La Excellence
— IAS Academy —

SEPTEMBER, 2026

Prelims Fact Sheet

Your Monthly Guidance for UPSC Prelims



- Current Affairs Deep Dive
- History & Culture
- Environment & Ecology
- Polity & Economy
- Science & Technology

50+ Key Facts I Segregated Section wise

Ashok Nagar	Kompally	Himayat Nagar	Bangalore	Kolkata
9052 29 29 29	9052 40 29 29	9000 29 64 24	9121 44 29 29	kolkata@laex.in

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1. Polity & Governance

1.1 Additional Official Language Status for Tulu in Coastal Karnataka

Context:
The Karnataka Cabinet has granted Tulu additional official-language status for government work in Dakshina Kannada and Udupi districts. The State will provide about **₹82 lakh** a year for translation, staff training and language-use needs.



Explanation:

- **Language family:** Tulu is a **Dravidian** language spoken mainly in Dakshina Kannada and Udupi (Karnataka) and in parts of Kasaragod district (Kerala).
- **Constitutional basis: Article 345** lets a State Legislature adopt one or more languages in use in the State, or Hindi, for official purposes.
- **State law:** the **Karnataka Official Language Act, 1963** makes Kannada the official language and permits English for specified purposes.
- **Scope:** the recognition is regional and administrative; it does not make Tulu an official language of the Union.
- **In practice:** Tulu can now be used in local administration, supported by translation and training.
- **Not the Eighth Schedule:** Tulu is not among the **22 languages** in the Eighth Schedule; State official-language status and Eighth Schedule recognition are constitutionally distinct.

1.2 Recognition of Same-Sex Partners as Nominees for Medical Decision-Making

Context: The Union Health Ministry and the National Medical Commission (NMC) have told the Delhi High Court that a competent adult may nominate a partner, including a same-sex partner, to take medical decisions if they later lose decision-making capacity, subject to safeguards.



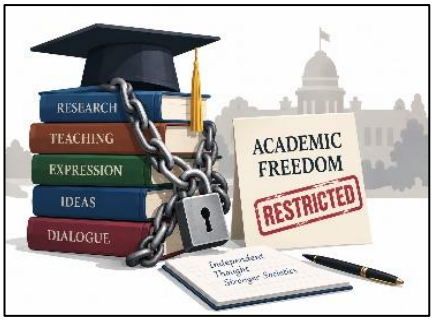
Explanation:

- **Patient autonomy:** a competent adult has the right to make informed decisions about their own medical treatment.
- **No exclusion:** an authorised partner should not be excluded because of sex, gender, sexual orientation or the absence of a legally recognised marriage.
- **Without a nomination:** a partner may, in suitable cases, be treated as a **"next friend"** or person in a relationship of care, after verification.
- **Common Cause v. Union of India (2018):** the Supreme Court recognised **Advance Medical Directives (living wills)** under **Article 21**; the procedure was simplified in 2023.
- **Supriyo v. Union of India (2023):** the Court discussed practical entitlements for queer couples, including being treated as family for certain medical decisions.
- **Scope:** the issue concerns medical decision-making, not legal recognition of same-sex marriage.

1.3 Academic Freedom in India: Findings of the Free to Think 2026 Report

Context: Scholars at Risk's Free to Think 2026 report has placed India's Academic Freedom Index (AFI) value at 0.14, in the "severely restricted" category. The finding has renewed debate on research, teaching and institutional autonomy in India.

Explanation:



- **Scholars at Risk (SAR):** an international network that protects scholars and promotes academic freedom.
- **Free to Think:** SAR's annual report documenting attacks on scholars, students and higher-education institutions.
- **What the AFI measures:** freedom to research and teach, academic exchange and dissemination, institutional autonomy, campus integrity, and academic and cultural expression.
- **Scale:** the AFI runs from **0 to 1**; a higher value means greater academic freedom.
- **India's trend:** its value fell from **0.16 in 2024 to 0.14**.
- **Global picture:** SAR recorded **382 attacks across 59 countries and territories** between July 2025 and June 2026.
- **Constitutional position:** **Article 19(1)(a)** protects free speech, subject to **Article 19(2)**; academic freedom is not separately listed as a Fundamental Right.

1.4 Regulating Misleading '100%' Claims on Food Products: CCPA Action

Context:

The Central Consumer Protection Authority (CCPA) has intensified action against food companies using broad "100%" claims that may suggest absolute purity or completeness. The Food Safety and Standards Authority of India (FSSAI) has also asked food businesses to drop such claims from labels, packaging and advertisements.

Explanation:



- **CCPA:** the apex consumer-protection regulator set up under **Section 10 of the Consumer Protection Act, 2019**; it became operational in 2020.
- **Mandate:** protects **consumers as a class** against unfair trade practices and false or misleading advertisements.
- **How it acts:** inquiries **suo motu**, on complaints or on the Centre's direction, through an Investigation Wing headed by a Director-General.
- **Powers (Section 21):** can order misleading advertisements to be discontinued or modified and penalise manufacturers, traders and endorsers.
- **Other remedies:** recall of unsafe goods, withdrawal of unsafe services and refund of prices.
- **FSSAI:** set up under the **Food Safety and Standards Act, 2006**; regulates food safety, labelling and claims.
- **Distinction:** CCPA protects consumer rights broadly, while FSSAI regulates food safety and standards specifically.

1.5 Supreme Court Safeguards against Arbitrary Re-Arrest

Context: The Supreme Court has ruled that a person released because the first arrest violated constitutional safeguards cannot be re-arrested merely on fresh grounds prepared by the police. Re-arrest needs the Magistrate's prior approval and full compliance with Article 22.

Explanation:

- **Article 22(1):** an arrested person must be told the **grounds of arrest** and has the right to consult and be defended by a lawyer.
- **Written grounds:** the Court held that grounds must be given **in writing, in a language the person understands**.

- **Article 22(2):** the person must be produced before the nearest Magistrate within **24 hours**, excluding travel time.
- **Effect of breach:** non-compliance makes the detention illegal and unconstitutional.
- **Not bail:** release after an unlawful arrest corrects an invalid loss of liberty; it differs from release on bail.
- **No quick fix:** police cannot cure the earlier illegality by drafting new grounds and arresting again at once.
- **Safeguard for re-arrest:** police must give valid written grounds and satisfy the **Magistrate** that fresh custody is necessary.

1.6 National Commission for Allied and Healthcare Professions

Context: The National Commission for Allied and Healthcare Professions (NCAHP) is setting national standards for allied-health workers such as laboratory technicians, physiotherapists and radiographers. It has recently widened competency-based curricula and brought several degree courses under common rules.

Explanation:

- **Legal status:** a **statutory body** under the **National Commission for Allied and Healthcare Professions Act, 2021**.
- **Coverage: 57 recognised categories** of allied and healthcare professions.
- **Fields:** medical laboratory sciences, imaging, physiotherapy, occupational therapy, nutrition, rehabilitation and other diagnostic and support services.
- **Mandate:** standardise education, competencies and professional conduct across the country.
- **State level: State Allied and Healthcare Councils** implement the Act in the States.
- **Recent reforms:** competency-based curricula and uniform undergraduate and postgraduate degrees, improving quality and professional mobility.
- **Why it matters:** allied-health professionals support diagnosis, treatment, rehabilitation and continuity of care in multidisciplinary teams.

1.7 Essential Religious Practices Test and the Hijab-School Uniform Dispute

Context: The Allahabad High Court has refused a student's plea to wear a hijab with her school uniform, holding that it was not shown to be an Essential Religious Practice (ERP) in Islam. It treated the matter mainly as one of institutional dress code and discipline.

Explanation:

- **Essential Religious Practice (ERP) Test:** The court held that the petitioner failed to place sufficient material or record evidence to establish that wearing a headscarf is an obligatory or essential religious practice in Islam protected under Article 25 of the Constitution.
- **Article 25:** guarantees freedom of conscience and the right to profess, practise and propagate religion, subject to public order, morality, health and other Fundamental Rights.
- **Article 26:** protects religious denominations' right to manage their own religious affairs.
- **A Judiciary-made test:** the phrase "essential religious practice" does not appear in the Constitution; the **Shirur Mutt case (1954)** laid its foundation.
- **How courts apply it:** they examine doctrine, religious texts and evidence to decide whether a practice is fundamental to the religion.
- **Karnataka precedent:** the **Karnataka High Court (2022)** held that hijab was not an essential Islamic practice; on appeal, the **Supreme Court split 1:1**, leaving no binding majority ruling.
- **Allahabad reasoning:** earlier permission to wear a headscarf created no enforceable right against a uniform, genuine and non-discriminatory dress code.

1.8 Distinguished Jurist as a Route to Appointment as Supreme Court Judge

- In news: a former Supreme Court judge highlighted this constitutional route, which has never been used.
- Article 124: deals with the establishment, composition and appointment of Supreme Court judges.
- Article 124(3): a candidate must be an Indian citizen and meet any one test: High Court judge for at least 5 years; High Court advocate for at least 10 years; or a distinguished jurist in the President's opinion.
- Undefined term: the Constitution does not define "distinguished jurist", leaving room for eminent legal scholars.
- Purpose: to bring legal scholarship into the Court beyond the bench and bar routes.
- Record: no judge has yet been appointed this way; Supreme Court judges retire at 65.

1.9 Judicial Invalidation of Maharashtra's Methanol Rules

- In news: the Supreme Court struck down Rules 18A and 18B of the Maharashtra Poisons Rules, 1972.
- Methanol: a toxic, flammable industrial chemical used for formaldehyde, resins and plastics; it is misused to adulterate illicit liquor.
- The rules: required suppliers to verify buyers' poison licences and mandated colouring and bittering agents, which made methanol unusable for many lawful processes.
- Held invalid: manifestly arbitrary under Article 14 and an unreasonable restriction on trade under Article 19(1)(g).
- Proportionality: burdening lawful industry had no rational nexus with stopping theft, diversion and black-market sales.

1.10 DILRMP 3.0: Building a GIS-Enabled Digital Land Stack

- In news: the Department of Land Resources, Ministry of Rural Development, launched the operational framework for Digital India Land Records Modernization Programme (DILRMP) 3.0 for 2026-31.
- Scheme: A Central Sector Scheme across States and Union Territories with an anticipated outlay of ₹565.50 crore.
- Land Stack: Digital Public Infrastructure linking land records, cadastral maps, property registration and revenue-court cases.
- Bhu-Aadhaar (ULPIN): a 14-digit Unique Land Parcel Identification Number for each parcel, based on its geographic coordinates.
- Components: paperless registration with a Registration Repository, the Revenue Court Case Management System (RCCMS), and NAKSHA for urban land surveys.

1.11 Central Drugs Standard Control Organisation

- In news: alerts and enforcement action against unauthorised, misbranded and unsafe health products.
- Place in government: the Central Drugs Standard Control Organisation (CDSCO) works under the Directorate General of Health Services, Ministry of Health and Family Welfare.
- Role: The Central Drug Authority for the Union's functions under the Drugs and Cosmetics Act, 1940.
- Functions: approves new drugs and clinical trials, regulates imports, sets drug standards and coordinates with State drug controllers.
- Head: the Drugs Controller General of India handles central licensing, including of vaccines and blood products.
- Centre-State split: manufacture, sale and distribution are mainly regulated by States; medical devices fall under the Medical Devices Rules, 2017.

1.12 Appointment of Permanent and Additional Judges of High Courts

- In news: an Additional Judge of the Calcutta High Court was made permanent, and six Additional Judges got a six-month extension from 31 August 2026.
- Article 217: the President appoints High Court judges after consulting the Chief Justice of India (CJI), the Governor and the High Court's Chief Justice; they serve till 62.
- Article 224: Additional Judges for a temporary rise in work or arrears, for up to 2 years and not beyond 62; it also provides for Acting Judges.
- Article 224A: a retired High Court judge may sit and act as a judge with the President's previous consent.
- In practice: appointments run through the Collegium system evolved in the Three Judges Cases.

1.13 Regulation of Registered Unrecognised Political Parties (RUPPs)

- In news: concerns over opaque funding, long non-contestation and weak compliance by some Registered Unrecognised Political Parties (RUPPs).
- Registration: parties register with the Election Commission of India (ECI) under Section 29A, Representation of the People Act, 1951.
- RUPPs: registered parties that have not met the vote or seat criteria for State or National recognition.
- Benefits: income-tax exemption, acceptance of contributions and a common election symbol, subject to conditions.
- Duties: file contribution reports, audited annual accounts and election-expenditure statements.
- Registration vs recognition: registration falls under the 1951 Act; recognition and symbols under the Election Symbols Order, 1968.
- ECI's limits: it cannot deregister parties merely for non-contestation or non-compliance; reformers suggest stronger powers and tying tax benefits to vote share.

2. International Relations

2.1 India's Objection to the China-Pakistan Boundary Joint Commission

Context: India has rejected the newly activated Pakistan-China Boundary Joint Commission, saying it has no legal basis. It has repeated that Jammu and Kashmir and Ladakh are integral parts of India.

Explanation:



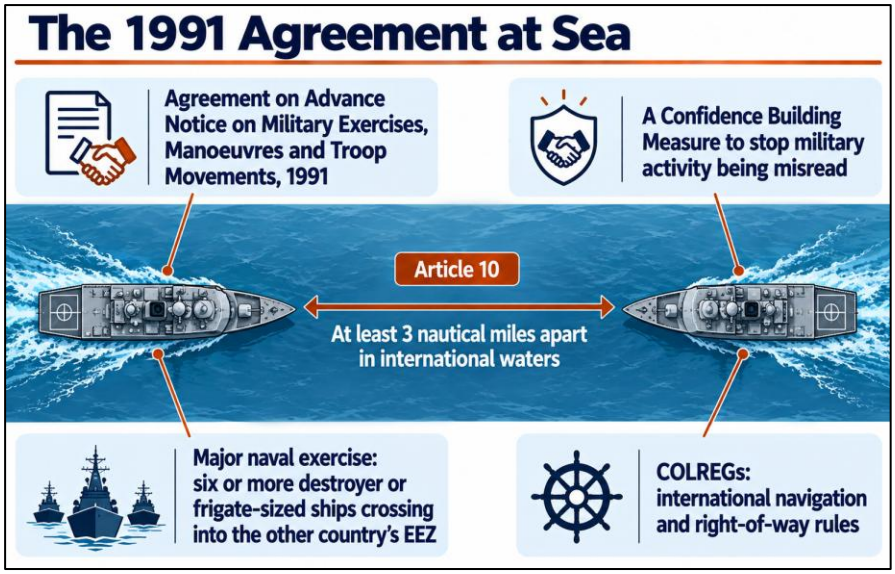
- **Purpose:** China and Pakistan set up the commission to manage, monitor and secure their claimed boundary, including trade and transit linked to the **China-Pakistan Economic Corridor (CPEC).**
- **Origin:** the **2013 China-Pakistan Agreement on the Boundary Management System.**
- **Root dispute:** under the **1963 China-Pakistan Boundary Agreement**, Pakistan handed the **Shaksgam Valley** (Trans-Karakoram Tract) to China.
- **India's position:** it does not recognise the 1963 agreement, holding that Pakistan had no authority to transfer the territory.
- **Location:** the Shaksgam Valley lies north of the **Siachen Glacier** in the Karakoram region.
- **CPEC:** links **Kashgar** in Xinjiang with **Gwadar Port** and is part of China's **Belt and Road Initiative.**
- **India's objection to CPEC:** parts of it pass through **Pakistan-occupied Kashmir (PoK).**

2.2 India-Pakistan Naval Collision and the 1991 Bilateral Agreement

Context: On 15 September 2026, Indian Navy destroyer INS Kolkata and Pakistan Navy vessel PNS Hunain collided in the North Arabian Sea. India alleged that PNS Hunain's unsafe manoeuvre violated a 1991 bilateral agreement and international collision rules, while Pakistan disputed India's account.

Explanation:

- **The agreement:** the **Agreement on Advance Notice on Military Exercises, Manoeuvres and Troop Movements, 1991** between India and Pakistan.
- **Purpose:** a **confidence-building measure (CBM)** to stop routine military activity from being misread as hostile.
- **Article 10:** naval ships and submarines of the two countries must stay at least **3 nautical miles (about 5.6 km)** apart in international waters.
- **COLREGs:** the International Regulations for Preventing Collisions at Sea, 1972, global rules on navigation and right of way.
- **Why it matters:** close encounters at sea between nuclear-armed neighbours can escalate quickly if rules are ignored.

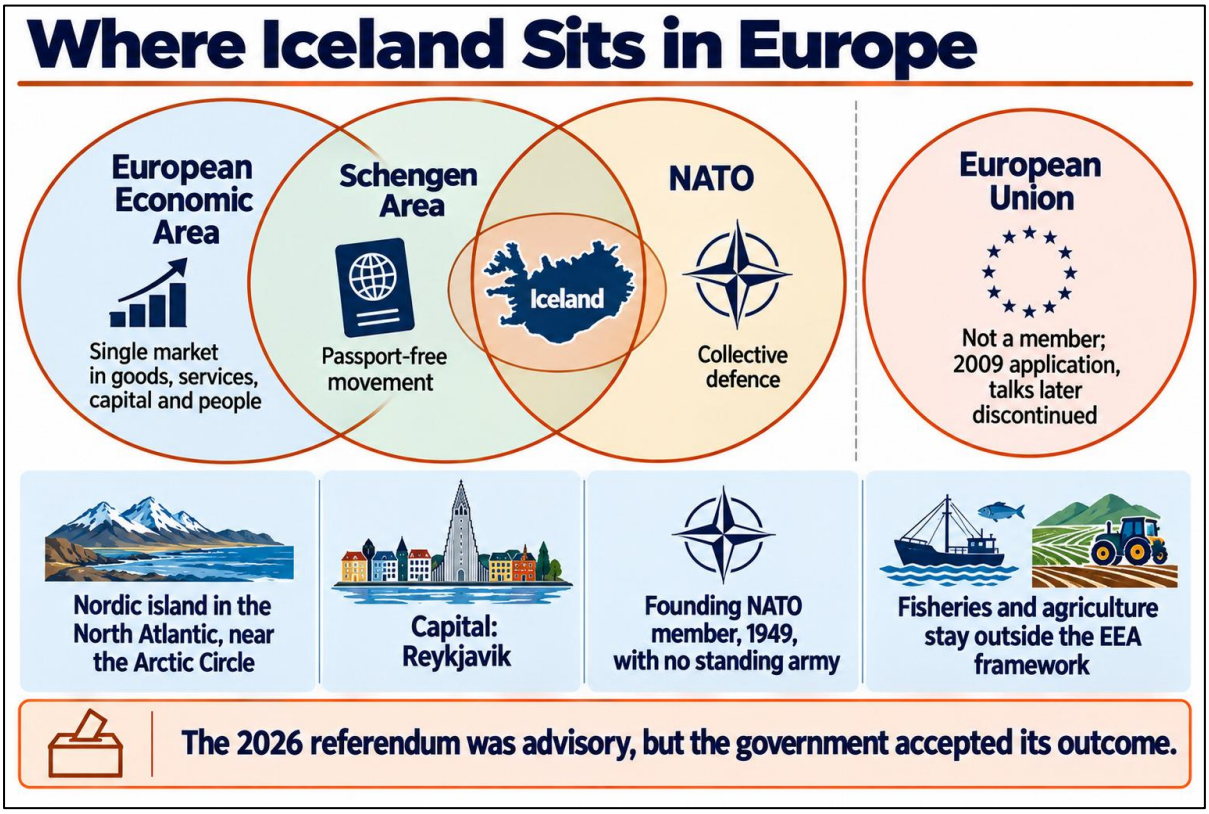


2.3 Iceland and the Question of Reopening EU Membership Negotiations

Context: In a referendum, Icelanders rejected reopening talks to join the European Union (EU), with 52.8% voting No and 47.2% Yes. Concerns over fishing rights, sovereignty and independence shaped the vote; the referendum was advisory, but the government accepted the result.

Explanation:

- **Referendum:** a direct vote by citizens to accept or reject a specific law, policy or public question.
- **Geography:** a Nordic island in the North Atlantic near the Arctic Circle; capital **Reykjavík**.
- **EU history:** Iceland applied for membership in 2009, but accession talks were later discontinued.
- **European Economic Area (EEA):** gives Iceland access to the EU Single Market without membership.
- **Schengen and NATO:** part of the passport-free **Schengen Area** and a founding member of **NATO (1949)**, though it has no standing army.
- **Fisheries:** control over fishing waters is central to Iceland's economy and its EU debate.

