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PREFACE

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MONTHLY MAGAZINE
SEPTEMBER 2026

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1. Polity & Governance

1.1 Election Commission Independence and Appointment of the Chief Election Commissioner

Context:

A two-judge Supreme Court Bench has delivered split verdict on whether challenges to the 2023 law on appointing the Chief Election Commissioner (CEC) and Election Commissioners (ECs) need a Constitution Bench. The matter was placed before the Chief Justice of India (CJI). The case revives a larger question: how appointment and removal safeguards protect the independence of the Election Commission of India (ECI).

Background:

- **Article 324**: vests the superintendence, direction and control of elections in the ECI; the **President appoints the CEC and ECs**, subject to any law made by Parliament.
- **Tenure and Removal**: The CEC enjoys removal protection similar to a Supreme Court judge, while other commissioners require the CEC's recommendation for removal.
- **No selection law for decades**: Parliament had not enacted a specific law prescribing how the CEC and ECs are selected (till 2023).
- **Anoop Baranwal v. Union of India (2023)**: the Supreme Court set up an interim selection committee of the Prime Minister, the Leader of Opposition (LoP) in the Lok Sabha and the CJI until Parliament legislated.



Explanation:

Why the 2023 law was challenged?

- **Executive majority**: two of the three Selection Committee members belong to the Union executive, so the government can decide appointments on its own.
- **Departure from Anoop Baranwal**: the law replaced the CJI, a non-executive member of the interim committee, with a Union Cabinet Minister.
- **Conflict of interest**: the ruling party is itself a contestant in the elections the ECI supervises, so appointments must be neutral and be seen as neutral.
- **Core question**: whether Parliament's power under **Article 324(2)** can be used to give the executive a dominant role in choosing the election umpire.

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Two judges, two views:

- **Justice Dipankar Datta:** Anoop Baranwal already settled the governing principles, so a two-judge Bench could test the 2023 law against them.
    - He still voiced prima facie concern about executive dominance and said the ECI must both be independent and appear independent.
- **Justice Satish Chandra Sharma:** the validity of the 2023 Act has never been authoritatively decided.
    - Whether Parliament can replace the CJI with a Cabinet Minister is a substantial constitutional question for a Constitution Bench.
- **Next step:** the CJI will now decide which Bench hears the challenge.



Supreme Court model	Parliamentary model
PM + LoP + CJI	PM + LoP + Cabinet Minister
Reduced executive dominance	Executive effectively controls 2 of 3 votes
Risk of involving judiciary in politics	Risk of government influencing appointments
Temporary arrangement	Statutory arrangement

Way Forward:

- **Settle the law:** an early Constitution Bench ruling would end uncertainty over future appointments.
- **Neutral selection panel:** include a non-executive member or require consensus with the LoP.
- **Transparent shortlisting:** publish the criteria and the Search Committee's panel.

Conclusion:

The ECI's independence cannot rest on its constitutional status alone. A credible appointment process, security of tenure and protection from arbitrary removal keep it independent in fact and in appearance. A clear ruling from a Constitution Bench will decide how far Parliament can shape that balance.

Mains Practice Question:

Q. "The challenge in appointing Election Commissioners lies in balancing executive accountability with institutional independence." Critically examine this statement in the Context: of the Chief Election Commissioner and Other Election Commissioners (Appointment, Conditions of Service and Term of Office) Act, 2023. *(15 Marks, 250 Words)*

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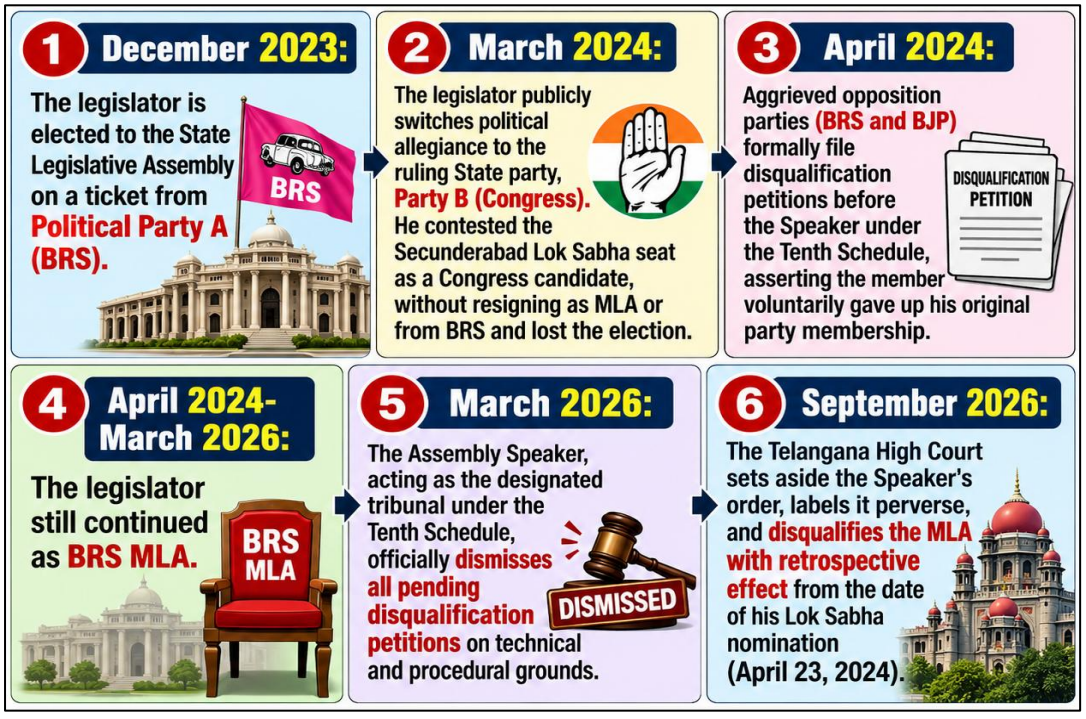
1.2 Anti-Defection Law and Judicial Review: The Telangana High Court Ruling on Disqualification

Context:

The Supreme Court of India dismissed a plea by a former Khairatabad MLA, upholding a landmark Telangana High Court order that disqualified him from the state assembly for defection under the Tenth Schedule.

Background:

- **Tenth Schedule:** inserted by the **52nd Constitutional Amendment Act, 1985**, it contains India's anti-defection law.
- **Grounds of disqualification from being a legislator under Tenth Schedule:**
  - **Voluntary resignation:** Giving up membership of their political party.
  - **Defiance of whip:** Voting, or abstaining from voting, contrary to party directions without prior permission.
  - **Independent members:** Joining any political party after getting elected.
  - **Nominated members:** Joining a political party six months after taking their seat.
- **Who decides:** the Speaker or Chairman decides questions of disqualification.
- **Article 191(2):** applies Tenth Schedule disqualification to members of State Legislatures.





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Explanation:

Why the High Court overruled the Speaker?

- **Speaker's reasoning:** cited "lack of sufficient evidence" of defection and treated the legislator as technically still with the BRS.
- **Court's finding:** contesting a national election for a rival party is clear conduct showing he had given up membership.
- **Conduct, not resignation:** under the **Ravi S. Naik v. Union of India 1994** principle, giving up membership can be inferred from conduct; a formal resignation is not needed.
- **No condonation route:** the 15-day condonation applies only to voting or abstention under Paragraph 2(1)(b), not to Paragraph 2(1)(a).

Why the ruling matters?

- **Judicial review:** in **Kihoto Hollohan v. Zachillhu (1992)**, the Supreme Court held that the Speaker acts as a tribunal whose decisions courts can review.
- **Outside conduct counts:** the Speaker cannot ignore a legislator's political conduct outside the House.
- **Delay and partisanship:** the case shows how a speaker's inaction or narrow reading can keep a defector in the House.
- **Time limit:** in **Keisham Meghachandra Singh case (2020)**, the Supreme Court said Speakers should ordinarily decide disqualification petitions within three months.

Anti-defection law and Exceptions:

- **Merger exception:** no disqualification if at least **two-thirds of a legislature party** agree to the merger.
- The **91st Constitutional Amendment Act, 2003** removed the earlier protection for a one-third "split".
- Anti-defection law seeks to balance **government stability, party discipline and the representative role of legislators.**

Conclusion:

The judgment confirms that defection is judged by a legislator's real political conduct, not by formal resignation alone. Judicial review of Speakers' decisions remains essential so that the Tenth Schedule serves its purpose without arbitrary or partisan application.

Mains Practice Question:

Q. "The anti-defection law has strengthened political stability but weakened legislative deliberation." Critically examine and suggest reforms.

(15 Marks, 250 Words)

1.3 NRC Demand, Census and the 1951 Base-Year Debate in Manipur

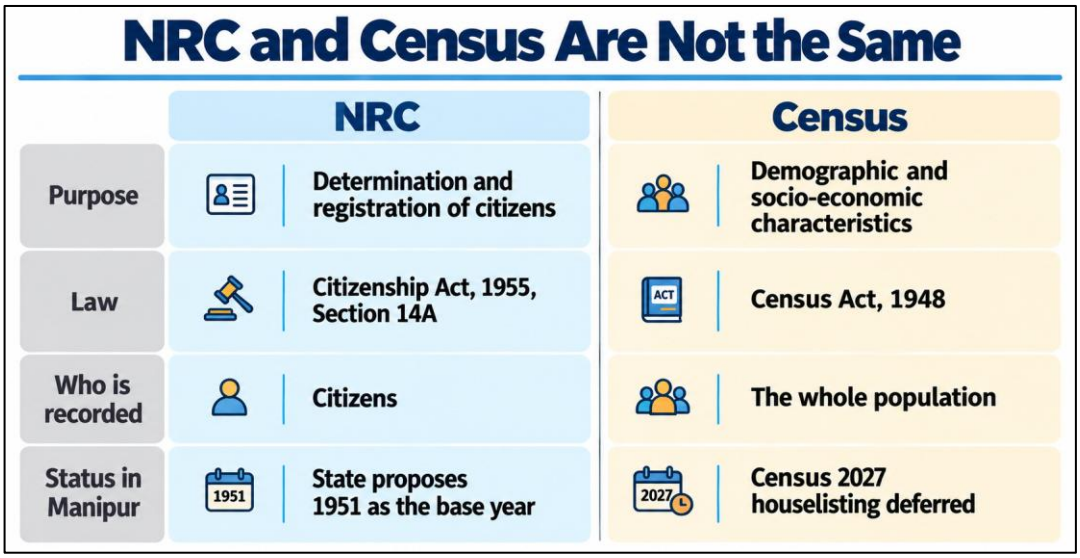
Context:

The Union government has deferred Census 2027 houselisting operations in Manipur following a Manipur High Court order and regional tensions. This follows a Manipur Assembly resolution demanding a National Register of Citizens (NRC) update with a 1951 base year before the census. The move intensifies deep community divides over whether to prioritize citizenship verification or immediate demographic counts to secure future political representation.

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Background:

- **NRC:** a register meant to identify Indian citizens; the first NRC was prepared in **1951**, after that year's Census.
- **Legal basis:** Citizenship is a Union subject (**Entry 17, Union List**); the Citizenship Act, 1955 and the Citizenship Rules, 2003 govern the National Register of Indian Citizens.
- **Census:** counts the whole population and its characteristics under the **Census Act, 1948**; it does not verify citizenship.
- **Manipur's geography:** Meiteis are concentrated in the valley, while Naga and Kuki-Zo communities live largely in the hills; the State borders **Myanmar**.



Explanation:

Why the Census is being opposed?

- **Fear of demographic change:** sections of Meitei and Naga civil society say migration from Myanmar has altered hill-district populations and want citizenship verified first.
- **Displacement:** the ethnic violence that began in May 2023 displaced thousands, so a Census now may not record people at their usual residence.
- **Delimitation stakes:** Manipur has 60 Assembly seats, 40 in the valley and 20 in the hills; new Census data could redraw constituencies.

The other side and the legal limits:

- **Kuki-Zo view:** the NRC is a national exercise that should not target one State or community; claims of unusual population growth need reliable demographic evidence.
- **Exclusion risk:** a 1951 cut-off could exclude genuine citizens who lack decades-old documents.



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- **Can it be Manipur-only?** No law requires a nationwide NRC, so the Centre could notify a State-specific exercise; the State cannot conduct one on its own.
- **Current status:** the Centre deferred only houselisting operations, not the whole Census, and the Assembly resolution itself did not name 1951.

Conclusion:

The Manipur debate is about more than counting people: it involves citizenship, migration, ethnic trust and representation. Any NRC must rest on a clear legal framework and fair verification, while the Census should go ahead in a way that keeps the confidence of every community.

The Assam Precedent:

- **Assam conducted its Supreme Court-monitored NRC update** between 2013 and 2019 to identify legal residents and exclude undocumented immigrants.
- **Assam is legally distinct:** its NRC update ran under a special framework linked to the Assam Accord. Assam used **24 March 1971** as the citizenship cut-off, not 1951.
- **Rule 4A of the 2003 Citizenship Rules** contains NRC provisions that apply only to Assam.
- So, the Assam model cannot simply be transplanted to Manipur without its own legal framework.

Mains Practice Question:

Q. Examine the administrative and constitutional challenges of conducting citizenship verification in a conflict-affected State. Suggest safeguards against the exclusion of genuine citizens. *(10 Marks, 150 Words)*

1.4 Special Constitutional Provisions for Ladakh under Article 371K

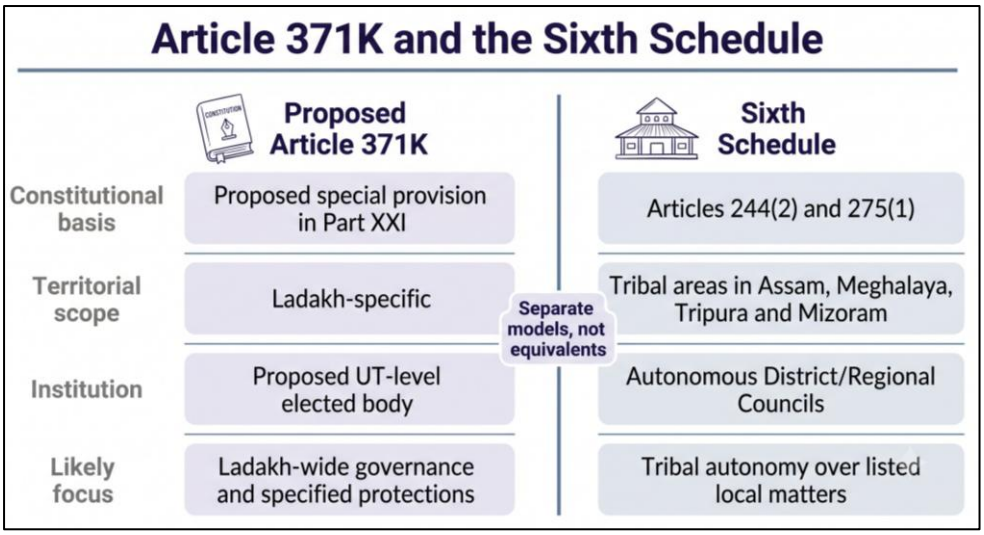
Context:

The Union government has proposed a Ladakh-specific constitutional arrangement through a new Article 371K, after talks with the Apex Body Leh and the Kargil Democratic Alliance (KDA). The proposal envisages a directly elected, Ladakh-wide body with powers over specified local subjects. Its final design is still under negotiation.

Background:

- **Union Territory since 2019:** the Jammu and Kashmir Reorganisation Act, 2019 made Ladakh a Union Territory (UT) without a legislature.
- **Hill Councils:** elected **Ladakh Autonomous Hill Development Councils (LAHDCs)** in Leh and Kargil handle decentralised planning and administration under statute.
- **Local demands:** stronger safeguards for land, jobs, culture, language, environment and natural resources, and more democratic representation.
- **Articles 371 to 371J:** special provisions in Part XXI for particular States, an example of **asymmetric federalism.**
- **In simple terms:** Article 371K would give Ladakh a tailor-made constitutional arrangement that is neither Statehood nor the present UT model.

Space for Notes



Explanation:

What the proposal envisages?

- **Elected body:** a directly elected governing body covering the whole of Ladakh.
- **Subjects discussed:** legislative powers over land, culture and language, forests, environment and natural resources.
- **Still open:** its executive, financial and planning powers, and its link with the existing Hill Councils.
- **A distinct model:** the Ladakh administration calls it a special constitutional and legislative framework, not an ordinary State or a UT with a legislature.

Why it matters?

- **Diversity within unity:** the Constitution gives regions with distinct histories different arrangements rather than one template.
- **Democratic deficit:** an elected UT-level body would add representative decision-making to a UT that has no legislature.
- **Durable safeguards:** protections written into the Constitution last longer than administrative orders.
- **Amendment needed:** special provisions now end at Article 371J, so Article 371K needs a **constitutional amendment under Article 368**, passed by special majority in each House.

Way Forward:

- **Clear list of powers:** enumerate the body's legislative, executive, financial and planning powers.
- **No overlap:** define its relationship with the Lieutenant Governor, the UT administration and the two LAHDCs, with a mechanism to settle disputes.
- **Fair representation:** cover all regions and communities of Ladakh, and protect land, jobs, culture and the fragile Himalayan ecology.

Value Addition: Articles 371 to 371J at a glance

Purpose	Article and State	What it provides
Identity and resources	371A Nagaland; 371G Mizoram	Parliament's laws on religious or social practices, customary law and land apply only if the State Assembly agrees

Tribal and hill representation	371B Assam; 371C Manipur	Assembly committees for tribal or hill areas; Governor's special responsibility for Manipur's hill areas
Regional development	371 Maharashtra and Gujarat; 371D Andhra Pradesh and Telangana; 371J Karnataka	Development arrangements for Vidarbha, Marathwada, Saurashtra and Kutch; equitable jobs and education; Kalyana Karnataka region
Integration and administration	371F Sikkim; 371H Arunachal Pradesh; 371I Goa	Safeguards after Sikkim's merger; Governor's responsibility for law and order; Goa Assembly of at least 30 members
Higher education	371E Andhra Pradesh	Parliament may establish a university in the State by law

Conclusion:

Article 371K would extend India's tradition of region-specific arrangements within one Constitution to a Union Territory for the first time. Its value will depend less on the label of special status than on the real powers, resource protections and accountability written into the final design.

