imports

Rare-Earth Availability in India

Indicator	Details
Global Share	India holds around 6% of global rare-earth reserves
Key Locations	Andhra Pradesh, Odisha, Tamil Nadu, Kerala, West Bengal, Gujarat, Maharashtra, Jharkhand
Monazite Reserves	~13.15 million tonnes
Rare Earth Oxide (REO) Content	~7.23 million tonnes

Most reserves occur in **coastal beach sands and inland alluvial deposits**.

21. Foundation Stone Laid for Semiconductor OSAT Unit in Jewar, Uttar Pradesh



The Prime Minister laid the foundation stone for “India Chip Pvt Ltd.” in Jewar, Uttar Pradesh, a semiconductor facility developed as a **joint venture between HCL Group and Taiwan’s Foxconn**, marking **North India’s first major semiconductor manufacturing unit**.

About the Semiconductor Unit

Aspect	Details
Project Name	India Chip Pvt Ltd
Location	Jewar, Uttar Pradesh
Partners	HCL Group (India) and Foxconn (Taiwan)
Type of Facility	OSAT (Outsourced Semiconductor Assembly and Test)
Operational Timeline	Expected by 2028
Production Capacity	Around 36 million chips per month
Primary Output	Display Driver Integrated Circuits (DDICs)

What is an OSAT Facility?

Outsourced Semiconductor Assembly and Test (OSAT) facilities perform the **final stages of semiconductor manufacturing**.

Key Functions

- **Packaging:** Silicon wafers containing chips are cut into individual dies and packaged.
- **Testing:** Chips are tested for **functionality, reliability, and quality control**.
- **Final Chip Production:** Packaged chips are delivered for use in **electronics and display systems**.

About Display Driver Integrated Circuits (DDICs)

Feature	Details
Function	Controls pixels and display signals in electronic screens
Applications	Smartphones, TVs, laptops, automotive displays
Importance	Critical component in the electronics and display industry

Landscape of India's Semiconductor Industry

Indicator	Status
Market Size (2024–25)	\$52 billion
Projected Market (2030)	Over \$100 billion
Import Dependence	90–95% of semiconductor demand imported
Employment Potential	Around 1 million jobs by 2026
Domestic Supply Target	70–75% of domestic demand by 2029

India Semiconductor Mission (ISM 2.0)

Aspect	Details
Announced In	Union Budget 2026–27
Objective	Build a high-value semiconductor ecosystem
Focus Areas	Chip design, fabrication, assembly, testing
Goal	Reduce import dependence and promote domestic chip manufacturing

22. Union Budget 2026–27 Announces New Scheme for Establishing Chemical Parks



The **Union Budget 2026–27** introduced a new scheme to support **three dedicated Chemical Parks**, with an allocation of **₹600 crore**, to strengthen India's chemical manufacturing ecosystem.

About Chemical Parks

Aspect	Details
Definition	Specialised industrial zones designed to support chemical value chain
Industrial Model	Based on the Cluster-based Plug-and-Play framework
Objective	Provide ready infrastructure for chemical manufacturing industries

Cluster-Based Infrastructure Model

Feature	Explanation
Production Integration	Co-location of feedstock suppliers and downstream industries
Shared Infrastructure	Common Effluent Treatment Plants (CETPs), solvent recovery units, distillation facilities
Utility Support	Centralised supply of power, steam, and demineralised water
Regulatory Facilitation	Park-level clearances for environmental and safety approvals

This model reduces **capital costs and project implementation timelines**.

Selection Mechanism

- States will compete for projects through a **challenge-based selection process**.
- This ensures **competitive proposals and efficient implementation**.

Significance of Chemical Parks

1. Strategic Autonomy

Promotes domestic production of **Key Starting Materials (KSMs)** and chemical intermediates.

2. Economies of Scale

Shared infrastructure reduces **production and compliance costs**.

3. Circular Economy

Industrial clusters enable **waste-to-wealth systems**, where by-products of one industry become inputs for another.

4. MSME Participation

Plug-and-play infrastructure allows **MSMEs to enter high-value chemical supply chains**.

5. Environmental Compliance

Centralised waste management improves **environmental monitoring and pollution control**.

Challenges Associated with Chemical Parks

Challenge	Explanation
Compliance Costs	Strict environmental norms like Zero Liquid Discharge (ZLD) increase operational costs
Domino Risk	Concentration of hazardous industries may cause cascading industrial accidents
Infrastructure Demand	Large clusters require significant water and power supply
Land Acquisition Issues	Difficulty in securing large contiguous land areas
Operational Expertise	Need for specialised technical expertise for complex shared facilities

India's Chemical Sector

Indicator	Status
Global Ranking	6th largest chemical producer globally
Asian Ranking	3rd largest in Asia (after China and Japan)
GDP Contribution	Around 7% of GDP
Manufacturing GVA Share	8.1% of manufacturing GVA
Production (FY25)	58,617 thousand metric tonnes
Growth Rate	CAGR of 2.8% since 2016

23. Yantra India Limited Granted Miniratna Category-I Status



On 2 February 2026, the Defence Minister approved Miniratna Category-I status for Yantra India Limited (YIL), recognising its financial performance and granting greater operational and investment autonomy.

About Yantra India Limited (YIL)

Aspect	Details
Established	1 October 2021
Origin	Created after corporatisation of the Ordnance Factory Board (OFB)
Administrative Ministry	Department of Defence Production, Ministry of Defence
Status	Schedule 'A' Defence Public Sector Undertaking (DPSU)
Role	Manufactures critical components for defence platforms

Financial Performance

Indicator	Data
Sales (FY 2021-22 H2)	₹956.32 crore
Sales (FY 2024-25)	₹3,108.79 crore
Export Growth	₹0 → ₹321.77 crore

The strong growth trajectory helped YIL qualify for **Miniratna Category-I status**.

Product Portfolio of YIL

The company manufactures components and materials used in defence systems, including:

- Carbon fibre composites
- Ammunition assemblies
- Armoured vehicles components
- Artillery guns
- Main battle tanks components
- Glass composites
- Aluminium alloys

These products support **India's defence manufacturing ecosystem**.

Benefits of Miniratna Category-I Status

Feature	Details
Financial Autonomy	Board can approve investments up to ₹500 crore
Project Approval	No prior government approval needed for capital expenditure
Operational Flexibility	Faster decision-making for modernisation and procurement
Strategic Objective	Strengthen self-reliance in defence manufacturing

Corporatisation of Ordnance Factory Board

In 2021, the Government restructured the Ordnance Factory Board into seven Defence Public Sector Undertakings (DPSUs) to improve efficiency and accountability.

Seven New DPSUs

1. Munitions India Limited
2. Armoured Vehicles Nigam Limited
3. Advanced Weapons and Equipment India Limited
4. Troop Comforts Limited
5. Yantra India Limited
6. India Optel Limited
7. Gliders India Limited

24. CCEA Approves India's First Underwater Road-Cum-Rail Tunnel Under Brahmaputra



The Cabinet Committee on Economic Affairs (CCEA) approved the Gohpur-Numaligarh road-cum-rail tunnel project in Assam, which will become India's first underwater twin-tube road-cum-rail tunnel beneath the Brahmaputra River.

Gohpur-Numaligarh Tunnel Project

Aspect	Details
Location	Under the Brahmaputra River, Assam
Connectivity	Gohpur (North Bank) - Numaligarh (South Bank)
Total Project Length	33.7 km
Tunnel Length	15.79 km twin-tube tunnel beneath riverbed
Implementation	Ministry of Road Transport & Highways (MoRTH) with Ministry of Railways
Technology Used	Tunnel Boring Machines (TBM)

Design Features

Feature	Description
Twin-Tube Structure	Two parallel tunnels for safety and operational efficiency
Road Infrastructure	Each tube carries 2 lanes (total 4 lanes)
Rail Provision	One tube includes provision for railway infrastructure
Construction Method	Tunnel Boring Machines (TBM) to withstand high water flow and siltation

25. India starts First Nam0 Bharat Regional Rapid Transit System (RRTS)



The Prime Minister inaugurated India's first Nam0 Bharat Regional Rapid Transit System (RRTS) on the Delhi-Ghaziabad-Meerut corridor, marking a major step toward high-speed regional mobility in the National Capital Region (NCR).

About Nam0 Bharat RRTS

Aspect	Details
Corridor Length	82 km
Route	Delhi - Ghaziabad - Meerut
Implementing Agency	National Capital Region Transport Corporation (NCRTC)
Institutional Structure	Joint venture of the Centre and the States of Delhi, Haryana, Rajasthan and Uttar Pradesh

Key Technical Features

Feature	Details
Design Speed	180 kmph
Operational Speed	160 kmph
Commute Time	Reduced to under one hour
Signalling System	Advanced radio-based signalling for real-time control
Headway	Allows closer train intervals for higher frequency

Operational Characteristics

Regional Connectivity

- Designed for **long-distance regional commuting** (up to ~100 km).

Limited Stops

- Fewer stations compared to metro systems to ensure **high-speed travel**.

Multimodal Integration

- Connects with:
 - **Indian Railways**
 - **Metro systems**
 - **Interstate bus terminals**

Example: Sarai Kale Khan transport hub

Interoperability

- Different corridors (e.g., **Alwar-Meerut**) can operate on the **same tracks without passenger transfers**.

26. Union Cabinet Approves ₹1 Lakh Crore Urban Challenge Fund for City Infrastructure



The Union Cabinet approved the Urban Challenge Fund (UCF) to transform urban infrastructure financing by shifting cities from grant-based funding to market-linked financing mechanisms.

About Urban Challenge Fund (UCF)

Aspect	Details
Scheme Type	Centrally Sponsored Scheme
Total Corpus	₹1 lakh crore
Objective	Promote market-linked financing for urban infrastructure
Nodal Ministry	Ministry of Housing and Urban Affairs (MoHUA)
Timeline	FY 2025–26 to FY 2030–31 (implementation extendable to FY 2033–34)
Monitoring System	Dedicated Project Management Unit (PMU) under MoHUA

Core Objective

The scheme aims to transition cities toward **fiscal self-sufficiency** by encouraging:

- Market-based infrastructure financing
- Municipal bond markets
- Creditworthy urban local bodies (ULBs)

Selection Mechanism

Projects are selected through a “**Challenge Mode**” competition, based on:

- Financial viability
- Reform readiness of cities
- Infrastructure impact

Funding is **linked to reform milestones and third-party verification** rather than just construction.

Financing Mechanism

Funding Source	Share
Central Government Grant	Up to 25%
Market Financing (Municipal Bonds/Loans)	50%
State Government / ULB Contribution	25%

This structure ensures cities develop **independent financing capabilities**.

Eligibility Criteria

Criteria	Requirement
Population Coverage	Cities with population ≥10 lakh
Strategic Cities	State/UT capitals and industrial cities above 1 lakh population
Financial Transparency	Audited financial statements for last 3 years
Creditworthiness	Minimum credit rating of BBB-

27. NMP 2.0: ₹16.72 Lakh Crore Asset Monetisation Plan for 2026–2030



The Union Finance Minister launched the National Monetisation Pipeline (NMP) 2.0, targeting ₹16.72 lakh crore in asset monetisation between FY 2026–2030, with ₹5.8 lakh crore expected as private investment.

About National Monetisation Pipeline (NMP) 2.0

Aspect	Details
Prepared By	NITI Aayog in consultation with line ministries
Time Period	FY 2026–2030
Total Monetisation Target	₹16.72 lakh crore
Private Investment Component	₹5.8 lakh crore
Monitoring Authority	Core Group of Secretaries on Asset Monetisation (CGAM) under the Cabinet Secretary

Concept of Asset Monetisation

Asset monetisation involves **unlocking the value of existing public infrastructure assets** and using the revenue to finance **new infrastructure projects**.

Key Principle: “Recycle capital from operational public assets to fund fresh capital expenditure.”

Monetisation Instruments

Instrument	Explanation
PPP Concessions	Private sector operates and maintains assets for a defined period
InvITs (Infrastructure Investment Trusts)	Capital market vehicles allowing investors to invest in infrastructure assets
Strategic Auctions	Competitive bidding for asset operation rights
Securitisation of Cash Flows	Monetising future revenue streams from public assets
Selective Divestment	Partial dilution of government ownership

28. India–US Trade Deal Lowers Effective Tariff on Indian Exports to 18%



The United States announced a new trade agreement with India that reduces the effective tariff on Indian exports to about 18%, improving India’s competitiveness in the US market.

About the Agreement

Aspect	Details
Tariff Adjustment	Effective tariff on Indian exports reduced to 18%
Punitive Duty Removed	Earlier 25% penalty duty linked to India’s Russian oil imports rolled back
Trade Reciprocity	India to reduce tariffs and non-tariff barriers on US goods
Energy Shift	India to purchase over \$500 billion in US energy, technology and agricultural products

Key Elements of the Deal

1. Penalty Rollback: The US removed the **25% punitive tariff** earlier imposed due to India's purchase of **Russian crude oil**.

2. Energy Supply Reorientation

India plans to diversify energy imports by purchasing:

- US crude oil
- Liquefied Natural Gas (LNG)
- Technology and agricultural products

3. Reciprocal Tariff Reduction

India agreed to:

- Lower tariffs on selected US products
- Reduce **non-tariff barriers**
- Provide **zero-tariff access in certain sectors**

29. Government Expands Export Promotion Mission with Seven New MSME Export Support Measures



The Government launched seven additional interventions under the Export Promotion Mission (EPM) to strengthen MSME export competitiveness and expand India's global trade footprint.

About Export Promotion Mission (EPM)

Aspect	Details
Scheme Type	Central Sector Scheme
Ministry	Ministry of Commerce and Industry
Implementing Agency	Directorate General of Foreign Trade (DGFT)
Total Outlay	₹25,060 crore
Duration	FY 2025-26 to FY 2030-31
Primary Focus	Enhancing MSME export competitiveness

Key Export Targets

Indicator Target

Total Exports by 2030 USD 2 trillion

Export-to-GDP Ratio 15%

Scheme Integration

The EPM integrates earlier export promotion schemes, including:

- Interest Equalisation Scheme (IES)
- Market Access Initiative (MAI)

This consolidation aims to create a **single unified export promotion framework**.

Operational Structure of EPM

The mission operates through **two coordinated sub-schemes**.

Sub-Scheme	Focus
NIRYAT PROTSAHAN	Financial support for exporters
NIRYAT DISHA	Non-financial support to improve competitiveness

New Interventions Under NIRYAT PROTSAHAN (Financial Support)

Intervention	Key Features
Export Factoring Support	Interest subvention of 2.75% , capped at ₹50 lakh per MSME annually
E-Commerce Credit Facilities	Direct credit up to ₹50 lakh with 90% guarantee coverage
Overseas Inventory Credit	Credit up to ₹5 crore with 75% guarantee coverage
Emerging Market Support	Shared-risk financial instruments for entry into new export markets

These interventions help **ease working capital constraints and improve export financing**.

New Interventions Under NIRYAT DISHA (Non-Financial Support)

Initiative	Objective
TRACE	Helps exporters meet global Testing, Inspection, and Certification (TIC) requirements
FLOW	Supports overseas warehousing and e-commerce export hubs
LIFT	Provides partial reimbursement of freight and logistics costs
INSIGHT	Provides trade intelligence and exporter capacity-building , including district-level export facilitation

30. India–France Amend Double Taxation Avoidance Convention (DTAC)



India and France **signed a protocol amending their 1992 Double Taxation Avoidance Convention (DTAC)** during the French President's 2026 state visit, updating tax rules related to dividends, capital gains, and multinational taxation.

About Double Taxation Avoidance Convention (DTAC)

Aspect	Details
Purpose	Prevent the same income from being taxed in two countries
Coverage	Taxes on income such as dividends, royalties, capital gains, and business profits
Benefit	Reduces tax disputes and promotes cross-border investment

Key Amendments in the India–France DTAC

1. Removal of MFN Clause

- The **Most Favoured Nation (MFN)** clause has been removed.

- Neither country must extend **tax concessions granted to third countries**.

2. Capital Gains Taxation

Provision	Change
Tax Rights	India gets exclusive rights to tax capital gains from sale of shares in Indian companies
Ownership Threshold	No minimum shareholding requirement

3. Dividend Tax Rates

Shareholding by French Entity Dividend Tax Rate

Above 10% stake	5% tax rate
Below 10% stake	15% tax rate

4. Adoption of BEPS Standards

The treaty incorporates **Base Erosion and Profit Shifting (BEPS)** rules to prevent multinational companies from:

- shifting profits to low-tax jurisdictions
- exploiting tax treaty loopholes

5. Expanded Permanent Establishment (PE) Definition

The definition of **Permanent Establishment** now includes:

- **service-based presence**

This allows India to **tax French firms providing services within India**.

6. Clarification of Fees for Technical Services (FTS)

- Updated to align with **modern international taxation standards**.
- Reduces disputes over classification between Indian and French tax authorities.

About Most Favoured Nation (MFN) Principle

Aspect Details

Meaning A country must extend the **same tax benefits offered to one treaty partner to other partners**

Purpose Ensures **equal treatment in international agreements**

Supreme Court Ruling on MFN (2023)

The **Supreme Court** ruled that:

- MFN benefits under tax treaties **do not apply automatically**.
- They require **explicit government notification under Section 90(1) of the Income Tax Act, 1961**.

31. US–EU Tariff Concessions on Apple Imports Raise Concerns for J&K Farmers



Recent tariff concessions by the US and EU on apple imports into India have raised concerns over price competitiveness and livelihood security for nearly seven lakh apple-growing families in Jammu & Kashmir.

Recent Tariff Changes

Trade Partner	Policy Change	Key Provision
United States	Tariff reduction	Import duty on US apples reduced from 50% to 25%
	Price safeguard	A ₹80/kg minimum import price introduced
European Union	FTA quota system	20% duty on 50,000 tonnes annually
	Future expansion	Quota to increase to 1,00,000 tonnes over 10 years

Vulnerabilities of Domestic Apple Cultivators

1. Productivity Gap

- Indian apple orchards yield 7–8 tonnes/hectare, compared to 40–70 tonnes/hectare in advanced apple-growing countries.

2. Fragmented Landholdings

- Average orchard size in J&K is about 0.40 hectares, limiting mechanisation and adoption of precision horticulture technologies.

3. Import Price Undercutting

- Off-season apple imports depress domestic prices.
- Lack of adequate cold storage and logistics infrastructure forces farmers into distress sales.

4. Quality and Variety Challenges

- Although varieties like Gala have been introduced, Indian apples often lag behind imports in: colour, uniformity, taste, shelf life.

Apple Cultivation in India

Aspect	Details
Global Rank	5th largest apple producer
Annual Production	~2.5 million metric tonnes
Major Producing Regions	J&K (70%), Himachal Pradesh (20%), Uttarakhand
Ideal Climate	Temperate climate with winters below 7°C and summers around 21–24°C
Soil Requirement	Deep well-drained loamy soil with pH 5.5–6.5
Altitude Range	1,500–2,700 metres above sea level
Average Yield	6–8 tonnes/hectare (global benchmark 40–60 tonnes/hectare)

Structural Challenges in Apple Sector

- Low productivity due to ageing orchards
- Limited high-density plantation adoption
- Inadequate cold-chain infrastructure
- Price volatility caused by imports
- Fragmented smallholder farming structure

32. Government Cuts RoDTEP Export Incentives by 50%



The Ministry of Commerce and Industry (MoCI) has reduced duty benefits under the Remission of Duties and Taxes on Exported Products (RoDTEP) scheme by 50% with immediate effect, affecting exporters across several sectors.

About RoDTEP Scheme

Aspect	Details
Launch Year	2021
Nodal Ministry	Ministry of Commerce and Industry (MoCI)
Purpose	Refund embedded taxes and duties on exported goods
Replaced Scheme	Merchandise Exports from India Scheme (MEIS)
WTO Compliance	Designed to comply with WTO rules by avoiding direct export subsidies

Core Principle : The scheme follows the international trade principle:

“Taxes and duties should not be exported.”

This ensures that **Indian export products are competitive globally** by removing hidden domestic taxes embedded in production.

Examples of such embedded taxes include:

- Electricity duties
- Fuel taxes used in logistics
- State levies not refunded under GST.

Administrative Framework

Authority	Role
Directorate General of Foreign Trade (DGFT)	Notifies eligible export products and remission rates
Department of Revenue (Ministry of Finance)	Disburses rebates

Mechanism of RoDTEP Benefits

1. E-Scrip System

- Benefits are issued as **transferable electronic duty credit scrips**.

2. Digital Platform

- Issued through the **ICEGATE portal**.

3. Usage

Exporters can:

- Use e-scrips to **pay Basic Customs Duty**, or
- **Sell them in the open market** to other importers.

Difference Between MEIS and RoDTEP

Feature	MEIS	RoDTEP
Nature	Export subsidy	Remission of taxes
WTO Status	Declared trade-distorting	WTO compliant
Calculation Method	Flat percentage incentives	Refund of embedded taxes
Implementation	DGFT	DGFT + Department of Revenue

33. US Imposes 125.87% Countervailing Duty on Indian Solar Cells



The U.S. Department of Commerce has imposed a **preliminary countervailing duty (CVD) of 125.87% on solar cells and modules imported from India**, alleging that Indian exporters benefit from **trade-distorting subsidies**.

Background of the Investigation

The U.S. investigation claims Indian solar exporters gain **unfair price advantages** due to multiple subsidy mechanisms.

Key Allegations

Allegation	Explanation
Actionable Subsidies	Government subsidies allegedly enable Indian firms to sell solar modules at artificially low prices.
Cross-Border Input Subsidies	Indian manufacturers allegedly use subsidised Chinese inputs , lowering production costs.
Circumvention of Trade Barriers	Chinese firms allegedly shift assembly operations to India to bypass U.S. tariffs on Chinese solar goods.

How the Duty Was Calculated

The duty was imposed using **Article 12.7 of the WTO Agreement on Subsidies and Countervailing Measures (SCM Agreement)**.

Key Concepts

Term	Meaning
Facts Available Provision	Used when exporters fail to provide required data during investigation.
Adverse Inference	Allows investigating authorities to impose maximum duty rates based on available information.

Indian companies allegedly **failed to submit complete data**, allowing the U.S. to apply **adverse inference and impose a high duty rate**.

What is a Countervailing Duty (CVD)?

A **Countervailing Duty (CVD)** is a **tariff imposed to offset subsidies** provided by the exporting country's government.

Objective : To ensure **fair competition** for domestic industries.

Legal Basis : Governed under the **WTO SCM Agreement**.

Types of Subsidies under WTO SCM Agreement

Type	Description	WTO Status
Prohibited Subsidies (Red Light)	Direct export subsidies or local content subsidies	Completely banned
Actionable Subsidies (Yellow Light)	Allowed but can be challenged if they harm other countries	Subject to dispute
Non-Actionable Subsidies (Green Light)	Certain permitted subsidies such as environmental or research support	Generally allowed

The U.S. classified Indian incentives as **“Actionable Subsidies.”**

34. India Revises Base Year of Merchandise Trade Indices to 2022–23



The Directorate General of Commercial Intelligence and Statistics (DGCI&S) has revised the base year of India's Merchandise Trade Indices from FY 2012–13 to FY 2022–23, updating the statistical framework used to measure export and import trends.

About Merchandise Trade Indices

Aspect	Details
Definition	Statistical indicators measuring changes in prices and volumes of exports and imports over time
Compiled By	Directorate General of Commercial Intelligence and Statistics (DGCI&S)
Ministry	Ministry of Commerce and Industry
Purpose	Tracks external sector trends, trade competitiveness, and terms of trade

Methodological Basis

The indices are constructed using the **Laspeyres Index Formula**, which:

- uses **fixed weights from the base year**
- compares current trade data with the **base year basket of commodities**

Types of Merchandise Trade Indices

Index Type	Measures
Unit Value Index (UVI)	Changes in price levels of exports and imports
Quantity Index (QI)	Changes in trade volumes , independent of price movements

Key Features of the Revised Index Series

1. Updated Base Year

- Base year changed from **2012–13 to 2022–23** to reflect **recent trade patterns**.

2. Revised Commodity Basket

- Commodity classification updated at the **Principal Commodity level**.
- Better reflects **new emerging export sectors and declining products**.

3. Updated Weight Structure

- Weights recalibrated using **latest trade value shares**.

4. Methodological Improvements

Enhancements include:

- improved commodity basket selection
- better handling of **missing unit values**
- alignment with **international statistical standards**.

5. Expanded Coverage

The revised indices now provide:

- **Monthly, quarterly, and annual indices**
- **SITC-based indices** (Standard International Trade Classification)
- **BEC-based indices** (Broad Economic Categories)
- **Region-wise and bilateral trade indices**

Terms of Trade Measurement

The revised framework includes three key indicators.

Indicator	Formula	Meaning
Net Terms of Trade (NTT)	Export Price Index ÷ Import Price Index	Indicates relative price advantage in trade
Gross Terms of Trade (GTT)	Import Quantity Index ÷ Export Quantity Index	Shows volume exchange ratio
Income Terms of Trade (ITT)	NTT × Export Quantity Index	Measures purchasing power of exports

35. DISCOMs Show Financial Turnaround with Reduced Losses and Improved Cost Recovery



India's power distribution companies (DISCOMs) have recorded a financial turnaround, reflected in reduced Aggregate Technical & Commercial (AT&C) losses, a narrowing ACS-ARR gap, and improved financial discipline.

About DISCOMs

Aspect	Details
Role	Responsible for retail electricity distribution and revenue collection
Sector Position	Known as the “Cash Register” of the power sector
Core Function	Manage substations, distribution lines, and last-mile electricity supply
Institutional Structure	72 utilities: 44 state DISCOMs, 16 private companies, 12 state power departments
Legal Origin	Created after unbundling of State Electricity Boards (SEBs) under the Electricity Act, 2003

The **Electricity Act, 2003** separated the power sector into three segments:

- Generation
- Transmission
- Distribution (DISCOMs)

Current Performance of DISCOMs

Indicator	Status
Profit After Tax (PAT)	₹2,701 crore profit in FY 2024-25
Historical Comparison	Loss of ₹67,962 crore in FY 2013-14
AT&C Losses	Reduced from 22.62% → 15.04%
ACS-ARR Gap	Narrowed to ₹0.06 per unit
Generator Dues	Reduced from ₹1.4 lakh crore → <₹5,000 crore

This indicates **near-complete cost recovery and improved financial health.**

Key Indicators Explained

AT&C Loss (Aggregate Technical & Commercial Loss)

Measures total inefficiency in power distribution.

Components include:

- technical transmission losses
- electricity theft
- billing inefficiency
- poor collection of payments.

ACS-ARR Gap

Term	Meaning
ACS (Average Cost of Supply)	Cost incurred to supply electricity
ARR (Average Revenue Realised)	Revenue collected from consumers

ACS - ARR gap indicates the financial loss per unit of electricity supplied.

36. UP Fertiliser Ban Triggers Debate on India's Fertiliser Regulatory Regime



The Uttar Pradesh Government banned authorised fertiliser dealers from selling non-subsidised speciality nutrients, triggering debate on the extent of government control in India's fertiliser sector.

Current Regulatory Framework of Fertiliser Sector

1. Statutory Price Control

Fertiliser	Pricing Policy
Urea	Government fixes a pan-India MRP of ₹242 per 45 kg bag

This price excludes **neem-coating charges and taxes**.

2. Nutrient-Based Subsidy (NBS) System

- Applies to **Phosphatic and Potassic (P&K)** fertilisers.
- Government provides **per-nutrient subsidy**.

Nutrient

Nitrogen (N)

Phosphorus (P)

Potassium (K)

Sulphur (S)

However, **urea remains outside NBS**, creating distortion.

3. Fertiliser Movement Control Order (1973)

The **Department of Fertilisers (DoF)** controls:

- allocation of railway **rakes**

- state-wise fertiliser supply planning.

This ensures equitable distribution across regions.

4. Bharat Fertiliser Branding

Under Pradhan Mantri Bhartiya Jan Urvarak Pariyojana (PMBJP):

- All subsidised fertilisers are sold under a single brand “Bharat”.

Examples: Bharat Urea, Bharat DAP, Bharat NPK

5. Direct Benefit Transfer (DBT) in Fertilisers

Feature	Description
Authentication	Aadhaar-linked Point of Sale (PoS) device
Subsidy Release	Paid to companies after sale to farmers
Purpose	Prevent diversion of subsidised fertilisers

6. Restrictions on Market Practices

Recent UP orders prohibit:

- “tagging” or forced bundling of speciality nutrients with urea.

37. India’s Crude Oil Import Dependence Crosses 88.5%



India’s crude oil import dependence exceeded 88.5% during FY 2025–26 (April–January), highlighting the widening gap between rising domestic demand and stagnant domestic production.

About Crude Oil

Aspect	Details
Nature	Naturally occurring unrefined fossil fuel
Composition	Mainly hydrocarbons
Formation	Derived from ancient marine organisms subjected to heat and pressure over millions of years
Use	Refined to produce petrol, diesel, LPG, kerosene, aviation fuel and petrochemicals

Drivers of Rising Import Dependence

1. Rapid Demand Growth

India is among the **fastest-growing oil demand centres globally** due to:

- expanding transport sector
- industrial growth
- aviation expansion
- petrochemical demand.

2. Stagnant Domestic Production

Indicator	Status
Domestic Production (FY26 Apr–Jan)	~23.5 million tonnes
Trend	Marginal decline in production

Major producing regions include:

- Mumbai High
- Assam Basin
- Krishna-Godavari Basin
- Rajasthan (Barmer)

3. Large Refining Capacity

Indicator Value

Refining Capacity ~258 MMTPA

Utilisation Rate Often above 100%

This reflects India's **strong downstream refining capability**.

Overview of India's Oil Sector

Indicator Details

Import Dependence ~85–89%

Global Position 3rd largest oil consumer

Refining Status Net exporter of petroleum products

Largest Refinery Hub Jamnagar (Gujarat)

Major Suppliers of Crude Oil

Country Role

Russia Largest supplier in recent years

Iraq Major long-term supplier

Saudi Arabia Key OPEC supplier

UAE Strategic partner

USA Increasing share of imports

38. India's E-Commerce Market Projected to Reach \$300 Billion by 2030



India's e-commerce market, currently valued at about \$120–140 billion, is projected to reach \$280–300 billion by 2030, reflecting sustained growth in digital consumption.

Overview of India's E-Commerce Sector

Indicator	Current Status
Market Size	~\$120–140 billion
Projected Size (2030)	~\$280–300 billion
Share in Total Consumer Spending	~7–8%
Online Shoppers	~300 million
Projected Shoppers (2030)	~440 million

Despite rapid growth, **online commerce still forms a small share of total retail**, indicating **large untapped potential**.

Changing Landscape of E-Commerce in India

1. Rapid Expansion of Digital Consumers

- India has around **300 million online shoppers** today.

2. Rural Market Expansion

Indicator **Share**

Rural Online Shoppers ~30%

3. Online-Offline Retail Coexistence

Even with e-commerce growth:

- **offline retail still grows at ~13-14% annually.**

India's retail sector remains **hybrid**, combining digital and physical commerce.

4. Emergence of New Commerce Models

Model **Growth Trend**

Quick Commerce 100%+ CAGR

Chat Commerce ~40-45% CAGR

5. Gendered Behavioural Shifts

Consumer surveys indicate:

- **Two-thirds of women shoppers feel safer shopping online.**

This reflects growing **digital trust and convenience**.

39. Government Moves to Establish 'Content Creator Labs' to Boost India's Orange Economy



The Ministry of Information & Broadcasting (I&B) held a high-level meeting to **operationalise Content Creator Labs**, announced in the **Union Budget 2026-27**, aimed at strengthening India's **AVGC-XR sector talent pipeline**.

About Content Creator Labs

Aspect	Details
Announcement	Union Budget 2026-27
Implementing Ministry	Ministry of Information & Broadcasting
Objective	Develop grassroots talent for AVGC-XR sector
Financial Outlay	₹250 crore
Coverage	15,000 secondary schools and 500 colleges

Purpose of the Initiative

The labs aim to:

- create a **skilled workforce in creative digital industries**
- democratise access to **industry-grade tools and software**

- strengthen India's **Orange Economy (creative economy)**.

Sector Focus: AVGC-XR Industry

The initiative targets the **AVGC-XR sector**, which includes:

Component	Meaning
Animation	Computer-generated visual storytelling
Visual Effects (VFX)	Digital enhancement of film and media content
Gaming	Video game development and interactive media
Comics	Digital and graphic storytelling
XR (Extended Reality)	Technologies like AR, VR, and Mixed Reality

This sector is increasingly important for:

- entertainment
- education
- metaverse and immersive technologies.

Institutional Framework

Institution	Role
Indian Institute of Creative Technologies (IICT), Mumbai	Central hub for curriculum and technical standards
Content Creator Labs	Grassroots training and talent identification centres

The labs will function as **feeder institutions** for **advanced training programmes** at IICT.

40. RBI Raises Collateral-Free MSME Loan Limit and Allows Bank Lending to REITs



The Reserve Bank of India (RBI) has proposed **doubling the collateral-free loan limit for MSMEs to ₹20 lakh** and permitting **bank lending to Real Estate Investment Trusts (REITs)** with prudential safeguards.

Change in Collateral-Free Loan Limit

Aspect	Previous Limit	Revised Limit
Collateral-Free Loan Ceiling	₹10 lakh	₹20 lakh

Key Features

- Expands access to **formal bank credit for MSMEs** without asset collateral.
- Encourages **cash-flow based lending**, focusing on **business viability rather than fixed assets**.
- Aligns with **Priority Sector Lending (PSL)** norms and credit guarantee frameworks.

Shift Toward Cash-Flow Based Lending

Traditionally, banks relied heavily on **asset collateral**. The new approach emphasises:

- business turnover**
- cash flow stability**
- repayment capacity**

This is particularly beneficial for **service-sector MSMEs and startups** that lack physical assets.

Bank Lending to REITs

The RBI also allowed banks to lend to **Real Estate Investment Trusts (REITs)**.

Key Safeguards

Safeguard	Purpose
Risk Weights	Manage financial risk exposure
Exposure Caps	Prevent excessive lending concentration
Due Diligence Norms	Ensure quality of underlying real estate assets

What are REITs?

Aspect	Explanation
Definition	Investment vehicles that own and operate income-generating real estate assets
Examples of Assets	Office parks, commercial complexes, malls
Investor Benefit	Provide regular rental income and capital appreciation

REITs were introduced in India by **SEBI in 2014**.

Significance of the MSME Loan Limit Increase

1. Reducing Credit Gap

Indicator	Value
Estimated MSME Credit Gap	₹20–25 lakh crore

Higher collateral-free limits help **address this financing gap**.

2. Reducing Dependence on Informal Finance

Indicator	Share
Micro enterprises relying on informal lenders	~40–45%

Access to bank credit lowers borrowing costs and improves financial stability.

3. Employment Impact

Indicator	Value
MSME Employment	~11 crore people

Improved credit availability supports **business expansion and job creation**.

Status of MSMEs in India

Indicator	Value
Total MSMEs	~6.3 crore
Share of Micro Enterprises	~99%
Contribution to GDP	~30%
Share in Manufacturing Output	~45%
Share in Merchandise Exports	~43–45%

MSMEs are therefore **critical to India's economic growth and export competitiveness**.

41. Government Launches 'Bharat Taxi' – India's First Cooperative Ride-Hailing Platform



The Union Home and Cooperation Minister launched "Bharat Taxi" in New Delhi, India's first cooperative-sector ride-hailing platform, offering a driver-owned alternative to private aggregators like Uber and Ola.

About Bharat Taxi

Aspect	Details
Nature	Cooperative-based ride-hailing platform
Objective	Create a driver-owned mobility ecosystem
Vision	Promote cooperative entrepreneurship under "Sahkar se Samridhhi"
Coverage Goal	Nationwide expansion within two years

It is considered the **world's largest cooperative-based mobility platform**.

Institutional Framework

Institution	Role
Ministry of Cooperation	Policy support and promotion
National e-Governance Division (NeGD)	Technical support
Sahakar Taxi Cooperative Limited (STCL)	Operating entity

Legal Framework : The platform operates under the: **Multi-State Cooperative Societies (MSCS) Act, 2002**

This allows cooperative organisations to function across **multiple states in India**.

Core Philosophy : The initiative is based on the principle: **"Sarathi Hi Malik" (Driver is the Owner)**

Key features include:

- Drivers are **shareholders and co-owners**
- Participation in **decision-making and profit-sharing**.

Revenue Model

Feature	Bharat Taxi	Private Aggregators
Commission	Zero commission	20-30% commission
Driver Earnings	Drivers retain 100% of fares	Platform takes commission
Platform Fee	Nominal daily fee (~₹30)	Variable platform charges

Benefits for Consumers

- **No surge pricing**
- **Fixed fare system**
- **Estimated 30% cheaper rides compared to private platforms**

Social Security for Drivers

Benefit	Coverage
Personal Accident Insurance	₹5 lakh
Family Health Insurance	₹5 lakh

This improves **financial security and welfare of drivers**.

Digital Public Infrastructure Integration

The platform integrates India's **Digital Public Infrastructure (DPI)**.

Digital Platform Role

- DigiLocker** Instant driver verification
- UMANG App** Service delivery and platform access

Gender Inclusion Initiative

"Bike Didi" Programme

- Encourages **women drivers** in the ride-hailing sector.
- Promotes **safe and dignified employment for women**.

42. Bonded Labour Persists Despite Legal Abolition in India



Millions of **migrant labourers in India** continue to face **bonded labour conditions**, highlighting gaps in **implementation of existing legal safeguards and rehabilitation mechanisms**.

Understanding Bonded Labour

Aspect	Details
Meaning	A system where a person is forced to work to repay a debt or fulfil an obligation
Nature	Often involves coercion, restricted movement, underpayment or non-payment of wages
Forms	Debt bondage, hereditary labour obligations, forced migration labour

Bonded labour often traps **entire families across generations**, especially among **marginalised communities**.

Legal Framework Against Bonded Labour

Law	Key Provision
Bonded Labour System (Abolition) Act, 1976	Abolished bonded labour, cancelled bonded debts, mandated release and rehabilitation
Bharatiya Nyaya Sanhita (BNS), Section 143	Penalises forced labour and human trafficking
Juvenile Justice Act	Protects children from exploitation and forced labour
SC/ST (Prevention of Atrocities) Act	Protects marginalised communities often affected by bonded labour

Why Bonded Labour Persists

1. Poverty and Indebtedness

Many migrant workers take **advance loans from employers**, which leads to debt bondage.

2. Migration Vulnerability

Seasonal migrants working in:

- brick kilns, construction, agriculture, mining, are particularly vulnerable.

3. Weak Monitoring

Limited identification and rescue operations lead to **underreporting of bonded labour cases**.

43. ESIC Marks 75th Foundation Year – Strengthening India’s Social Security Framework



The Employees’ State Insurance Corporation (ESIC) commenced celebrations marking its 75th Foundation Year in New Delhi, highlighting the evolution of India’s largest social security health insurance system for workers.

About Employees’ State Insurance Corporation (ESIC)

Aspect	Details
Nature	Statutory social security organisation
Established Under	Employees’ State Insurance Act, 1948
Administrative Ministry	Ministry of Labour and Employment
Purpose	Provide medical care and financial protection to workers in the organised sector

Origin of the ESI Scheme : The Employees’ State Insurance (ESI) Scheme was designed based on the recommendations of the **B.P. Adarkar Committee**. The committee recommended a **health insurance system for industrial workers** to protect them against sickness, injury, and maternity risks.

Coverage of the ESI Scheme

Parameter	Details
Eligible Workers	Employees earning up to ₹21,000 per month
Coverage Type	Health insurance and social security
Beneficiaries	Insured workers and their dependents

Funding Model: The scheme operates on a **self-financing contributory model**.

Contributor	Contribution
Employer	Majority share of payroll contribution
Employee	Small percentage of wages

This pooled fund finances **medical treatment and cash benefits**.

Key Benefits Under ESI

Benefit Type	Description
Medical Benefit	Comprehensive medical treatment for insured persons and dependents
Sickness Benefit	Cash compensation during certified illness
Maternity Benefit	Paid leave and financial assistance for maternity
Disablement Benefit	Compensation for employment injury or disability
Dependants’ Benefit	Financial support to family members in case of worker’s death

Recent Initiatives by ESIC

1. SPREE (Scheme to Promote Registration of Employers/Employees)
2. Amnesty Scheme (2025)

44. Union Budget Boosts PM VIKAS Scheme for Minority Skill Development



The Union Budget 2026–27 has allocated fresh funding to the PM-Virasat Ka Samvardhan (PM VIKAS) scheme, aimed at skill development and socio-economic upliftment of minority communities.

About PM VIKAS Scheme

Aspect	Details
Nature	Central Sector Scheme
Launch Year	2025
Objective	Skill development and economic empowerment of minority communities
Implementing Ministry	Ministry of Minority Affairs
Operational Framework	Implemented through the Skill India Mission

Target Beneficiaries

The scheme covers the **six notified minority communities in India:**

Minority Community

Muslims
Christians
Sikhs
Buddhists
Jains
Parsis

Key Components of PM VIKAS

Component	Focus
Skilling	Vocational training and skill development
Entrepreneurship	Business development and startup support
Education	Capacity building and educational assistance
Infrastructure Development	Creation of skill training centres and support infrastructure

Scheme Convergence : PM VIKAS integrates and subsumes five earlier schemes.

Previous Scheme	Focus Area
Seekho Aur Kamao	Skill development for minorities
USTTAD	Preservation of traditional arts and crafts
Hamari Dharohar	Protection of minority heritage
Nai Roshni	Leadership development of minority women
Nai Manzil	Education and skill training for minority youth

This consolidation **streamlines implementation and reduces duplication.**

Inclusion Mandate: The scheme includes specific **social inclusion provisions.**

Category	Reservation
Women	Minimum 33% participation in skilling programmes
Persons with Disabilities (PwDs)	3% reservation across scheme activities

45. DGCA Proposes Immediate 30-Day Flight Ban for Disruptive Passengers



The Directorate General of Civil Aviation (DGCA) has proposed allowing airlines to impose an **immediate 30-day flying ban on disruptive passengers**, instead of waiting for the approval of an independent committee, which previously took **up to 45 days**. The proposal aims to **strengthen passenger discipline and enhance aviation safety**.

About Directorate General of Civil Aviation (DGCA)

Aspect	Details
Nature	India's primary aviation safety regulator
Administrative Ministry	Ministry of Civil Aviation
Legal Basis	Bharatiya Vayuyan Adhiniyam, 2024
Core Role	Regulation of civil aviation safety and operations in India

Key Functions of DGCA

1. Aviation Safety Regulation

- Establishes **airworthiness standards** for aircraft.
- Issues **operational certificates** to airlines.
- Conducts **safety inspections and audits**.

2. Licensing Authority

DGCA issues and renews licences for aviation professionals:

Licence Type
Commercial Pilots
Aircraft Maintenance Engineers
Air Traffic Controllers

3. Regulatory Compliance

- Enforces **Civil Aviation Requirements (CAR)**.
- Monitors airline operational standards.

4. International Coordination

DGCA acts as India's **nodal agency for coordination with the International Civil Aviation Organization (ICAO)** to ensure **global aviation safety standards**.

5. Digital Governance

- Uses the **e-GCA digital platform** to streamline:
 - licensing
 - approvals
 - compliance reporting
 - administrative processes.

Proposed Change for Disruptive Passengers

Earlier System

Ban required approval of an **independent committee**
Decision could take **up to 45 days**
Delayed enforcement
The independent committee may still review cases **after the temporary ban**.

Proposed System

Airlines can impose **immediate 30-day ban**
Immediate action allowed
Faster disciplinary action

46. AAIB Probes Air Ambulance Crash in Jharkhand – Focus on Absence of Black Boxes



The Aircraft Accident Investigation Bureau (AAIB) is investigating the crash of a Redbird Airways air ambulance in Jharkhand. Investigators confirmed that the aircraft **did not have black boxes**, which are typically used to reconstruct accident events.

About Aircraft Accident Investigation Bureau (AAIB)

Aspect	Details
Nature	Independent statutory investigation body
Established	2012
Administrative Ministry	Ministry of Civil Aviation
Objective	Investigate aircraft accidents and recommend safety improvements
Legal Framework	Bharatiya Vayuyan Adhiniyam, 2024
Operational Rules	Aircraft (Investigation of Accidents and Incidents) Rules, 2017 (amended 2021)

Core Functions of AAIB

- Accident Investigation** : Investigates **aircraft accidents and serious incidents in Indian airspace**.
- Safety Recommendations** : Identifies **systemic failures** in aviation operations.
 - Issues **safety recommendations to prevent recurrence**.
- Technical Investigation Authority** : Conducts **data analysis, wreckage examination, and flight reconstruction**.
- International Cooperation** : Aligns investigations with global aviation standards.

International Framework

AAIB operates according to **international aviation investigation standards**.

Framework	Details
Chicago Convention	Global treaty governing international aviation
Annex 13	Specifies procedures for aircraft accident investigations
Organisation	International Civil Aviation Organization (ICAO)

About ICAO

- A specialised agency of the **United Nations**.
- Established in **1944 under the Chicago Convention**.
- India is a **founding member**.

Limitations of AAIB

Unlike the **Directorate General of Civil Aviation (DGCA)**:

AAIB	DGCA
Investigative body	Regulatory authority
Issues safety recommendations	Enforces aviation regulations
No punitive powers	Can suspend licences, ground airlines, impose penalties

About Black Box in Aircraft

A **black box** is a flight recording system used to **reconstruct accident events during investigations**.

Despite the name, it is **bright orange** for easier recovery after crashes.

Components of a Black Box

Device	Function
Flight Data Recorder (FDR)	Records hundreds of flight parameters such as altitude, speed, heading, engine performance
Cockpit Voice Recorder (CVR)	Records cockpit conversations, pilot communication with ATC, and cockpit sounds

Design Characteristics

Feature	Purpose
Titanium/steel casing	Withstands high temperatures and impact
Underwater locator beacon	Helps locate the device in water accidents
High visibility colour	Easier recovery after crashes

Regulatory Requirement in India

Under DGCA Civil Aviation Requirements (CAR):

Parameter	Requirement
Aircraft Weight Threshold	Mandatory for aircraft with MTOW above 5,700 kg

Smaller aircraft such as **light aircraft or certain air ambulances** may not always carry black boxes.

47. SC Examines WhatsApp–CCI Dispute: India’s Digital Competition Regime in Focus



India’s digital competition framework is under scrutiny as WhatsApp challenges the ₹213.14 crore penalty imposed by the Competition Commission of India (CCI) before the Supreme Court over alleged abuse of dominant position through data sharing practices.

About the CCI-WhatsApp Data Sharing Dispute

Issue	Details
Policy Change (2021)	WhatsApp introduced a privacy policy requiring users to share data with its parent company Meta
Consent Model	“Take-it-or-leave-it” consent without an opt-out option
CCI Penalty (2024)	₹213.14 crore penalty imposed for abuse of dominant position in the messaging market
Additional Direction	WhatsApp ordered to stop sharing user data with Meta for advertising for 5 years

Meta’s Defence : Meta argued that:

- Data sharing was **necessary for improving services**.
- **Privacy issues fall under data protection law**, not competition law.

NCLAT Decision (2025)

Aspect	Outcome
Penalty	Upheld ₹213.14 crore fine
5-year Data Sharing Ban	Overtured

Supreme Court Observation

The **Supreme Court** criticised WhatsApp's consent structure, describing it as:

"An exploitative agreement between a lion and a lamb."

This highlights concerns about **asymmetric bargaining power between big tech firms and users**.

India's Digital Competition Framework

1. Competition Act, 2002

Feature **Details**

Nature Primary competition law in India

Approach **Ex-post regulation** (intervenes after anti-competitive conduct occurs)

Focus Prevent monopolies, cartels, and abuse of dominant position

2. Competition (Amendment) Act, 2023

Key reform introduced:

Provision **Purpose**

Deal Value Threshold CCI approval required for acquisitions exceeding **₹2,000 crore**

Objective Prevent **"killer acquisitions"** of innovative startups by big tech firms

3. Proposed Digital Competition Bill

Feature **Purpose**

Ex-ante regulation Prevent anti-competitive behaviour before it occurs

Target Entities **Systemically Significant Digital Enterprises (SSDEs)**

Focus Areas Data monopolisation, predatory pricing, self-preferencing

4. Digital Markets Division

The CCI recently created a specialised division to:

- Investigate **digital platforms**
- Monitor **digital market competition**.