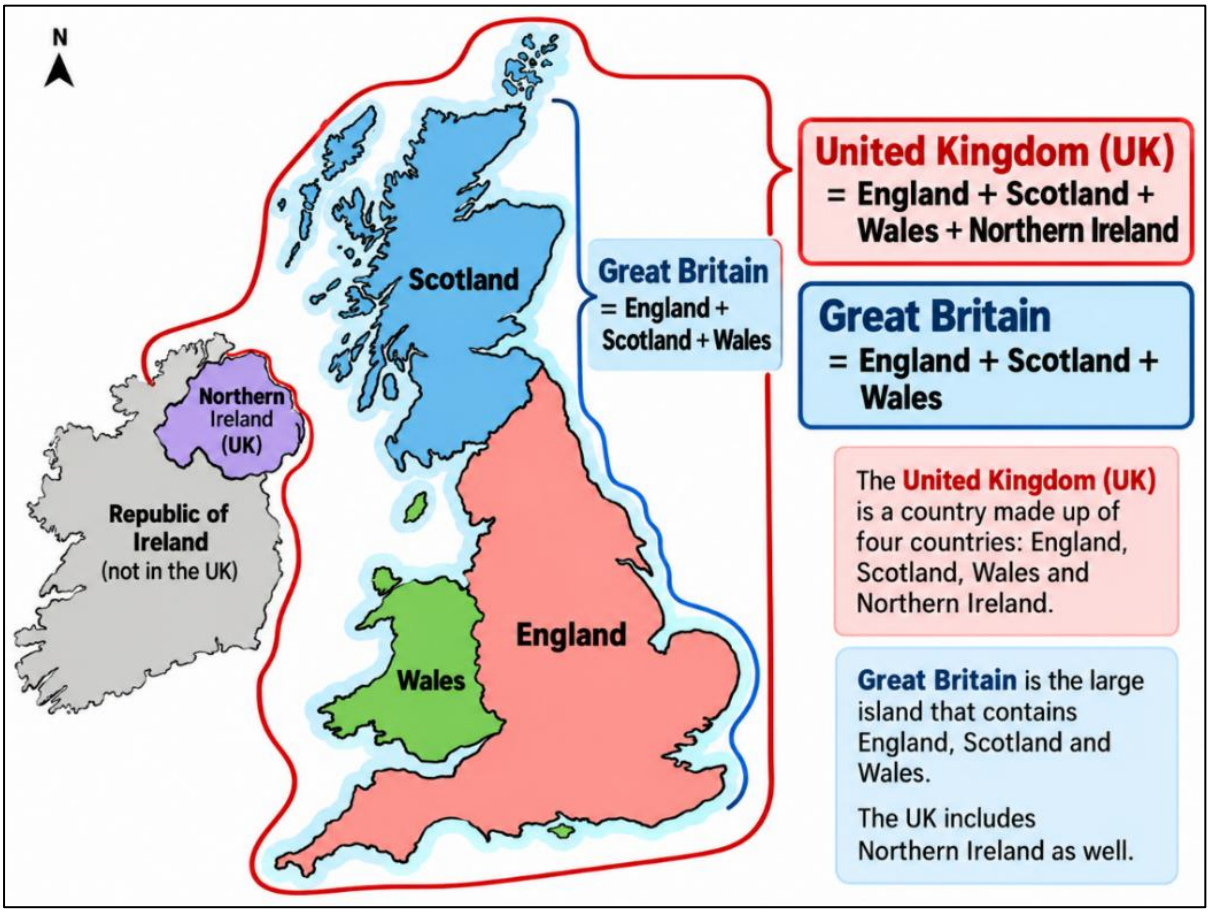


2.4 Independence Movements in Scotland, Wales and Northern Ireland

Context: The leaders of Scotland, Wales and Northern Ireland have signed a memorandum in Cardiff asserting a right to decide their constitutional future, including independence or, for Northern Ireland, reunification with Ireland.

Explanation:

- **UK and Great Britain:** the **United Kingdom** comprises England, Scotland, Wales and Northern Ireland; **Great Britain** covers only England, Scotland and Wales.
- **Union history:** the **Acts of Union, 1707** united Scotland and England; the Acts of Union, 1800 created the United Kingdom of Great Britain and Ireland.
- **Northern Ireland:** remained in the UK after Irish independence in the 1920s.
- **Devolution:** Scotland, Wales and Northern Ireland have their own legislatures, while Westminster keeps important reserved powers.
- **Scotland 2014:** about **55%** voted to remain in the UK in the independence referendum.
- **Good Friday Agreement, 1998:** a **border poll** can lead to Irish reunification if democratic consent exists.
- **Brexit effect:** the 2016 vote to leave the EU sharpened the debate, as Scotland and Northern Ireland had voted to remain.



2.5 The U.S.-Denmark-Greenland Agreement and American Military Presence in the Arctic

Context:

The United States, Denmark and Greenland have signed a defence agreement expanding the American military presence in Greenland. It strengthens Arctic security cooperation while explicitly preserving the sovereignty and territorial integrity of the Kingdom of Denmark.

Explanation:



- **Greenland:** the world's largest island and a **self-governing territory within the Kingdom of Denmark**, between North America and the Arctic Ocean.
- **Legal basis:** the **1951 U.S.-Denmark Defence Agreement** underpins the American military presence.
- **Pituffik Space Base:** formerly Thule Air Base, important for missile warning, missile defence and space surveillance.
- **What is new:** expansion at Pituffik and additional U.S. defence areas at **Narsarsuaq and Mestersvig.**
- **NATO cover:** Greenland is covered by NATO through Denmark; non-NATO states cannot set up military installations unless the parties agree.
- **Why it matters:** Arctic shipping routes, strategic minerals and U.S.-Russia-China competition are raising Greenland's value.

2.6 Renewed Ethiopia-Eritrea Tensions in the Horn of Africa

Context:

Ethiopia and Eritrea have cut diplomatic ties as fighting has resumed in northern Ethiopia, with Addis Ababa accusing Eritrea of backing Tigrayan forces. Eritrea fears that Ethiopia's push for sea access could threaten Eritrean territory.

Explanation:

- **Independence:** Eritrea became independent from Ethiopia in **1993** after a referendum, leaving Ethiopia **landlocked.**
- **Border war:** fought in 1998-2000 and ended by the **Algiers Agreement.**
- **Peace and drift:** the **2018** peace agreement improved ties, and Eritrea fought alongside Ethiopia's federal forces in the Tigray conflict of 2020-22.
- **Pretoria Agreement, 2022:** ended major fighting between Ethiopia and Tigrayan forces, but Eritrea was not a party.
- **Sea access:** Ethiopia's demand for reliable Red Sea access has revived suspicion; Eritrea controls the ports of **Assab and Massawa.**
- **Wider risk:** renewed war could destabilise the Horn of Africa and threaten Red Sea trade routes.



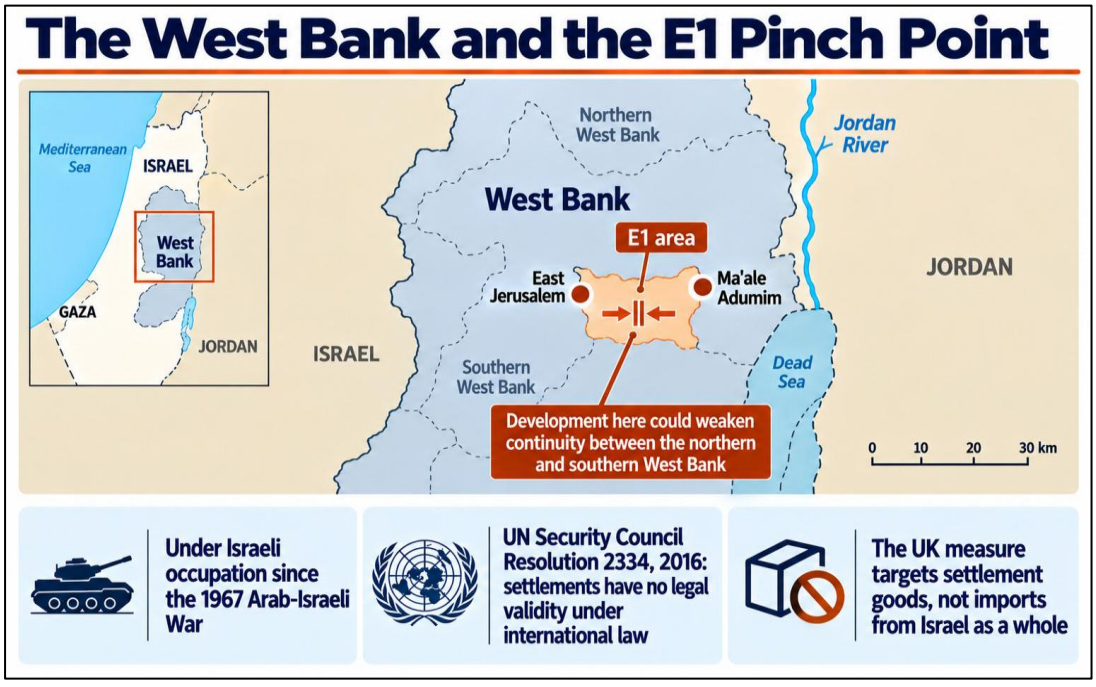


2.7 The United Kingdom's Ban on Goods from Israeli Settlements in the West Bank

Context: The United Kingdom has banned imports from Israeli settlements in the occupied West Bank, including East Jerusalem. It cited continued settlement growth, especially plans in the E1 corridor, and the damage this does to a two-state solution.

Explanation:

- **West Bank:** land west of the Jordan River, under Israeli occupation since the **1967 Arab-Israeli War**.
- **UN Security Council Resolution 2334 (2016):** settlements in territory occupied since 1967, including East Jerusalem, have no legal validity.
- **E1 corridor:** about 12 sq km east of Jerusalem, between East Jerusalem and the settlement of **Ma'ale Adumim**.
- **Why E1 matters:** building there could split the northern and southern West Bank and cut East Jerusalem off from Palestinian areas.
- **Two-state solution:** an independent Palestine alongside Israel; Israel's government opposes Palestinian statehood, and the Knesset passed a declaration against it in 2024.
- **Scope of the ban:** it targets settlement goods, not imports from Israel as a whole.



2.8 India's Rejection of the Arbitral Ruling on the Indus Waters Treaty

Context:

A Court of Arbitration under the Indus Waters Treaty has held that the treaty remains in force and issued interim directions on the Ratle Hydroelectric Project. India rejected the award, saying it does not recognise the tribunal and that the treaty stays in abeyance after the April 2025 Pahalgam attack.

Explanation:

- **The treaty:** signed in **1960** by India and Pakistan, with the **World Bank** performing specified procedural roles.
- **Eastern Rivers (Ravi, Beas, Sutlej):** allocated mainly to India.
- **Western Rivers (Indus, Jhelum, Chenab):** allocated largely to Pakistan; India may use them for domestic needs, irrigation and hydropower within limits.
- **Graded dispute settlement:** questions go to the Permanent Indus Commission, differences to a Neutral Expert, and disputes to a Court of Arbitration.
- **India's objection:** parallel proceedings before a Neutral Expert and a Court of Arbitration on the same hydropower-design issues.
- **PCA is not the ICJ:** the Permanent Court of Arbitration at The Hague provides administrative support; it is distinct from the International Court of Justice.
- **Article XII:** the treaty can be modified or ended only by a ratified agreement between the two countries.

2.9 Renewal of the Ganga Water Treaty and Bihar's Concerns

Context: The 1996 India-Bangladesh Ganga Water Sharing Treaty completes its 30-year term in December 2026. The Union government has said Bihar's concerns over water availability and upstream siltation will be considered while deciding on renewal.

Explanation:

- **Scope:** shares Ganga waters at the **Farakka Barrage** in West Bengal during the lean season, **1 January to 31 May**, in 10-day periods.
- **Formula:** at 70,000 cusecs or less, each country gets half; between 70,000 and 75,000 cusecs, Bangladesh gets 35,000 cusecs; at 75,000 cusecs or more, India gets 40,000 cusecs and Bangladesh the rest.
- **Renewal:** by mutual consent of the two countries.
- **Farakka's role:** diverts water into the **Bhagirathi-Hooghly** system to keep Kolkata Port navigable.
- **Bihar's concerns:** silt accumulation, riverbed rise, flooding and lean-season water needs upstream.
- **Process:** inter-ministerial consultations led by the **Ministry of Jal Shakti**, with affected States.
- **Monitoring:** a bilateral Joint Committee, with unresolved issues going to the **India-Bangladesh Joint Rivers Commission**.

2.10 Yudh Abhyas 2026: India-U.S. Joint Military Exercise

- In news: the 22nd edition of Yudh Abhyas was held from 9 to 28 September 2026 at Auli, Uttarakhand and the Mahajan Field Firing Range, Rajasthan.
- About: an annual exercise between the Indian Army and the U.S. Army since 2004, held alternately in each country.
- Aim: interoperability, joint planning and exchange of tactics.
- 2026 edition: about 600 personnel from each side trained for mountainous and high-altitude terrain; U.S. Arctic-trained troops from Alaska took part.
- Training: cold-weather warfare, drones and counter-drone systems, long-range precision fires and multi-domain operations.

2.11 Exercise SLINEX-26

- In news: the 13th edition of SLINEX concluded at Visakhapatnam.
- About: the Sri Lanka-India Naval Exercise between the two navies, conceptualised in 2005.

- Ships: INS Kavaratti, an indigenous anti-submarine warfare corvette, and the fleet tanker INS Jyoti; Sri Lanka sent SLNS Sindurala.
- Phases: a harbour phase of professional exchanges and cross-deck visits, and a sea phase.
- Sea drills: manoeuvres, air operations, night replenishment at sea and Visit-Board-Search-Seizure (VBSS) operations.
- Policy link: supports India's Neighbourhood First policy and the MAHASAGAR vision for the Indian Ocean.

2.12 Exercise NOMADIC ELEPHANT

- In news: the 18th edition of NOMADIC ELEPHANT was held at the Foreign Training Node, Pithoragarh, Uttarakhand.
- About: an annual exercise between the Indian Army and the Mongolian Armed Forces, held alternately in each country.
- Scale: platoon level, with 45 personnel from each side in 2026.
- Aim: interoperability for counter-insurgency in semi-urban and mountainous terrain under a UN mandate.
- Training: cordon-and-search, room intervention, heliborne operations, cybersecurity, drones and counter-drone systems.
- Do not confuse: Khaan Quest is a multinational peacekeeping exercise hosted by Mongolia.

2.13 Exercise Tarang Shakti

- In news: the Indian Air Force (IAF) hosted Tarang Shakti at Air Force Station Jodhpur.
- About: a multilateral air exercise; the 2026 edition, themed "Power in Partnership", built on the first edition in 2024.
- Participants: Australia, the USA, the UAE, France, Germany, Sri Lanka and Bangladesh, with other countries as observers.
- Aircraft: F-35, Rafale, F-16, A400M, KC-30A and C-130J, alongside Indian platforms.
- Focus: joint air operations, mission planning, aerospace safety and mutual learning.
- Significance: reflects India's growing role in multinational air cooperation and defence diplomacy.

2.14 Exercise Varuna

- In news: the 24th edition of Varuna was held by the Indian and French navies at Toulon, France.
- About: India-France naval exercises began in 1993 and were named Varuna in 2001.
- 2026 edition: India deployed INS Trishul, a guided-missile stealth frigate.
- Phases: harbour and sea phases, with professional exchanges and cross-deck visits.
- Drills: anti-submarine warfare, air defence, tactical manoeuvres, replenishment at sea and maritime interdiction.
- Significance: a pillar of the India-France strategic partnership.

2.15 India-Belgium Defence Cooperation

- In news: India and Belgium signed three government-level defence agreements, including a Letter of Intent on Defence Cooperation.
- Belgium: a member of the European Union (EU) and NATO; Brussels hosts NATO headquarters and major EU institutions.
- Institutional link: India will post a Defence Attaché at its embassy in Brussels.
- Industry: encourages co-development and co-production between the two defence industries.

- Security: cooperation on safe sea lanes, terrorism, organised crime and cybercrime, including between the CBI and the Belgian Federal Police.
- Wider frame: complements the India-EU Security and Defence Partnership.

2.16 26th Shanghai Cooperation Organisation Summit

- In news: the 26th Council of Heads of State summit of the Shanghai Cooperation Organisation (SCO) met at Bishkek, Kyrgyzstan, marking 25 years of the body.
- Origin: set up in 2001 from the earlier Shanghai Five mechanism.
- Members: ten: India, China, Russia, Pakistan, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Iran and Belarus.
- Permanent bodies: the Secretariat in Beijing and the Regional Anti-Terrorist Structure (RATS) in Tashkent, which targets terrorism, separatism and extremism.
- Outcome: the Bishkek Declaration, four MoUs and over 20 decisions on climate, nuclear safety, energy and drug control.
- India's pitch: three pillars of Security, Connectivity and Opportunity, and an SCO Civilisation Dialogue Forum.

2.17 Colombo Security Conclave

- In news: Seychelles became a full member of the Colombo Security Conclave at the National Security Adviser-level meeting in New Delhi in November 2025.
- About: a regional security grouping launched by India at the level of National Security Advisers.
- Members: India, Sri Lanka, Maldives, Mauritius, Bangladesh and Seychelles; Secretariat in Colombo.
- Five pillars: maritime security; counter-terrorism and counter-radicalisation; trafficking and organised crime; cybersecurity; and humanitarian assistance and disaster relief.
- Why it matters: threats that cross borders need shared surveillance and information.
- For India: complements SAGAR (Security and Growth for All in the Region) and MAHASAGAR.

2.18 Visegrad Group

- In news: the Visegrad Group completed 35 years of regional cooperation.
- Members: Poland, the Czech Republic, Slovakia and Hungary (the "V4"), an informal Central European forum.
- Origin: formed in 1991 at Visegrad, Hungary, by Poland, Hungary and Czechoslovakia; it became the V4 after Czechoslovakia split in 1993.
- Early aims: transition to democracy and market economies, and integration with European institutions.
- Today: all four are members of both the EU and NATO.
- International Visegrad Fund (2000): funds grants, scholarships and cultural exchanges.

2.19 Community of Latin American and Caribbean States

- In news: Uruguay took over the rotating Pro Tempore Presidency of the Community of Latin American and Caribbean States (CELAC) for 2026-27 after its 10th summit.
- About: a forum of 33 Latin American and Caribbean countries, set up in 2011 at Caracas, Venezuela.
- Aims: political dialogue, regional integration, economic cooperation and common positions abroad.
- Membership contrast: unlike the Organization of American States, it excludes the U.S. and Canada and includes Cuba.
- Structure: no permanent headquarters; work is coordinated by the rotating presidency.
- Partners: holds dialogues with the EU, China, India and the African Union.

3. Economy

3.1 Merchant Discount Rate on Large UPI Merchant Payments

Context:

The National Payments Corporation of India (NPCI) has introduced a **Merchant Discount Rate (MDR)** on selected UPI merchant payments. From **15 October 2026**, a 0.4% fee applies to merchant payments above ₹2,000, while person-to-person transfers, small payments and eligible small merchants stay exempt.

Explanation:

- **UPI:** the Unified Payments Interface is an instant, interoperable payment system run by NPCI, linking bank accounts through participating apps.
- **MDR:** the fee a merchant pays for processing a digital payment, shared among banks and payment providers; it is **not a tax.**
- **What is charged:** Person-to-Merchant (P2M) payments above ₹2,000 attract **0.4% (40 basis points)**, capped at **₹300** for payments of ₹75,000 and above.
- **What stays free:** all Person-to-Person (P2P) transfers, P2M payments up to ₹2,000, and small merchants (P2PM) receiving up to **₹1 lakh a month** through UPI QR codes.
- **Concessions:** a flat **₹5** for railways, telecom, fuel, insurance and agricultural inputs, and **0.02%** for capital-market transactions.
- **Customers protected:** the merchant pays; banks must ensure the charge is not passed on, and apps cannot add customer fees.
- **Separate rules:** RuPay credit cards and pre-sanctioned credit lines on UPI follow credit-product MDR rules.

3.2 India's First Soil Carbon Payments to Farmers

Context:

India has made its first soil-carbon payments to over **2,500 farmers** in Punjab and Haryana. Under the **Aadi** programme, verified cuts in emissions and gains in soil carbon become saleable carbon credits that earn farmers extra income.

Explanation:

- **Soil Organic Carbon (SOC):** carbon in soil organic matter from plant residues, roots and microorganisms; a key indicator of **soil health and fertility.**
- **Soil as a sink:** roots and crop residues move carbon from the air into the soil.
- **Regenerative agriculture:** practices such as reduced tillage, residue retention, crop diversification and **Direct Seeded Rice (DSR).**
- **Carbon credit:** generally, represents **one tonne of carbon dioxide equivalent (tCO_2e)** reduced, avoided or removed.
- **Aadi programme:** launched by **Grow Indigo in 2019** with technical guidance from the **Indian Council of Agricultural Research (ICAR);** payments follow independent verification.
- **Co-benefits:** water saving, less stubble burning and PM2.5, better soil health and climate resilience.