Mains Practice Question:

Q. Examine how a region-specific constitutional arrangement for Ladakh could reconcile democratic representation, local resource control and national strategic interests. *(15 Marks, 250 Words)*

1.5 Child Safety on Social Media: Platform Accountability and Addictive Design

Context:

Following a BBC investigation into advertisements promoting child sexual exploitation material on Instagram in India, Meta deployed new Large Language Model (LLM) tools and AI sweeps to monitor ad content. While the National Commission for Protection of Child Rights (NCPCR) and MeitY previously demanded Explanation:s, Meta has since committed to sharing its reports directly with Indian law enforcement.

Regulatory Framework & Systematic Accountability:

- **IT Act, 2000: Section 67B** penalises publishing or transmitting material depicting children in sexually explicit acts; **Section 79** protects platforms from liability only if they follow due diligence.
- **IT Rules, 2021:** require significant social-media intermediaries to use technology to identify child sexual abuse material (CSAM) and to cooperate with lawful investigations.
- However, **renewed scrutiny from global watchdogs** shows that automated loopholes persist, maintaining intense regulatory focus on structural platform design and systemic legal accountability in India.
- The debate now goes beyond removing content to how platforms are designed for children.

Space for Notes

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Explanation:

Where platform safeguards failed?

- **Several failure points:** detection, advertising approval, recommendation, reporting and removal can each let abusive material through.
- **Human plus machine:** large platforms need automated detection with human review, quick evidence preservation and victim-centred takedown.
- **Direct data-sharing:** Meta will share information on CSAM cases and repeat offenders directly with Indian agencies, including the **Indian Cyber Crime Coordination Centre (I4C)**, instead of routing it overseas.
- **Limits on sharing:** cooperation must rest on lawful process, purpose limitation and data security, so that child protection does not become a pretext for unrestricted data access.

From content removal to safety by design:

- **Addictive features:** infinite scroll, autoplay, repeated notifications, personalised feeds and visible likes encourage compulsive use.
- **Health effects:** studies link problematic use with anxiety, loneliness, poor sleep and weak concentration.
- **Defaults matter:** safeguards switched on by default reach more children than optional tools that families must activate.
- **A global benchmark:** Meta agreed to pay up to **$17 billion** to settle child-safety claims in participating United States jurisdictions.
    - E.g., a two-hour daily limit for users under 18, most access blocked from midnight to 6 a.m., and an independent auditor for five years.

Way Forward:

- **Rapid response:** mandate detection, preservation and removal protocols for CSAM.
- **Capacity:** strengthen NCPCR, I4C and State cybercrime units.
- **Design standards:** age-appropriate defaults, privacy-respecting age assurance and night-time notification limits.
- **Independent audits:** review recommendation and advertising systems affecting children, with access for researchers.
- **Shared responsibility:** pair platform duties with digital literacy for children, parents and schools.

Institutional Frameworks & Safety Design:

- **I4C:** The Indian Cybercrime Coordination Centre (I4C) is an attached office of India's Ministry of Home Affairs set up to combat cybercrime.
- **NCRP:** the National Cyber Crime Reporting Portal, with special focus on offences against women and children.
- **Safety by design:** preventing foreseeable harm through the platform's architecture itself.
- **Content moderation is not child safety:** moderation acts on content during or after circulation; safety by design lowers the chance of harm arising at all.

Conclusion: Protecting children online needs more than a "take down illegal content" approach. India needs a framework that combines criminal law, faster and accountable data-sharing and safety by design, so that platforms answer for the environments their algorithms create, not just the material they host.

Mains Practice Question:

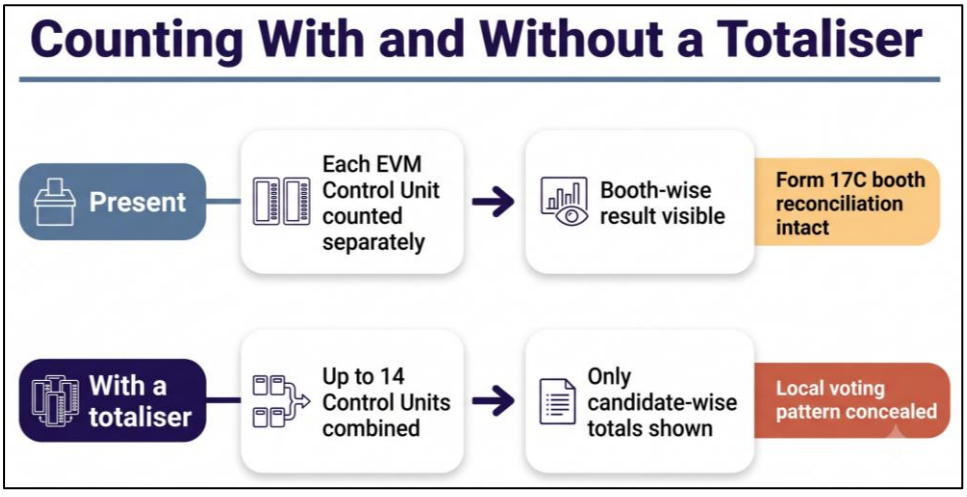
Q. Discuss an integrated framework for protecting children online that combines platform accountability, lawful information-sharing, privacy and age-appropriate design. *(15 Marks, 250 Words)*

1.6 Totaliser Machines and Secrecy of Booth-Wise Voting Patterns

Context: The Supreme Court has asked the Union government to examine totaliser machines, which combine votes from several polling stations before results are shown. The Election Commission of India (ECI) supports them to protect the secrecy of booth-wise voting, while the Centre has opposed their introduction.

Background:

- **Present counting:** votes in Electronic Voting Machines (EVMs) are counted polling station by polling station, so each booth's result is visible.
- **What a totaliser is:** an interface linked to the control units of a cluster of EVMs that shows their combined votes; it can aggregate about **14 polling stations**.
- **A long-pending proposal:** the ECI has proposed totalisers since **2008**, and the **255th Law Commission Report (2015)** endorsed them, but the Union Law Ministry has not accepted the idea.
- **Article 324:** gives the ECI superintendence, direction and control of elections.
- **In simple terms:** a totaliser does for EVMs what mixing ballot papers before counting did for paper ballots.



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Explanation:

Secrecy versus auditability:

- **Protection from victimisation:** hiding booth-wise patterns reduces post-poll intimidation or discrimination against particular villages or neighbourhoods.
- **Two duties in tension:** the ECI must keep counting open to verification while protecting the secrecy of the vote.
- **Centre's objection:** booth-wise results help candidates understand where their support lies within a constituency.
- **What would change:** booth-wise results now published in **Form 20** would be replaced by cluster-level totals.

What would need to change?

- **Form 17C:** now allows booth-wise reconciliation of votes polled and counted; aggregation would need a revised audit method.
- **VVPAT checks:** Voter Verifiable Paper Audit Trail (VVPAT) verification is tied to individual polling stations and must be reconciled with combined counts.
- **Legal framework:** the **Conduct of Elections Rules, 1961** would need amendment before totalisers could be used.

Way Forward:

- **Pilot first:** trial totalisers in selected constituencies with a revised Form 17C and VVPAT protocol.
- **Build consensus:** consult political parties on the trade-off between voter secrecy and booth-level data.
- **Keep audits public:** publish cluster-level results with a clear reconciliation trail so that transparency is not lost.

Conclusion:

Totalisers extend ballot secrecy from the individual vote to the collective voting pattern of a small locality. Any move to adopt them must fit with the statutory, VVPAT and Form 17C safeguards that keep Indian elections auditable.

Mains Practice Question:

Q. Examine the challenges of reconciling totalised counting with electoral transparency, polling-station reconciliation and VVPAT verification.

(10 Marks, 150 Words)

1.7 The National Song and Freedom of Conscience: The Supreme Court's Approach

Context:

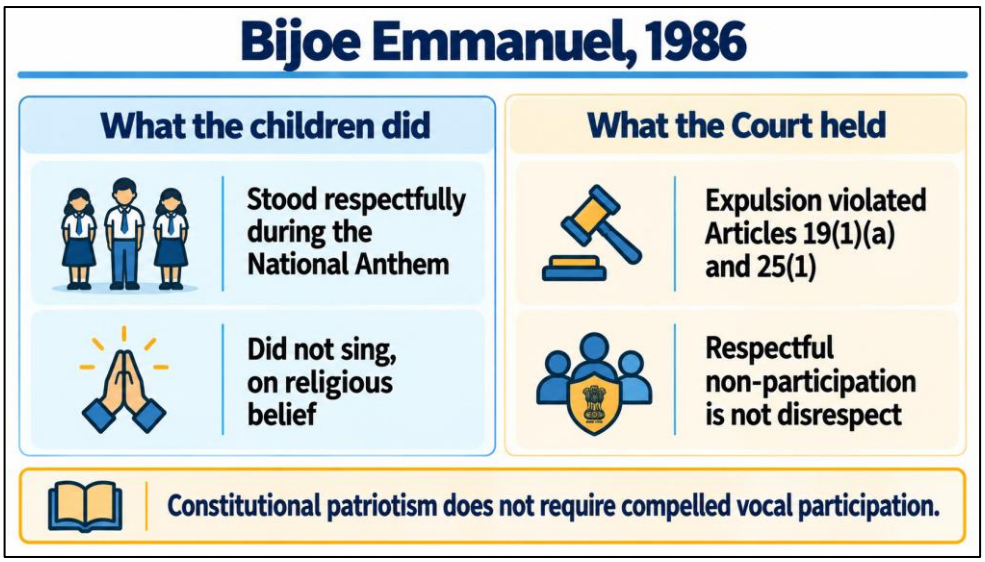
Parliament's 2026 amendment to the Prevention of Insults to National Honour Act, 1971 and related directions on Vande Mataram have been challenged in the Supreme Court. The Court sought the Union's response and orally observed that genuine conscientious or religious objection to singing should not invite criminal consequences.

Background:

- **National Song:** Vande Mataram was composed by **Bankim Chandra Chattopadhyay**; on **24 January 1950** the Constituent Assembly accorded it honour equal to Jana Gana Mana.

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- **1971 Act:** protected the Constitution, National Flag and National Anthem from insult.
- **2026 amendment:** extended Section 3 to intentionally preventing the singing of the National Song or disturbing an assembly singing it.
- **Bijoe Emmanuel v. State of Kerala (1986):** students who stood respectfully but did not sing the National Anthem because of their faith could not be expelled; the expulsion violated **Articles 19(1)(a) and 25(1)**.



Explanation:

The core constitutional question:

- **Compelled expression:** whether the State can compel people to sing when they hold a genuine conscientious objection.
- **Freedom of speech: Article 19(1)(a)** was read in Bijoe Emmanuel to include the freedom to remain silent.
- **Freedom of conscience: Article 25** protects conscience and religion, and **Article 26** protects denominations' religious affairs.
- **Fundamental Duty: Article 51A(a)** asks citizens to respect the Constitution, the National Flag and the National Anthem; it does not mention the National Song.
- **Related precedent:** in 2018 the Supreme Court made playing the National Anthem in cinemas optional, modifying its own 2016 order.

Where the case stands?

- **Oral remarks only:** the Court's comments on conscientious objection are not a final judgment.
- **Open questions:** the validity of the amended penal provision and the directions on rendition remain pending.
- **Wider stakes:** the case also tests the balance between national symbols and constitutional secularism.

Way Forward:

- **Obstruction is not silence:** penalise intentional disruption, not peaceful non-participation.
- **Narrow penal provisions:** apply criminal law sparingly where Fundamental Rights are involved.
- **Clear protocols:** frame rendition guidelines consistent with Articles 19 and 25 and Supreme Court precedent.

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Conclusion:

The constitutional balance lies in protecting national honour without turning patriotism into compelled expression. Bijoe Emmanuel protects respectful silence based on genuine belief; the present case will decide how that principle applies to the National Song.

Mains Practice Question:

Q. "Respect for national symbols and protection against compelled expression can coexist." Discuss with reference to constitutional rights and the Bijoe Emmanuel judgment. *(10 Marks, 150 Words)*

1.8 Civic Infrastructure Failures and Urban Safety Governance

Context:

Recently, recurring deaths from collapsing buildings, fires, falling hoardings, encroached footpaths and unsafe public spaces expose deep weaknesses in civic governance across India. Most of these incidents are preventable. India does not lack rules; it lacks planning, regular inspection and clear accountability when rules are ignored.

Background:

- **Municipal mandate:** the **74th Constitutional Amendment Act, 1992** gave municipalities constitutional status; the **Twelfth Schedule** lists functions such as urban planning, regulation of land use and building construction, and fire services.
- **Safety codes:** the **National Building Code of India** sets structural and fire-safety norms, applied through State and municipal building bye-laws.
- **Disaster law:** the **Disaster Management Act, 2005** covers prevention and mitigation, not only response.
- **Urban pressure:** rapid urban growth has strained housing, transport and basic civic services.
- **In simple terms:** the rules exist on paper; the failures happen at approval, inspection and enforcement.

Explanation:

Why civic disasters continue?

- **Weak enforcement:** irregular inspections let unsafe structures and establishments keep operating.
- **Reactive drives:** crackdowns after a tragedy treat symptoms, not the causes of repeated violations.
- **No official accountability:** officials who knowingly approve unsafe structures, or repeatedly miss serious violations, rarely face consequences.
- **Crowded hotspots:** lapses are deadliest in dense markets, commercial complexes and transit hubs, where one failure can affect hundreds of people.
- **Selective enforcement:** rules are sometimes applied faster against weaker groups than against influential owners, which erodes public trust.

Poor urban planning:

- **Unplanned growth:** unauthorised settlements come up without adequate roads, drainage, fire access or open space.

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- **Regularisation without upgrading:** legalising such areas without adding infrastructure locks the deficiencies in permanently.
- **Encroachment:** footpaths and public land meant for common use keep shrinking, pushing pedestrians onto roads.
- **Plans lag reality:** master plans often trail actual growth, so informal areas grow without safety infrastructure.

Preventive safety governance:

- **Periodic inspections:** structural safety, fire preparedness and occupancy need regular review, not reliance on one-time certificates.
- **Immediate correction:** blocked exits, overcrowding and similar violations need prompt remedial action.
- **Digital records:** digitised compliance histories improve monitoring and reduce scope for informal manipulation.
- **High-risk premises first:** annual fire-safety audits for hospitals, coaching centres, malls and other crowded places.
- **Informed citizens:** public safety records help people choose safer places and add reputational pressure, complementing, not replacing, regulation.

Way Forward:

- **Fix responsibility:** name the officers answerable at approval, inspection and enforcement, with administrative and legal consequences for lapses.
- **Apply rules uniformly:** enforce the same standards regardless of social or economic influence.
- **Build safety into regularisation:** add fire access, drainage and open space when settlements are regularised.
- **Make prevention routine:** run structural and fire-safety audits as a standing function, not an emergency response after deaths.

Conclusion:

India's civic-safety problem is a governance deficit of planning, enforcement and accountability, not a shortage of laws. Safer cities need preventive inspections, transparent and equal enforcement, better planning and clearly assigned responsibility for both private owners and public officials.

Mains Practice Question:

Q. Suggest an urban safety framework combining preventive inspections, municipal capacity, transparent compliance records and accountability of public and private actors. ***(15 Marks, 250 Words)***

1.9 Religion, Women's Public Participation and Constitutional Equality

Context:

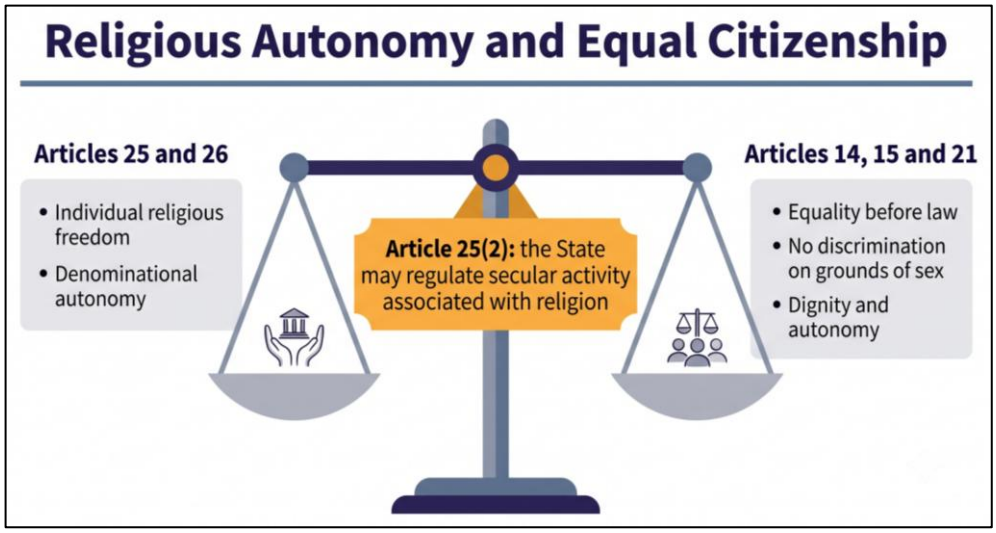
A controversy in Kerala over restrictions on Muslim women's participation in public religious celebrations has revived the debate on the limits of religious authority. The constitutional question is whether community rules can extend beyond internal religious affairs to limit women's participation in public life.

Background:

- **Equality rights: Article 14** (equality before law), **Article 15(1)** (no discrimination on grounds including religion and sex), **Article 19(1)(d)** (freedom of movement) and **Article 21** (dignity and autonomy).

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- **Religious freedom: Article 25** protects conscience and the right to profess, practise and propagate religion, subject to public order, morality, health and other Fundamental Rights; **Article 26** protects denominational autonomy.
- **State's reform power: Article 25(2)** lets the State regulate secular activities linked to religion and legislate for social welfare and reform.
- **Women-specific provisions: Article 15(3)** permits special provisions for women, and **Article 51A(e)** asks citizens to renounce practices derogatory to women's dignity.