5. DPDP Act, 2023

The **Digital Personal Data Protection Act** complements competition regulation.

Provision **Objective**

Consent-based data use Prevent cross-use of personal data without user permission

Data fiduciary responsibility Protect user privacy and data rights

About Competition Commission of India (CCI)

Aspect	Details
Established	2003
Legal Basis	Competition Act, 2002
Administrative Ministry	Ministry of Corporate Affairs
Nature	Statutory quasi-judicial body

Core Functions of CCI

1. Prevent Anti-Competitive Practices

- Cartels
- Abuse of dominant position
- Anti-competitive agreements.

2. Regulate Mergers and Acquisitions

Known as “**combinations regulation**”, ensuring mergers do not harm competition.

3. Protect Consumer Welfare

Ensures **fair market conditions and competitive pricing**.

Composition of CCI

Position	Details
Chairperson	Head of the Commission
Members	2-6 members
Appointment	Central Government

Appellate Mechanism

Authority Role

NCLAT Appeals against CCI decisions

Extraterritorial Jurisdiction

CCI can investigate **foreign companies** if their actions cause an:

Appreciable Adverse Effect on Competition (AAEC) in India.

48. SBI Launches CHAKRA Centre of Excellence to Finance Sunrise Sectors



The State Bank of India (SBI) has launched CHAKRA - Centre of Excellence, an institutional platform aimed at financing technology-driven and sustainability-focused sunrise sectors to accelerate India's innovation-led economic transformation.

About CHAKRA (Centre of Excellence)

Aspect	Details
Launched By	State Bank of India (SBI)
Nature	Institutional Centre of Excellence for emerging sectors
Objective	Facilitate financing of next-generation technology and sustainability sectors
Strategic Role	Support India's transition toward innovation-based growth

Meaning of CHAKRA

CHAKRA is an acronym representing strategic sectors of the future economy.

Letter Sector

- C Cell Chemistry (Advanced Battery Technologies)
- H Hydrogen (Green Hydrogen Economy)
- A Advanced Computing (Data Centres)
- K Charismatic Living (Smart Infrastructure)
- R Renewable Energy & E-Mobility
- A Advanced Electronics / Semiconductors

Focus Sunrise Sectors Supported by CHAKRA

The initiative prioritises **eight key sunrise sectors**.

Sunrise Sector
Renewable Energy
Advanced Cell Chemistry & Battery Storage
Electric Mobility & Charging Infrastructure
Green Hydrogen & Green Ammonia
Semiconductors
Decarbonisation Technologies
Smart Infrastructure
Data Centre Infrastructure

Strategic Importance of the Initiative

Aspect	Significance
Capital Mobilisation	Sunrise sectors may unlock ~₹100 lakh crore investment by 2030
Financial Innovation	Provides specialised financing models for emerging technologies
Policy Alignment	Supports India's energy transition and digital infrastructure expansion
Industrial Competitiveness	Strengthens India's position in high-value technology supply chains

49. India Releases First Inflation Data Under New CPI Series (Base Year 2024)



The Ministry of Statistics and Programme Implementation (MoSPI) has released the first retail inflation data under the revised Consumer Price Index (CPI) series, reflecting updated consumption patterns and a new base year of 2024.

Key Inflation Data Under the New CPI Series

Indicator	Inflation Rate
Headline Retail Inflation	2.75%
Previous Series (Dec 2025)	1.33%
Food Inflation	2.13%
Housing Inflation	2.05%

Key Change : For the first time, rural house rent has been included in the housing component, improving representational accuracy.

About the New CPI Series

Feature	Details
Base Year	2024 (earlier 2012)
Data Source	Household Consumption Expenditure Survey (HCES) 2023–24
Purpose	Reflect updated consumption patterns and spending behaviour

The revision helps capture changes in India's consumption structure, especially rising spending on services.

Major Weightage Changes in CPI Basket

Category	Weight in New CPI
Food & Beverages	36.75% (reduced weight)
Housing (incl. utilities)	17.67% (increased weight)
Transport	8.8%
Health	6.1%

Interpretation

- Food weight reduced due to declining share of food in household expenditure.
- Services weight increased reflecting higher spending on housing, transport, and healthcare.

Adoption of International Classification

The new CPI series follows the COICOP 2018 standard.

COICOP : Classification of Individual Consumption According to Purpose

Feature	Description
Developed By	United Nations Statistical Commission
Purpose	Standardise consumption classification across countries
Structure	CPI basket divided into 12 consumption divisions

Significance of the New CPI Series

1. Better Representation of Consumption Patterns : Captures modern spending behaviour, especially rising service consumption.

2. Improved Inflation Measurement : Updated weights reduce distortions caused by **outdated** consumption baskets.

3. Policy Relevance for RBI : More accurate CPI helps the **Reserve Bank of India** design monetary policy.

4. Rural Housing Inclusion: Including **rural house rent** improves coverage of rural living costs.

FEBRUARY 2026

ENVIRONMENT

1. India Adds Two New Ramsar Sites
2. Rajasthan Assures No Forced Displacement
3. NBWL Clears Forest Diversion in Durgavati TR
4. Cheetah Gamini Gives Birth at Kuno
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1. India Adds Two New Ramsar Sites, Total Wetlands of International Importance Reach 98



The Ministry of Environment, Forest and Climate Change (MoEFCC) has designated **Patna Bird Sanctuary (Uttar Pradesh)** and **Chhari-Dhand (Gujarat)** as **Ramsar Sites**, raising India's total to **98 wetlands of international importance**.

New Ramsar Sites in India

Wetland	State	Key Feature
Patna Bird Sanctuary	Uttar Pradesh	Important migratory bird stopover
Chhari-Dhand	Gujarat	Seasonal desert wetland near Banni Grasslands

Patna Bird Sanctuary

Aspect	Details
Location	Jalesar tehsil, Etah district, Uttar Pradesh
Area	108 hectares (smallest bird sanctuary in UP)
Flyway Link	Central Asian Flyway
Avian Population	Over 50,000 birds recorded

Key Bird Species

Species	Scientific Name
Northern Pintail	<i>Anas acuta</i>
Sarus Crane	<i>Antigone antigone</i>

The sanctuary acts as a **"Sarus Kem" (congregation site)** for Sarus cranes during summer.

Chhari-Dhand Wetland

Aspect	Details
Location	Near Banni Grasslands , Rann of Kutch, Gujarat
Meaning	From Kutchi words meaning "salty shallow wetland"
Hydrology	Seasonal desert wetland filled during monsoon
Previous Status	Declared Conservation Reserve in 2008

Key Biodiversity at Chhari-Dhand

Conservation Status	Species
Critically Endangered	Sociable Lapwing
Vulnerable	Common Pochard
Migratory Birds	Greater Flamingo, Common Crane

Mammalian Species

Species

Chinkara
Caracal
Desert Cat
Indian Wolf

The wetland serves as a **wintering ground for migratory birds and habitat for desert fauna.**

About Ramsar Sites

Aspect	Details
Definition	Wetlands of international importance
Treaty	Ramsar Convention
Adopted	2 February 1971
Location of Adoption	Ramsar, Iran

India and the Ramsar Convention		States with Highest Ramsar Sites		
Aspect	Details	Rank	State	Number of Sites
India Ratified	1982	1	Tamil Nadu	20
Total Ramsar Sites (2026)	98	2	Uttar Pradesh	11
		3	Bihar	6

First Ramsar Sites in India

Site	State	Year
Chilika Lake	Odisha	1981
Keoladeo National Park	Rajasthan	1981

World Wetlands Day

Aspect	Details
Date	2 February
Purpose	Commemorate Ramsar Convention
2026 Theme	<i>Wetlands and Traditional Knowledge: Celebrating Cultural Heritage</i>

2. Rajasthan Assures No Forced Displacement in Dholpur–Karauli Tiger Reserve



The Rajasthan Government assured local communities that residents within the Dholpur–Karauli Tiger Reserve (DKTR) will not be displaced without their consent, addressing concerns regarding relocation after the reserve’s notification.

About Dholpur–Karauli Tiger Reserve (DKTR)

Aspect	Details
Location	Eastern Rajasthan
Area	1,111 sq. km
Notification Year	2023
National Rank	54th Tiger Reserve in India
State Rank	5th Tiger Reserve in Rajasthan

Geographical Features

1. Geological Location

Feature	Description
Geological Junction	Located at the meeting point of the Vindhyan and Aravalli hill ranges

2. Topography

The reserve's landscape is dominated by:

- **extensive ravines**
- **rugged terrain**

These formations are associated with the **Chambal River basin**.

3. Hydrology

Feature	Details
Major River	Chambal River
Nature	Perennial
Role	Primary water source for the reserve

Vegetation

The forest type is classified as **tropical dry deciduous forest**.

Dominant Tree Species
Dhok
Khair
Tendu
Babool

Ecological Importance

1. Tiger Population Management

The reserve acts as a **sink habitat** for:

- **overflow tiger population from Ranthambore Tiger Reserve.**

2. Wildlife Corridor

DKTR is part of an **important tiger landscape corridor**.

Corridor Link

Ranthambore Tiger Reserve (Rajasthan)

Kuno National Park (Madhya Pradesh)

Madhav National Park (Madhya Pradesh)

This connectivity is crucial for **genetic diversity and tiger movement**.

3. NBWL Clears Forest Diversion Inside Veerangana Durgavati Tiger Reserve for Irrigation Project



The Standing Committee of the National Board for Wildlife (NBWL) has approved the diversion of 272 hectares of forest land within the core area of the Veerangana Durgavati Tiger Reserve (VDTR) for the Kopra Medium Irrigation Project.

About Veerangana Durgavati Tiger Reserve (VDTR)

Aspect	Details
Location	Madhya Pradesh
Notification Year	2023
State Rank	7th Tiger Reserve in Madhya Pradesh
National Rank	54th Tiger Reserve in India
Area	~2,339 sq km

Formation of the Reserve

The reserve was created through the **merger of two wildlife sanctuaries**:

- Wildlife Sanctuary
- Nauradehi Wildlife Sanctuary
- Veerangana Durgavati Wildlife Sanctuary

The formation of the reserve was also **linked to environmental approval conditions for the Ken-Betwa River Linking Project**.

Geographical Features

River Basin Location

The reserve spans parts of **two major river basins**:

- Basin
- Narmada Basin
- Yamuna Basin

Major Rivers in the Reserve

River	Status
Bamner River	Tributary of Ken River
Kopra River	Tributary of Ken River
Bearma River	Tributary of Ken River

These rivers ultimately drain into the **Ken River**, a major tributary of the Yamuna.

Landscape Connectivity

The reserve serves as a **critical wildlife corridor** linking:

- Protected Areas Connected
- Panna Tiger Reserve
- Satpura Tiger Reserve

This connectivity is essential for **tiger dispersal and genetic diversity**.

Vegetation Type

The reserve mainly consists of **tropical mixed dry deciduous forests**.

Dominant Tree Species
Teak
Saja
Dhaora
Ber
Amla

Historical and Cultural Significance

Named After Rani Durgavati

The reserve commemorates **Rani Durgavati**, the **Gond queen who resisted Mughal expansion in the 16th century**.

Singorgarh Fort

Feature	Description
Location	Within the tiger reserve
Historical Significance	A historic Gond hill fort associated with Rani Durgavati

UPSC Relevance

Prelims Focus

- Veerangana Durgavati Tiger Reserve
- Ken-Betwa river linking project
- NBWL.

4. 'Turtle Trails' Initiative Announced to Promote Ecological Tourism and Sea Turtle Conservation



The **Union Budget 2026-27** introduced the **'Turtle Trails' initiative**, aimed at promoting **ecological tourism centred on sea turtle conservation and ethical wildlife observation**.

About Turtle Trails Initiative

Aspect	Details
Nature	Ecological tourism initiative
Announced In	Union Budget 2026-27
Objective	Promote tourism linked with sea turtle conservation
Focus	Strictly regulated tourism circuits around nesting beaches

The programme intends to balance **biodiversity conservation with sustainable tourism development**.

Major Project Sites

The initiative focuses on **key sea turtle nesting beaches in India**.

Location	State
Gahirmatha Beach	Odisha

Rushikulya Beach	Odisha
Karnataka Coast	Karnataka
Kerala Coast	Kerala

These locations host **major sea turtle nesting habitats**.

Target Species

Olive Ridley Sea Turtle

Feature	Details
Scientific Name	<i>Lepidochelys olivacea</i>
Key Event	Arribada mass nesting
Global Significance	One of the largest mass nesting events in the world

Arribada

- A **synchronised mass nesting phenomenon** where thousands of turtles come ashore simultaneously to lay eggs.

Significance of the Turtle Trails Initiative

1. Promotion of Niche Tourism

Encourages **wildlife and nature-based tourism**, diversifying India's tourism sector.

2. Green Employment

Creates **local livelihood opportunities** by training communities as:

- nature guides
- conservation stewards.

3. Public Awareness

Educates visitors about **marine biodiversity and coastal ecosystem conservation**.

4. Infrastructure Development

Improves **last-mile connectivity and eco-sensitive tourism infrastructure** in coastal villages.

4. Cheetah 'Gamini' Gives Birth to Three Cubs at Kuno National Park



A South African cheetah named **Gamini** has given birth to **three cubs** in **Kuno National Park, Madhya Pradesh**, marking another milestone under **Project Cheetah**, India's cheetah reintroduction programme.

Key Developments

Indicator	Details
New Cubs Born	3
Total Cheetah Population in India	38
Indian-born Cubs	27
Translocated Adults	11

About Gamini

Aspect	Details
Origin	South Africa
Translocation Year	February 2023
Location	Kuno National Park, Madhya Pradesh

The birth represents **successful adaptation and breeding of translocated cheetahs in India**.

Project Cheetah

Aspect	Details
Nature	Species reintroduction programme
Launch Year	2022
Objective	Reintroduce cheetahs to restore ecological balance
Global Significance	World's first intercontinental large wild carnivore translocation project

Cheetahs were declared **extinct in India in 1952**, making this reintroduction a **major conservation effort**.

Current Habitat Distribution

Location	Number of Cheetahs
Kuno National Park (MP)	35
Gandhi Sagar Wildlife Sanctuary (MP)	3

Future Expansion of Cheetah Habitat

Proposed Site	State
Nauradehi Wildlife Sanctuary	Madhya Pradesh

This will become the **third cheetah reintroduction site in India**.

About Kuno National Park

Feature	Details
Location	Sheopur district, Madhya Pradesh
Earlier Status	Wildlife Sanctuary
National Park Status	2018

River	Kuno River flows through the park
-------	-----------------------------------

The park was originally prepared as a **possible site for Asiatic lion relocation**, but later chosen for **Project Cheetah**.

Significance of Cheetah Reintroduction

1. Ecological Restoration

Cheetahs function as **apex predators**, helping regulate herbivore populations.

2. Grassland Conservation

Cheetahs thrive in **savannah and grassland ecosystems**, drawing attention to the conservation of these neglected habitats.

3. Global Conservation Model

Project Cheetah demonstrates **large carnivore translocation across continents**.

5. Lion-Tailed Macaque Populations Increasing in Human-Dominated Landscapes of Western Ghats



Recent studies report a **rise in lion-tailed macaque populations in human-dominated landscapes**, particularly in the **Anamalai Hills of the Western Ghats**, indicating increasing interaction between wildlife and human settlements.

About Lion-Tailed Macaque

Aspect	Details
Scientific Name	<i>Macaca silenus</i>
Common Name	Wanderoo
Type	Old World monkey
Endemism	Endemic to the Western Ghats of India

Physical Characteristics

Feature	Description
Mane	Distinctive silver-white mane around the face
Tail	Ends in a lion-like black tuft
Appearance	Black-bodied monkey with striking facial hair

Habitat and Distribution

Preferred Habitat

- Tropical evergreen forests
- Semi-evergreen rainforests
- Primarily inhabits the **upper forest canopy**

Geographical Distribution

Region	States
Anamalai Hills	Tamil Nadu / Kerala
Nilgiri Hills	Tamil Nadu / Kerala / Karnataka
Ashambu Hills	Kerala / Tamil Nadu
Sirsi-Honnavar Rainforests	Karnataka

These populations are **highly fragmented due to habitat loss**.

Behavioural Characteristics

Feature	Details
Lifestyle	Highly arboreal
Activity Pattern	Diurnal
Social Structure	Lives in small hierarchical groups
Human Interaction	Generally shy and avoids humans

The lion-tailed macaque is considered **the most arboreal of all macaque species**.

Ecological Role

Seed Dispersal

The species is a **frugivorous omnivore**, playing a crucial role in:

- dispersing seeds of rainforest trees
- promoting **forest regeneration**
- maintaining **rainforest biodiversity**.

Key Threats

Threat	Explanation
Habitat Fragmentation	Expansion of tea and coffee plantations
Road Mortality	Increased roadkills due to highways
Poaching	Hunting for meat or illegal wildlife trade
Human Encroachment	Forest fragmentation and settlement expansion

Fragmented habitats force macaques to **enter plantations and human landscapes**.

Conservation Status

Organisation	Status
IUCN Red List	Endangered
CITES	Appendix I
Wildlife Protection Act, 1972	Schedule I

These protections provide the **highest level of legal conservation in India**.

Prelims Focus

- Lion-tailed macaque
- Western Ghats fauna
- IUCN / CITES / WPA schedules.

6. Thriving Coral Reef Stretch Discovered Near Kalpeni Island in Lakshadweep



A healthy and continuous coral reef stretch has been discovered near Kalpeni Island in Lakshadweep, even as the world is experiencing the fourth global mass coral bleaching event.

What are Coral Reefs?

- Coral reefs are **marine ecosystems** formed by tiny organisms called **coral polyps**.
- These polyps secrete calcium carbonate, creating **reef structures over time**.

Symbiotic Relationship

Corals exist in a **mutualistic relationship** with microscopic algae called **zooxanthellae**.

Component	Role
Coral Polyps	Provide shelter and nutrients
Zooxanthellae	Perform photosynthesis and supply energy

👉 This relationship enables:

- **High productivity**
- **Rich biodiversity**

Global Coral Crisis

(a) Mass Coral Bleaching

- Rising **ocean temperatures** cause stress to corals.
- Corals **expel zooxanthellae**, leading to:
 - Loss of colour, Reduced energy, Possible death

(b) Thermal Tipping Point

- As per **Global Tipping Points Report (2025)**:
 - Around **1.4°C global warming** → coral reefs may face **irreversible decline**

(c) Biodiversity Importance

- Coral reefs cover **<1% of ocean area** but support:
 - **~25% of marine biodiversity**
- Act as:
 - **Habitats, Nurseries, Feeding grounds**

Ideal Conditions for Coral Growth

Condition	Requirement
Climate	Stable, no sudden temperature change
Temperature	Warm waters (20–30°C)
Latitude	30°N to 30°S
Depth	Shallow waters (45–55 m)
Water Quality	Clear, saline (low turbidity)
Food Supply	Plankton availability
Pollution Level	Very low (high sensitivity)

Why Lakshadweep Reefs are Thriving

- (a) **Thermal Buffering:** Ocean currents and vertical mixing reduce **heat stress**
- (b) **Strong Water Circulation:** Ensures: Nutrient exchange, Prevention of heat buildup
- (c) **Heat-Resilient Species:** Presence of **thermally tolerant coral species** helps survival during heatwaves

About Lakshadweep

Feature	Details
Location	Arabian Sea (off southwest India)
Type	Coral island archipelago
Capital	Kavaratti
Terrain	Flat islands; no rivers or hills

Island Groups		Important Channels	
Group	Location	Channel	Separates
Amindivi Islands	North	8° Channel	Maldives & Minicoy Island
Laccadive Islands	Central	9° Channel	Minicoy & rest of Lakshadweep
Minicoy Islands	South		

7. Artificial Reef Restoration Revives Vaan Island in the Gulf of Mannar



A decade-long artificial reef restoration project at Vaan Island (Tamil Nadu) has produced socio-ecological benefits exceeding twice the project cost, while reversing severe coastal erosion.

About Vaan Island

Feature	Details
Other Names	Van Tivu / Church Island
Location	Gulf of Mannar, Tamil Nadu
Status	Small uninhabited coral island
Protected Area	Part of the Gulf of Mannar Marine National Park

The island is **one of the 21 islands** located within the marine national park.

Marine Ecosystems Around Vaan Island

The waters surrounding the island support **high marine biodiversity**, including:

- Coral reefs
- Seagrass beds
- Rich fish diversity

These ecosystems play a key role in **coastal protection and fisheries productivity**.

Severe Coastal Erosion

Year Island Area

1969 20 hectares

2015 1.53 hectares

Total Loss:

About 92% of the island area was lost due to:

- Extensive coral mining
- Sea-level rise
- Wave erosion

Restoration Efforts

Artificial Reef Deployment

Since 2015, scientists have deployed:

- 10,000+ artificial reef modules

These structures serve as **substrates for coral growth and wave barriers**.

Results of the “Vaan Model”

Impact	Outcome
Coastal erosion	Halted
Island area	Increased by over 2.3 hectares (by 2026)
Marine biodiversity	Improved
Livelihood benefits	Increased fish availability for local fishermen

The Vaan Model is now considered a **successful example of ecosystem-based coastal restoration**.

About Gulf of Mannar

Feature	Details
Location	Between Southeastern India and Western Sri Lanka
Ocean	Part of the Indian Ocean
Nature	Shallow marine ecosystem

Geographical Boundaries

Feature	Role
Adam’s Bridge (Ram Setu)	Chain of shoals separating water bodies
Rameswaram Island	Northern boundary
Mannar Island	Sri Lankan boundary

These features separate the **Gulf of Mannar from Palk Bay**.

Conservation Importance

Status	Year
India’s First Marine Biosphere Reserve	1989
UNESCO MAB Recognition	2001

The UNESCO Man and Biosphere (MAB) Programme promotes **sustainable coexistence of humans and ecosystems**.

Keystone Species

Dugong (Sea Cow)

- A marine herbivorous mammal
- Feeds mainly on seagrass beds
- The Gulf of Mannar is India's most significant habitat for dugongs.

8. Rare Giant Phantom Jellyfish Filmed in the Deep Waters off Argentina



Researchers recently captured rare footage of the Giant Phantom Jellyfish (*Stygiomedusa gigantea*) off the coast of Argentina, a species that has been documented fewer than 130 times since its discovery in 1899.

About Giant Phantom Jellyfish

Feature	Details
Scientific Name	<i>Stygiomedusa gigantea</i>
Group	Scyphozoa (True Jellyfish)
Family	Ulmaridae
Habitat	Deep sea

This species is considered **one of the most elusive deep-sea jellyfish** ever recorded.

Physical Characteristics

Feature	Description
Bell Size	Up to 1 metre in diameter
Colour	Deep reddish-brown
Oral Arms	Four ribbon-like arms extending over 10 metres
Tentacles	Absent (unusual for jellyfish)

Unlike most jellyfish, the species **does not possess marginal stinging tentacles**.

Unique Feeding Mechanism

Instead of tentacles, the jellyfish captures prey using **four massive oral arms**.

Method

- The oral arms **wrap around prey**
- Prey is **enveloped and consumed**

Diet

- Plankton
- Small fish

Habitat : The species lives in the **deep ocean layer known as the Midnight Zone**.

Feature	Details
Depth Range	1,000–4,000 metres
Light Conditions	No sunlight penetration
Environment	High pressure and low temperatures

Global Distribution

The Giant Phantom Jellyfish occurs across most ocean basins worldwide, except the:

- Arctic Ocean

Its rarity is largely due to **extreme deep-sea habitat**, making observation difficult.

Symbiotic Relationship

The jellyfish exhibits **symbiosis with a fish species**.

Species	Role
Pelagic Brotula (<i>Thalassobathia pelagica</i>)	Takes refuge within the jellyfish's bell and arms

The fish gains **protection**, while the jellyfish is **not harmed**.

Ecological Role

The Giant Phantom Jellyfish acts as:

- a **large invertebrate predator**
- an important component of the **deep-sea food web**.

It helps regulate populations of **plankton and small marine organisms**.

Threats

Threat	Impact
Deep-sea mining	Habitat destruction
Bottom trawling	Accidental bycatch
Ocean acidification	Impacts deep ocean ecosystems

Largest Jellyfish by Length

Species	Feature
Lion's Mane Jellyfish (<i>Cyanea capillata</i>)	Tentacles can reach 120 feet , longer than a blue whale

This makes it the **largest jellyfish species by length**.

UPSC Relevance : Prelims Focus

- Giant Phantom Jellyfish
- Midnight Zone (Deep Ocean Layers)
- Symbiotic marine relationships.

9. New Dragonfly Species *Lyriothemis keralensis* Discovered in Kerala



Scientists have discovered a **new species of dragonfly**, *Lyriothemis keralensis*, in the **low-lying coastal regions of Kerala**, expanding the known biodiversity of India's Western Ghats landscape.

About *Lyriothemis keralensis*

Feature	Details
Scientific Name	<i>Lyriothemis keralensis</i>
Common Name	Slender Bombardier
Group	Dragonfly (Order: Odonata)
Discovery Location	Coastal regions of Kerala, India

This species belongs to the **genus *Lyriothemis***, a group of dragonflies mostly found in **tropical Asia**.

Physical Characteristics

Feature	Description
Abdomen	Noticeably slimmer than related species
Reproductive Structures	Distinct anatomical features that differentiate it from close relatives
Body Shape	Slender and elongated

These morphological differences helped scientists identify it as a **new species**.

Sexual Dimorphism

The species shows **clear differences between male and female individuals**.

Sex	Colour Pattern
Male	Blood-red abdomen with black markings
Female	Yellow and black coloration

This phenomenon is known as **sexual dimorphism**, where males and females differ in appearance.

Habitat Preference

The species thrives mainly in **human-modified landscapes**, including:

- **Pineapple plantations**
- **Rubber plantations**
- **Shaded irrigation canals**
- **Seasonal water pools**

These environments provide **temporary freshwater habitats necessary for dragonfly breeding**.

Seasonal Activity

Feature	Details
Seasonality	Mainly active during the monsoon months
Behaviour	Seasonal resident species

The **availability of rainwater pools during monsoon** creates ideal breeding conditions.

Ecological Importance

Natural Pest Control

Dragonflies play a crucial role as **biological control agents**.

They help regulate populations of:

- **Mosquitoes**
- **Other disease-carrying insects**

Thus contributing to **ecosystem balance and public health**.

UPSC Relevance : Prelims Focus

- Dragonflies (Order **Odonata**)
- Biological pest control
- Species discovery in Western Ghats.

10. New Soil Micro-Arthropod *Lepidocampa sikkimensis* Discovered in the Eastern Himalayas



Scientists from the **Zoological Survey of India (ZSI)** have discovered a **new soil-dwelling micro-arthropod species, *Lepidocampa sikkimensis***, in the Eastern Himalayas.

This discovery is significant because **an Indian research team has described a species belonging to the Diplura group for the first time.**

About *Lepidocampa sikkimensis*

Feature	Details
Scientific Name	<i>Lepidocampa sikkimensis</i>
Type	Soil-dwelling micro-arthropod
Order	Diplura
Group	Primitive hexapods (six-legged arthropods)
Wings	Wingless

Diplurans are **primitive insects that live in soil and leaf litter environments**.

Physical Characteristics

Feature	Description
Body Shape	Slender and elongated
Colour	Translucent
Surface	Covered with distinct scales
Cerci	Two long tail-like appendages

Cerci

Cerci are **sensory appendages** that help the organism detect environmental stimuli.

Habitat

The species prefers **moist forest soils rich in organic matter**.

Typical habitat conditions include:

- **Humus-rich soil**
- **Leaf litter layers**
- **Temperate Himalayan forests**

Such habitats provide **moisture, organic nutrients, and protection from predators**.

Geographical Distribution

Currently known from **two locations in the Eastern Himalayas**:

Location	State
Ravangla	Sikkim
Kurseong	West Bengal

Its distribution appears to be **restricted to the Eastern Himalayan ecosystem**.

Ecological Importance

1. Nutrient Cycling

The organism helps **break down organic matter in soil**, contributing to:

- nutrient recycling
- soil fertility.

2. Soil Health Indicator

Diplurans are considered **bio-indicators of healthy soil ecosystems**.

Their presence suggests:

- **good soil quality**
- **stable forest ecosystems**.

About Diplura

Feature	Description
Classification	Primitive hexapods
Habitat	Soil and leaf litter
Body Traits	Wingless, elongated
Key Feature	Two cerci at the rear

Diplura are **important decomposers within soil ecosystems**.

UPSC Relevance: Prelims Focus

- Diplura group
- Soil arthropods
- Eastern Himalayan biodiversity.

11. New Snapping Shrimp Species *Alpheus madhusoodanai* Discovered in Kochi Backwaters



Scientists have discovered a **new species of snapping shrimp**, *Alpheus madhusoodanai*, in the **Kochi backwaters of Kerala**, adding to the known marine biodiversity of India's estuarine ecosystems.

About *Alpheus madhusoodanai*

Feature	Details
Scientific Name	<i>Alpheus madhusoodanai</i>
Common Type	Snapping shrimp / Pistol shrimp
Family	Alpheidae
Location of Discovery	Kochi backwaters, Kerala

Snapping shrimps are well known for their **unique hunting mechanism using powerful acoustic shock waves**.

Unique Hunting Mechanism

The shrimp uses a **specialised large claw** to create a **high-speed snapping motion**.

Mechanism

- The claw snaps shut rapidly.
- This creates a **cavitation bubble**.
- The bubble collapses and produces:
 - **high-pressure shock waves**
 - **loud snapping sound**

This acoustic shock can **stun or kill small prey**.

Physical Characteristics

Feature	Description
Body	Translucent
Colour Pattern	Reddish-brown bands
Claw	Large asymmetrical claw used for defence and hunting

The **asymmetry of claws** is a defining feature of snapping shrimps.

Habitat Preference

The species is primarily found in **brackish estuarine ecosystems**, particularly:

- muddy substrates
- mangrove root systems
- shallow coastal estuaries.

These environments provide **food availability and shelter**.

Geographical Distribution

Location	Status
Kochi Backwaters, Kerala	Endemic distribution

So far, the species has **only been recorded in this region.**

Dietary Habits

The shrimp is an **opportunistic carnivore.**

Diet Includes

- small fish
- small crustaceans
- organic detritus.

It feeds mainly within the **benthic zone of estuaries.**

Ecological Importance

1. Soil Aeration

Through burrowing activities, the shrimp:

- **aerates swampy sediment**
- improves sediment oxygenation.

2. Gas Release

Burrowing helps release **toxic gases trapped within sediments**, improving **ecosystem health.**

3. Nutrient Cycling

The species contributes to **nutrient recycling in estuarine ecosystems.**

UPSC Relevance : Prelims Focus

- Snapping shrimp
- Kochi backwaters ecosystem
- Mangrove-associated species.

12. New Dinosaur Species *Spinosaurus mirabilis* Discovered in the Sahara Desert



Scientists have discovered a **new species of Spinosaurus, *Spinosaurus mirabilis***, in **Jenguebi in the central Sahara Desert of Niger**, providing new insights into the **evolution of aquatic dinosaurs during the Late Cretaceous period.**

About *Spinosaurus mirabilis*

Feature	Details
Scientific Name	<i>Spinosaurus mirabilis</i>
Meaning of Name	"Spine lizard"
Location of Discovery	Jenguebi, central Sahara Desert, Niger
Geological Period	Late Cretaceous
Age	Approximately 95 million years ago

This discovery expands the diversity within the **Spinosaurus genus.**

Taxonomic Significance

Species	Discovery
<i>Spinosaurus aegyptiacus</i>	Discovered in Egypt in 1915
<i>Spinosaurus mirabilis</i>	Newly identified species from Niger

Thus, *Spinosaurus mirabilis* represents **only the second known species in the genus Spinosaurus**.

Evolutionary Timeline

Feature	Details
Era	Mesozoic Era
Period	Late Cretaceous
Approximate Age	~95 million years ago
Habitat Type	Inland riparian ecosystems (river environments)

These ecosystems consisted of **rivers, floodplains, and shallow wetlands**.

Distinct Morphological Features

Head Crest

Feature	Description
Size	About 20 inches long
Shape	Scimitar-shaped crest

Possible Function

The crest likely served as:

- **visual display structure**
- **socio-sexual signalling**
- **territorial display**

Similar structures are seen in many **display-oriented dinosaur species**.

Ecological Role

Wading Predator

Spinosaurus mirabilis likely behaved like **modern wading birds**.

Behaviour Explanation

Hunting Style Standing in shallow water

Prey Capture Ambush attacks on aquatic prey

Researchers compare its behaviour to a **giant prehistoric heron**.

Specialised Dentition

Feature	Function
Interlocking teeth	Formed a fish-trapping mechanism
Interdigitating structure	Prevented slippery fish from escaping

This adaptation indicates a **semi-aquatic predatory lifestyle**.

UPSC Relevance : Prelims Focus

- *Spinosaurus* genus , Late Cretaceous period, Riparian ecosystems.

13. New Flowering Plant *Impatiens nagorum* Discovered in Nagaland



Scientists have discovered a **new flowering plant species**, *Impatiens nagorum* in the **Fakim Wildlife Sanctuary of Nagaland**, enriching the botanical diversity of the **Eastern Himalaya biodiversity hotspot**.

About *Impatiens nagorum*

Feature	Details
Scientific Name	<i>Impatiens nagorum</i>
Family	Balsaminaceae
Common Family Name	Balsams / Touch-me-nots
Discovery Location	Fakim Wildlife Sanctuary, Nagaland

The genus **Impatiens** is known for its **unique explosive seed dispersal mechanism**.

Etymology

The species name "**nagorum**" is derived from the **Naga tribes** of the region.

This naming recognises the **indigenous communities inhabiting the Eastern Himalayan region**.

Morphological Features

Feature	Description
Flower Colour	Distinct purple flowers
Leaves	Serrated margins
Sepals	Covered with hairy lateral sepals

These features distinguish it from **other Impatiens species**.

Habitat

Feature	Details
Forest Type	Moist temperate broadleaf forests
Elevation	Around 2,336 metres above sea level
Climate	Cool, humid mountainous environment

Such ecosystems are typical of the **Eastern Himalayan biodiversity region**.

Seed Dispersal Mechanism

Ballistic Seed Dispersal

Like other **Impatiens species**, this plant disperses seeds through an **explosive mechanism**.

Process:

1. Mature seed capsules build internal tension.
2. When touched or disturbed, the capsule **bursts open suddenly**.
3. Seeds are **scattered away from the parent plant**.

This is why these plants are commonly called "**touch-me-nots**."

Ecological Role

Pollinator Support

The plant acts as a **specialised nectar source** for:

- high-altitude insects
- other mountain pollinators

This helps sustain **pollination networks in fragile mountain ecosystems**.

About Fakim Wildlife Sanctuary

Feature	Details
Location	Nagaland
Region	Eastern Himalayas
Border	Near the India-Myanmar border
Forest Type	Tropical and temperate forests

The sanctuary forms part of the **Indo-Burma biodiversity hotspot**, one of the world's richest biodiversity regions.

UPSC Relevance : Prelims Focus

- Impatiens genus
- Ballistic seed dispersal
- Fakim Wildlife Sanctuary.

14. Sarus Crane Population in Uttar Pradesh Rises to 20,628



The latest winter census has recorded a **3.1% increase in the Sarus Crane population in Uttar Pradesh**, raising the total count to **20,628 individuals**.

About Sarus Crane

Feature	Details
Scientific Name	<i>Antigone antigone</i>
Family	Gruidae
Type	Non-migratory crane species
Special Feature	World's tallest flying bird

Physical Characteristics

Feature	Description
Height	Up to 1.8 metres
Body Colour	Grey plumage
Head	Bare red head and upper neck
Legs	Long pale red legs
Wingspan	Massive grey wings

Habitat Preference

The Sarus Crane prefers **open wetland ecosystems** rather than dense forests.

Typical habitats include:

- **Marshlands**
- **Open wetlands**
- **Flooded agricultural fields**
- **Shallow freshwater bodies**

Such environments provide **abundant food and nesting sites**.

Geographical Distribution

Global Range

The species occurs in **fragmented populations across**:

- **Indian Subcontinent**
- **Southeast Asia**
- **Northern Australia**

Distribution in India

Region	States
--------	--------

Gangetic Plains	Uttar Pradesh, Bihar
------------------------	----------------------

Western India	Rajasthan, Gujarat
----------------------	--------------------

Northern India	Haryana
-----------------------	---------

India hosts the **largest population of Sarus cranes globally**.

State Symbol

State	Status
-------	--------

Uttar Pradesh	State Bird
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Dietary Habits

The Sarus Crane is an **opportunistic omnivore**.

Diet Includes

- aquatic tubers
- insects
- crustaceans
- small vertebrates.

These feeding habits link the species closely with **wetland ecosystems**.

Social Behaviour

Monogamous Pair Bonding

- Sarus cranes form **lifelong monogamous pairs**.
- Known for **elaborate courtship dances**.

Courtship Display

- **Synchronized trumpeting calls**
- **Coordinated dancing movements**

These displays strengthen **pair bonding and territorial defence**.

Ecological Importance

Indicator Species

The Sarus Crane is considered an **indicator of healthy wetland ecosystems**.

Its presence indicates:

- **good wetland quality**
- **adequate water and food availability**
- **balanced ecological conditions.**

UPSC Relevance : Prelims Focus

- Sarus Crane (*Antigone antigone*)
- State bird of Uttar Pradesh
- Wetland biodiversity.

15. Rare Ferruginous Pochard Sighted at Amoor Lake Near Chennai



A female Ferruginous Pochard (*Aythya nyroca*) was recently sighted at Amoor Lake near Chennai, marking only the second recorded occurrence of the species in the region.

About Ferruginous Pochard

Feature	Details
Scientific Name	<i>Aythya nyroca</i>
Common Name	Ferruginous Pochard / White-eyed Pochard
Family	Anatidae
Type	Migratory diving duck

The species is native to the **Palaearctic region**, covering Europe, North Africa, and Central Asia.

Physical Characteristics

Feature	Description
Body Colour	Rich chestnut-brown plumage
Undertail	Distinct white triangular patch
Body Size	Medium-sized diving duck

Sexual Dimorphism

Sex	Eye Colour
Male (Drake)	Bright white iris
Female	Brown iris

This difference helps in **identifying males and females in the field**.

Habitat Preference

Unlike many diving ducks that prefer **open water**, the Ferruginous Pochard usually inhabits:

- **Shallow freshwater lakes**
- **Marshes**
- **Wetlands with dense aquatic vegetation**

Submerged and floating vegetation provides **food and nesting cover**.

Breeding Range

Region	Coverage
Western Europe	Iberian Peninsula
North Africa	Mediterranean regions
Central Asia	Kazakhstan and surrounding areas
Eastern Range	Western Mongolia

Winter Distribution in India

The species is a **winter migratory visitor** to India.

Region	Occurrence
Eastern India	West Bengal
Northwestern India	Rajasthan
Southern India	Rare visitor

The sighting near **Chennai is therefore notable**.

Behaviour

- Generally **less gregarious** than other pochard species.
- Usually found **alone, in pairs, or in small groups** rather than large flocks.

Diet

The Ferruginous Pochard is an **omnivorous feeder**.

Food Sources

- aquatic plants
- seeds and tubers
- molluscs
- aquatic insects
- small fish.

UPSC Relevance : Prelims Focus

- Ferruginous Pochard (*Aythya nyroca*)
- Migratory waterfowl of India
- Wetland indicator species.

16. Rare Migratory Duck 'Smew' Recorded at Kaziranga National Park



The Smew (*Mergellus albellus*), a rare Eurasian diving duck, was recorded during the 7th waterbird census at Kaziranga National Park, Assam, highlighting the park's importance as a winter refuge for migratory waterbirds.

About Smew

Feature	Details
Scientific Name	<i>Mergellus albellus</i>
Common Name	Smew
Family	Anatidae
Type	Migratory diving duck
Taxonomic Status	Sole living member of the genus Mergellus

Physical Characteristics

Feature	Description
Male (Drake)	White body with a distinct black mask pattern
Female	Grey body with rusty-red head
Body Type	Medium-sized diving duck

The striking plumage of males often gives them the nickname "**panda duck.**"

Habitat Preference

The Smew is associated with **freshwater ecosystems.**

Typical Habitats

- Freshwater lakes
- Slow-moving rivers
- Wetlands near **old-growth forests**

These habitats provide **fish-rich waters and nesting sites.**

Breeding Range

The Smew breeds mainly in the **taiga forests of northern Eurasia.**

Region	Coverage
Northern Europe	Scandinavia
Russia	Across Siberia
Northern Asia	Taiga belt

Breeding habitats are typically **freshwater lakes surrounded by mature forests.**

Winter Migration

During winter, the species migrates south to:

Region	Areas
Europe	Western and Central Europe
Mediterranean	Eastern Mediterranean region
Asia	Central Asia, China, Japan

Region **Areas**
South Asia Occasionally **Northern India**

The sighting at **Kaziranga** is therefore rare.

Dietary Habits

The Smew shows **seasonal dietary shifts**.

Season	Diet
Winter	Mainly fish (piscivorous)
Breeding Season	Aquatic insects, larvae, amphibians

Specialised Feeding Adaptation

Sawbill

The Smew has a **serrated bill** known as a “sawbill.”

Feature	Function
Serrated edges	Grip slippery fish
Hooked tip	Helps capture prey

This adaptation is common among **fish-eating ducks like mergansers**.

Nesting Behaviour

The Smew is an **obligatory cavity nester**.

Nesting Sites

- Tree cavities
- Holes in old-growth trees
- Often previously used by **other birds**

This makes the species dependent on **mature forest ecosystems**.

Ecological Importance

Indicator Species

The Smew indicates the presence of:

- **healthy riparian forests**
- **clear, fish-rich freshwater ecosystems**

Thus it serves as an **indicator of wetland and forest ecosystem health**.

UPSC Relevance : Prelims Focus

- Smew (*Mergellus albellus*)
- Sawbill ducks
- Kaziranga National Park biodiversity.

17. Union Budget Allocates ₹20,000 Crore to Scale Up Carbon Capture Technologies



The Union Budget 2026–27 has allocated ₹20,000 crore over five years to accelerate the development and deployment of Carbon Capture, Utilisation and Storage (CCUS) technologies in India.

About Carbon Capture, Utilisation and Storage (CCUS)

CCUS refers to a group of technologies designed to capture carbon dioxide (CO₂) emissions from industrial sources and either reuse them or store them underground, preventing their release into the atmosphere.

Key Stages in CCUS

Stage	Process
Capture	Separation of CO ₂ from industrial gases before they are released
Transportation	CO ₂ is compressed and transported to storage or utilisation sites
Utilisation (CCU)	CO ₂ converted into useful products
Storage (CCS)	Long-term geological sequestration of CO ₂

CO₂ Capture Techniques

Method	Description
Pre-combustion capture	CO ₂ removed before fossil fuels are burned
Post-combustion capture	CO ₂ separated from flue gases after combustion
Oxy-fuel combustion	Fuel burned in pure oxygen to produce concentrated CO ₂

Transportation of Captured CO₂

Captured CO₂ is typically transported through:

- Pipelines
- Specialised ships

It is then delivered to utilisation facilities or geological storage sites.

Carbon Utilisation (CCU)

Captured carbon dioxide can be converted into value-added products, including:

Product	Application
Green Urea	Fertiliser production
Methanol	Fuel and chemical feedstock
Carbonated Concrete	Construction material
Algae-based biofuels	Renewable energy source

Carbon Storage (CCS)

Long-term carbon storage involves injecting CO₂ into deep geological formations.

Major Storage Sites

- Saline aquifers
- Depleted oil and gas reservoirs

- **Unmineable coal seams**

This process **locks carbon underground for thousands of years.**

Significance of the Budgetary Push

1. Decarbonising Hard-to-Abate Sectors

CCUS targets industries where emissions are difficult to reduce:

- **Power**
- **Steel**
- **Cement**
- **Refineries**
- **Chemicals**

2. Net-Zero Strategy

The technology helps India move toward its **Net Zero emissions target by 2070.**

3. Support for Blue Hydrogen

CCUS enables the production of **Blue Hydrogen**, where CO₂ generated during hydrogen production from natural gas is captured and stored.

4. Export Competitiveness

Lower industrial carbon intensity helps Indian exports avoid costs under the **Carbon Border Adjustment Mechanism (CBAM)** of the **European Union.**

5. Implementation of CCUS R&D Roadmap

The funding operationalises the **R&D Roadmap for CCUS (2025).**

Target: Capture 750 million tonnes of CO₂ annually by 2050.

6. Commercial Scalability

Budgetary support helps move CCUS from **pilot projects to large-scale industrial deployment.**

7. Carbon Market Integration

CCUS can help industries generate **Carbon Credit Certificates (CCCs)** under the **Indian Carbon Market (CCTS).**

UPSC Relevance : Prelims Focus

- **CCUS technology**
- **Blue hydrogen**
- **Carbon Border Adjustment Mechanism (CBAM).**

18. Budget 2026–27 Expands Climate Spending, But Scale Remains Modest



The Union Budget 2026–27 increased allocations for clean energy and industrial decarbonisation, but experts note that the overall scale of climate funding remains far below India's transition requirements.

Green Priorities in Union Budget 2026

1. Industrial Decarbonisation Push

Initiative	Allocation	Objective
CCUS Incentives	₹20,000 crore (5 years)	Support pilot and demonstration projects in industrial carbon capture
National Green Hydrogen Mission	₹600 crore	Build domestic green hydrogen production capacity

These initiatives target **hard-to-abate sectors** such as steel, cement, and refineries.

2. Decentralised Renewable Energy

Scheme	Allocation	Objective
PM Surya Ghar Muft Bijli Yojana	₹22,000 crore (up from ₹17,000 crore RE)	Promote household rooftop solar power
PM-KUSUM Scheme	₹5,000 crore	Deploy solar irrigation pumps to replace diesel pumps

These programmes support **distributed renewable energy generation**.

3. Clean Power and Green Finance

Initiative	Key Feature
Nuclear Energy Mission	Focus on Small Modular Reactors (SMRs)
Customs Duty Extension	Zero basic customs duty on nuclear equipment till 2035
Carbon Market Expansion	Development of carbon credit trading and climate bonds

These measures aim to **mobilise long-term finance for low-carbon energy systems**.

UPSC Relevance : Prelims Focus

- CCUS technology
- Green Hydrogen Mission
- PM Surya Ghar Muft Bijli Yojana
- Carbon Border Adjustment Mechanism (CBAM).

19. India's Power Mix Projected to Shift from Coal to Renewables by 2070



A NITI Aayog report titled "Scenarios Towards Viksit Bharat and Net Zero" projects a major structural transition in India's electricity sector, shifting from a coal-dominated power system to a renewables-led energy mix by 2070.

India's Future Power Mix Projections

1. Renewable Energy Expansion

Year	Share of Renewables
2024-25	~20%
2070 (Projected)	~80%

This indicates **deep decarbonisation of India's electricity generation system.**

Renewables include:

- Solar power
- Wind energy
- Hydro power
- Biomass energy.

2. Decline of Coal in Electricity Generation

Period Coal Share

Present ~74%

2070 Projection 6-10%

Coal is expected to move from **dominant energy source to limited backup capacity.**

3. Insurance Role of Coal

In future power systems:

- Coal plants will act as **backup capacity**
- They will support grid stability during **renewable intermittency**

Thus coal will play a "**grid insurance**" role rather than serving as base-load power.

Nuclear Power Projections

Share in Electricity Mix

Period	Nuclear Share
Present	~3%
2070 Projection	5-8%

Nuclear energy will act as **firm low-carbon baseload power.**

Nuclear Capacity Expansion

Capacity Projection Scenario (CPS)

Year	Nuclear Capacity
2025	8.18 GW
2070	90-135 GW

Net Zero Scenario (NZS)

Under accelerated decarbonisation:

Year	Nuclear Capacity
2070	295-320 GW

This scenario assumes **faster nuclear expansion to support net-zero emissions.**

Prelims Focus : Renewable energy share in India

- Small Modular Reactors (SMRs)
- Net Zero 2070 target.

20. NITI Aayog Highlights Waste Sector as Major Methane Emissions



NITI Aayog's report "Scenarios Towards Viksit Bharat and Net Zero - Sectoral Insights: Waste" identifies the waste sector as a critical methane-intensive emissions source and outlines strategies for waste-sector decarbonisation and methane mitigation.