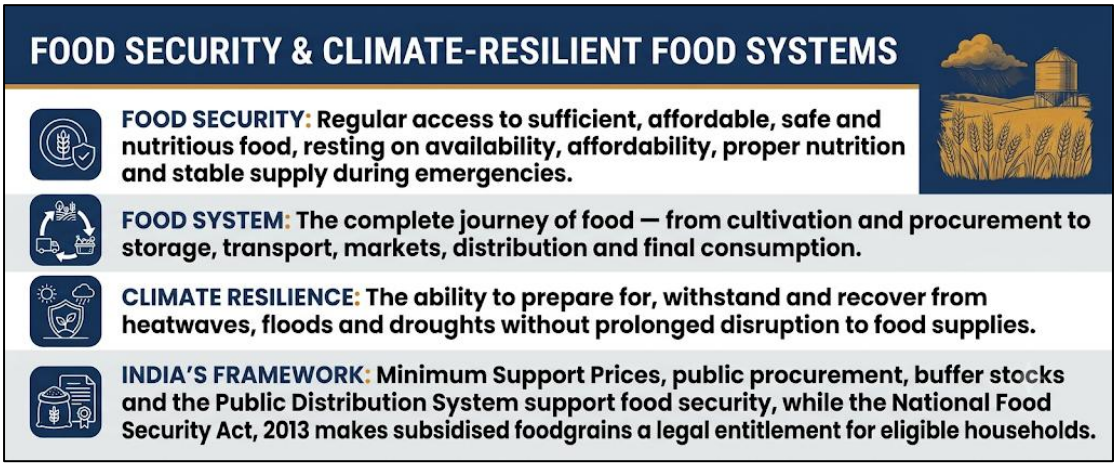
3.3 Building a Climate-Resilient Food System

Context:

India produced a record 357.73 million tonnes of foodgrains in 2024-25, but heatwaves, erratic rain, floods and water scarcity are making farming less secure. A resilient food system must adapt at every stage, from growing to buying, storing and distributing food.

Explanation:

- **Meaning:** a **climate-resilient food system** anticipates, absorbs and recovers from climate shocks while keeping food available, affordable and nutritious.
- **Risks:** drought, floods, heat stress, shifting monsoons, groundwater depletion and pest outbreaks.
- **Diversification:** procuring millets, pulses, oilseeds and nutri-cereals, and widening the **Public Distribution System** basket, reduces dependence on water-intensive rice and wheat.
- **Farm adaptation:** climate-resilient seeds, micro-irrigation, watershed management, precision farming, weather advisories and weather-indexed insurance.
- **NICRA:** under National Innovations in Climate Resilient Agriculture, ICAR assessed 651 districts and found **310 climate-vulnerable**, 109 of them very highly vulnerable.
- **Planning ahead: District Agriculture Contingency Plans** and India Meteorological Department forecasts can guide procurement and buffer stocks before shocks.
- **Beyond the farm:** flood-proof warehouses, cold chains and stronger transport reduce food losses.



3.4 Insurer Investment in the New Development Bank's Onshore Rupee Bonds

Context:

The Insurance Regulatory and Development Authority of India (IRDAI) has allowed insurers to invest in the New Development Bank's (NDB) proposed **Maharajah INR Bonds**. The NDB plans to raise about **₹25,000 crore** over five years through these onshore rupee bonds.

Explanation:

- **NDB:** a multilateral development bank set up by the **BRICS** countries in **2015**, headquartered in **Shanghai**.
- **Mandate:** finances infrastructure and sustainable-development projects in emerging economies.
- **Maharajah vs Masala bonds:** Maharajah INR Bonds are rupee bonds issued **inside India**; **Masala Bonds** are rupee bonds issued **outside India**.
- **Why rupee bonds:** the NDB can raise domestic money for Indian projects without a currency mismatch.
- **Use of proceeds:** infrastructure, green, social and sustainable-development projects.
- **Regulatory status:** IRDAI treats them as **approved investments** for insurers; they are "securities" under the **Securities Contracts (Regulation) Act, 1956**.
- **Benefit:** wider options for insurers and long-term finance for development.

3.5 Crisis in the Tea Industry of Darjeeling and the Dooars-Terai

Context:

The Indian Tea Association (ITA) has released two White Papers seeking targeted help for the tea industry in Darjeeling and the Dooars-Terai belt. Darjeeling's output fell from 14.49 million kg in 1990 to 5.6 million kg in 2025.

Explanation:

- **Growing conditions:** tea needs a warm, humid, frost-free climate of about **20 to 30°C**, rainfall of **150 to 300 cm** and deep, well-drained acidic soils.
- **Darjeeling:** slopes prevent waterlogging, while altitude and mist give **Darjeeling orthodox tea** its character and **Geographical Indication (GI)** status.
- **Dooars:** meaning "doors", the foothill belt of northern West Bengal that forms a gateway to Bhutan.
- **Terai:** a moist alluvial belt south of the Himalayan foothills, where high rainfall and fertile soils suit tea.
- **Tea Board India:** a statutory body under the **Tea Act, 1953**, under the Department of Commerce and headquartered in **Kolkata**.
- **Its role:** promotes cultivation, research, quality, exports and GI protection.

3.6 Income-tax Act, 2025 and Concerns over Tax Administration

Context:

The **Income-tax Act, 2025** came into force on 1 April 2026, replacing the 1961 law. A Parliamentary Standing Committee has since flagged compliance burdens, wide administrative discretion and an enforcement culture it sees as too punitive.

Explanation:

- **Constitutional basis:** income tax is a **direct tax**; under **Entry 82 of the Union List**, Parliament taxes income other than **agricultural income**.
- **New framework:** the Income-tax Act, 2025 replaced the 1961 Act, and the **Income-tax Rules, 2026** put it into operation.
- **Aim:** simpler language, a streamlined structure and easier compliance, without changing underlying tax policy.
- **"Tax year":** the new law uses a single "tax year", replacing the older terminology for the period in which income is taxed.
- **Administration:** the **Central Board of Direct Taxes (CBDT)**, under the Department of Revenue, Ministry of Finance, runs direct taxes.
- **Committee scrutiny:** the Standing Committee on Finance has sought data on collections, assessees and pending litigation.
- **The real issue:** simpler law must come with predictable, proportionate and taxpayer-friendly administration.

3.7 Global Impact of Rising U.S. Bond Yields

Context:

U.S. government bond yields have risen sharply, with the 10-year Treasury yield crossing **5%** in September 2026. Because U.S. Treasuries are the world's benchmark safe asset, higher yields quickly raise borrowing costs and move capital, currencies and markets elsewhere.

Explanation:

- **Government bond:** a loan to the government that pays periodic interest (the **coupon**) and returns the principal at **maturity**; its **yield** is the return an investor earns.
- **Benchmark role:** Treasuries are seen as relatively safe, so their yields set the floor for returns investors demand elsewhere.
- **Why yields are rising:** repeated U.S. fiscal deficits mean more bonds to sell, and inflation worries from oil prices and tariffs demand higher returns.
- **Global effect:** other governments and firms must pay more to borrow, leaving less room for welfare, health and infrastructure.

- **Slower investment:** businesses may delay expansion and hiring, and households may postpone loan-financed purchases.
- **Impact on India:** foreign capital may leave Indian markets, pressuring share prices and the rupee.
- **Costlier imports:** a weaker rupee raises the cost of dollar-priced imports such as crude oil and of foreign borrowing.

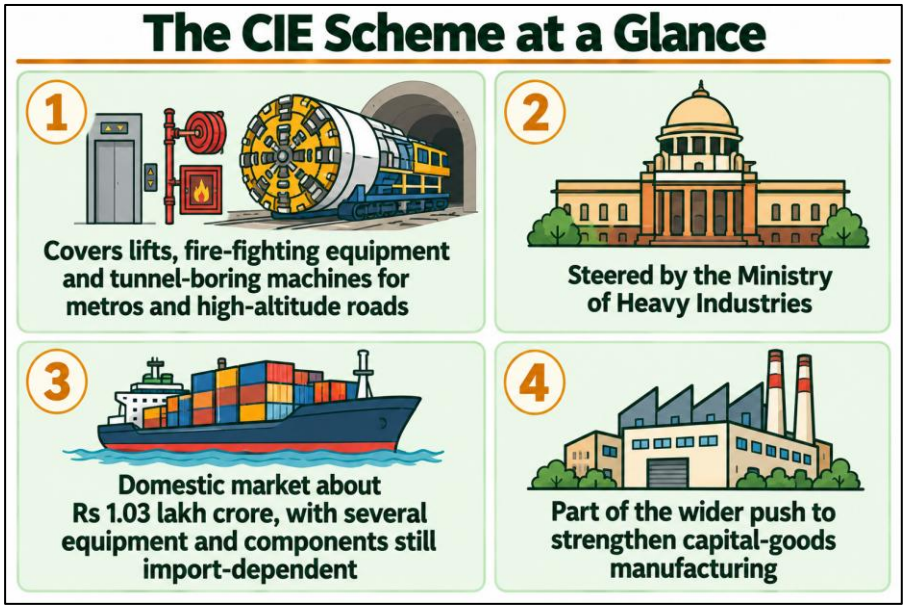
3.8 Scheme to Promote Domestic Manufacturing of Construction and Infrastructure Equipment

Context:

The Union Budget 2026-27 announced a Scheme for Enhancement of **Construction and Infrastructure Equipment (CIE)**. It aims to build more of this high-value, technically advanced equipment in India and cut the capital-goods sector's dependence on imports.

Explanation:

- **Coverage:** equipment such as lifts, fire-fighting systems and the **tunnel-boring machines** used for metros and high-altitude roads.
- **Nodal ministry:** the **Ministry of Heavy Industries**.
- **Market:** India's domestic market for such equipment is worth about **₹1.03 lakh crore**, but much of it is still imported; India is the world's third-largest construction-equipment market after China and the United States.
- **Outlay:** about **₹14,300 crore over seven years**, with an initial provision of **₹200 crore**.
- **Localisation targets:** at least **30%** domestic value addition in equipment now fully imported, and **50%** in high-import equipment and components.
- **Objectives:** import substitution, technology development and export competitiveness.
- **Wider link:** supports Atmanirbhar Bharat, with scope for MSME component makers.



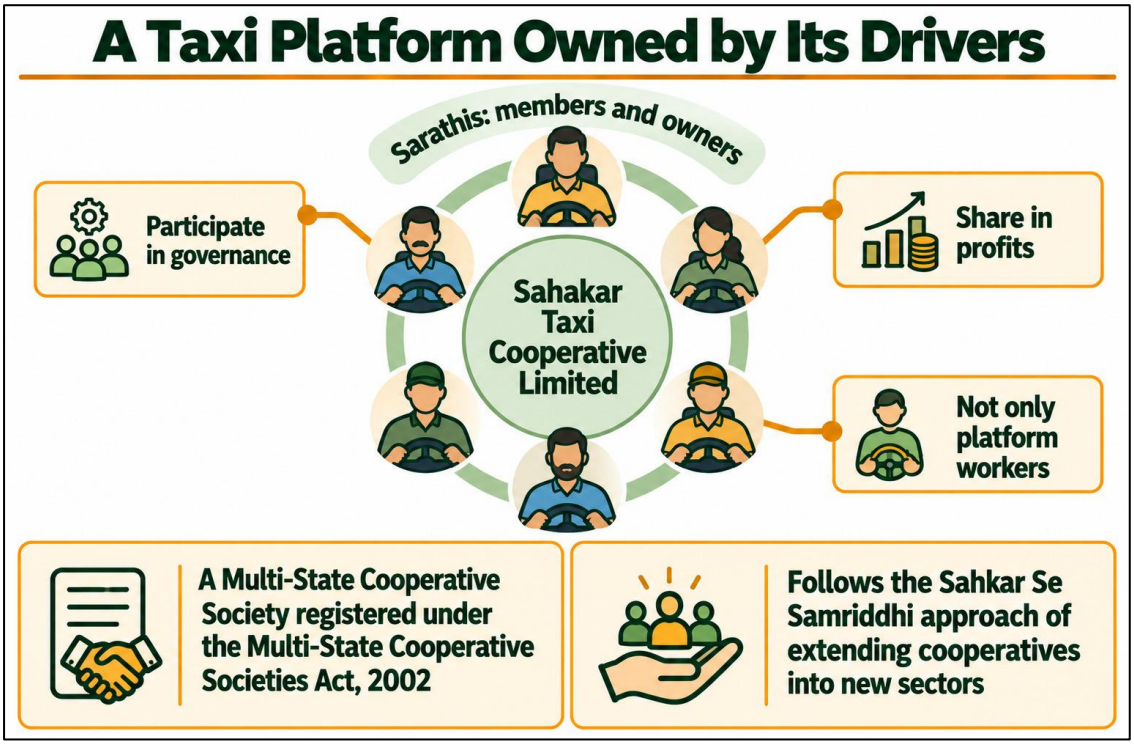
3.9 Bharat Taxi: The Cooperative Model in India's Mobility Sector

Context:

Bharat Taxi, India's first cooperative-run ride-hailing platform, has launched in Lucknow, Gorakhpur, Varanasi, Kanpur and Prayagraj and plans a wider rollout across Uttar Pradesh. It follows a "Driver is the Owner" model, in which drivers share in ownership and profits.

Explanation:

- **Operator: Sahakar Taxi Cooperative Limited**, registered under the **Multi-State Cooperative Societies Act, 2002**.
- **Sarathi-owner model:** drivers, called Sarathis, become members and owners, take part in governance and share profits, instead of paying commissions as platform workers.
- **Promoters:** The National Cooperative Development Corporation (NCDC) with IFFCO, NAFED, AMUL, KRIBHCO, the National Dairy Development Board, National Cooperative Exports Limited and NABARD.
- **Article 43B:** directs the State to promote voluntary, autonomous and democratically controlled cooperatives.
- **Part IXB:** the part of the Constitution dealing with cooperative societies.
- **Ministry of Cooperation:** created in July 2021 to strengthen the cooperative movement.
- **Sahkar Se Samriddhi:** the approach of taking cooperatives beyond farming, dairy and credit into new sectors.



3.10 Public-Sector Bank Employees' Strike: Performance-Linked Incentives and Service Conditions

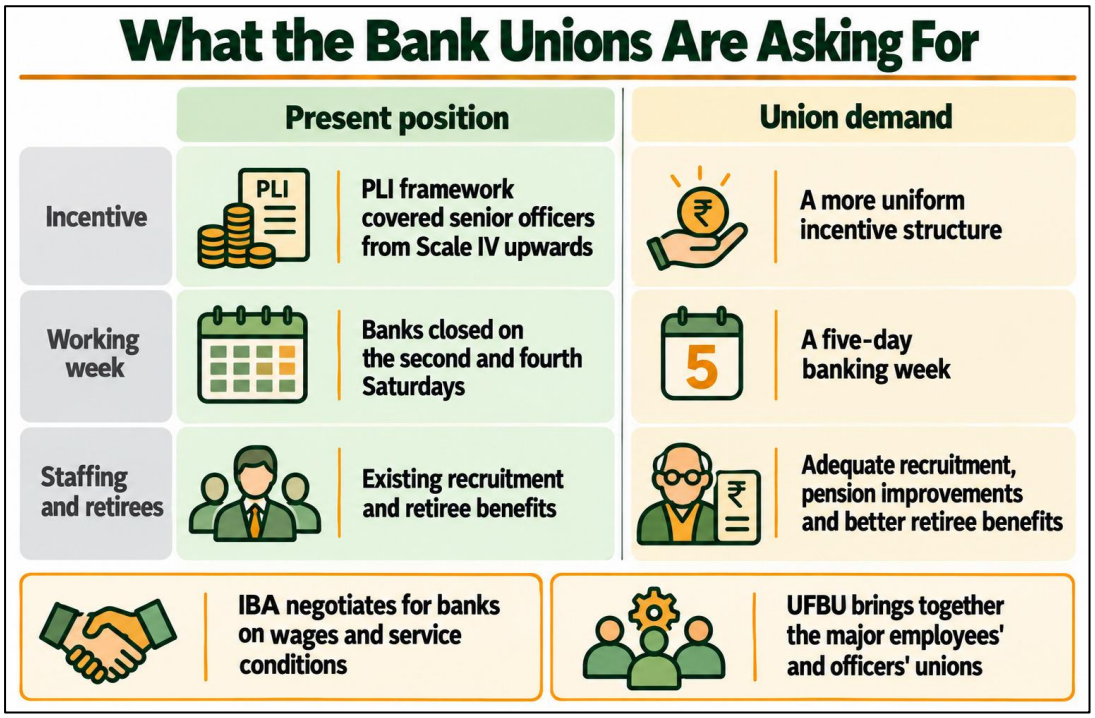
Context:

Public-sector bank employees held a nationwide strike over a five-day banking week and a revised **Performance-Linked Incentive (PLI)** framework. The government has paused the PLI scheme, but unions say their wider demands remain unresolved.

Explanation:

- **PLI:** extra pay linked to a bank's financial and operational performance.
- **The dispute:** the revised scheme covered mainly officers of **Scale IV and above**, so unions demanded a uniform incentive for all officers and employees.
- **Other demands:** a five-day banking week, more recruitment and better facilities for retired employees.
- **Pensions:** unions also seek a return from the National Pension System to the **Old Pension Scheme**.

- **Bargaining bodies:** the **Indian Banks' Association (IBA)** negotiates for banks, while the **United Forum of Bank Unions (UFBU)** brings the major unions together.
- **Public utility:** banking is declared a public utility service under the **Industrial Disputes Act, 1947**.
- **Impact:** digital banking limited the disruption, but rural customers still rely heavily on branches.



3.11 Global Business Climate Survey 2026

- In news: India ranked first among 41 markets in the Global Business Climate Survey 2026, ahead of Ireland and Vietnam.
- Publisher: Business Sweden and the Swedish Chambers of Commerce, with Swedish diplomatic and business networks.
- What it measures: the experience of Swedish companies abroad: profitability, business conditions, investment plans and outlook.
- Coverage: a record 41 markets across Asia-Pacific, Europe, the Americas, and the Middle East and Africa.
- India finding: about 73% of Swedish companies in India rated the business climate good or very good.
- Do not confuse: it is a company-perception survey, not a regulatory ranking like the former World Bank Ease of Doing Business Index.

3.12 Demat 2.0 Pilot for Corporate Bond Tokenisation

- In news: the Securities and Exchange Board of India (SEBI) launched a pilot for issuing, holding, trading and settling tokenised corporate bonds.
- Tokenisation: turning a security into a digital token whose ownership and transfers are recorded on a distributed ledger.
- How: bonds are issued as native tokens on a private, permissioned network run by the depositories.
- Same bond, new form: it stays a corporate bond under existing law, with its ISIN, coupon, maturity, rating and investor rights.
- Demat 2.0: an extension of the existing demat account; issuance still runs through the Electronic Bidding Platform.
- Settlement: linked to the RBI's wholesale central bank digital currency, enabling instant (atomic) settlement; smart contracts can automate coupon and redemption.

3.13 India's First Blue Bond: Proposed Launch and Subsequent Withdrawal

- In news: Sagarmala Finance Corporation Ltd proposed raising ₹600 crore through India's first blue bond, then withdrew the issue when investors sought a higher coupon.
- Blue bond: a debt instrument whose proceeds fund water- and ocean-related sustainable projects.
- Regulation: under SEBI's sustainable-finance framework, blue bonds are a sub-category of green debt securities.
- Eligible uses: sustainable water management, marine conservation and environmentally sound maritime infrastructure.
- Like any bond: investors get a coupon and their principal back; only the use of proceeds differs.
- Lesson: the 10-year issue drew bids of about ₹525 crore at yields above the issuer's target, showing that green labels do not override interest rates, ratings and demand.

3.14 Hub-and-Spoke International Flight Operations from Ahmedabad

- In news: Ahmedabad became the third spoke airport, after Varanasi and Amritsar, for international flights through Delhi.
- Hub-and-spoke model: passengers from several smaller airports are channelled through a major hub for onward connections.
- Present network: Delhi is the hub; Varanasi, Amritsar and Ahmedabad are the first spokes.
- Passenger journey: check-in, immigration and customs are done at the spoke airport, and baggage is checked through to the final destination.
- At the hub: passengers transfer to the international flight without repeating formalities.
- Aim: reduce dependence on foreign transit hubs; India's International Aviation Hub Strategy targets a preferred hub by 2030 and a leading global hub by 2047.