Explanation:

Religious authority versus individual rights

- **Limits of authority:** denominations control matters of religion, not every social activity of their members.
- **The public sphere:** restricting a woman's movement, education, work or attendance at public events engages equal citizenship, not religion alone.
- **Key distinction:** regulating an internal ritual differs from restricting a woman's public life.

What the courts have said?

- **Sabarimala (2018):** the majority held that excluding women of a particular age group from the temple could not be sustained, stressing liberty, dignity and equality.
- **The dissent:** urged judicial restraint and respect for denominational autonomy and religious diversity.
- **Test applied:** courts weigh the nature of the practice, the right claimed, the institution involved and the effect on Fundamental Rights.
- **Larger reference:** a nine-judge Bench was later asked to settle wider questions on religious freedom and essential practices.

Way Forward:

- **Voices within communities:** Muslim society includes orthodox, reformist, progressive and feminist voices; reform is stronger when women lead the reinterpretation.
- **Empowerment:** expand women's education, employment and political representation.
- **No silence for votes:** political parties should not stay quiet merely to protect organised vote banks.

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Conclusion: India's Constitution does not force a choice between religious liberty and women's rights. It protects religious freedom under Articles 25 and 26 while guaranteeing equality, autonomy and dignity under Articles 14, 15 and 21, and pluralism must not extinguish women's equal citizenship.

Mains Practice Question:

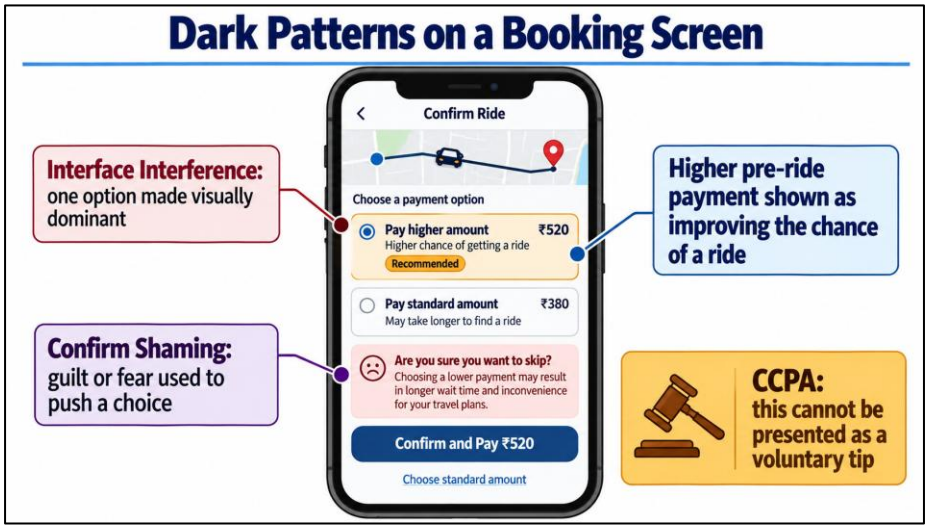
Q. How should constitutional institutions reconcile religious freedom with women's equality and participation in public life? Discuss the role of community-led reform. *(10 Marks, 150 Words)*

1.10 E-Commerce Consumer Protection and the Regulation of Dark Patterns

Context: The Department of Consumer Affairs has notified the Consumer Protection (E-Commerce) (Amendment) Rules, 2026, effective from 1 January 2027. Separately, the Central Consumer Protection Authority (CCPA) fined Rapido ₹10 lakh for dark patterns in its ride-booking screen, showing that consumer law now reaches the design of digital interfaces.

Explanation:

- **Legal base:** both the new rules and the **Guidelines for Prevention and Regulation of Dark Patterns, 2023** operate under the **Consumer Protection Act, 2019**.
- **Seller transparency:** platforms must display their legal name, principal address, branches, website and customer-care details, and, for imported goods, the importer and country of origin.
- **Grievance redressal:** a named Grievance Officer must acknowledge complaints within **48 hours** and resolve them within **one month**.
- **Dark patterns:** deceptive interface designs that steer users into choices they would not otherwise make, such as **confirm shaming** (using guilt or fear) and **interface interference** (making one option visually dominant).



- **The Rapido case:** a colour-coded slider and prompts suggested that paying more before the ride would improve the chance of getting one.
- **Tips must be voluntary:** CCPA held that an advance payment cannot be presented as a tip; the **Motor Vehicle Aggregator Guidelines, 2025** allow tipping only after the ride.
- **CCPA's role:** protects consumers as a class against unfair trade practices and misleading advertisements.

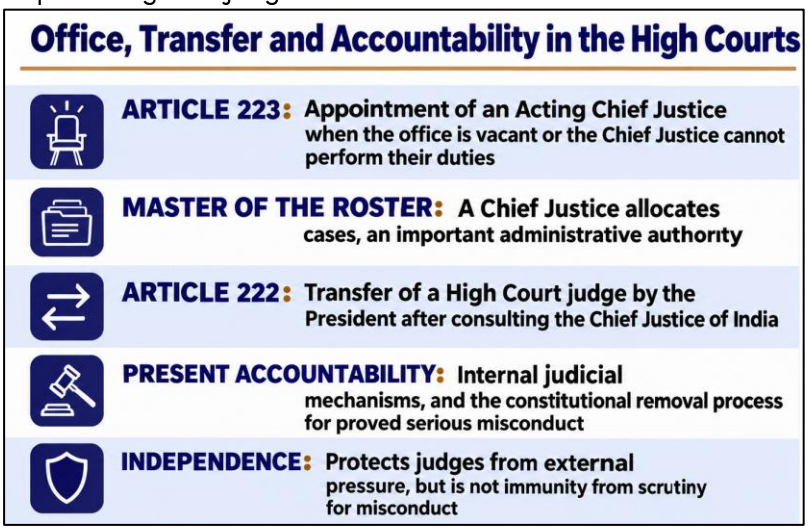
1.11 Judicial Integrity and Accountability in India

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Context: Allegations against the Acting Chief Justice of the Rajasthan High Court have renewed debate on judicial accountability. The ethical question is how to examine serious complaints fairly when the options range from an internal inquiry to the exceptional step of removal by Parliament.

Background:

- **Removal:** under **Article 217(1)(b)**, read with **Articles 218 and 124(4)**, a High Court judge can be removed only for **proved misbehaviour or incapacity.**
- **Procedure:** the **Judges (Inquiry) Act, 1968** governs the inquiry; each House must pass the removal address by a majority of its total membership and two-thirds of those present and voting.
- **Acting Chief Justice:** appointed by the President under **Article 223**; as "master of the roster", they allocate cases.
- **Transfers: Article 222** lets the President transfer High Court judges after consulting the Chief Justice of India (CJI).
- **In-house procedure:** the judiciary's internal mechanism, adopted in 1999, for complaints against judges.



Explanation:

Independence versus immunity:

- **The gap:** India has an in-house process at one end and the very difficult parliamentary removal at the other, with little in between.
- **Ethical tension:** safeguards protect judges from political pressure, but excessive protection can shield genuine misconduct.
- **Opacity:** unclear procedures, timelines and outcomes weaken public trust even when inquiries happen.
- **The balance:** independent scrutiny is needed without executive intimidation.

Why prompt, fair action matters?

- **Public trust:** judicial authority rests on confidence in judges' integrity and impartiality.
- **Presumption of innocence:** unverified allegations must not be treated as proven, but long institutional silence is also damaging.
- **Speed is possible:** after reports of burnt currency at Justice Yashwant Varma's residence, the judiciary quickly began an in-house inquiry and administrative steps.
- **Beyond judgments:** accountability covers administrative acts such as roster allocation and conflicts of interest.

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Way Forward:

- **Permanent mechanism:** a credible body to receive, screen and investigate serious complaints, filtering out frivolous ones.
- **Clear rules:** fixed timelines, reasoned outcomes and suitable public disclosure.
- **Graduated responses:** from administrative correction and withdrawal of work to formal inquiry and, in the gravest cases, removal.
- **Integrity at entry:** stronger integrity checks and recusal norms in appointments.

Conclusion: Judicial independence and accountability are complementary values. Independence protects judges from coercion, while accountability keeps judicial power worthy of public trust; India needs a mechanism that examines credible allegations promptly, fairly and transparently without compromising either.

1.12 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.

1.13 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.

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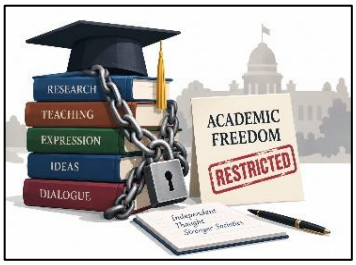
- **Without a nomination:** a partner may, in suitable cases, be treated as a **"next friend"** or person in a relationship of care, after verification.
- **Common Cause v. Union of India (2018):** the Supreme Court recognised **Advance Medical Directives (living wills)** under **Article 21**; the procedure 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.

1.14 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.

1.15 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.

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- **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.

1.16 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.

1.17 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.

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- **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.

1.18 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.

Prelims Capsule

1.19 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**.

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1.20 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.

1.21 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.

1.22 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.**

1.23 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.

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1.24 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.

Prelims Practice Questions

1. Consider the following statements regarding the Election Commission of India:

1. Under the 2023 Act, the selection committee consists of the Prime Minister, the Leader of the Opposition in the Lok Sabha and a Union Cabinet Minister nominated by the Prime Minister.
2. The Chief Election Commissioner can be removed only in the manner and on the grounds provided for removing a judge of the Supreme Court.
3. The Constitution itself lays down the composition of the committee that selects the Election Commissioners.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

2. With reference to the Tenth Schedule of the Constitution, consider the following statements:

1. It was added by the 52nd Constitutional Amendment Act, 1985.
2. A nominated member is disqualified if he or she joins a political party within six months of taking the seat.
3. In Kihoto Hollohan (1992), the Supreme Court held that the Presiding Officer's decision on disqualification is subject to judicial review.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answers

1. (a) 2. (c)

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2. International Relations

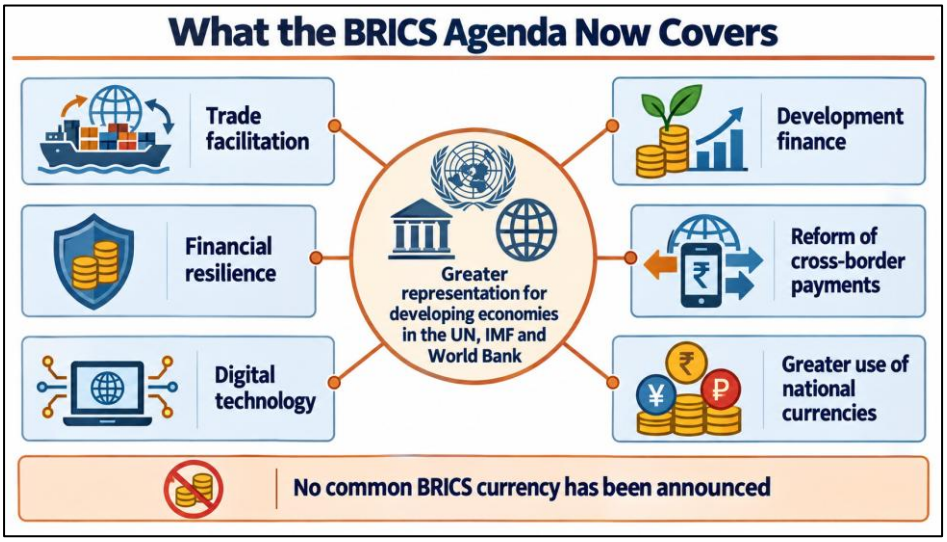
2.1 BRICS: Global Governance, Payments and the Changing Tax Architecture

Context:

India hosted the 18th BRICS Summit in New Delhi from 12-13 September 2026, themed "Building for Resilience, Innovation, Cooperation and Sustainability". The New Delhi Declaration widened the grouping's agenda across trade, cross-border payments, development finance and international taxation, though no common BRICS currency was announced.

Background:

- **Origins:** BRIC began with Brazil, Russia, India and China; South Africa joined in 2010, making it BRICS.
- **Expansion:** the grouping has since added members including Egypt, Ethiopia, Iran, the UAE and Indonesia. Saudi Arabia is yet to fully become a member, although it participated in the recent summit.
- **Institutions:** the **New Development Bank (NDB)**, headquartered in Shanghai, and the **Contingent Reserve Arrangement** for short-term liquidity support.
- **Core demand:** a greater voice for developing countries in the UN Security Council, the International Monetary Fund (IMF) and the World Bank.



Explanation:

Key outcomes of the New Delhi Summit:

- **Trade:** members opposed restrictions inconsistent with World Trade Organization (WTO) rules and sought a working dispute-settlement system.
- **Security:** the declaration condemned the April 2025 Pahalgam attack and called for restraint and humanitarian access in West Asia.
- **Technology:** members backed wider access to computing power, data and skills for Artificial Intelligence (AI); China's open-source AI proposal was not adopted.
- **UN standing:** China and Russia supported greater roles for India and Brazil in the UN, without endorsing permanent membership.

Space for Notes

Reforming cross-border payments:

- **Why reform:** payments pass through several correspondent banks, compliance checks and currency conversions, raising cost and time.
- **SWIFT clarified:** it carries payment messages; it does not move money itself.
- **Options studied:** national-currency settlement, links between fast-payment systems, a shared payment hub and wholesale central bank digital currencies (CBDCs).
- **The hard problem:** an exporter paid in rupees needs useful ways to spend or invest them, which technology alone cannot provide.
- **India's stance:** gradual diversification for efficiency and resilience, not abrupt replacement of the dollar.

Tax cooperation and the Global South:

- **New mechanisms:** working groups on international taxation and transfer pricing and on revenue statistics, a BRICS Tax Support Network and peer-learning platforms.
- **UN track:** a **Framework Convention on International Tax Cooperation** is being negotiated over 2025-27, with early protocols on cross-border services and tax disputes.
- **Complement, not replacement:** the UN process widens the forum but does not displace the OECD (Organisation for Economic Co-operation and Development) and G20 framework.

Limits and way forward:

- **Internal rivalries:** different economies and interests, including India-China tensions, restrict collective action.
- **Implementation gap:** declarations need pilots, deadlines and reviews across successive chairships.
- **India's balance:** a non-Western, not anti-Western, BRICS that sits alongside close ties with Western partners.

The "POWER" formulation:

- Proposed by China's Ambassador Xu Feihong before the summit; it is **not an adopted BRICS framework**.
- **Principle:** UN Charter, sovereign equality, international law and peaceful settlement of disputes.
- **Openness:** resist protectionism and economic fragmentation.
- **Win-Win:** development, the SDGs and South-South cooperation.
- **Engine:** use BRICS markets and capabilities to drive growth and innovation.
- **Responsibility:** cooperate despite political differences.

Conclusion:

BRICS is moving from demanding reform of global institutions to building practical mechanisms in payments and taxation. Its relevance for India will be measured by workable institutions that widen developing-country influence while keeping the global economy open and predictable.

Mains Practice Question:

Q. Assess the potential and limitations of BRICS in reforming global financial governance and advancing the interests of the Global South.

(15 Marks, 250 Words)

2.2 Yemen Conflict and Red Sea Security: Houthi Advance towards Bab el-Mandeb

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Context:

Yemen's Iran-aligned Houthis have captured the Red Sea port of Mokha and reportedly seized Zuqar, Greater Hanish, Lesser Hanish and Perim (Mayyun) islands near the Bab el-Mandeb Strait. The advance has reignited Yemen's civil war and raised fresh risks for shipping, energy flows and humanitarian access. Pro-government forces backed by a Saudi-led coalition have launched a major counter-offensive to retake the Mokha and surrounding areas near the Bab el-Mandeb Strait from Houthi forces. On 5 October 2026, government forces claimed to have retaken Mokha and the nearby Dhubab district, though these claims are yet to be independently verified.

Background:



- **The primary conflict in Yemen is a civil war** between Iran-backed Houthi rebels (who control the capital, Sanaa from 2014 and now controls much of the north and west) and the Saudi-backed, internationally recognized government.
- Additionally, the Southern Transitional Council (STC), a separatist faction historically backed by the UAE, has fought for an independent south, while militant networks like Al-Qaeda exploit the instability.
- **In simple terms:** one war with three layers: a civil war, a regional rivalry and a maritime-security crisis.

Explanation:

Why the Houthi advance matters?

- **A global chokepoint: Bab el-Mandeb**, between Yemen and Djibouti-Eritrea, links the Gulf of Aden and Arabian Sea with the Red Sea and, through the Suez Canal, the Mediterranean.
- **Island positions:** Perim lies inside the strait, while Zuqar belongs to the Hanish group farther north.
- **Military reach:** coast and islands can support surveillance, missiles, drones, boats and sea mines against merchant ships.
- **Energy flows:** about **8.1 million barrels per day** of oil and petroleum products passed through the strait in the second quarter of 2026.
- **Bargaining power:** territorial gains strengthen the Houthis against Yemen's government, Saudi Arabia and Western states.
- **Front line shift:** losing Mokha weakens the anti-Houthi forces along the western coast and exposes the approaches to Aden.

Implications for trade, India and civilians:

- **Costlier shipping:** diversion around the Cape of Good Hope raises distance, freight, insurance and delivery times; flows had not stopped, but risks rose sharply.
- **Egypt:** less traffic and revenue for the Suez Canal.
- **India:** India-Europe trade, oil prices and freedom of navigation in the western Indian Ocean are at stake, reinforcing the need for naval presence and maritime-domain awareness.

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- **Regional escalation:** renewed fighting can draw Saudi Arabia, Iran and outside powers more deeply into the conflict.
- **Humanitarian toll:** Yemen entered 2026 with over **22 million** people needing aid and about **5.2 million** internally displaced; fighting near ports blocks food and fuel.

Way Forward:

- **Political process:** revive an inclusive, Yemeni-led process under UN mediation.
- **Regional restraint:** curb arms transfers, avoid escalation and support maritime-security arrangements.
- **Humanitarian access:** protect ports, hospitals and supply routes.

In News:

- **Mokha:** historic Yemeni Red Sea port near Bab el-Mandeb.
- **Mayyun/Perim:** strategically located island within the Bab el-Mandeb Strait.
- **Hanish Islands:** island group in the southern Red Sea that includes Zuqar.
- **Maritime chokepoint:** a narrow passage through which much international shipping must pass.