Waste Sector and India's Emissions Profile

Indicator	Details
Share in total GHG emissions	~2.56%
Key greenhouse gas	Methane (CH ₄)
Global Warming Potential	Methane is ~25 times more potent than CO ₂

Although the waste sector contributes a **relatively small share of emissions**, its **high methane intensity** makes it climate-critical.

Wastewater as the Major Emission Source

Source	Share of Waste Sector Emissions
Wastewater systems	~74%
Solid waste disposal	Remaining share

This reflects **gaps in sewer coverage and sewage treatment infrastructure.**

Projected Emission Reduction Under Net Zero Scenario

Year	Waste-Sector Emissions
Present	High methane emissions
2070 (NZS)	~10.9 MtCO ₂ e

This represents a **~95.9% reduction in emissions** under the Net Zero pathway.

Strategic Pillars for Waste Sector Decarbonisation

1. Universal Methane Recovery

- Achieve **100% methane recovery** by 2040 from industrial wastewater.
- Promote **anaerobic treatment systems with energy recovery.**

2. Decentralised Circular Economy

Promote **biodegradable waste processing** through:

- **Bio-methanation plants**
- **Bio-CNG production systems**

This supports **circular resource recovery from organic waste**.

3. Wastewater Reuse Expansion

Target	Objective
~85% sewer coverage	Expand sewage infrastructure
Treated water reuse	Irrigation, industrial uses

4. Legacy Waste Remediation

- Accelerate **scientific closure of open dumpsites**.
- Replace them with **engineered sanitary landfills**.

5. IoT-Based Monitoring

Develop a **national waste-data architecture** using:

- **IoT sensors**
- **real-time monitoring systems**

This improves **transparency and regulatory oversight**.

Aerobic vs Anaerobic Wastewater Treatment

Parameter	Aerobic Treatment	Anaerobic Treatment
Oxygen Requirement	Requires oxygen	No oxygen required
Main Emissions	CO ₂	Methane (CH ₄)
Energy Efficiency	Lower	Higher
Energy Recovery	Limited	Biogas production possible

Anaerobic systems are **energy-efficient but require strict methane capture**.

UPSC Relevance : Prelims Focus

- Methane global warming potential
- SATAT Scheme
- GOBAR-Dhan initiative
- Sewage treatment capacity.

21. India Mandates Nationwide Sale of E20 Ethanol-Blended Petrol from April 2026



The Ministry of Petroleum and Natural Gas (MoPNG) has directed oil marketing companies to sell petrol blended with up to 20% ethanol (E20) nationwide from April 1, 2026.

About the E20 Petrol Directive

Aspect	Details
Fuel Composition	Petrol blended with 20% ethanol
Implementation Date	1 April 2026
Implementing Authority	Ministry of Petroleum and Natural Gas (MoPNG)
Operational Agencies	Oil Marketing Companies (OMCs)
Standard Compliance	Must meet Bureau of Indian Standards (BIS) specifications

Legal Basis

The directive has been issued under:

- Essential Commodities Act, 1955
- Motor Spirit and High-Speed Diesel Order, 2005

These laws allow the government to regulate production, supply, and distribution of essential fuels.

Fuel Standard Requirements

Parameter	Requirement
Fuel Type	E20 Petrol
Minimum Research Octane Number (RON)	95
Regulating Authority	Bureau of Indian Standards (BIS)

The Central Government may grant temporary exemptions for specific regions if required.

Research Octane Number (RON)

Definition : RON (Research Octane Number) measures a fuel's ability to resist engine knocking, which occurs when fuel detonates prematurely in the engine.

Key Points

Parameter	Details
Ethanol RON value	~108
E20 Minimum Standard	95 RON
Purpose	Prevent engine damage and improve combustion efficiency

Because ethanol has a very high octane value, blending it improves fuel quality.

National Policy Background

- The National Policy on Biofuels, 2018 initially targeted 20% ethanol blending by 2030.
- A 2022 amendment advanced the target to Ethanol Supply Year (ESY) 2025-26.

Thus the E20 rollout is aligned with this accelerated timeline.

Significance of Nationwide E20 Adoption

1. Energy Security

- Reduces dependence on imported crude oil.
- Estimated **annual savings of ~₹40,000 crore in oil imports.**

2. Agricultural Support

Creates a stable demand for ethanol produced from:

- **Sugarcane**
- **Maize**
- **Surplus food grains**
- **Agricultural residues**

This strengthens **farm incomes and rural economy.**

3. Climate and Environmental Benefits

E20 fuel helps reduce:

- **carbon monoxide emissions**
- **hydrocarbon emissions**

It contributes to India's **Net Zero target by 2070 under the Panchamrit commitments.**

4. Circular Bioeconomy

Promotes **waste-to-energy conversion**, including:

- **damaged food grains**
- **agricultural residues.**

This supports **sustainable fuel production and resource efficiency.**

UPSC Relevance : Prelims Focus

- Ethanol Blended Petrol (EBP) Programme
- National Policy on Biofuels 2018
- Research Octane Number (RON).

22. Concerns Rise Over Dilution of Environmental Jurisprudence in India



Recent **judicial interpretations and policy changes** have raised concerns about the **weakening of environmental safeguards**, potentially undermining **constitutional environmental justice in India.**

Environmental Jurisprudence in India

India's environmental law framework has evolved largely through **Supreme Court judgments and constitutional interpretation.**

1. Right to Environment (Article 21)

The **Supreme Court expanded Article 21 (Right to Life)** to include the **Right to a clean and healthy environment.**

Key Case:

- **Subhash Kumar v. Union of India (1991)**
- The Court held that **environmental pollution violates the right to life.**

2. Constitutional Environmental Duties

Provision	Responsibility
Article 48A	Directive Principle requiring the State to protect and improve the environment
Article 51A(g)	Fundamental duty of citizens to protect forests, rivers, wildlife, and the natural environment

These provisions establish **shared responsibility between the State and citizens**.

3. Public Trust Doctrine

Key Case:

- **M.C. Mehta v. Kamal Nath (1996)**

Principle:

- The **State acts as a trustee of natural resources**.
- Natural resources **cannot be diverted for private exploitation if it harms public interest**.

4. Precautionary Principle

Key Case:

- **Vellore Citizens' Welfare Forum v. Union of India (1996)**

Key idea:

- Environmental protection must adopt a **preventive approach**.
- **Lack of full scientific certainty cannot justify delaying protective measures**.

5. Polluter Pays Principle

Key Case:

- **Indian Council for Enviro-Legal Action v. Union of India (1996)**

Principle:

- Polluting industries must **pay for environmental damage and restoration costs**.

6. Ban on Post-Facto Environmental Clearance

Key Case:

- **Common Cause v. Union of India (2017)**

The Supreme Court held that:

- **Retrospective environmental approvals for illegal activities are not permissible**, especially in mining projects.

Key Signs of Dilution in Environmental Safeguards

1. Post-Facto Clearances

Authorities increasingly **regularise illegal projects after violations**, weakening deterrence.

2. Weakening of the Environmental Impact Assessment (EIA)

Recent policy changes allow **non-coal mining projects to conduct EIAs without precise land and area details**, reducing environmental scrutiny.

3. Aravalli Redefinition

A **100-metre height criterion** for defining Aravalli hills excludes many **ecologically important hill systems from protection**.

4. Mangrove Removal for Infrastructure

Courts have allowed **removal of more than 34,000 mangrove trees** for urban projects with **compensatory plantation assurances**.

5. Risky Himalayan Infrastructure

Projects like the **Char Dham highway expansion** continue despite identification of **811 landslide-prone zones in Uttarakhand**.

Corrective Measures Required

1. Strengthening EIA Enforcement

- Restore **strict pre-clearance environmental assessments**.
- Avoid **post-facto environmental approvals**.

2. Science-Based Ecological Definitions

Adopt **ecosystem-based protection frameworks** rather than arbitrary criteria.

Example:

Landscape-level conservation of **Aravalli geomorphological systems**.

3. Judicial Specialisation

- Revive **permanent environmental benches in Supreme Court and High Courts**.
- Strengthen institutions like the **National Green Tribunal (NGT)**.

4. Corporate Environmental Accountability

Introduce:

- stronger environmental penalties
- compliance monitoring
- **performance-linked environmental bonds for large projects**.

UPSC Relevance : GS II - Polity

- Article 21 expansion
- Constitutional environmental principles.

23. Study Finds 80% of Environmental Clearance Appeals in NGT Favour Project Developers



An analysis of over one lakh National Green Tribunal (NGT) orders since 2020 indicates that around 80% of environmental and forest clearance appeals were decided in favour of project developers, raising concerns about the tribunal's environmental oversight role.

Key Findings of the Analysis

Indicator	Observation
Total NGT orders analysed	Over 1 lakh orders since 2020
Developer success rate	~80% of environmental clearance appeals
Trend in 2024-25	~88% of industry appeals succeeded
Implication	Concerns about pro-project bias in environmental litigation

The data suggests a growing trend of approvals or favourable decisions for development projects.

About National Green Tribunal (NGT)

Feature	Details
Established Under	National Green Tribunal Act, 2010
Nature	Statutory environmental judicial body
Objective	Speedy disposal of environmental cases
Disposal Target	Ideally within 6 months

India became:

- Third country after Australia and New Zealand
- First developing country

to establish a specialised environmental tribunal.

Composition of NGT

Position	Appointment
Chairperson	Appointed by Central Government in consultation with the Chief Justice of India
Judicial Members	Judges or retired judges
Expert Members	Specialists in environmental science, forestry, ecology, etc.

The tribunal combines legal expertise and scientific expertise.

Judicial Powers of NGT

- Possesses powers of a civil court.
- Functions based on principles of natural justice.
- Not bound by the Code of Civil Procedure (CPC), 1908.
- Can take suo motu cognisance of environmental matters.

Legal Jurisdiction of NGT

The tribunal deals with civil disputes under **seven key environmental laws**, including:

Law	Year
Water (Prevention and Control of Pollution) Act	1974
Forest (Conservation) Act	1980
Environment (Protection) Act	1986

These laws relate to **pollution control, environmental clearance, and ecological protection.**

Acts Outside NGT Jurisdiction

NGT cannot adjudicate cases under:

Law	Year
Wildlife Protection Act	1972
Indian Forest Act	1927
Forest Rights Act (FRA)	2006

These matters fall under **other judicial or administrative forums.**

UPSC Relevance : GS II - Polity

- Judicial institutions and environmental justice.

24. Supreme Court Issues Pan-India Directions to Enforce Solid Waste Management Rules, 2026



The Supreme Court issued nationwide directions to enforce the Solid Waste Management (SWM) Rules, 2026, reiterating that a clean environment is an integral part of the Right to Life under Article 21.

Key Observations of the Supreme Court

The Court noted that **inefficient municipal waste management** poses serious risks to:

- Public health
- Groundwater quality
- Air quality
- Urban sustainability

Therefore, strict compliance with the **SWM Rules, 2026** has been mandated.

Key Directions Issued by the Supreme Court

1. Four-Stream Waste Segregation

Authorities must accelerate **source segregation into four categories:**

Waste Type	Description
Wet Waste	Biodegradable waste such as food and organic matter
Dry Waste	Recyclables such as plastic, paper, and metal
Sanitary Waste	Diapers, sanitary napkins, medical hygiene waste
Special Care Waste	Hazardous household waste like batteries and chemicals

Bulk Waste Generators must be **informed and monitored for compliance.**

2. Role of Elected Representatives

Local elected leaders are assigned a **facilitation role in waste segregation awareness**:

- Mayors
- Councillors
- Corporators
- Ward Members

They must **promote behavioural change at the household level**.

3. Legacy Waste Remediation

The Court directed authorities to:

- prepare **separate time-bound plans**
- scientifically **remediate existing dump sites**.

Institutional Accountability Framework

Institution	Responsibility
MoEFCC	Issue binding directions under Section 5 of Environment Protection Act, 1986
District Collectors	Conduct solid waste infrastructure audits
Urban Local Bodies (ULBs)	Declare clear deadlines for 100% compliance

Failure to comply may trigger **penalties and administrative accountability**.

Three-Tier Enforcement Mechanism

Tier 1 - Financial Penalties

- Immediate **monetary fines** for regulatory violations.

Tier 2 - Criminal Liability

- Persistent violations can lead to **prosecution under environmental laws**.

Tier 3 - Extended Accountability

- Liability extends to **officials responsible for oversight failures**.

This ensures **institutional responsibility along with citizen compliance**.

UPSC Relevance : GS II - Polity

- Article 21 expansion
- Judicial intervention in environmental governance.

25. NGT Clears Great Nicobar Island Project Citing Strategic Importance



The National Green Tribunal (NGT) has cleared the Great Nicobar Island Project, stating that the project has adequate environmental safeguards and strong strategic significance for India.

About the Great Nicobar Island Project

The Great Nicobar Island Project is a greenfield mega-infrastructure initiative aimed at transforming the island into a global maritime and strategic hub.

Feature	Details
Conceptualised by	NITI Aayog
Implementing Agency	Andaman and Nicobar Islands Integrated Development Corporation (ANIIDCO)
Project Area	166 sq km (~18% of the island)
Location	Great Nicobar Island, Andaman & Nicobar Islands

The project involves denotification of some tribal reserves and protected forest areas.

Major Components of the Project

1. International Container Transshipment Terminal (ICTT)

- Located at Galathea Bay.
- Developed as a deep-sea port.
- Intended to compete with major hubs such as:
 - Singapore
 - Port Klang (Malaysia)
 - Colombo (Sri Lanka).

2. Greenfield International Airport

- Dual-use facility serving both:
 - civil aviation
 - military surveillance operations.

It will support tourism, logistics, and defence mobility.

3. Power Plant

- Planned 450 MVA hybrid gas and solar power plant.
- Intended to ensure energy self-sufficiency for the island infrastructure.

4. Modern Township

A planned urban township will be developed to accommodate:

- project workers
- logistics personnel
- permanent residents.

Strategic and Economic Importance

1. Proximity to Key Maritime Chokepoints

Great Nicobar lies close to:

- Malacca Strait
- Sunda Strait
- Lombok Strait

Approximately 25–40% of global trade passes through these chokepoints.

2. Countering China's Strategic Presence

The project strengthens India's position against China's "String of Pearls" strategy in the Indian Ocean Region (IOR).

3. Economic Potential

- Galathea Bay ICTT is expected to generate about ₹30,000 crore annual revenue by 2040.
- The project may create over 1.5 lakh jobs.

4. Maritime Domain Awareness (MDA)

The dual-use airport enhances India's surveillance capability in the Indian Ocean.

5. Strategic Policy Alignment

The project supports major national initiatives:

- Sagarmala Programme
- Maritime India Vision 2030
- Act East Policy

26. India Expands Waste-to-Energy Plants to Convert Urban Waste into Power



India is expanding Waste-to-Energy (WtE) plants to convert non-recyclable waste into electricity, in line with the Solid Waste Management (SWM) Rules, 2026.

About Waste-to-Energy (WtE) Technology

Waste-to-Energy (WtE) refers to technologies that convert non-recyclable municipal or industrial waste into usable energy such as electricity, heat, or biofuels.

Feature	Details
Purpose	Convert waste into usable energy
Waste Type	Non-recyclable municipal and industrial waste
Output	Electricity, heat, biogas or biofuels

WtE reduces landfill waste while generating renewable energy.

Core Methods of Waste-to-Energy

Method	Description
Incineration	Controlled burning of waste to produce heat and electricity
Gasification	Converts waste into synthetic gas (syngas) used for power generation
Anaerobic Digestion	Microbial breakdown of organic waste in absence of oxygen to produce biogas

Current Status of WtE in India

Indicator	Data
Operational WtE plants	21 plants
Biogas facilities	133 facilities
Power generation	~170 MW electricity

These plants contribute to **urban waste management

27. Circular Economy in Agriculture: Turning India's 350 Million Tonnes of Farm Waste into Energy and Income



India generates around 350 million tonnes of agricultural waste annually, and policymakers are promoting a circular economy approach to convert this waste into bioenergy, income, and climate solutions.

Current Scenario of Agricultural Waste in India

Indicator	Data
Annual agricultural waste	~350 million tonnes
Renewable energy potential	18,000+ MW power
Surplus biomass available	~228 million tonnes
Biomass used for co-firing	1.62 MMT
Biomass mandated for co-firing	38.55 MMT

This highlights a significant implementation gap in biomass utilisation.

Need for a Circular Economy in Agriculture

1. Rural Economic Growth

- Converting crop residues into bioenergy, biofertilisers, and biogas can generate additional income for farmers.
- It also creates rural employment opportunities in biomass processing and energy production.

2. High Waste Generation

India produces ~350 million tonnes of agricultural waste annually, including:

- crop residues
- husk
- straw
- agro-processing waste.

Much of this waste is burnt or left unused.

3. Renewable Energy Potential

Agricultural residues can generate **over 18,000 MW of electricity**, which can reduce reliance on **coal-based power generation**.

4. Biomass Availability

India has **~228 million tonnes of surplus biomass**, which can support:

- bioenergy production
- biofuel generation
- biofertiliser production.

5. Climate Change Concerns

Globally, around **1.3 billion tonnes of food is wasted annually**, producing **large quantities of methane emissions**.

Utilising agricultural waste can reduce **open burning and greenhouse gas emissions**.

Key Government Measures Supporting Circular Agriculture

1. GOBARdhan Programme
2. Crop Residue Management (CRM) Scheme
3. Agriculture Infrastructure Fund (AIF)
4. Biomass Co-firing Policy
5. Animal Husbandry Infrastructure Development Fund (AHIDF)
6. Mechanisation Support

UPSC Relevance : GS III - Energy

- Biomass co-firing
- Bioenergy generation.

28. Maharashtra SBWL Clears Iron-Ore Mining in Corridor Near Tadoba-Andhari Tiger Reserve



The Maharashtra State Board for Wildlife (SBWL) has granted **wildlife clearance for an open-cast iron-ore mining project in Lohardongri (Chandrapur district)**, despite expert committee concerns about **irreversible ecological damage**.

Project Location and Ecological Significance

Aspect	Details
Project Area	35.94 hectares
Forest Type	Reserved Forest
Location	Lohardongri, Chandrapur district, Maharashtra
Ecological Setting	Wildlife corridor linking Tadoba-Andhari Tiger Reserve (TATR) with Brahmapuri-Gadchiroli landscape

Wildlife corridors are crucial for **tiger dispersal, genetic diversity, and long-term species survival**.

Advisory Committee Concerns

The **expert committee of the SBWL** recommended **rejecting the project**, citing:

- irreversible environmental damage
- fragmentation of wildlife corridors
- risks to tiger movement and habitat connectivity.

However, the **State Board approved the project overriding the expert recommendation.**

Regulatory Framework for Mining in Ecologically Sensitive Areas

1. Prohibition in Protected Areas

Under the **Wildlife (Protection) Act, 1972**:

- Commercial mining is **prohibited inside National Parks and Wildlife Sanctuaries.**

2. One-Kilometre Safety Buffer

The **Supreme Court mandates a ban on mining within 1 km of protected area boundaries**, unless specifically permitted.

3. Environmental Impact Assessment (EIA)

Under the **EIA Notification, 2006**:

Major mining projects must conduct:

- Environmental Impact Assessment
- **Public hearings with affected communities.**

4. Strategic Mineral Exemption

Projects involving **critical and strategic minerals** such as:

- lithium
- uranium

may receive **exemptions from public hearings.**

5. Wildlife Clearance Process

Mining projects near protected areas require **two-stage wildlife clearance**:

Stage Authority

Stage 1 State Board for Wildlife (SBWL)

Stage 2 National Board for Wildlife (NBWL)

Only after **NBWL approval** can projects proceed.

UPSC Relevance : GS II - Governance

- Gram Sabha consent under the **Forest Rights Act**
- Environmental clearance mechanisms.

29. MoEFCC Flags Non-Compliance of Compensatory Afforestation in Subansiri Lower Hydroelectric Project



The Ministry of Environment, Forest and Climate Change (MoEFCC) has flagged Arunachal Pradesh's failure to implement compensatory afforestation for the 2,000 MW Subansiri Lower Hydroelectric Project (SLHEP).

About the Subansiri Lower Hydroelectric Project (SLHEP)

Feature	Details
Project Type	Run-of-the-river hydropower project
Capacity	2,000 MW
Location	Gerukamukh on Assam-Arunachal Pradesh border
River	Subansiri River (tributary of Brahmaputra)
Significance	Expected to be India's largest hydropower project

Compliance Issue Flagged

Issue	Details
Forest clearance granted	2004
Required afforestation area	31.83 sq km
Current status	Plantation not undertaken yet

This delay represents continued non-compliance with environmental clearance conditions.

Compensatory Afforestation (CA)

Compensatory Afforestation is a legal mechanism to offset the ecological loss caused by diversion of forest land for development projects.

Legal and Institutional Framework

Aspect	Provision
Statutory Basis	Forest (Conservation) Act, 1980
Fund Management	Compensatory Afforestation Fund (CAF) Act, 2016
Implementing Authority	CAMPA (Compensatory Afforestation Fund Management and Planning Authority)

Net Present Value (NPV) of Forest Land

NPV represents the economic valuation of ecological services lost due to forest diversion.

It includes valuation of:

- carbon sequestration
- water recharge
- soil conservation
- biodiversity services.

The valuation typically considers ecosystem benefits over a 50-year period.

Payment Responsibility

The User Agency (project developer) must deposit:

- Net Present Value (NPV)
- cost of compensatory plantations

into the CAMPA fund before project implementation.

Compensatory Afforestation Rules

1. Primary Requirement

Afforestation must be carried out on **equivalent non-forest land**.

Objective: maintain **overall forest cover and ecological balance**.

2. Exception Rule

If **non-forest land is unavailable**:

- plantations can be done on **degraded forest land**
- but **twice the area of the diverted forest land must be planted**.

This rule often applies to **Central Public Sector Undertakings (PSUs)**.

CAMPA Fund Sharing

Authority	Share
State CAMPA	90%
National CAMPA	10%

These funds support:

- afforestation
- forest regeneration
- wildlife conservation.

Digital Monitoring Mechanism

The **e-Green Watch Portal** tracks:

- plantation progress
- fund utilisation
- afforestation outcomes.

This ensures **transparency and accountability**.

UPSC Relevance : GS II - Governance

- Forest Rights Act and community rights.

30. Dragon Hole Blue Hole Reveals Unique Microbial Life in Oxygen-Free “Death Zone”



Researchers have discovered **distinct microbial communities thriving in the deep anoxic “death zone” of Dragon Hole**, located in the **South China Sea**. The study revealed specialised bacteria and thousands of viral types adapted to oxygen-free conditions.

About Dragon Hole (Sansha Yongle Blue Hole)

- **Location:** Paracel Islands, **South China Sea**
- **Type:** Massive underwater **blue hole (marine sinkhole)**
- **Depth:** **301.19 metres** (formerly considered the **world’s deepest blue hole** until 2024)

Blue holes are **vertical underwater caves or sinkholes formed in carbonate rock**, often associated with **karst landscapes**.

Ecological Stratification of Dragon Hole

Dragon Hole shows **clear vertical ecological layering**.

Depth Zone Characteristics

Upper ~100 m Oxygenated water supporting **20+ marine species**

Below ~100 m **Anoxic (oxygen-free) stagnant water** where most fish and plants cannot survive

This oxygen-depleted region is commonly referred to as a **“death zone.”**

Microbial Adaptations in the Anoxic Zone

Scientific expeditions found:

- **~1,700 distinct viral types**
- **Sulphur-eating bacteria**

These microbes survive through **chemosynthesis**, deriving energy from **chemical reactions involving sulphur compounds** rather than sunlight.

Such ecosystems resemble **early Earth conditions** and help scientists understand **extreme life environments**.

Geological Origin

- Dragon Hole formed as a **karst limestone cave**.
- It developed during the **last Ice Age**, when **sea levels were significantly lower**.
- Rising sea levels later **flooded the cave**, forming the present **blue hole structure**.

Scientific Significance

1. Paleo-Climate Archive

Sediments at the bottom remain **undisturbed due to lack of water turbulence**, preserving records of:

- ancient climate patterns
- historical typhoons
- oceanographic changes.

2. Extreme Life Research

Studying microbes in oxygen-free zones helps scientists understand:

- **extremophile organisms**
- **potential life in deep oceans or extraterrestrial environments.**

3. Oceanographic Research

Blue holes serve as **natural laboratories for studying marine chemistry, stratification, and microbial evolution.**

UPSC Relevance: Karst topography , Marine sinkholes and blue holes , Microbial ecosystems

31. Iran Uses Cloud Seeding to Revive Shrinking Lake Urmia



Iran recently initiated **cloud seeding in the Lake Urmia basin** to increase rainfall and restore the shrinking lake. However, the drying lakebed has also triggered **salt storms in surrounding regions.**

About Lake Urmia

Feature	Details
Location	Armenian Highlands, northwestern Iran
Provinces	East Azerbaijan and West Azerbaijan
Type	Endorheic lake (no natural outlet)
Status	Largest lake in the Middle East

An **endorheic lake** loses water **only through evaporation**, causing minerals and salts to accumulate.

Hydrological Characteristics

- The lake basin is mainly fed by the **Zarīneh, Sīmīneh, and Talkheh rivers.**
- Historically, Lake Urmia was the **sixth-largest saltwater lake in the world.**

Severe Shrinkage of the Lake

Lake Urmia has undergone **dramatic ecological decline.**

Indicator Status

Area reduction 90–95% shrinkage

Primary causes Drought, river damming, excessive groundwater extraction for agriculture

As water evaporates, **salts accumulate**, creating **exposed salt flats that generate salt storms.**

Hypersaline Nature

Lake Urmia is a **hypersaline lake.**

- Salt concentration is roughly **one-fourth that of the Dead Sea.**
- High salinity limits biodiversity but supports **specialised salt-tolerant organisms.**

Seasonal Red Colour Phenomenon

During summer:

- Extreme salinity causes blooms of **Dunaliella salina (algae)**
- and **Halobacteriaceae (salt-loving bacteria).**

These organisms produce pigments that **turn the lake water reddish.**

International Environmental Status

Lake Urmia has global ecological recognition:

Status	Organisation
Ramsar Site	Ramsar Convention on Wetlands
Biosphere Reserve	UNESCO Man and Biosphere (MAB) Programme

Biodiversity Importance

The ecosystem supports several important species.

Key Fauna

- Migratory flamingos
- Endemic brine shrimp - *Artemia urmiana*

However, increasing salinity threatens the survival of *Artemia urmiana*, a crucial species in the lake's food chain.

Environmental Concerns

- Salt storms from exposed lakebed affecting agriculture and health
- Collapse of local fisheries and tourism
- Loss of wetland biodiversity
- Regional climate and microclimate changes

UPSC Relevance : GS I - Geography Endorheic lakes , Saline lakes of the world

GS III - Environment Wetland degradation, Ramsar sites and biosphere reserves

32. Kerala Launches AI-Based “NeophyteID” App to Track Invasive Alien Plants



The Kerala government launched the AI-powered mobile application “NeophyteID” to identify and monitor **invasive alien plant species in the Western Ghats** using image recognition and citizen science participation.

About NeophyteID Application

Feature	Details
Purpose	Identification and monitoring of invasive alien plant species
Technology Used	YOLOv11 machine learning algorithm for image recognition
Approach	AI + citizen science participation
Output	Generates geospatial distribution maps of invasive plants
Target Region	Western Ghats biodiversity hotspot

The application enables **real-time identification of invasive plants using photographs captured on mobile phones.**

Key Functional Features

1. AI-Based Plant Identification

- Uses YOLOv11 deep-learning algorithm.
- Identifies invasive plants instantly from uploaded images.

2. Citizen Science Model

The platform encourages participation from:

- students
- researchers
- forest officials
- local communities.

This crowdsourced data strengthens **large-scale ecological monitoring**.

3. Geospatial Mapping

The application compiles field observations into **spatial distribution maps**, enabling:

- identification of invasion hotspots
- prioritisation of conservation actions.

Invasive Alien Species (IAS)

Definition : Invasive Alien Species are **non-native plants, animals, or microorganisms that spread rapidly and harm ecosystems, biodiversity, economy, or human health.**

Legal Framework in India

Aspect	Provision
Legal Definition	Wild Life (Protection) Amendment Act, 2022
Regulatory Authority	Central Government
Powers	Can regulate or prohibit import, trade, possession, and spread of invasive species

Global Biodiversity Framework

Under the **Kunming–Montreal Global Biodiversity Framework (GBF):**

- **Target 6** aims to **reduce the introduction and establishment of invasive alien species by at least 50% by 2030.**

Role in Biodiversity Loss

According to **IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services):**

- Invasive species are among the **five major drivers of biodiversity loss globally.**

Economic Impact in India

- Estimated **\$127 billion loss between 1960–2020** due to invasive species.

Major Invasive Plant Species in India

Species	Impact
Lantana camara	Degrades forest ecosystems
Prosopis juliflora	Destroys Banni grasslands of Gujarat
Water Hyacinth	Chokes freshwater bodies and blocks sunlight

Importance of the Initiative

The NeophyteID app helps:

- strengthen **early detection of invasive plants**
- improve **ecosystem monitoring in biodiversity hotspots**
- support **data-driven conservation policies**.

It demonstrates how **AI and citizen science** can support **biodiversity management**.

UPSC Relevance : GS III - Environment Invasive alien species; Biodiversity conservation Western Ghats ecosystem. **International Environment** Kunming–Montreal Global Biodiversity Framework.

33. Government Launches Bharat-VISTAAR AI Platform for Personalised Farm Advisory



The Government announced the launch of **Bharat-VISTAAR**, a **multilingual AI platform** designed to deliver **customised digital advisory services to farmers** using AgriStack data and ICAR agricultural practices.

About Bharat-VISTAAR (Virtually Integrated System to Access Agricultural Resources)

Feature	Details
Nature	Multilingual AI-based agricultural advisory platform
Core Integration	Links AgriStack farmer data with ICAR Package of Practices
Objective	Provide personalised real-time farm guidance
Coverage	Designed for multiple crops, regions and Indian languages

The platform aims to **improve farm productivity while reducing climate and market risks**.

Key Features of Bharat-VISTAAR

1. Data-Driven Advisory

- Uses **farmer profiles, soil information and crop data**
- Generates **customised farming recommendations**.

2. Precision Farming Support

Promotes efficient use of:

- water
- fertilisers
- pesticides and agro-chemicals.

This reduces **input costs and environmental impact**.

3. Climate-Smart Farming

Provides advisories related to:

- **weather variability**
- crop management during **extreme climate events**
- improved **risk management strategies**.

About the Agri-Stack Scheme

Agri-Stack is a **national digital infrastructure for agriculture** that enables **data-driven service delivery to farmers**.

Feature	Details
Nature	Digital backbone for agriculture services
Implementing Ministry	Ministry of Agriculture & Farmers Welfare
Objective	Integrate farmer records, land data and scheme benefits

It enables **efficient delivery of government schemes and agri-tech innovations**.

Core Components of Agri-Stack

1. Three Digital Registries

Registry	Purpose
Farmer Registry	Digital identification of farmers
Farmland Registry	Records of land ownership and plots
Crop Sown Registry	Data on crops cultivated each season

Together they create a **comprehensive national agricultural data ecosystem**.

2. Unified Farmer Service Interface (UFSI)

- Digital **interoperability platform** connecting:
 - government databases
 - banks
 - agri-tech companies.

This enables **seamless service delivery to farmers**.

3. Agri-Stack Sandbox

A **testing environment** where startups and innovators can experiment with **digital agriculture solutions** before large-scale implementation.

4. Consent-Based Data Sharing

Farmers retain control over their data through:

- **Consent Manager systems**
- Ability to **grant, monitor and revoke access**.

This ensures **privacy and data security**.

Significance of Bharat-VISTAAR

- Improves **farm productivity through data-driven decisions**
- Supports **precision agriculture and climate-resilient farming**
- Enhances **digital inclusion in agriculture**
- Strengthens the **Agri-Stack digital agriculture ecosystem**.

UPSC Relevance : GS III - Agriculture : Digital agriculture, Precision farming, Climate-resilient agriculture. **GS III - Science & Technology** Artificial Intelligence in governance, Digital public infrastructure.

34. UNEP FI Launches Impact Centre to Align Global Finance with SDGs



The United Nations Environment Programme Finance Initiative (UNEP FI) launched the **Impact Centre** to consolidate its “SDGs & Impact” **workstream** and provide financial institutions with tools to manage sustainability impacts.

About UNEP Finance Initiative (UNEP FI)

Feature	Details
Established	1992
Location	Geneva
Partnership	United Nations Environment Programme (UNEP) and the private financial sector
Objective	Integrate sustainability principles into financial markets and investment practices

UNEP FI works with **banks, insurers, and investors** to promote **responsible finance aligned with global sustainability goals**.

About the UNEP FI Impact Centre

The **Impact Centre** is a **centralised global hub** that helps financial institutions assess and manage the **environmental, social, and economic impacts** of their investments.

Aspect	Details
Purpose	Standardise tools for sustainability impact assessment
Target Users	Banks, asset managers, insurers and financial institutions
Strategic Goal	Align private capital with the SDGs and the Paris Climate Agreement

Core Objective: The centre aims to **mainstream holistic impact management** by enabling financial institutions to:

- measure sustainability impacts
- manage risks and opportunities
- integrate ESG considerations into investment decisions.

Main Workstreams of the Impact Centre

The centre operates through **five key workstreams**.

Workstream	Purpose
Impact Methodology	Global framework for portfolio-level sustainability impact assessment
Interoperability	Aligns tools with global reporting standards such as EU ESRS and IFRS sustainability standards
Implementation Support	Capacity building and training for financial institutions
Advisory Services	Integration of impact management into core financial operations
Consensus Building	Harmonisation of global sustainability practices through the Impact Management Platform

Key Tools Developed by the Impact Centre

The centre provides practical tools for financial practitioners.

Tool	Purpose
Impact Protocol	Step-by-step guide to analyse and manage sustainability impacts of portfolios
Impact Radar	Classification framework for environmental, social, and economic impact themes
Impact Mappings	Databases linking economic activities to sustainability outcomes
Portfolio Analysis Tools	Digital tools identifying impact concentrations within investment portfolios
Indicator Library	Repository of metrics for monitoring sustainability performance

UPSC Relevance : Sustainable finance ; Climate finance and ESG frameworks; Global environmental governance. **International Organisations** UNEP ; Financial sector role in achieving **SDGs and Paris Agreement**.

35. IPBES Report Warns: Business Activities Spending \$7.3 Trillion Are Driving Global Nature Loss



A recent Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report highlights that **global business activities heavily damage ecosystems**, despite businesses relying on **clean water, healthy soils, pollinators, and climate stability**.

Current Status of Nature–Business Interaction

Indicator	Data
Global spending on nature-damaging activities (2023)	\$7.3 trillion
Spending on ecosystem protection	\$220 billion
Funding gap	Huge imbalance between destructive and conservation investments
Indigenous land under industrial pressure	~60% affected
High industrial stress	~25% under mining, logging, and energy pressures

This reflects a **major global financing imbalance between nature destruction and conservation**.

Major Sectors Driving Ecosystem Damage

The IPBES report identifies the following sectors as key drivers of biodiversity loss:

- Agriculture
- Forestry
- Fishing
- Mining
- Energy
- Construction
- Transportation

These sectors are responsible for **land-use change, habitat destruction, pollution, and resource depletion.**

Impact of Businesses on Ecosystems

Businesses influence ecosystems in **both positive and negative ways.**

Positive Contributions

1. Sustainable Production Practices

- Adoption of **eco-friendly production systems.**
- Reducing **deforestation and habitat destruction.**

2. Conservation Funding

- Global investments of **\$220 billion in ecosystem restoration.**
- Supports **biodiversity conservation and climate mitigation.**

3. Responsible Supply Chains

- Sustainable sourcing of raw materials.
- Prevents **deforestation, overexploitation, and pollution.**

Negative Impacts

1. Community Displacement

Communities that traditionally protect ecosystems – especially **Indigenous peoples** – face the **greatest harm.**

2. Biodiversity Decline

Loss of:

- **pollinators**
- **wetlands**
- **forest ecosystems**

directly threatens **food security and livelihoods.**

3. Habitat Loss

Activities such as:

- **deforestation**
- **mining**
- **infrastructure construction**

lead to **species displacement and extinction.**

Key Challenges

1. Profit-Driven Business Models

Short-term profit incentives often **override long-term ecosystem protection.**

2. Weak Corporate Accountability

- **Less than 1% of companies disclose biodiversity impacts** in corporate reports.

3. Greenwashing

Some companies **claim sustainability commitments while making minimal changes.**

UPSC Relevance : Biodiversity loss ; Ecosystem services ; Corporate environmental responsibility.
International Organisations ; IPBES ; Global biodiversity governance frameworks.

36. Him-CONNECT Initiative to Promote Himalayan Innovations at WSDS 2026



The Ministry of Environment, Forest and Climate Change (MoEFCC) will organise Him-CONNECT during the World Sustainable Development Summit (WSDS) 2026 in New Delhi to promote ecological innovations for sustainable development in the Indian Himalayan Region (IHR).

About Him-CONNECT

Feature	Details
Nature	Platform linking scientific research with entrepreneurship
Objective	Scale up ecological innovations for sustainable Himalayan development
Institutional Link	Innovations developed under National Mission on Himalayan Studies (NMHS)
Target Region	Indian Himalayan Region (IHR)

The initiative aims to commercialise sustainable technologies developed through Himalayan research programmes.

Key Focus Sectors

Him-CONNECT promotes innovations in several strategic sectors:

- Waste-to-wealth technologies
- Climate-resilient infrastructure
- Water resource management
- Bio-resource utilisation
- Green energy solutions

Significance of Him-CONNECT

- Encourages science-industry collaboration for Himalayan sustainability
- Promotes green entrepreneurship in mountain ecosystems
- Supports sustainable development of fragile Himalayan ecosystems
- Strengthens India's solution-oriented climate diplomacy and South-South cooperation.

The initiative reframes the Himalayas from a vulnerability zone to a hub of green growth.

National Mission on Himalayan Studies (NMHS)

Feature	Details
Launch Year	2015-16
Type	Central Sector Scheme
Ministry	MoEFCC
Objective	Support research and technological solutions for sustainable development in the Indian Himalayan Region

World Sustainable Development Summit (WSDS) 2026

Feature	Details
Organiser	The Energy and Resources Institute (TERI)
Nature	Annual global sustainability summit
Edition	25th edition (Silver Jubilee)
Location	New Delhi

WSDS is regarded as the **only independently convened international sustainable development summit of the Global South.**

About TERI

Feature	Details
Full Name	The Energy and Resources Institute
Established	1974
Nature	Independent non-profit research institution
Headquarters	New Delhi

Major Contribution

- Developed **GRIHA (Green Rating for Integrated Habitat Assessment)** – India's national green building rating system.

UPSC Relevance : GS III - Environment Sustainable mountain development, Himalayan ecosystem conservation, Climate adaptation strategies, **International Environmental Governance** Global sustainability summits, Climate diplomacy and South-South cooperation.

37. Chhattisgarh Sets Up “Hornbill Restaurants” to Protect Malabar Pied

Hornbill



The Chhattisgarh Forest Department is establishing six “hornbill restaurants” in the Udanti Sitanadi Tiger Reserve (USTR) to improve habitat and food availability for the Malabar Pied Hornbill.

Hornbill Restaurants Initiative

Feature	Details
Location	Udanti Sitanadi Tiger Reserve (USTR), Chhattisgarh
Number of sites	6
Objective	Improve food availability and habitat for hornbills
Method	Planting clusters of fruit-bearing trees

These “restaurants” are designed as **clusters of fruiting trees** that provide a **continuous supply of ripe fruits**, ensuring reliable food for hornbills throughout the year.

Target Species: Malabar Pied Hornbill

About the Species

Feature	Details
Scientific Name	<i>Anthracoceros coronatus</i>
Family	Bucerotidae
Status	Native to the Indian subcontinent

Physical Characteristics

- Predominantly **black plumage** with **white belly and tail tips**
- Large **yellow bill with a prominent casque** (helmet-like structure).

Sexual Dimorphism

- **Males:** Deep **red iris**
- **Females:** Distinct **white skin ring around the eyes**.

Habitat and Distribution

Feature	Details
Habitat	Evergreen forests, moist deciduous forests, and riverine forests
Preferred trees	Tall trees along riverbanks
Distribution	Western Ghats, Central India, Eastern India, and Sri Lanka

Dietary Behaviour

The Malabar Pied Hornbill is **primarily frugivorous**.

Diet Includes

- fruits (main diet)
- insects
- small vertebrates (especially during breeding).

Unique Behaviour

Dust Bathing

The hornbill often **descends to the ground to dust-bathe**, helping remove:

- ticks
- parasites
- excess oil from feathers.

Ecological Importance

Hornbills play a crucial ecological role as **"Farmers of the Forest."**

- They **disperse seeds of large tropical tree species**.
- Help maintain **forest regeneration and biodiversity**.

Because of this role, hornbills are considered **keystone seed dispersers in tropical forests**.

Conservation Status

Convention	Status
IUCN Red List	Near Threatened
CITES	Appendix II
Wildlife Protection Act, 1972	Schedule I

Schedule I status provides the **highest level of legal protection in India**.

About Udanti Sitanadi Tiger Reserve (USTR)

- Located in **Chhattisgarh**.
- Part of the **Central Indian forest landscape**.
- Known for **rich biodiversity and forest ecosystems**.

The reserve was originally established to conserve the **endangered wild buffalo**.

UPSC Relevance : Wildlife conservation initiatives; Role of seed dispersers in forest ecosystems
Protected areas and biodiversity management.

38. Frequent Elephant Sightings Reported Near Marudhamalai Murugan Temple



The Tamil Nadu Forest Department reported **119 sightings of wild elephants in 2025 near the Marudhamalai Murugan Temple**, highlighting the area's role as an **important elephant migratory corridor**.

About Marudhamalai Murugan Temple

Feature	Details
Location	Hillock in the Western Ghats near Coimbatore, Tamil Nadu
Primary Deity	Lord Murugan
Religious Significance	Widely regarded as the unofficial Seventh Arupadai Veedu (abode) of Murugan
Architecture	Dravidian style temple with a gopuram
Orientation	East-facing temple

The temple is a **major pilgrimage centre in Tamil Nadu**.

Ecological Significance

- The foothills around the temple form part of a **traditional elephant migratory corridor**.
- This corridor lies within the **Nilgiri Biosphere Reserve**, one of India's most important biodiversity hotspots.

Frequent elephant sightings highlight the **interface between wildlife movement and human religious activity**.

Historical Antiquity

Aspect	Details
Period of structural construction	12th century (Chola period)
Literary references	Mentioned in Sangam literature, particularly Purananuru

The temple therefore combines **religious, historical, and ecological significance**.

Etymology of “Marudhamalai”

The name derives from:

- “Marudham” trees (*Terminalia arjuna*)
- which grow abundantly on the hill.

These trees are associated with **riverine and moist forest ecosystems**.

Spiritual Heritage

The temple is closely associated with **Pambatti Siddhar**, one of the **18 Siddhars of Tamil spiritual tradition**. The Siddhars are revered for their contributions to:

- **Tamil spiritual philosophy**
- **medicine (Siddha system)**
- **yogic practices**.

About the Nilgiri Biosphere Reserve

Feature	Details
Location	Western Ghats (Tamil Nadu, Kerala, Karnataka)
Established	1986
Status	India’s first biosphere reserve
UNESCO Recognition	Part of the UNESCO Man and Biosphere Programme

The reserve supports **large elephant populations and important wildlife corridors**.

Ecological Concern

Frequent elephant sightings near pilgrimage sites highlight:

- **human-wildlife conflict risks**
- the need to **protect elephant corridors**
- sustainable **eco-sensitive tourism management**.

UPSC Relevance : GS I - Culture Murugan temples and Tamil religious traditions ; Sangam literature references. **GS III - Environment** Elephant corridors ; Nilgiri Biosphere Reserve ; Human-wildlife conflict.

39. Government Introduces Access Pass for Fishing in India's Exclusive Economic Zone



The Ministry of Fisheries, Animal Husbandry and Dairying has launched a **national Access Pass** system for fishing in India's Exclusive Economic Zone (EEZ) to promote sustainable deep-sea fishing and better monitoring of marine resources.

Access Pass for Fishing in EEZ

Feature	Details
Implementing Ministry	Ministry of Fisheries, Animal Husbandry and Dairying
Objective	Promote deep-sea fishing and sustainable resource use
Target Resources	High-value species such as tuna
Legal Framework	Sustainable Harnessing of Fisheries in the EEZ Rules, 2025

The initiative aims to **shift fishing activities from nearshore waters to deeper offshore regions.**

Coverage of the Access Pass

Vessel Type	Applicability
Mechanised fishing vessels	Mandatory
Large motorised fishing crafts	Mandatory
Traditional non-motorised crafts	Exempted

The exemption protects the **livelihoods of small-scale artisanal fishers.**

Digital Platform Integration

The access pass system operates on the **ReALCRaft platform.**

Key Features

- **Zero-fee digital registration system**
- Integrated with **MPEDA (Marine Products Export Development Authority)**
- Enables **end-to-end traceability of fish products** for global export markets.

This improves **transparency, monitoring, and export compliance.**

About Exclusive Economic Zone (EEZ)

Feature	Details
Definition	Maritime zone extending 200 nautical miles from the baseline
Legal Basis	United Nations Convention on the Law of the Sea (UNCLOS), 1982
Rights of Coastal State	Exploration and exploitation of natural resources

In the EEZ, a country has **sovereign rights over living and non-living marine resources.**

India's Exclusive Economic Zone

Feature	Details
Total Area	Approximately 2.4 million sq km
Global Rank	18th largest EEZ in the world
Island Contribution	Andaman Nicobar & Lakshadweep account for ~49% of the EEZ area

Legal Framework in India

India exercises jurisdiction over its EEZ under:

The Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976. This law governs:

- maritime boundaries
- resource exploration
- fisheries management.

Significance of the Initiative

- Promotes **sustainable exploitation of marine resources**
- Encourages **deep-sea fishing and diversification of catch**
- Improves **traceability and export competitiveness**
- Reduces pressure on **nearshore fish stocks.**

UPSC Relevance : GS III - Agriculture / Fisheries Marine fisheries management; Sustainable exploitation of marine resources. **GS II - International Relations / Maritime Law ; UNCLOS and maritime zones ; India's maritime jurisdiction.**

FEBRUARY 2026

SCI&TECH

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2. SPHEREx Detects Rare Interstellar Comet
3. Mons Mouton Selected for Chandrayaan-4
4. Inside-Out Planetary System Around LHS 1903
5. Comet ATLAS Breaks After Solar Flyby
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49. RailTech Policy and e-RCT Platform Launched
50. VoicERA Open-Source Voice AI Stack
51. Global CyberPeace Summit 2026 Held
52. Copyright vs AI Debate in India
53. AI-Led Tech Sector Roadmap in India
54. SBTi Aligns Corporate Climate Action
55. Davos Compact 2025 Targets AMR
56. India-US Subsea Cable for AI Infra
57. India Expands Global AI Partnerships
58. New Delhi Declaration on AI Impact
59. WAVES AI Hub for AVGC-XR Sector



1. 📌 Antarctica Balloon Science: NASA's Mission to Track Antimatter



The NASA completed its **Scientific Balloon Programme** campaign in February 2026 from **McMurdo Station** on the **Ross Ice Shelf**. The campaign deployed high-altitude balloons to study **antimatter, neutrinos, and ultra-high-energy cosmic particles**, which could provide clues about **dark matter and fundamental particle physics**.

📌 Key Concept: Antimatter

Antimatter consists of particles that have the **same mass but opposite electric charge and quantum properties** compared to ordinary matter.

Particle	Antiparticle
Electron	Positron (+ charge)
Proton	Antiproton (- charge)
Neutron	Antineutron

Key Facts

- Antimatter is **extremely rare in nature**.
- It can be produced in **particle accelerators** or detected in **cosmic rays**.
- When matter and antimatter collide, **annihilation occurs releasing energy** ($E=mc^2$).

📌 NASA Scientific Balloon Program

The **NASA Scientific Balloon Program** uses **large high-altitude balloons** (~35-40 km altitude) to carry scientific payloads above most of Earth's atmosphere.