3.15 Surplus Liquidity in India's Banking System

- In news: surplus liquidity in the banking system rose to about ₹5.05 lakh crore on 30 August 2026, a four-month high, driven by government spending and foreign-currency deposits.
- Meaning: banks together hold more funds than their immediate needs; the opposite is a liquidity deficit.
- Sources: government spending moves money from its RBI balances into bank accounts, and RBI purchases of foreign currency release rupees.
- Standing Deposit Facility (SDF): banks park surplus funds with the RBI without collateral; it is the floor of the policy rate corridor.
- Variable Rate Reverse Repo (VRRR): auctions that absorb surplus funds temporarily.
- Goal: keep the Weighted Average Call Rate, the RBI's operating target, close to the repo rate.

4. Science & Technology

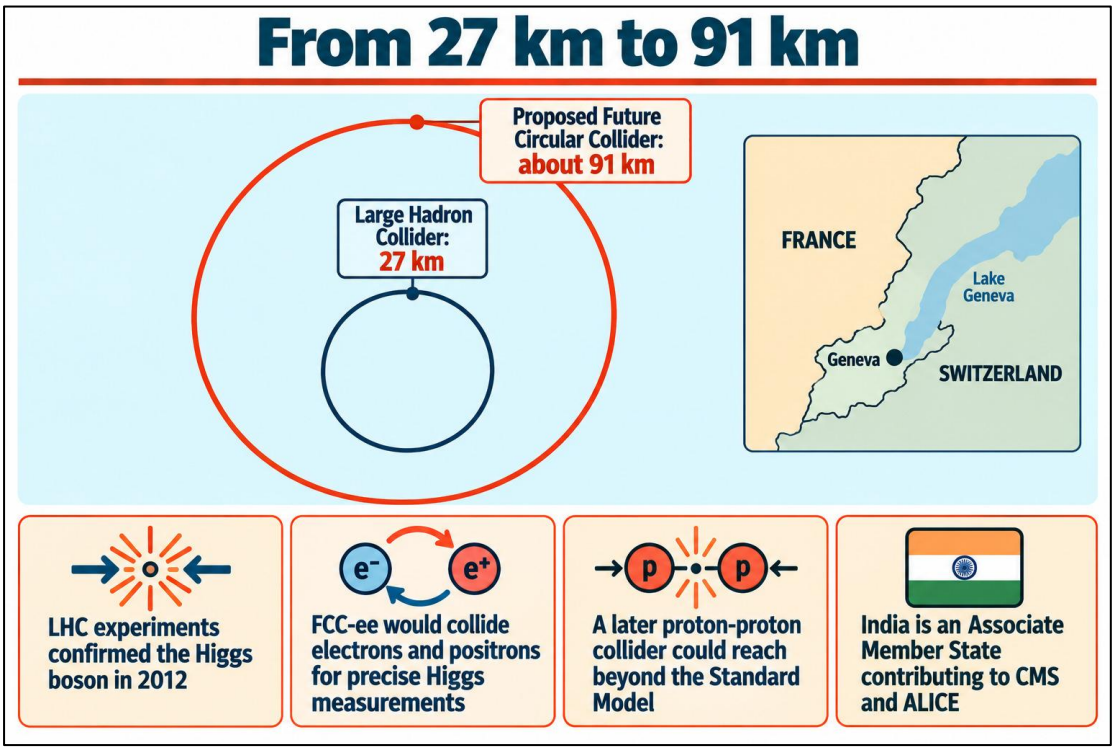
4.1 CERN's Future Circular Collider and India's Potential Role

Context:

CERN, the European Organization for Nuclear Research, is exploring a larger Indian role in its future projects, especially the proposed **Future Circular Collider (FCC)**, the planned successor to the Large Hadron Collider.

Explanation:

- **CERN:** an international particle-physics laboratory headquartered near **Geneva**, on the France-Switzerland border.
- **Large Hadron Collider (LHC):** the world's largest and most powerful particle accelerator, in a **27-km** underground ring.
- **Higgs boson:** LHC experiments confirmed it in **2012**; it is linked to how elementary particles acquire mass.
- **FCC:** a ring of about **91 km** that would first collide electrons and positrons for precise Higgs measurements, and later protons.
- **HL-LHC:** the High-Luminosity LHC is an upgrade to produce far more collision data.
- **India's role:** an **Associate Member State** of CERN, contributing to experiments such as CMS and ALICE.



4.2 Elimination of Dog-Transmitted Rabies as a Public Health Problem in Bhutan

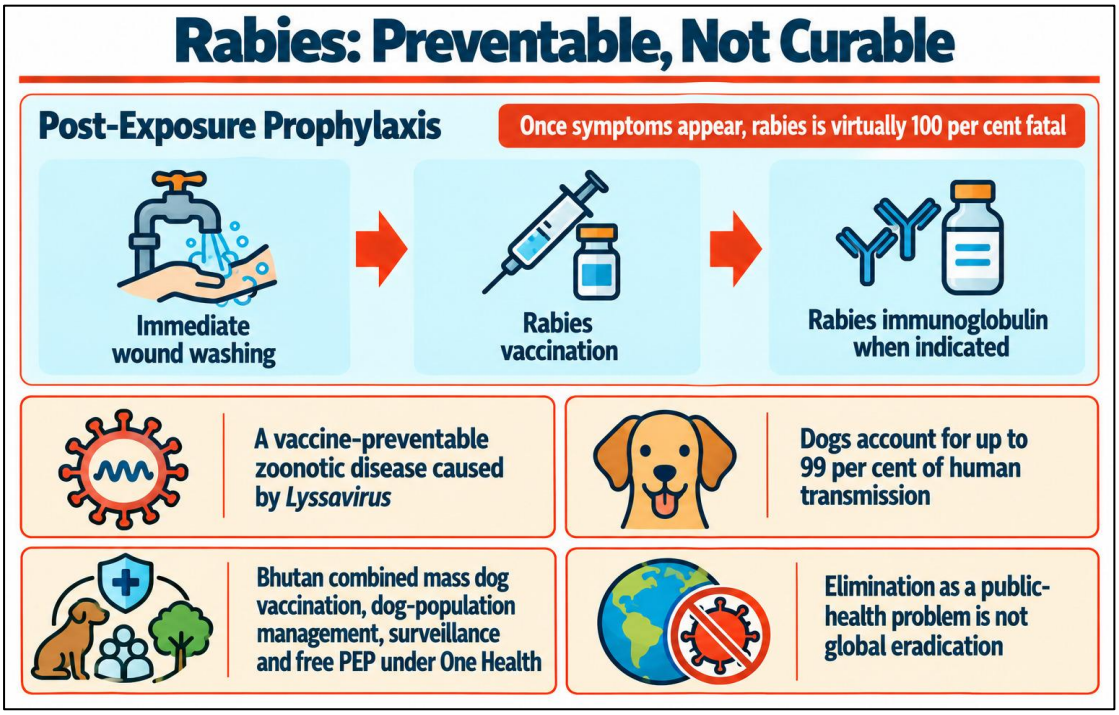
Context:

The World Health Organization (WHO) has certified Bhutan as the first country in its South-East Asia Region to eliminate dog-transmitted human rabies as a public-health problem, through mass dog vaccination, surveillance and a One Health approach.

Explanation:

- **The disease:** a vaccine-preventable **zoonosis** caused by a *Lyssavirus*, attacking the central nervous system.

- **Transmission:** mainly through saliva of infected animals; dogs cause up to **99%** of human cases.
- **Fatal but preventable:** almost always fatal once symptoms appear, but prompt **Post-Exposure Prophylaxis (PEP)** prevents it: wound washing, rabies vaccine and, where needed, rabies immunoglobulin.
- **WHO strategy:** control infection at its animal source through mass dog vaccination and prevent disease in people through PEP.
- **One Health:** joint action across human, animal and environmental health sectors.
- **India's plan:** the **National Action Plan for Dog Mediated Rabies Elimination (2021)** targets zero human deaths by **2030**.
- **Elimination is not eradication:** the disease is controlled as a public-health problem, not wiped out.



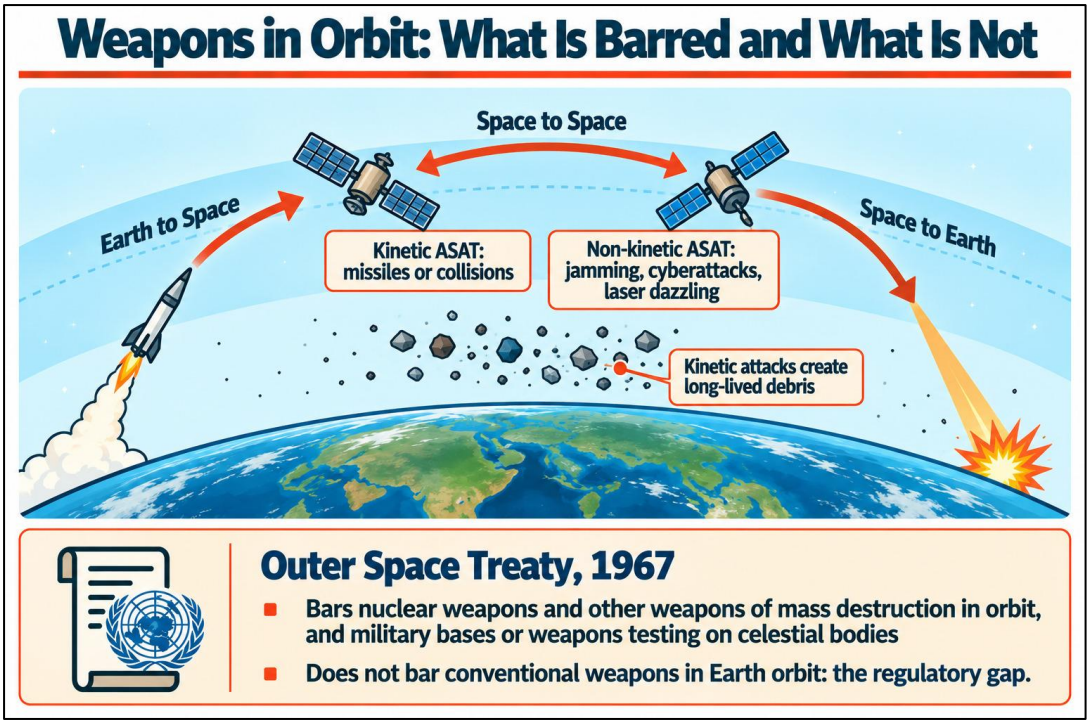
4.3 Weaponisation of Outer Space: U.S. Deployment of Space Control Weapons

Context:

The United States has acknowledged, for the first time, deploying "space control" weapons in Earth orbit, without revealing their type or number. China and Russia have warned against turning space into a battlefield, reviving fears of an arms race.

Explanation:

- **Three categories:** Earth-to-Space (missiles or jammers against satellites), Space-to-Space (spacecraft that collide with or disable satellites) and Space-to-Earth (orbital weapons striking ground targets).
- **Kinetic and non-kinetic:** anti-satellite (ASAT) attacks may destroy a satellite physically, creating long-lived debris, or disable it through jamming, cyberattack or laser dazzling.
- **Outer Space Treaty, 1967:** bars nuclear weapons and other weapons of mass destruction in orbit and military bases or tests on celestial bodies.
- **The gap:** it does not ban conventional weapons in Earth orbit or ground-launched ASAT weapons, though the **UN Charter** still governs any attack.
- **Verification problem:** satellites built to repair others can also damage them, so intentions are hard to judge.
- **Stalled diplomacy:** arms-control proposals remain stuck; the **Artemis Accords** guide civil exploration only.
- **Way ahead:** verifiable limits on destructive attacks, crisis hotlines and debris cooperation.



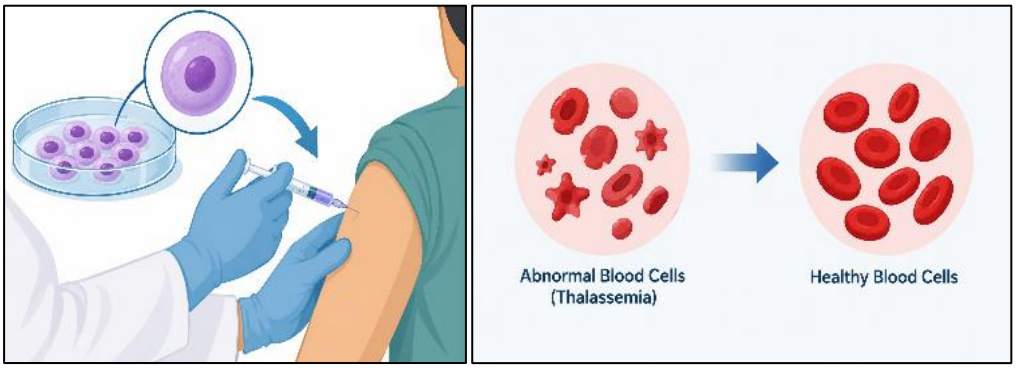
4.4 Stem Cell Therapy Regulation and Stem Cell Transplantation in Thalassemia

Context:

The Health Ministry has directed that stem-cell therapy may be offered as standard care only for approved conditions; other uses remain experimental. Separately, a two-year-old girl who was a perfect 12/12 HLA match donated blood stem cells to her brother with thalassemia major.

Explanation:

- **Stem cells:** unspecialised cells that can renew themselves and turn into specialised cells.
- **Guidelines:** the **National Guidelines for Stem Cell Research, 2017**, issued by the Indian Council of Medical Research (ICMR) and the Department of Biotechnology (DBT).
- **New directive:** for **autism spectrum disorder**, stem cells may be used only in approved clinical trials; the advisory follows the Supreme Court's 2026 judgment in *Yash Charitable Trust v. Union of India*.
- **Enforcement:** States under the **Clinical Establishments Act, 2010** must act against unauthorised treatment.
- **Thalassemia:** an inherited **autosomal recessive** disorder with reduced or absent alpha or beta globin chains of haemoglobin.
- **Transplant cure: haematopoietic stem cells**, from bone marrow, blood or cord blood, make all blood cells; transplanting healthy ones can cure eligible patients.
- **HLA matching:** a close Human Leukocyte Antigen match improves success and reduces **graft-versus-host disease**.



4.5 Raman Research Institute Method for Protecting Quantum Entanglement

Context:
Scientists at the Raman Research Institute (RRI), Bengaluru, have shown that a single, well-timed operation can delay or prevent the collapse of quantum entanglement in the system they studied, which could make quantum computers more reliable.

Explanation:

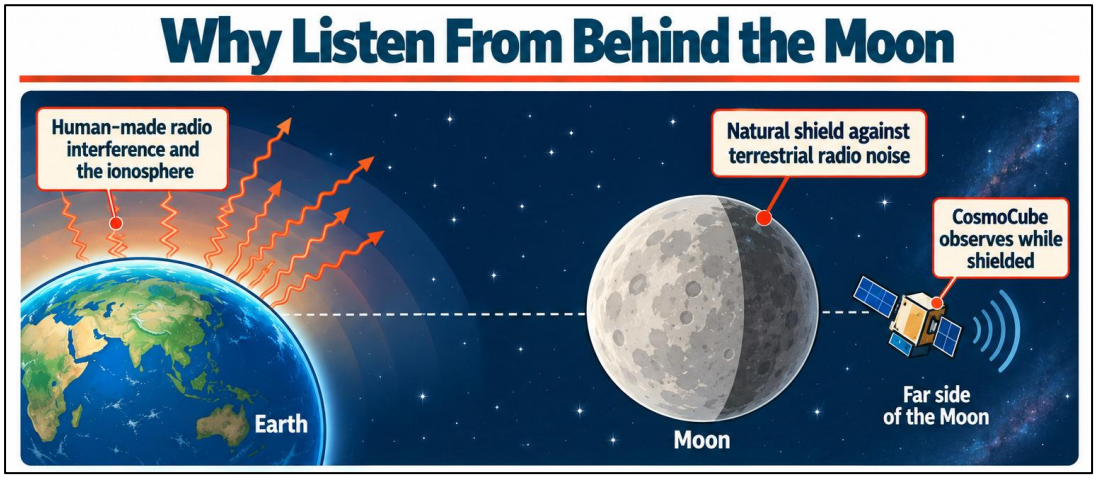
- **Bits and qubits:** classical computers use bits that are 0 or 1; quantum computers use **qubits**.
- **Superposition:** a qubit can exist in a combination of 0 and 1 at once.
- **Entanglement:** two particles share one correlated state, so measuring one reveals information about the other even when they are far apart.
- **Decoherence:** interaction with the environment degrades quantum information and can destroy entanglement.
- **The finding:** applying one operation at a carefully chosen moment protected entanglement under the conditions studied.
- **Link to error correction:** the method could complement **quantum error correction**, which detects and fixes errors.
- **Why it matters:** stable quantum states are essential for reliable quantum computing.

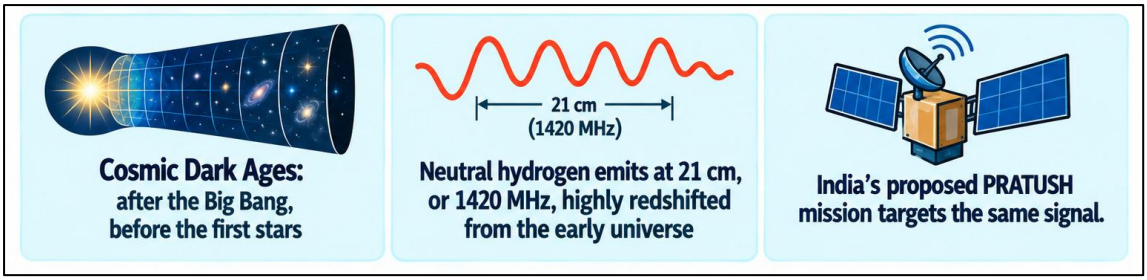
4.6 CosmoCube: Probing the Cosmic Dark Ages from Lunar Orbit

Context:
Scientists are developing **CosmoCube**, a small satellite that will orbit the Moon and use its radio-quiet far side to detect the faint **21-cm signal** of neutral hydrogen from the Cosmic Dark Ages, to study the universe before the first stars formed.

Explanation:

- **Cosmic Dark Ages:** the period after the Big Bang before the first stars, which ordinary optical telescopes cannot observe.
- **The signal:** neutral hydrogen emits radio waves at **21 cm (1,420 MHz)**; from the early universe this signal is stretched (redshifted) to much lower frequencies and is very faint.
- **Why not from Earth:** human-made radio interference, thousands of times stronger, and the ionosphere drown it out.
- **Why the far side:** the Moon itself blocks radio noise from Earth while CosmoCube passes behind it.
- Target: the redshifted 21-cm signal from neutral hydrogen during the Cosmic Dark Ages, before the first stars formed.
- **Bonus science:** independent clues on dark matter and the "Hubble tension" over the universe's expansion rate.
- **Indian parallel:** India's proposed lunar-orbit experiment **PRATUSH** aims at the same signal.