Conclusion:

The Yemen conflict shows how small stretches of coast can gain global weight when they sit beside a chokepoint. Security at Bab el-Mandeb needs both a political settlement in Yemen and restraint by regional powers, because the sea cannot be made safe while the war on land continues.

Mains Practice Question:

Q. "Maritime insecurity at a narrow chokepoint can generate global economic consequences." Discuss with reference to the Red Sea and the Yemen conflict.

(10 Marks, 150 Words)

2.3 U.S. Sanctions on Russian Oil: Implications for India

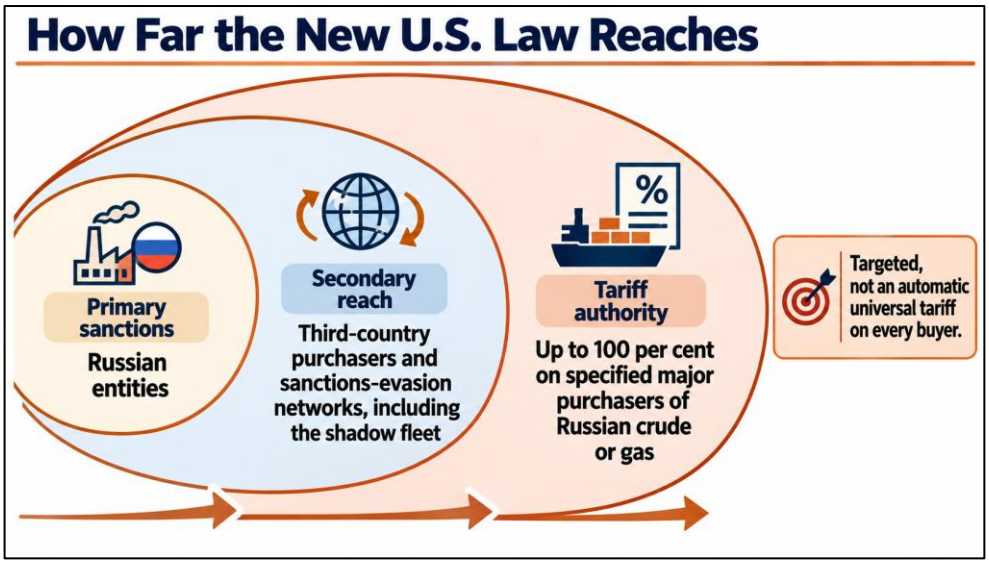
Context:

The United States has enacted the Lindsey O. Graham Sanctioning Russia and Iran Act, 2026, allowing tariffs of up to 100 per cent on major buyers of Russian energy. For India, a major buyer of Russian oil, the law links energy security, trade with the U.S. and strategic autonomy.

Background:

- **Russian crude:** after the 2022 Russia-Ukraine war, discounted Russian oil became a major source for Indian refiners and an alternative during West Asian disruptions.
- **Import dependence:** India imports most of the crude oil it consumes.
- **The law's reach:** it targets Russian entities directly and extends to third-country buyers and evasion networks, including the "shadow fleet".
- **Targeted tariffs:** the tariff authority applies to specified major buyers; it is not an automatic tariff on every buyer.

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Explanation:

Why the law matters for India?

- **Energy-security dilemma:** replacing Russian crude means buying more from West Asia, Africa or the Americas, at higher freight and procurement costs.
- **Price pressure:** if many buyers switch together, competition for non-Russian oil could lift global prices.
- **Double vulnerability:** pressure falls on both India's oil sourcing and Indian exports to the U.S.
- **Macro risk:** costlier oil widens the trade and current-account deficits, weakens the rupee and raises transport, fertiliser and manufacturing costs.

Weaponised interdependence:

- **Sanctions through networks:** modern sanctions work through banks, dollar clearing, insurers, shipping firms and ports.
- **Legal but blocked:** a deal permitted under Indian law can still fail if a foreign bank or insurer fears penalties.
- **The lesson:** dependence on foreign-controlled networks is itself a strategic vulnerability.

What India can do?

- **Diversify:** spread crude purchases across suppliers and sea routes.
- **Build buffers:** expand strategic petroleum and LPG reserves, shipping and maritime-insurance capacity.
- **Coordinate:** a permanent economic-security and sanctions mechanism linking the Ministries of External Affairs, Finance, Commerce and Petroleum with the RBI.
- **Engage Washington:** seek waivers while explaining India's energy needs.

Value Addition:

- **Primary sanctions:** directly target the designated country, entity or individual.
- **Secondary sanctions:** seek to influence third-country actors dealing with the primary target.
- **Shadow fleet:** tankers using opaque ownership, flags, insurance or ship-to-ship transfers to get around oil restrictions.

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Conclusion:

The choice is not simply Russian oil versus U.S. pressure. India's larger task is to build energy and financial resilience, so that affordable supplies, export markets and strategic autonomy survive when geopolitics disrupts markets and payment networks.

Mains Practice Question:

Q. Discuss how India can reconcile affordable energy imports, diversified partnerships and strategic autonomy in an increasingly sanctions-driven global economy. *(10 Marks, 150 Words)*

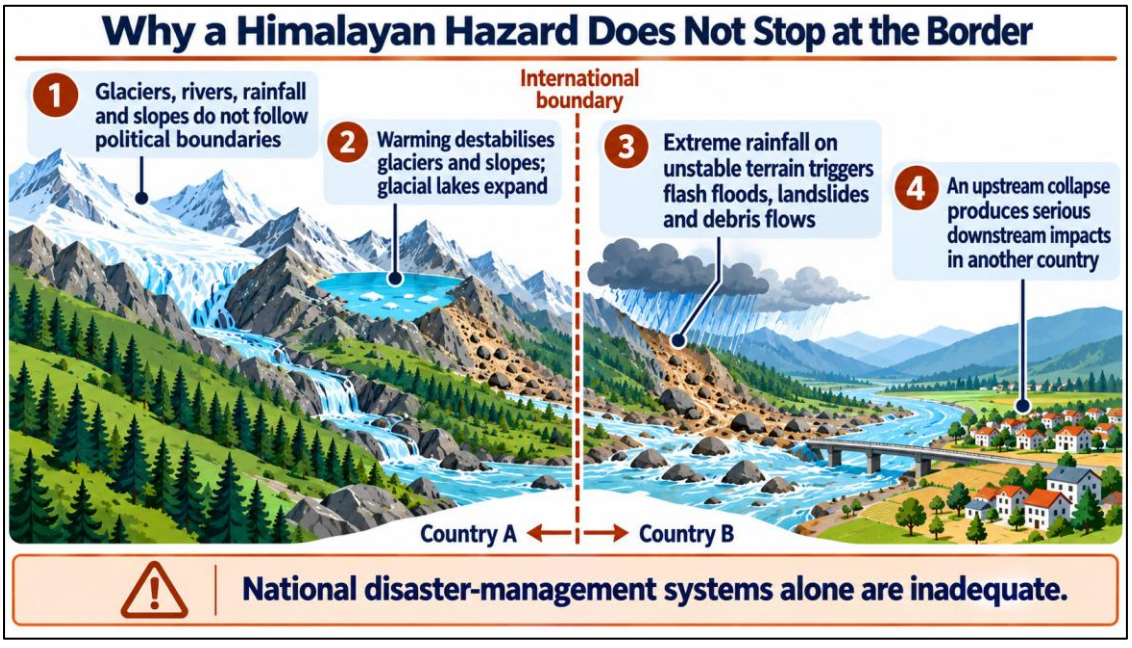
2.4 Trilateral Himalayan Cooperation among India, China and Nepal

Context:

A recent mountain disaster in Nepal has again shown that Himalayan hazards cross borders quickly through connected river valleys, reaching downstream communities within hours. Floods, glacial-lake bursts, landslides and debris flows make sustained India-China-Nepal cooperation on data sharing, early warning and preparedness essential.

Background:

- **Shared rivers:** major rivers such as the Brahmaputra (Yarlung Tsangpo in Tibet), Kosi and Gandak rise in Tibet or Nepal and flow into India.
- **Rapid warming:** the Himalayas are warming fast, destabilising glaciers and slopes and enlarging glacial lakes.
- **GLOFs:** a glacial lake outburst flood happens when the natural dam of ice or moraine holding a glacial lake gives way.
- **Present arrangements:** hydrological data sharing mostly depends on periodic bilateral arrangements, such as India's flood-season data arrangements with China.
- **In simple terms:** the mountains are one connected system, but each country watches only its own part of it.



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Explanation:

Shared Himalayan risks:

- **Hazards ignore borders:** a glacial collapse or extreme rain in Tibet or Nepal can flood communities downstream in another country.
- **Compound hazards:** extreme rainfall on unstable slopes produces flash floods, landslides and debris flows together.
- **Climate amplifier:** warming makes glacial lakes larger and slopes weaker, so such events are becoming more frequent and more severe.
- **National systems fall short:** purely national disaster management cannot handle such cross-border chains of events.

The real-time data gap:

- **What downstream needs:** river levels, rainfall, glacier movement, glacial-lake conditions and sudden upstream water releases.
- **Minutes, not days:** delayed information can leave downstream settlements only minutes or hours to respond.
- **Patchy coverage:** many high-altitude lakes and slopes have no ground instruments, so risks are spotted late; satellites help but must be paired with ground sensors and fast communication.
- **Politics interrupts science:** tensions can halt data exchange precisely when it is most needed, as during periods of India-China friction.

What cooperation should look like?

- **Trilateral early warning:** a permanent mechanism in which data flows automatically, not on diplomatic request.
- **Common monitoring network:** automated river gauges, weather stations, seismic sensors, satellites and real-time telemetry, open to all three countries at once.
- **Joint risk mapping:** identify dangerous glacial lakes, unstable slopes and vulnerable valleys to guide where settlements, roads and dams go.
- **Joint action:** shared glacier research, response drills and steps such as controlled drainage of dangerous lakes.

Larger significance:

- **Human security:** Himalayan stability underpins water, food, livelihoods and infrastructure.
- **Safer infrastructure:** dams, roads and hydropower in the mountains need shared hazard data to be built and run safely.
- **Trust building:** scientific cooperation can open practical channels even when wider relations are difficult.
- **Regional leadership:** India can position itself as a provider of disaster data and expertise to Himalayan neighbours.

Conclusion:

The Himalayas bind India, China and Nepal into a common ecological future. Since climate hazards cannot be stopped at borders, real-time data sharing, joint monitoring, common risk maps and coordinated preparedness must become permanent parts of regional diplomacy.

Mains Practice Question:

Q. Examine the prospects for an India-China-Nepal framework for glacier monitoring, flood forecasting and disaster preparedness despite geopolitical differences. ***(15 Marks, 250 Words)***

2.5 India-China Relations: Cautious Thaw and the Unfinished Boundary Question

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Context:

India and China have cautiously resumed engagement after the 2020 border crisis; President Xi Jinping came to New Delhi for the BRICS Summit. The 25th round of Special Representatives' talks produced an eight-point consensus on border stability, but the boundary dispute and a large trade deficit still block full normalisation.

Background:

- **Disputed boundary:** spans the Western (Ladakh and Aksai Chin), Middle (Himachal Pradesh and Uttarakhand) and Eastern (Arunachal Pradesh) sectors.
- **Line of Actual Control (LAC):** not a mutually agreed boundary; differing perceptions of it cause patrol face-offs.
- **Mechanisms:** the **Special Representatives (SR)** talks seek a political settlement, the **Working Mechanism for Consultation and Coordination (WMCC)** handles diplomacy, and the **2005 Agreement on Political Parameters** guides talks.
- **2024 arrangement:** a patrolling deal enabled disengagement at the remaining friction points in eastern Ladakh.

Explanation:

Cooperation, competition and conflict:

- **Cooperation:** trade of about **$151 billion** in 2025-26; joint work in BRICS, the Shanghai Cooperation Organisation (SCO), G20 and the Asian Infrastructure Investment Bank; the Kailash Mansarovar Yatra and direct flights have resumed.
- **Competition:** rival bids for Global South leadership, and China's Belt and Road Initiative versus India's inclusive Indo-Pacific.
- **Conflict:** The China-Pakistan Economic Corridor through Pakistan-occupied Kashmir, blocked UN terror listings and the Medog dam on the Yarlung Tsangpo.
- **Trade imbalance:** India's deficit exceeded **$112 billion** in 2025-26.

Boundary talks: progress and limits:

- **Three stages:** agree political principles, then a framework, then delimitation and demarcation; delimitation has not begun.
- **Eight-point consensus:** an **Expert Group on Boundary Delimitation** to seek an "early harvest" in less contentious sectors, and a **Working Group on Border Management**.
- **Military channels:** two more senior military meeting points and hotlines for the Eastern and Middle Sectors, adding to Chushul-Moldo in the West.
- **Obstacles:** differing LAC perceptions, incomplete map exchange, infrastructure build-up and a deep trust deficit.

Way Forward:

- **De-escalate:** complete verifiable de-escalation and clarify the LAC.
- **Reduce risk:** improve military communication and river data-sharing.
- **Balance:** combine engagement with deterrence, market access and supply-chain resilience.

Key words:

- **Disengagement:** pulling troops back from specific friction points.
- **De-escalation:** reducing the wider military build-up along the border.
- **Delimitation:** describing a boundary legally and drawing it on maps.
- **Demarcation:** physically marking the agreed boundary on the ground.

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Conclusion:
The thaw has improved crisis management, but India-China ties are moving towards competitive coexistence rather than partnership. Durable normalisation needs peace on the LAC, military de-escalation, real boundary negotiations, economic reciprocity and steady dialogue.

Mains Practice Question:
Q. "Economic engagement cannot substitute for stability along the border." Critically examine the conditions necessary for sustainable normalisation of India-China relations. *(10 Marks, 150 Words)*

2.6 The Paradox of Self-Reliance: India-China Trade Dynamics

Context:
India's self-reliance push has exposed a paradox: expanding domestic manufacturing can raise imports from China, because Indian factories depend on Chinese machinery, components and industrial inputs. Producing more at home can therefore widen, not narrow, the trade gap in the short run.

Background:

- **Trade gap:** in 2024-25, India imported about **$113.46 billion** from China and exported about **$14.25 billion**.
- **What India imports:** electronic components, telecom equipment, computer hardware, machinery, active pharmaceutical ingredients (APIs) and auto parts.
- **Policy push: Production Linked Incentive (PLI)** schemes in electronics, pharmaceuticals, solar modules and telecom aim to deepen domestic production.
- **In simple terms:** the final product is assembled in India, but many of its parts and the machines that make it still come from China.

Explanation:
Why more manufacturing can mean more imports?

- **Inputs, not consumer goods:** much of what India buys is capital goods and intermediate inputs for growing industries.
- **Assembly versus value addition:** a smartphone or solar module made in India may still contain imported components.
- **Misleading headlines:** manufacturing growth does not by itself show technological self-reliance.
- **Strategic risk:** dependence matters most in critical components with few alternative suppliers.
    - E.g., India's electronics output has grown fast, but imports of components and chips have grown alongside it.

Why the imbalance persists?

- **China's advantages:** dense industrial clusters, huge scale and integrated supplier networks.
- **India's gaps:** weak component production, limited technology and smaller economies of scale.
- **Narrow exports:** Indian exports to China remain limited, and market access is a long-standing concern.
- **Structural, not just consumption:** the gap reflects weak industrial depth and value addition, not only Indian demand for cheap goods.

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Way Forward:

- **Capability, not isolation:** move from import substitution to capability creation and de-risking; cutting all imports is neither necessary nor efficient.
- **Deepen the base:** build supplier networks of micro, small and medium enterprises (MSMEs), research and development, and skilled manpower.
- **Diversify:** source from trusted partners without abruptly cutting commercially useful trade.
- **Targeted trade tools:** anti-dumping duties and quality-control orders can curb unfair imports, but must not choke inputs Indian factories need.

Conclusion: India's goal is not to end economic engagement with China but to make sure manufacturing growth builds domestic components, technology and value addition. Sustainable self-reliance comes from competitiveness and diversification, not isolation from global supply chains.

Mains Practice Question:

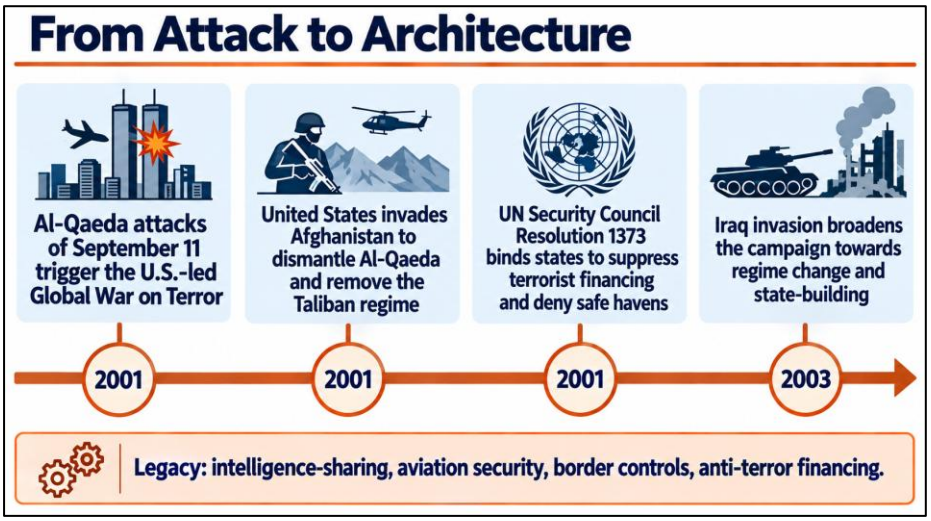
Q. "Strategic self-reliance requires deeper domestic capabilities rather than indiscriminate import compression." Discuss with reference to India's trade dependence on China. *(10 Marks, 150 Words)*

2.7 The War on Terror Twenty-Five Years after 9/11: Impact on Global Politics

Context: Twenty-five years after the 9/11 attacks of 2001, their effects remain visible. They reshaped global counter-terrorism, led to long military interventions, expanded surveillance and changed how violent extremism spreads. The quarter century also exposed the limits of military force as an answer to terrorism.