Feature	Details
Altitude	~35-40 km (near-space environment)
Platform	High-altitude scientific balloons
Cost	Much cheaper than satellites
Role	Bridge between ground observatories and orbital missions
Duration	Weeks during Antarctic summer

🌍 Why Antarctica is Ideal for Balloon Experiments

Factor	Advantage
Polar Vortex Winds	Circular winds allow balloons to travel in stable loops for weeks
Continuous Summer Sunlight	Maintains constant balloon altitude
Low Electromagnetic Interference	Improves signal detection
Sparse Population	Safe long-duration flights

These conditions enable **Long Duration Balloon (LDB) missions**, a key Antarctic feature.

📌 Scientific Significance

- Helps detect **cosmic antimatter particles**
- Improves understanding of **dark matter**
- Enables observation of **neutrinos and ultra-high-energy cosmic rays**
- Supports **astrophysics and particle physics research**

📌 UPSC Mains Question (Analytical)

"High-altitude balloon experiments are emerging as cost-effective tools for astrophysical research." Discuss the significance of balloon-based scientific missions in studying cosmic particles and dark matter. (10/15 Marks)

2. 🚀 SPHEREx Mission Spots Rare Interstellar Comet 3I/ATLAS



The NASA SPHEREx mission recently detected a **significant brightening of the interstellar comet 3I/ATLAS**, indicating increased activity as it passes through the Solar System. The object 3I/ATLAS is only the **third known interstellar object** observed travelling through our Solar System after ‘Oumuamua (2017) and Borisov (2019).

■ What is the SPHEREx Mission?

SPHEREx (Spectro-Photometer for the History of the Universe, Epoch of Reionisation and Ices Explorer) is a near-infrared space observatory launched by NASA in 2025.

Feature	Details
Mission Type	Space-based astronomical observatory
Launch Year	2025
Mission Duration	2 years
Orbit	Sun-synchronous Low Earth Orbit (~700 km altitude)
Survey Type	All-sky spectral survey
Main Instrument	Spectrophotometer

The mission will **map the entire sky four times** to create a **3D map of galaxies**.

🔬 Technology Used

SPHEREx uses a **spectrophotometer**, an instrument that splits incoming light into **102 infrared wavelengths (colours)**.

Importance : This helps scientists identify:

- Chemical composition of distant objects
- Interstellar dust and molecules
- Galaxy formation signatures

Infrared observations allow astronomers to **see through cosmic dust and detect distant galaxies**.

🎯 Key Scientific Goals of SPHEREx

Goal	Explanation
Study Cosmic Inflation	Map galaxies to test theories of rapid expansion after the Big Bang
Study First Stars & Galaxies	Observe early cosmic structures formed during the Epoch of Reionisation
Search for Life Ingredients	Detect biogenic molecules such as water, CO, and CO ₂ in interstellar clouds
Map the Milky Way	Identify molecular clouds where new stars and planets form

🚀 Interstellar Object: 3I/ATLAS

Feature	Details
Type	Interstellar comet
Detection	Observed by ATLAS survey telescope
Status	Third known interstellar visitor
Origin	Outside the Solar System

Previous Interstellar Objects

Object	Year	Characteristics
1I/Oumuamua	2017	First known interstellar visitor; asteroid-like
2I/Borisov	2019	First confirmed interstellar comet
3I/ATLAS	2026	Newly observed brightening object

These objects originate **from other star systems** and carry clues about **planetary formation beyond our Solar System**.

UPSC Mains Question

“Space-based infrared surveys are crucial for understanding the origin and evolution of the universe.” Discuss the significance of missions such as SPHEREx in advancing modern astrophysics. (10/15 Marks)

3. ● Mons Mouton Selected for Chandrayaan-4 Landing Site



The **Indian Space Research Organisation (ISRO)** has selected **MM-4 in Mons Mouton**, located in the Moon's **south polar region**, as the **primary landing site for the Chandrayaan-4 mission**. The site was chosen after analysing high-resolution imagery from the **Chandrayaan-2 Orbiter High Resolution Camera (OHRC)** for India's **first lunar sample-return mission**.

Chandrayaan-4 Mission (Background)

Chandrayaan-4 is India's upcoming mission aimed at **collecting lunar soil/rock samples and bringing them back to Earth for analysis**.

Feature	Details
Mission Type	Lunar sample return mission
Planned Launch	Late 2020s (expected)
Objective	Collect lunar samples and return them to Earth
Architecture	Five-module spacecraft system
Target Region	Moon's South Polar region

About Mons Mouton

Mons Mouton is a large **flat-topped lunar mountain (mesa)** in the **Moon's south polar region**.

Feature	Details
Location	Moon's South Pole
Width	~100 km
Area	~5,180 km ²
Elevation	~6,000 m above surrounding terrain
Nearby Craters	Nobile crater and Malapert crater
Geological Origin	Part of rim structure of South Pole-Aitken Basin

Why the South Polar Region is Important

Factor	Importance
Water Ice	Permanently shadowed craters may contain frozen water

Continuous Sunlight	Peaks receive extended illumination useful for solar power
Future Lunar Bases	Water can support fuel production and life-support systems
Scientific Insights	Oldest lunar crust preserved in this region

This region has therefore become a **global focus for lunar exploration**.

UPSC Mains Question

“The Moon’s south polar region has emerged as the new frontier in lunar exploration.”

Discuss the scientific and strategic significance of missions such as Chandrayaan-4 targeting this region. (10/15 marks)

4. 🌟 “Inside-Out” Planetary System Found Around LHS 1903



The European Space Agency’s CHEOPS mission has discovered an unusual **four-planet system around LHS 1903**, a red dwarf star about **117 light-years away in the Lynx constellation**.

The system displays an **“inside-out” structure**, where both the **innermost and outermost planets are rocky**, contradicting conventional planetary formation models.

What are Exoplanets?

Exoplanets (Extrasolar Planets) are planets located outside our Solar System orbiting other stars.

Feature	Details
First confirmed discovery	1990s
Known exoplanets	~6,100 confirmed planets
Planetary systems	4,500+ discovered systems
Detection methods	Transit method, radial velocity, direct imaging

Exoplanet research helps scientists understand **planet formation, stellar systems, and potential habitable worlds**.

★ Host Star: LHS 1903

Feature	Details
Star Type	Red dwarf star
Distance from Earth	~117 light-years
Constellation	Lynx
Stellar Characteristics	Small, cool, and long-lived stars

Red dwarfs are the **most common stars in the Milky Way**, making them key targets in **exoplanet searches**.

The “Inside-Out” Planetary System

The **LHS 1903 planetary system** contains **four planets** arranged in an unusual configuration.

Planet Position	Composition
Innermost planet	Rocky

Second planet	Gaseous
Third planet	Gaseous
Outermost planet	Rocky

Why This is Unusual

Standard planetary formation models predict:

Region	Expected Planet Type
Inner region (hot)	Rocky planets
Outer region (cool)	Gas giants

However, LHS 1903 has a rocky planet at the outermost orbit, which contradicts the conventional model.

Possible Explanation (Formation Theory)

Scientists propose a **sequential formation model**.

Stage	Process
Early phase	Inner planets formed while the protoplanetary disc still had gas
Intermediate phase	Gas accumulated around mid-region planets forming gas giants
Late phase	Gas in the disc dissipated before the outer planet formed

As a result, the **outermost planet formed as a rocky body due to lack of gas**.

About CHEOPS Mission

Feature	Details
Full Name	CHaracterising ExOPlanet Satellite
Agency	European Space Agency (ESA)
Launch Year	2019
Mission Type	Small-class exoplanet research mission
Orbit	Sun-synchronous Low Earth Orbit (~700 km)

Mission Objective

CHEOPS studies **already-known exoplanets in detail** to determine their **size and composition**.

Challenges in Exoplanet Research

Issue	Explanation
Distance	Exoplanets are extremely far from Earth
Weak signals	Planet signals are faint compared to stars
Detection bias	Easier to detect large planets near stars
Atmospheric analysis	Requires advanced telescopes

UPSC Mains Question

“Discoveries of exoplanetary systems are reshaping our understanding of planetary formation.”

Discuss how missions such as CHEOPS contribute to this evolving understanding. (10/15 marks)

5. Comet C/2025 K1 (ATLAS) Breaks Apart After Solar Flyby



Astronomers observed Comet C/2025 K1 (ATLAS) breaking into multiple fragments after its closest approach to the Sun in October 2025.

The fragmentation was captured using the Gemini North Telescope, revealing the comet's fragile structure.

What are Comets?

Comets are ancient icy bodies formed during the early Solar System (~4.6 billion years ago).

Feature	Description
Composition	Ice, frozen gases, dust and rock
Orbit	Highly elliptical orbits around the Sun
Structure	Head (coma + nucleus) and tail
Origin Regions	Kuiper Belt and Oort Cloud

Formation of Tail

As comets approach the Sun:

- Solar heat **sublimates ice into gas**
- Gas and dust form a **coma (glowing head)**
- Solar radiation and solar wind create **dust and ion tails**

NASA has catalogued ~3,900 comets, though billions may exist in the outer Solar System.

About Comet C/2025 K1 (ATLAS)

Feature	Details
Type	Long-period comet
Origin	Oort Cloud (outermost region of Solar System)
Discovery	May 2025
Discovering System	ATLAS
Event Observed	Fragmentation after perihelion (closest solar approach)

Cause of Breakup

The comet disintegrated due to:

- **Solar tidal forces**
- **Intense solar radiation**
- **Solar wind pressure**

Because comet nuclei are **loosely bound icy rubble**, they are **structurally fragile**.

Long-Period Comets

Feature	Explanation
Orbital period	Greater than 200 years
Origin	Oort Cloud
Orbit type	Extremely elongated
Scientific importance	Carry primitive material from early Solar System

Such comets act as **time capsules of early planetary formation**.

Source Regions of Comets

Region	Location	Objects Found
Kuiper Belt	Beyond Neptune (~30-50 AU)	Short-period comets
Oort Cloud	Up to ~100,000 AU	Long-period comets

ATLAS (Asteroid Terrestrial-impact Last Alert System) is a planetary defence survey system.

Location : Hawaii, Chile, South Africa

 Gemini North Telescope : Mauna Kea, Hawaii

UPSC Mains Question

“Comets are considered time capsules of the early Solar System.” Explain their origin, structure and scientific importance in understanding planetary evolution. (10/15 marks)

6. Drogue Parachute Test Boosts Safety of Gaganyaan Mission



The Defence Research and Development Organisation (DRDO) successfully conducted a qualification load test of the drogue parachute designed for the Gaganyaan programme. The test validates India's indigenous capability to design high-strength ribbon parachutes required for the safe descent and recovery of the crew module.

About Gaganyaan Mission

Gaganyaan is India's first human spaceflight programme, led by the Indian Space Research Organisation (ISRO).

Feature	Details
Mission Type	Human spaceflight
Orbit	Low Earth Orbit (LEO) - ~400 km altitude
Mission Duration	~3 days
Crew	Indian astronauts (Vyomnauts)
Recovery	Splashdown in Indian Ocean waters

Launch Vehicle : LVM3 Human-rated rocket for crew launch

What is a Drogue Parachute?

A drogue parachute is a small stabilising parachute deployed during spacecraft re-entry.

Role	Explanation
Stabilisation	Aligns the descending spacecraft
Speed Reduction	Slows down the module gradually
Deployment Trigger	Helps deploy the larger main parachutes

Drogue parachutes are critical during the early phase of atmospheric descent.


Gaganyaan Crew Module Recovery System

The parachute system for Gaganyaan consists of multiple stages.

Stage	Parachute Type	Purpose
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1	Drogue parachutes	Stabilise and slow descent
2	Pilot parachutes	Deploy main parachutes
3	Main parachutes	Final safe landing in ocean

These systems ensure **controlled splashdown and astronaut safety**.

 **Ribbon Parachute Technology** : The drogue parachute uses **high-strength ribbon parachute design**.

Feature	Advantage
Ribbon structure	Allows airflow to reduce stress
High strength material	Withstands extreme aerodynamic forces
Controlled drag	Ensures stable descent

This design is widely used in **space capsule recovery systems**.

UPSC Mains Question

“Human spaceflight missions require robust crew recovery systems.”

Discuss the significance of parachute recovery systems in ensuring astronaut safety in missions like Gaganyaan. (10/15 marks)

7. “Moltbook”: First AI-Only Social Network Raises Cyber Governance Questions



A new AI-only social networking platform “Moltbook” recently went viral after launching a digital ecosystem where **autonomous AI agents create posts, comment, and form communities without human interaction**. The platform demonstrates the capabilities of **Agentic AI**, while also raising concerns regarding **cybersecurity risks, data exposure, and the “Dead Internet Theory.”**

What is Moltbook?

Moltbook is an **experimental social networking platform designed exclusively for Artificial Intelligence agents**, where humans can only observe activity.

Feature	Details
Platform Type	AI-only social network
Users	Autonomous AI agents
Human Role	Read-only observers
Purpose	Study interactions among AI agents
Concept	Machine-to-machine social interaction

The platform acts as a **digital laboratory to observe how AI systems evolve collective behaviour**.

Technological Basis: Agentic AI

Agentic AI refers to **autonomous artificial intelligence systems capable of taking decisions and acting independently without constant human instructions**.

Feature	Explanation
Autonomy	AI performs tasks independently
Goal-oriented behaviour	Agents pursue defined objectives

Interaction capability	Communicate with other agents
Self-learning	Improve through feedback loops

Examples include:

- Autonomous trading bots
- AI research agents
- AI-driven digital assistants

Dead Internet Theory

The emergence of Moltbook illustrates the **“Dead Internet Theory.”**

Concept	Explanation
Theory	Much of online content is generated by bots rather than humans
Origin	Internet culture and digital sociology debates
Implication	Declining authenticity of online discourse

Although controversial, the theory highlights **increasing automation in digital spaces.**

UPSC Mains Question

“Autonomous AI systems are beginning to interact with each other without human intervention.” Discuss the opportunities and governance challenges posed by AI-only digital ecosystems. (10/15 marks)

8. 📰 India Mandates Labels for AI-Generated Content Under IT Rules



The Union Government amended the **Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021** to mandate **labelling of AI-generated or synthetically created content**. The amendment also **shortens takedown timelines for unlawful and deepfake content**, strengthening accountability of digital intermediaries.

📌 Intermediary Rules

The IT Rules (2021) regulate **online intermediaries** such as **social media platforms, search engines, and digital news platforms**.

Legal Basis

- Derived from the **Information Technology Act, 2000**
- Govern obligations of intermediaries hosting **user-generated content**

A key concept under the Act is **“Safe Harbour”**, which protects platforms from liability for user content **if they follow due diligence obligations**.

⚖️ Key Amendments Notified

Provision	Details
Mandatory AI Labelling	Photorealistic AI-generated or synthetic content must carry clear disclosure labels
Compressed Takedown Timelines	Platforms must remove unlawful content within 3 hours and deepfake/NCII content within 2 hours
User Disclosure Duty	Platforms must require users to declare whether uploaded content is AI-generated
Narrowed AI Definition	Routine edits such as camera filters or basic enhancements excluded

These measures aim to prevent **misleading synthetic media from being mistaken as real content**.

🎯 Rationale Behind the Amendment

Objective	Explanation
Prevent Viral Harm	Harmful content spreads quickly; over 60% reaches peak circulation within 6 hours
Protect Privacy & Dignity	Rapid rise in Non-Consensual Intimate Imagery (NCII) cases
Strengthen Platform Accountability	India has ~850 million internet users , requiring stronger moderation frameworks
Responsible AI Governance	Aligns with **OECD AI Principles and **Group of Twenty AI safety guidelines

🔑 Key Concept: Deepfakes

Deepfakes are **synthetic media created using artificial intelligence (deep learning)** that manipulate images, audio, or video to appear real.

Risks Political misinformation, Identity impersonation etc

📌 UPSC Mains Question

“The rise of AI-generated content poses new regulatory challenges for digital governance.”
Examine the implications of India’s amendments to the IT Rules on AI-generated content and platform accountability. (10/15 marks)

9. 🇮🇳 AI for Inclusive Welfare: From Tech Power to Public Good



India is hosting the 4th AI Impact Summit, signalling a shift in global AI discourse from AI safety toward welfare-oriented AI deployment guided by the philosophy “sarvajana hitaya, sarvajana sukhaya” (welfare and happiness for all). The summit highlights the use of Artificial Intelligence to improve food security, healthcare access, education, and livelihoods.

■ What is Artificial Intelligence (AI)?

Artificial Intelligence (AI) refers to computer systems capable of performing tasks that normally require human intelligence, such as learning, reasoning, pattern recognition, and decision-making.

Key Technologies

- Machine learning
- Natural language processing
- Computer vision
- Predictive analytics

AI systems are increasingly integrated into public governance and welfare delivery.

🌱 AI as a Tool for Welfare Transformation

Sector	Application	Example
Food Security	AI-based crop advisory for farmers	Kisan E-Mitra answering ~20,000 queries daily in 11 languages
Agricultural Income	Precision farming and input optimisation	Telangana’s Saagu Baagu doubled chilli farmers’ incomes
Healthcare Access	AI-enabled telemedicine consultations	eSanjeevani completed ~389 million consultations by 2025
Education & Skills	AI-enabled digital learning platforms	DIKSHA platform reached ~275 million users

AI therefore acts as a multiplier for welfare delivery and public services.

🌐 Role of Digital Public Infrastructure (DPI)

India’s Digital Public Infrastructure model enables large-scale AI deployment.

DPI Example Role

Aadhaar	Digital identity
UPI	Digital payments
DIKSHA	Education platform
eSanjeevani	Telemedicine

AI built on these platforms can deliver welfare services at national scale.

📌 UPSC Mains Question

“Artificial Intelligence can transform welfare delivery in developing countries.”

Discuss the opportunities and structural challenges in deploying AI for inclusive development in India. (10/15 marks)

10. 🚀 AI-Driven Genomics: India Advances Personalised & Predictive Healthcare



The Department of Biotechnology (DBT) has deployed AI-driven genomics tools to enable personalised prescriptions and predictive healthcare across India.

The initiative integrates Artificial Intelligence with genome sequencing and disease surveillance to accelerate diagnostics, public health monitoring, and biotechnology research.

■ What is AI-Driven Genomics?

AI-Driven Genomics refers to the application of Artificial Intelligence to analyse and interpret genomic data for research, diagnostics, and healthcare decision-making.

Key Genetic Concepts

Term	Meaning
Genome	The complete set of DNA in an organism
Genomics	Study of the structure, function, and mapping of genomes
Genome Sequencing	Determining the exact order of DNA base pairs
DNA Bases	Adenine (A), Thymine (T), Guanine (G), Cytosine (C)

AI tools help analyse massive genomic datasets **much faster than conventional computational methods**.

⚙️ How AI Helps Genomics

Function	Role of AI
Pattern detection	Identify disease-linked genetic mutations
Drug response prediction	Enable personalised medicine
Disease surveillance	Track pathogen mutations
Data analysis	Process massive genome datasets quickly

This combination enables **predictive, preventive and personalised medicine (PPPM)**.

IN Major Government Initiatives

1 Genome India Project

Feature Details

Objective Map genetic diversity of India

Scope Genome sequencing of thousands of individuals

Outcome Identify disease-linked genetic variants

This project strengthens India's capacity in **precision medicine and genomics research**.

2 Bio-AI Mulankur Hubs

Feature Details

Launch Planned by DBT-BIRAC

Function Integrate AI predictions with laboratory validation

Goal Advance genomic research and biotech innovation

3 National Genomics Core

Feature **Details**

Location **Kalyani (West Bengal) and Hyderabad**

Role High-throughput genome sequencing

Technology AI-based genomic analytics

4 InTGS (Indian Tuberculosis Genomic Surveillance)

Feature **Details**

Full Name Indian TB Genomic Surveillance Consortium

Role Track **drug-resistant TB mutations**

Impact Detection time reduced from **weeks to days**

5 GARBH-Ini Initiative

Feature **Details**

Focus Maternal and child health

Achievement Identification of **66 genetic markers linked to preterm birth**

Benefit Early risk prediction and preventive care

UPSC Mains Question

“The integration of Artificial Intelligence with genomics is transforming healthcare into a predictive and personalised system.”

Discuss the significance of AI-driven genomics for public health and biotechnology development in India. (10/15 marks)

11. Sarvam AI Unveils India's First Sovereign Large Language Models



Bengaluru-based startup Sarvam AI launched India's first large-scale foundational Large Language Models (LLMs) – Sarvam 30B and Sarvam 105B – at the IndiaAI Impact Summit 2026. These models are open-source and designed to support 22 Indian languages across 11 scripts, marking a major step toward AI sovereignty and indigenous AI capability.

What are Large Language Models (LLMs)?

Large Language Models (LLMs) are advanced artificial intelligence systems trained on massive text datasets to understand and generate human language.

Key Features

Feature	Explanation
Training Data	Massive datasets of text and code
Capability	Language understanding, translation, reasoning
Technology	Deep learning neural networks
Use Cases	Chatbots, search engines, analytics

Examples globally include GPT, Gemini, and Claude models.

Sarvam AI Foundational Models

Model	Parameter Size	Purpose
Sarvam 30B	~30 billion parameters	Conversational AI on low-compute devices
Sarvam 105B	~105 billion parameters	Advanced reasoning and analytics

Model Differentiation

- Sarvam 30B
 - Optimised for feature phones and low-power devices
 - Supports multilingual conversational AI
- Sarvam 105B
 - Designed for complex reasoning tasks
 - Suitable for enterprise analytics and large-scale applications

Both models support 22 Indian languages across 11 scripts, improving linguistic inclusion in AI systems.

Hardware Innovation: Kaze AI Smart Glasses

Sarvam AI also unveiled Kaze AI-powered smart glasses.

Feature	Function
Visual capture	Understand surroundings through camera input
Audio processing	Real-time voice interaction
AI response	Context-aware responses

These devices integrate AI with wearable computing.

UPSC Mains Question

“Developing indigenous Large Language Models is crucial for technological sovereignty and digital inclusion.” Discuss the significance of India's foundational AI models in achieving these goals. (10/15 marks)

12. 🤖 'MANAV' Vision for Artificial Intelligence: India's Human-Centric AI Governance Model



Prime Minister Narendra Modi unveiled the MANAV Vision for Artificial Intelligence at the India AI Impact Summit 2026. The framework proposes a **human-centric governance model** to guide the **ethical, transparent and inclusive development of AI** globally.

■ What is the MANAV Vision?

MANAV Vision is a policy framework for responsible AI governance that prioritises **human welfare, ethical standards, and sovereign control over data and digital infrastructure**.

Core Idea AI must function as a **tool for human empowerment**, not as a **disruptive or monopolistic technological force**.

🔑 Core Pillars of the MANAV Vision

Pillar	Key Idea	Explanation
M - Moral Systems	Ethical AI	AI systems must incorporate human values, fairness and ethical standards in design and deployment.
A - Accountable Governance	Transparent oversight	Regulatory frameworks should ensure transparency, explainability and accountability in AI systems.
N - National Sovereignty	Data ownership	Upholds the principle "whose data, his right" , emphasising national control over data and digital infrastructure.
A - Accessible & Inclusive	AI for development	AI should reduce inequalities and support Global South development , rather than creating technological monopolies.
V - Valid & Legitimate	Trustworthy AI	AI applications must remain lawful, verifiable and socially trusted.

🌐 Strategic Significance

- 1 **Global Governance Leadership**: India seeks to shape **global AI norms** by promoting **ethical and development-oriented AI frameworks**.
- 2 **Digital Sovereignty** : Emphasises **national ownership of data, computing infrastructure and AI models**.
- 3 **Inclusive Development** : AI can be used to address **development challenges in agriculture, health, education and governance**.
- 4 **Global South Cooperation** : Positions India as a **technology partner for developing countries**.

🗨️ Key Concepts Related to AI Governance

Concept	Meaning
Ethical AI	AI systems designed with fairness, transparency and accountability.
AI Sovereignty	National control over data, algorithms and computing infrastructure.
Responsible AI	Ensuring AI technologies operate safely and without harmful bias.

✍️ UPSC Mains Question

"Human-centric governance frameworks are essential to ensure that Artificial Intelligence becomes a tool for inclusive development rather than technological domination."

Discuss with reference to India's MANAV Vision for Artificial Intelligence. (10/15 marks)

13. 📰 SAHI & BODH: India Launches AI Framework for Healthcare



The Union Minister of Health and Family Welfare launched SAHI and BODH, two national initiatives for Artificial Intelligence in healthcare, at the India AI Impact Summit 2026 in New Delhi. The initiatives aim to enable safe, ethical, and evidence-based use of AI in India's healthcare system.

■ SAHI Initiative (Strategy for Artificial Intelligence in Healthcare for India)

SAHI is a national strategic framework for integrating Artificial Intelligence into India's healthcare ecosystem.

Feature	Details
Full Form	Strategy for Artificial Intelligence in Healthcare for India
Nature	National policy framework
Purpose	Guide ethical and responsible AI adoption in healthcare
Coverage	Hospitals, public health institutions and state health systems

Key Focus Areas

Area	Role
Data Stewardship	Secure and responsible use of health data
Governance	Regulatory frameworks for AI tools
Validation	Ensuring reliability of AI-based diagnostics
Deployment	Align AI solutions with national public health priorities

SAHI aims to help state governments and health institutions deploy AI responsibly.

■ BODH Platform (Benchmarking Open Data Platform for Health AI)

BODH is a national evaluation platform for Health AI models.

Feature	Details
Full Form	Benchmarking Open Data Platform for Health AI
Developed By	Indian Institute of Technology Kanpur
Partner Institution	National Health Authority
Function	Benchmark and validate AI healthcare models

🔗 Technology Used: Federated Learning

BODH uses Federated Learning, an AI training technique where models learn from distributed datasets without transferring sensitive data.

Feature	Benefit
Data remains local	Protects patient privacy
Distributed training	Enables large-scale learning
Secure analytics	Reduces risk of data breaches

This method is particularly suitable for healthcare AI systems.

📌 UPSC Mains Question

“Artificial Intelligence can transform healthcare delivery but requires robust governance frameworks.” Discuss the significance of initiatives such as SAHI and BODH in ensuring responsible AI adoption in India's healthcare system. (10/15 marks)

14. 🇮🇳 IndiaAI Mission 2.0: Scaling Sovereign AI Ecosystem



The Union Minister for Electronics and Information Technology announced **IndiaAI Mission 2.0** at the **India AI Impact Summit 2026**.

The second phase aims to **expand AI research, innovation, compute infrastructure, and sectoral adoption across India's economy**.

■ **What is the IndiaAI Mission?** : The **IndiaAI Mission** is a national initiative launched in **2024** by the **Ministry of Electronics and Information Technology (MeitY)** to build a **comprehensive Artificial Intelligence ecosystem in India** by democratizing access to computing infrastructure, datasets, and innovation funding.

Feature	Details
Launch Year	2024
Implementing Agency	Digital India Corporation – IndiaAI Independent Business Division (IBD)
Objective	Build sovereign AI capability and expand AI innovation
Focus	Compute infrastructure, research, startups, and AI governance

🚀 Key Features of IndiaAI Mission 2.0

Area	Description
Expanded Compute Infrastructure	Procurement of 20,000 additional GPUs to support AI training and research
AI for MSMEs	Ready-to-use AI solutions for small businesses, similar to UPI-style digital infrastructure adoption
Deep-Tech R&D	Greater focus on indigenous AI models and foundational research
Application Layer Expansion	Scaling AI deployment across sectors like healthcare, agriculture, and governance

🏗️ Seven Key Pillars of the IndiaAI Mission

Pillar	Objective
Compute Capacity	Develop scalable AI infrastructure with 10,000+ GPUs via public-private partnerships
Innovation Centre	Establish IndiaAI Innovation Centre to develop Large Multimodal Models (LMMs) and foundational models
Datasets Platform (AIKosh)	Unified access to high-quality non-personal datasets for AI development
Application Development	AI solutions for healthcare, agriculture, governance, education
FutureSkills	Expand AI education and establish AI labs in Tier-2 & Tier-3 cities
Startup Financing	Provide risk capital and funding support to deep-tech AI startups
Ethical AI Governance	Frameworks for safe, responsible and trustworthy AI deployment

📌 UPSC Mains Question

“Democratising access to computing infrastructure and datasets is essential for building an indigenous AI ecosystem.” Discuss the role of **IndiaAI Mission** and its proposed **Phase 2 expansion** in strengthening India's artificial intelligence capabilities. (10/15 marks)

15. 🧠 Training Large Language Models in India: Rise of Indigenous AI Models



Indian technology firms are increasingly investing in **domestic Large Language Model (LLM) development**, signalling a push for **technological self-reliance in Artificial Intelligence**. A key technological innovation driving this shift is the **Mixture of Experts (MoE) architecture**, which significantly reduces the cost of running large AI models.

📌 **What are Large Language Models (LLMs)?**: Large Language Models (LLMs) are advanced Artificial Intelligence systems trained on massive datasets to **understand, process, and generate human language**.

Application	Use Case
Natural Language Processing	Chatbots, virtual assistants
Translation	Multilingual communication
Text Generation	Content creation and summarisation
Sentiment Analysis	Public opinion analysis

LLMs power technologies such as **AI chatbots, search engines, coding assistants, and decision-support systems**.

Dynamics of LLM Training : Training LLMs requires enormous computational and data resources.

Factor	Explanation
Compute Intensity	Requires large clusters of GPUs and high energy consumption
Training Cost	Often runs into millions of dollars
Data Requirement	Performance depends on massive high-quality datasets
Infrastructure Need	High-performance computing and data centres

⚠️ Structural Constraints in Indian LLM Development

Constraint	Explanation
Data Scarcity	Limited high-quality datasets in Indian languages
Capital Constraints	High GPU and infrastructure costs for startups
Language Performance Gap	Weak Indian-language capability affects adoption in governance, education and rural tech

⚡ Mixture of Experts (MoE) Architecture

Mixture of Experts (MoE) is an advanced AI model design that improves efficiency by activating **only specific parts of a neural network for each task**.

Feature	Explanation
Selective Parameter Activation	Only relevant neural network modules are activated during inference
Lower Compute Cost	Reduces energy use and GPU demand
Scalable Models	Allows development of larger models efficiently
Faster Responses	Improves latency and response time

📌 UPSC Mains Question

“Indigenous Large Language Model development is essential for technological sovereignty and linguistic inclusion.” Discuss the opportunities and challenges in building LLM ecosystems in India. (10/15 marks)

16. 🌱 AI for Rural Transformation: India's Push for Inclusive Development



Artificial Intelligence is increasingly being positioned as a **structural driver of inclusive rural development in India**, supported by national governance frameworks and multilingual AI platforms.

Government initiatives under the **NITI Aayog** and the **Ministry of Electronics and Information Technology (MeitY)** aim to integrate AI into **rural governance, agriculture, education, and welfare delivery systems**.

■ Why AI is Needed for Rural Transformation

Dimension	Role of AI	Example
Service Delivery Efficiency	Reduces welfare leakages through automation	Direct Benefit Transfer systems saved ₹2.7 lakh crore
Agricultural Risk Mitigation	Predictive advisories for climate variability	Climate factors cause 15–25% crop losses annually
Governance Precision	Data analytics improves local planning	2.44 lakh Gram Panchayats preparing decentralised plans

AI improves **targeting accuracy, planning efficiency and resource allocation** in rural governance.

🏠 Institutional Tools Driving AI-Led Rural Transformation

1 Administrative Modernisation

Tool	Function
SabhaSaar	Converts Panchayat meeting audio/video into structured minutes, improving documentation
eGramSwaraj	Enhances fiscal transparency and expenditure tracking
Gram Manchitra	Uses GIS mapping for infrastructure planning and asset management
AIKosh	Provides reusable datasets and AI models for governance innovation

2 Sectoral Transformation

Agriculture

Initiative	Role
National Pest Surveillance System	Early warning for crop diseases
Crop Health Monitoring	Satellite and AI-based crop analysis
Kisan e-Mitra	AI chatbot assisting farmers with schemes and advisories

Human Capital Development

Initiative	Impact
DIKSHA	Expands access to digital learning
YUVAI (Youth for Unnati and Vikas with AI)	Builds foundational AI and digital skills among youth

Social Protection

Initiative	Impact
Suman Sakhi WhatsApp Chatbot	Maternal and newborn health awareness in rural areas

🌐 Expanding Digital Accessibility

Platform	Purpose
BHASHINI	Enables translation and voice-based public service access
BharatGen	Multilingual AI models supporting text, speech and documents
Adi Vaani	AI language platform enabling governance access in tribal languages

These tools reduce **language barriers and digital exclusion** in rural governance.

📌 UPSC Mains Question

“Artificial Intelligence has the potential to transform rural governance and development in India.” Discuss the role of AI-based platforms and governance frameworks in enabling inclusive rural transformation. (10/15 marks)

17. 🧬 Triple-Drug Breakthrough Shows Promise Against Pancreatic Cancer



Researchers in Spain have reported a **potential breakthrough therapy for pancreatic cancer**, one of the **most aggressive and deadly cancers globally**.

The experimental treatment targets the **KRAS oncogene**, which drives **over 90% of pancreatic cancer cases**, using a novel **triple-drug therapy**.

📌 About Pancreatic Cancer

Feature	Details
Organ	Pancreas (digestive gland behind the stomach)
Major Type	Pancreatic Ductal Adenocarcinoma (PDAC)
Mortality	Among the deadliest cancers , with very low survival rates
Detection	Often detected late due to subtle symptoms

Key Cause: Mutations in the **KRAS oncogene** are responsible for the majority of pancreatic cancers.

🧬 What is the KRAS Oncogene?

Term	Meaning
Oncogene	A mutated gene that drives uncontrolled cell growth
KRAS	A gene regulating cell signalling pathways controlling cell division
Mutation Impact	Causes continuous growth signals, leading to tumour formation

KRAS mutations occur in **over 90% of pancreatic cancer cases**, making it a major therapeutic target.

🔑 **The New Triple-Drug Therapy:** Since KRAS has historically been **difficult to target with a single drug**, researchers used **three complementary agents** to block multiple cancer pathways simultaneously.

Drug	Mechanism
Daraxonasib	Selective KRAS inhibitor blocking the main tumour growth driver
Afatinib	Approved lung cancer drug blocking backup signalling pathways
SD36	PROTAC-based protein degrader disabling tumour stress-response systems

⚙️ What is PROTAC Technology?

PROTAC (Proteolysis-Targeting Chimaera) is a new biotechnology approach that **destroys disease-causing proteins rather than merely blocking them**.

Feature	Role
Targeted protein degradation	Eliminates harmful proteins
Precision therapy	Acts only on specific cancer targets
Next-generation drug design	Used in modern cancer treatments

Key Results of the Study

Parameter	Finding
Experimental Stage	Preclinical trials in mice
Tumour Response	Complete tumour regression observed
Duration	No relapse for 200 days
Safety	Minimal side effects and lower toxicity than chemotherapy

This indicates a **potential breakthrough for pancreatic cancer treatment**, although **human clinical trials are still required**.

UPSC Mains Question

“Advances in biotechnology are enabling precision therapies targeting the genetic drivers of diseases.” Discuss with reference to recent developments in pancreatic cancer treatment targeting the KRAS oncogene. (10/15 marks)

18. CAR-T Cell Therapy Breakthrough: IIT Bombay Improves Cancer Immunotherapy



Researchers from **Indian Institute of Technology Bombay** have developed a **safer technique to detach and recover lab-grown T-cells**, addressing a key manufacturing bottleneck in CAR-T Cell Therapy.

The method uses **3D electrospun scaffolds and the enzyme Accutase**, improving cell survival and potentially lowering the cost of therapies such as **NexCAR19**.

What is CAR-T Cell Therapy?

Chimeric Antigen Receptor (CAR) T-cell therapy is an advanced form of **immunotherapy** in which a patient's own immune cells are genetically engineered to recognise and destroy cancer cells.

Step	Explanation
Cell Extraction	T-cells are collected from the patient's blood
Genetic Engineering	Cells are modified to express CAR receptors
Expansion	Modified cells are multiplied in the laboratory
Re-infusion	CAR-T cells are infused back into the patient to attack cancer

The CAR receptor acts like a **molecular GPS**, guiding T-cells toward specific cancer antigens.

Key Target: CD19 Antigen

Term	Meaning
Antigen	A molecule capable of triggering an immune response
CD19	A protein found on the surface of certain cancer cells, especially B-cell cancers
Target Role	CAR-T cells recognise CD19 and destroy malignant cells

New Manufacturing Innovation

Researchers introduced a **new cell recovery technique**.

Innovation	Role
3D Electrospun Scaffolds	Artificial structures mimicking body tissue for cell growth
Accutase Enzyme	Gentle enzyme used to detach cells without damaging them
Higher Cell Viability	Improves survival rate of harvested T-cells
Manufacturing Efficiency	Enables larger-scale production of CAR-T therapies

This reduces one of the **major bottlenecks in CAR-T therapy production**.

Indigenous Development: NexCAR19 : India launched NexCAR19 in 2024.

Feature	Details
Developed by	IIT Bombay + Tata Memorial Centre
Industry partner	ImmunoACT
Target disease	Blood cancers such as leukemia and lymphoma
Cost	Around 1/10th of global CAR-T therapies

This represents a major step toward **affordable cancer immunotherapy in India**.

What are T-Cells?

Feature	Explanation
Cell Type	White Blood Cells (lymphocytes)
Function	Identify and destroy infected or abnormal cells
Role in immunity	Coordinate immune response against pathogens and tumours

UPSC Mains Question

“Immunotherapy is transforming the treatment of cancer through precision targeting of tumour cells.” Discuss the working and significance of **CAR-T cell therapy**, with reference to India’s indigenous development **NexCAR19**. (10/15 marks)

19. 🇮🇳 Frozen Embryo Donation: Legal Challenge to ART Act, 2021



The Delhi High Court issued notice on a **Public Interest Litigation (PIL)** challenging provision of the Assisted Reproductive Technology (Regulation) Act, 2021.

The petition questions the rule mandating **destruction or research use of unused frozen embryos**, arguing that it prevents **embryo donation to infertile couples**.

■ What is Frozen Embryo Donation?

Frozen embryo donation refers to a regulated medical process in which **surplus cryopreserved embryos created during IVF treatment are voluntarily donated to another infertile couple** to achieve pregnancy.

Term	Meaning
Cryopreservation	Freezing biological material (embryos) at extremely low temperatures for future use
Embryo Donation	Transfer of stored embryos to another couple seeking pregnancy
IVF (In Vitro Fertilisation)	Fertilisation of egg and sperm outside the body in a laboratory

⚖️ Existing Legal Framework under the ART Act, 2021

Provision	Details
Permitted Donations	Altruistic donation of sperm and eggs allowed
Double Donor IVF	IVF using donor sperm and donor eggs permitted
Non-genetic parenthood	Children may have no genetic link with commissioning parents
Embryo Storage Limit	Frozen embryos may be stored for maximum 10 years
End Use	After storage period, embryos must be donated for research or allowed to perish
Clinic Restrictions	Clinics cannot transfer frozen embryos to other couples
Consent Rules	Consent forms exclude embryo donation as an option

Thus, the Act **prohibits reproductive transfer of frozen embryos to other couples**.

⚠️ Issues Raised in the PIL

1 Legal Contradictions

Issue	Explanation
Fresh vs Frozen Embryo Disparity	Fresh donor embryos allowed but frozen donor embryos prohibited
Policy Inconsistency	Donor sperm and egg IVF permitted but embryo donation blocked

2 Constitutional Concerns

Article	Issue
Article 14	Differential treatment between fresh and frozen embryos lacks rational basis
Article 21	Restriction affects reproductive autonomy, privacy and dignity

🇮🇳 Need for Frozen Embryo Donation

Infertility Burden	India has 27-30 million infertile couples
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Cost of IVF	Each IVF cycle costs ₹1.5–3 lakh
Surplus Embryos	30–40% embryos remain unused after IVF cycles
Adoption Delays	Legal adoption can take 2–5 years

Allowing embryo donation could **expand reproductive options while utilising existing medical resources.**

UPSC Mains Question

“Advances in assisted reproductive technologies raise complex legal and ethical questions.”

Discuss the issues surrounding **frozen embryo donation in India** in the context of the ART (Regulation) Act, 2021. (10/15 marks)

20. Breakthrough in Epstein–Barr Virus Research: Step Closer to an EBV Vaccine



In February 2026, researchers reported progress toward developing a vaccine against the Epstein-Barr virus (EBV) after testing newly developed **monoclonal antibodies** in mice. The findings demonstrated that certain antibodies can **block viral entry into human cells**, marking an important step toward preventive vaccines.

What is Epstein–Barr Virus (EBV)?

Feature	Details
Virus family	Herpesviridae
Alternate name	Human Herpesvirus-4
Transmission	Primarily through saliva (“kissing disease”)
Global prevalence	Infects ~95% of the world’s population

Diseases Associated with EBV

Disease	Explanation
Infectious Mononucleosis	Viral illness causing fever, sore throat and fatigue
Multiple Sclerosis	EBV infection strongly associated with autoimmune risk
Cancers	Linked to nasopharyngeal carcinoma, Hodgkin lymphoma and EBV-associated lymphomas

Key Breakthrough in Research

Scientists developed **10 monoclonal antibodies** targeting two crucial EBV surface proteins.

Viral Protein	Role
gp350	Binds to receptors on human cells
gp42	Enables the virus to enter host cells

Experimental Findings

Observation	Result
Antibody targeting gp42	Completely prevented infection in humanised mice
Antibody targeting gp350	Provided partial protection

Infection prevention | Demonstrated possibility of blocking viral entry

This indicates **potential pathways for future vaccine design**.

🔍 What are Monoclonal Antibodies?

Feature	Explanation
Definition	Laboratory-produced antibodies targeting specific pathogens
Precision	Bind to specific viral proteins
Medical use	Used in cancer treatment, autoimmune diseases and infectious diseases

Monoclonal antibodies can **neutralise viruses or block infection pathways**.

⚠️ High-Risk Groups for EBV

Group	Risk
Immunosuppressed patients	High risk of EBV-related complications
Organ transplant recipients	Risk of EBV reactivation leading to lymphoma
Cancer patients	EBV-linked tumour development

Antibody infusions could help **prevent viral activation in such patients**.

🌐 Significance of the Discovery

Dimension	Importance
Vaccine development	First major step toward EBV vaccine
Disease prevention	Could reduce EBV-related cancers
Neurological research	May help prevent multiple sclerosis
Precision medicine	Enables targeted antiviral therapies

⚠️ Challenges

Issue	Explanation
Clinical trials required	Human trials needed to confirm safety
Complex virus biology	EBV persists lifelong in human cells
Vaccine development	Virus latency makes vaccine design difficult

📌 UPSC Mains Question

“Advances in biotechnology are increasingly enabling targeted therapies against viral infections.” Discuss the significance of recent research on **monoclonal antibodies against the Epstein-Barr Virus** and its potential implications for vaccine development. (10/15 marks)

21. 🇮🇳 India's First National Biobank for Rare Lysosomal Disorders



In February 2026, India established the **first government-supported National Biobank for Lysosomal Storage Disorders (LSDs)**. The initiative aims to strengthen **research, diagnosis, and treatment development** for these rare genetic diseases, which affect an estimated **12,000+ patients in India** but remain largely **underdiagnosed and poorly understood**.

1. What are Lysosomal Storage Disorders (LSDs)?

Lysosomal Storage Disorders (LSDs) are a group of **rare inherited metabolic diseases** caused by **defects in lysosomal enzymes**, which normally break down complex molecules within cells.

Key Characteristics : Number of Diseases: Over **70 distinct disorders** identified.

Genetic Nature: Mostly **autosomal recessive genetic mutations** affecting lysosomal function.

Pathological Mechanism: Defective enzymes fail to break down substrates such as **lipids, glycoproteins, or complex sugars**. These substances **accumulate inside lysosomes**, causing **progressive cellular damage**.

2. Treatment Challenges

- **Limited disease-modifying therapies** exist.
- **Enzyme Replacement Therapy (ERT)** is the most common treatment.
- **Cost:** Often **₹1 crore or more per patient annually**, making treatment inaccessible for most patients in developing countries.
- Need for **early diagnosis and genetic screening**.

National Biobank for Lysosomal Storage Disorders

A biobank is a **systematic repository of biological samples and associated health data** used for **medical research, diagnostics, and drug development**.

Aspect	Details
Sample Repository	Biological samples from 530 patients across 15 states
Data Integration	Includes genomic DNA, plasma, urine samples, enzyme activity profiles, and mutation data
Collaboration	Network of 28 medical and research institutions across India
Funding Agency	Department of Biotechnology (DBT)
Lead Organisation	Foundation for Research in Genetics and Endocrinology (FRIGE), Ahmedabad

3. Significance of the Biobank

- **Strengthens Rare Disease Research:** Enables large-scale **genomic and biochemical studies**.
- **Improves Diagnosis:** Supports development of **new diagnostic biomarkers**.
- **Drug & Therapy Development:** Facilitates **precision medicine and gene therapy research**.
- **Policy Support:** Aligns with India's **National Policy for Rare Diseases (NPRD), 2021**.

UPSC Mains Question

"Rare genetic diseases pose unique healthcare challenges in developing countries. Discuss the significance of biobanks in advancing diagnosis, research, and treatment of rare diseases in India." (15 marks)

22. SC Bars Stem Cell Therapy as Routine Treatment for Autism



In February 2026, the Supreme Court of India prohibited the use of stem cell therapy as a routine clinical treatment for Autism Spectrum Disorder (ASD). The Court upheld the National Medical Commission (NMC) position that such therapy is experimental, warning that doctors offering it commercially may face professional misconduct and medical malpractice charges.

1. Autism Spectrum Disorder (ASD): A Brief

Autism Spectrum Disorder is a neurodevelopmental condition characterised by:

- Impaired social communication and interaction
- Restricted and repetitive behavioural patterns
- Onset typically in early childhood

Causes

- Combination of genetic and environmental factors
- No proven curative therapy; treatment focuses on behavioural therapy, education support, and symptom management.

2. Supreme Court Ruling

- Stem cell therapy cannot be used as routine treatment for ASD.
- Classified as experimental therapy by the National Medical Commission (NMC).
- Informed consent from parents is legally invalid because the therapy lacks scientifically proven safety and efficacy.
- Doctors offering the therapy as a commercial service may face disciplinary action and malpractice liability.
- Use of stem cells is permitted only within regulated clinical trials.

3. Stem Cell Therapy: Concept

What are Stem Cells?

Stem cells are undifferentiated cells capable of:

- Self-renewal
- Differentiation into specialised cell types

They are central to regenerative medicine, which aims to repair or replace damaged tissues.

Major Sources of Stem Cells

Source	Description
Adult Stem Cells	Obtained from tissues such as bone marrow or adipose tissue
Embryonic Stem Cells	Derived from early-stage embryos
Umbilical Cord Blood	Collected during childbirth
Induced Pluripotent Stem Cells (iPSCs)	Adult cells genetically reprogrammed to behave like embryonic stem cells

4. Types of Stem Cell Transplants

Type	Feature
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Autologous Transplant	Patient's own cells used → low immune rejection risk
Allogeneic Transplant	Stem cells from donor → risk of Graft-versus-Host Disease (GvHD)

Methods of Administration

- **Intravenous infusion**
- **Intrathecal injection** (spinal fluid)
- **Direct tissue injection**

5. Regulation of Stem Cell Therapy in India : Legal and Institutional Framework

Regulation	Key Role
New Drugs and Clinical Trials Rules, 2019	Classifies stem-cell derived products as "New Drugs" requiring trials
Central Drugs Standard Control Organisation (CDSCO)	Approves clinical trials and market authorisation
National Guidelines for Stem Cell Research (2017)	Issued by ICMR & DBT; classify research as Permissible / Restricted / Prohibited
Institutional Committee for Stem Cell Research (IC-SCR)	Mandatory oversight within research institutions

UPSC Mains Question

"Stem cell therapy holds transformative potential for regenerative medicine, yet its misuse raises ethical and regulatory concerns." Discuss the challenges associated with stem cell therapy in India and the role of regulation in ensuring ethical medical practice. (15 marks)

23. 🌸 **First Evidence-Based Guidelines for Lung Cancer Care**



In February 2026, the Union Health Minister released India's first 'Lung Cancer Treatment and Palliation Guidelines', aimed at **standardising diagnosis, treatment, and palliative care** for lung cancer across the country. Developed jointly by the **Department of Health Research (DHR)** and the **Directorate General of Health Services (DGHS)**, the guidelines seek to reduce **variation in clinical practice** and improve survival outcomes.

1. Lung Cancer: A Brief

Lung cancer is a malignant tumour arising from the **cells of the lungs**, often associated with **tobacco use, environmental pollution, and occupational exposure to carcinogens**.