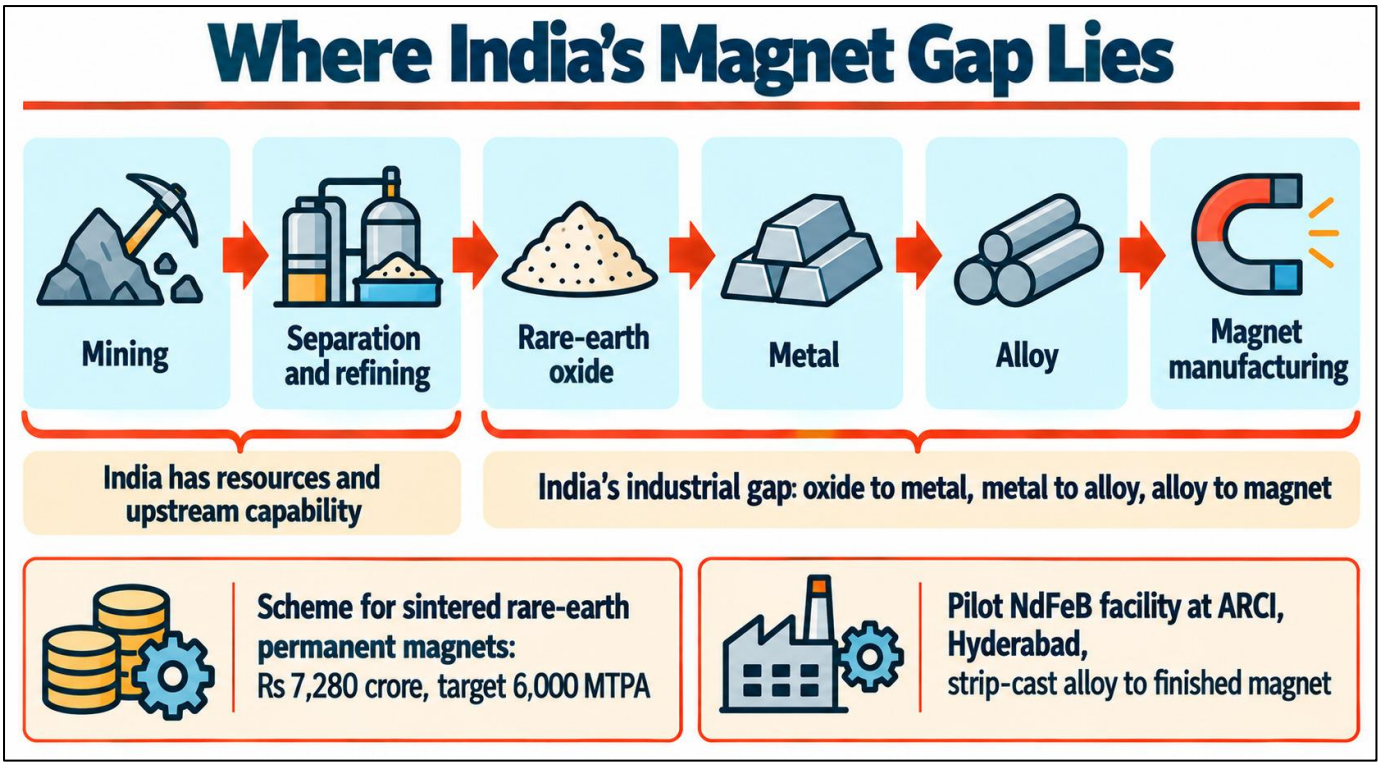


4.7 Rare-Earth Magnets: From Mineral Wealth to NdFeB Manufacturing

Context: India wants to reduce its dependence on imported rare-earth permanent magnets (REPMs), used in electric vehicles, wind turbines, electronics and defence equipment. Policy now focuses on Neodymium-Iron-Boron (NdFeB) magnets and on building every stage at home, from rare-earth oxide to the finished magnet.

Explanation:

- **NdFeB magnets:** permanent magnets of neodymium, iron and boron, among the strongest available commercially.
- **Key elements:** neodymium and praseodymium (NdPr) are rare-earth elements; dysprosium or terbium improve performance at high temperatures.
- **Uses:** their strength allows smaller, lighter motors and generators for EVs, wind turbines, robotics, electronics, aerospace and defence; unlike an electromagnet, a permanent magnet needs no continuous current.
- **Value chain:** mining, separation and refining, rare-earth oxide, metal, alloy and finally magnet.



- **India's gap:** India has the minerals and upstream capability, but lacks oxide-to-metal, metal-to-alloy and alloy-to-magnet conversion; deposits alone do not create self-reliance.
- **Import reliance:** India imports its industrial requirement of sintered NdFeB magnets, many arriving inside imported equipment, which leaves demand poorly measured.
- **Policy push:** a **₹7,280 crore** scheme targets **6,000 tonnes a year** of integrated magnet capacity, and a pilot plant at **ARCI, Hyderabad** makes sintered magnets from alloy.

4.8 EOS-05: India's Dedicated Geosynchronous Earth-Imaging Satellite

- In news: ISRO launched EOS-05 aboard GSLV-F17 from Sriharikota.
- About: India's first dedicated Earth Observation Satellite (EOS) for imaging from geosynchronous orbit, about 36,000 km up.
- Geosynchronous orbit: the orbital period equals Earth's rotation, so the satellite returns to the same point in the sky at the same time daily.
- Geostationary orbit: a special case that is circular, equatorial and west-to-east, so the satellite appears fixed over one spot.
- Satellite: multi-band imaging, about 2,367 kg, with a nine-year life.
- Uses: agriculture, environment, disaster management and strategic needs; the three-stage GSLV has a cryogenic upper stage.

4.9 Nancy Grace Roman Space Telescope

- In news: NASA launched the Nancy Grace Roman Space Telescope on 30 August 2026 aboard a SpaceX Falcon Heavy rocket, to study dark energy, dark matter and exoplanets.
- Name: after Nancy Grace Roman, NASA's first Chief of Astronomy, often called the "mother of Hubble".
- Location: near Sun-Earth L2, about 1.5 million km from Earth, a stable spot for observation.
- Wide Field Instrument: maps huge areas of sky to study galaxies, cosmic expansion and dark matter through gravitational lensing.
- Exoplanets: a census through gravitational microlensing, and a coronagraph that blocks starlight to see faint planets.
- Mirror: 2.4 m, like Hubble's, but with a far wider field of view.

4.10 Aditya-L1: New Findings from India's Solar Mission

- In news: Aditya-L1, India's solar mission, is returning new data on the Sun.
- Location: orbits the Sun-Earth L1 point, about 1.5 million km from Earth, with an uninterrupted view of the Sun.
- Nature: mainly a scientific mission, not an operational space-weather forecaster; from space it avoids atmospheric interference.
- Coronal Mass Ejections (CMEs): eruptions of magnetised plasma from the Sun's corona; in interplanetary space they are called ICMEs.
- Finding: An Indian study found nearly 45% of observed ICMEs heated up on the way to Earth, which affects their impact on Earth.
- Use: better space-weather prediction for satellites, power grids and communications.

4.11 Drug-Resistant Fungi: An Emerging Health Challenge

- In news: research on Candida auris shows fungi escape antifungal drugs by duplicating genes and even whole chromosomes, not just through mutations.
- Fungi: eukaryotic organisms distinct from plants and animals, including yeasts, moulds and mushrooms.
- Candida auris: an emerging yeast that causes serious, often multidrug-resistant hospital infections.
- Eagle effect: at very high drug doses, some fungi survive by switching on defences such as extra chitin in the cell wall.
- Climate link: warming may favour heat-tolerant fungi able to survive at human body temperature.
- Response: part of antimicrobial resistance; needs susceptibility testing, genomic surveillance and combination therapies.

4.12 The Hall Effect

- In news: physicists showed an in-plane anomalous Hall effect in an atomically thin material, without the usual perpendicular magnetic field.
- Hall effect: discovered by Edwin Hall in 1879; a voltage develops across a current-carrying conductor placed in a magnetic field.
- Cause: the Lorentz force pushes charge carriers to one side, creating the Hall voltage.
- What it reveals: the voltage's sign shows whether carriers are electrons or holes; its size gives their concentration.
- Uses: Hall sensors measure magnetic field, position, speed and proximity in cars and electronics.
- Promise: a single ultrathin sensor could measure fields along several axes.

4.13 Gyrotron

- In news: the Institute for Plasma Research (IPR), Gandhinagar, commissioned an 82.6 GHz, 400 kW gyrotron for the SST-1 tokamak.
- Gyrotron: a high-power source of millimetre-wave or microwave radiation used in plasma and fusion research.
- How it works: electrons spiral in a strong magnetic field, and their motion transfers energy to electromagnetic waves.
- Role in a tokamak: heats plasma electrons through Electron Cyclotron Resonance Heating (ECRH) to start, heat and control the plasma.
- Distinct: unlike ordinary microwave sources, it produces very high power at very high frequencies.
- Uses: fusion, plasma generation, spectroscopy and material processing; the international ITER fusion project also uses gyrotrons.

4.14 BIO-NIVESH Platform

- In news: the BIO-NIVESH platform was launched to connect biotechnology innovators, start-ups and investors.
- Aim: bridge the funding gap between laboratory innovation and commercial-scale production, where ventures need patient capital.
- Ministry: linked to the Department of Biotechnology, Ministry of Science and Technology.
- Partner role: complements the Biotechnology Industry Research Assistance Council (BIRAC), which supports biotech entrepreneurship.
- Bioeconomy: builds start-up, industry and investor links to commercialise Indian technologies.
- Policy fit: supports the BioE3 Policy for high-performance biomanufacturing in biotherapeutics, bio-based chemicals, climate-resilient farming and functional foods.

4.15 Naegleria fowleri

- In news: cases and studies of amoebic meningoencephalitis in Kerala.
- About: Naegleria fowleri is a free-living amoeba of warm freshwater such as lakes, ponds, rivers and hot springs.
- Disease: causes Primary Amoebic Meningoencephalitis (PAM), an acute and usually fatal brain infection.
- Route: contaminated water enters the nose, and the amoeba travels along the olfactory nerve to the brain.
- Not by drinking: it is not caught by swallowing water and does not normally spread between people.
- Prevention: avoid forcing untreated freshwater into the nose, and keep pools and water systems properly chlorinated.

4.16 Satellite Smart Anti-Airfield Weapons

- In news: the Ministry of Defence signed a contract with Bharat Dynamics Limited for 160 Satellite Smart Anti-Airfield Weapons (SAT-SAAW) for the Indian Air Force.
- About: an air-to-ground precision-guided glide bomb developed indigenously by the Defence Research and Development Organisation (DRDO).
- Targets: runways, bunkers, aircraft shelters and radars, hit from a long stand-off range that keeps the aircraft safe.
- Platforms: Jaguar, Hawk and Su-30 MKI.
- Category: a stand-off precision-guided munition, allowing strikes without entering heavily defended airspace.
- Procurement: under Buy (Indian-IDDM), the indigenously designed, developed and manufactured category, supporting Aatmanirbhar Bharat.

4.17 Sagar Manthan: India's Indigenous Ocean Research Vessel

- In news: Garden Reach Shipbuilders and Engineers (GRSE), Kolkata, launched Sagar Manthan, an indigenous Ocean Research Vessel.
- Owner: The National Centre for Polar and Ocean Research (NCPOR), Goa, an autonomous institute under the Ministry of Earth Sciences.
- NCPOR's role: coordinates India's polar and Southern Ocean research and ocean studies.
- Vessel: about 89.5 m long, gross tonnage about 5,900 tonnes, expected in service by 2028.
- Tasks: seafloor mapping, geological surveys, marine mineral exploration, biodiversity studies and underwater technology.
- Link: supports India's Deep Ocean Mission.

5. Environment, Geography & Disaster Management

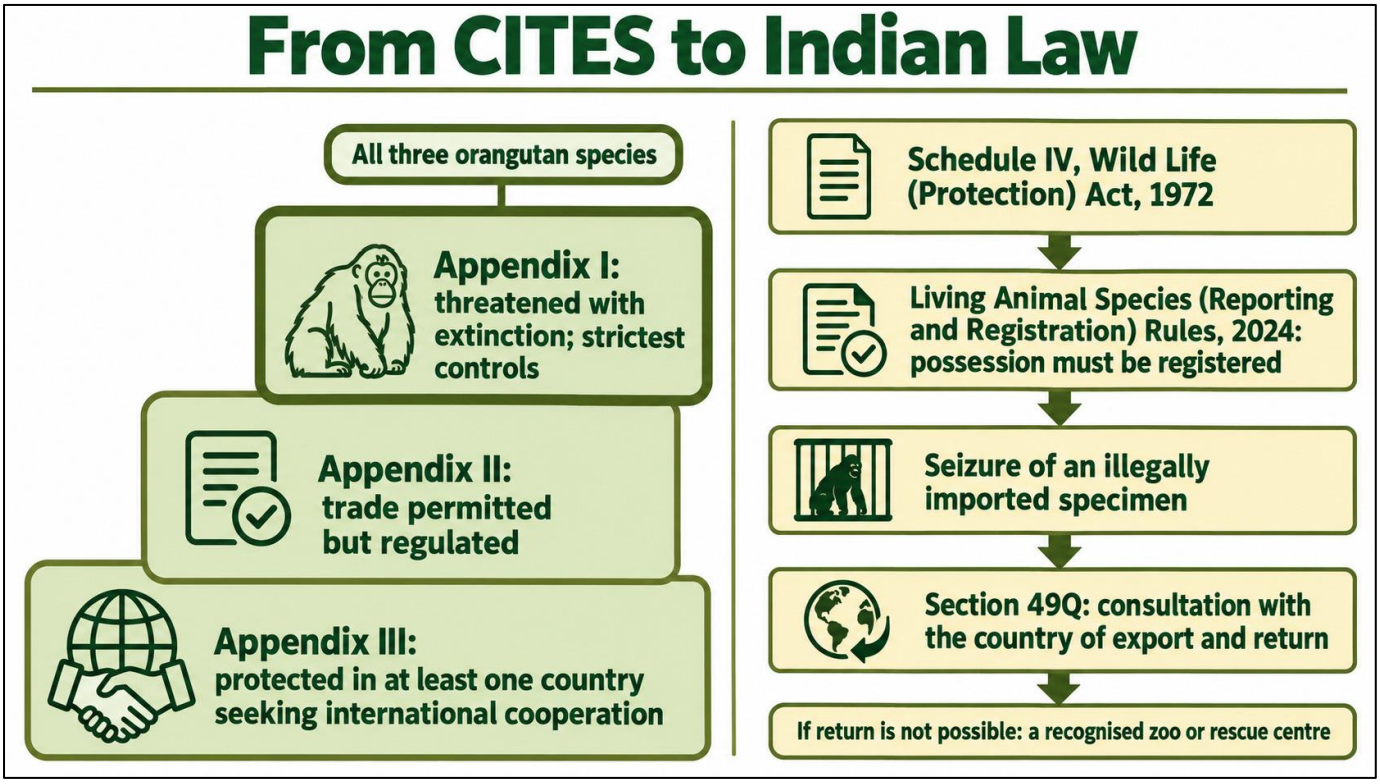
5.1 Orangutans in Odisha: CITES Rules, Illegal Wildlife Trade and Repatriation

Context:

The Odisha Forest Department rescued five baby orangutans being illegally transported in Balasore district, and the Wildlife Crime Control Bureau (WCCB) is probing an international smuggling network. The case raises questions under CITES and India's wildlife law on exotic animals, trafficking and repatriation. Indonesia has sought their return, as they are suspected to be Sumatran orangutans; DNA tests will confirm their origin.

Explanation:

- **Orangutans:** great apes (genus *Pongo*) found only in the rainforests of **Borneo and Sumatra**; the Bornean, Sumatran and Tapanuli species are all **Critically Endangered**, threatened by deforestation, palm-oil expansion and the pet trade.
- **CITES:** the Convention on International Trade in Endangered Species regulates wildlife trade through three Appendices; all orangutans are in **Appendix I**, which generally bans commercial trade.
- **The Appendices: I** cover species threatened with extinction; **II** species whose trade is allowed but regulated; **III** species protected by at least one country seeking help to control trade.



- **India and CITES:** a Party since **1976**; the **Wild Life (Protection) Amendment Act, 2022** placed CITES-listed species in **Schedule IV** of the 1972 Act.
- **Enforcement:** a Management Authority issues CITES permits, Scientific Authorities advise, and the WCCB, under the Environment Ministry, tackles organised wildlife crime.
- **Registration:** under the **Living Animal Species (Reporting and Registration) Rules, 2024**, anyone holding live Schedule IV animals must register them and report births, deaths and transfers.
- **Repatriation:** under **Section 49Q**, a seized illegally imported animal is returned to the exporting country after consultation, or placed in a recognised zoo or rescue centre.

5.2 Pygmy Hog Breeding and Reintroduction in Assam

Context:

The Pygmy Hog Conservation Programme began with six wild founders in 1996 and has bred and released 194 hogs into Assam's grasslands. It aims to rebuild a wild population of around 300 by 2040 through breeding, releases and habitat protection.



Explanation:

- **Species:** *Porcula salvania*, the **world's smallest wild pig**, living in tall, wet alluvial grasslands of the Himalayan foothills.
- **Range:** once found in India, Nepal and Bhutan; surviving wild populations are now mainly in **Assam**.
- **Status:** **Endangered** on the IUCN Red List and protected under **Schedule I** of the Wild Life (Protection) Act, 1972.
- **Programme:** the **Pygmy Hog Conservation Programme** began captive breeding with six hogs from **Manas National Park**.
- **Method:** breeding in captivity and reintroduction, combined with restoration of grassland habitat.
- **Releases:** into protected grasslands including **Manas and Orang National Parks**.
- **Indicator species:** its presence signals healthy tall grasslands, so saving it protects other grassland wildlife too.

5.3 Inter-State Agreement on the Kishau Multipurpose Project

Context:

Six Yamuna-basin States (Himachal Pradesh, Uttarakhand, Uttar Pradesh, Haryana, Rajasthan and Delhi) have signed an agreement to build the long-delayed **Kishau Multipurpose Project**, to improve water storage, irrigation, hydropower and environmental flows.

Explanation:

- **Location:** a major dam on the **Tons River**, an important tributary of the **Yamuna**, on the Himachal Pradesh-Uttarakhand border.
- **Part of a plan:** one of three Upper Yamuna storage projects, with **Lakhwar and Renukaji**, envisaged under the **1994 Yamuna water-sharing agreement**.
- **Uses:** storage, irrigation, drinking water and hydropower.
- **River health:** extra regulated flows will help **Yamuna rejuvenation**.
- **Irrigation:** potential for about **97,000 hectares**.
- **Funding:** declared a **National Project**, with **90%** Central assistance for the water component and 10% shared by the States.
- **Significance:** an example of cooperative federalism in managing inter-State rivers.

5.4 Renaming of Nauru as Naoero

Context:

The Pacific island nation known as Nauru has restored its traditional name, the **Republic of Naoero**. President David Adeang presented the change at the 81st UN General Assembly as a reclaiming of indigenous heritage, language and identity.

Explanation:

- **Location:** a tiny island country in **Micronesia**, central Pacific, just south of the Equator and north-east of Australia.



- **Geography:** a raised coral-limestone island, among the world's smallest countries by area and population.
- **History:** independent since **1968**, after German rule and administration by Australia, New Zealand and the UK.
- **Capital:** it has no official capital; government functions are centred in **Yaren** district.
- **Economy:** long dominated by mining of **phosphate** formed from seabird guano, which has left much of the interior degraded.
- **Climate risk:** as a small Pacific island state, highly vulnerable to sea-level rise.
- **Pronunciation and code:** "Now-ero"; its international country code changes from NRU to NRO.

5.5 Forest Rights Act and Gram Sabha Consent for Forest Diversion

Context: The Tribal Affairs Ministry has clarified that the Forest Rights Act (FRA), 2006 does not itself require Gram Sabha consent at the final (Stage-II) forest clearance. The clarification separates the recognition of forest rights from the later diversion of forest land for non-forest use.

Explanation:

- **The Act:** recognises individual and community forest rights of forest-dwelling Scheduled Tribes and other traditional forest dwellers; the **Ministry of Tribal Affairs** is the nodal ministry.
- **Gram Sabha's role:** it starts the process of determining the nature and extent of rights; **Section 4(5)** bars eviction until recognition and verification are complete.



- **Separate track:** diversion of forest land is governed by the forest-clearance framework of the Environment Ministry under the **Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980**.
- **No express consent clause:** the FRA does not explicitly require Gram Sabha consent for every diversion.
- Diversion order: under Rule 11(7) of the 2023 forest-conservation rules, a State or Union Territory may issue a forest-diversion order only after Central final approval and compliance with applicable laws, including settlement of forest rights.
- **Section 3(2):** for specified government facilities, diverting up to **one hectare** of forest, with no more than **75 trees** felled, needs the Gram Sabha's recommendation.
- **Niyamgiri case (2013):** in *Orissa Mining Corporation v. MoEF*, the Supreme Court gave Gram Sabhas a decisive say over community and religious rights; **PESA, 1996** also requires Gram Sabha consultation in Scheduled Areas.

5.6 FAO Assessment of Declining Soil Biodiversity and Soil Health

Context:
The Food and Agriculture Organization's (FAO) Status of the World's Soil Resources 2026 report, released at UNCCD COP17, warns that declining soil biodiversity is weakening essential soil functions and that sustainable soil management is not spreading fast enough.

Explanation:

- **Soil biodiversity:** below-ground life such as bacteria, fungi, archaea, protozoa, nematodes, earthworms and arthropods.
- **Scale:** soils hold about **59% of Earth's biodiversity.**
- **Functions:** decomposition, nutrient cycling, carbon storage, soil structure and disease control.
- **Ranking:** FAO places biodiversity loss **fourth among seven** major soil threats, after erosion, loss of soil organic carbon and nutrient mismanagement.
- **Main threat:** habitat loss, especially conversion of forests and grasslands to farmland, along with intensive farming, pesticides, pollution and climate change.
- **Remedies:** maintaining suitable soil pH, organic manure, reduced or no tillage and lower pesticide use.
- **SDG link:** directly tied to **Sustainable Development Goal 15**, Life on Land.