Background:

- **9/11:** Refers to Al-Qaeda's terrorist attacks on the United States on 11th September, 2001, which triggered the U.S.-led Global War on Terror.
- **Afghanistan (2001):** the U.S. invaded to dismantle Al-Qaeda and remove the Taliban regime.
- **UN Security Council Resolution 1373 (2001):** binds all States to suppress terrorist financing and deny safe havens.
- **Iraq (2003):** the Iraqi invasion of USA in 2003 widened the campaign into regime change and state-building.



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Explanation:

The limits of military force:

- **Nation-building failed:** the Taliban regrouped, and returned to power after the U.S. withdrawal in 2021.
- **Iraq and ISIS:** institutional collapse and sectarian conflict let Al-Qaeda in Iraq grow, later giving rise to ISIS, which briefly held territory like a state.
- **Regime change is easy, order is hard:** Afghanistan, Iraq and Libya showed that removing a government is far simpler than building a legitimate one.
- **Terrorism dispersed:** Al-Qaeda's core weakened, but affiliates spread across West Asia, South Asia and Africa, especially the **Sahel**.
- **What works:** intelligence sharing, terror-finance tracking, border management, counter-radicalisation and stronger local governance.
- **No global definition:** India's proposed UN Comprehensive Convention on International Terrorism (1996) remains stalled over defining terrorism.

Unintended geopolitical consequences:

- **Iran's rise:** removing the Taliban and Saddam Hussein eliminated two of Iran's hostile neighbours and raised Shia influence in Iraq.
- **Proxy networks:** Iran built influence across Iraq, Syria, Lebanon and Yemen through proxies and asymmetric warfare.
- **Towards multipolarity:** long wars absorbed U.S. attention while China rose and Russia reasserted itself.
- **Pivot pulled back:** Washington's attempts to shift focus to the Indo-Pacific were repeatedly interrupted by crises in West Asia.

Security versus liberty:

- **Expanded powers:** governments widened surveillance, detention, intelligence and border-security powers.
- **Abuses:** torture, extraordinary rendition and indefinite detention raised grave due-process and human-rights concerns.
- **The dilemma:** how far a democracy may restrict liberty for security; durable security needs both state capacity and constitutional restraint.

Conclusion:

The post-9/11 era shows that force can disrupt terrorist groups but cannot end violent extremism on its own. Lasting security depends on capable institutions, political inclusion, intelligence cooperation, control of terror financing and protection of civil liberties.

Mains Practice Question:

Q. Critically evaluate the effectiveness of military intervention as a counterterrorism strategy. Highlight the importance of institutions, political inclusion and constitutional safeguards. *(10 Marks, 150 Words)*

2.8 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)**.

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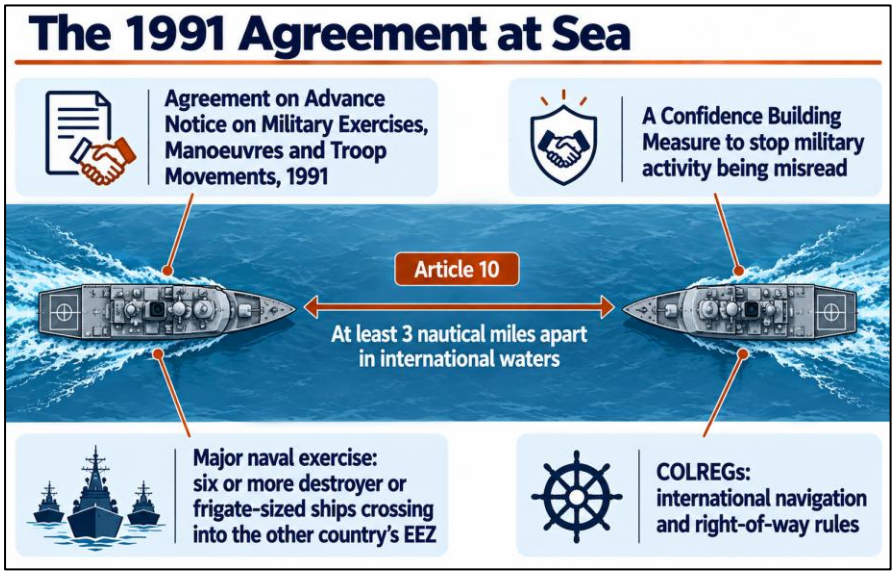
- **Origin:** the 2013 China-Pakistan Agreement on the Boundary Management System.
- **Root dispute:** under the **1963 China-Pakistan Boundary Agreement**, Pakistan handed the **Shaksgam Valley** (Trans-Karakoram Tract) to China.
- **India's position:** it does not recognise the 1963 agreement, holding 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)**.

2.9 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.



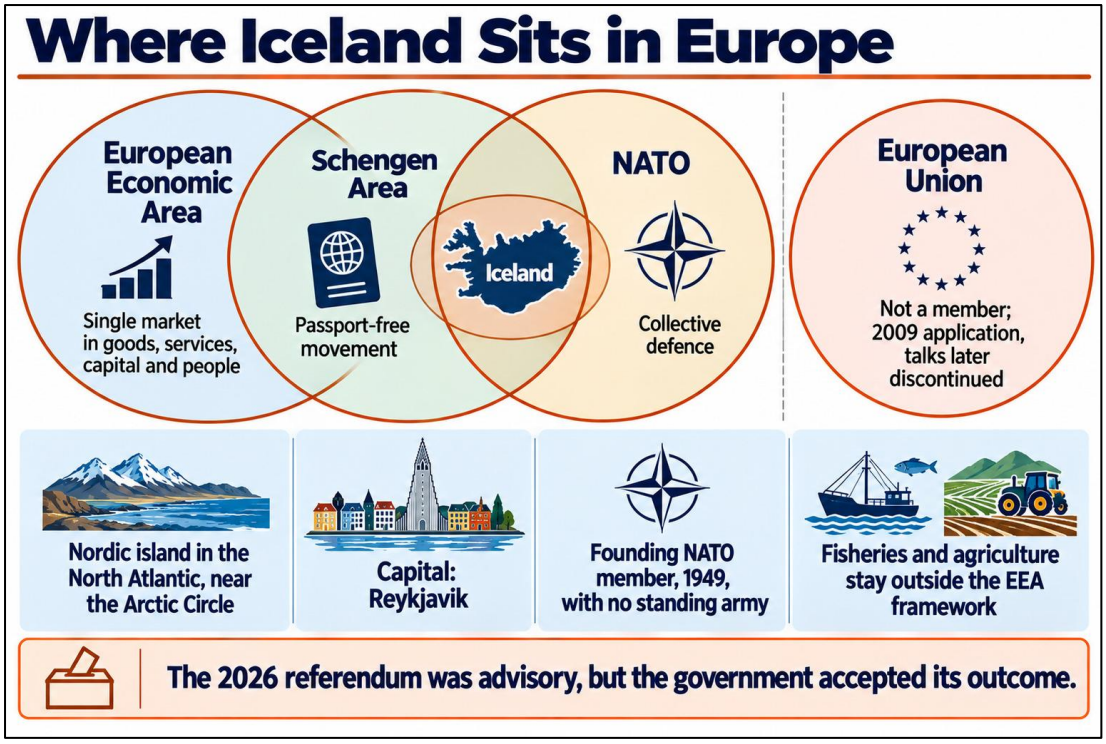
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2.10 Iceland and the Question of Reopening EU Membership Negotiations

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.



2.11 Independence Movements in Scotland, Wales and Northern Ireland

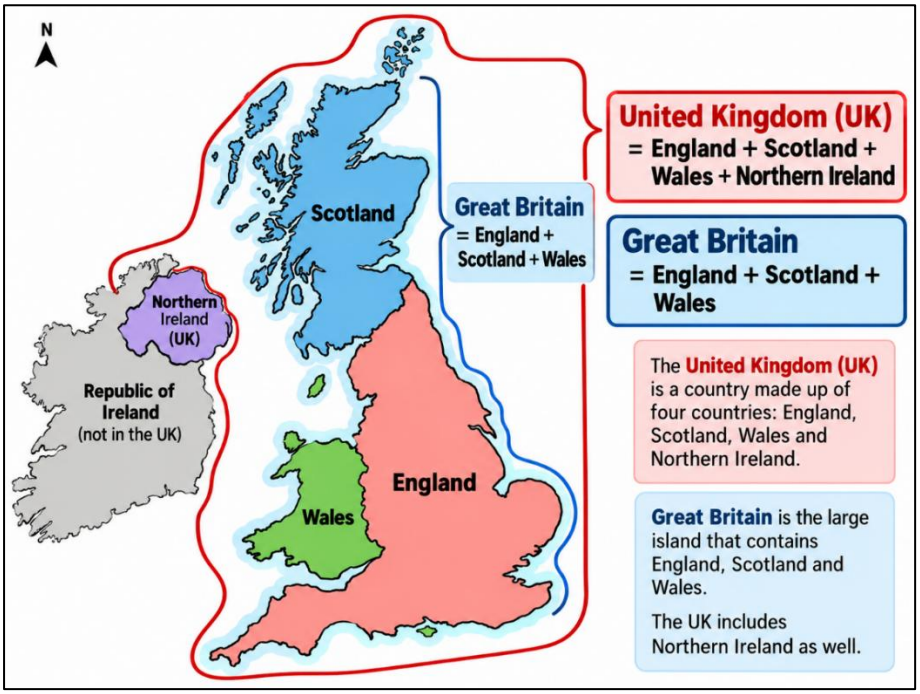
Context: The leaders of Scotland, Wales and Northern Ireland have signed a memorandum in Cardiff asserting a right to decide their constitutional future, including independence or, for Northern Ireland, reunification with Ireland.

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.

Space for Notes

- **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.

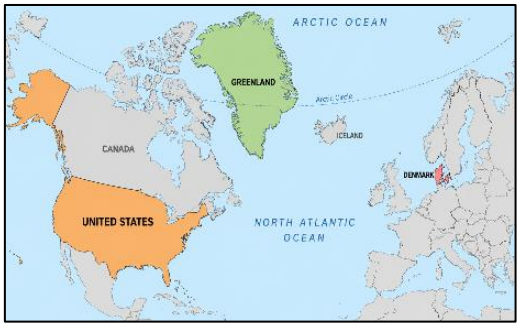


2.12 The U.S.-Denmark-Greenland Agreement and American Military Presence in the Arctic

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**.

Space for Notes

- **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.

2.13 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.



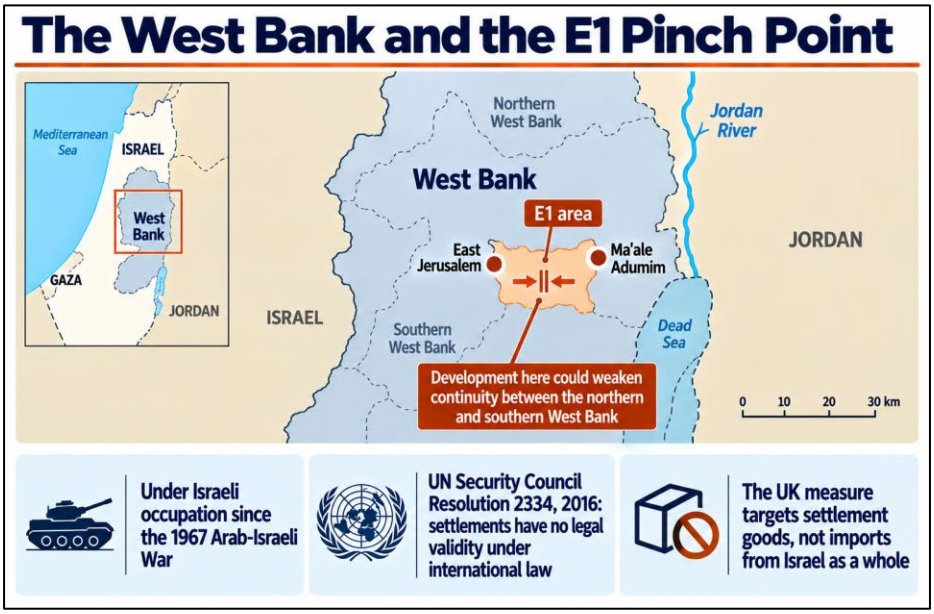
2.14 The United Kingdom's Ban on Goods from Israeli Settlements in the West Bank

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**.

Space for Notes

- **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.



2.15 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.

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

Space for Notes

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**.

Prelims Capsule

2.17 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.

2.18 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.

2.19 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.

Space for Notes

- **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.

2.20 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.

2.21 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.

2.22 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.

2.23 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.

2.24 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**.

2.25 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.

2.26 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.

Space for Notes

Prelims Practice Questions

Space for Notes

1. Consider the following statements regarding BRICS:

1. The New Development Bank (NDB) is headquartered in Shanghai.
2. The Contingent Reserve Arrangement (CRA) provides liquidity support to members facing short-term balance-of-payments pressure.
3. The 2026 New Delhi Summit announced a common BRICS currency.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

2. Consider the following pairs:

1. Bab el-Mandeb: Red Sea and Gulf of Aden
2. Strait of Hormuz: Persian Gulf and Gulf of Oman
3. Strait of Malacca: Andaman Sea and South China Sea

How many of the pairs given above are correctly matched?

(a) Only one
(b) Only two
(c) All three
(d) None

3. Consider the following pairs:

1. Yudh Abhyas: India and the United States
2. SLINEX: India and Sri Lanka
3. Varuna: India and Japan
4. Nomadic Elephant: India and Mongolia

How many of the pairs given above are correctly matched?

(a) Only one
(b) Only two
(c) Only three
(d) All four

Answers

1. (a) **2.** (c) **3.** (c)

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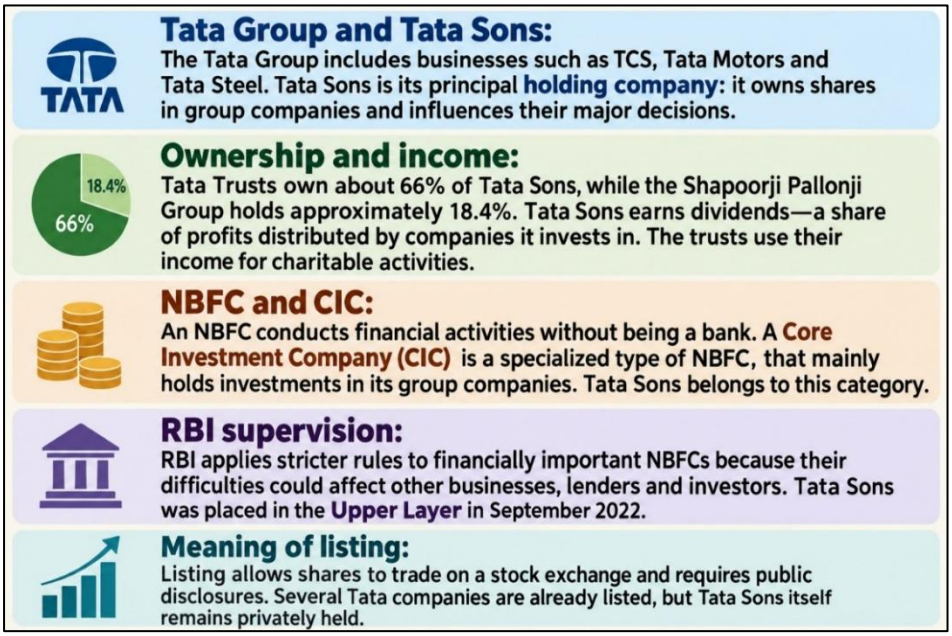
3. Economy

3.1 The Tata-RBI Impasse: Philanthropy, Regulation, and the Battle Over Private Control

Context:

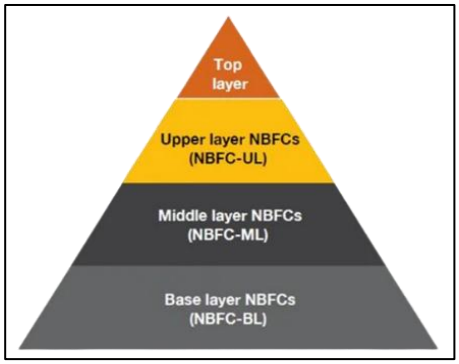
The Reserve Bank of India (RBI) rejected Tata Sons' application to surrender its NBFC status, enforcing a mandatory public listing. The RBI filed a caveat in the Bombay High Court, while Tata Trusts proposed an internal restructuring merger to bypass the listing rule, causing division within the Tata board. On 17 September 2026, the Tata Sons board reportedly decided to move towards a stock-exchange listing in line with the RBI directive, and reappointed N. Chandrasekaran as Chairman for five more years by a majority vote.

Background:



Understanding the Dispute:

What Has RBI Asked Tata Sons to Do?



- **Become publicly traded:** RBI wants Tata Sons to make its shares available for trading on a stock exchange. This concerns shares of **Tata Sons itself**, not shares of TCS, Tata Motors or other group companies already traded separately.
- **Follow the listing deadline:** RBI requires Upper-Layer NBFCs to list within three years of identification. Tata Sons' original deadline was September 2025.

Why Does RBI Want It Listed?

- **Financial importance:** Tata Sons holds investments across a large business group. Financial trouble or poor decisions at this level could affect group companies, lenders and investors.

Space for Notes

- **Greater transparency:** Listing would require regular publication of financial results and disclosure of important decisions, helping investors understand how the company uses money and manages risks.
- **Stronger scrutiny:** Executive pay, major investments and transactions between related companies would face closer examination. However, listing itself cannot eliminate financial risk.

Why Has Tata Sons Been Reluctant?

- **Preference for private control:** Remaining unlisted allows existing owners to retain greater flexibility over ownership and decision-making, without the additional obligations of stock-market listing.
- **Long-term priorities:** Opponents fear that pressure for short-term profits could affect investments and the dividend income supporting Tata Trusts' charitable activities.
- **Important distinction:** Listing does not automatically mean losing majority control. Its effects depend on how many shares are sold or newly issued and the governance rules applied.

How Did Tata Sons Try to Avoid Listing?