Type	Characteristics
Non-Small Cell Lung Cancer (NSCLC)	Accounts for ~85% of cases; includes adenocarcinoma, squamous cell carcinoma
Small Cell Lung Cancer (SCLC)	Aggressive cancer strongly associated with smoking

Key Risk Factors

- **Tobacco smoking and smokeless tobacco, Air pollution (PM2.5 exposure)**
- **Radon gas exposure, Occupational carcinogens** (asbestos, arsenic)
- **Genetic susceptibility**

2. India's First Lung Cancer Treatment & Palliation Guidelines

Aspect	Details
Nature of Document	First evidence-based national framework for lung cancer care
Coverage	15 recommendations covering diagnosis, treatment, and palliation
Objective	Standardised clinical protocols for public and private sectors
Approach	Tailored to India's healthcare resources and disease patterns
Institutions	Developed by DHR and DGHS
Special Focus	Strong emphasis on palliative care and quality of life

UPSC Mains Question

"The rising incidence of lung cancer among non-smokers highlights the changing epidemiology of cancer in India." Discuss the role of environmental factors and the importance of standardised national treatment guidelines in improving cancer outcomes. (15 marks)

24. 🌿 H5N1 Bird Flu Resurfaces in Tamil Nadu



In February 2026, Avian Influenza (H5N1) resurfaced in Tamil Nadu, leading to the death of over 1,000 crows in Chennai. Authorities initiated surveillance and containment measures, highlighting renewed concerns about the spread of highly pathogenic avian influenza among birds and the potential risk to humans.

1. What is Avian Influenza? : Avian Influenza (Bird Flu) is a highly contagious viral disease caused by Influenza Type A viruses, primarily affecting domestic poultry and wild birds.

Virus Classification : The virus is classified based on two surface proteins:

Protein	Function
Hemagglutinin (H)	Helps the virus attach and enter host cells
Neuraminidase (N)	Helps newly formed viruses exit infected cells

Different combinations of these proteins form subtypes such as H5N1, H7N9, H5N8, etc.

2. Pathogenic Categories

Category	Features
Low Pathogenic Avian Influenza (LPAI)	Causes mild symptoms in birds
Highly Pathogenic Avian Influenza (HPAI)	Causes severe disease and high mortality in poultry

The H5N1 strain belongs to the HPAI category.

3. H5N1: Key Characteristics

- Causes severe infection and high mortality in poultry populations.
- Known for frequent genetic mutations, increasing the risk of species spillover.

Mutation Mechanisms

Mechanism	Meaning
Antigenic Drift	Gradual small genetic mutations over time
Antigenic Shift	Major genetic reassortment leading to new strains

These processes can **enable viruses to infect new species**, including humans.

4. Natural Reservoir and Transmission

- **Wild aquatic birds** (ducks, geese, swans) act as **natural reservoirs**.
- Spread occurs through **migratory bird routes**.
- Transmission pathways include:
 - **Direct contact with infected birds**
 - **Contaminated surfaces, feed, or water**
 - **Bird droppings**

Cross-Species Infection

The virus has been detected in several mammals:

- **Tigers**
- **Seals**
- **Minks**
- **Dairy cows**

Human Infection : Human infection is **rare but severe**.

UPSC Mains Question

“Zoonotic diseases such as Avian Influenza highlight the growing interface between wildlife, livestock, and human health.” Examine the importance of the One Health approach in preventing future pandemics. (15 marks)

25. 📌 Indian Pharmacopoeia Commission Strengthens Drug Safety Framework



In February 2026, the Indian Pharmacopoeia Commission (IPC) signed **three Memoranda of Understanding (MoUs)** to strengthen **medicine safety, drug quality standards, and healthcare professional capacity building**. The initiative aims to enhance **pharmacovigilance and regulatory cooperation** in India's healthcare system.

1. What is a Pharmacopoeia? : A pharmacopoeia is an **official, legally binding compendium of drug standards** that specifies the **identity, purity, strength, and quality** of medicines within a country.

- It acts as a **reference book for drug manufacturers, regulators, pharmacists, and healthcare professionals**.
- Ensures **standardisation and quality control** of medicines in the market.

Examples include:

- **Indian Pharmacopoeia (India) , British Pharmacopoeia**

2. Indian Pharmacopoeia Commission (IPC)

Aspect	Details
Establishment	2005 (operational since 2009)
Administrative Ministry	Ministry of Health and Family Welfare
Headquarters	Ghaziabad, Uttar Pradesh
Nature	Autonomous institution

Core Function

The IPC sets standards for drugs manufactured, sold, and consumed in India to ensure their quality, safety, and efficacy.

3. Legal Authority

- Drug standards prescribed by IPC are **legally binding** under the **Second Schedule of the Drugs and Cosmetics Act, 1940**.
- These standards guide **drug manufacturing, testing, and regulatory approvals** in India.

UPSC Mains Question

“Effective drug regulation is essential for ensuring patient safety and maintaining public confidence in healthcare systems.” Examine the role of the Indian Pharmacopoeia Commission in strengthening drug quality and pharmacovigilance in India. (15 marks)

26. Affordable Dipstick Test Developed to Detect AMR in Sewage



In February 2026, Indian scientists developed a **rapid and affordable dipstick assay** to detect **Antimicrobial Resistance (AMR) genes** in sewage. The test, which works similarly to a **pregnancy test strip**, allows **community-level monitoring of drug resistance** using **Wastewater-Based Epidemiology (WBE)**.

1. What is Antimicrobial Resistance (AMR)?

Antimicrobial Resistance (AMR) occurs when **microorganisms** such as **bacteria, viruses, fungi, or parasites** evolve mechanisms to resist drugs designed to kill them.

Causes

- **Overuse and misuse of antibiotics**
- **Incomplete treatment courses**
- **Excessive use of antibiotics in livestock and agriculture**
- **Poor sanitation and infection control**

Global Concern

- According to global estimates, **AMR could cause up to 10 million deaths annually by 2050 if uncontrolled**.

2. New Dipstick Assay for AMR Detection

- Functions similar to a **pregnancy test strip**.
- **PCR-amplified DNA fragments** from sewage samples are applied to the strip.
- If **antibiotic resistance genes** are present, a **visible coloured band** appears.

3. Key Features of the Technology

Feature	Details
Detection Capability	Identifies 16 antibiotic resistance genes simultaneously
Result Time	Within 2 hours
Cost	₹400–₹550 per test
Alternative Cost	Shotgun sequencing costs ₹9,000+ per sample
Adaptability	Can be updated to detect new resistance genes within ~3 days
Infrastructure	Works in low-resource settings without advanced laboratory facilities

4. Wastewater-Based Epidemiology (WBE)

Wastewater-Based Epidemiology is a public health surveillance method that analyses sewage to detect biological or chemical markers indicating disease trends within a community.

Applications

- Monitoring antimicrobial resistance
- Tracking infectious diseases (e.g., COVID-19)
- Detecting drug consumption patterns
- Identifying emerging pathogens

Advantages

- Community-level disease surveillance
- Early warning system for outbreaks
- Non-invasive population monitoring

UPSC Mains Question

“Antimicrobial Resistance (AMR) is emerging as one of the greatest global public health threats.” Discuss the role of innovative surveillance tools such as wastewater-based epidemiology in combating AMR. (15 marks)

27. 🇮🇳 India Semiconductor Mission 2.0: India’s Push for Chip Self-Reliance



The Union Budget 2026–27 announced the launch of **India Semiconductor Mission (ISM) 2.0**, expanding the country’s semiconductor strategy beyond fabrication plants to build a **complete semiconductor ecosystem**. The initiative aims to achieve **70–75% self-sufficiency in India’s semiconductor demand by 2029** through domestic design, manufacturing, and intellectual property creation.

1. What are Semiconductors?

Semiconductors are materials whose electrical conductivity lies between **conductors and insulators**, making them essential for manufacturing **microchips and integrated circuits (ICs)**.

Key Uses

- Computers and smartphones
- Automobiles and electric vehicles
- Artificial Intelligence and data centres
- Defence and space technologies
- Telecommunications equipment

Common semiconductor materials include **silicon, germanium, and gallium arsenide**.

2. India Semiconductor Mission (ISM)

Aspect	Details
Launch	2021
Implementing Agency	Digital India Corporation
Administrative Ministry	Ministry of Electronics & Information Technology (MeitY)
Objective	Build semiconductor manufacturing and design ecosystem in India
Financial Incentives:	Provides fiscal support up to 50% of project cost for semiconductor manufacturing facilities.

3. Key Features of ISM 2.0

Feature	Details
Strategic Shift	From only fabrication units to full semiconductor ecosystem development
Self-Sufficiency Goal	70-75% domestic chip demand met locally by 2029
Upstream Supply Chain	Focus on equipment, specialised materials, and semiconductor components
Intellectual Property	Development of Full-Stack Indian chip design IP
R&D Infrastructure	Semiconductor Laboratory (SCL), Mohali upgraded as advanced R&D and prototyping hub
Skill Development	Expansion of Chips to Startup (C2S) programme

4. Design Linked Incentive (DLI) Scheme

A key component of ISM promoting domestic semiconductor design capabilities.

Key Provisions

- Up to 50% reimbursement of eligible design costs.
- Support for start-ups, MSMEs, and academic institutions developing semiconductor chips.

UPSC Mains Question

“Semiconductors have become the backbone of modern digital economies.” Discuss the significance of the India Semiconductor Mission in strengthening India’s technological sovereignty and economic competitiveness. (15 marks)

28. 🚀 India Recognises 'Deep Tech Start-ups' as a Distinct Category



In February 2026, the Department for Promotion of Industry and Internal Trade (DPIIT) issued a notification formally defining 'Deep Tech Start-ups' as a separate category within India's start-up ecosystem. The move aims to support **science-driven innovation with long development cycles**, while improving access to funding and regulatory flexibility.

1. What are Deep Tech Start-ups?

Deep Tech Start-ups are enterprises that develop **advanced technology solutions** based on **fundamental scientific research and engineering innovations**.

Key Characteristics

- High R&D intensity
- Long gestation periods
- Development of **novel intellectual property (IP)**
- Focus on **breakthrough technologies** rather than **incremental innovation**

Examples of Deep Tech Areas

- **Artificial Intelligence (AI) and Machine Learning**
- **Quantum computing**
- **Semiconductors**
- **Biotechnology and genetic engineering**
- **Advanced materials and nanotechnology**
- **Space technology and robotics**

2. Key Provisions in the DPIIT Notification

Feature	Provision
Definition	Start-ups based on new scientific knowledge and breakthrough technologies
Recognition Period	Extended from 10 years to 20 years
Turnover Limit	₹300 crore annual turnover cap (higher than ₹200 crore for normal start-ups)
Capital Usage Restriction	Prohibits investment in speculative assets such as real estate or luxury goods , unless linked to R&D
Funding Support	Access to Research, Development and Innovation (RDI) Fund

3. Research, Development and Innovation (RDI) Fund

Aspect	Details
Fund Size	₹1 lakh crore
Managing Institution	Anusandhan National Research Foundation (ANRF)
Objective	Provide long-term capital support for emerging technologies

Role of ANRF : The Anusandhan National Research Foundation aims to:

- Strengthen **research ecosystems in universities and industries**
- Promote **industry-academia collaboration**
- Fund **high-impact scientific innovation**

(ANRF was established under the National Education Policy framework to enhance research funding in India.)

UPSC Mains Question

“Deep technology innovation requires long-term investment, robust research ecosystems, and supportive policy frameworks.” Examine the significance of recognising deep tech start-ups in strengthening India’s innovation ecosystem. (15 marks)

29. 🌐 India Nears One Billion Internet Users: Rural Digital Surge



Recent digital economy data (2026) shows India’s active internet users have reached about 958 million, driven largely by rapid rural connectivity expansion. The trend highlights a new phase of digital transformation, where rural adoption, AI tools, and short-video platforms are reshaping India’s digital ecosystem.

1. India’s Expanding Digital Landscape

Indicator	Status
Active Internet Users	958 million
Rural Share of Users	~57%
Population Offline	~38%
AI Tool Usage	~44% of users
Short-Video Consumption	Over 60% of users

India is now one of the largest internet markets globally, reflecting rapid smartphone penetration and cheaper mobile data.

2. Key Trends in Internet Usage

Rural Digital Expansion

- More than half of internet users are now from rural areas.
- Indicates a shrinking urban-rural digital divide.

AI Adoption

- 44% of users interact with AI-enabled tools such as:
 - Voice search
 - Chatbots
 - Image-based search
- Highest adoption among young internet users.

Short-Video Content Boom

- Short-form videos dominate digital engagement, driven by platforms like YouTube Shorts, Instagram Reels, and similar platforms.

E-Commerce Transformation

New models emerging:

- Quick Commerce: Ultra-fast delivery (10–30 minutes).
- Social Commerce: Purchases through social media platforms.

Multi-Device Access: Around 20% of users access the internet through multiple devices (smartphones, laptops, tablets).

Shared Device Access : Rural households often share mobile devices, reflecting adaptive access models in low-income communities.

3. Significance of Internet Connectivity

Economic Growth

- India's digital economy is projected to contribute around 20% of GDP by 2029-30.

Employment Generation

- Digital sectors such as IT services and e-commerce employed around 14.67 million people in 2022-23.

Financial Inclusion

- Digital platforms enable efficient Direct Benefit Transfers (DBT).

Key pillars: Aadhaar UPI Pradhan Mantri Jan Dhan Yojana (PMJDY)

Digital Education

Platforms like: SWAYAM and DIKSHA enabled online education during COVID-19 and beyond.

4. Government Initiatives for Digital Expansion

Initiative	Objective
PM-WANI (Prime Minister Wi-Fi Access Network Interface)	Expands public WiFi hotspots, especially in rural areas
BharatNet Phase I	Optical fibre connectivity to 2.14 lakh Gram Panchayats
BharatNet Phase II	Expanding broadband to ~3.8 lakh villages
Telecom Manufacturing Push	Shift from mobile imports to exports worth ₹1.75 lakh crore
Bharat 6G Alliance	Collaboration for next-generation 6G technology development

UPSC Mains Question

“Digital connectivity is becoming a critical driver of economic growth and social inclusion.”
Examine the role of internet expansion in transforming India's economy and governance. (15 marks)

30. 🌐 Network Readiness Index 2025: India Improves Global Digital Standing



The Network Readiness Index (NRI) 2025 was released by the Portulans Institute (Washington, DC). India ranked 45th globally, improving four places from 2024, reflecting progress in digital infrastructure, AI research output, and telecom investments.

1. What is the Network Readiness Index (NRI)?

The Network Readiness Index (NRI) measures how effectively countries use information and communication technologies (ICT) to drive economic growth, governance, and societal well-being.

- First introduced by the World Economic Forum (WEF) in 2002.
- Since 2019, it has been published by the Portulans Institute.

2. Framework of the NRI

The index evaluates countries based on four pillars:

Pillar	Focus
Technology	ICT infrastructure, internet access, digital innovation
People	Digital skills among individuals, businesses, and governments
Governance	Digital policies, regulatory environment, cybersecurity
Impact	Economic and social impact of digital technologies

3. Global Rankings (NRI 2025)

Rank Country

- 1 United States
- 2 Finland
- 3 Singapore

These countries lead due to advanced digital ecosystems, strong innovation capacity, and high ICT adoption.

4. India's Performance

Indicator Status

Global Rank 45th

Areas of Strength

India ranked 1st globally in: AI scientific publications, Annual telecom investment, ICT services exports, E-commerce legislation

UPSC Mains Question

“Digital infrastructure and technological readiness are key determinants of economic competitiveness in the modern world.” Discuss India's performance in the Network Readiness Index and the challenges in strengthening digital readiness. (15 marks)

31. ⚡ From Molecules to Electrons: India's Industrial Energy Transition Challenge



Recent analysis highlights that India's industrial sector still relies heavily on fossil fuel "molecules" (coal, oil, gas), whereas China has electrified nearly half of its industrial energy use. This shift toward electricity-based industrial processes has strengthened China's manufacturing competitiveness and decarbonisation prospects, raising policy questions for India's industrial strategy.

1. What is Industrial Electrification? : Industrial electrification refers to the replacement of fossil fuel combustion in industrial processes with electricity-based technologies.

Key Components

- Electric motors replacing diesel or combustion engines
- Induction furnaces and electric arc furnaces for metal production
- Electric boilers and heat pumps
- Digitally controlled manufacturing systems

2. China's Industrial Electrification Model

Strategy	Impact
Grid-first approach	Large investments in ultra-high-voltage transmission lines, energy storage, and smart substations
Electric Arc Furnace (EAF) Steel Policy	Steel production via EAF rose from 44 million tonnes (2010) to 106 million tonnes (2024)
Industrial Digitalisation	Automation and digital monitoring improved manufacturing efficiency
Renewable Integration	Electricity increasingly sourced from renewables, reducing carbon intensity

As a result, around 50% of China's industrial energy consumption now comes from electricity.

3. India's Current Industrial Energy Structure

Indicator	Status
Industrial energy from electricity	~25%
Industrial energy from green electricity	~7-8%
Industry's share in India's GHG emissions	~25%
Oil import dependence	~85%
Natural gas import dependence	~45%

India's industry still relies heavily on coal boilers, diesel generators, and fossil-fuel furnaces.

4. Why Electrification Matters for India

Export Competitiveness

- Global markets are increasingly imposing carbon standards on industrial products (e.g., EU Carbon Border Adjustment Mechanism - CBAM).
- Electrification helps produce low-carbon steel, cement, and manufacturing goods.

Energy Security

- Reduces dependence on imported fossil fuels.

Efficiency Gains

- **Electric motors:** >90% efficiency
- **Combustion engines:** <35% efficiency

Climate Commitments

- Helps India meet **net-zero emission target by 2070**.

5. Challenges in India's Electrification Transition

Challenge	Explanation
Legacy Infrastructure	Existing factories rely on coal boilers and fossil-fuel systems
Low Clean Electricity Share	Limited availability of green electricity for industry
Policy Focus on Generation	Policies emphasise renewable capacity addition , not industrial consumption
Hard-to-Abate Sectors	Industries like cement require high-temperature calcination , difficult to electrify

6. Pathways for Industrial Electrification in India

National Electrification Mission

- Dedicated policy focusing on **industrial electricity adoption**.
- Mandate **electrified production processes in new industrial parks**.

Grid Infrastructure Expansion

- Develop **ultra-high-voltage transmission corridors** and energy storage systems.

Steel Sector Transition

- Promote **Electric Arc Furnaces (EAF)** and strengthen **scrap recycling markets**.

MSME Green Financing

- Provide **low-interest loans for electric equipment upgrades**.
- Encourage **renewable Power Purchase Agreements (PPAs)** for industries.

UPSC Mains Question

"Electrification of industrial processes is emerging as a key pathway for decarbonising manufacturing sectors." Examine the significance of industrial electrification for India's energy security, export competitiveness, and climate commitments. (15 marks)

32. 🇮🇳 India's Battery Strategy: Exploring Sodium-Ion as an Alternative to Lithium-Ion



With the rapid growth of **Electric Vehicles (EVs)** and **renewable energy storage**, India is reconsidering its heavy dependence on **lithium-ion batteries** and exploring **sodium-ion battery (SiB) technology** as a safer and more supply-secure alternative.

1. Lithium-Ion Batteries (LiB) : A Lithium-ion battery is a rechargeable electrochemical energy storage system in which lithium ions move between electrodes during charge and discharge cycles.

Basic Working

- During **discharge**, lithium ions move from **anode** → **cathode** through the electrolyte.
- During **charging**, ions move **back from cathode** → **anode**.

Component	Function
Anode	Usually graphite; stores lithium ions
Cathode	Lithium compounds such as Lithium Iron Phosphate (LFP) or Nickel-Manganese-Cobalt (NMC)
Electrolyte	Lithium salt solution enabling ion movement
Separator	Prevents short-circuit between electrodes

Applications

- Electric vehicles
- Smartphones and laptops
- Renewable energy storage systems

2. Why India Wants to Reduce Reliance on Lithium-Ion Batteries

Issue	Explanation
Supply Concentration	Over 70% of lithium processing and cobalt refining concentrated in few countries
Import Dependence	India's Advanced Chemistry Cell (ACC) PLI scheme (~40 GWh capacity) still depends on imported raw materials
Price Volatility	Rising EV demand increasing pressure on lithium and cobalt supply chains

This raises **geopolitical and energy security concerns**.

3. Sodium-Ion Batteries (SiB): A Potential Alternative : Sodium-ion batteries function similarly to lithium-ion batteries but use **sodium ions (Na⁺)** as charge carriers.

Advantage	Explanation
Abundant Raw Materials	Sodium widely available from soda ash and salt deposits
Reduced Critical Minerals	Many designs avoid cobalt, nickel, and copper
Manufacturing Compatibility	Existing Li-ion factories can be retrofitted for sodium-ion production
High Safety	Lower thermal runaway risk , safer transport and storage
Rapid Global Growth	Capacity projected to grow from ~70 GWh (2025) to ~400 GWh by 2030

4. Limitations of Sodium-Ion Batteries

Challenge	Explanation
Lower Energy Density	Heavier and less compact compared to Li-ion batteries
Early Commercial Stage	Technology still developing; limited large-scale adoption
Performance Gap	Currently unsuitable for long-range EV applications

5. Sodium-Ion vs Lithium-Ion Batteries

Aspect	Sodium-Ion Batteries	Lithium-Ion Batteries
Raw Material	Abundant sodium from soda ash	Scarce lithium, cobalt, nickel
Energy Density	Lower	Higher
Safety	Lower risk of thermal runaway	Higher fire hazard
Supply Chain	Low geopolitical vulnerability	Highly concentrated global supply
Charging & Life Cycle	Faster charging and longer cycle life (in some designs)	Slower charging, shorter lifecycle

UPSC Mains Question

“Energy storage technologies are central to the transition toward electric mobility and renewable energy.” Discuss the advantages and limitations of sodium-ion batteries as an alternative to lithium-ion batteries in India’s energy strategy. (15 marks)

33. 🇮🇳 India Pushes Thorium-Based Nuclear Fuel for Energy Security



The Department of Atomic Energy (DAE) announced that NTPC Ltd and Clean Core Thorium Energy (CCTE) are exploring the deployment of **thorium-based ANEEL fuel** in **Pressurised Heavy Water Reactors (PHWRs)**. The initiative aims to strengthen India’s **long-term nuclear fuel sustainability** by leveraging its large **thorium reserves**.

1. What is ANEEL Fuel?

ANEEL (Advanced Nuclear Energy for Enriched Life) is an advanced thorium-based nuclear fuel blend designed to enhance the performance of existing nuclear reactors.

Key Characteristics

- Combines **thorium with enriched uranium**.
- Designed to operate in **Pressurised Heavy Water Reactors (PHWRs)**.
- Improves **fuel efficiency, reactor safety, and sustainability**.

2. India’s Nuclear Energy Strategy

Three-Stage Nuclear Power Programme

India’s nuclear strategy, originally conceptualised by **Dr. Homi J. Bhabha**, aims to utilise the country’s **limited uranium and abundant thorium resources**.

Stage	Fuel	Reactor Type	Objective
Stage I	Natural uranium	Pressurised Heavy Water Reactors (PHWRs)	Produce electricity and generate plutonium

Stage II	Plutonium-based fuel	Fast Breeder Reactors (FBRs)	Breed more fissile material
Stage III	Thorium → Uranium-233	Advanced reactors	Long-term sustainable nuclear power

Current Status

- India operates **19 PHWRs**, forming the backbone of nuclear generation.
- Nuclear energy contributes about **~3% of India's electricity generation**.
- Long-term goal: **100 GW nuclear capacity by 2047**.

3. Strategic Shift in Nuclear Policy

Strategy Shift	Explanation
Fuel Innovation Focus	Emphasis on advanced fuels like ANEEL rather than building entirely new reactor types
Use of Existing Reactors	Deploy thorium fuel in existing PHWR fleets
Closed Fuel Cycle	Continue reprocessing spent fuel to recover fissile material

This approach allows **incremental upgrades to current infrastructure**.

4. Why Thorium Matters for India

Resource Advantage

- India possesses **one of the world's largest thorium reserves**, mainly in **monazite sands along coastal regions** (Kerala, Tamil Nadu, Odisha).

Energy Security

- Reduces reliance on **imported uranium**.

Environmental Benefits

- Thorium fuel cycles produce **fewer long-lived radioactive wastes**.

5. Benefits of ANEEL Fuel in PHWRs

Benefit	Explanation
Resource Security	Utilises India's vast thorium reserves
Compatibility	Works with existing PHWR reactors
Higher Fuel Efficiency	Improved burn-up rates and neutron economy
Reduced Waste	Generates fewer transuranic radioactive elements
Improved Safety	Thorium exhibits stable thermal behaviour in reactors

UPSC Mains Question

"Thorium-based nuclear technology is central to India's long-term energy security strategy." Examine the significance of thorium utilisation in India's nuclear power programme and the challenges in its implementation. (15 marks)

34. 🌱 Green Ammonia: India's New Route to Clean Energy Transition



Green ammonia is emerging as a **key derivative of green hydrogen**, linking India's **clean energy transition with industrial decarbonisation**. Recent **auction-based procurement of green ammonia by the Solar Energy Corporation of India (SECI)** for fertiliser plants signals India's attempt to **scale hydrogen-based fuels through market mechanisms**.

1. What is Green Ammonia? : Green ammonia (NH_3) is ammonia produced using **green hydrogen generated through renewable-powered electrolysis**, combined with **nitrogen extracted from air**.

Production Process

1. **Electrolysis of water using renewable energy** → produces green hydrogen.
2. **Air separation process** → produces nitrogen.
3. Hydrogen and nitrogen combine through the **Haber-Bosch process** to produce ammonia.

Emission Comparison

Type	Feedstock	Carbon Footprint
Grey Ammonia	Natural gas	High CO ₂ emissions
Blue Ammonia	Natural gas with carbon capture	Lower emissions
Green Ammonia	Renewable hydrogen	Near-zero emissions

2. Importance of Green Ammonia in Energy Transition

Hydrogen Carrier

- Ammonia contains **17.6% hydrogen by weight**.
- Easier to **store and transport hydrogen over long distances**.

Industrial Decarbonisation

- Conventional ammonia production contributes **~1.8% of global CO₂ emissions**.

Energy Security

- India imports **~85% of natural gas**, used for producing grey ammonia.
- Green ammonia reduces **import dependence**.

Multi-Sectoral Fuel Potential

Global ammonia demand **exceeds 180 million tonnes annually** and is expanding for:

- **Fertilisers**
- **Shipping fuel**
- **Power generation**
- **Hydrogen transport**

3. India's Auction-Based Green Ammonia Strategy

Feature	Details
Demand Aggregation	SECI aggregated demand for 724,000 tonnes/year
Coverage	13 fertiliser plants
Contract Duration	10-year fixed-price contracts
Price Range	₹49.75 - ₹64.74/kg (\$572-\$744 per tonne)

Feature	Details
Market Participation	15 bidders participated

Outcome

- Prices **approaching grey ammonia cost** (~\$515 per tonne).
- Achieved **40-50% lower prices** than many global procurement mechanisms.

4. Policy Context

The green ammonia push aligns with India's National Green Hydrogen Mission (NGHM).

Key Programme

- **SIGHT (Strategic Interventions for Green Hydrogen Transition)** scheme supports:
 - Hydrogen production incentives
 - Domestic electrolyser manufacturing.

UPSC Mains Question

"Green hydrogen derivatives such as green ammonia can play a transformative role in the decarbonisation of industry and global energy trade." Discuss the significance and challenges of green ammonia in India's energy transition. (15 marks)

35. 🧩 U.S. Demonstrates Air Transport of Nuclear Microreactor



The United States recently conducted the first-ever air transport of a nuclear microreactor, showcasing its potential for rapid deployment of nuclear power in military bases, remote regions, and disaster zones. The demonstration highlights the growing global interest in compact, transportable nuclear energy technologies.

1. What are Nuclear Microreactors?

Nuclear microreactors are very small, factory-built nuclear fission reactors capable of producing 1-20 megawatts (MW) of electricity.

- They are **100 to 1,000 times smaller than conventional nuclear reactors**.
- Designed to provide **portable, resilient, and low-carbon power** in remote or off-grid locations.

Key Applications

- **Military bases**
- **Disaster relief zones**
- **Remote communities**
- **Mining operations**
- **Space missions or Arctic installations**

2. Key Characteristics of Nuclear Microreactors

Feature	Description
Factory Fabrication	Fully assembled in factories before transportation
Compact & Transportable	Can be transported by truck, ship, or aircraft
Fuel Longevity	Operate for 5-10 years without refuelling

Passive Safety	“Walk-away safety” systems shut down automatically without human intervention
Power Capacity	Typically 1-20 MW

3. Fuel Used: HALEU

High-Assay Low-Enriched Uranium (HALEU)

Feature	Details
Uranium Enrichment	5%-20% U-235 concentration
Energy Density	Higher energy density compared to conventional nuclear fuel
Reactor Use	Used in microreactors and advanced reactors

HALEU enables **longer operational cycles and compact reactor designs.**

4. Advantages of Nuclear Microreactors

Reliable Energy Supply

- Provide **continuous power in remote areas** without dependence on fuel transport.

Low Carbon Emissions

- Generate **electricity without greenhouse gas emissions.**

Rapid Deployment

- **Factory-built design enables quick installation.**

Resilience

- Useful in **emergency response and disaster recovery scenarios.**

UPSC Mains Question

“Advanced nuclear technologies such as microreactors and small modular reactors are emerging as potential solutions for clean and resilient energy systems.” Discuss their advantages and challenges in the global energy transition. (15 marks)

36. 🚀 DRDO Successfully Tests Solid Fuel Ducted Ramjet (SFDR)

Missile Technology



The Defence Research & Development Organisation (DRDO) successfully demonstrated Solid Fuel Ducted Ramjet (SFDR) technology at the Integrated Test Range (ITR), Chandipur, Odisha. This achievement places India among a small group of countries possessing advanced air-breathing missile propulsion systems, enhancing the capability of long-range air-to-air missiles.

1. What is SFDR Technology? : Solid Fuel Ducted Ramjet (SFDR) is an air-breathing propulsion system used in advanced missile technologies.

- Unlike conventional rocket engines, it **uses atmospheric oxygen for combustion instead of carrying an oxidiser onboard.**
- This allows missiles to **carry more fuel and achieve longer ranges with sustained supersonic speeds.**

2. Working Principle of SFDR

Ramjet Mechanism

- The missile's **forward motion compresses incoming air** through the intake ducts.
- The compressed air mixes with **solid fuel** inside the combustion chamber.
- Combustion produces **high-speed exhaust gases**, generating thrust.

Key Operational Steps

Stage	Function
Booster Phase	A nozzleless booster accelerates the missile to supersonic speed
Air Intake	Atmospheric air enters through intake ducts
Combustion	Solid fuel reacts with compressed air
Sustained Propulsion	Ramjet provides continuous supersonic thrust

3. Key Features of SFDR Technology

Feature	Explanation
Air-Breathing Engine	Uses oxygen from atmosphere instead of onboard oxidiser
Higher Range	Reduced weight allows more fuel storage
Sustained Supersonic Speed	Maintains high speed throughout flight
Superior Terminal Agility	Improves manoeuvrability during the final attack phase
Extended Engagement Range	Expands the " point of no return " for enemy targets

4. Strategic Importance

Enhanced Missile Capabilities

SFDR technology can power **next-generation long-range air-to-air missiles**, strengthening India's **air defence capabilities**.

Indigenous Defence Technology

- Supports **Atmanirbhar Bharat** in defence manufacturing.
- Reduces dependence on **foreign missile propulsion technologies**.

Strategic Deterrence

- Improves capability to engage **high-speed aerial targets at extended ranges**.

5. Integrated Test Range (ITR), Chandipur

Feature Details

Location Chandipur, Odisha

Operated By DRDO

Purpose Testing **missiles, rockets, and defence systems**

The facility is a **key missile testing centre** for India's strategic defence programmes.

UPSC Mains Question

"Advanced propulsion technologies are reshaping modern missile systems." Discuss the significance of Solid Fuel Ducted Ramjet (SFDR) technology in enhancing India's defence capabilities. (15 marks)

37. ✨ India Approves Six More Boeing P-8I Maritime Surveillance Aircraft



India has approved the procurement of **six additional Boeing P-8I aircraft** from the United States. The acquisition was cleared by the **Defence Acquisition Council (DAC)** to strengthen the **Indian Navy's long-range maritime surveillance and anti-submarine warfare capabilities**, particularly in the **Indian Ocean Region (IOR)**.

1. Defence Acquisition Council (DAC)

The Defence Acquisition Council (DAC) is the **highest decision-making body in India for defence procurement**.

Feature	Details
Established	2001
Headed by	Defence Minister of India
Role	Approves capital acquisitions for armed forces
Objective	Ensure timely procurement, optimal budget utilisation, and modernisation of defence forces

DAC functions under the **Ministry of Defence** and operates through the **Defence Acquisition Procedure (DAP)**.

2. Boeing P-8I Aircraft

The **Boeing P-8I Poseidon** is a **Long Range Maritime Reconnaissance and Anti-Submarine Warfare (LRMR-ASW) aircraft** used by the **Indian Navy** for maritime surveillance and combat missions.

Aspect	Details
Manufacturer	Boeing (USA)
Service	Indian Navy
Variant	Customised version of P-8A Poseidon used by the US Navy
Role	Maritime reconnaissance, anti-submarine warfare, intelligence and surveillance

3. Key Mission Roles

Anti-Submarine Warfare (ASW)

- Detects and tracks **enemy submarines** using advanced sensors and sonobuoys.

Anti-Surface Warfare (ASuW)

- Tracks and engages **surface ships and maritime threats**.

Intelligence, Surveillance and Reconnaissance (ISR)

- Provides **real-time maritime intelligence and monitoring**.

Maritime Patrol

- Ensures **security of sea lanes and Exclusive Economic Zone (EEZ)**.

4. Advanced Systems and Capabilities

System	Function
Advanced Radar	Detects ships and submarines over long distances
Sonobuoys	Underwater acoustic sensors for submarine detection
Magnetic Anomaly Detector (MAD)	Detects metal objects such as submarines underwater
Electronic Warfare Systems	Counter enemy radar and missile threats

Weapons Capability

- Torpedoes
- Anti-ship missiles
- Depth charges

UPSC Mains Question

“Maritime surveillance and anti-submarine warfare capabilities are crucial for securing India’s strategic interests in the Indian Ocean Region.” Discuss the role of advanced maritime patrol aircraft such as the P-8I in strengthening India’s naval capabilities. (15 marks)

38. 📡 Air-Ship Based High-Altitude Pseudo Satellite (AS-HAPS) for Persistent Surveillance



The Defence Acquisition Council (DAC) has granted Acceptance of Necessity (AoN) for the procurement of Air-Ship Based High-Altitude Pseudo Satellites (AS-HAPS) for the Indian Air Force. These platforms act as pseudo-satellites, providing long-duration surveillance and communication capabilities without requiring rocket launches.

1. What are High-Altitude Pseudo Satellites (HAPS)?

High-Altitude Pseudo Satellites (HAPS) are solar-powered unmanned aerial platforms operating in the stratosphere (about 18–20 km above Earth) that provide satellite-like services such as surveillance, communication, and remote sensing.

- Called “pseudo satellites” because they perform satellite-like functions while operating within the atmosphere.
- Unlike satellites, they do not require rockets for launch.

2. Operational Concept

Feature	Explanation
Altitude	Operates in the stratosphere (~18–20 km) above commercial aircraft routes
Power Source	Solar panels during the day
Energy Storage	High-density batteries power operations at night
Endurance	Can remain airborne for months or even years
Coverage	Provides persistent regional monitoring

3. Key Applications of HAPS

Military Uses

- **Intelligence, Surveillance and Reconnaissance (ISR)**
- **Electronic Intelligence (ELINT)**
- Border monitoring
- Secure military communications

Communication Infrastructure

- Acts as a **“tower in the sky”**, extending communication networks over large areas.

Civilian Applications

- **Disaster management**
- **5G network extension**
- **Precision agriculture**
- **Environmental monitoring**

4. Why India Needs HAPS

Challenge	Explanation
Doklam Standoff (2017)	Highlighted need for continuous real-time surveillance near sensitive borders
Limited UAV Endurance	Conventional drones typically operate 24–48 hours
Satellite Limitations	Low Earth Orbit (LEO) satellites follow fixed orbital paths and cannot continuously monitor a single area
Large Border Length	India has ~15,000 km of land borders across difficult terrains such as mountains, deserts, and forests

HAPS can provide **persistent monitoring of strategic regions**.

UPSC Mains Question

“High-Altitude Pseudo Satellites (HAPS) represent an emerging class of aerial platforms bridging the gap between satellites and drones.” Examine their significance for military surveillance and communication infrastructure. (15 marks)

39. 📰 **AFR Satellite Demonstrates India’s First Private “In-Orbit Snooping”**



The **Aerospace First Runner (AFR)** satellite, developed by **Azista BST Aerospace**, has successfully demonstrated **“in-orbit snooping”** by tracking and imaging the **International Space Station (ISS)**. This marks the **first publicly reported instance of an Indian private satellite performing non-Earth orbital imaging**, enhancing India’s capabilities in **Space Situational Awareness (SSA)**.

1. What is In-Orbit Snooping? : In-orbit snooping, also called **Non-Earth Imaging (NEI)** or **Space-to-Space Imaging**, refers to the **capability of satellites to observe, track, and photograph other objects in space rather than the Earth**.

Applications

- Monitoring **space debris**
- Inspecting **satellites and spacecraft**
- Tracking **potential threats in orbit**
- Enhancing **space situational awareness**

2. Aerospace First Runner (AFR) Satellite

Feature	Details
Satellite Name	Aerospace First Runner (AFR)
Weight	~80 kg
Manufacturer	Azista BST Aerospace (ABA)
Ownership	Indo-German joint venture
Manufacturing Location	Ahmedabad, India
Launch Date	June 2023
Launch Vehicle	SpaceX Transporter-8 mission
Orbit	Sun-Synchronous Orbit (SSO)

3. Payload and Imaging Capabilities

Primary Payload

The satellite carries **wide-swath optical cameras** capable of capturing:

Imaging Type	Description
Panchromatic imagery	High-resolution black-and-white images
Multispectral imagery	Images captured across multiple spectral bands for environmental and resource analysis

These sensors enable **high-resolution remote sensing and orbital object imaging**.

4. Strategic Importance

Space Situational Awareness (SSA)

SSA refers to the **ability to monitor and track objects in Earth's orbit**, including:

- Operational satellites
- Space debris
- Potential hostile space assets

SSA is critical for **safe satellite operations and national security**.

Dual-Use Capability

The AFR satellite's **space-to-space imaging** has both:

Domain Use

Civilian Space debris monitoring, satellite inspection

Strategic Tracking adversary space assets and improving space security

UPSC Mains Question

"The increasing congestion of Earth's orbit has made Space Situational Awareness (SSA) a critical capability for modern spacefaring nations." Discuss the importance of SSA and the role of private sector satellites in strengthening India's space security. (15 marks)

40. Solar Cycle: Understanding the Sun's 11-Year Activity Rhythm



Researchers at IIT Kanpur have developed a **new data-driven model to predict solar cycles**, improving the ability to forecast periods of **high solar activity** that can affect **satellites, GPS systems, and power grids**.

1. What is a Solar Cycle?

A **solar cycle** is an approximately **11-year periodic variation in the Sun's magnetic activity**, reflected through changes in **sunspots, solar flares, and coronal mass ejections (CMEs)**.

- It represents the **rise and fall of solar magnetic activity**.
- Two solar cycles together (about **22 years**) form the **Hale Magnetic Cycle**, after which the Sun's magnetic polarity returns to its original orientation.

2. Mechanism Behind the Solar Cycle

Differential Rotation

The solar cycle is driven by **differential rotation of the Sun**.

Region Rotation Speed

Equator Rotates faster (~25 days)

Poles Rotate slower (~35 days)

This difference **twists and stretches the Sun's magnetic field lines**, generating magnetic disturbances and sunspots.

3. Phases of the Solar Cycle

Phase	Characteristics
-------	-----------------

Solar Minimum	Few sunspots, relatively calm solar activity
----------------------	--

Rising Phase	Gradual increase in sunspots and solar flares
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Solar Maximum	Peak activity with frequent solar storms
----------------------	--

Declining Phase	Activity gradually decreases
------------------------	------------------------------

4. Sunspots: Indicators of Solar Activity

Sunspots are:

- **Cooler and darker regions on the Sun's surface**
- Caused by **intense magnetic activity inhibiting convection**

They serve as the **primary indicator for measuring the solar cycle**.

Sunspot Distribution

Sunspots follow a characteristic pattern known as the **Butterfly Diagram**.

Pattern	Explanation
---------	-------------

Initial Appearance	Sunspots appear at higher latitudes (~30°)
--------------------	---

Migration	Gradually move toward the equator as the cycle progresses
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5. Magnetic Pole Reversal

- During **solar maximum**, the **Sun's magnetic poles reverse polarity**.

- This reversal happens **once every 11 years**.
- It takes **two solar cycles (22 years)** for the magnetic orientation to return to its original state.

6. Impacts of Solar Cycles

Space Weather Effects

High solar activity can produce **geomagnetic storms**.

Impact Area	Effects
Satellites	Signal disruptions and orbital damage
GPS Systems	Navigation errors
Power Grids	Electrical grid disturbances
Astronaut Safety	Increased radiation exposure

Natural Phenomena

- Intensified **auroras (Northern and Southern Lights)**.

Climate Influence

Solar cycles may have **limited but measurable effects on Earth's climate patterns** through variations in solar radiation.

UPSC Mains Question

"Solar cycles influence both space weather and technological systems on Earth." Discuss the mechanism of solar cycles and their potential impacts on modern infrastructure. (15 marks)

41. 📰 Predicting Lethal Moist Heatwaves During the Monsoon



A recent study has identified **predictable atmospheric patterns that trigger lethal moist heatwaves during India's Southwest Monsoon**, enabling forecasts **up to four weeks in advance**. The findings can significantly improve **early-warning systems and climate adaptation strategies**.

1. What are Moist Heatwaves?

A **moist heatwave** is an extreme weather condition where **high temperatures combine with high humidity**, making it difficult for the human body to cool itself.

Key Characteristics

- High **temperature + humidity**
- Reduced **evaporation of sweat**
- Increased **risk of heat-related illnesses**

This combination makes moist heatwaves **more dangerous than dry heatwaves**.

2. Role of Boreal Summer Intraseasonal Oscillation (BSISO)

The **Boreal Summer Intraseasonal Oscillation (BSISO)** is a **large-scale atmospheric circulation system** affecting **South and Southeast Asia during the summer monsoon**.

Key Features

Feature	Description
---------	-------------

Cycle Duration	30–90 days
Geographic Influence	South Asia and Southeast Asia
Role in Monsoon	Controls active and break phases of the monsoon

3. Monsoon Phases and Heatwave Patterns

Monsoon Phase **Moist Heatwave Risk**

Active Phase (heavy rainfall) Higher risk in **northern and northwestern India**

Break Phase (dry conditions) Higher risk in **southern and eastern India**

Thus, **monsoon variability strongly influences heatwave occurrence.**

4. Wet-Bulb Temperature (WBT)

Definition

Wet-Bulb Temperature (WBT) is the **lowest temperature air can reach through evaporation of water at constant pressure.**

It represents the **combined effect of temperature and humidity on human heat stress.**

Critical Threshold

WBT Level **Impact**

~35°C Upper physiological limit of human survivability

Above 35°C Body can no longer cool itself through sweating

5. Health Impacts of Moist Heatwaves

Condition **Description**

Hyperthermia Abnormally high body temperature

Heat Exhaustion Weakness, dizziness, dehydration

Heatstroke Life-threatening condition due to failure of body temperature regulation

High humidity **prevents sweat evaporation**, increasing the risk of **fatal heat stress.**

6. Significance for Climate Adaptation

Early Warning Systems

Forecasting moist heatwaves **up to four weeks in advance** can help governments prepare.

Public Health Preparedness

- Emergency medical services
- Heat action plans

Disaster Risk Reduction

- Protect **vulnerable populations**
- Improve **urban heat mitigation strategies**

UPSC Mains Question

“Extreme heat combined with humidity poses severe health risks in tropical regions.” Examine the concept of moist heatwaves and discuss how improved forecasting can support climate adaptation strategies in India. (15 marks)

42. ⚡ Heatwaves and Lightning May Be Declared National Disasters



The 16th Finance Commission has recommended that **heatwaves and lightning** be included in India's list of nationally notified disasters. This would enable better access to disaster relief funds and strengthen preparedness against **climate-driven extreme weather events**.

1. What are Notified National Disasters?

Notified national disasters are disasters officially recognised under the Disaster Management Act, 2005, making them eligible for structured financial relief and response mechanisms.

Current List

India currently recognises **12 major disasters**, including:

- Cyclones, Floods, Droughts, Earthquakes, Landslides, Cloudbursts, Cold waves, Tsunami
- Avalanches, Pest attacks, Hailstorms, Urban floods

2. Disaster Relief Funding Mechanism

Two-Tier Disaster Relief System

Fund	Level	Purpose
State Disaster Response Fund (SDRF)	State level	Immediate disaster relief and response
National Disaster Response Fund (NDRF)	Central level	Additional support when disasters exceed state capacity

Funding Pattern

Region	Centre-State Sharing
General States	75 : 25
North-East & Himalayan States	90 : 10

Sequential Use

1. States first utilise **SDRF resources**.
2. If the disaster magnitude exceeds state capacity, **NDRF assistance** can be requested.

3. Why Include Heatwaves as National Disasters?

Rising Temperature Extremes

- **2024 was India's warmest year since 1901.**
- Temperatures crossed **50°C in parts of Delhi and Rajasthan.**

Increasing Frequency

- **446 heatwave days recorded in 2024**, the highest since 2000.

Rising Mortality

- **3,798 deaths from heat and heatwaves (2018–2022).**

Funding Constraints

- States could use **only 10% of SDRF funds for heatwave relief**, limiting response capacity.

4. Why Include Lightning as a National Disaster?

Sharp Increase in Lightning Events

- Lightning strikes increased by **nearly 400% between 2019 and 2025.**

Major Cause of Disaster Deaths

- Lightning accounts for **over 35% of natural disaster-related deaths in India** (NCRB data).

Sudden High Casualties

- Example: Bihar recorded nearly 100 lightning deaths in a single week in April 2025.

5. Significance of the Recommendation

Improved Disaster Relief

- Enables formal relief compensation and rehabilitation support.

Climate Change Adaptation

- Recognises heatwaves as climate-driven disasters.

Better Preparedness

- Encourages early warning systems, heat action plans, and lightning detection networks.

Protection of Vulnerable Groups

- Particularly important for:
 - Outdoor workers
 - Farmers
 - Urban poor

UPSC Mains Question

“Climate change is increasing the frequency and intensity of extreme weather events in India.”
Examine the need to classify heatwaves and lightning as nationally notified disasters. (15 marks)

43. 🚀 AIM SUMVAAD: Strengthening India’s Startup Incubation Ecosystem



The Atal Innovation Mission (AIM) organised AIM SUMVAAD, its annual national incubator conclave, in New Delhi. The event brought together over 100 incubators, industry leaders, and policymakers, and witnessed the launch of the National Incubator Assessment Framework to benchmark incubator performance across India.

1. What is AIM SUMVAAD?

AIM SUMVAAD is an annual national platform organised by the Atal Innovation Mission to bring together stakeholders of India’s startup incubation ecosystem.

Purpose

- Align policy, institutional capacity, and industry partnerships.
- Strengthen the quality and effectiveness of startup incubators.
- Promote collaboration between government, academia, and industry.

Key Outcomes

Achievement	Details
Incubators Established	100+ incubators supported
Startups Supported	5,000+ startups
Employment Generated	50,000+ jobs

2. National Incubator Assessment Framework

A digital platform launched during the conclave to **benchmark incubator performance in India**.