5.7 The Kathmandu Declaration of the South Asia Wildlife Enforcement Network

Context:
The **South Asia Wildlife Enforcement Network (SAWEN)** has adopted the **Kathmandu Declaration** on regional cooperation against illegal wildlife trade at its first General Assembly in Kathmandu, along with an implementation plan and a three-year work programme.

Explanation:

- **About SAWEN:** a regional inter-governmental body supporting wildlife law enforcement, launched in **2011 at Paro, Bhutan.**
- **Members:** eight countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.
- **Secretariat:** Kathmandu, Nepal.
- **Role:** intelligence sharing, capacity building, policy coordination and joint action against cross-border wildlife crime.
- **The Declaration:** strengthens coordinated enforcement, criminal-justice cooperation and financial investigation of wildlife trafficking.
- **Frontline staff:** stresses the safety and welfare of rangers.
- **SAWEN Day:** members will observe **30 January** to mark the network's founding.

5.8 Robotic Removal of Water Hyacinth from Vembanad Lake

Context:
A pilot project will use a robotic system to clear water hyacinth, a fast-spreading invasive weed, from Vembanad Lake in Kerala, and test whether the harvested weed can be turned into useful products.

Explanation:

- **Vembanad Lake:** India's **longest lake**, part of the **Vembanad-Kol Wetland**, a **Ramsar Site.**
- **Ecosystem:** a brackish-water system linked to the Arabian Sea, supporting fisheries, farming, inland navigation and biodiversity.



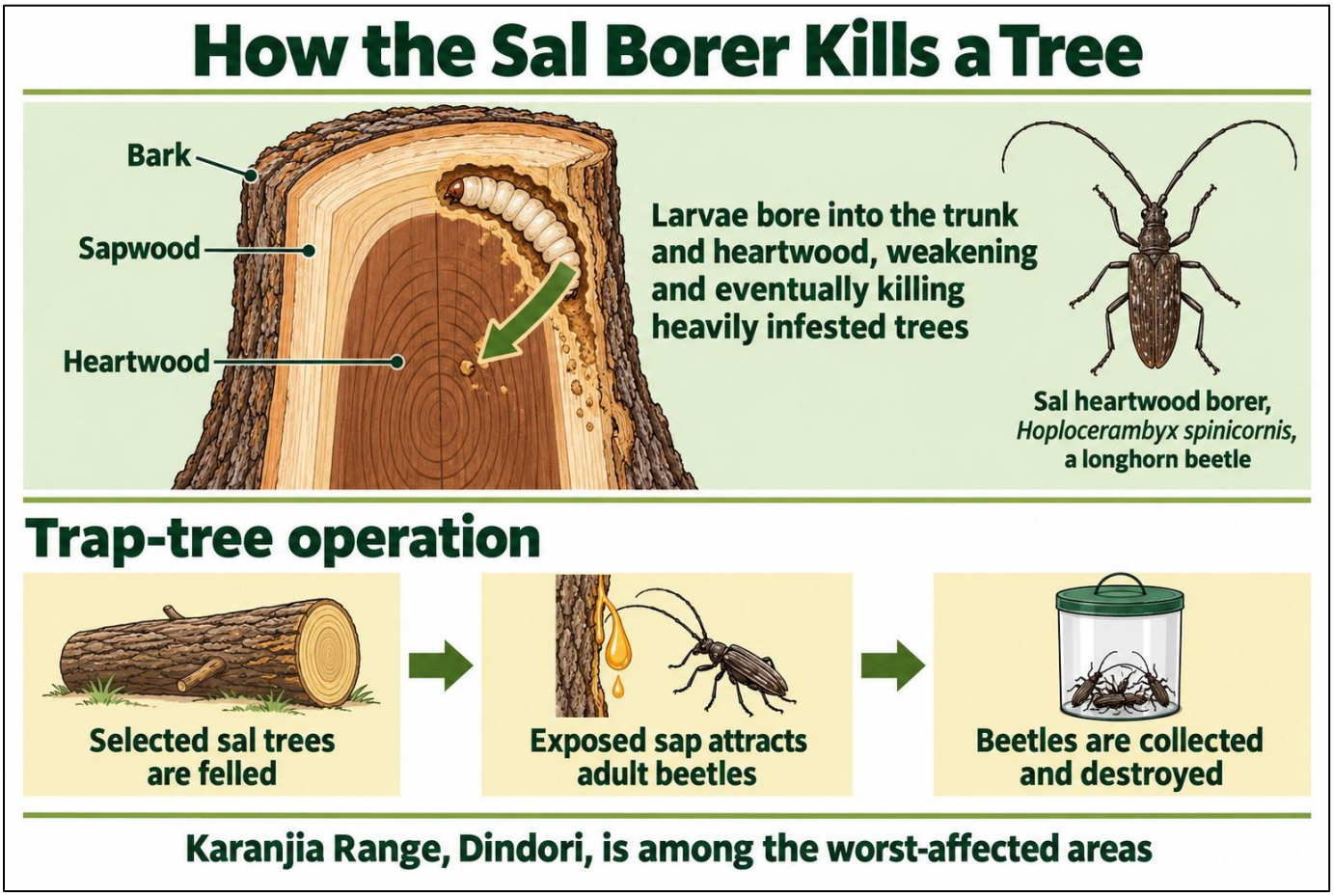
- **Water hyacinth:** *Eichhornia crassipes*, a free-floating plant native to South America and a major **invasive alien species** in India.
- **Harm:** it forms dense mats that block sunlight, oxygen exchange, boats and fishing; its decay lowers dissolved oxygen.
- **The technology:** an unmanned surface vehicle fitted with a robotic harvester.
- **Circular use:** harvested biomass may become value-added products.
- **Scheme:** funded under the **National Plan for Conservation of Aquatic Ecosystems (NPCA)** of the Environment Ministry.

5.9 Sal Borer Outbreak in the Sal Forests of Madhya Pradesh

Context: Felling of more than 1.56 lakh sal trees has been permitted in Madhya Pradesh's Dindori and Anuppur districts, including the Amarkantak region, after a sal-borer outbreak. Removing infested trees, with other measures, aims to stop the pest spreading through nearby forests.

Explanation:

- **Sal:** *Shorea robusta*, a major deciduous tree of India's tropical moist and dry deciduous forests.
- **The pest:** the sal heartwood borer (*Hoplocerambyx spinicornis*), a longhorn beetle whose larvae bore into the trunk, weakening and killing trees.
- **Spread:** outbreaks grow fast when many weakened or susceptible trees are available.
- **Trap-tree method:** selected sal trees are felled so their exposed sap attracts adult beetles, which are then collected and destroyed.
- **Community role:** the State pays local people to collect adult beetles.
- **Worst hit:** the Karanjia Range in Dindori.
- **Amarkantak:** in the Maikal Hills, the source region of the **Narmada and Son** rivers.

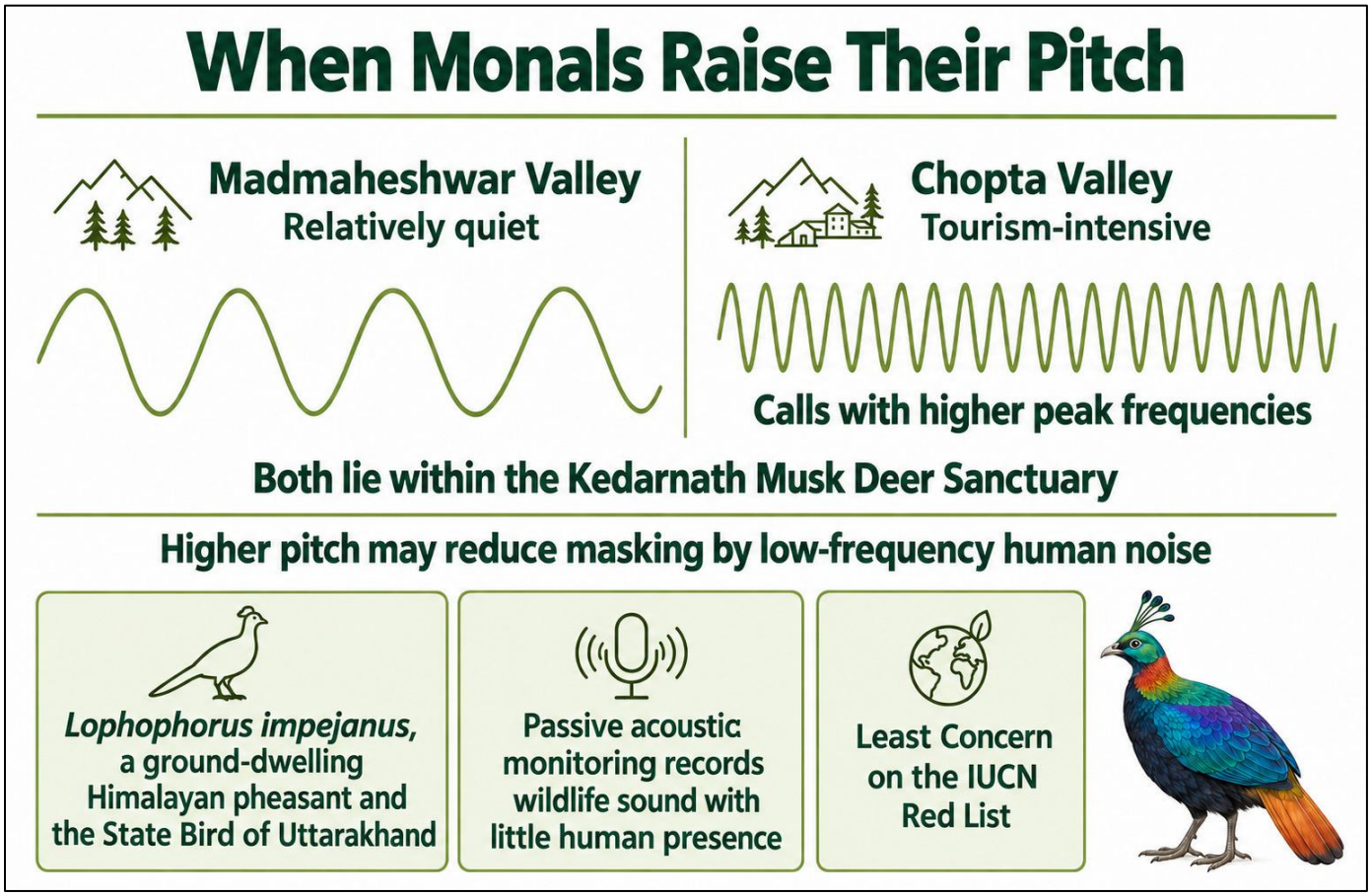


5.10 Impact of Anthropogenic Noise on the Calls of the Himalayan Monal

Context: A study by Hemvati Nandan Bahuguna Garhwal University found that Himalayan monals in noisier areas call at a higher pitch, apparently adjusting to noise from traffic, tourism and pilgrimage. Long-term effects on mating and survival are not yet known.

Explanation:

- **The bird:** *Lophophorus impejanus*, a colourful ground-dwelling pheasant and the **State Bird of Uttarakhand**.
- **Range:** Himalayan habitats from Jammu and Kashmir and Himachal Pradesh to Uttarakhand and Sikkim.
- **Study sites:** the quiet Madmaheshwar Valley and the tourist-heavy Chopta Valley, both in the **Kedarnath Musk Deer Sanctuary**.
- **Method: passive acoustic monitoring**, which records animal sounds without people present.
- **Finding:** monals in noisy areas used higher-frequency calls, which may stop low-frequency human noise from masking them.
- **Concept:** an example of **behavioural plasticity**, where animals change behaviour to suit their surroundings.
- **Status: Least Concern** on the IUCN Red List.



5.11 Inclusion of Heatwaves in India's List of Notified Disasters

Context:

Acting on the recommendations of the **Sixteenth Finance Commission**, the Union government has added **heatwaves and lightning** to India's list of 14 notified natural calamities for 2026-31, so regular disaster-relief and mitigation funds can now be used for heat-related losses.

Explanation:

- **Legal framework:** the **Disaster Management Act, 2005** governs disaster management and financing.
- **Relief funds:** the **State Disaster Response Fund (SDRF)** pays for immediate relief, and the **National Disaster Response Fund (NDRF)** supplements it in severe disasters.
- **Earlier limit:** States could treat heatwaves only as **local disasters**, using up to **10% of the SDRF**.
- **What changes:** notification removes this cap and brings heatwaves under regular SDRF and NDRF norms.
- **Mitigation:** the **State Disaster Mitigation Fund** can pay for cooling shelters, early warning and heat-resilient buildings.
- **Heat Action Plans:** predictable funding strengthens their implementation across States.
- **Article 280:** the Finance Commission recommends how disaster-management funds are shared between the Union and the States.

5.12 Monsoon Variability: Drought Stress and Floods Despite Rainfall Deficit

Context:

The 2026 monsoon showed India's two water risks at once: several regions faced dry spells and drought stress, while **Bihar** suffered severe floods despite rainfall about **27% below normal** up to 8 September.

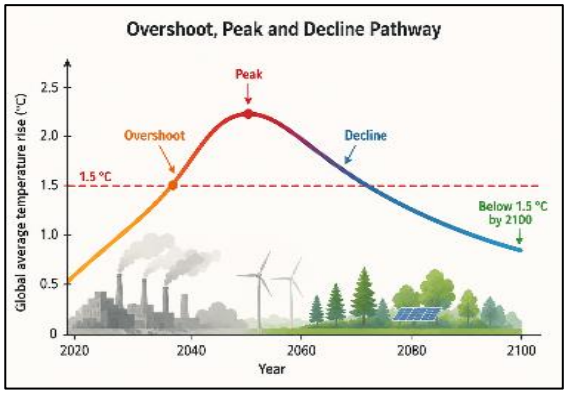
Explanation:

- **Two kinds of drought: meteorological drought** means deficient rain; **agricultural drought** means too little soil moisture for crops.
- **Measuring drought:** assessments also use dry spells, groundwater, sowing area and crop distress; the **National Agricultural Drought Assessment and Monitoring System (NADAMS)** combines satellite and ground data.
- **Catchment, not State:** floods depend on rain across the whole river basin, not just within Bihar.
- **Bihar's setting:** a flat, low-gradient part of the Ganga plain crossed by silt-laden rivers such as the Kosi, Gandak, Bagmati and Punpun.
- **Junction floods:** heavy upstream rain and swollen tributaries arriving together can flood the plain even in a dry year; this year's floods were not driven by unusual releases from Nepal.
- **Backwater effect:** a high Ganga slows the drainage of tributaries such as the Gandak and Punpun.
- **Human factors:** siltation raises riverbeds, and embankments trap water, worsening flooding and waterlogging.

5.13 The UN "Overshoot, Peak and Decline" Pathway for Global Warming

Context:

The UN Environment Programme's (UNEP) **Limiting Overshoot** report warns that temporarily crossing the 1.5°C warming threshold is becoming unavoidable. It sets out an "overshoot, peak and decline" pathway to limit how far and how long warming exceeds the threshold.



Explanation:

- **Paris Agreement, 2015:** aims to hold warming **well below 2°C** above pre-industrial levels and pursue efforts to limit it to **1.5°C**.
- **Overshoot:** global temperature temporarily exceeds a threshold and later falls back below it.
- **The pathway:** warming crosses 1.5°C, peaks as low as possible, then is brought back below 1.5°C.

- **Even best case:** fully implementing current **Nationally Determined Contributions (NDCs)** and net-zero pledges could still see a peak of about **1.8°C**.
- **Current policies:** point to about **2.6°C** by 2100.
- **What it needs:** rapid emission cuts, stronger NDCs, protection of carbon sinks and eventually **carbon dioxide removal (CDR)**.
- **Why limit it:** a smaller, shorter overshoot lowers risks of extreme heat, ecosystem loss and irreversible tipping points.

5.14 PACT and e-FAST India: Accelerating Zero-Emission Freight Transport

Context:

NITI Aayog has launched the **Platform for Aggregating Clean Transport (PACT)** at the 5th e-FAST India Summit 2026 to speed up the use of **Zero-Emission Trucks (ZETs)**, by pooling freight demand to ease financing, vehicle supply and charging.

Explanation:

- **e-FAST India:** The Electric Freight Accelerator for Sustainable Transport, a NITI Aayog platform for zero-emission freight, especially medium and heavy trucks.
- **How PACT works:** it pools demand from shippers, Logistics Service Providers (LSPs) and other freight users.
- **Why pooling helps:** visible, assured demand gives manufacturers and investors the confidence to back electric medium and heavy-duty vehicles.
- **Stakeholders linked:** shippers, LSPs, vehicle makers, financiers and Charge Point Operators.
- **Corridors:** it helps identify key freight routes for corridor-based charging.
- **ZET Marketplace:** launched at the same summit for business, finance, technology and charging partnerships.
- **Benefits:** lower oil imports, transport emissions and freight-related air pollution.

5.15 Relocating Carcass Dumping Sites to Reduce Vulture Electrocution

Context:

A study from Dehradun linked vulture deaths near a livestock-carcass dump to nearby high-tension power lines. After the dump was moved about **2.4 km** away in 2015, no further deaths were recorded during limited monitoring.



Explanation:

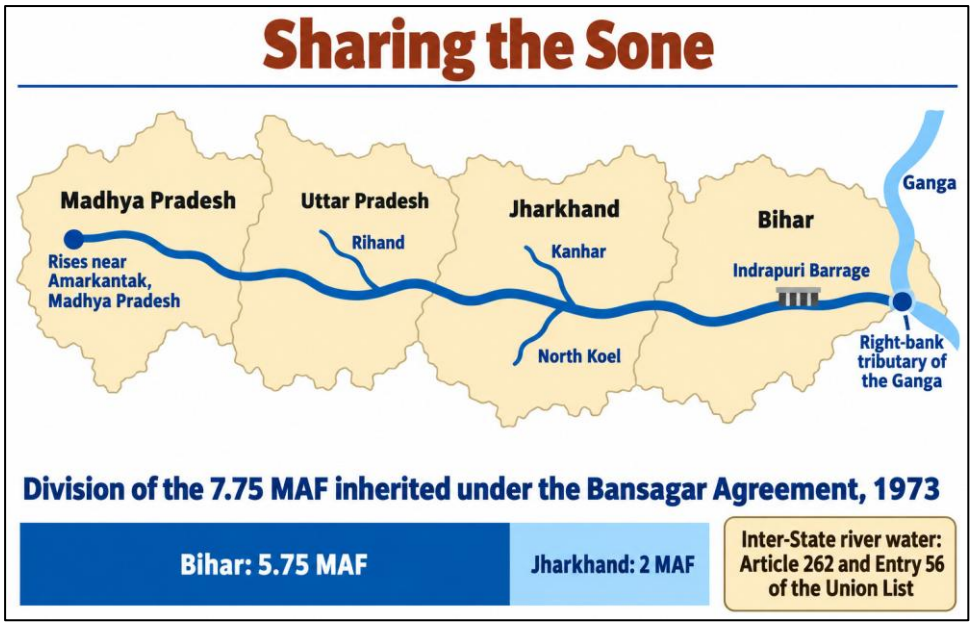
- **Ecological role:** vultures quickly dispose of carcasses, reducing disease risks.
- **Decline:** Indian vulture populations crashed mainly because of veterinary drugs such as **diclofenac**, along with food scarcity, habitat loss and electrocution.
- **Power-line danger:** large soaring birds die from electrocution or collision, especially near feeding sites.
- **Study finding: 46 vulture carcasses** were attributed to electrocution.
- **Species hit:** mostly the **Himalayan griffon** (*Gyps himalayensis*), with Eurasian griffons and cinereous vultures.
- **Lesson:** relocating dumps away from power infrastructure cuts risk without removing a food source.
- **Wider toolkit:** complements vulture-safe drugs, habitat protection and bird-safe power lines.

5.16 Bihar-Jharkhand Sone River Water-Sharing Agreement

Context: Bihar and Jharkhand have signed an inter-State MoU settling their 25-year-old dispute over the Sone River. Of the 7.75 million acre-feet (MAF) allotted to undivided Bihar, Bihar will now get 5.75 MAF and Jharkhand 2 MAF.