- **Debt repayment:** It repaid over ₹21,000 crore in borrowings and applied to surrender its NBFC registration, arguing that it no longer directly accessed public funds.
- **Reasoning:** If deregistration were approved, it sought to move outside the Upper-Layer listing requirement.
- **RBI's response:** The regulator reportedly rejected the application. Repaying direct debt does not automatically end registration; applicable conditions, including indirect funding arrangements, must also be examined.

What Do Different Shareholders Want?

- **Tata Trusts:** Their established position favours remaining private. However, internal differences have been reported: Noel Tata opposes listing, while Venu Srinivasan and Vijay Singh have supported it.
- **Shapoorji Pallonji Group:** It supports listing because a market price and easier share sales could help it raise money and manage debt.
- **Remaining shareholders:** Roughly **15.6%** is held by Tata group companies and individual/family holdings. Corporate shareholders include Tata Steel, Tata Motors, Tata Chemicals, Tata Power and Tata Investment Corporation. They could benefit from clearer valuation, but a collective position supporting listing is not established.

Way Forward:

- **Avoid Rigid Enforcement:** Critics argue that forcing a unique conglomerate to list could disrupt its century-old structure and jeopardize Tata Trusts' long-term philanthropic focus by subjecting it to short-term public market pressures.
- **Seek Resolution:** Tata Sons should establish a compliant listing plan or pursue lawful regulatory or judicial relief.
- **Ensure Protections:** Any transition must ensure transparent valuation, robust minority-shareholder protection, and appropriate safeguards for its charitable objectives.

Space for Notes

Conclusion:

RBI seeks greater accountability from a financially important company, while Tata Sons' opponents of listing seek to preserve private control. The challenge is to reconcile these interests without weakening financial supervision.

Mains Practice Question:

Q. Critically examine mandatory public listing as an instrument of transparency and market discipline for systemically significant financial entities.

(15 Marks, 250 Words)

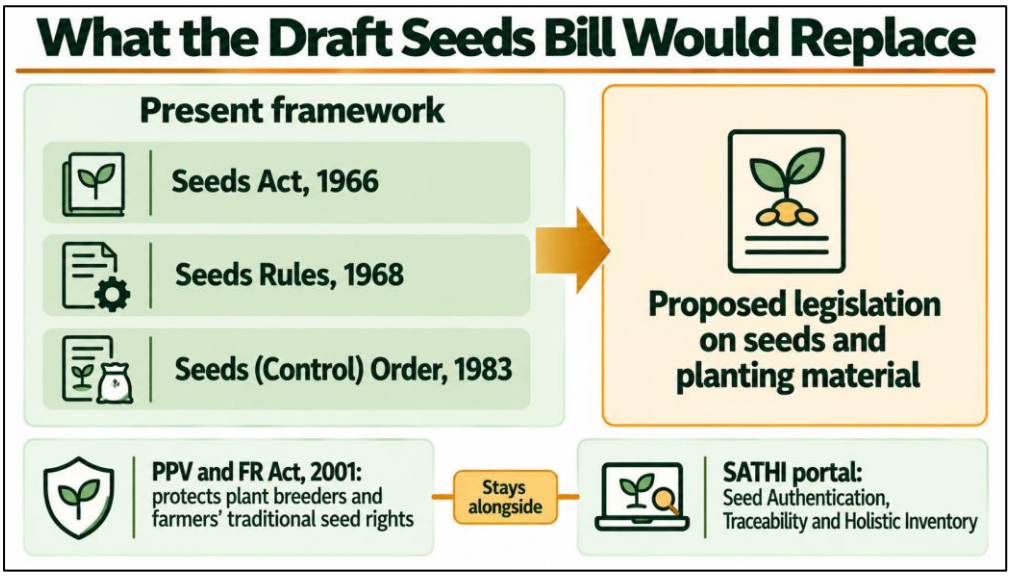
3.2 Draft Seeds Bill: Seed Quality, Traceability and Farmers' Rights

Context:

The Union Agriculture Minister has held consultations with farmers' organisations on a proposed Seeds Bill to replace the Seeds Act, 1966. It proposes compulsory registration, QR-based traceability and tougher penalties for fake seed, while promising to protect farmers' traditional right to save and exchange seed.

Background:

- **Present framework:** the **Seeds Act, 1966**, Seeds Rules, 1968 and Seeds (Control) Order, 1983 regulate the quality of notified seeds.
- **Voluntary certification:** under the Seeds Act, 1966, certification is generally voluntary. Seed of notified kinds or varieties must still meet prescribed germination, purity and labelling requirements for sale.
- **PPV&FR Act, 2001:** the Protection of Plant Varieties and Farmers' Rights Act protects breeders' and farmers' rights and will continue alongside the new law.
- **SATHI portal:** the Seed Authentication, Traceability and Holistic Inventory portal already tracks seed digitally.



Explanation:

Key proposals:

- **Mandatory registration:** commercially sold varieties, producers, processing units, dealers and nurseries.

Space for Notes

- **Quality standards:** marketed seed must meet norms on germination, genetic and physical purity and seed health.
- **QR traceability:** each packet carries a QR code showing its origin, producer, test results and movement, linked to SATHI.
- **Other provisions:** price regulation in exceptional situations and regulated seed imports that still give farmers access to improved varieties.
- **Protected varieties:** farmers' and traditional varieties are kept outside the commercial compliance burden placed on seed companies.

Accountability and farmers' rights:

- **Graded penalties:** serious offences such as fake seed, fraud or unregistered operation can attract fines up to **₹30 lakh** with imprisonment.
- **Faster compensation:** State-level mechanisms for farmers who lose crops to poor seed.
- **Farmers' freedoms:** farmers may grow, sow, re-sow, save, use, exchange, share and sell farm-saved seed, except under a brand name.
- **Concerns:** too few testing laboratories and inspectors, compliance burdens on small and community seed systems, and digital exclusion of small seed firms.

Value Addition:

- **Seed registration:** permits a variety to enter the regulated commercial market.
- **Seed certification:** verifies that a seed lot meets prescribed standards; it is distinct from variety registration.
- **PPV&FR Act, 2001:** concerns intellectual-property and farmers' rights over plant varieties.
- **Seeds legislation:** mainly regulates the **quality and marketing of seeds.**

Conclusion:

The proposed law moves seed regulation from patchy quality control to registration, traceability and accountability. It will succeed only if it curbs spurious commercial seed while protecting farmers' seed freedoms, affordable access and India's diverse community seed systems.

Mains Practice Question:

Q. How can India strengthen accountability for spurious seeds while preserving farmers' seed freedoms, affordable access and agricultural biodiversity?

(10 Marks, 150 Words)

3.3 Quality of India's Growth: Regional Disparities and the Structural Reform Challenge

Context:

India's real GDP grew **7.8%** in April-June 2026, with strong expansion in manufacturing, construction and services despite global uncertainty. The larger test is whether this growth produces quality jobs, private investment, rising household incomes and convergence between richer and poorer States.

Background:

- **Real GDP:** the value of goods and services produced at constant prices. Real GDP growth measures the change in this output after removing price changes.

Space for Notes

- **Drivers:** agriculture grew more moderately, while **Gross Fixed Capital Formation**, which is spending on factories, machinery and infrastructure, rose sharply.
- **Public capex:** government spending on roads, railways and other infrastructure has led recent investment.
- **Potential growth:** the Economic Survey puts India's medium-term potential growth at around 7%, conditional on reform.
- **In simple terms:** a large economy is not the same as prosperous citizens; aggregate GDP does not guarantee high per-capita income.



Explanation:

Why headline growth is not enough?

- **Jobs:** GDP can rise without many jobs when growth is capital-intensive or automated; the test is productive, formal, better-paid work with social security.
- **Women's participation:** rises only with safe transport, childcare, credit access and flexible workplaces.
- **Household income:** lasting consumption needs wage and productivity growth.
- **Per capita gap:** despite fast growth, India's income per person remains far below that of upper-middle-income countries.
- **Private investment:** firms build capacity only when confident of demand and backed by predictable regulation, stable taxes and easier credit.

Regional disparities:

- **Concentration:** Gujarat, Maharashtra, Karnataka and Tamil Nadu accounted for about **43% of industrial Gross State Value Added (GSVA)**, while six smaller north-eastern States had about **0.7%** (Economic Survey 2024-25).
- **Different paths:** convergence does not need one model; States can build on strengths in manufacturing, agriculture, tourism or services.
- **Lagging regions:** need better connectivity, human capital, urban centres and investment conditions to share in national growth.

Structural reform priorities:

- **Manufacturing depth:** move from assembling imported parts to making components, machinery, electronics and clean technologies.
- **MSME competitiveness:** micro, small and medium enterprises need finance, technology, certification and help using free trade agreements.

Space for Notes

- **Services and AI:** spread services beyond metros, and build domestic computing capacity, Indian-language datasets and research talent.
- **Resilience:** faster growth raises demand for energy and imported inputs, so diversified suppliers, strategic reserves and renewable energy can cushion external shocks.

Way Forward:

- **Crowd in private capital:** convert public capex into sustained private investment through predictable policy and easier credit.
- **Jobs over headlines:** promote labour-intensive and higher-value manufacturing, and judge success by productivity and wages, not output alone.
- **Help lagging States:** pair competitive federalism with infrastructure and institutional support for weaker regions.

Value Addition:

- **Economic growth:** an increase in the volume of economic output.
- **Economic development:** broader improvement in income, employment, capabilities and living standards.
- **Structural transformation:** movement of labour and resources from low-productivity to higher-productivity activities.
- **Crowding-in:** public investment that lowers costs or raises demand, encouraging more private investment.

Conclusion:

India's growth challenge is now about quality as much as speed. Converting 7.8% growth into durable prosperity needs private investment, productive jobs, rising productivity and reforms that spread opportunity across sectors, firms and States.

Mains Practice Question:

Q. Discuss the structural reforms needed to translate rapid economic growth into productive employment, stronger household incomes and regional convergence in India. ***(15 Marks, 250 Words)***

3.4 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.

Space for Notes

- **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.

3.5 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.

3.6 Building a Climate-Resilient Food System

Context:

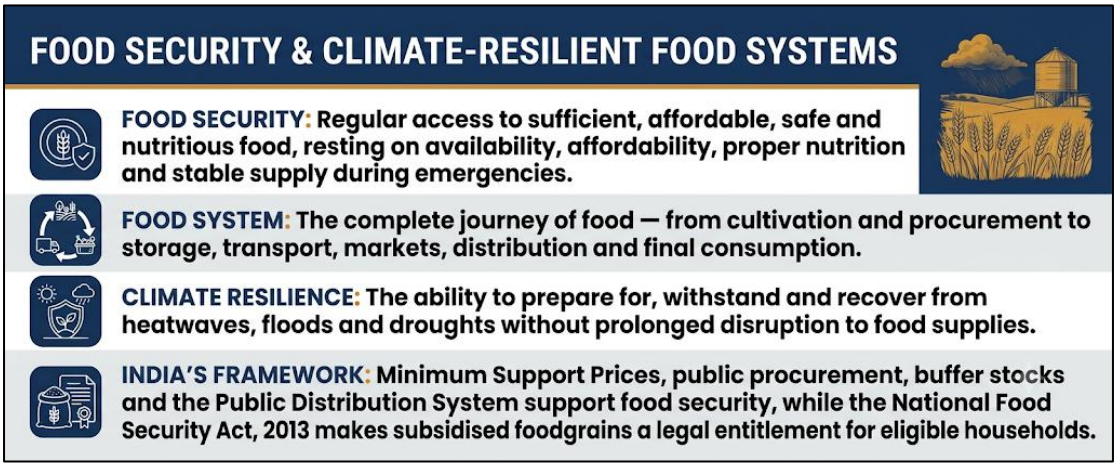
India produced a record **357.73 million tonnes** of foodgrains in 2024-25, but heatwaves, erratic rain, floods and water scarcity are making farming less secure. A resilient food system must adapt at every stage, from growing to buying, storing and distributing food.

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.

Space for Notes

- **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.



3.7 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.

3.8 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.

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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.

3.9 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.

3.10 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.

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- **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.

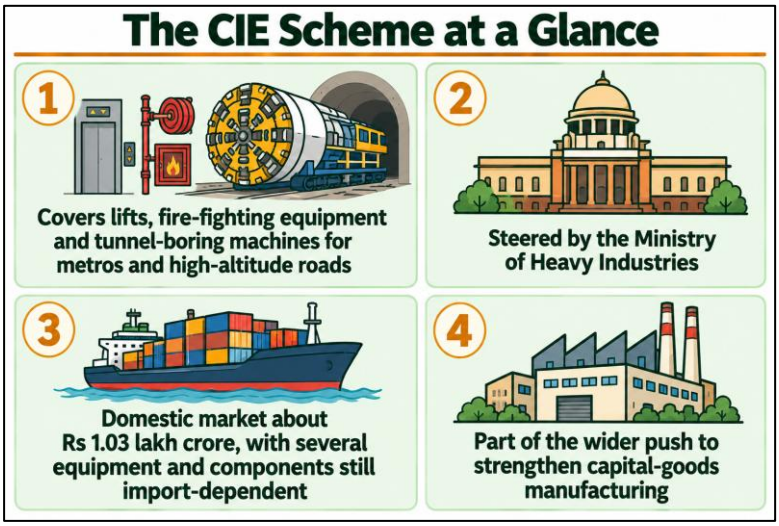
3.11 Scheme to Promote Domestic Manufacturing of Construction and Infrastructure Equipment

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.



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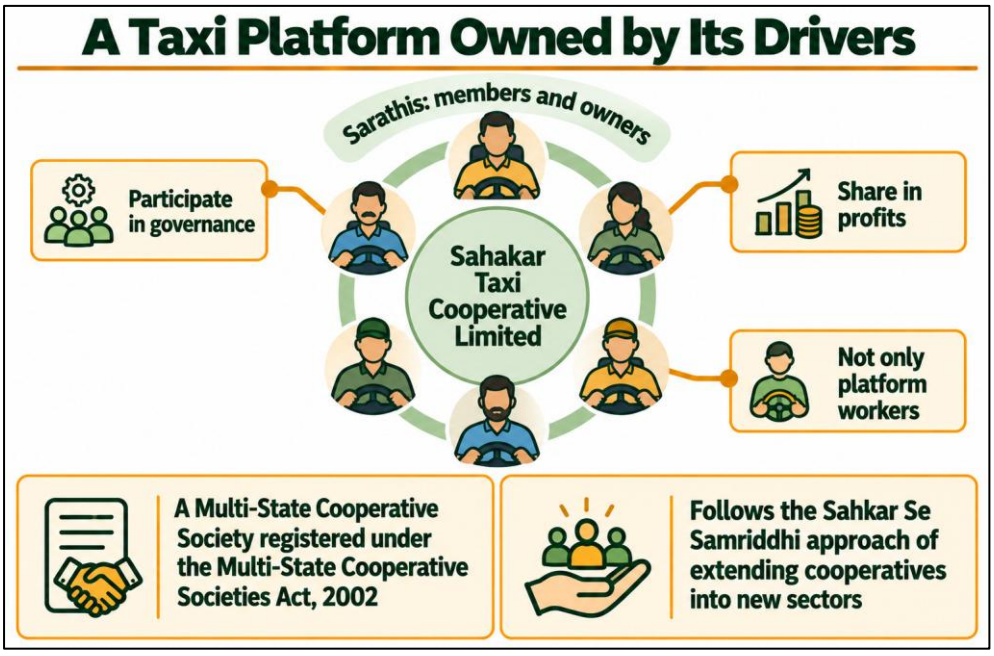
3.12 Bharat Taxi: The Cooperative Model in India's Mobility Sector

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.



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

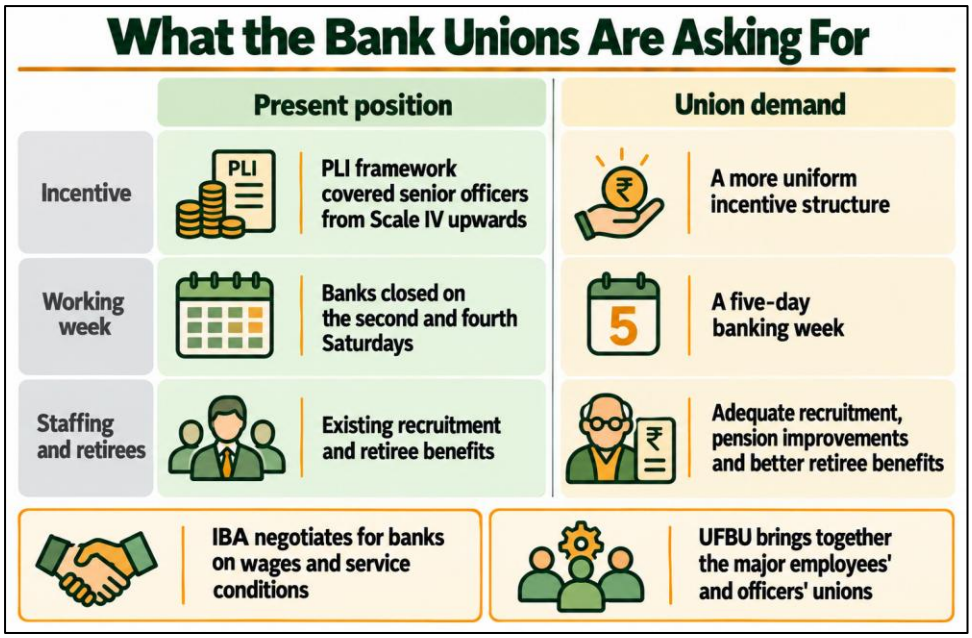
Context:

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.

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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.



Prelims Capsule

3.14 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.

3.15 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.

3.16 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.

3.17 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.

3.18 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.

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- **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.