Objectives

- Standardise **evaluation metrics for incubators**
- Promote **best practices and transparency**
- Strengthen the **startup ecosystem through data-driven assessment**

3. Atal Innovation Mission (AIM)

Overview

Feature	Details
Launch Year	2016
Implementing Agency	NITI Aayog
Objective	Build a culture of innovation and entrepreneurship across India

AIM focuses on **innovation development at multiple levels**:

- Schools, Universities, Startups, MSMEs, Industry

AIM 2.0

- Launched in **2024**
- Expands innovation infrastructure and ecosystem support
- Programme extended until **2028**

4. Key Pillars of Atal Innovation Mission

Initiative	Focus
Atal Tinkering Labs (ATL)	Innovation labs in schools (Grades 6-12) promoting STEM learning
Atal Incubation Centres (AIC)	Startup incubators in universities and industry institutions
Atal Community Innovation Centres (ACIC)	Innovation hubs in underserved and rural regions
Atal New India Challenges (ANIC)	Grants up to ₹1 crore for startups solving national challenges
ARISE-ANIC	Promotes innovation in MSMEs with government ministries
Language Inclusive Program for Innovation (LIPI)	Supports innovation ecosystems in all 22 scheduled languages

UPSC Mains Question

"A strong innovation ecosystem is essential for sustaining economic growth in the knowledge economy." Examine the role of the Atal Innovation Mission in promoting innovation and entrepreneurship in India. (15 marks)

44. 📰 ₹1 Lakh Crore RDI Fund Launched to Boost Deep-Tech Innovation



The Technology Development Board (TDB) has launched the **first open call for the Research, Development and Innovation (RDI) Fund**. The fund aims to accelerate the **commercialisation of indigenous research and deep-tech innovation**, with project proposals accepted **year-round through the TDB RDI Portal**.

1. What is the Research, Development and Innovation (RDI) Fund?

The RDI Fund is a ₹1 lakh crore financial mechanism created to support the **transition of research from laboratories to commercial markets**.

- Operates as a **Special Purpose Fund (SPF)** under the **Anusandhan National Research Foundation (ANRF) Act, 2023**.
- Implemented by the **Department of Science & Technology (DST)**.

Key Objective

To catalyse **private investment and commercialise indigenous research**, particularly in **deep-tech and emerging technologies**.

2. Key Features of the RDI Fund

Feature	Details
Financial Corpus	₹1 lakh crore
Implementation Period	5–6 years
Application Mode	Rolling application (24/7 submission)
Funding Limit	Up to 50% of project cost
Private Sector Role	Remaining 50% funded by industry partners
Funding Instruments	Equity investments or concessional long-term loans
Grants	Not permitted , ensuring commercial accountability

3. Technology Readiness Focus

The fund prioritises **Technology Readiness Level (TRL) 4 and above**.

Technology Readiness Levels

TRL Level Stage

TRL 1–3 Basic research and concept development

TRL 4–6 Prototype development and validation

TRL 7–9 Commercialisation and deployment

Thus, the fund focuses on **scaling technologies rather than basic research**.

4. Two-Tier Fund Management Structure

Tier Role

Tier 1 Policy oversight and capital allocation through **Special Purpose Fund (SPF) under ANRF**

Tier 2 Project evaluation and financing through **Second-Level Fund Managers (SLFMs)**

Second-Level Fund Managers

- **Technology Development Board (TDB)**
- **Alternative Investment Funds (AIFs)**
- **Non-Banking Financial Companies (NBFCs)**
- **BIRAC (Biotechnology Industry Research Assistance Council)**

5. Strategic Focus Areas

The RDI Fund prioritises “**sunrise sectors**” critical to future technologies:

Sector	Examples
Deep-Tech	Robotics, advanced materials
Quantum Computing	Quantum algorithms and hardware
Artificial Intelligence	AI and machine learning platforms
Clean Energy	Hydrogen technologies, energy storage

A large portion will function as a **Fund of Funds to support deep-tech startups with long development cycles.**

6. Technology Development Board (TDB)

Feature	Details
Established	1996
Legal Basis	Technology Development Board Act, 1995
Administrative Ministry	Department of Science & Technology (DST)
Mandate	Promote commercialisation of indigenous technologies

TDB acts as a **Second-Level Fund Manager (SLFM)** under the RDI Fund structure.

UPSC Mains Question

“The lack of financing for scaling emerging technologies often creates a ‘valley of death’ between research and commercialisation.” Examine how the Research, Development and Innovation (RDI) Fund can address this gap in India’s innovation ecosystem. (15 marks)

45. 📰 Proposal for an Indian Scientific Service (ISS) for Expert-Led Policymaking



Amid rising **technological complexity in governance**, experts have proposed the creation of an **Indian Scientific Service (ISS)** to ensure **evidence-based policymaking**. The idea seeks to institutionalise **scientific expertise within government decision-making structures**, especially in domains like **AI, biotechnology, climate science, and nuclear policy**.

1. What is the Proposed Indian Scientific Service (ISS)?

The **Indian Scientific Service (ISS)** is a proposed specialised civil service cadre of scientists and technical experts to support **science-driven policymaking and governance**.

Objective

- Integrate **scientific expertise directly into policy formulation**.
- Bridge the gap between **scientific research and public policy implementation**.

2. Current Framework of Scientific Governance

Issue	Explanation
Generalist Dominance	Many scientific departments are headed by IAS officers , sometimes lacking domain expertise
Fragmented Recruitment	Scientists are recruited separately by institutions like CSIR, ISRO, DRDO , without a unified cadre
Restrictive Conduct Rules	Scientists operate under CCS (Conduct) Rules, 1964 , prioritising administrative discipline
Reactive Scientific Role	Science is often used for crisis response rather than long-term policymaking
Limited Career Mobility	Scientists face administrative ceilings , limiting decision-making authority

UPSC Mains Question

“The increasing technological complexity of governance requires greater integration of scientific expertise in policymaking.” Critically examine the proposal for creating an Indian Scientific Service (ISS) in India. (15 marks)

46. 📰 LIGO-India Observatory to Boost India's Gravitational Wave Research



Engineering major **Larsen & Toubro (L&T)** has secured the contract to construct **LIGO-India**, the country's first **Laser Interferometer Gravitational-Wave Observatory**, in **Maharashtra**. The project will make India part of the **global gravitational-wave detection network**, strengthening astrophysics research and high-precision scientific manufacturing.

1. What is LIGO-India?

LIGO-India is a major **international scientific collaboration** aimed at detecting **gravitational waves** using a highly sensitive **laser interferometer**.

Core Design

- Consists of **two long perpendicular (L-shaped) vacuum tunnels**.
- Laser beams travel through these arms and detect extremely small distortions in space caused by gravitational waves.
- Capable of measuring changes **thousands of times smaller than the width of a proton**.

Location

- **Hingoli district, Maharashtra** (approved site).

2. Institutional Collaboration

Institution	Role
Department of Atomic Energy (DAE)	Project leadership
Department of Science & Technology (DST)	Scientific coordination
National Science Foundation (USA)	International partner

Key Indian Institutions

- Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune
- Institute for Plasma Research (IPR), Gujarat
- Raja Ramanna Centre for Advanced Technology (RRCAT), Indore

3. Global Gravitational-Wave Observatory Network

Observatory	Country
LIGO Hanford Observatory	USA
LIGO Livingston Observatory	USA
Virgo Detector	Italy
KAGRA Observatory	Japan
LIGO India (Upcoming)	India

Adding an observatory in India improves **triangulation accuracy for locating cosmic events**.

4. What are Gravitational Waves?

Gravitational waves are **ripples in spacetime** produced by extremely energetic cosmic events.

Causes

- Colliding **black holes**

- Merging **neutron stars**
- Supernova explosions

They carry **direct information** about the structure of the universe and gravity.

Scientific Prediction

- Predicted in 1916 by **Albert Einstein** through the **General Theory of Relativity**.

Discovery

- First detected in 2015 by the **LIGO observatories** in the **United States**.

5. Significance of LIGO-India

Advancing Astrophysics Research

Will enable India to contribute to **cutting-edge gravitational-wave astronomy**.

Global Scientific Collaboration

Strengthens India's participation in **international big-science projects**.

Precision Engineering

Requires extremely advanced:

- Laser technology
- Ultra-high vacuum systems
- Precision optics

This boosts **high-tech manufacturing capability**.

Human Resource Development

Creates opportunities for **Indian scientists, engineers, and students** in frontier physics research.

UPSC Mains Question

"Big science projects such as LIGO-India demonstrate the importance of international collaboration in frontier scientific research." Discuss the significance of the LIGO-India project for India's scientific and technological development. (15 marks)

47. 🇮🇳 SATYA Portal Launched to Digitise Electronics Quality

Certification



The Ministry of Electronics and Information Technology (MeitY) launched the SATYA (STQC Automation Portal) in New Delhi to digitise and modernise the **testing, certification, and quality assurance services** for electronics and IT products in India.

1. What is the SATYA Portal?

SATYA (STQC Automation Portal) is a **digital platform** for laboratory automation and certification services offered by the **Standardisation Testing and Quality Certification (STQC) Directorate**.

Objective

- Digitise **testing and certification processes**
- Improve **efficiency, transparency, and accountability**
- Provide **faster quality certification services** for electronics and IT products

2. Key Features of the SATYA Portal

Feature	Description
Digital Workflow	Fully online submission, tracking, and certification processes
Laboratory Automation	Automated testing and evaluation workflows
Ticketing System	Online grievance redressal and query resolution
Transparency	Real-time monitoring of certification requests

The portal helps reduce **manual paperwork and delays in quality certification processes.**

3. Standardisation Testing and Quality Certification (STQC)

Aspect	Details
Organisation	Standardisation Testing and Quality Certification (STQC) Directorate
Ministry	Ministry of Electronics and Information Technology (MeitY)
Role	Quality assurance, testing, and certification for electronics and IT products
Function	Ensures security, reliability, and standard compliance of digital systems

Key Services

- Electronics product testing
- Cyber security certification
- Biometric device certification
- e-Governance quality assurance

4. Technology Partner

Institution	Role
Centre for Development of Advanced Computing (C-DAC)	Developed the SATYA digital platform

C-DAC is a premier R&D organisation under MeitY specialising in **high-performance computing and advanced IT technologies.**

UPSC Mains Question

“Digital platforms are transforming regulatory governance in India.” Examine the significance of initiatives like the SATYA Portal in improving transparency and efficiency in technology regulation. (10/15 marks)

48. 🦋 SUJVIKA Portal: AI Platform to Strengthen India's Bioeconomy



The Ministry of Science and Technology launched the SUJVIKA portal, an AI-driven biotechnology product data platform, on the 40th Foundation Day of the Department of Biotechnology (DBT). The portal aims to support data-driven decision-making in biotechnology manufacturing and innovation.

1. What is the SUJVIKA Portal?

SUJVIKA is an AI-enabled digital platform that provides structured data on biotechnology imports and product demand trends in India.

Objective

- Enable evidence-based policymaking in biotechnology
- Identify priority areas for domestic manufacturing
- Promote public-private partnerships (PPP) in biotech innovation

Development

- Developed by the Department of Biotechnology (DBT)
- In collaboration with Association of Biotechnology-Led Enterprises (ABLE).

2. Key Features of SUJVIKA

Feature	Description
AI-driven analytics	Uses data intelligence to analyse biotech product imports
Structured data repository	Provides detailed information on biotech products and demand patterns
Policy support tool	Helps policymakers identify sectors requiring domestic manufacturing
Industry collaboration	Encourages partnerships between government, research institutions and industry

3. Department of Biotechnology (DBT)

Feature	Details
Established	1986
Ministry	Ministry of Science & Technology
Mandate	Promote biotechnology research, innovation and commercialisation

Key Focus Areas

- Biopharmaceuticals
- Agricultural biotechnology
- Bioenergy
- Industrial biotechnology

4. India's Bioeconomy Landscape

Indicator	Data
Bioeconomy Size (2014)	\$10 billion

Indicator	Data
Bioeconomy Size (2026)	\$165.7 billion
Contribution to GDP	~4.25%
Biotechnology Startups	~50 (2014) → 13,000+ (2025)

India is now among the **fastest-growing biotechnology ecosystems globally**.

5. Policy Framework Supporting the Bioeconomy

BioE3 Policy

India has introduced the **BioE3 Policy (Biotechnology for Economy, Employment, and Environment)**.

Targets

Target	Timeline
\$300 billion bioeconomy	By 2030
\$1 trillion bioeconomy	By 2047

SUJVIKA supports these targets by enabling **data-driven biotech manufacturing strategies**.

UPSC Mains Question

“Biotechnology is emerging as a key driver of India’s knowledge economy.” Discuss the significance of digital platforms like the SUJVIKA portal in strengthening India’s bioeconomy ecosystem. (10/15 marks)

49. 🧑🏫 RailTech Policy & e-RCT Platform Launched to Modernise Indian Railways



The Ministry of Railways launched the **RailTech Policy & Portal** and the **e-Railway Claims Tribunal (e-RCT)** under the “52 Reforms in 52 Weeks” initiative. These reforms aim to **promote railway innovation, strengthen startup participation, and digitise railway litigation processes**.

What is the RailTech Policy?

The **RailTech Policy** is a framework designed to **promote indigenous innovation and technological solutions in Indian Railways** by encouraging participation from **startups, innovators, and private companies**.

RailTech Portal

A dedicated digital platform enabling structured collaboration between **Indian Railways and technology innovators**.

Key Features

Feature	Details
Startup Collaboration	Connects innovators and startups with railway problem statements
Grant-based Funding	Government funds up to 50% of development costs
Simplified Participation	Replaces complex tendering with a single submission portal
Technology Deployment	Encourages real-world pilot testing in railway operations

Priority Technology Areas

- **AI-based Elephant Intrusion Detection Systems (EIDS)** to prevent train-wildlife collisions
- **Drone-based rail fracture detection** for track monitoring
- Predictive maintenance technologies
- Smart safety and surveillance systems

e-Railway Claims Tribunal (e-RCT)

What is e-RCT?

The e-Railway Claims Tribunal (e-RCT) is an **AI-enabled digital platform** designed to **automate and streamline litigation related to railway claims**.

Key Functions

Feature	Description
Digital Filing	Claimants can file petitions online
Integrated System	Connects all 23 benches of the Railway Claims Tribunal
AI-enabled case management	Automates documentation and case processing
Remote Accessibility	Enables litigants to submit documents without travelling

Railway Claims Tribunal (RCT)

- Established under the **Railway Claims Tribunal Act, 1987**.
- Handles claims related to:
 - **Railway accidents**
 - **Compensation for death or injury**
 - **Loss or damage of goods during railway transport.**

"52 Reforms in 52 Weeks" Initiative

A reform programme launched by **Indian Railways** to implement **systematic institutional reforms across infrastructure, safety, governance, and digital services** within a fixed timeline.

UPSC Mains Question

"Technological innovation is increasingly transforming India's public infrastructure systems." Discuss the significance of the RailTech Policy in promoting innovation and safety in Indian Railways. (10/15 marks)

50. 🇮🇳 VoicERA: India Launches Open-Source Voice AI Stack on BHASHINI



On 18 February 2026, the Ministry of Electronics and Information Technology (MeitY) launched VoicERA, an open-source end-to-end Voice AI stack, during the India AI Impact Summit 2026. The platform has been deployed on the BHASHINI National Language Infrastructure to strengthen India's multilingual Digital Public Infrastructure (DPI).

1. What is VoicERA?

VoicERA (Voice-enabled Ecosystem for Real-time AI) is an open-source Voice AI technology stack designed to enable real-time multilingual voice interaction services at population scale.

Objective

- Expand India's language AI capabilities
- Enable voice-based digital services in multiple Indian languages
- Strengthen inclusive digital governance

2. Development & Collaboration

Institution	Role
Digital India BHASHINI Division	Lead implementing agency
EkStep Foundation	Technology partner
International Institute of Information Technology Bangalore (IIIT-B)	Research collaboration
AI4Bharat	Language AI research support
**Centre for Open Source Software	Open-source development support

3. Key Features of VoicERA

Feature	Description
Open-source architecture	Allows developers to build and customise applications
Modular and interoperable	Easily integrates with multiple platforms
Cloud & On-premise deployment	Enables secure and scalable deployment
Voice AI capability	Supports real-time speech recognition and conversational AI
Multilingual support	Enables voice services across many Indian languages

The platform moves beyond text translation to provide speech-based digital services.

4. Integration with BHASHINI

What is BHASHINI?

BHASHINI (Bhasha Interface for India) is a national digital language platform that supports AI-driven translation and speech technologies across Indian languages.

It is part of the Digital India Programme.

VoicERA's Role

- Creates a national execution layer for voice and language AI

- Enables **real-time speech-to-speech communication systems**

UPSC Mains Question

“Language technologies are essential for inclusive digital governance in a linguistically diverse country like India.” Discuss the significance of initiatives such as VoicERA and BHASHINI in achieving digital inclusion. (10/15 marks)

51. 🗝️ Global CyberPeace Summit 2026: Strengthening Digital Trust & Cyber Resilience



The **Global CyberPeace Summit 2026** was held on 8–9 February 2026 at the **United Services Institution of India (USI), New Delhi**, ahead of **Safer Internet Day (10 February)**. The summit focused on **enhancing cyber resilience, digital safety, and global cooperation in cybersecurity**.

1. What is the Global CyberPeace Summit?

The **Global CyberPeace Summit** is an international platform bringing together stakeholders from across sectors to **promote safe, secure, and resilient cyberspace**.

Participants

The summit convened representatives from:

- Policymakers
- Law enforcement agencies
- Defence personnel
- Technology companies
- Academia
- Civil society organisations
- Digital citizens

Core Principle

Cybersecurity is a **shared responsibility involving governments, industry, institutions, and individual users**.

2. Key Themes of the Summit

Day 1: Cyber Resilience as a People-Centric Issue

Focus areas included:

Theme	Focus
Digital Expansion	Growing digital footprint in governance, business and everyday life
Cyber Resilience Framework	Launch of the Global CyberPeace Summit framework
Technical Discussions	Malware analysis, protection of critical infrastructure, and industrial control systems

The discussions emphasised that **cyber threats now impact national security, economic systems, and social stability**.

Day 2: Operationalising Trust & Safety

Key focus areas included:

Area	Description
Capacity Building	Training for children, parents, first responders and cybersecurity professionals
CyberPeace Tech Sessions	Showcasing AI-driven cybersecurity solutions
Innovation Platforms	Buildathons promoting solutions for digital safety and trust

These initiatives aim to improve **digital literacy and cybersecurity preparedness**.

3. Key Concepts Highlighted

Cyber Resilience

The ability of **digital systems, institutions, and societies to withstand, recover from, and adapt to cyber threats**.

Critical Infrastructure Protection

Safeguarding essential systems such as:

- Power grids
- Financial networks
- Telecommunications
- Transportation systems

Industrial Control Systems (ICS)

Specialised computing systems used to control **industrial operations like manufacturing plants, energy grids, and water supply systems**.

UPSC Mains Question

“Cyber resilience is becoming a critical component of national security in the digital age.” Discuss the importance of collaborative initiatives such as the Global CyberPeace Summit in strengthening cybersecurity governance. (15 marks)

52. 🏛️ Copyright vs AI: Rebalancing India’s Intellectual Property Regime



The debate on reforming copyright laws in the era of Artificial Intelligence resurfaced during the India AI Impact Summit 2026. Experts highlighted that **rigid copyright provisions in India may restrict access to knowledge, AI innovation, and digital technology development**.

1. India’s Current Copyright Framework

Legal Basis

India’s copyright regime is governed by the **Copyright Act, 1957**, which protects **original literary, artistic, musical and dramatic works, cinematograph films and sound recordings**.

Key Features

Provision	Description
Copyright Protection	Exclusive rights to reproduce, distribute, communicate and adapt works
Duration of Protection	Lifetime of the author + 60 years after death
Fair Dealing (Section 52)	Limited exceptions for research, criticism, review and reporting of current events
Digital Update	The Copyright (Amendment) Act, 2012 exempted temporary digital copies (e.g., browsing, caching) from infringement

Global Compliance

India follows the **Berne Convention for the Protection of Literary and Artistic Works**, which grants **automatic copyright protection without formal registration**.

2. Key Challenges in the AI Era

Challenge	Explanation
Knowledge Access Barriers	Long protection period delays entry of works into the public domain
Rigid Legal Exceptions	Closed-list fair dealing provisions restrict judicial flexibility
AI Training Uncertainty	Copyright law does not clearly address algorithmic data processing or AI training
Economic Burden	High licensing costs affect education and research institutions
Accessibility Issues	Strict enforcement discourages development of assistive technologies for persons with disabilities

3. Marrakesh Treaty and Accessibility

Overview

The **Marrakesh Treaty**, adopted in **2013 under the World Intellectual Property Organization (WIPO)**, requires countries to provide **copyright exceptions for visually impaired persons**.

Key Provisions

Provision	Details
Accessible Format Conversion	Allows conversion of works into formats such as DAISY audiobooks
Cross-border Exchange	Enables sharing of accessible materials between countries
Indian Ratification	India became the first country to ratify the treaty in 2014

This treaty improves **educational access for visually impaired individuals**.

4. Proposed Reforms for AI-era Copyright

Text and Data Mining (TDM) Exception

Allow AI systems to **train on copyrighted data without infringement claims**.

Safe Harbour for Public Data

Provide legal protection for **government-curated datasets and open-access platforms**.

Flexible Fair Use Doctrine

Shift from a **closed list of exceptions to an open-ended fair use system**, enabling courts to adapt to emerging technologies.

Dispute Resolution Reform

Create **specialised tribunals or fast-track mechanisms** for copyright disputes involving AI technologies.

Global Cooperation

Use global platforms like the **AI Impact Summit** to advocate **balanced international copyright standards**.

UPSC Mains Question

“The rise of Artificial Intelligence is challenging traditional intellectual property frameworks.” Examine the need for reforming India’s copyright laws to balance innovation, access to knowledge, and creators’ rights. (15 marks)

53. 🗞️ “Technology Services – Reimagination Ahead”: India’s AI-Led Tech Sector Roadmap



The NITI Aayog’s Frontier Tech Hub released a 10-year roadmap titled “Technology Services - Reimagination Ahead”, outlining how India’s technology sector can transition from a **labour-arbitrage outsourcing model to an AI-native, IP-driven ecosystem**.

1. What is the “Technology Services - Reimagination Ahead” Roadmap?

It is a **strategic blueprint for transforming India’s technology services sector** to remain competitive in the era of **Artificial Intelligence and digital transformation**.

Key Objective

Scale India’s technology services industry from **\$265 billion today to \$750–850 billion by 2035**, supporting the national vision of **Viksit Bharat 2047**.

2. Background: India’s Technology Services Model

India’s IT sector historically grew through the **labour-arbitrage model**, where global firms outsourced services to India due to:

- Lower labour costs
- Large skilled workforce
- English-language proficiency

However, **AI automation and global competition** are reducing the advantage of purely labour-based outsourcing.

3. Key Growth Levers Identified in the Roadmap

Priority Area	Focus
Agentic AI	Autonomous AI systems capable of decision-making and complex task execution
Software & Products	Development of proprietary technology platforms and products
Digital Infrastructure	Expansion of data centres, cloud systems and digital platforms
Innovation-led Engineering	Advanced R&D in sectors such as semiconductors, robotics and electronics
India-for-India Solutions	Digital technologies designed for domestic sectors like agriculture, healthcare and governance

4. Infrastructure Targets

Data Centre Capacity Expansion

Indicator	Target
Current Data Centre Growth	Rapid expansion due to AI demand
Target Capacity	10 GW of data centre capacity by 2030

This capacity is essential to support:

- AI computing
- Cloud services
- Big data analytics

5. Policy Recommendations

Government-Industry Collaboration

Encourage cooperation between **technology firms, startups, and government institutions.**

Enterprise AI Adoption

Promote widespread use of **AI solutions across industries.**

Intellectual Property Development

Increase **investment in domestic IP creation** to reduce dependence on foreign technologies.

Regulatory Predictability

Ensure **stable policy frameworks for technology investment and innovation.**

UPSC Mains Question

“The future of India’s technology sector lies in shifting from labour-arbitrage outsourcing to innovation-led growth.” Examine the significance of the ‘Technology Services - Reimagination Ahead’ roadmap in achieving this transition. (15 marks)

54. ● Science Based Targets Initiative (SBTi): Aligning Corporate Climate Action with Paris Goals



The Science Based Targets initiative (SBTi) is expanding engagement with India's private sector to encourage companies to adopt science-based emission reduction targets aligned with the Paris Climate Agreement.

1. What is the Science Based Targets Initiative (SBTi)?

The Science Based Targets initiative (SBTi) is a global framework that helps businesses set greenhouse gas (GHG) reduction targets consistent with climate science and the goals of the Paris Agreement.

Core Objective

Mobilise the private sector to reduce emissions and transition towards net-zero economies.

Establishment

- Founded in 2015
- Now operates as an independent UK-based charity

2. Founding Organisations

Organisation	Role
CDP (formerly Carbon Disclosure Project)	Climate disclosure platform
United Nations Global Compact	Corporate sustainability initiative
World Resources Institute (WRI)	Climate policy research
World Wide Fund for Nature (WWF)	Global environmental NGO

3. Key Principles of SBTi

Mitigation Hierarchy

Companies must prioritise deep emission reductions before relying on carbon offsets.

Near-Term Targets

Participating firms must establish 5-10 year emission reduction targets.

Net-Zero Standard

To claim net-zero, companies must:

Requirement	Condition
-------------	-----------

Emission Reduction	Reduce absolute emissions by at least 90% by 2050
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Residual Emissions	Remaining ~10% neutralised through carbon removal technologies
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4. Emission Accounting Framework

SBTi requires companies to measure emissions across three scopes defined under the Greenhouse Gas Protocol.

Scope	Description
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Scope 1	Direct emissions from company-owned operations
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Scope 2	Indirect emissions from purchased electricity, heating or cooling
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Scope 3	Value-chain emissions including suppliers and product use
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Scope 3 emissions often represent **the largest share of corporate carbon footprints**.

UPSC Mains Question

“Corporate climate commitments are increasingly shaping global climate governance.” Discuss the role of initiatives like the Science Based Targets Initiative (SBTi) in accelerating private sector climate action. (10/15 marks)

55. 🌱 Davos Compact on AMR 2025: Global Push to Fight Drug Resistance



The World Economic Forum (WEF) launched the **Davos Compact on Antimicrobial Resistance 2025** to mobilise private sector, civil society and research institutions against the growing threat of **Antimicrobial Resistance (AMR)**.

1. What is the Davos Compact on AMR 2025?

The **Davos Compact on AMR** is a **voluntary global initiative involving non-state actors** aimed at combating drug-resistant infections.

Role

- Serves as a **non-state counterpart to the UNGA Political Declaration on AMR 2024**.
- Encourages **corporations, research organisations, and philanthropies** to support global AMR action.

Key Targets

Target	Goal
Lives Saved	Prevent 100 million deaths linked to AMR
Economic Impact	Mitigate a projected \$1.7 trillion global economic loss by 2050

2. Implementation Mechanism

Unified Coalition for the AMR Response (UCARE)

The **Unified Coalition for the AMR Response (UCARE)** functions as the **implementation arm of the compact**.

Four Strategic Pillars

Pillar	Focus Area
Innovation	Development of new antibiotics and diagnostic tools
Awareness	Public advocacy and policy engagement
Agri-Food	Reduction of antibiotic use in livestock and agriculture
Funding	Mobilisation of private and philanthropic investment

3. One Health Framework

The compact adopts the **One Health approach**, which recognises the interconnection between:

- **Human health**

- **Animal health**
- **Environmental health**

This approach is essential because antimicrobial resistance often emerges through **agricultural use of antibiotics and environmental contamination**.

4. Additional Key Commitments

Commitment	Description
Equitable Access	Ensure affordable access to new and existing antibiotics in LMICs
Pollution Control	Reduce antimicrobial waste discharge from pharmaceutical manufacturing
Global Coordination	Strengthen international collaboration in surveillance and drug development

5. Antimicrobial Resistance (AMR)

Definition

Antimicrobial Resistance (AMR) occurs when **microorganisms such as bacteria, viruses, fungi and parasites evolve to resist medicines**, making infections harder to treat.

Key Drivers

Driver	Explanation
Overuse in human medicine	Unnecessary prescriptions and improper use
Agricultural use	Antibiotics used for livestock growth and disease prevention
Environmental contamination	Pharmaceutical waste entering ecosystems

Impact

- Increased mortality
- Longer hospital stays
- Rising healthcare costs

Global Projections

- **39 million deaths projected between 2025–2050** due to AMR.

6. Regional Risk Zones

The compact identifies **South Asia and Sub-Saharan Africa** as major AMR hotspots due to:

- High population density
- High antibiotic consumption
- Limited healthcare infrastructure

UPSC Mains Question

“Antimicrobial resistance is one of the most serious threats to global health, food security and development.” Examine the importance of international initiatives such as the Davos Compact on AMR in addressing this challenge. (15 marks)

56. 🌐 America–India Connect (AIC): Subsea Cable Push to Make India an AI Infrastructure Hub



At the India AI Impact Summit 2026, Sundar Pichai, CEO of Google, announced the America–India Connect (AIC) initiative to strengthen India’s AI-ready digital infrastructure and global data connectivity.

1. What is the America–India Connect (AIC) Initiative?

The America–India Connect (AIC) initiative is a major subsea cable connectivity project designed to enhance India’s global data network capacity.

Investment Plan

- Part of Google’s \$15 billion investment plan.
- Goal: Position India as a global AI infrastructure hub within five years.

2. New Subsea Cable Landing Station

Landing Station Status

Mumbai Existing

Chennai Existing

Visakhapatnam New landing station under AIC

Visakhapatnam will become India’s third international subsea cable landing hub.

3. Proposed Subsea Cable Corridors

Corridor Connectivity Route

India–South Africa Corridor Visakhapatnam & Chennai → Africa → American East Coast

India–Singapore Corridor Visakhapatnam → Singapore → American West Coast

India–Australia Corridor Mumbai → Western Australia → American West Coast

These corridors will connect India to the global internet backbone through multiple fibre-optic routes.

4. Supporting Subsea Cable Systems

The new corridors will complement existing cable systems such as:

Cable System Region Connected

Blue India–Europe

Raman India–Middle East–Europe

Sol India–US connectivity

This diversification improves global internet resilience and capacity.

5. Significance of the AIC Initiative

Strengthening Digital Infrastructure

Enhances India’s international data bandwidth capacity needed for AI, cloud computing, and big data.

Geographic Redundancy

Multiple cable routes reduce risks from **maritime chokepoints** such as the Red Sea.

AI Ecosystem Support

AI workloads require **low latency and high bandwidth**, which subsea cables enable.

Bridging the Global AI Divide

Improved connectivity allows **developing countries to participate in AI-driven digital economies**.

UPSC Mains Question

“Digital infrastructure is becoming a strategic asset in the global AI economy.” Examine the importance of initiatives such as the America-India Connect project in strengthening India’s role in the global digital ecosystem. (15 marks)

57. 🇮🇳 India Expands Global AI Partnerships at India AI Impact Summit 2026



The **India AI Impact Summit 2026** became a major diplomatic platform where India strengthened **bilateral partnerships in Artificial Intelligence, trade, and strategic technologies** with several countries across **Europe and the Gulf region**.

1. Strategic Context

The summit showcased **AI diplomacy**, where emerging technologies are increasingly shaping **international partnerships, economic cooperation, and technological alliances**.

India used the summit to expand collaboration in areas such as:

- Artificial Intelligence
- Digital infrastructure
- Defence manufacturing
- Trade and investment
- Semiconductor and green technology ecosystems

2. Key Bilateral Engagements

India-France

Area **Development**

Innovation Year Launch of **2026 India-France Year of Innovation**

Medical AI Establishment of the **Franco-Indian Centre for AI in Health**

Institutions Involved

- AIIMS New Delhi
- Sorbonne University
- Paris Brain Institute

The engagement strengthens the **India-France Special Global Strategic Partnership**.

India-United Arab Emirates

Area	Development
Supercomputing	Agreement between Centre for Development of Advanced Computing (C-DAC) and G42 to deploy an 8-exaflop supercomputer cluster
Financial Services	Abu Dhabi National Insurance Company opened an office in **GIFT City, Gujarat

This strengthens the **India-UAE economic corridor and digital partnership**.

India-Spain

Area	Development
Maritime Security	Spain joined the Indo-Pacific Oceans Initiative (IPOI)
Defence Manufacturing	Progress reviewed in the Tata-Airbus C-295 aircraft manufacturing facility in Vadodara

India-Finland

Area	Development
Trade Target	Commitment to double trade under the India-EU Free Trade Agreement
Technology Cooperation	Collaboration in 6G, biofuels, and circular economy technologies

India-Estonia

Area	Development
Economic Integration	Strengthening ties through the India-EU FTA framework
AI Cooperation	Estonia's AI Leap Programme aligned with India's AI initiatives

India-Switzerland

Area	Development
AI Governance	Invitation for India to join the Council of Europe's AI Convention
Trade Partnership	Implementation discussions on India-EFTA Trade and Economic Partnership Agreement (TEPA)

India-Greece

Area	Development
Connectivity	Expansion of cooperation in the India-Middle East-Europe Economic Corridor (IMEC)
Strategic Cooperation	Collaboration in defence, maritime shipping and skilled mobility

India-Netherlands

Area	Development
AI Diplomacy	Bridging the AI development gap between Global North and South

Area	Development
Technology Cooperation	Partnership in semiconductors, water management and green hydrogen

UPSC Mains Question

“Emerging technologies such as Artificial Intelligence are increasingly shaping international diplomacy.” Discuss the role of AI cooperation in strengthening India’s bilateral relations with global partners. (15 marks)

58. 🇮🇳 New Delhi Declaration on AI Impact: Global Framework for Inclusive Artificial Intelligence



The **India AI Impact Summit 2026** concluded with the adoption of the **New Delhi Declaration on AI Impact**, endorsed by **89 countries and international organisations**, including the **United States, China, and the United Kingdom**. The declaration establishes a **voluntary global framework for using Artificial Intelligence as a shared global good**.

1. What is the New Delhi Declaration on AI Impact?

The **New Delhi Declaration** is a **non-binding international framework** aimed at promoting **equitable access, responsible development, and global cooperation in Artificial Intelligence**.

Guiding Philosophy

The framework draws inspiration from the principle:

“Sarvajan Hitaya, Sarvajan Sukhaya”

(Welfare of all, Happiness of all)

This emphasises **inclusive and equitable access to AI technologies**.

2. Seven “Chakras” Framework

The declaration is structured around **seven core pillars (Chakras)** guiding global AI governance.

Chakra	Objective
Democratise Resources	Ensure equitable access to computing resources and data
Foster Social Good	Use AI for developmental and public welfare applications
Build Trusted Systems	Promote ethical, secure, and trustworthy AI
Advance Science	Accelerate scientific discovery using AI
Empower Communities	Expand AI benefits to underserved populations
Develop Human Capital	Reskill and upskill global workforce
Create Resilient Infrastructure	Build sustainable digital and computing infrastructure

3. Key Initiatives under the Declaration

Initiative	Purpose
Charter for Democratic Diffusion of AI	Affordable access to computing infrastructure, datasets, and foundational AI models
Global AI Impact Commons	Replication of successful AI solutions across countries
Trusted AI Commons	Repository of AI tools, benchmarks and best practices
AI Workforce Development Playbook	Global framework for AI workforce reskilling
AI for Social Empowerment Platform	Knowledge-sharing platform for public service innovation
International Network of AI for Science Institutions	Collaboration among global AI research centres
Guiding Principles on Resilient AI	Reduce environmental footprint of large-scale computing systems

4. Other Major Outcomes of the Summit

Investment Commitments

Area	Investment
Total AI Investments	\$250 billion
Deep-Tech Research & Data Infrastructure	Additional \$20 billion

Strategic Technology Alignment

India joined the **Pax Silica Coalition**, a U.S.-led initiative aimed at strengthening **global semiconductor supply chains and computing hardware security**.

Indigenous AI Models Announced

AI Initiative	Purpose
BharatGen	Indigenous generative AI ecosystem
Sarvam AI	Large language models for Indian languages
Gnani.ai	Conversational AI technologies
MANAV Governance Framework	Ethical and regulatory framework for AI governance

UPSC Mains Question

“Artificial Intelligence is emerging as a new frontier of global governance.” Discuss the significance of the New Delhi Declaration on AI Impact in shaping an inclusive and responsible global AI ecosystem. (15 marks)

59. 📰 WAVES Creators' Corner: AI Innovation Hub for India's AVGC-XR Sector



The WAVES Creators' Corner was inaugurated during the India AI Impact Summit 2026 as a specialised innovation pavilion for AI-driven digital content creation, particularly in the AVGC-XR sector.

1. What is WAVES Creators' Corner?

The WAVES Creators' Corner is an innovation workspace designed to demonstrate the integration of Artificial Intelligence with creative industries.

Objective

- Promote AI-powered innovation in digital content creation
- Strengthen India's AVGC-XR ecosystem
- Support the Create in India initiative by positioning India as a global hub for creative technology industries.

2. What is the AVGC-XR Sector?

Component	Meaning
Animation	Computer-generated animated visual storytelling
Visual Effects (VFX)	Digital effects integrated into films and media
Gaming	Interactive digital entertainment platforms
Comics	Graphic storytelling formats
Extended Reality (XR)	Technologies such as Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR)

This sector is becoming a major global digital content industry, with India emerging as a growing production and innovation hub.

3. Key Highlights of the WAVES Creators' Corner

AI-Powered Newsroom

Feature	Details
Technology Demonstration	Agentic AI newsroom
Collaborators	Amazon Web Services (AWS) and BharatGen
Function	Automated editorial workflows and AI-assisted content production

Agentic AI systems can autonomously perform complex tasks such as data analysis, content generation, and editorial decision-making.

AI Theatre

Feature	Details
Film Screening	150+ AI-generated films
Special Showcase	Kathāvatār series

Feature	Details
Theme	AI-generated short films inspired by Indian folklore and cultural narratives

This highlights the **creative potential of AI in filmmaking and storytelling.**

Interactive AI Technologies

Technology	Application
Voice Cloning	Synthetic voice generation for media and dubbing
Markerless Motion Capture	Capturing human movements without physical sensors
Face and Voice Re-Ageing	AI-driven transformation of facial features and voice to depict different ages

These tools demonstrate **advanced AI-driven digital production technologies.**

UPSC Mains Question

“Artificial Intelligence is transforming creative industries and digital content ecosystems.”

Discuss the significance of AI-driven initiatives like the WAVES Creators’ Corner for India’s AVGC-XR sector. (10/15 marks)

FEBRUARY 2026

GEOGRAPHY

DISASTER Management

1. India Flags Off Aconcagua Youth Expedition
2. Scientists Redefine El Niño Criteria
3. Urban Heat Island Intensifies in Indian Cities
4. Scientists Detect Birth of CME Shock Waves
5. India Launches National DVI Protocol
6. Kerala Declares Tidal Flooding as Disaster
7. Sharda River Corridor Project in Uttarakhand
8. Tulbul Barrage on Jhelum Back in Focus
9. India Accelerates Thorium Nuclear Programme
10. India Pushes Strategic Rare Earth Corridors
11. Integrated Farming Boosts Small Farmer Income
12. New Jasmine Pest Contarinia Identified
13. Volcán de Fuego Erupts in Guatemala



1. Aconcagua Expedition: India Flags Off Youth Climb to the Highest Peak Outside Asia



The Defence Minister of India flagged off a joint mountaineering expedition to Mount Aconcagua (Argentina) in February 2026 as part of a youth training initiative.

The expedition aims to promote adventure sports, leadership, and endurance training among Indian youth while strengthening international mountaineering cooperation.

Mount Aconcagua - Key Geographic Facts

Mount Aconcagua is the highest mountain in South America and the tallest peak outside Asia, located in the Andes Mountains of Argentina.

Feature	Details
Location	Mendoza Province, Argentina (near Chile border)
Elevation	6,961 m (22,838 ft)
Mountain Range	Andes - Principal Cordillera
Global Ranking	Highest peak in South America, Western Hemisphere, and Southern Hemisphere
Seven Summits	One of the Seven Summits (highest peaks of each continent)
Protected Area	Located in Aconcagua Provincial Park

Geological Formation

- The Andes Mountains were formed due to the subduction of the Nazca Plate beneath the South American Plate, creating intense tectonic uplift.
- Mount Aconcagua itself is believed to have volcanic origin, though it is now inactive.
- The Andes form the longest continental mountain chain in the world, stretching over 7,000 km along the western coast of South America.

Glaciers and Physical Geography

Aconcagua hosts several glaciers, important for regional hydrology.

Glacier	Key Feature
Ventisquero Horcones Inferior	Largest glacier (~10 km long)
Polish Glacier	Famous climbing route
Vacas Glacier System	Major eastern glacier system

These glaciers descend from the mountain's southern slopes into surrounding valleys.

Mount Aconcagua and the "Seven Summits"

The Seven Summits challenge involves climbing the highest peak on each continent.

Continent	Highest Peak
Asia	Mount Everest
South America	Mount Aconcagua
North America	Denali
Africa	Kilimanjaro
Europe	Elbrus
Antarctica	Vinson Massif
Australia/Oceania	Puncak Jaya (Carstensz Pyramid)

Mains Practice Question : Mount Aconcagua is considered one of the most significant peaks in global physical geography. Discuss its geographical characteristics and explain the tectonic processes responsible for the formation of the Andes mountain system. (10 Marks)

2. El Niño Reclassified: Scientists Update ENSO Criteria in a Warming World



Scientists and agencies such as NOAA (National Oceanic and Atmospheric Administration) have updated the classification method for El Niño and La Niña in 2026 as global warming has shifted sea surface temperature baselines. The change aims to separate natural ENSO variability from long-term anthropogenic warming, improving climate monitoring and forecasting.

What is ENSO?

El Niño–Southern Oscillation (ENSO) is a periodic fluctuation in sea surface temperatures and atmospheric pressure in the equatorial Pacific Ocean that significantly influences global weather patterns.

Phase	Ocean Temperature	Global Impact
El Niño	Warmer-than-normal SSTs in central/eastern Pacific	Droughts in Australia/India, floods in Americas
La Niña	Cooler-than-normal SSTs	Stronger monsoon in India, cooler global temperatures
Neutral	Near-average SST conditions	Normal climate variability

Oceanic Niño Index (ONI)

- ENSO is monitored using the Oceanic Niño Index (ONI).
- ONI measures 3-month running mean SST anomalies in the Niño 3.4 region of the east-central equatorial Pacific (5°N–5°S, 170°W–120°W).

Thresholds

Condition	ONI Value
El Niño	$\geq +0.5^{\circ}\text{C}$ anomaly for 5 consecutive overlapping seasons
La Niña	$\leq -0.5^{\circ}\text{C}$ anomaly for 5 seasons

Change in the Labelling Criteria

Earlier Method	New Method
SST anomalies compared with a fixed 30-year baseline (e.g., 1991–2020)	SST anomalies compared with a rolling 30-year baseline updated every 5 years
Baseline assumed to be stationary	Baseline now adjusts for long-term warming trends
Risk of misclassifying ENSO events due to global warming	Allows clear separation of ENSO variability from anthropogenic climate change

Why Was the Change Needed?

1 Rising Ocean Temperatures


- Global warming has **raised average sea surface temperatures**, making historical reference baselines outdated.

2 Earth's Energy Imbalance

- Studies indicate nearly **75% of recent increases in Earth's energy imbalance** are linked to the **combined effects of anthropogenic warming and ENSO phase shifts**.

3 Triple-Dip La Niña (2020–2023)

- Three consecutive La Niña events **suppressed surface heat release**.
- When the cycle ended, **rapid global warming spikes occurred**.

 **Mains Practice Question : Rising global temperatures are altering the baseline of climate oscillations such as ENSO. Examine how these changes affect climate prediction and disaster preparedness in monsoon-dependent countries like India. (10 Marks)**

3. India's Cities Heating Faster: Urban Heat Island Effect Alters Climate Projections



Recent research shows that **Indian cities are warming about 45% faster than surrounding rural regions**, largely due to the **Urban Heat Island (UHI) effect**. Climate models may **underestimate future city temperatures**, projecting **~2.2°C warming**, whereas actual urban warming could reach **2.6–2.7°C or higher**.

Urban Heat Island (UHI) - Definition

The **Urban Heat Island (UHI) effect** refers to the phenomenon where **urban areas experience higher temperatures than surrounding rural areas** due to **concrete structures, reduced vegetation, and heat-retaining materials**.

Key characteristics:

- Stronger **at night**, because cities retain heat absorbed during the day.
- Common in **densely built metropolitan regions** with low vegetation cover.

Key Findings on Urban Warming

Aspect	Findings
Rate of warming	Cities warming ~45% faster than nearby rural areas
Model projections	Climate models estimate ~2.2°C warming
Actual possible warming	May reach 2.6–2.7°C due to UHI effects
Extreme case	Patiala could experience nearly 4°C warming under a 2°C global warming scenario

Why Climate Models Underestimate Urban Heat

Factor	Explanation
Coarse Resolution	Global climate models average large areas, masking city-rural temperature differences
Surface Averaging	Urban materials like concrete and asphalt treated similar to soil/vegetation
Albedo Oversight	Dark urban surfaces absorb more solar radiation , but models underestimate this
Microclimate Neglect	Urban features like building density, street layout, airflow are not included

Causes of Urban Heat Island


1. **Concretisation and impervious surfaces**
2. **Reduced vegetation and evapotranspiration**
3. **High building density restricting airflow**
4. **Waste heat from vehicles, industries, and air conditioners**
5. **Low albedo surfaces (asphalt, dark roofs)**

Modelling Reforms Suggested

Reform	Example
High-resolution urban climate models	Ward-level heat mapping in Ahmedabad Heat Action Plan
Surface-specific datasets	Satellite-based urban surface data used in European city climate models
Vegetation and green cover integration	Urban green indices used in Singapore climate projections

Significance for India

- **India's rapid urbanisation** increases vulnerability to extreme heat.
- UHI intensifies **heatwaves**, raising risks to **public health, electricity demand, and urban infrastructure**.
- Urban heat management is critical for **climate adaptation and sustainable city planning**.

 **Mains Practice Question : Urban Heat Island effects are increasingly altering local climate dynamics in rapidly urbanising countries. Discuss the causes of urban heat islands and evaluate measures needed to make Indian cities climate resilient. (10 Marks)**

4. Cracking the Solar Storm Code: Scientists Detect the Birth of CME

Shock Waves



Astronomers from the **Indian Institute of Astrophysics (IIA)** have **identified the origin of a Coronal Mass Ejection (CME) shock wave for the first time**, observing its formation **~1,30,000 km above the Sun's surface**.

The discovery used observations from the **Aditya-L1** and the **Gauribidanur Radio Telescope**, resolving a long-standing question about where CME shocks originate.

Coronal Mass Ejection (CME) - Definition

A **Coronal Mass Ejection (CME)** is a **massive eruption of hot plasma and magnetic fields from the Sun's corona**, ejecting billions of tons of charged particles into space.

Formation Mechanism

- Occurs when **solar magnetic field lines suddenly break and reconnect** (magnetic reconnection).
- This releases enormous energy, propelling **magnetised plasma into interplanetary space**.

Key Discovery

Aspect	Details
Shock origin detected	~1,30,000 km above the solar surface
Discovery significance	First confirmed observation of the "birth stage" of CME-driven shock waves
Scientific debate resolved	Earlier uncertainty about where CME shocks actually form
Outcome	Enables better early prediction of solar storms

Instruments Used

Instrument	Details
Gauribidanur Radio Telescope	India's only dedicated low-frequency solar radio observatory detecting radio bursts from solar shocks
Aditya-L1 - VELC Payload	Visible Emission Line Coronagraph (VELC) detects CMEs in visible wavelengths

About Aditya-L1 Mission

Feature	Details
Mission type	India's first dedicated solar observatory mission
Agency	Indian Space Research Organisation (ISRO)
Orbit	Halo orbit around Sun-Earth Lagrange Point L1 (~1.5 million km from Earth)
Objective	Study solar corona, solar winds, CMEs and magnetic activity

Lagrange Point L1

- A gravitational equilibrium point between the **Sun and Earth**.
- Allows **continuous observation of the Sun without Earth eclipsing the view**.

Mains Practice Question : Coronal Mass Ejections (CMEs) significantly influence space weather and technological systems on Earth. Discuss the mechanisms of CME formation and

examine the importance of India's Aditya-L1 mission in improving solar storm forecasting. (10 Marks)

✔ Value-added UPSC keywords:

CME, solar corona, magnetic reconnection, heliophysics, space weather, geomagnetic storm, Lagrange Point L1, solar observatory missions.