Explanation:

- **The river:** the Sone rises near **Amarkantak** in Madhya Pradesh and flows through Madhya Pradesh, Uttar Pradesh, Jharkhand and Bihar.
- **Ganga system:** a major **right-bank tributary** of the Ganga; its tributaries include the **Rihand, Kanhar and North Koel.**
- **Origin of dispute:** the **Bansagar Agreement, 1973** among Madhya Pradesh, Uttar Pradesh and undivided Bihar allotted 7.75 MAF to Bihar.
- **After 2000:** the creation of Jharkhand left this inherited share to be divided.
- **Benefit:** enables full use of Bihar's **Indrapuri Barrage** in Rohtas district for irrigation in drought-prone areas.
- **Constitution:** inter-State River disputes fall under **Article 262** and **Entry 56 of the Union List.**



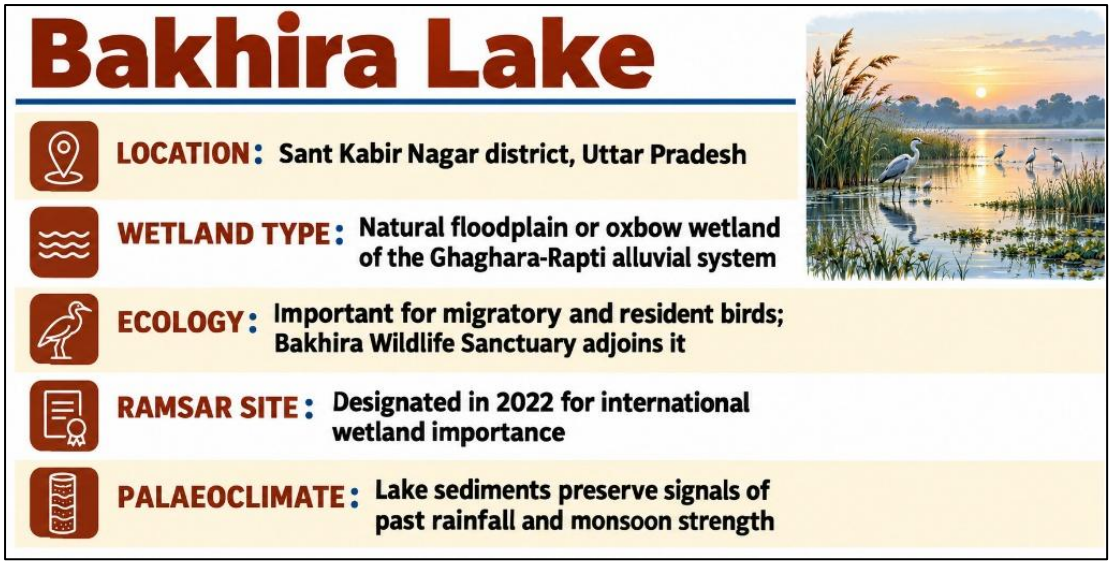
5.17 Bakhira Lake: A 25,000-Year Record of Monsoon Variability

Context:

A scientific study of sediments from Bakhira Lake in Uttar Pradesh has recovered a 25,000-year record of monsoon variability. Such records help scientists understand past climate and plan water use in the Central Ganga Plain.

Explanation:

- **Location:** Sant Kabir Nagar district, Uttar Pradesh.
- **Type:** a natural floodplain or oxbow wetland of the Ghaghara-Rapti alluvial system in the Central Ganga Plain.
- **Birds:** important for migratory and resident birds.
- **Protection:** adjoins the **Bakhira Wildlife Sanctuary**; designated a **Ramsar Site in 2022.**
- **Climate archive:** lake-bed sediments preserve layered signals of past rainfall, vegetation and erosion.
- **Why it matters:** long records of past monsoon swings help test climate models and plan for future variability.

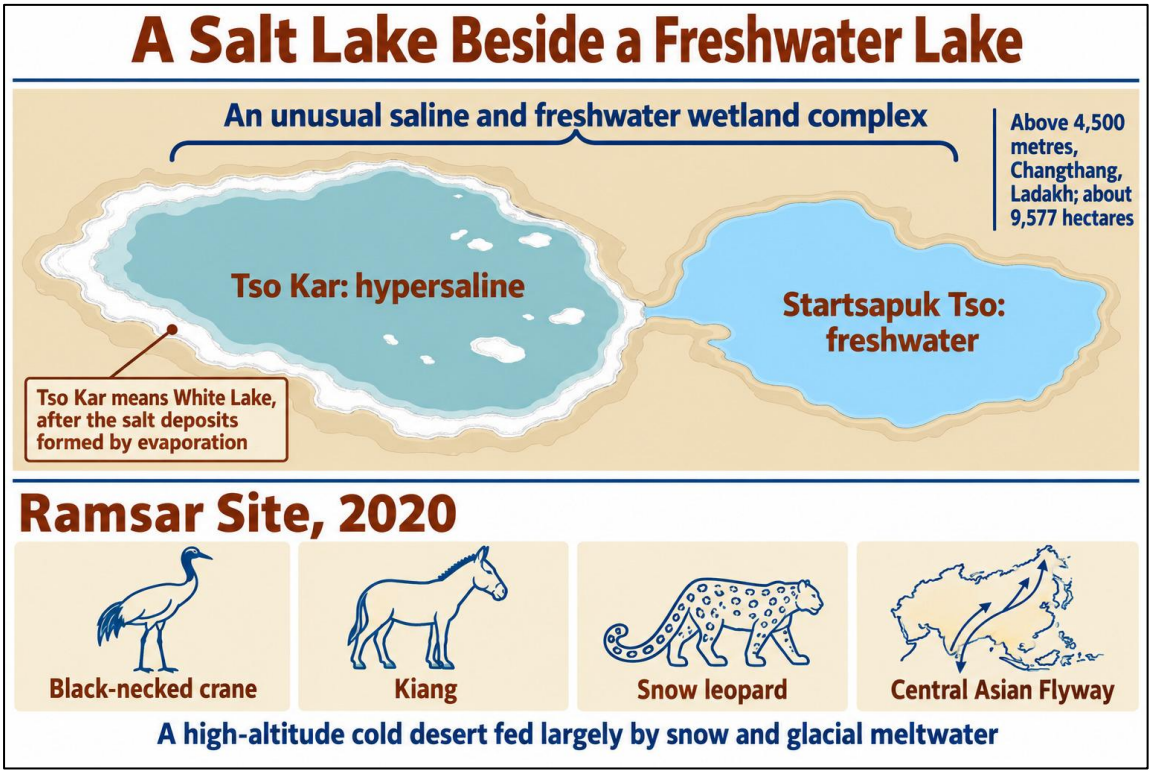


5.18 Restoration of Tso Kar Lake in Ladakh

Context: Ladakh has launched a project to revive Tso Kar Lake, which has shrunk sharply over the past decade, by channelling water from the Rupsho-Kharnak glacier stream. The case shows how fragile high-altitude wetlands are when water flows change.

Explanation:

- **Location:** The **Changthang** region of Ladakh, above **4,500 m**.
- **Size:** the Tso Kar Wetland Complex covers about **9,577 hectares**.
- **Unusual pairing:** the **hypersaline Tso Kar**, meaning "White Lake" after its salt crust, sits beside the freshwater **Startsapuk Tso**.
- **Status:** A **Ramsar Site since 2020**.
- **Wildlife:** black-necked crane, kiang (Tibetan wild ass) and snow leopard.
- **Flyway:** an important stopover on the **Central Asian Flyway** for migratory birds.
- **Water source:** fed largely by snow and glacial meltwater, which climate change is altering.



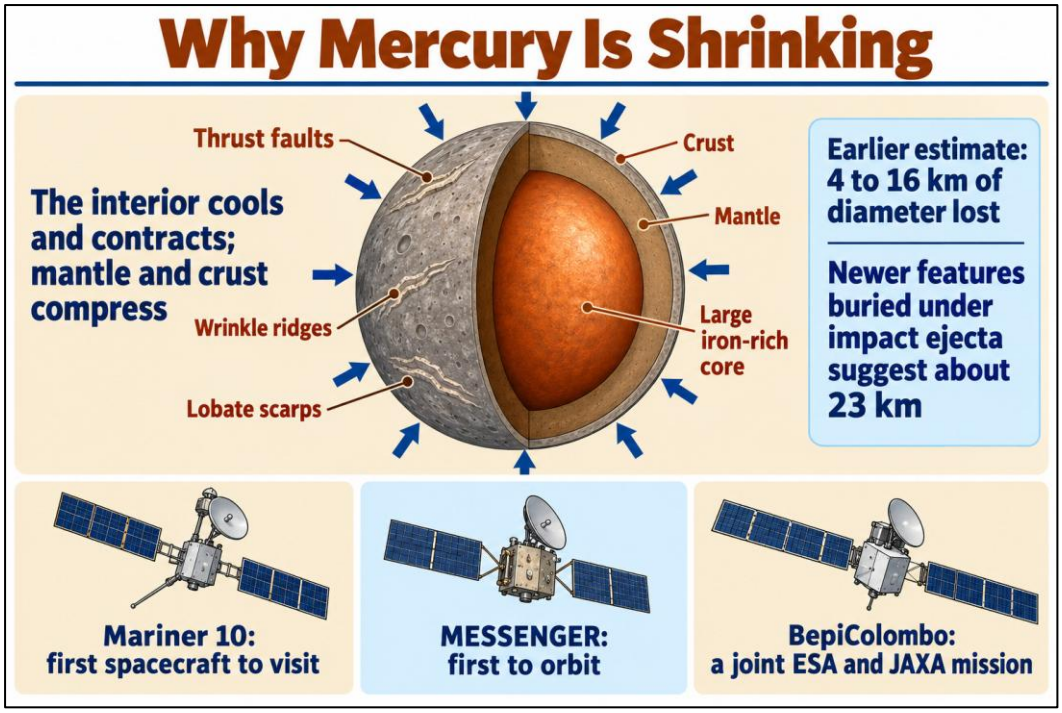
5.19 Planetary Cooling and the Contraction of Mercury

Context:

A new study in *Geophysical Research Letters* estimates that **Mercury** has shrunk 10 to 30% more than earlier thought, losing up to **23 km** of its diameter since it formed, as its interior slowly cooled.

Explanation:

- **The planet:** the smallest and innermost planet of the Solar System, with an unusually large **iron-rich core**.
- **Cooling and shrinking:** over about 4.5 billion years its interior cooled and contracted, squeezing the mantle and crust.
- **Surface evidence:** the rigid crust buckled into **lobate scarps**, thrust faults and wrinkle ridges.
- **Revised estimate:** earlier studies suggested a 4 to 16 km fall in diameter; counting features hidden under impact debris raises it to 23 km.
- **Missions:** NASA's **Mariner 10** first visited Mercury, and **MESSENGER** was the first to orbit it.
- **Next steps:** **BepiColombo**, a joint European (ESA) and Japanese (JAXA) mission, will study its surface, interior and contraction history.



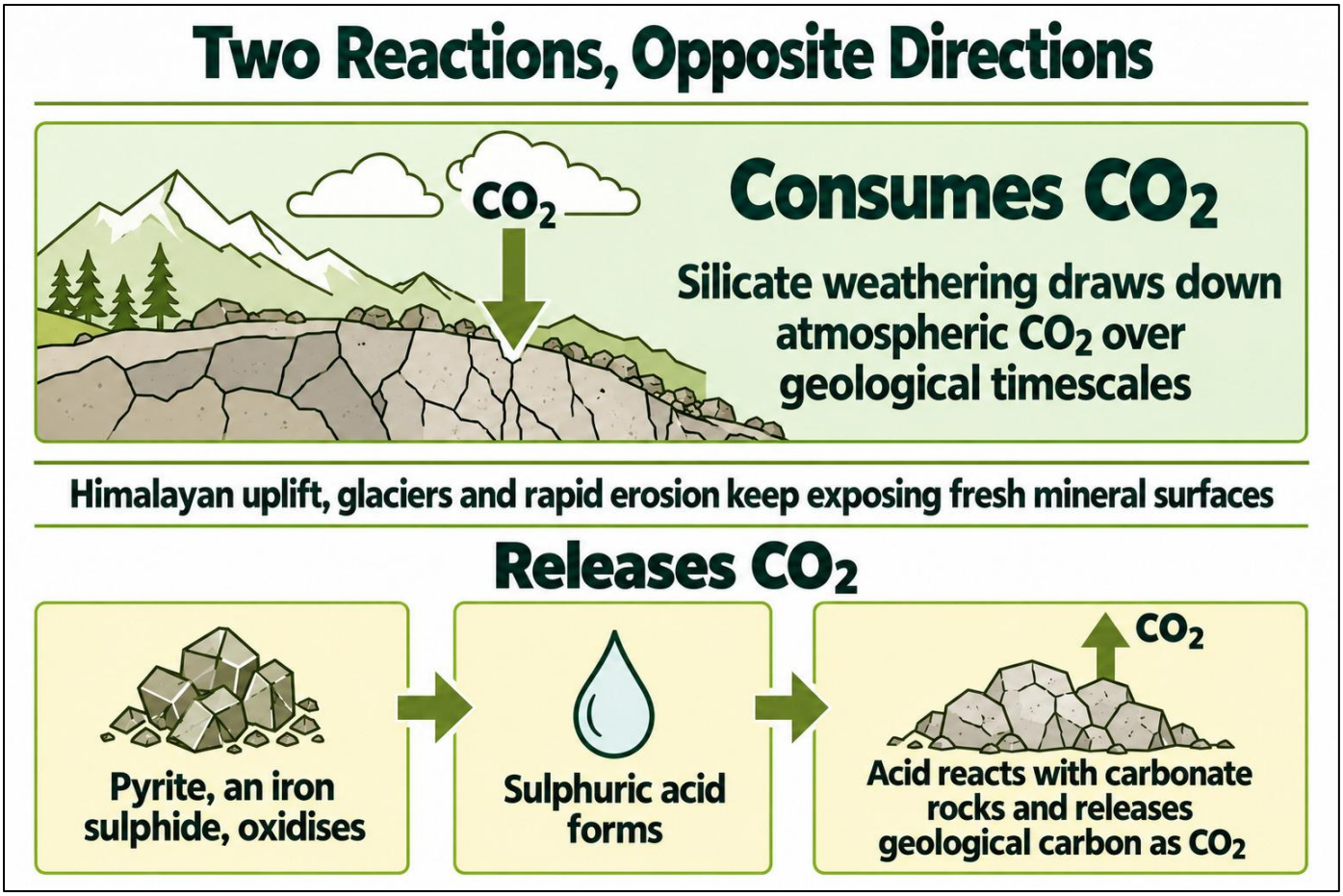
5.20 Himalayan Erosion as a Source of Carbon Dioxide

Context:

Mountains are usually seen as long-term absorbers of carbon dioxide, but a study of the **upper Indus basin** in the northwestern Himalayas finds that intense erosion there may release more CO_2 than rock weathering removes.

Explanation:

- **Fresh rock:** Himalayan uplift, glaciers and rapid erosion keep exposing new mineral surfaces to air and water.
- **Silicate weathering:** draws down atmospheric CO_2 and stores carbon in ocean sediments over geological time.
- **Pyrite oxidation:** pyrite, an iron sulphide, oxidises to form **sulphuric acid**.
- **CO_2 release:** this acid reacts with carbonate rocks and releases geological carbon as CO_2.



- **Tracing the process:** researchers used **sulphur and oxygen isotopes.**
- **Finding:** in the upper Indus, CO_2 released through sulphide oxidation may exceed uptake by silicate weathering.
- **Lesson:** steep, fast-eroding mountains can be **net carbon sources**, while flatter downstream floodplains may remain sinks.

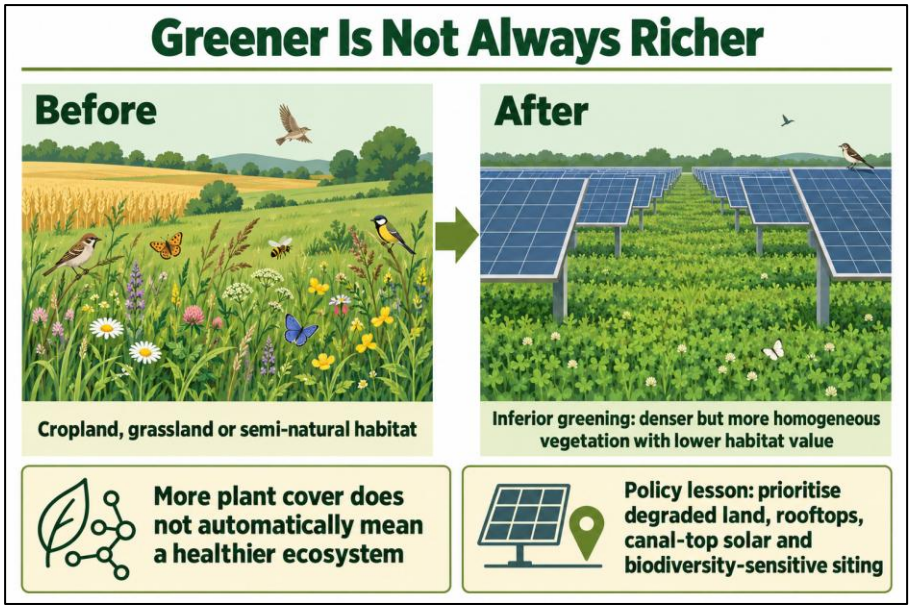
5.21 Large-Scale Solar Farms and 'Inferior Greening'

Context:

A study of 2,344 counties in China over 2014-2023 found that large solar farms can increase vegetation cover while reducing biodiversity, an effect called "inferior greening", which was stronger outside deserts.

Explanation:

- **Utility-scale solar:** large ground-mounted photovoltaic plants built to supply power to the grid.
- **Microclimate change:** panels create shade and change soil temperature, moisture and the spread of rainfall.
- **Apparent greening:** these changes can increase plant cover under and around panels, so satellite indices show a greener landscape.
- **Inferior greening:** the new vegetation is dense but uniform, lacking the variety of natural habitats.
- **Biodiversity loss:** bird diversity, insect numbers and habitat complexity can fall.
- **Where it is worse:** in non-desert areas, where solar farms replace richer cropland, grassland or semi-natural habitat.
- **Policy lesson:** prefer deserts, degraded land, rooftops and canal tops for large solar projects.



5.22 Indravati Tiger Reserve

- In news: tiger skins were recovered in Chhattisgarh, and forest staff of the Indravati Tiger Reserve were suspended for alleged negligence.
- Location: mainly in Bijapur district, Chhattisgarh, within the Dandakaranya forest landscape.
- History: brought under Project Tiger in 1982-83.
- Area: about 2,799 sq km, with a core of 1,258.37 sq km and a buffer of 1,540.70 sq km.
- River: the Indravati forms much of its northern and western boundary and part of the Chhattisgarh-Maharashtra border.
- Wildlife: moist and dry deciduous forests with tiger, leopard, dhole, gaur and the endangered wild water buffalo.

5.23 Painganga Wildlife Sanctuary

- In news: Maharashtra continued moving tigers into the Painganga Wildlife Sanctuary to build a breeding population in eastern Vidarbha.
- Location: mainly in Yavatmal district, Maharashtra, linked to the Nanded-Kinwat side of the landscape.
- Name: after the Painganga (Penganga) River, a tributary of the Wardha in the Godavari basin.
- Status: notified as a sanctuary in 1986 under the Wild Life (Protection) Act, 1972.
- Habitat: Southern Tropical Dry Deciduous Forest, mainly teak; home to tiger, leopard, sloth bear, wild dog, chital and nilgai.
- Corridor: connects Tipeshwar Wildlife Sanctuary (Maharashtra) with Kawal Tiger Reserve (Telangana).

5.24 Tokay Gecko

- In news: the Directorate of Revenue Intelligence seized 86 live Tokay geckos in Assam.
- About: Gekko gecko, a large nocturnal, tree-dwelling lizard with bluish-grey skin, red or orange spots and a loud "to-kay" call.
- Range: mainly Northeast India, with records from West Bengal and Bihar; also, South and Southeast Asia.
- Protection: Schedule I of the Wild Life (Protection) Act, 1972.
- CITES: listed in Appendix II, so international trade needs permits.
- Threat: IUCN lists it as Least Concern, but it is heavily trafficked for traditional medicine and the pet trade.

5.25 Lake Ontario: One of North America's Five Great Lakes

- In news: the United States directed that Lake Ontario be called "Lake America" in its federal naming system; Canada, which shares the lake, is not bound.
- Great Lakes: Superior, Michigan, Huron, Erie and Ontario.
- Location: between Canada's Ontario province to the north and New York State to the south.
- Size: the smallest Great Lake by area; Lake Erie is the smallest by volume.
- Inflow: water comes mainly from Lake Erie through the Niagara River, home to Niagara Falls.
- Outflow: drains through the St. Lawrence River to the Atlantic.
- Fact: Lake Michigan is the only Great Lake entirely within the United States.