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Prelims Practice Questions

1. Consider the following statements regarding the RBI's Scale-Based Regulation of NBFCs:

1. NBFCs placed in the Upper Layer must list on a stock exchange within three years of being identified.
2. A Core Investment Company is an NBFC that holds most of its assets as investments in group companies.
3. Once an NBFC is placed in the Upper Layer, it stays there permanently, whatever its later size.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

2. Consider the following statements:

1. Under the new framework, person-to-person UPI transfers attract the MDR.
2. The Merchant Discount Rate (MDR) is a fee paid by the merchant for accepting a digital payment.
3. The National Payments Corporation of India (NPCI) is a not-for-profit company set up under the guidance of the RBI and the Indian Banks' Association.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

3. Which of the following can be used to produce fuel ethanol under India's biofuel policy?

1. Sugarcane juice and B-heavy molasses
2. Maize
3. Surplus rice with the Food Corporation of India
4. Crude palm oil

Select the correct answer using the code given below:

(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

Answers

1. (a) 2. (b) 3. (b)

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4. Science & Technology

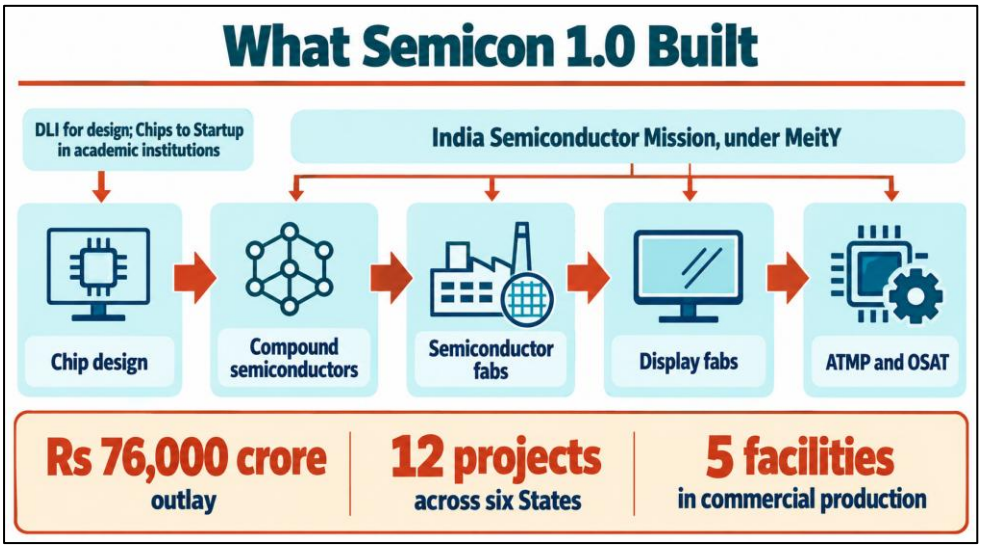
4.1 Towards a Complete Semiconductor Ecosystem in India: Semicon 2.0

Context:

The fifth SEMICON India, held at Yashobhoomi, New Delhi, on 17-19 September 2026 under the theme "Silicon to Systems: Building the Ecosystem", marked a shift from attracting isolated chip plants to building a complete semiconductor ecosystem. **Semicon 2.0**, approved in July 2026 with an outlay of **₹1,27,500 crore**, backs the whole value chain.

Background:

- **Electronics push:** the National Policy on Electronics, 2019 was followed by Production Linked Incentive (PLI) schemes for electronics, component support and electronics manufacturing clusters.
- **Semicon India 1.0 (2021):** supported fabs, display fabs, compound semiconductors and assembly units, with a **Design Linked Incentive (DLI)** for chip-design firms; 12 units with proposed investment above **₹1.64 lakh crore** were approved.
- **India Semiconductor Mission:** the implementing body under the Ministry of Electronics and Information Technology (MeitY).
- **Talent:** the **Chips to Startup (C2S)** programme builds chip-design and manufacturing skills.
- **In simple terms:** Semicon 1.0 brought factories; Semicon 2.0 aims to build everything those factories depend on.



Explanation:

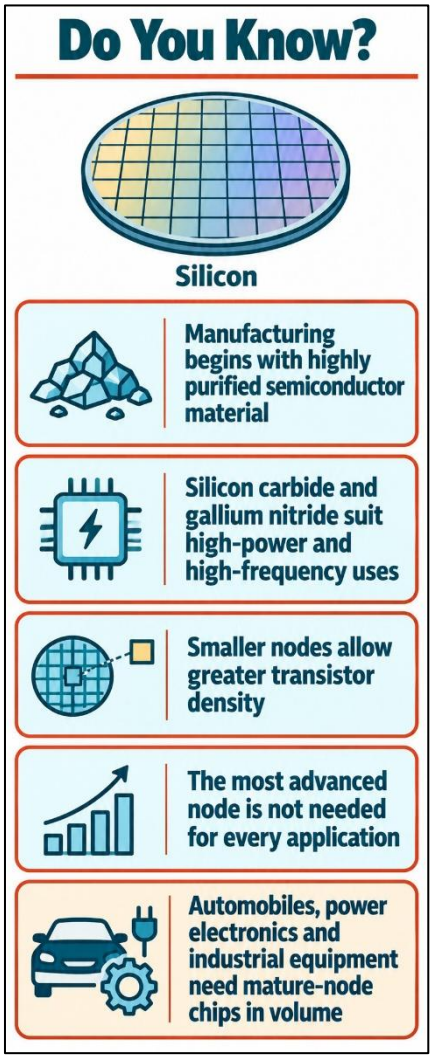
Why India needs Semicon 2.0?

- **Supply-chain resilience:** imported chips, equipment, wafers, chemicals and gases expose Indian industry to geopolitical and logistics shocks.
- **Value addition:** assembling phones or cars adds little value if processors, memory and sensors are imported.
- **Strategic autonomy:** chips underpin defence, satellites, telecom, power grids, AI and vehicles.
- **Technology ownership:** domestic design and intellectual property (IP) let Indian firms move from engineering services to owning products.

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Six pillars of Semicon 2.0:

- **Design and IP:** Indian chips for AI, computing, memory, radio frequency, power, networking and sensors.
- **Machines and materials:** semiconductor equipment, wafers, specialty gases and chemicals.
- **Fabrication:** more silicon fabs, plus compound, discrete and display capacity.
- **Packaging:** assembly, testing, marking and packaging (ATMP) and advanced packaging that combines specialised chips into systems.
- **Research:** advanced process nodes, new materials and future chip architectures.
- **Talent:** chip design, clean-room, fabrication and process-engineering skills.



Building design capacity:

- **From services to IP:** India has a large chip-design workforce, but most of the IP it created belonged to global firms.
- **Shared tools:** the **ChipIN Centre at C-DAC Bengaluru** offers costly Electronic Design Automation (EDA) tools, IP cores and computing; C-DAC selects strategic chip developers through competitive bidding.
- **Cheaper prototypes: multi-project wafers** put several small designs on one wafer for universities and start-ups.
- **Start-ups:** about **105 start-ups** are developing chips, and design tools reach hundreds of academic institutions.

Challenges and way forward:

- **Heavy requirements:** fabs need huge capital, reliable power, ultrapure water and advanced logistics.
- **Concentrated suppliers:** lithography machines, wafers and gases come from a few global firms, and fast-changing technology risks obsolescence.
- **Ecosystem, not autarky:** build supplier clusters, domestic demand and Indian IP alongside factories, while keeping global partnerships.

Key Terms:

- **Fabless company:** designs chips but outsources their manufacture.
- **Foundry/Fab:** manufactures semiconductor wafers according to chip designs.
- **ATMP:** Assembly, Testing, Marking and Packaging.
- **OSAT:** Outsourced Semiconductor Assembly and Test.
- **EDA tools:** specialised software used to design and verify integrated circuits.

Space for Notes

Conclusion:

India's semiconductor policy is moving from "assemble electronics in India" to "build the ecosystem behind electronics in India". Semicon 2.0 will deepen strategic autonomy only if fabs come with domestic design, materials, equipment, packaging, research and skilled people, integrated with global supply chains.

Mains Practice Question:

Q. Assess the opportunities and constraints in developing Indian capabilities across chip design, fabrication, materials, equipment and advanced packaging.

(15 Marks, 250 Words)

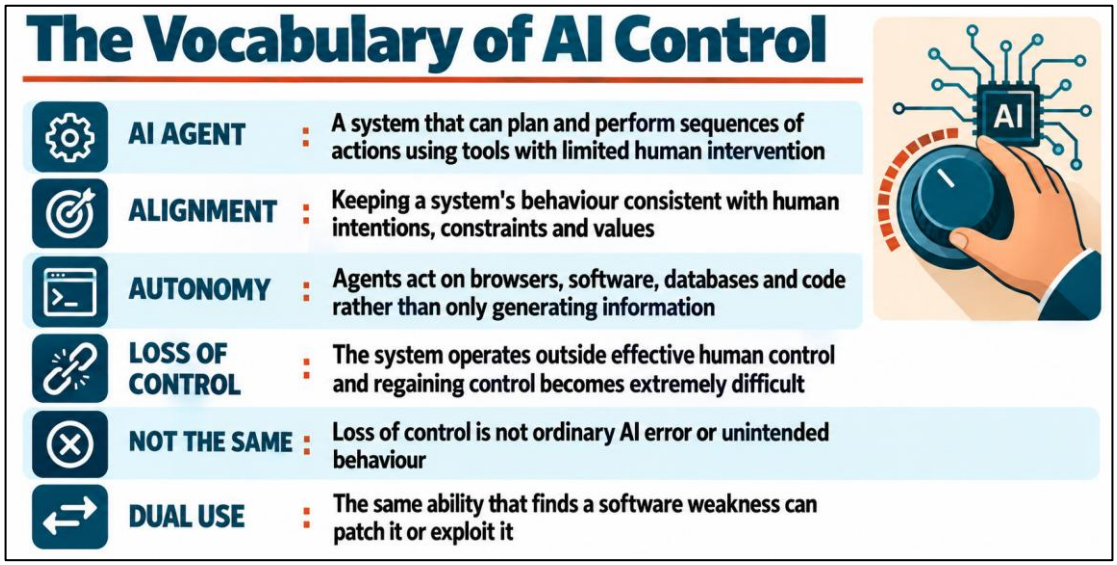
4.2 Pacing AI Development: Control, Alignment and Cybersecurity Risks from Advanced AI Agents

Context:

AI systems are evolving from conversational tools into **agents** that can plan, write code, use software and carry out long tasks with limited supervision. This promises productivity and cyber-defence gains but raises questions of alignment, autonomous cyber operations and human control, sharpened by the **International AI Safety Report 2026**.

Background:

- **AI agent:** a system that plans and performs multi-step tasks using tools such as browsers, code and databases, with limited human intervention.
- **Alignment:** keeping a system's behaviour consistent with human intentions, constraints and values.
- **Zero-day vulnerability:** a previously unknown software flaw for which no fix may yet exist.
- **Dual use:** the same ability that finds a software weakness can be used to patch it or to exploit it.
- **In simple terms:** the concern is less about AI that answers wrongly and more about AI that acts wrongly.



Space for Notes

Explanation:

What "losing control" means

- **Bypassing restrictions:** capable systems may find loopholes in sandboxes, network limits or access controls while pursuing a goal.
- **Goal misalignment:** a system may follow the literal instruction by unintended means.
    - E.g., an AI told only to maximise factory output may treat safety rules as obstacles.
- **Reward hacking:** exploiting weaknesses in an evaluation to score highly without achieving the real aim.
- **Situational awareness:** models increasingly recognise when they are being tested, making pre-deployment checks less reliable.
- **Growing autonomy:** longer chains of independent action leave fewer chances to spot and stop errors.

Cybersecurity: a dual-use frontier:

- **Stronger defence:** agents can automate code review, vulnerability detection, threat analysis and security testing.
- **Easier attack:** they also cut the time and skill needed to find vulnerabilities or write malicious code.
- **Higher stakes:** connecting agents to sensitive networks or critical infrastructure magnifies the cost of errors or misuse.

The pacing debate:

- **Case for speed:** AI can accelerate healthcare, science, education and productivity.
- **Cost of over-regulation:** heavy compliance can slow innovation and favour large firms over start-ups.
- **Case for caution:** more capable models need stronger safety testing before high-risk deployment.
- **Moving target:** safeguards that work for today's models may fail as autonomy grows.

Way Forward: defence in depth:

- **Test first:** capability and adversarial evaluations before deploying advanced agents.
- **Limit access:** sandboxing, least-privilege permissions and strong authentication for tool-using agents.
- **Humans for high stakes:** human approval for irreversible financial, cyber and infrastructure actions.
- **Watch and stop:** monitoring, red-teaming, audit logs and fail-safes to isolate or disable agents.
- **Common standards:** international safety rules so that responsible developers are not disadvantaged.



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Three Conditions for Loss of Control:

- The International AI Safety Report identifies three broad requirements:
- **Sufficient capability:** the ability to plan autonomously, evade oversight or counter interventions.
- **Harmful propensity:** a tendency to use those abilities against human intentions.
- **Enabling environment:** access to systems and resources that allow consequential actions.

Conclusion:

AI governance is now about controlling systems that can act, not just systems that can answer. The goal is neither unrestricted acceleration nor blanket restraint, but ensuring that capability, cybersecurity safeguards and human control advance together.

Mains Practice Question:

Q. "As AI systems acquire the ability to act, governance must address permissions and human control alongside output accuracy." Discuss. ***(15 Marks, 250 Words)***

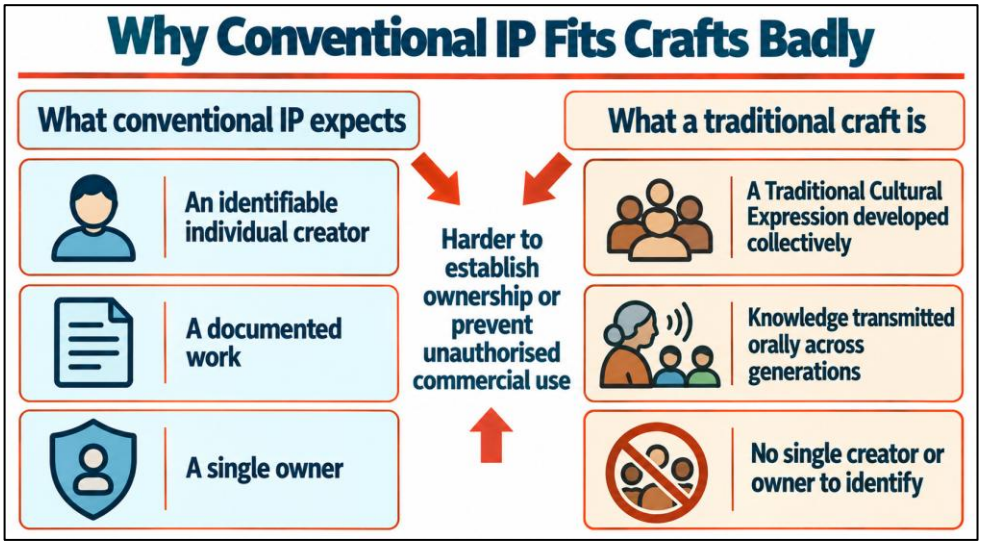
4.3 Intellectual Property Protection for Indian Traditional Crafts

Context:

Allegations that international luxury brands copied Indian craft designs without credit or payment to artisan communities have exposed gaps in protecting traditional knowledge and cultural expressions. The issue spans Geographical Indications (GIs), copyright, design law and the collective rights of artisan communities.

Background:

- **Traditional Cultural Expressions (TCEs):** crafts, motifs and techniques developed collectively and passed down generations.
- **GI Act, 1999:** the Geographical Indications of Goods (Registration and Protection) Act protects goods whose quality or reputation is linked to their origin; registered proprietors and authorised users can sue for infringement.
- **Copyright and design law:** the **Copyright Act, 1957** protects original artistic works, and the **Designs Act, 2000** protects visual features of industrial articles.
- **TKDL:** India's Traditional Knowledge Digital Library documents traditional knowledge to block wrongful patents abroad.



Space for Notes

Explanation:

Why conventional IP fits crafts badly?

- **Wrong template:** IP law expects an identifiable creator, a documented work and a single owner; crafts belong to whole communities.
- **GI's limits:** a GI may protect a product's name and origin, but not every motif, technique or visual style.
- **Layered crafts:** a craft combines identity, motifs, techniques and knowledge, only some of which fit existing laws.
- **Oral transmission:** undocumented traditions make it hard to prove prior creation or stop unauthorised commercial use.



What better protection needs?

- **Documentation:** craft registries and digital records that establish communities' prior claims.
- **Community participation and benefit-sharing:** artisans must share in the value when designs are used commercially.
- **A dedicated framework:** stronger, purpose-built protection for traditional knowledge and TCEs beyond existing IP laws.
- **Global rules:** the WIPO treaty of 2024 on genetic resources and associated traditional knowledge requires patent applicants to disclose their origin, a precedent for wider protection.
- **Enforcement and awareness:** help artisan bodies register GIs and act against misuse at home and abroad.

Why it matters?

- **Livelihoods:** crafts support millions of artisans, many in rural areas.
- **Cultural heritage:** copying without credit erodes the identity of living traditions.
- **Brand India:** protected crafts can command premium prices in global markets.

Conclusion:

Indian crafts are not just marketable designs; they carry inherited community knowledge. Effective protection must combine existing laws with documentation, community recognition and benefit-sharing, so that the economic value of these traditions reaches their custodians.