5. India Introduces First National Protocol for Disaster Victim Identification (DVI)



The National Disaster Management Authority (NDMA) released India's first Standard Operating Procedure (SOP) and Guidelines for Disaster Victim Identification (DVI). The guidelines were released in 2026 on the 25th anniversary of the 2001 Bhuj Earthquake, aiming to standardise the management of Mass Fatality Incidents (MFIs) in disasters.

Disaster Victim Identification (DVI) - Definition

Disaster Victim Identification (DVI) refers to a scientific and systematic process of identifying victims after disasters or mass casualty incidents using forensic techniques such as DNA, fingerprints, and dental records.

The new NDMA framework aligns India's DVI procedures with Interpol standards.

NDMA - Institutional Background

Feature	Details
Establishment	Under the Disaster Management Act 2005
Ministry	Ministry of Home Affairs
Role	Apex body for disaster management planning, coordination, and guidelines in India
Chairperson	Prime Minister of India

Four-Stage Disaster Victim Identification Workflow

Stage	Process	Purpose
1. Systematic Recovery	Organised retrieval of remains	Prevent loss or mixing of evidence
2. Post-Mortem (PM) Data	Collection of DNA, fingerprints, dental records	Biometric identification of victims
3. Ante-Mortem (AM) Data	Collection of medical records and personal data from families	Establish identity reference
4. Reconciliation	Matching PM and AM data	Confirm identity before handing over remains

Key Features of the Guidelines

1 Humanitarian Forensics

- Treats dignified management of the dead as a human right.
- Ensures respectful handling of remains and transparent communication with families.

2 Psychosocial Support

- Families receive **psychological counselling and support during identification procedures.**

3 National Dental Data Registry

- Proposal to create a **national dental database** since **dental structures often survive severe disasters.**

4 Forensic Archaeology

- Recognised as a **standard recovery technique** for locating and recovering buried remains.


5 Specialised DVI Teams

States must create **multidisciplinary DVI teams** including:

- Police officers
- Forensic pathologists
- Forensic odontologists
- Archaeologists

6 Scientific Disposal Protocol

- **Mass burials or unscientific disposal of bodies prohibited.**
- Ensures possibility of **future identification.**

 **Mains Practice Question : Mass fatality incidents during disasters require a scientific and humanitarian response. Discuss the importance of Disaster Victim Identification (DVI) protocols in strengthening disaster management and protecting human dignity. (10 Marks)**

6. Kerala Recognises Tidal Flooding as a Disaster for First Time in India



The Kerala Government has declared **tidal flooding as a state-specific disaster**, becoming the **first Indian state to formally recognise the phenomenon as a disaster.**

The decision was taken under **Disaster Management Act 2005**, enabling affected people to receive compensation through the **State Disaster Response Fund (SDRF).**

What is Tidal Flooding?

Tidal flooding refers to the **temporary inundation of low-lying coastal areas during exceptionally high tides**, even in the absence of rainfall or storms.

It is often called "**sunny day flooding**" because it can occur during clear weather conditions.

Causes of Tidal Flooding

Cause	Explanation
Gravitational pull of Sun and Moon	Drives tidal cycles that periodically raise sea levels
Sea-level rise	Climate change causes thermal expansion of oceans and melting glaciers
Coastal land subsidence	Gradual sinking of coastal land increases flood vulnerability
Urbanisation in coastal areas	Reduces natural drainage and increases exposure

Tidal Cycle and Flood Occurrence

Tidal Condition	Description
Semi-diurnal tides	Two high tides and two low tides each day
Spring Tides	Occur when Sun, Moon, and Earth align , producing stronger tides
King Tides	Extremely high tides when the Moon is closest to Earth (perigee)

During **spring or king tides**, low-lying coastal areas may experience **repeated flooding during high-tide periods**.


State-Specific Disaster - Concept

A **state-specific disaster** is a hazard that:

- Is **not included in the Union Government's national disaster list**, but
- Poses **significant risk within a particular state**.

Financial Provisions

Feature	Details
Funding Source	State Disaster Response Fund (SDRF)
Maximum allocation	Up to 10% of annual SDRF funds
Relief norms	Must follow same guidelines as nationally notified disasters

 **Mains Practice Question : Rising sea levels and tidal flooding are emerging coastal hazards in India. Examine the causes of tidal flooding and discuss the importance of recognising such events as disasters for improving climate resilience. (10 Marks)**

7. Sharda River Corridor Project: Uttarakhand's Riverfront Development Initiative



The Government of Uttarakhand has launched the **Sharda River Corridor Project**, an infrastructure and tourism initiative aimed at **revitalising the Sharda (Kali) riverfront** near Banbasa.

The project includes **riverfront redevelopment, ecological restoration, and tourism infrastructure**, such as a heliport and biodiversity corridor.

Key Components of the Project

Component	Description
Sharda Ghat redevelopment	Riverfront development for tourism and cultural activities
City drainage system	Improved drainage to prevent urban flooding and pollution
Banbasa heliport	Enhancing tourism connectivity in the Kumaon region
Kiroda Nala Ecological Corridor	Biodiversity restoration and ecological conservation

Sharda River - Geographic Profile

Feature	Details
Origin	Near Kalapani on the eastern slopes of the Nanda Devi Massif
Elevation at source	~ 3,600 m
Upper course name	Kali River
Name in Nepal	Mahakali River
Name in plains	Sharda River (after entering plains at Banbasa)
Confluence	Joins the Ghaghara River near Chauka Ghat
River system	Ganges River basin

Major Tributaries

Indian Side	Nepal Side
Dhauliganga East	Chameliya River
Goriganga River	Ramgun River
Sarju River	–
Ladhiya River	–

International Boundary Significance

The **Treaty of Sugauli 1816** defined the **Kali River** as the western boundary between **India** and **Nepal**. This river boundary has been linked to territorial disputes such as **Kalapani-Lipulekh-Limpiyadhura** issues.


Hydroelectric Cooperation

Project	Details
Pancheshwar Multipurpose Project	Joint hydroelectric and irrigation project
Governing agreement	Mahakali Treaty 1996
Purpose	Hydropower generation, irrigation, flood control

Ecological Importance

The Sharda River flows through **Dudhwa National Park**, a critical ecosystem supporting:

- **Gangetic Dolphin** (India's National Aquatic Animal)
- **Mahseer Fish**
- Diverse wetland and riparian biodiversity.

 **Mains Practice Question : The Sharda (Mahakali) River has both ecological and geopolitical significance in South Asia. Discuss its geographical features and evaluate the importance of river-based cooperation between India and Nepal. (10 Marks)**

8. Tulbul Navigation Barrage Revived: Strategic Project on Jhelum River Back in Focus



The Government of Jammu and Kashmir has proposed reviving the Tulbul Navigation Barrage Project, also known as the Wular Barrage, as the Indus Waters Treaty 1960 (IWT) remains in abeyance.

The project was started in 1984 but halted in 1987 after objections from Pakistan, which argued that it violated provisions of the treaty.

Tulbul Navigation Barrage Project

Feature	Details
Alternate name	Wular Barrage Project
Location	Outlet of Wular Lake on the Jhelum River
District	Baramulla District near Sopore
Project type	Navigation lock-cum-control structure
Objective	Maintain minimum water depth of 4.5 feet in Jhelum during winter
Benefit	Enables year-round river navigation and improved hydropower generation

Hydropower Benefits

The project helps regulate water flow to downstream hydropower plants such as:

- Uri-I Hydroelectric Project
- Uri-II Hydroelectric Project

Indus Waters Treaty Context

Aspect	Details
Treaty signed	1960
Parties	India and Pakistan
Mediator	World Bank
River allocation	Western rivers (Indus, Jhelum, Chenab) mainly to Pakistan; Eastern rivers (Ravi, Beas, Sutlej) to India

Pakistan objected that the Tulbul project could alter downstream flows of the Jhelum, potentially violating treaty provisions.

About Wular Lake

Feature	Details
Location	Jammu and Kashmir
Type	Largest freshwater lake in India
Formation	Basin formed due to tectonic activity
Main inflow	Jhelum River
Ecological role	Acts as natural flood reservoir for the Kashmir Valley
International status	Designated **Ramsar Convention wetland in 1990

Historical Feature

The lake contains Zaina Lank, a man-made island built by Sultan Zain-ul-Abidin.

Mains Practice Question: The Tulbul Navigation Barrage project highlights the intersection of water resource management and geopolitics in South Asia. Examine its significance and discuss the role of the Indus Waters Treaty in governing transboundary rivers. (10 Marks)

9. India's Thorium Roadmap: Accelerating the Three-Stage Nuclear Programme



India is accelerating its **thorium-based nuclear roadmap** under its long-standing **three-stage nuclear power programme**, aiming to reduce dependence on imported uranium. Expansion of **Pressurised Heavy Water Reactors (PHWRs)** is expected to speed up the transition toward **thorium-based reactors** that can produce **Uranium-233 fuel** for long-term nuclear energy security.

India's Three-Stage Nuclear Programme

The programme, conceptualised by **Homi J. Bhabha**, aims to utilise India's large **thorium reserves**.

Stage	Reactor Type	Fuel Used	Objective
Stage 1	Pressurised Heavy Water Reactors (PHWRs)	Natural uranium (U-238)	Produce plutonium as by-product
Stage 2	Fast Breeder Reactors (FBRs)	Plutonium fuel	Breed more fissile material
Stage 3	Thorium Reactors	Thorium → Uranium-233	Long-term sustainable nuclear fuel cycle

India currently operates **19 PHWRs**, which form the **backbone of nuclear electricity generation**.

Current Status of Nuclear Energy in India

Indicator	Value
Share in electricity mix	~ 3%
Long-term target	100 GW nuclear capacity by 2047
Key institutions	Department of Atomic Energy, Nuclear Power Corporation of India Limited

Why Thorium is Important for India


Factor	Explanation
Resource availability	India holds ~25% of global thorium reserves
Limited uranium reserves	Only 1-2% of global uranium
Energy security	Reduces dependence on imported uranium
Strategic advantage	Thorium found in coastal monazite sands (Kerala, Tamil Nadu, Odisha)
Non-proliferation benefits	U-233 fuel cycle has higher proliferation resistance

How PHWR Expansion Supports Thorium Transition

Mechanism	Role
Irradiation platform	PHWRs can convert thorium into Uranium-233
Alternative to slow FBR rollout	Helps compensate for delays in Fast Breeder Reactors
Fuel flexibility	Thorium can be blended with HALEU (High-Assay Low-Enriched Uranium)
Scaling potential	Planned 50-75 GWe PHWR capacity by 2047

Challenges in Thorium Deployment

Challenge	Explanation
Fissile material requirement	Large stockpile of U-233 needed initially
Fuel cycle complexity	Requires advanced reprocessing and recycling technology
Economic cost	Thorium reactors require large capital investment
Technological maturity	Thorium-based reactors are still experimental globally

 **Mains Practice Question: India's three-stage nuclear programme seeks to utilise thorium resources to ensure long-term energy security. Discuss the stages of this programme and examine the opportunities and challenges in transitioning to thorium-based nuclear power. (10 Marks)**

10. Strategic Rare Earth Corridors: India's Push for Critical Mineral Security



The Government of India is planning **Dedicated Rare Earth Corridors** to create **secure supply chains for critical minerals** required for **electric vehicles (EVs), renewable energy systems, electronics, and defence technologies**.

The initiative aims to operationalise the **National Critical Minerals Mission** and reduce India's heavy dependence on imports of rare earth elements.

Rare Earth Elements (REEs) - Definition

Rare Earth Elements (REEs) are a group of **17 metallic elements** (15 lanthanides + scandium + yttrium) that possess unique **magnetic, catalytic, and luminescent properties**, making them essential for modern technologies.

Rare Earth Availability in India

Indicator	Details
Global reserve share	~ 6% of world reserves
Major resource mineral	Monazite (contains thorium and rare earth oxides)
Monazite reserves	~ 13.15 million tonnes
Rare Earth Oxides (REO) potential	~ 7.23 million tonnes
Total resources identified	~ 482.6 million tonnes

Key Resource Regions

Rare earth deposits occur mainly in **coastal beach sands and inland alluvium** across:

- Andhra Pradesh
- Odisha
- Tamil Nadu
- Kerala
- West Bengal
- Gujarat
- Maharashtra
- Jharkhand

Exploration is led by the **Geological Survey of India (GSI)**.

Dedicated Rare Earth Corridors

Concept

Dedicated Rare Earth Corridors are **integrated infrastructure networks connecting:**

- **Mining zones**
- **Mineral processing facilities**
- **Manufacturing clusters**

This ensures **efficient transport and processing of rare earth minerals**.

Proposed Locations

Focus on the **eastern and southern coastal belt** where major beach sand mineral deposits exist:

- Odisha
- Andhra Pradesh
- Tamil Nadu
- Kerala

Key Features of the Corridor Initiative


Feature	Details
Magnet manufacturing linkage	Supports Sintered Rare Earth Permanent Magnet Scheme
Investment outlay	₹7,280 crore
Production target	6,000 MTPA magnet capacity
Incentives	₹6,450 crore sales-linked incentives
Capital subsidy	₹750 crore for manufacturing units
Governance model	State-led industrial clusters

Rare Earth Permanent Magnets (REPM)

Feature	Details
Nature	Strongest commercial permanent magnets
Material	Alloys of rare earth elements (e.g., neodymium)
Global dominance	China controls ~90% of production and processing

Key Applications

- **Electric vehicle motors**
- **Wind turbine generators**
- **Consumer electronics**
- **MRI scanners**
- **Precision-guided defence systems**

 **Mains Practice Question: Rare earth elements have emerged as strategic resources in the global energy transition and high-technology manufacturing. Examine India's rare earth potential and evaluate the significance of dedicated rare earth corridors for strengthening supply chain security. (10 Marks)**

11. Integrated Farming Models: A Path to Higher Income for Small Farmers



The Union Agriculture Minister urged scientists at the **Indian Institute of Horticultural Research** to develop **Integrated Farming Models (IFMs)** suitable for small and marginal farmers. The initiative aims to **enhance farm income, resilience, and resource efficiency** through diversified agricultural systems.

What are Integrated Farming Models (IFMs)?

Integrated Farming Models (IFMs) refer to a **farm system approach that combines multiple agricultural activities** – such as crops, livestock, fisheries, poultry, and horticulture – within the same farm to optimise **resource use, productivity, and income stability**.

Key principle:

“Waste from one enterprise becomes input for another.”

Components of an Integrated Farming System

Component	Role in the System
Crop cultivation	Main food and cash crop production
Livestock	Provides manure, milk, and draught power
Poultry	Additional income and protein source
Fisheries	Utilises farm ponds and water resources
Horticulture	Fruits and vegetables for nutrition and income
Agroforestry	Soil conservation and additional biomass

Benefits of Integrated Farming Models


Dimension	Impact
Higher income	Farm income increases by 30-60% compared to monocropping (ICAR studies)
Risk reduction	Mixed crop–livestock systems reduce income variability by 20-25% during droughts or price shocks
Employment generation	250-350 person-days/ha/year , compared to 120-150 in cereal monocropping
Cost efficiency	Recycling farm residues reduces fertiliser and feed costs by 15-25%
Nutritional security	Households show 15-20% higher dietary diversity

Challenges in Adoption

Challenge	Explanation
Credit constraints	~45% of small farmers struggle to access formal credit
High initial investment	IFMs require 20-30% higher upfront capital
Institutional fragmentation	Crop, livestock, and fisheries schemes often lack convergence
Knowledge gap	Limited awareness and technical training among farmers

Government Programmes Supporting IFMs

Programme	Objective
National Mission for Sustainable Agriculture - Rainfed Area Development (RAD)	Promote integrated farming in rainfed regions
Rashtriya Krishi Vikas Yojana (RKVY)	Flexible funding for agriculture infrastructure
Paramparagat Krishi Vikas Yojana	Promote organic nutrient recycling
Viksit Krishi Sankalp Abhiyan	Improve technology transfer from labs to farms

 **Mains Practice Question:** Integrated Farming Systems are considered a sustainable solution for improving the income and resilience of small farmers in India. Discuss the advantages of integrated farming and examine the challenges in scaling up such models. (10 Marks)

12. New Jasmine Pest Identified: *Contarinia icardiflores*



Scientists from the **ICAR-Directorate of Floricultural Research** have discovered a **new blossom midge species** named *Contarinia icardiflores* that infests **commercial jasmine crops**. The discovery is significant for **pest management in India's floriculture sector**, particularly in major jasmine-growing states.

About *Contarinia icardiflores*: *Contarinia icardiflores* is a **species of blossom midge** (family Cecidomyiidae) that attacks **jasmine flower buds**, causing significant yield loss.

Feature	Details
Type	Blossom midge (tiny fly-like insect)
Scientific name	<i>Contarinia icardiflores</i>
Size	1.5–2 mm
Life cycle	16–21 days
Host plant	Jasmine (<i>Jasminum</i> species)
Damage stage	Larval stage feeding inside flower buds

Distribution in India

The pest has been reported from major **jasmine cultivation regions**, including:

- Maharashtra
- Tamil Nadu
- Andhra Pradesh
- Karnataka

These states are key centres of **commercial jasmine production for perfume, garlands, and export markets**.


Mode of Infestation

Stage	Impact
Egg laying	Adult midge lays eggs inside flower buds
Larval feeding	Larvae burrow into buds and consume internal tissues
Crop damage	Bud deformation, flower drop, and reduced yield

A major challenge is that **larvae remain inside buds**, making **surface pesticide sprays ineffective**.

Possible Pest Management Approaches

- **Integrated Pest Management (IPM)** practices.
- **Biological control agents** such as parasitoids.
- **Monitoring and early detection** through pheromone traps.
- **Improved cultivation practices** to reduce pest spread.

 **Mains Practice Question :** Agricultural pests pose a significant challenge to horticultural productivity in India. Discuss the importance of scientific pest identification and integrated pest management in protecting high-value crops such as floriculture. (10 Marks)

13. Volcán de Fuego Erupts in Guatemala

- **Context (IT):** The **Volcán de Fuego** in **Guatemala** recently experienced a series of eruptions, releasing **ash plumes up to about 16,000 feet** into the atmosphere.
- **Location:** It is a **stratovolcano (composite volcano)** located along the **Central American Volcanic Arc** in **southern Guatemala**.
- **Tectonic Setting:** The volcano was formed due to the **subduction of the Cocos Plate beneath the Caribbean Plate**, a process associated with the **Pacific Ring of Fire**.
- **Eruption Pattern:** The volcano frequently exhibits **Strombolian and Vulcanian types of eruptions**, marked by explosive discharge of **pyroclastic materials and basaltic-andesite lava**. It has remained **continuously active since 2002**.

FEBRUARY 2026

HEALTH & NUTRITION

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2. WHO Approves nOPV2 Polio Vaccine
3. Piezo1 Discovery for Osteoporosis Prevention
4. New Treatment Pathway for Lymphoedema
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🦋 1. Breakthrough Treatment for Celphos (Aluminium Phosphide)

Poisoning



Doctors at the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh have reported a **major treatment breakthrough for Celphos poisoning**, using **Intravenous Lipid Emulsion (ILE) therapy**, which significantly reduces mortality from this highly lethal pesticide.

1. What is Celphos (Aluminium Phosphide)? : Celphos is a **highly toxic pesticide** containing **Aluminium Phosphide**, widely used as a **grain fumigant** in agricultural storage facilities.

Usage - Preserves stored grains by killing pests in warehouses and silos.

- Commonly used in states such as **Punjab, Haryana and Uttar Pradesh**.

What is a Fumigant? : A **fumigant** is a chemical that **kills pests by releasing toxic gases in enclosed environments**, commonly used in grain storage.

2. Toxic Mechanism of Aluminium Phosphide

When ingested, aluminium phosphide reacts with **moisture and stomach acid**, releasing **phosphine gas (PH₃)**.

Physiological Effects		Celphos poisoning has a very high fatality rate , often exceeding 50-60% in severe cases .
Effect	Description	
Cardiac toxicity	Severe damage to heart muscles	
Metabolic acidosis	Excess acid accumulation in the bloodstream	
Circulatory shock	Rapid drop in blood pressure	
Respiratory distress	Organ failure and death	

3. New Treatment Discovery

Intravenous Lipid Emulsion (ILE) Therapy

Feature	Explanation	This mechanism is known as the “lipid sink” effect , where toxic molecules are absorbed into lipid particles.
Nature	Fat-based intravenous therapy	
Mechanism	Binds lipid-soluble toxins in the bloodstream	
Effect	Reduces toxin availability to vital organs	

4. Key Outcomes of the Study

Outcome	Observation
Reduced Mortality	Significant decrease in fatality rates
Improved Heart Stability	Better cardiac function recovery
Correction of Metabolic Acidosis	Faster stabilisation of blood chemistry
Early Treatment Advantage	Early ILE administration improves survival outcomes

UPSC Mains Question : “Pesticide poisoning continues to pose a major public health challenge in India.” Discuss the causes of pesticide toxicity and evaluate recent medical advances in the treatment of aluminium phosphide poisoning. (10/15 marks)

2. WHO Prequalifies nOPV2: New Vaccine to Fight Polio Outbreaks



The World Health Organization (WHO) has prequalified the novel Oral Polio Vaccine type 2 (nOPV2) to strengthen global response to poliovirus outbreaks. The vaccine is produced by Biological E (India) and targets Circulating Vaccine-Derived Poliovirus type 2 (cVDPV2).

1. What is nOPV2?

The novel Oral Polio Vaccine type 2 (nOPV2) is an improved version of the oral polio vaccine (OPV) designed to reduce the risk of vaccine-derived outbreaks.

Key Features

Feature	Details
Target Virus	Circulating Vaccine-Derived Poliovirus type 2 (cVDPV2)
Type	Oral polio vaccine
Advantage	Lower probability of genetic mutation and reversion to neurovirulence
Immunity	Provides strong intestinal (mucosal) immunity

This vaccine is a crucial tool for the **Global Polio Eradication Initiative (GPEI)**.

2. What is Circulating Vaccine-Derived Poliovirus (cVDPV2)?

cVDPV2 arises when the weakened virus used in oral polio vaccines **mutates after circulating for a long period in under-immunised populations**.

How it Emerges

Step	Process
1	OPV contains weakened virus strains
2	Virus replicates in the intestine and is excreted
3	In poorly immunised communities, the virus spreads person-to-person
4	Over time, genetic mutations allow it to regain neurovirulence

This can cause **paralytic polio outbreaks**.

3. Vaccine Strategy Changes

Global Vaccine Shift

Vaccine Type	Poliovirus Types Covered
Trivalent OPV (tOPV)	Types 1, 2, and 3
Bivalent OPV (bOPV)	Types 1 and 3 only

The world shifted to **bivalent OPV** after **wild poliovirus type 2 (WPV2)** was eradicated to reduce vaccine-derived outbreaks.

4. Poliomyelitis (Polio) : Polio is a **highly infectious viral disease** that primarily affects **children under five years of age**.

Transmission

- Spread mainly through the **faecal-oral route**
- Contaminated **water or food**

Virus Types

Virus Type	Status
WPV1	Still endemic
WPV2	Globally eradicated
WPV3	Globally eradicated

Currently, **wild poliovirus type 1 (WPV1)** remains endemic only in:

- Afghanistan, Pakistan

5. Vaccines Against Polio

Vaccine	Type	Immunity
Oral Polio Vaccine (OPV)	Live attenuated	Provides intestinal immunity
Inactivated Polio Vaccine (IPV)	Killed virus	Provides systemic immunity

OPV helps stop **virus transmission**, while IPV prevents **paralytic disease**.

UPSC Mains Question : "Although wild poliovirus has nearly been eradicated globally, vaccine-derived poliovirus outbreaks remain a challenge." Examine the significance of novel vaccines like nOPV2 in global polio eradication efforts. (10/15 marks)

3. Piezo1 Discovery: A New Pathway for Osteoporosis Prevention



A study by the **University of Hong Kong** has identified **Piezo1**, a protein that explains how **physical activity increases bone density**, offering a potential new pathway for **osteoporosis prevention and treatment**.

1. Key Scientific Discovery : Researchers identified **Piezo1**, a **mechanosensitive protein** that acts as a **biological sensor for mechanical stress in bones during physical activity**.

Component	Role
Piezo1 Protein	Detects mechanical stress caused by exercise
Mechanotransduction	Converts physical force into intracellular biochemical signals
Bone Response	Signals stimulate bone formation and strengthening

Thus, exercise **mechanically stimulates bone growth through Piezo1 signalling**.

2. Role in Bone Formation: Piezo1 controls the behaviour of **Bone Marrow Mesenchymal Stem Cells (BMMSCs)**.

Stem Cell Differentiation

Pathway	Result
With Piezo1 activation	BMMSCs become osteoblasts (bone-forming cells)
Without Piezo1 activation	BMMSCs become adipocytes (fat cells)

This determines whether **bone tissue grows stronger or becomes weaker**.

3. Link to Wolff's Law

The findings provide cellular evidence for the **Wolff's Law**.

Wolff's Law

Bone **adapts structurally to mechanical loads**, meaning:

- Bones subjected to **stress become stronger**
- Lack of mechanical stress leads to **bone loss**

The **Piezo1 pathway is the molecular mechanism explaining this law.**

4. Effects of Piezo1 Deficiency

Biological Change	Impact
Increased inflammatory mediators	Accelerates bone degradation
Fat accumulation in bone marrow	Leads to "fatty marrow"
Reduced osteoblast formation	Lower bone density
Fragile bone structure	Higher fracture risk

This explains **why ageing leads to bone weakness.**

UPSC Exam Relevance

Prelims: Osteoporosis, stem cells, mechanotransduction, Wolff's Law.

Mains: GS-III (biomedical research, ageing, public health innovations).

4.Lymphoedema: New Research Opens Pathway for Treatment



Researchers at the **University of Auckland** have identified a potential therapeutic pathway for **lymphoedema** by discovering the role of **insulin-like growth factor (IGF)** in stimulating **lymphatic vessel growth**.

1. What is Lymphoedema?

Lymphoedema is a **chronic medical condition characterised by abnormal swelling in body tissues** due to failure of the **lymphatic system to drain lymph fluid properly.**

Key Characteristics

Feature	Description
Nature	Chronic swelling disorder
Cause	Accumulation of protein-rich lymph fluid
Affected Areas	Commonly arms, legs, chest, or genital region
Progression	Often permanent and progressive

2. Role of the Lymphatic System

The **lymphatic system** is a vital component of the **immune system.**

Major Functions

Function	Explanation
Fluid balance	Returns excess tissue fluid to the bloodstream
Immune defence	Filters pathogens through lymph nodes
Waste removal	Removes toxins, cellular debris and proteins

When this drainage system **fails or is damaged**, fluid accumulates in tissues causing **lymphoedema**.

3. Types of Lymphoedema

Primary Lymphoedema		Secondary Lymphoedema	
Feature	Description	Feature	Description
Nature	Rare inherited disorder	Nature	Most common type
Cause	Genetic abnormalities affecting lymphatic vessel development	Cause	Damage to lymphatic vessels
Onset	Often appears during childhood or adolescence	Triggers	Surgery, radiation therapy, infection, trauma

4. Cancer-Related Lymphoedema

A major cause of secondary lymphoedema is **cancer treatment**.

Example

- **Breast cancer surgery**
- Removal of **lymph nodes** during treatment
- Disruption of lymph drainage pathways

This can lead to **permanent swelling of the arm**.

5. Symptoms of Lymphoedema

Symptom	Description
Persistent swelling	Often in limbs
Heaviness or tightness	Affected area feels heavy
Restricted mobility	Difficulty in movement
Skin infections	Recurrent infections such as cellulitis
Skin thickening	Advanced cases develop fibrotic tissue



5. Tetrodotoxin (TTX): One of the Deadliest Marine Neurotoxins



Tetrodotoxin (TTX) poisoning is suspected after **seafood consumption caused rapid neurological illness and deaths in Thiruvananthapuram, Kerala.**

1. What is Tetrodotoxin (TTX)?

Tetrodotoxin (TTX) is a **potent non-protein neurotoxin** found in several marine and amphibious organisms.

Feature	Description
Chemical nature	Non-protein neurotoxin
Toxicity	About 1,200 times more toxic than cyanide
Effect	Blocks nerve signals leading to paralysis
Source	Produced by bacteria and accumulated in marine animals

Even very small doses can cause **fatal poisoning**.

2. Host Animals Containing TTX

Several animals accumulate tetrodotoxin in their tissues.

Organism	Habitat
Pufferfish	Marine
Blue-ringed octopus	Marine
Rough-skinned newt	Amphibian
Xanthid crab	Marine
Moon snail	Marine
Certain frogs and sea stars	Marine / Amphibian

These animals **do not produce the toxin themselves** but accumulate it through diet or bacterial association.

3. Bacterial Origin of the Toxin

TTX is produced by **symbiotic marine bacteria**, such as:

- *Pseudoalteromonas*
- *Vibrio*
- *Alteromonas*

The toxin **enters the food chain and accumulates in host animals**.

4. Mechanism of Toxicity

Tetrodotoxin disrupts **nerve and muscle function**.

Biological Mechanism

Step	Process
1	TTX binds to voltage-gated sodium channels on nerve cells
2	Sodium ions cannot enter the cell
3	Nerve signals fail to propagate
4	Muscles become paralysed

6. Lenacapavir: A Long-Acting Injection for HIV Prevention



Zimbabwe has begun the free rollout of Lenacapavir injections to treat HIV and prevent new infections among high-risk populations. The approval was accelerated through the World Health Organization (WHO) under its Collaborative Registration Procedure (CRP).

1. What is Lenacapavir?

Lenacapavir is a first-in-class capsid inhibitor drug used to treat HIV-1 infection.

Key Features

Feature	Description
Drug class	Capsid inhibitor
Target	Capsid protein shell of HIV virus
Administration	Subcutaneous injection
Dosing frequency	Once every six months
Significance	Longest-acting HIV treatment currently approved

Unlike conventional HIV drugs that target viral enzymes, lenacapavir directly disrupts the viral capsid.

2. Mechanism of Action

Lenacapavir interferes with multiple stages of the HIV viral life cycle.

Viral Life Cycle Disruption

Stage	Effect of Lenacapavir
Nuclear entry	Prevents the virus from entering the host cell nucleus
Capsid formation	Disrupts assembly of the viral protein shell
Virion assembly	Blocks formation of mature virus particles

This multi-stage disruption reduces viral replication and infection spread.

3. Advantage Over Traditional HIV Drugs

Feature	Traditional Antiretrovirals	Lenacapavir
Target	Viral enzymes (reverse transcriptase, protease)	Viral capsid protein
Dosing frequency	Daily oral drugs	Injection every 6 months
Drug resistance	Some strains resistant	Effective against multidrug-resistant HIV

This makes lenacapavir particularly valuable for patients with treatment-resistant HIV infections.

4. WHO Collaborative Registration Procedure (CRP)

The drug was approved using the Collaborative Registration Procedure (CRP) of the World Health Organization.

What is CRP?

Feature	Description
Purpose	Accelerate drug approval in low-income countries

Mechanism	National regulators rely on assessments done by trusted global regulatory agencies
Benefit	Avoids repeating full clinical evaluation

This significantly **reduces the time required for national approval.**

About HIV : Human Immunodeficiency Virus (HIV)

Feature	Description
Nature	Retrovirus attacking immune cells (CD4 T cells)
Transmission	Unprotected sex, infected blood, mother-to-child
Progression	Untreated infection may lead to AIDS

Antiretroviral therapy (ART) helps **control the virus and prevent immune system damage.**

7. Indigenous Td Vaccine Replaces TT in India's Universal Immunisation Programme



The Ministry of Health and Family Welfare has launched an **indigenous Tetanus and Adult Diphtheria (Td) vaccine**, which will replace the traditional **Tetanus Toxoid (TT) vaccine** in India's **Universal Immunisation Programme (UIP)**. The vaccine was developed by the **Central Research Institute Kasauli**.

1. What is the Td Vaccine?

The Td vaccine is a **combined vaccine providing protection against both tetanus and diphtheria.**

Feature	Description
Type	Combination vaccine
Protection	Tetanus + Diphtheria
Developer	Central Research Institute (CRI), Kasauli
Programme	Universal Immunisation Programme

This vaccine replaces the **TT vaccine**, which protected only against tetanus.

2. Why Replace the TT Vaccine?

TT Vaccine	Td Vaccine
Protects only against tetanus	Protects against tetanus and diphtheria
Single-disease protection	Dual protection
Limited immunisation scope	Improves population-level immunity

The switch helps **prevent diphtheria outbreaks while continuing tetanus protection.**

Tetanus Definition : Tetanus is a **life-threatening non-communicable bacterial disease** caused by the bacterium **Clostridium tetani**.

Transmission

Source	Mode
Soil	Contaminated wounds
Dust	Injury exposure
Animal faeces	Open wounds

The bacteria produce a **neurotoxin that disrupts nerve signals**.

Symptoms

- Muscle stiffness
- Severe spasms
- **Locked jaw ("lockjaw")**
- Difficulty breathing

About Diphtheria : Diphtheria is a highly contagious bacterial infection caused by *Corynebacterium diphtheriae*.

Transmission

Mode	Explanation
Respiratory droplets	Coughing or sneezing
Direct contact	Skin lesions of infected individuals

8. ARFID: Understanding Avoidant or Restrictive Food Intake

Disorder



Recent studies emphasise the need to **distinguish Avoidant or Restrictive Food Intake Disorder (ARFID)** from normal **picky eating**, as misdiagnosis can lead to **serious malnutrition and developmental problems in children**.

1. What is ARFID?

Avoidant or Restrictive Food Intake Disorder (ARFID) is a recognised eating and mental health disorder characterised by a **persistent failure to meet daily nutritional requirements**.

Key Characteristics

Feature	Description
Nature	Eating disorder
Main problem	Severe restriction or avoidance of food
Result	Nutritional deficiencies and growth problems
Recognition	Classified as a clinical eating disorder

Unlike ordinary picky eating, **ARFID significantly affects health and daily functioning**.

2. Causes of ARFID

The disorder can arise from several biological and psychological factors.

Cause	Explanation
Genetic predisposition	Increased susceptibility to eating disorders
Sensory aversion	Extreme sensitivity to food texture, smell, or taste

Traumatic food experiences	Events such as choking or vomiting while eating
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These triggers lead to **persistent avoidance of certain foods or food groups**.

3. Difference Between ARFID and Anorexia

Feature	ARFID	Anorexia Nervosa
Body image concerns	Absent	Present
Fear of weight gain	Absent	Present
Reason for food avoidance	Sensory issues, trauma, lack of appetite	Desire to lose weight

Thus, ARFID is not driven by body image distortion.

4. Population Most Affected

ARFID mainly affects:

- Children
- Adolescents
- More frequently boys

Early detection is crucial because it can **interfere with physical development**.

9. Regulating Refurbished Medical Devices in India



The **Ministry of Health and Family Welfare (MoHFW)** has constituted a committee to frame a **policy for regulating refurbished medical devices**, aiming to resolve regulatory conflicts between health and environmental authorities.

1. What are Refurbished Medical Devices? : Refurbished medical devices are previously used medical equipment that have been restored to the safety and performance standards set by the Original Equipment Manufacturer (OEM).

Device	Application
MRI scanners	Advanced medical imaging
CT scanners	Cross-sectional diagnostic imaging
PET-CT systems	Cancer detection and metabolic imaging
Robotic surgery units	Precision surgical procedures

These are **high-cost capital equipment used in hospitals and diagnostic centres**.

2. Economic and Environmental Benefits

Cost Efficiency

Feature	Impact
Price	50–60% cheaper than new devices
Accessibility	Enables hospitals in Tier-2 and Tier-3 cities to access advanced diagnostics

Resource Optimisation

Refurbishing supports **circular economy principles** by:

- Extending the **life cycle of medical equipment**
- Reducing **electronic waste (e-waste)**
- Lowering **capital investment requirements**

3. Current Regulatory Framework

India currently **does not have a dedicated regulatory pathway for refurbished devices.**

Existing Rules

Regulation	Authority	Role
**Medical Devices Rules 2017	Central Drugs Standard Control Organisation (CDSCO)	Regulates medical devices
**Hazardous and Other Wastes Rules 2016	Ministry of Environment Forest and Climate Change	Governs import of used equipment

Import Conditions

The **MoEFCC allows import of 38 categories of refurbished devices**, provided:

- **Minimum 7 years residual life**
- **Mandatory warranty**
- **Compliance with environmental norms**

4. Key Policy Conflict

There is a **regulatory conflict between two authorities.**

Authority	Position
MoEFCC	Permits imports under waste rules
CDSCO	Blocks approvals due to lack of safety framework

This creates **uncertainty for hospitals and importers.**

10. Front-of-Package Labelling (FOPL)



The Supreme Court of India has directed the Food Safety and Standards Authority of India (FSSAI) to implement Front-of-Package (FOP) labelling on packaged foods to help consumers make healthier dietary choices.

1. What is Front-of-Package Labelling (FOPL)?

Front-of-Package Labelling (FOPL) is a public health policy tool that provides simple, visible nutrition information on the front of packaged food products.

Purpose

Objective	Explanation
Quick information	Allows consumers to instantly identify unhealthy foods
Highlight key nutrients	Focus on high sugar, salt, and saturated fat
Public health protection	Helps reduce lifestyle diseases

Unlike detailed nutrition panels on the back of packages, FOP labels are designed for quick understanding.

2. Supreme Court Intervention

Judicial Push

Step	Development
2025	Supreme Court formed an FSSAI expert committee to examine labelling reforms
2026	Court expressed dissatisfaction with slow progress
Directive	Ordered FSSAI to implement FOP warning labels within four weeks

The court emphasised urgent consumer protection.

3. Rising Dietary Health Risks in India

According to the Indian Council of Medical Research - INDIAB Study (2023):

Condition	Prevalence
Diabetes	101 million people
Prediabetes	136 million people
Hypertension	35.5% of adults
Abdominal obesity	39.5%
High cholesterol	24%

These conditions are strongly linked to high consumption of sugar, salt, and unhealthy fats.

4. Importance of Front-of-Package Labelling

Public Health Benefits

Benefit	Impact
Consumer awareness	Helps identify unhealthy foods quickly
Disease prevention	Reduces risk of lifestyle diseases
Dietary behaviour change	Encourages healthier food choices

Policy Objective

The goal is to **reduce the burden of non-communicable diseases (NCDs)**.

5. Global Practice

Several countries already use **front-of-package warning systems**.

Country	Label Type
Chile	Black warning labels for high sugar/salt
Mexico	Octagonal health warning symbols
UK	Traffic-light nutrition labels
Australia	Health star rating system

These models guide India's regulatory discussions.

11. India Records Fourfold Increase in Organ Transplants



India has witnessed a **fourfold increase in organ transplants**, rising from **under 5,000 procedures in 2013 to nearly 20,000 in 2025**, according to data from the **Ministry of Health and Family Welfare**. However, the **deceased organ donation rate remains extremely low, at less than 1 donor per million population**, compared to about **48 donors per million in Spain**, one of the global leaders.

1. Legal and Institutional Framework

Transplantation Law : The primary law governing organ transplantation in India is the **Transplantation of Human Organs and Tissues Act 1994 (THOTA)**.

Objectives of THOTA

Objective	Explanation
Regulation	Governs organ removal, storage, and transplantation
Prevent illegal trade	Restricts commercial organ trafficking
Ethical donation	Establishes consent requirements

2. National Organ Transplant Programme (NOTP)

The **National Organ Transplant Programme (NOTP)** promotes **deceased organ donation across India**.

Three-tier Network

Level	Institution
National	National Organ and Tissue Transplant Organisation
Regional	Regional Organ and Tissue Transplant Organisations
State	State Organ and Tissue Transplant Organisations

This structure ensures **organ retrieval, allocation, and transplant coordination**.

3. Consent System in India

India follows an **opt-in system**.

Key Features

Feature	Explanation
Voluntary pledge	Individuals register willingness to donate
Family consent mandatory	Even if pledged, family approval is required
Legal safeguard	Prevents unethical procurement

This requirement is a **major barrier to deceased organ donation**.

4. Digital Registry for Organ Donation

India has introduced an **Aadhaar-linked National Organ and Tissue Transplant Registry**.

Functions

Feature	Purpose
Donor registration	Record pledge to donate organs
Waiting list management	Track recipients awaiting organs
Transparency	Ensure fair allocation

6. Organ Transplant Landscape in India

Transplant Statistics

Indicator	Data
Total transplants (2025)	~20,000
Ranking globally	3rd after U.S. and China
Deceased donor rate	<1 per million population

Living vs Deceased Donation

Type	Share
Living donors	82%
Deceased donors	18%

India heavily depends on **living donors**.

📌 12. India Launches Nationwide Free HPV Vaccination Drive



India has launched a **nationwide free vaccination drive against Human Papillomavirus (HPV)** to prevent **cervical cancer**, led jointly by the **Ministry of Health and Family Welfare** and the **Ministry of Women and Child Development** under the **"Swastha Nari"** initiative.

1. Key Features of the HPV Vaccination Drive

Target Population

Feature	Details
Target age group	14-year-old girls
Reason	Maximum preventive benefit before exposure to HPV infection

Vaccination at this age ensures **strong immune protection before the onset of sexual activity**, when HPV transmission risk increases.

2. Vaccine Used

The programme uses **Gardasil**, a **quadrivalent recombinant HPV vaccine**.

Types of HPV Covered

HPV Type	Risk Category	Disease Association
HPV-16	High-risk	Cervical cancer
HPV-18	High-risk	Cervical cancer
HPV-6	Low-risk	Genital warts
HPV-11	Low-risk	Genital warts

Together, **HPV-16 and HPV-18 cause about 70% of cervical cancers worldwide.**

3. Dosage Strategy

India has adopted a **single-dose vaccination regimen**.

Rationale

Reason	Explanation
WHO recommendation	Supports single-dose protection
Higher coverage	Easier implementation
Logistical efficiency	Reduces cost and supply burden

This approach aims to **rapidly expand immunisation coverage across the country.**

4. Implementation Mechanism

Feature	Details
Access	Free at all government health facilities
Nature	Voluntary vaccination
Digital platform	Managed through the **U-WIN digital vaccination portal

The **U-WIN platform** helps track **vaccination records and coverage nationwide.**

Cervical Cancer in India

Disease Overview

Cervical cancer is caused mainly by **persistent infection with high-risk HPV strains.**

India's Disease Burden

Indicator	Data
Ranking	Second most common cancer among Indian women
Global share of cases	~20%
Global share of deaths	~23%

Regional Hotspots

The disease burden is particularly high in **Northeastern states.**

State	Observation
Mizoram	Highest incidence rate
Arunachal Pradesh	High prevalence

13. The Illusion of “Safe” Bottled Water



Recent studies highlight **emerging contamination risks in bottled drinking water**, raising concerns about excessive dependence on packaged water despite declining trust in municipal supply systems.

1. Growing Dependence on Bottled Water

Urban households increasingly rely on bottled water due to **perceived safety and convenience**.

Key Drivers

Factor	Explanation
Trust deficit in public supply	Surveys by the National Sample Survey Office show 35–40% of urban households distrust municipal drinking water quality
Safety perception	Packaged water is widely viewed as cleaner and safer
Convenience economy	Availability in retail outlets and transport hubs

India’s bottled-water market has **exceeded ₹20,000 crore**, indicating rapidly growing consumption.

2. Emerging Contamination Risks

Microplastics in Bottled Water

Issue	Details
Microplastic presence	Studies detect plastic particles in bottled water
Nagpur study	Found 72–212 microplastic particles per litre

Microplastics originate from **plastic bottle degradation and packaging processes**.

Nanoplastics

Feature	Explanation
Size	Extremely small plastic particles
Detection difficulty	Harder to detect with current testing methods
Health concerns	May penetrate cells and tissues

The **Organisation for Economic Co-operation and Development (OECD)** estimates nanoplastics may constitute a **significant share of ingested plastic particles**.

Chemical Leaching

Plastic bottles can release harmful chemicals into water.

Chemical	Source	Risk
Phthalates	Plastic softeners	Hormonal disruption
Antimony	Plastic manufacturing catalyst	Toxic exposure

High temperatures during **storage and transport in India** increase chemical leaching.

3. Regulatory Gaps in India

The bottled-water sector faces **several regulatory challenges**.

Testing Limitations

Issue	Explanation
Microplastic standards absent	Current regulations do not define permissible limits

The Food Safety and Standards Authority of India (FSSAI) has not yet set **microplastic safety thresholds**.

Enforcement Challenges

Issue	Details
Quality violations	State inspections reveal substandard bottled water
Example	Karnataka audits reported over 20% non-compliance in some surveys

14. Mental Health and Infertility: An Overlooked Link



Recent research highlights that **mental health burdens significantly affect fertility outcomes in India**, influencing reproductive health for both men and women. Despite this, **infertility is often culturally framed as a woman's failure**, even though **male factors account for nearly 40-50% of infertility cases globally**.

1. What is Infertility?

Infertility refers to the **inability of a couple to conceive after one year of regular, unprotected sexual intercourse**.

Category	Examples
Male factors	Low sperm count, poor motility
Female factors	Ovulatory disorders, hormonal imbalance
Combined factors	Both partners contribute
Unexplained infertility	No identifiable medical cause

Globally, **male infertility contributes to nearly half of cases**.

2. Impact of Mental Health on Fertility

Psychological stress can **affect reproductive physiology through hormonal and neurological pathways**.

Impact on Male Fertility

Effect	Explanation
Reduced sperm quality	Depression and stress lower sperm concentration and motility
Hormonal imbalance	Stress elevates cortisol levels, disrupting testosterone and spermatogenesis

Chronic stress can **impair sperm production and overall reproductive health**.

Impact on Female Fertility

Effect	Explanation
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Reduced probability of conception	High stress levels reduce fertility rates
Endocrine disruption	Anxiety and depression interfere with ovulation and hormonal regulation
Implantation issues	Stress hormones can affect embryo implantation

These disruptions can **delay pregnancy or increase infertility risk.**

Impact on Assisted Reproductive Technology (ART)

Impact	Explanation
Lower IVF success rates	Anxiety and depression reduce treatment effectiveness
Emotional burnout	Repeated treatment failures increase psychological stress

Psychological distress can **compound infertility challenges during fertility treatments.**

3. Social and Cultural Dimensions

In India, infertility often carries **strong social stigma.**

Cultural Challenges

Issue	Impact
Gender bias	Women often blamed for infertility
Social stigma	Emotional distress and isolation
Delayed medical care	Couples may avoid testing for male infertility

This reinforces **mental health pressures on affected couples.**

4. Fertility Transition in India

India is undergoing a **demographic fertility transition.**

Total Fertility Rate (TFR)

According to **Sample Registration System (SRS) 2023 data:**

Indicator	Data
India's TFR	~1.9 births per woman
Replacement level	2.1 births per woman

India is now **below replacement fertility level.**

15. Pariksha Pe Charcha 2026: Turning Exam Stress into Student Success



The 9th edition of Pariksha Pe Charcha (PPC) recorded over 4.5 crore registrations, the highest participation since its launch. In 2026, the programme expanded for the first time to multiple locations across India, reflecting the government's focus on student well-being and exam stress management.

What is Pariksha Pe Charcha (PPC)?

Pariksha Pe Charcha is an annual interactive outreach programme launched in 2018, where the Prime Minister interacts with students, teachers and parents to address exam stress, learning strategies and holistic education.

The programme encourages students to view exams as "Utsav" (a celebration) rather than a source of anxiety.

Key Features of the 9th Edition (2026)

Feature	Details
Participation	4.5+ crore registrations
Launch Year	2018
Target Group	Students of Classes 6–12, teachers and parents
Organising Body	Department of School Education & Literacy, Ministry of Education
Digital Platform	MyGov
Format	Interactive Town Hall dialogue with the Prime Minister
2026 Expansion	Conducted simultaneously at five locations

"Exam Warriors" Movement : The programme is inspired by the book **Exam Warriors written by Narendra Modi. The initiative promotes:

- Stress-free learning
- Holistic student development
- Positive examination mindset
- Focus on mental well-being

Significance

1. **Mental Health Awareness :** Addresses exam-related stress and anxiety among students.
2. **Participatory Governance :** Enables direct interaction between students and national leadership.
3. **Education Reform Support :** Reinforces ideas of holistic learning under the National Education Policy 2020.
4. **Digital Civic Participation :** Uses citizen engagement platforms like MyGov for participation.

UPSC Mains Question : "Exam stress among students has emerged as a major public health concern in India." Examine the role of initiatives such as Pariksha Pe Charcha in addressing student well-being. (10/15 Marks)

🏠 16. Vidyanjali Programme: Community Power Strengthening Government Schools



The Vidyanjali Programme has recently onboarded around 8.5 lakh schools and over 5 lakh volunteers, significantly expanding community participation in strengthening government schools. The initiative supports **volunteer contributions, mentoring, and infrastructure support** to improve school ecosystems.