5.26 Taklamakan Desert

- In news: China expanded a long green belt to stabilise shifting sands in the Taklamakan Desert.
- Location: the Tarim Basin of Xinjiang Uyghur Autonomous Region, China.
- Size: China's largest desert and one of the world's largest shifting-sand deserts.
- Mountains around it: the Tian Shan to the north, Kunlun to the south and the Pamirs to the west.
- Drainage: a largely inland (endorheic) basin; the Tarim River flows along its northern edge.
- Character: extremely dry with vast dunes, nicknamed the "Sea of Death"; Silk Route branches skirted it via oases such as Kashgar and Hotan.

5.27 Review of the Census Town Definition ahead of Census 2027

- In news: the Ministry of Housing and Urban Affairs (MoHUA) said the Census Town definition miss's peri-urban growth, but the Registrar General of India (RGI) has kept it for Census 2027.
- Two kinds of town: a Statutory Town has an urban local body such as a municipality or cantonment board.
- Census Town test: population of at least 5,000, density of at least 400 per sq km, and at least 75% of male main workers outside agriculture, all together.
- Statistical label: a Census Town may still be governed by a Gram Panchayat.
- MoHUA's critique: the male-worker rule ignores women's work, and uniform thresholds hurt hilly and north-eastern areas.
- Census authority: the RGI, under the Ministry of Home Affairs.

5.28 Extension of the Tsunami-Ready Initiative to the Andaman and Nicobar Islands

- In news: the Indian National Centre for Ocean Information Services (INCOIS) will extend the UNESCO-IOC Tsunami Ready Recognition Programme to the Andaman and Nicobar Islands, starting with about 30 villages.
- INCOIS: an autonomous institute in Hyderabad under the Ministry of Earth Sciences providing ocean information and early warnings.
- Warning centre: the Indian Tsunami Early Warning Centre at INCOIS monitors earthquakes that can cause tsunamis in the Indian Ocean.
- The programme: a community-based preparedness initiative of UNESCO's Intergovernmental Oceanographic Commission.
- What it requires: inundation and evacuation maps, warning signs, communication systems, drills and public awareness.
- Why the islands: they lie near the Sumatra-Andaman subduction zone; Odisha already has Tsunami Ready communities.

5.29 Nevados de Chillán Volcano

- In news: Nevados de Chillán in Chile showed increased activity with explosions and ash, under a yellow alert with access restricted.
- Location: Ñuble Region, Chile, in the Central-Southern Andes.
- Structure: a complex of overlapping stratovolcanoes, domes and craters, including the active Nicanor crater.
- Cause: subduction of the oceanic Nazca Plate beneath the South American Plate.
- Hazards: ashfall, pyroclastic flows and lahars (volcanic mudflows).
- Setting: part of the Pacific Ring of Fire, the world's most active volcanic and earthquake belt.

6. Indian Society & Social Justice

6.1 Tamil Nadu's School Breakfast Scheme and Child Nutrition

Context:

Tamil Nadu has extended its free school breakfast scheme to Classes VI to VIII in government and government-aided schools. The State scheme complements PM POSHAN, the Centre-State programme that provides hot cooked mid-day meals.

Explanation:

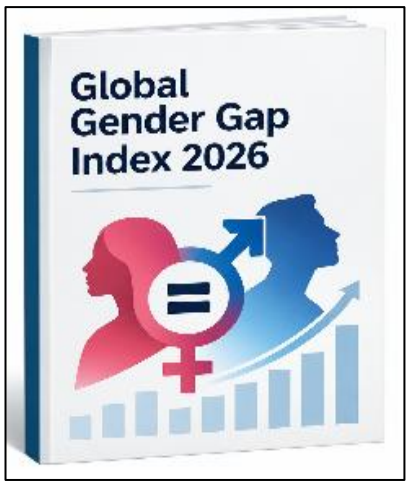
- **Origin:** the **Chief Minister's Breakfast Scheme** was launched in **2022** for Classes I to V.
- **Expansion:** now extended to Classes VI to VIII and renamed the **Perunthalaivar Kamarajar Breakfast Scheme**.
- **Aim:** breakfast before school to reduce classroom hunger and improve nutrition, attendance and learning.
- **Two schemes, two meals:** the breakfast scheme is a state initiative, while **PM POSHAN** is a Centre-State scheme for the mid-day meal.
- **Shared goals:** both address malnutrition, enrolment, attendance and retention in school.
- **A pioneer State:** Tamil Nadu introduced the **Mid-Day Meal** idea in the 1950s, later adopted across India.

6.2 India's Performance in the Global Gender Gap Index 2026

Context:

India has again been placed **131st among 145 economies** in the World Economic Forum's (WEF) **Global Gender Gap Index 2026**. Its parity score rose slightly to **64.5%**, still below the global average of 69.2%.

Explanation:



- **About the index:** introduced by the WEF in **2006**.
- **What it measures:** the gap between women and men, not a country's absolute level of development.
- **Four dimensions:** Economic Participation and Opportunity, Educational Attainment, Health and Survival, and Political Empowerment.
- **Scoring:** from **0 to 1**; a higher score means more of the gender gap has been closed.
- **Top performers: Iceland** first (about 93% of its gap closed), followed by **Finland and Norway**.
- **Bottom: Chad** last at 145th, with Iran 144th and Pakistan 143rd.
- **Global picture:** about **69.2%** of the gender gap has been closed across the 145 economies.

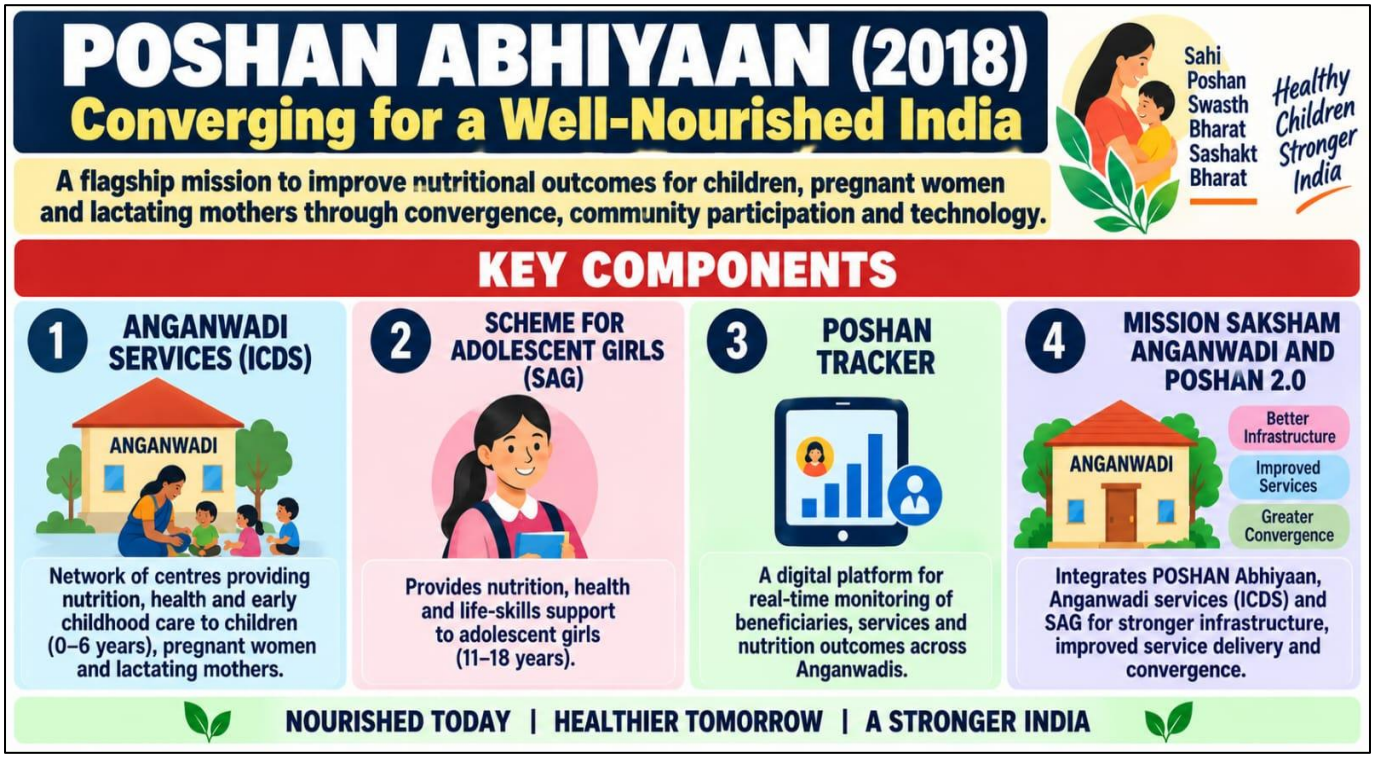
6.3 Ninth Rashtriya Poshan Maah: The National Nutrition Month

Context:

India observed the **9th Rashtriya Poshan Maah** in September 2026, a month-long nutrition drives themed **"Hamari Anganwadi, Hamari Jimmedari"** (Our Anganwadi, Our Responsibility), focused on community participation in maternal and child nutrition.

Explanation:

- **Community ownership: Anganwadi Management Committees (AMCs)** let parents monitor food quality, cleanliness, attendance and service delivery.
- **Transparency:** weekly menus are displayed so families know what beneficiaries should receive.
- **Dietary diversity:** the focus is shifting from calories to balanced diets of millets, pulses, vegetables, fruits, milk and eggs, with special attention to **protein**.
- **Better hot cooked meals:** fresh, hygienic and locally acceptable food, with menu rotation and food-safety testing.
- **First 1,000 days:** from conception to about two years of age, the most critical window for physical growth and brain development.
- **Nurturing, not just feeding:** Anganwadis combine nutrition with early stimulation, play, developmental monitoring and referral.
- **Maternal support:** more eligible women are being enrolled under the **Pradhan Mantri Matru Vandana Yojana (PMMVY)**, a maternity benefit paid through Direct Benefit Transfer.



6.4 Mechanised Sanitation, Swachhta Udyami Yojana and NCSK

- In news: the Swachhta Udyami Yojana (SUY) helped a five-member sanitation-worker group in Guntur buy a 3-in-1 jetting, grabbing and rodding machine; new members were appointed to the National Commission for Safai Karamcharis (NCSK).
- NAMASTE: the National Action for Mechanised Sanitation Ecosystem, a Central Sector Scheme of the Ministries of Social Justice and Empowerment and Housing and Urban Affairs, to end hazardous manual cleaning.
- SUY: finances sanitation equipment and vehicles for entrepreneurs, supported by the National Safai Karamcharis Finance and Development Corporation.
- NCSK: set up under the NCSK Act, 1993; since the Act lapsed in 2004, it continues as a non-statutory body by government resolution.
- Mandate: monitors the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013.
- Article 17: abolition of untouchability links sanitation work to dignity.

6.5 NCPCR's Pan-India Campaign against Child Labour

- In news: the National Commission for Protection of Child Rights (NCPCR) rescued over 3,800 children and helped register more than 575 FIRs in a campaign from 12 June to 31 August 2026.
- NCPCR: a statutory body under the Commissions for Protection of Child Rights Act, 2005, under the Ministry of Women and Child Development; covers children below 18.
- Article 24: bars employment of children below 14 in factories, mines and hazardous work; Article 21A guarantees free and compulsory education from 6 to 14.
- Articles 39(e) and 39(f): direct the State to protect children from exploitation.
- Child and Adolescent Labour Act, 1986 (amended 2016): bars work below 14, with exceptions, and hazardous work for adolescents aged 14 to 18.
- Beyond rescue: rehabilitation, schooling, compensation and prosecution must follow.

6.6 Paliyar Tribe

- In news: Paliyar families at Nochiodai, inside the Srivilliputhur-Megamalai Tiger Reserve, received solar electricity.
- About: A Scheduled Tribe of the Dravidian tradition of southern India.
- Habitat: forested hills of the southern Western Ghats in Tamil Nadu and eastern Kerala.
- Names and language: also called Paliyan or Palaiyar; their speech is closely related to Tamil.
- Livelihood: traditionally hunter-gatherers living on forest produce, tubers and honey; many now farm, keep bees or do wage work.
- Settlements: traditionally called kudis or Paliyakudis.

7. History and Art & Culture

7.1 Inscription of Sarnath as India's 45th UNESCO World Heritage Site

Context: The Ancient Buddhist Site of Sarnath has been inscribed on the UNESCO World Heritage List at the 48th World Heritage Committee session in Busan, South Korea, becoming India's 45th World Heritage property (37 cultural, seven natural and one mixed).



Explanation:

- **Significance:** near **Varanasi**, Uttar Pradesh, where the Buddha gave his **first sermon**, the **Dharmachakra Pravartana**, to five disciples and founded the Sangha.
- **Four key Buddhist sites: Lumbini** (birth), **Bodh Gaya** (enlightenment), **Sarnath** (first sermon) and **Kushinagar** (Mahaparinirvana).
- **The property:** a serial site including **Chaukhandi Stupa** and a complex with **Dhamek Stupa**, Dharmarajika Stupa, Mulagandhakuti Vihara and the **Ashokan Pillar**.
- **Criteria:** inscribed under **(iii)**, testimony to a cultural tradition, and **(vi)**, association with events or beliefs of outstanding significance.
- **The Convention:** India ratified the **1972 World Heritage Convention** in **1977**.
- **Purpose:** the Convention protects cultural and natural sites of **Outstanding Universal Value**.

7.2 Inclusion of the Shekhawati Havelis in UNESCO's Tentative List

Context: The painted havelis of Shekhawati in Rajasthan, spread across 14 towns including Mandawa, Nawalgarh, Fatehpur, Churu and Sikar, have entered UNESCO's Tentative List, a first step towards possible World Heritage nomination.

Explanation:



- **Region:** Shekhawati, in **north-eastern Rajasthan**, is called an **"open-air art gallery"** for havelis built by wealthy merchant families.
- **Architecture:** courtyards, ornate gateways, carved façades, **jharokhas** and elaborate frescoes.
- **Murals:** religious and mythological scenes, daily life, flora and fauna, and modern subjects such as trains and cars.
- **Historical record:** the paintings capture the social, economic and technological change of the 19th and early 20th centuries.
- **Tentative List:** an inventory of sites a country may later nominate for the World Heritage List.
- **Required step:** a site generally must be on the Tentative List before it can be nominated.
- **Not yet World Heritage:** inclusion supports documentation, conservation and heritage tourism but confers no World Heritage status.

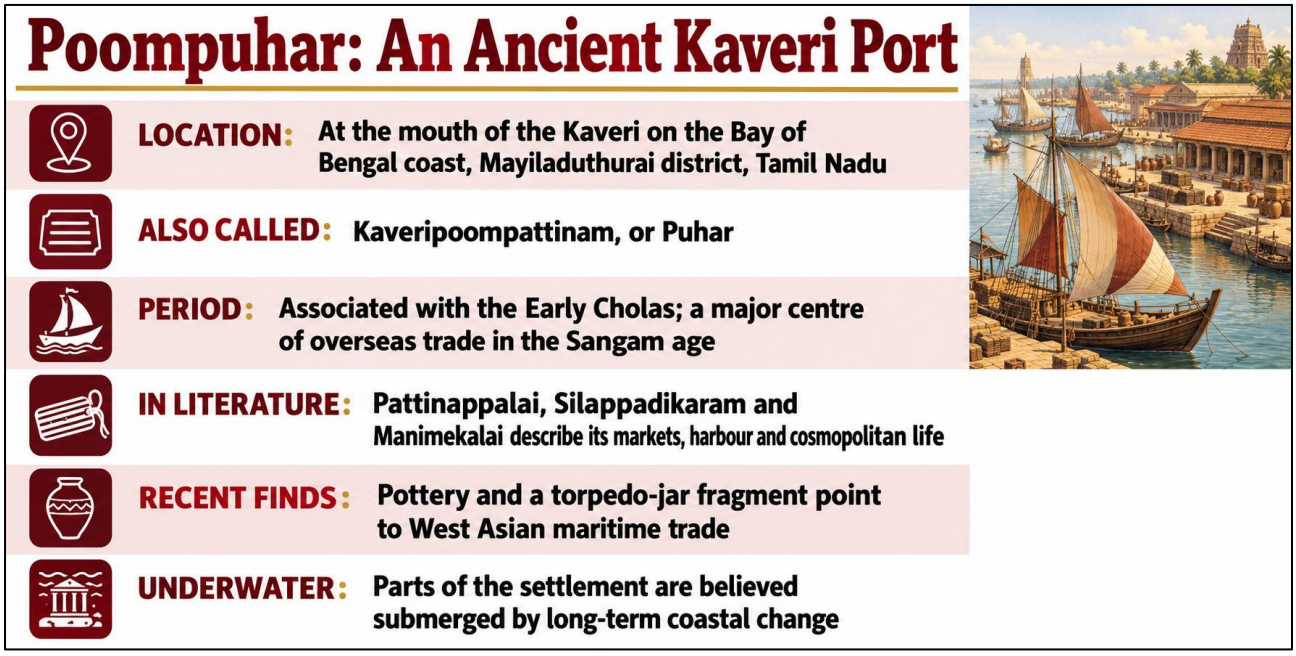
7.3 Poompuhar: Underwater Archaeology and Ancient Maritime Trade

Context:

Underwater archaeological work off Poompuhar in Tamil Nadu has yielded fresh evidence of long-distance sea trade, strengthening its identification as a major ancient port linked to Indian Ocean trading networks.

Explanation:

- **Names:** also known as **Kaveripoompattinam** or **Puhar**.
- **Location:** at the mouth of the **Kaveri** on the Bay of Bengal coast, in present-day Mayiladuthurai district.
- **Political link:** associated with the **Early Cholas**, it grew into a major centre of overseas trade in the **Sangam age**.
- **Literary evidence:** Tamil works such as **Pattinappalai, Silappadikaram** and **Manimekalai** describe its markets, harbour and cosmopolitan life.
- **Foreign traders:** Sangam literature mentions Yavana (Greek and Roman) merchants in the port towns of the Tamil coast.
- **Earlier surveys:** underwater exploration by the National Institute of Oceanography had earlier found submerged structures offshore.
- **Why it matters:** physical finds help confirm literary accounts of ancient Tamil maritime trade.



7.4 Swami Vivekananda's Historic Chicago Address of 1893

- In news: the Prime Minister commemorated Swami Vivekananda's address of 11 September 1893 at Chicago.
- Life: born Narendranath Datta (1863-1902) in Calcutta; foremost disciple of Ramakrishna Paramahamsa.
- The address: at the World's Parliament of Religions, he stressed tolerance, universal acceptance and harmony among faiths.
- Ideas: presented Vedanta as a universal philosophy and introduced Vedantic thought and Yoga to the West.
- Practical Vedanta: spirituality expressed through service to humanity, character-building and social upliftment.
- Legacy: founded the Ramakrishna Mission in 1897; his birthday, 12 January, is National Youth Day.

7.5 Ramanathaswamy Temple

- In news: the temple's pillared corridor served as a cultural backdrop during the BRICS Summit.
- Location: Rameswaram on Pamban Island, Ramanathapuram district, Tamil Nadu; dedicated to Shiva.
- Sacred status: one of the 12 Jyotirlingas and one of the four Char Dham with Badrinath, Dwarka and Puri, the only Shaiva shrine among them.
- Legend: in the Ramayana tradition, Rama worshipped Shiva here after returning from Lanka.
- Architecture: expanded over centuries with patronage from the Sethupathi rulers, in the Dravidian style.
- Famous for: its monumental third corridor of carved pillars and its 22 sacred theerthams (water tanks).

8. Miscellaneous

8.1 Sardar Patel National Unity Award

- In news: the 2026 cycle of the Sardar Patel National Unity Award.
- About: instituted by the Government of India in 2019 and administered by the Ministry of Home Affairs.
- Status: the highest civilian award for contribution to the unity and integrity of India.
- Eligibility: Indian citizens, institutions and organisations; individuals may nominate themselves.
- Form: a medal and citation with no cash prize; normally not more than three awards a year.
- Timing: announced on National Unity Day, 31 October, the birth anniversary of Sardar Vallabhbhai Patel.

8.2 Ramon Magsaysay Award 2026

- In news: Tommy Koh (Singapore), Runa Khan (Bangladesh) and Bo Kyi (Myanmar) are the 2026 Ramon Magsaysay Award winners.
- About: set up in 1957 in memory of Ramon Magsaysay, the seventh President of the Philippines; first given in 1958.
- Purpose: recognises transformative public service in Asia, often called "Asia's Nobel Prize".
- Tommy Koh: diplomacy and international law; he presided over the negotiations that produced the UN Convention on the Law of the Sea.
- Runa Khan: empowering remote and climate-vulnerable communities in Bangladesh.
- Bo Kyi: a former political prisoner who defends political prisoners and human rights.
- Format: given in six categories until 2008; now a broader leadership framework.

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