What is the Vidyanjali Programme?

The Vidyanjali Programme is a **community and volunteer engagement initiative** launched in **September 2021** by the **Department of School Education & Literacy** under the **Ministry of Education** to strengthen **government and government-aided schools**.

It is aligned with **National Education Policy 2020**, promoting **community participation in school education**.

Feature	Details
Launch Year	2021
Implementing Body	Department of School Education & Literacy, Ministry of Education
Schools Covered	~8.5 lakh schools
Volunteers	5+ lakh volunteers
Platform	Digital volunteer engagement portal
Target Institutions	Government & Government-aided schools

Digital Platform Model : The programme operates through a **structured digital platform** connecting schools with:

- **Volunteers and alumni**
- **Civil Society Organisations (CSOs)**
- **Corporate Social Responsibility (CSR) partners**

The platform enables **approval, monitoring, validation and feedback mechanisms**, allowing states to track implementation through **dashboard-based monitoring**.

Types of Contributions

Category	Activities
Service Activities	Subject mentoring, career counselling, AI & coding workshops
Student Support	Assistance for Children with Special Needs (CWSN) , sports and life-skills development
Asset Contributions	Teaching-learning materials, ICT infrastructure, sanitation facilities
Sustainability Initiatives	Renewable energy solutions for schools

UPSC Mains Question : “Community participation is essential for improving learning outcomes in public education systems.” Examine the role of programmes such as Vidyanjali in strengthening government schools in India.

📌 17. CBSE's Three-Language Reform: Multilingual Education from Class 6



The Central Board of Secondary Education (CBSE) has announced that it will implement the revised Three-Language Formula from Class 6, in line with the National Education Policy 2020 and the National Curriculum Framework for School Education 2023. The move aims to strengthen multilingual learning and cultural integration in school education.

What is the Three-Language Formula?

The Three-Language Formula is an education policy framework designed to promote multilingualism, national integration, and preservation of regional languages.

It requires students to study three languages during school education, with flexibility in language choice.

Historical Background

Milestone	Development
1964–66	Recommended by the Kothari Commission
1968	Adopted under the National Policy on Education 1968
1986 & 1992	Continued under revised National Education Policies
2020	Updated under NEP 2020 with greater flexibility

Key Features of the Revised Implementation

Component	Provision
Total Languages	Three languages to be studied
Indian Languages Requirement	At least two must be native Indian languages
English Status	Categorised as a foreign language in the framework
Language Continuity	Recommended until Class 10 (NCFSE 2023)
Flexibility	Students may change languages in Classes 6 or 7

Examples of Indian languages: Hindi, Sanskrit, Tamil, Telugu, Kannada, Bengali etc.

Pedagogical Principles

Mother-Tongue Instruction : NEP recommends mother tongue or regional language as medium of instruction till Grade 5, preferably Grade 8.

Cognitive Benefits : Multilingual learning enhances critical thinking, cultural awareness, and cognitive development.

Cultural Integration : Encourages appreciation of India's linguistic diversity.

UPSC Mains Question

"The Three-Language Formula reflects India's attempt to balance national integration with linguistic diversity." Discuss its evolution and the challenges in implementing it in India's education system.

18. Budget 2026 Boost: Divyangjan Kaushal & Sahara Yojanas for Inclusive Empowerment



The Union Budget 2026–27 announced two new schemes – Divyangjan Kaushal Yojana and Divyang Sahara Yojana – aimed at skill development, employment and assistive technology access for persons with disabilities (Divyangjan). The initiatives reinforce India’s commitment to inclusive development under the vision of “Sabka Saath, Sabka Vikas.”

Background: Divyangjan Welfare in India

India has 2.68 crore persons with disabilities (Census 2011). Their rights and welfare are governed by the Rights of Persons with Disabilities Act 2016, which expanded recognised disability categories from 7 to 21 and mandates 4% reservation in government jobs. The new schemes aim to strengthen economic empowerment and assistive technology accessibility.

Divyangjan Kaushal Yojana

Objective : Provide industry-relevant, customised skill training to create sustainable livelihood opportunities for persons with disabilities.

Feature	Details
Focus	Skill development and employment
Target Sectors	IT, AVGC (Animation, Visual Effects, Gaming & Comics), hospitality, food services
Approach	Task-oriented training suited to different disability categories
Goal	Improve employment and financial independence of Divyangjan

Divyang Sahara Yojana

Objective : Improve availability and affordability of assistive devices for persons with disabilities.

Key Components

Component	Purpose
Support to Artificial Limbs Manufacturing Corporation of India (ALIMCO)	Increase production of assistive devices and integrate AI-enabled technologies
Strengthening PM Divyasha Kendras	Provide integrated rehabilitation services
Assistive Technology Marts	Enable trial and purchase of assistive devices

UPSC Mains Question : “Economic empowerment and assistive technology are key pillars of disability inclusion.” Examine the potential of schemes like Divyangjan Kaushal Yojana and Divyang Sahara Yojana in promoting inclusive development in India.

19. NAMASTE Scheme: First Nationwide Enumeration of Waste Pickers



The Union Government released **nationwide enumeration data of 1.52 lakh waste pickers** under the NAMASTE scheme, using the Waste Picker Enumeration App (2025). The data highlights **caste concentration, gender participation, and the scale of informal sanitation labour** in India.

Background: Informal Waste Pickers in India

Waste pickers form the backbone of India's **informal recycling economy**, collecting recyclable materials from landfills, streets, and bins.

However, they often work **without formal recognition, safety protection, or social security benefits**. The enumeration aims to **identify waste pickers and integrate them into the formal circular economy**.

Key Findings of the Enumeration

Indicator	Key Data
Total waste pickers enumerated	1.52 lakh
Women workers	48.7%
SC/ST/OBC communities	84.5% of workforce
General category workers	10.7% (≈16,329 workers)

Regional Insight: General category workers form a majority in regions such as Delhi & Goa.

What is the NAMASTE Scheme?

NAMASTE (National Action for Mechanised Sanitation Ecosystem) is a Central Sector Scheme launched in 2023 to ensure **safety, dignity and mechanisation of sanitation work**. It replaced the Self-Employment Scheme for Rehabilitation of Manual Scavengers (SRMS).

Key Feature	Details
Launch Year	2023
Type	Central Sector Scheme
Target Groups	Sewer & Septic Tank Workers and Waste Pickers
Enumeration Target	2.5 lakh waste pickers
Goal	Replace hazardous sanitation work with mechanised systems

Institutional Framework	Role
Ministry of Social Justice & Empowerment	Nodal Ministry
Ministry of Housing & Urban Affairs	Co-implementing Ministry
National Safai Karamcharis Finance and Development Corporation	Implementing agency

UPSC Mains Question

“Sanitation workers and waste pickers remain among the most vulnerable sections in India’s urban economy.” Examine how the NAMASTE scheme seeks to address issues of dignity, safety and social security in sanitation work.

🇮🇳 20. PM RAHAT Scheme: Cashless Golden-Hour Treatment for Road Accident Victims



The Government of India launched the PM RAHAT (Road Accident Victim Hospitalisation and Assured Treatment) scheme to provide cashless emergency treatment to road accident victims during the “Golden Hour”. The scheme aims to reduce road fatalities and strengthen emergency trauma care across India.

Background: Road Safety Crisis in India

India accounts for one of the **highest numbers of road accident deaths globally**.

Indicator	Data
Annual road accident deaths	~1.68 lakh deaths (MoRTH data)
Major cause	Delay in trauma care during the Golden Hour
Global goal	Reduce road fatalities by 50% by 2030

The PM RAHAT scheme forms the **Emergency Care pillar** of India’s **4E road safety strategy**.

What is the 4E Road Safety Strategy?

Component	Focus
Education	Road safety awareness
Engineering	Safer road design
Enforcement	Traffic law compliance
Emergency Care	Rapid trauma treatment

PM RAHAT Scheme : PM RAHAT (Road Accident Victim Hospitalisation and Assured Treatment) is a Central Sector Scheme launched by the Ministry of Road Transport and Highways (MoRTH) to provide **cashless treatment** for road accident victims during the **critical early hours**.

Legal Basis: The scheme derives statutory backing from **Section 162 of the Motor Vehicles (Amendment) Act 2019**, which mandates creation of a **cashless treatment mechanism** for accident victims.

Institutional Framework

Institution	Role
Ministry of Road Transport and Highways	Scheme implementation
National Health Authority	National nodal agency
State Health Agencies	State-level implementation
District Road Safety Committees	Grievance redressal

Financial Framework

Source	Purpose
Motor Vehicle Accident Fund (MVAf)	Reimbursement of hospital expenses
Insurance company contributions	Accidents involving insured vehicles
Government budget allocation	Hit-and-run or uninsured vehicle accidents

Operational Features

Provision	Details
Cashless Treatment Limit	Up to ₹1.5 lakh
Treatment Period	Maximum 7 days from accident
Hospital Network	AB-PMJAY empanelled hospitals + designated public/private hospitals
Stabilisation Treatment	24 hours (non-critical), 48 hours (critical)
Claim Settlement	Within 10 days by State Health Agencies

Digital & Emergency Integration System	Role
eDAR (Electronic Detailed Accident Report)	Digital accident verification
TMS 2.0	Claim management by NHA
112 Emergency Helpline	Coordination with first responders

Police verification via eDAR must occur within **24 hours (standard cases) or 48 hours (critical cases)**.

UPSC Mains Question : "Timely trauma care is critical for reducing road accident fatalities in India." Discuss the role of initiatives such as the PM RAHAT scheme in strengthening emergency medical response systems.

21. Grain ATMs in Bihar: Automating India's Public Distribution System



The Bihar government approved a **pilot installation of "Grain ATMs" (Annapurta machines) in Patna** to modernise the **Public Distribution System (PDS)**. The initiative aims to **automate ration distribution, reduce leakages, and ensure faster delivery of subsidised food grains.**

What are Grain ATMs (Annapurta)?

Grain ATMs, also called **Annapurta machines**, are **automated dispensing systems that distribute subsidised food grains directly to beneficiaries**, similar to how bank ATMs dispense cash. They aim to **improve transparency, reduce corruption, and provide round-the-clock access to ration distribution.**

Institutional Framework

Institution	Role
World Food Programme	Technology development support
Food Corporation of India	Grain supply and logistics
Bihar Food & Consumer Protection Department	State-level implementation
Central & State Governments	Joint maintenance and security funding

States provide **physical space for installing machines.**

Key Features

Feature	Description
Automated Dispensing	Wheat and rice dispensed directly via machines
High Capacity	Up to 50 kg grain within 5 minutes
24×7 Availability	Machines operate round-the-clock
Renewable Power	Can run using solar power
Digital Integration	Linked to PDS database via internet systems

Working Mechanism

Step	Process
Card Access	Beneficiary swipes ration/ATM card
Biometric Verification	Aadhaar authentication confirms identity
Quantity Selection	Beneficiary selects grain type and quantity
Digital Update	PDS database updated automatically with printed receipt

The system integrates with the ****National Food Security Act 2013 beneficiary database.**

UPSC Mains Question

"Technological reforms are increasingly transforming India's Public Distribution System." Examine the role of innovations such as Grain ATMs in improving food security governance.

🌐 22. Rural–Urban Migration Surge: Cities Near Capacity, Says Economic Survey



The Economic Survey 2025–26 highlighted that **continuous migration of rural youth to cities is pushing Indian urban centres close to capacity limits**. The report stresses the need to **revive rural economies and create local livelihood opportunities** to reduce migration pressure.

What is Rural–Urban Migration?

Rural–urban migration refers to the movement of people from **villages to cities in search of employment, better infrastructure, and improved living standards**.

It is primarily driven by **economic opportunities, social mobility, and better access to services in urban areas**.

Causes of Rising Rural Migration

Factor	Explanation
Infrastructure Deficit	~35% of rural households lack quality healthcare within 5 km ; school dropout rates remain above 17%
Income Disparity	Urban wages are 1.7–2 times higher than rural earnings
Aspirational Shift	Over 60% of rural youth prefer non-farm urban jobs

Emerging Urban Challenges

Issue	Impact
Urban Population Growth	Urban population increased from 31% (2011) → ~36% (2025)
Slum Expansion	Nearly 24% of urban residents live in informal settlements
Urban Unemployment	Youth unemployment 15–18% , especially among migrants
Environmental Stress	Cities face 20–40% water deficits and severe air pollution

Social Impact on Rural Areas

Issue	Effect
Ageing Villages	Nearly 12% rural population above 60 years
Agricultural Labour Shortage	Farm labour shortages increased 20–25% in several states
Community Fragmentation	Migration affects kinship networks and local institutions

UPSC Mains Question

“Rural–urban migration in India reflects both economic aspiration and structural disparities.” Examine its causes and suggest policy measures to achieve balanced regional development.

23. Food Adulteration in India: Strengthening Safety of the Food Supply Chain



The Union Minister of State for Health informed the **Rajya Sabha** about the government's measures to curb food adulteration in India, highlighting regulatory frameworks, surveillance systems, and awareness initiatives to ensure **safe and quality food for consumers**.

What is Food Adulteration? : Food adulteration refers to the intentional or accidental deterioration of food quality by adding inferior substances (adulterants) or removing essential nutrients. Common adulterants include water, urea, caustic soda, artificial dyes (e.g., Metanil Yellow), and synthetic chemicals.

Vulnerable Food Sectors

Sector	Common Adulterants
Dairy products	Water, urea, detergents
Edible oils	Mineral oils, cheaper substitutes
Spices	Artificial colours such as Metanil Yellow
Milk-based sweets	Starch, synthetic milk

Health and Economic Impact

- **Health Risks:** Organ failure, cancer, cardiac complications.
- **Food Safety Threat:** Long-term consumption of adulterants damages public health.
- **Trade Impact:** Weakens India's credibility in global food exports.

Legal and Regulatory Framework

Law / Institution	Role
Food Safety and Standards Act 2006	Primary legislation regulating food safety
Food Safety and Standards Authority of India	Apex regulator for food safety
Bharatiya Nyaya Sanhita 2023	Criminal penalties for sale of adulterated food
Consumer Protection Act 2019	Protects consumers from unsafe food products
Central Consumer Protection Authority	Enforces consumer rights

Key Government Initiatives

Initiative	Objective
Eat Right India	Promote safe, healthy and sustainable food
Detect Adulteration with Rapid Test (DART)	Household-level detection of adulterants
Food Safety on Wheels	Mobile food testing laboratories
Repurpose Used Cooking Oil (RUCO)	Convert used cooking oil into biodiesel
State Food Safety Index	Ranks states on food safety performance

UPSC Mains Question : "Food adulteration remains a major public health challenge in India." Evaluate the effectiveness of India's legal and institutional framework in addressing this issue.

24. India's First 'Cow Culture' Museum to be Set Up in Mathura



The Uttar Pradesh Braj Teerth Vikas Parishad is establishing India's first national "Cow Culture" museum in Mathura, Uttar Pradesh. The initiative aims to highlight the cultural, economic and scientific importance of indigenous cattle and promote cattle conservation and rural livelihoods.

What is the Cow Culture Museum?

The proposed museum will showcase India's historical, cultural and economic relationship with cattle, integrating traditional knowledge with modern scientific insights.

It will be located at the campus of **Pandit Deendayal Upadhyaya Veterinary Science University in Mathura.

Key Features

Feature	Details
Location	Mathura, Uttar Pradesh
Implementing Body	Uttar Pradesh Braj Teerth Vikas Parishad
Focus	Cultural, economic and scientific importance of cattle
Exhibits	Around 100 digital and physical models of indigenous cattle breeds
Technology Use	Interactive displays on nutrition and Ayurvedic properties of dairy products

Indigenous Cattle Diversity in India

India has one of the largest cattle populations in the world, with several indigenous breeds known for disease resistance, heat tolerance and adaptability.

Examples include:

- Gir, Sahiwal, Tharparkar, Red Sindhi, Ongole

Conservation of indigenous breeds is promoted through schemes like Rashtriya Gokul Mission.

UPSC Mains Question

"Indigenous cattle play a crucial role in India's rural economy and cultural traditions." Examine the significance of conserving native cattle breeds in the context of sustainable agriculture and rural livelihoods.

🌱 25. Soybean Festival in Nagaland: Promoting the 'Golden Bean' in Northeast



A two-day Soybean Festival was organised at Chümoukedima in Nagaland under the theme "From Field to Feast" to promote scientific soybean cultivation and value addition. The event highlighted the large untapped potential for soybean production in Northeast India, as Nagaland contributes only ~0.1% of India's soybean output.

About Soybean (Golden Bean)

Soybean (*Glycine max*) is an important kharif crop cultivated both as an oilseed crop and a legume, valued for its high protein and oil content.

Crop Characteristics

Feature	Details
Crop Season	Kharif
Ideal Temperature	26–30°C
Rainfall Requirement	~90 cm well-distributed rainfall
Soil Type	Fertile, well-drained loamy soils
Crop Duration	~90–120 days

Origin and Global Spread

- **Native Region:** East Asia (particularly China).
- Currently cultivated widely in tropical, subtropical and temperate regions.

Global Production Leaders

Rank	Country
1	Brazil
2	United States
3	Argentina

India is the 5th largest soybean producer globally.

Soybean Production in India

Rank	State
1	Madhya Pradesh – "Soy State of India"
2	Maharashtra
3	Rajasthan

Production is mainly concentrated in central and western India.

Leguminous Crop Advantage : Soybean belongs to the Fabaceae family, whose plants form symbiotic root nodules with Rhizobium bacteria.

This allows them to fix atmospheric nitrogen, thereby improving soil fertility.

Examples of other legumes:

- Gram, Lentil, Pea, Groundnut

UPSC Mains Question : "Crop diversification is essential for improving farm income and soil health." Discuss the role of oilseed crops like soybean in achieving sustainable agriculture in India.

🎵 26. Grammy Awards 2026: Global Diversity Takes Centre Stage



The 68th Grammy Awards (2026) witnessed several historic wins and new categories, reflecting the growing global diversity of the music industry. Notable highlights included a first Spanish album winning Album of the Year and the Dalai Lama receiving his first Grammy Award.

About the Grammy Awards

The Grammy Awards are among the most prestigious international music awards, recognising artistic and technical excellence in the recording industry. They are presented annually by the Recording Academy in the United States.

Feature	Details
First Awarded	1959
Organising Body	Recording Academy
Recognition	Music albums, songs, performances and production
Trophy Design	Gramophone-shaped trophy
Name Origin	Derived from "gramophone", the early sound recording device

Indian Presence at the Grammys

India has had a notable presence in the Grammy Awards, with around 15 Indian winners over the years.

Prominent winners include:

- A. R. Rahman
- Zakir Hussain

These achievements highlight India's global cultural footprint in music.

Key Highlights of the 68th Grammy Awards (2026)

Category / Achievement	Winner / Detail
Album of the Year	Bad Bunny - <i>Debí Tirar Más Fotos</i> (first Spanish album to win)
Song of the Year	Billie Eilish - <i>Wildflower</i>
Rap Milestone	Kendrick Lamar became the most awarded rapper (27 Grammys)
Unique Achievement	Dalai Lama won his first Grammy for audiobook narration
EGOT Status	Steven Spielberg achieved EGOT after winning Best Music Film

What is EGOT? : EGOT refers to artists who have won all four major American entertainment awards:

Award	Field
Emmy	Television
Grammy	Music
Oscar (Academy Award)	Film
Tony	Theatre

Achieving EGOT status represents exceptional cross-domain artistic achievement.

New Categories Introduced

The Grammys have introduced new categories to reflect **evolving musical trends and global diversity**:

- African Music
- Pop Dance
- Alternative Jazz

UPSC Mains Question : "Global cultural awards increasingly reflect diversity in language and artistic expression." Examine the significance of international platforms such as the Grammy Awards in shaping global cultural exchange.

27. Budget 2026 Push: India Targets Global Leadership in Medical Tourism & Biopharma



The Union Budget 2026–27 announced major initiatives to **position India as a global hub for medical tourism, biopharmaceutical manufacturing, and Ayurveda-based healthcare**. The measures include **regional medical hubs, a new Biopharma SHAKTI mission, and expansion of research and training infrastructure**.

Background: Medical Tourism in India

Medical tourism refers to people travelling across borders to obtain **medical treatment at lower cost or with better expertise**.

India has emerged as a major destination due to:

- **Affordable treatment costs (often 30–70% cheaper than developed countries)**
- **Highly skilled doctors and advanced hospitals**
- **Combination of modern medicine and traditional wellness therapies**

Key Healthcare Announcements in Union Budget 2026–27

Initiative	Details
Regional Medical Hubs	Five hubs under Public-Private Partnership (PPP) integrating allopathic and traditional medicine
Biopharma SHAKTI Mission	₹10,000 crore scheme to boost production of biologics and biosimilars
Ayush Infrastructure	Three new **All India Institute of Ayurveda and upgraded Ayush pharmacies & labs
Clinical Trial Network	Creation of 1,000+ accredited clinical trial sites
Regulatory Reform	Strengthening of **Central Drugs Standard Control Organisation with a scientific review cadre
Skill Development	Establishment of **three new National Institute of Pharmaceutical Education and Research campuses

What are Biologics and Biosimilars?

Term	Meaning
Biologics	Medicines produced from living organisms (e.g., vaccines, monoclonal antibodies)
Biosimilars	Highly similar versions of biologic drugs after patent expiry

They are used for **complex diseases such as cancer, autoimmune disorders, and diabetes.**

Strategic Impact

Healthcare Value Chain Upgrade

- Moves India from **generic drug production to high-value biologics.**

Global Medical Tourism Hub

- Integration of **modern medicine with Ayurveda** creates a unique **“Holistic Health” brand.**

Employment Generation

- New hubs and research facilities will create **jobs for doctors, researchers and healthcare workers.**

Import Substitution

- Domestic biosimilar manufacturing reduces **dependence on expensive imported therapies.**

Global Research Destination

- Accredited clinical trial sites strengthen **credibility of Indian drug research.**

Agricultural Linkages

- Growth of Ayurveda exports benefits **farmers cultivating medicinal plants.**

UPSC Mains Question

“India has the potential to become a global hub for medical tourism and biopharmaceutical innovation.” Examine the policy measures required to realise this vision.

28. Rajaji Remembered: Bust of C. Rajagopalachari Unveiled at Rashtrapati Bhavan



The President of India **Droupadi Murmu** unveiled a bust of **Chakravarti Rajagopalachari (Rajaji)** at **Rashtrapati Bhavan** during the **Rajaji Utsav**. The event is part of a broader effort to **honour national leaders and move beyond colonial-era symbols**.

Who was C. Rajagopalachari?

Chakravarti Rajagopalachari (1878–1972), popularly known as **Rajaji**, was a prominent **freedom fighter, statesman, social reformer, and writer**.

He holds the distinction of being the **first and only Indian Governor-General of independent India (1948–1950)**.

Role in the Freedom Struggle

Movement / Event	Contribution
Non-Cooperation Movement	Active participant under Gandhi
Vaikom Satyagraha	Supported temple entry movement in Travancore
Civil Disobedience Movement	Key Congress leader
Vedaranyam Salt Satyagraha (1930)	Led the Madras Presidency Salt March parallel to Gandhi's Dandi March

Social Reform Contributions

Reform	Details
Temple Entry Reform	Passed Madras Temple Entry Authorisation Act (1939) allowing Dalits to enter temples
Anti-Untouchability Campaign	Advocated social equality and caste reform

Political Contributions

Initiative	Significance
C.R. Formula (1944)	Proposed compromise between Indian National Congress and All-India Muslim League over Pakistan demand
Swatantra Party (1959)	Founded a pro-free market party opposing socialist economic policies

Positions Held After Independence

Office	Period / Role
Governor-General of India	1948–1950 (only Indian to hold the office)
Governor of West Bengal	Early post-independence administration
Union Home Minister	Served in central government
Chief Minister of Madras State	Headed the state government

Major Awards

Award	Year
Bharat Ratna	1954 (one of the first recipients)
Sahitya Akademi Award	1958

UPSC Mains Question

“Chakravarti Rajagopalachari was a statesman who contributed both to India’s freedom movement and post-independence political thought.” Discuss his contributions.

🌳 29. Great Nicobar Project Sparks Debate Over Tribal Land Rights



The Tribal Council of Little and Great Nicobar alleged that district authorities asked tribal members to sign “surrender certificates” for tsunami-hit ancestral lands linked to the ₹72,000-crore Great Nicobar Mega Project. The issue has raised concerns about tribal land rights, consent procedures, and compliance with forest rights laws.

Background: Tribal Land Rights in Nicobar Islands

The Nicobarese and Shompen communities inhabit the Great Nicobar Island, part of the Andaman and Nicobar archipelago.

Their land and forest rights are protected under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, which requires due process and consent before land diversion.

Key Concerns Raised by the Nicobar Tribal Council

Issue	Details
Consent Process	Allegation that tribal members were asked to sign surrender documents without clear explanation
Incomplete Forest Rights Settlement	Community claims Forest Rights Act procedures remain unfinished
Delayed Rehabilitation	Many displaced tribal families still await return to ancestral villages 21 years after the 2004 tsunami

About the Great Nicobar Tribal Council

Feature	Details
Status	Apex representative body of the Nicobarese Scheduled Tribe
Role	Acts as the consultation interface with UT authorities
Advocacy	Raises tribal rights issues before authorities such as the National Commission for Scheduled Tribes

Great Nicobar Development Project

The Great Nicobar Project, officially titled **Holistic Development of Great Nicobar Island**, was approved by the Union Cabinet in 2021.

Feature	Details
Estimated Cost	₹72,000 crore
Total Island Area	~910 sq km
Project Area	166 sq km (~10% of island area)
Implementation Agency	Andaman and Nicobar Islands Integrated Development Corporation Limited
Policy Conceptualisation	NITI Aayog
Timeline	Phased 30-year development plan

Major Components of the Project

Component	Description
International Container Transshipment Terminal	Proposed at Galathea Bay
Greenfield International Airport	To improve connectivity
Power Infrastructure	450 MVA hybrid gas-solar power plant
Greenfield Township	Urban infrastructure for economic development

Significance of the Project

Strategic Importance

- Strengthens India's maritime presence in the Indo-Pacific region.

Trade and Logistics

- Transshipment port could reduce dependence on foreign ports like Singapore and Colombo.

Economic Development

- Expected to boost shipping, tourism, and employment opportunities.

Environmental and Tribal Concerns

Concern	Explanation
Tribal Rights	Risk of displacement of Nicobarese and Shompen tribes
Forest Diversion	Large-scale diversion of tropical rainforest ecosystems
Biodiversity Impact	Threat to endangered species and fragile island ecology
Legal Compliance	Questions over compliance with Forest Rights Act and environmental clearance procedures

UPSC Mains Question

"Large infrastructure projects in ecologically fragile and tribal-dominated regions often generate conflicts between development and rights." Examine this statement in the context of the Great Nicobar Project.

30. World Cancer Day

- **World Cancer Day** is observed on **4 February** to promote awareness, prevention, early detection, and treatment of cancer.
- The current observance is part of the **second phase of a three-year campaign (2025–2027)** with the theme **“United by Unique”**, led by the **Union for International Cancer Control (UICC)**.
- The **UICC**, headquartered in **Geneva**, is the oldest and largest organisation working to reduce the global cancer burden.
- World Cancer Day was established in **2000** at the **World Summit Against Cancer for the New Millennium** under the **Charter of Paris**.
- The initiative aligns with **SDG Target 3.4**, which seeks to **reduce premature mortality from non-communicable diseases (NCDs) by one-third by 2030**.

Global Cancer Landscape

- A global analysis by **WHO and the International Agency for Research on Cancer (IARC)** indicates that **37.9% of cancer cases worldwide are potentially preventable**.
- **Lung, stomach, and cervical cancers** together account for **nearly half of all preventable cases globally**.
- **Tobacco smoking** is the leading preventable cause (**15.1%**), followed by **infections (10.2%)** and **alcohol consumption (3.2%)**.
- The burden is **higher in men (45.4%) than in women (29.7%)**. Tobacco accounts for **23.1% of male cancer cases**, while **infections such as HPV** are a major cause among women.

31. BAFTA Awards 2026

- **Context (PIB):** The Manipuri-language film **Boong** won the **Best Children’s & Family Film** award at the **79th BAFTA Awards (2026)**, becoming the **first Indian film to win in this category**.
- The film, directed by **debutant Lakshmipriya Devi**, portrays a young boy’s emotional journey to reunite his fractured family amid **social and political unrest in Manipur**.

About the BAFTA Awards

- The **BAFTA Awards** are presented annually by the **British Academy of Film and Television Arts (BAFTA)** in **London** to recognise excellence in **British and international film, television, and video games**.
- They are widely regarded as the **British counterpart to the Academy Awards (Oscars)**.
- **Indian Milestone: Rohini Hattangadi (1983)** became the **first Indian actor to win a competitive BAFTA**, receiving the **Best Supporting Actress** award for her role as **Kasturba Gandhi in the film Gandhi**.

32. Winter Olympics 2026

- **Context (AJ):** The 25th Winter Olympic Games (Milano Cortina 2026) were held in Italy from 6–22 February 2026.
- The Games were jointly hosted by two cities – Milan and Cortina d’Ampezzo, marking the first official co-hosting of the Winter Olympics by two cities.
- **New Sport:** Ski Mountaineering (Skimo) was introduced as a new Olympic event in this edition.
- **Medal Tally:** Norway finished at the top of the medal table for the fourth consecutive time.

About the Olympics

- The ancient Olympic Games originated in Olympia, Greece, in the 8th century BC and were held in honour of Zeus.
- The Winter Olympics began in 1924 and are organised every four years, featuring sports played on snow and ice.
- France is scheduled to host the 2030 Winter Olympic Games.
- The Olympics are governed by the International Olympic Committee (IOC), headquartered in Lausanne, Switzerland.

FEBRUARY 2026

HISTORY

ART & CULTURE

1. Devnimori Buddha Relics Displayed in Sri Lanka
2. Neolithic Discoveries at Tekkalakote, South India
3. Indian Inscriptions Found in Egyptian Tombs
4. Alexander's Lost City Rediscovered in Iraq
5. Shivaji Maharaj Jayanti Celebrated Nationwide
6. Battle of Serengsia: Ho Tribal Resistance
7. Protocols Issued for Singing Vande Mataram
8. Ol Chiki Script Centenary Celebrations
9. Michelangelo: Renaissance Master Highlighted



1. 🌍 Devnimori Buddha Relics Displayed in Sri Lanka: Cultural Diplomacy Through Heritage



India is exhibiting the **Devnimori Relics of Lord Buddha** at **Gangaramaya Temple** in Colombo, Sri Lanka from **4–10 February 2026** as part of cultural diplomacy outreach. The exhibition aims to **strengthen India–Sri Lanka Buddhist cultural ties** and highlight India’s ancient Buddhist heritage.

What are the Devnimori Buddha Relics?

The **Devnimori relics** are sacred remains associated with **Gautama Buddha**, discovered at the **Devnimori archaeological site** near **Shamlaji** in **Gujarat’s Aravalli district**.

The site represents an **important Buddhist centre** in western India during the **early centuries of the Common Era**.

Excavation and Discovery

Aspect	Details
Archaeological Site	Devnimori, near Shamlaji (Aravalli district, Gujarat)
Year of Excavation	1957
Archaeologist	Prof. S. N. Chowdhry
Monument Type	Buddhist stupa complex

The discoveries confirmed the **spread of Buddhism in western India**, which is traditionally associated more with eastern and northern regions.

Key Archaeological Discoveries

Discovery	Description
Relic Casket	Stone casket made of green schist found inside the stupa at ~24 ft depth
Sacred Inscription	Brahmi script inscription in Sanskrit reading “ Dashabala Sharira Nilaya ”
Copper Container	Container with flat base and fitted lid for relic preservation
Inner Offerings	Silk cloth fragments, holy ashes, black clay covering
Gold-Coated Bottle	Silver–copper miniature amphora-style bottle storing sacred relics

Preservation of the Relics

The relics are currently preserved in an **air-tight glass desiccator**, preventing **moisture exposure and deterioration of organic materials**.

Devnimori Site Importance

Feature	Details
Region	Western India (Gujarat)
Monument Type	Buddhist stupa complex
Cultural Period	Early centuries CE
Religious Importance	Evidence of Buddhist relic worship

2. 🏠 Neolithic Discoveries at Tekkalakote: Window into South India's Early Settlements



Recent excavations at **Tekkalakote** in Ballari district, Karnataka have uncovered **Neolithic artefacts and human skeletal remains** dating back 3,000–5,000 years. The findings reveal a **multi-period settlement** spanning the Neolithic to the Early Historic period, offering insights into early life in southern India.

What is the Neolithic Period?

The **Neolithic Age (New Stone Age)** marks the phase when humans began **agriculture, animal domestication, and permanent settlements**, replacing earlier nomadic lifestyles.

In India, the Neolithic period generally spans **around 7000 BCE to 2000 BCE**, with significant regional variations.

About Tekkalakote Archaeological Site

Feature	Details
Location	Tekkalakote, Ballari district, Karnataka
Cultural Phase	Neolithic to Early Historic period
Age of Discoveries	~3,000–5,000 years old
Importance	Major Neolithic settlement in South India

The site provides evidence of **continuous human occupation across multiple historical periods**.

Key Archaeological Discoveries

Category	Evidence Found
Settlement Architecture	Circular thatched huts; some had an “umbrella” design supported by a central post
Burial Practices	Extended pit burials and urn burials
Ritual Evidence	Ash mounds indicating ritual burning of cattle dung
Early Gold Use	Ear ornaments and toe rings showing early gold craftsmanship
Ceramic Traditions	Burnished Grey Ware and Black-and-Red Ware pottery

Decorative Motifs on Pottery

Pottery fragments featured engravings of:

- Bulls, Snakes, Peacocks

These motifs provide clues about **religious beliefs, symbolism, and cultural practices**.

UPSC Mains Question

“Archaeological discoveries from Neolithic sites in South India provide crucial insights into early agricultural and settlement patterns.” Discuss with examples.

3. 🗿 Indian Inscriptions Found in Egyptian Tombs Reveal Indo-Roman Connections



Researchers documented nearly **30 Indian inscriptions** inside tombs of the ****Theban Necropolis** in Luxor, Egypt. The inscriptions – written in **Tamil-Brahmi, Sanskrit, Prakrit and Kharosthi** – date to the **1st-3rd centuries CE**, indicating the **presence and inland movement of Indian traders during the Indo-Roman trade era.**

Body

Location and Chronology of the Discovery

Feature	Details
Archaeological Site	Theban Necropolis / Valley of the Kings, Egypt
Number of Inscriptions	~30
Time Period	1st-3rd centuries CE
Historical Context	Indo-Roman trade networks

The inscriptions suggest that **Indian merchants and travellers visited inland Egyptian sites**, not just coastal trade ports.

Languages and Scripts Identified

Language / Script	Region of Origin
Tamil-Brahmi	Early historic Tamil region
Sanskrit	Pan-Indian scholarly language
Prakrit	Widely used vernacular in ancient India
Gandhari-Kharosthi	Northwestern India / Gandhara region

This diversity reflects **pan-Indian participation in overseas trade networks.**

Notable Epigraphic Insights

Evidence	Interpretation
“Cikai Korṛaṇ” inscription (appears 8 times)	Possibly indicates repeated visits or prolonged presence
Travel phrase “Kopāṇ varata kantan” (“came and saw”)	Similar to Mediterranean graffiti traditions
Tamil name parallels	Names such as Cātaṇ and Kiraṇ known from Tamil-Brahmi inscriptions in South India
Dynastic link	Reference connected to the Kshaharata dynasty of western India (1st century CE)

Berenike-Sangam Connection : The name element **“Korṛaṇ”** is also found in inscriptions at **Berenike**, a Red Sea port used in Indo-Roman trade.

It also appears in:

- Sangam literature
- Pugalur inscriptions of the Chera dynasty (2nd-3rd century CE)

This demonstrates **cultural continuity between Tamil regions and Mediterranean trade centres.**

Historical Significance

Evidence of Inland Mobility

- Indians travelled **beyond coastal ports into Egypt's interior.**

Indian Ocean Trade Networks

- Reinforces the importance of **Indo-Mediterranean maritime trade** during the early Common Era.

Cultural Interaction

- Shows **linguistic and cultural exchange between India and the Roman world.**

Literacy Among Traders

- Graffiti inscriptions suggest **functional literacy among merchants and travellers.**

Indo-Roman Trade (Context)

Feature	Details
Period	Mainly 1st century BCE - 3rd century CE
Trade Goods from India	Spices, pepper, pearls, textiles, ivory
Imports into India	Gold coins, wine, glassware
Key Evidence	Roman coins in South India, ports like Arikamedu

UPSC Mains Question

"Archaeological and epigraphic discoveries provide important evidence of India's participation in ancient global trade networks." Examine with reference to the Indo-Roman trade.

4. Alexander's Lost City Charax Spasinou Rediscovered in Iraq



An international team of archaeologists has identified the ancient city **Charax Spasinou** in southern Iraq. The city was originally founded by **Alexander the Great** in 324 BC as **Alexandria on the Tigris**, serving as a strategic trade hub linking **Mediterranean commerce with India and China**.

Foundation and Location

Feature	Details
Founder	Alexander the Great (324 BC)
Original Name	Alexandria on the Tigris
Later Name	Charax Spasinou
Location	Near the confluence of **Tigris River and the Karun River (ancient Eulaeus)
Region	Southern Mesopotamia near the modern Iran-Iraq border

The site occupied a **strategic location controlling waterways connecting Mesopotamia with the Persian Gulf**.

Reconstruction and Political Role

After destruction by flooding, the city was rebuilt by **Hyspaosines**, a satrap who later became ruler of the **Characene Kingdom**.

Aspect	Details
Rebuilder	Hyspaosines
New Name	Charax Spasinou
Political Role	Capital of the Characene (Mesene) Kingdom
Strategic Importance	Controlled maritime and river trade routes

The kingdom acted as an intermediary between the ****Roman Empire** and the **Parthian Empire**.

Economic and Trade Significance

For nearly **five centuries**, the city functioned as a major commercial gateway.

Trade Network

Trade Route	Linkages
Mediterranean route	Through Palmyra
Persian Gulf maritime routes	Connected to Indian Ocean trade
Long-distance trade	Linked Mediterranean markets with India and China

Goods moving through the region included **spices, textiles, pearls, and luxury goods**.

Urban Planning Features

Geophysical surveys reveal that the city followed the **Hippodamian grid system**, a planned urban layout characteristic of Hellenistic cities.

Urban Feature	Description
City Layout	Hippodamian grid pattern

Residential Blocks	Larger than those in many Hellenistic cities
Planning Model	Greek-style urban design adapted to Mesopotamian environment

Decline of the City

The importance of Charax Spasinou declined in the **3rd century AD** due to:

- **Westward shift of the Tigris River**, affecting port access
- Rise of the **Sassanian Empire**, which altered regional political and trade dynamics

Historical Significance

Hellenistic Expansion

- Demonstrates Alexander's strategy of founding **strategic cities to control trade and administration.**

Intercontinental Trade

- Served as a key node linking **Mediterranean, Persian Gulf and Indian Ocean trade networks.**

Urban Planning

- Example of **Greek urban planning applied in Mesopotamian geography.**

Geographical Impact

- Shows how **river shifts could transform economic geography in ancient civilizations.**

UPSC Mains Question

"Trade routes linking the Mediterranean world with India shaped the political and economic geography of ancient West Asia." Discuss with suitable examples.

(10/15 Marks)

✂ 5. Chhatrapati Shivaji Maharaj Jayanti: Celebrating the Founder of the Maratha State



Chhatrapati Shivaji Maharaj Jayanti is observed on **19 February** to commemorate the birth anniversary of **Chhatrapati Shivaji Maharaj**, the founder of the Maratha state. The first public celebration was initiated in **1870 by Jyotirao Phule at Raigad Fort**, later popularised by **Bal Gangadhar Tilak** to mobilise anti-colonial nationalist sentiment.

Early Life and Rise

Feature	Details
Birth	1630 at Shivneri Fort , Maharashtra
Parents	Shahaji Bhonsle and Jijabai
Coronation	Crowned Chhatrapati in 1674 at Raigad Fort
Political Vision	Establishment of Hindavi Swarajya (self-rule of native people)

Shivaji built an **independent Maratha kingdom** by confronting the **Mughal Empire and Deccan Sultanates such as Bijapur and Golconda**.

Governance and Administration

Institution / Policy	Description
Ashta Pradhan Council	Eight-member ministerial council managing finance, defence, foreign affairs and justice
Administrative Language	Promoted Marathi and Sanskrit , reducing Persian influence
Meritocracy	Appointments based on ability rather than heredity
Social Policy	Protection of civilians, women and places of worship

Military and Naval Strategy

Strategy	Details
Ganimi Kava	Guerrilla warfare tactics enabling small forces to defeat larger armies
Standing Army	Soldiers paid directly in cash , avoiding jagir-based feudal control
Naval Development	Fortified naval bases at **Sindhudurg Fort and **Vijaydurg Fort
Title	Often regarded as the Father of the Indian Navy

Major Events

- Capture of **Torna Fort in 1646** at age 16
- Defeat of Bijapur general ****Afzal Khan** using the concealed weapon **Wagh Nakh** (tiger claw)

Economic and Revenue Policies

Policy	Description
Revenue Reforms	Strengthened direct relationship between state and peasants
Chauth	Tax equal to one-fourth of revenue collected from neighbouring territories
Sardeshmukhi	Additional 10% levy asserting Maratha sovereignty

These measures helped **finance military campaigns and expand Maratha influence.**

Historical Significance

State Formation

- Established the **Maratha state**, which later became the dominant power in 18th-century India.

Administrative Innovation

- Developed **efficient governance and decentralised military administration.**

Maritime Security

- Strengthened India's **western coastal defence against European naval powers.**

National Inspiration

- His legacy became a **symbol of resistance and self-rule during the freedom movement.**

UPSC Mains Question

"Chhatrapati Shivaji Maharaj combined administrative innovation with military strategy to establish a powerful regional state." Discuss.

6. 🗡️ Battle of Serengsia (1837): Ho Tribal Resistance Against British Rule



Ho Adivasi activists have objected to the **Jharkhand government's decision to commemorate the Battle of Serengsia on February 2**, arguing that **January 1-2 mark the actual martyrdom of Ho leaders**. The controversy highlights concerns over preserving the **historical accuracy of tribal resistance movements.**

About the Battle of Serengsia

The Battle of Serengsia (1837) was the **final decisive confrontation between the Ho tribe and the British East India Company** in the Kolhan region.

Feature	Details
Year	1837
Location	Serengsia Valley near Chaibasa , present-day Jharkhand
Communities Involved	Ho tribe vs British East India Company
British Commander	Captain Thomas Wilkinson

The conflict was part of a **broader series of tribal uprisings in eastern India against colonial expansion.**

Causes of the Uprising

Cause	Explanation
Colonial Expansion	British occupation of the Singhbhum region
Diku Interference	Entry of outsider landlords (called <i>Dikus</i>)
Taxation Policy	Imposition of the Plough Tax on tribal cultivators
Loss of Autonomy	British attempts to control the Kolhan tribal territory

These measures disrupted the **traditional tribal socio-economic system**.

Key Leaders of the Resistance

Leader	Role
**Poto Ho	Principal leader of the Ho resistance
Nara Ho	Associate rebel leader
Boro Ho	Tribal commander
Pandua Ho	Rebel participant

The Ho warriors relied primarily on **traditional weapons such as bows and arrows**.

Warfare Strategy

The rebels adopted **guerrilla tactics**, using the **dense forests and hilly terrain of Kolhan** to ambush British forces.

This strategy initially inflicted **heavy casualties despite limited weaponry**.

Outcome of the Battle

Outcome	Details
Military Result	British victory due to superior firearms
Execution	Leader Poto Ho was publicly hanged on 1 January 1838
Administrative Change	Formation of the Kolhan Government Estate (1837)

Aftermath: Wilkinson's Rule

Following the uprising, the British introduced **Wilkinson's Rule** to stabilise the region.

Feature	Description
Governance System	Recognition of the Manki-Munda tribal administrative system
Objective	Maintain peace while ensuring British control
Structure	Local tribal chiefs retained limited authority

The **Manki-Munda system** was a traditional governance structure of the **Ho tribe**, organising villages under **Mundas (village heads)** and **Mankis (regional chiefs)**.

UPSC Mains Question

"Tribal uprisings in colonial India were often triggered by economic exploitation and disruption of traditional governance structures." Examine with reference to the Ho uprising and the Battle of Serengsia.

7. Protocols Notified for Singing Vande Mataram



The Ministry of Home Affairs (MHA) issued the first formal protocols for singing *Vande Mataram*, especially when performed along with the National Anthem of India. The guidelines aim to establish uniform ceremonial practices at official events and state functions.

Key Guidelines Issued by MHA

Protocol	Description
Order of Performance	When both are played, Vande Mataram must be sung before the National Anthem
Official Version	The approved six-stanza version should be performed during formal state events
Standing Requirement	Audience must stand in attention as a mark of respect
Film Exception	Standing not mandatory if played in newsreels or documentaries

These rules aim to **standardise ceremonial etiquette across government functions.**

About *Vande Mataram*

Aspect	Details
Author	Bankim Chandra Chattopadhyay
Year of Composition	1875
Literary Source	Included in the novel Anandamath (1882)
Publication	First appeared in the magazine Bangadarshan
Structure	Six stanzas - first two mainly Sanskrit, remaining Bengali
Meaning	"I praise thee, Mother" , symbolising devotion to the motherland

Historical Milestones

Event	Details
First Public Performance	Sung by **Rabindranath Tagore at the **Indian National Congress session in Calcutta (1896)
Pre-Independence Status	First two stanzas adopted as National Song in 1937 by the Congress Working Committee
Post-Independence Recognition	Declared National Song on 24 January 1950 by **Rajendra Prasad in the Constituent Assembly

Constitutional and Legal Position

Aspect	Details
Constitutional Status	Not explicitly mentioned in the Constitution
Fundamental Duty	Article 51A(a) mandates respect for the National Anthem , not the National Song
Symbolic Role	Remains an important symbol of India's freedom movement and nationalism

UPSC Mains Question

"National symbols and patriotic songs played a crucial role in India's freedom movement and continue to shape civic identity." Discuss with reference to *Vande Mataram*.

8. Ol Chiki Script Centenary

- The **Ministry of Culture** organised the **centenary celebrations of the Ol Chiki script** in **New Delhi**.
- The script was **developed in 1925** by **Pandit Raghunath Murmu**, popularly known as **Guru Gomke**.
- It was designed as a **scientific writing system for the Santhali language**, replacing earlier borrowed scripts such as **Devanagari, Roman, Bengali, and Odia**, which could not accurately represent its phonetic structure.
- **Structure:** The script contains **30 letters – 6 vowels and 24 consonants** – and is written **from left to right**.
- **Design:** The shapes of the letters are derived from **natural forms and everyday objects**, making them easier for the tribal community to learn.
- **Geographical Use:** Ol Chiki is used among **Santhali-speaking communities in Jharkhand, West Bengal, Odisha, and Assam**, and also among speakers in **Nepal and Bangladesh**.
- **Constitutional Recognition:** **Santhali** was included in the **Eighth Schedule of the Constitution** in **2003** through the **92nd Constitutional Amendment**, with **Ol Chiki** recognised as its script.
- **Recent Development:** In **December 2025**, the **Constitution of India** was **officially translated and released in the Santhali language using the Ol Chiki script** for the first time.

9. Michelangelo

- **Context (LM):** A previously unknown **red-chalk sketch by Michelangelo** was recently discovered and sold at a **record price**.
- **Michelangelo** was an Italian **sculptor, painter, architect, and poet** of the **Renaissance period**.
- He is regarded, along with **Leonardo da Vinci** and **Raphael**, as one of the **“Trinity of Great Masters”** of the Renaissance.
- His works reflected **Renaissance Humanism**, emphasising the **realistic depiction of the human body** to convey **divine beauty and emotional expression**.
- He is famous for his **muscular precision in sculpture**, seen in masterpieces such as **David, Pietà, and Moses**.
- **Architectural Contribution:** Michelangelo designed the **dome of St. Peter’s Basilica in the Vatican** and contributed to the development of **Mannerist architecture** through innovative use of **space and columns**.