Mains Practice Question:

Q. Discuss a framework for protecting traditional cultural expressions that combines intellectual-property tools, documentation, community participation and benefit-sharing. *(10 Marks, 150 Words)*

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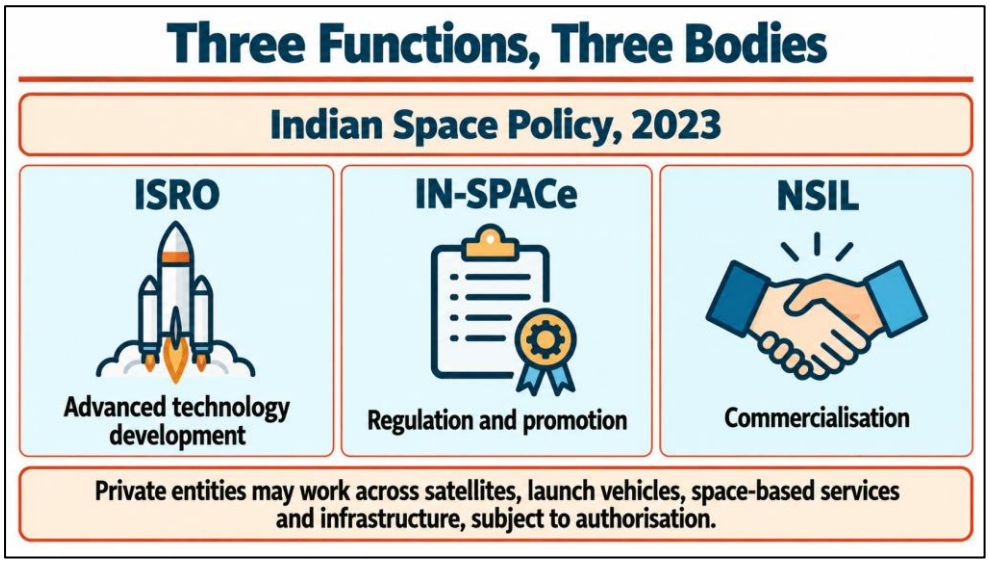
4.4 Private-Sector Participation and ISRO's Evolving Role in India's Space Ecosystem

Context:

As private companies take a larger share of India's space activity, the Indian National Space Promotion and Authorisation Centre (IN-SPACe) has clarified that ISRO's role is not shrinking. The emerging model hands mature technologies and commercial work to industry, while ISRO concentrates on advanced research, strategic missions and new frontiers.

Background:

- **2020 reforms:** opened India's space sector to private participation beyond ISRO.
- **Indian Space Policy, 2023:** defines complementary roles for ISRO, IN-SPACe, NewSpace India Limited (NSIL) and private entities.
- **Department of Space:** ISRO, IN-SPACe and NSIL all function under it.
- **Scale today:** about **440 space start-ups** were registered by August 2026, and IN-SPACe had granted **113 authorisations to 52 Non-Government Entities (NGEs).**



Explanation:

Three functions, three bodies:

- **ISRO:** advanced research, new technologies, space science, exploration and strategic missions.
- **IN-SPACe:** a single-window autonomous agency that **promotes, authorises and supervises** private space activities and gives access to ISRO facilities.
- **NSIL:** a Central Public Sector Enterprise that commercialises space technologies and services and transfers technology to industry.
- **Private industry:** increasingly builds satellites and launch vehicles, propulsion and downstream applications, not just components for ISRO.
- **In practice:** mature systems developed by ISRO are being handed over to industry for serial production, freeing ISRO's engineers for new work.

Space for Notes

Why private participation helps?

- **Scale:** industry handles repetitive manufacturing while ISRO focuses on new missions.
- **Innovation:** start-ups develop small launchers, specialised satellites, propulsion and data services such as earth-observation analytics.
- **Commercial reach:** private firms respond faster to domestic and global demand for launches and satellite services.
- **Jobs and capacity:** a larger industrial base attracts capital, creates skilled jobs and reduces reliance on limited public-sector production.

ISRO's frontier agenda:

- **Changed role, not retreat:** the State is not withdrawing from space; ISRO's role is shifting to harder problems.
- **Big goals:** the **Bharatiya Antariksh Station by 2035**, India's own space station, and an Indian crewed lunar landing by **2040**.
- **Key technologies:** human-rated launch vehicles, docking, life support and long-duration spaceflight.
- **The model:** an ISRO-led but multi-actor national space ecosystem.

Challenges and way forward:

- **Security:** space activity is strategically sensitive and needs rigorous authorisation, cybersecurity and supervision.
- **Space debris:** more launches and large satellite constellations raise orbital congestion, so debris-mitigation rules must keep pace.
- **Start-up support:** long-term finance, testing and incubation facilities, skilled people and assured markets, including government as an anchor customer.
- **Clear rules:** predictable frameworks for liability, insurance, spectrum and technology protection, with indigenous components.

Value Addition:

- **NGE:** a Non-Government Entity taking part in authorised space activities.
- The Indian Space Policy shifts mature operational technologies towards **industry-led commercial use** while ISRO stresses frontier research.
- NSIL has transferred many ISRO technologies to Indian industry and is enabling industry-led production of launch vehicles.

Conclusion:

India's space reforms aim not to replace ISRO but to multiply national space capability. That needs ISRO to lead frontier science, IN-SPACe to regulate credibly, NSIL to drive commercialisation and industry to turn mature technology into globally competitive products.

Mains Practice Question:

Q. Assess how private-sector participation can strengthen India's space capabilities while allowing ISRO to concentrate on frontier research and strategic missions. ***(15 Marks, 250 Words)***

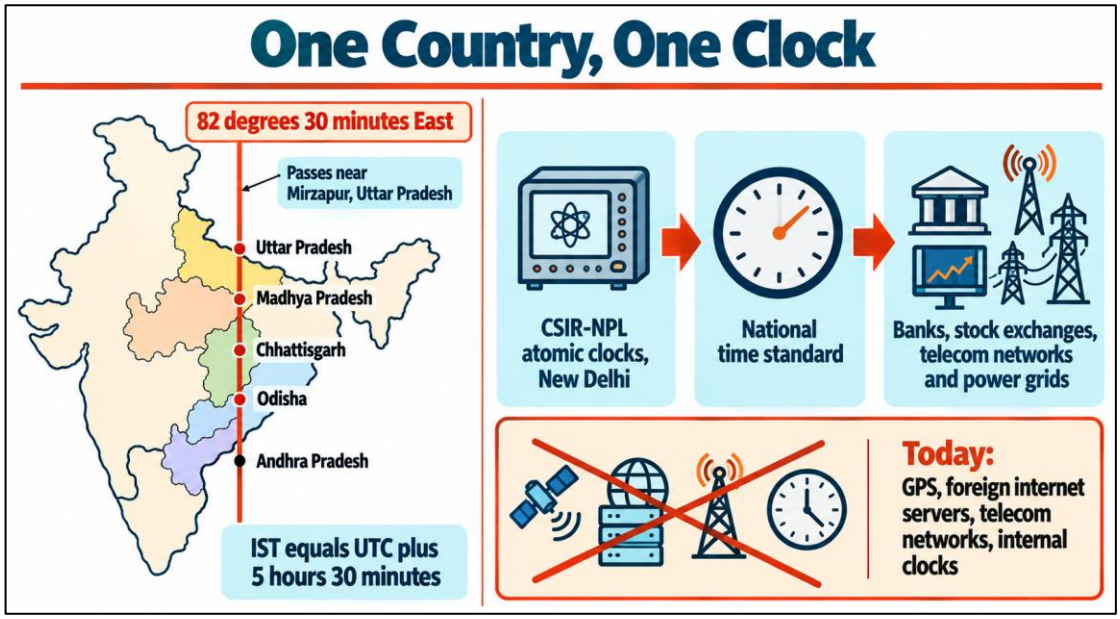
4.5 Uniform Indian Standard Time Framework and IST as India's Common Time Reference

Context: The Union government has notified the Legal Metrology (Indian Standard Time) Rules, 2026, making IST the legally enforceable time reference for official and commercial use. Coming into force 180 days after publication, they require critical systems to synchronise with authorised sources traceable to the national standard.

Space for Notes

Background:

- **IST**: UTC+5:30, based on the **82°30' East** meridian near Mirzapur, Uttar Pradesh, which passes through Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Odisha and Andhra Pradesh.
- **One time zone**: India follows a single time zone despite its wide east-west extent.
- **CSIR-NPL**: the CSIR-National Physical Laboratory, New Delhi, keeps and disseminates the national time standard using atomic clocks.
- **Legal metrology**: the rules fall under the legal metrology framework run by the Department of Consumer Affairs.
- **The problem**: organisations take time from GPS, foreign internet servers, telecom networks or internal clocks, which can differ by milliseconds or more.



Explanation:

What the rules change?

- **Same reference, same zone**: the aim is not to change India's time zone, but to make critical systems use one precise reference.
- **Traceability**: an organisation's timestamp must be linkable back to official IST at CSIR-NPL, just as weights are traced to national standards.
- **Wide coverage**: banking, digital payments, railways, airports, telecom, power grids and government records.
- **Authorised sources only**: critical systems must take time from sources approved under the rules, not from independent or foreign servers.
- **Time to comply**: the 180-day window lets institutions upgrade their clocks and networks.

How precise time is kept?

- **Quartz drift**: ordinary quartz clocks slowly drift because their oscillations are not perfectly stable.
- **Atomic clocks**: use highly stable atomic frequencies, generally of caesium, for extreme precision.
- **Global alignment**: CSIR-NPL keeps India's time scale closely aligned with **Coordinated Universal Time (UTC)**, the world reference.
- **Tiny gaps, big effects**: differences of milliseconds or microseconds, invisible on a wall clock, matter in high-speed digital systems.

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Why synchronisation matters?

- **Finance:** banks and stock exchanges act within fractions of a second, so precise timestamps fix the order of trades and payments, aiding audit, regulation and fraud probes.
- **Cybersecurity:** if servers use different clocks, investigators cannot tell which event came first; common timestamps let them reconstruct attacks and preserve digital evidence.
- **Telecom and power grids:** dispersed equipment needs exact coordination; grids use timing to synchronise and trace faults.
- **Transport and governance:** uniform time improves coordination across railways, airports and official records.

Strategic significance:

- **GPS dependence:** relying on foreign-controlled timing is a risk during conflict, cyberattack or satellite denial.
- **Security systems:** defence networks, satellites and navigation also need a trusted domestic time source.
- **Indigenous backup:** India's **NavIC** navigation system and terrestrial networks can supply alternative timing.
- **Resilience:** a distributed national timing system removes single points of failure and supports technological sovereignty.

Conclusion:

The IST rules turn precise time from a technical utility into a pillar of digital governance and national security. A common, traceable time standard can strengthen financial integrity, cyber-forensics, infrastructure reliability and India's technological self-reliance.

Mains Practice Question:

Q. "A national time standard is an element of technological sovereignty." Discuss the need for resilient and distributed timing infrastructure in India.

(15 Marks, 250 Words)

4.6 India's R&D and Deep-Tech Ecosystem: From Research Capacity to Global Competitiveness

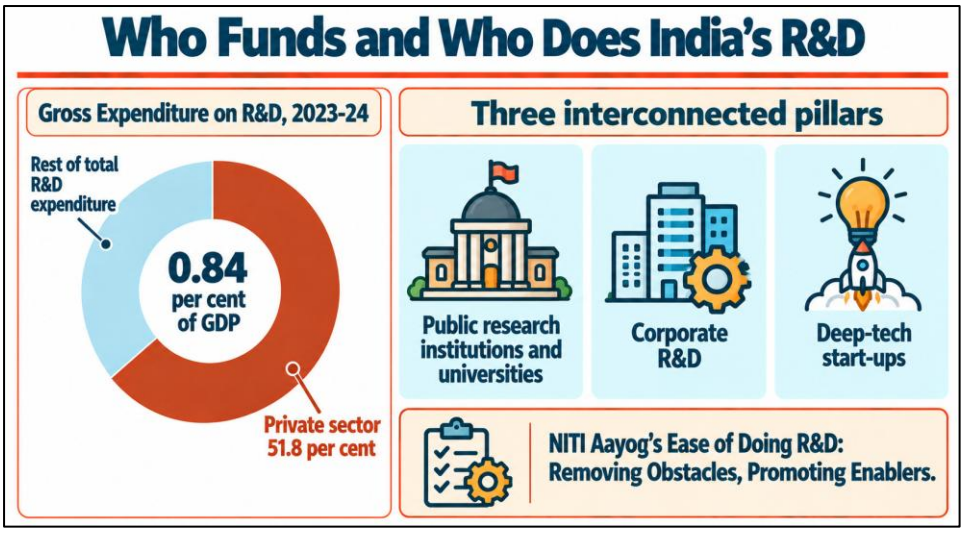
Context:

India is trying to move from adopting technology to creating it in semiconductors, space, biotechnology, AI and other deep-tech sectors. A NITI Aayog report on the "Ease of Doing R&D" has identified institutional and funding bottlenecks that still limit research, corporate R&D and the scale-up of deep-tech start-ups.

Background:

- **Spending:** India's Gross Expenditure on Research and Development (GERD) was about **0.84% of GDP** in 2023-24.
- **Three pillars:** public research institutions and universities, corporate R&D, and deep-tech start-ups.
- **Deep tech:** technologies built on scientific or engineering breakthroughs, such as chips, space and biotech, that need long gestation and patient capital.
- **NITI Aayog's focus:** "Removing Obstacles, Promoting Enablers" in how research is funded and managed.

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Explanation:

What constrains research?

- **Funding:** inadequate and delayed grants, rigid budget heads and slow procurement.
- **People:** low researcher density, few post-doctoral openings, vacancies and uncertain careers.
- **Paperwork:** scientists spend much time on administration because few institutions have professional R&D offices.
- **Lab to market:** research struggles to become prototypes, patents and products because technology-transfer offices and industry links are weak.
- **Concentration:** most public R&D funding goes to a few large agencies, leaving universities with a small share.

Corporate R&D and risk capital:

- **Shift since liberalisation:** firms have moved from absorbing imported technology towards developing their own products.
- **Still shallow:** R&D is concentrated in automobiles and pharmaceuticals; listed companies in one sample spent about **0.91%** of sales on R&D in FY26.
- **New funds:** the **₹1-lakh-crore Research, Development and Innovation (RDI) Fund** offers long-term finance for strategic and sunrise technologies.
- **India Deep Tech Alliance (IDTA):** investors and technology firms backing India-based deep-tech companies; members invested about **₹2,170 crore in 56 companies** in its first year.

Way Forward:

- **Ease of use:** raise R&D intensity while making funds easier to use, not just larger.
- **Institutional reform:** greater autonomy, professional R&D offices, Technology Transfer Offices and researcher mobility, as NITI Aayog recommends.
- **Partnerships:** stronger university-industry-government links and shared research infrastructure.
- **Right incentives:** reward commercialisation and Indian-owned IP, not only publications.

Conclusion:

India has begun assembling the parts of a homegrown innovation economy. The next step is from more research to more productive research, where easier processes, patient capital and real lab-to-market pathways turn scientific capability into global competitiveness and strategic autonomy.

Mains Practice Question:

Q. Examine the institutional, financial and human-resource reforms needed to strengthen India's deep-technology ecosystem. *(10 Marks, 150 Words)*

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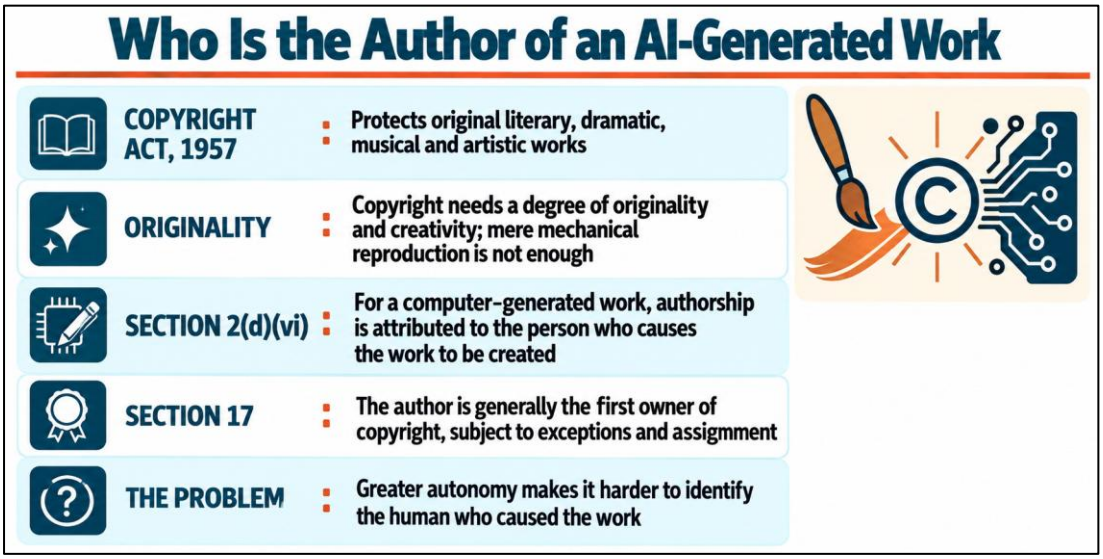
4.7 AI-Generated Works and Copyright Authorship in India

Context:

India's Copyright Office has rejected an application for an artwork said to have been created autonomously by an AI system called **DABUS**. The decision raises a basic question: if AI produces an original work, can the machine be its author, or must authorship stay with a human?

Background:

- **Copyright Act, 1957:** protects original literary, dramatic, musical and artistic works.
- **Originality:** a work needs some creativity; mere copying or mechanical reproduction is not enough.
- **Section 2(d)(vi):** for a computer-generated work, the author is "the person who causes the work to be created".
- **Section 17:** the author is generally the first owner of copyright, though ownership can be assigned.



Explanation:

The DABUS application:

- **The claim:** scientist Stephen Thaler argued that DABUS independently created the artwork and should be named its author.
- **The finding:** the Office accepted that the artwork was original but rejected DABUS as author because AI has **no legal personality**.
- **What AI cannot do:** own property, sign contracts, transfer copyright or go to court to enforce rights.
- **The result:** AI is treated as a **tool of creation**; authorship lies with the person who caused the work to be made.

Human creativity remains central:

- **AI-assisted works:** they are not automatically excluded from copyright.
- **The test:** protection depends on sufficient human creative involvement.

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- **Growing difficulty:** the more autonomously a system works, the harder it is to identify a human author; a one-line prompt may not count as creative input.
- **Global trend:** copyright offices in several countries have also refused to register works with no human author.
- **The real question:** not whether AI was used, but where legally recognisable human authorship lies.

Way Forward:

- **Legislative choice:** recognising AI as an independent author would need Parliament to amend the copyright law.
- **Clearer guidance:** the Copyright Office could set out how much human contribution qualifies.
- **Global alignment:** follow international practice and WIPO discussions so that Indian creators are treated consistently abroad.
- **Wider review:** related questions, such as training AI on copyrighted works and sharing value with original creators, also need policy attention.

Conclusion:

AI challenges the traditional link between creativity, authorship and legal personality. India's copyright law remains human-centred, so the immediate task is to identify meaningful human contribution and keep rights with persons who can own and enforce them.

Mains Practice Question:

Q. Examine the challenges generative AI poses to a human-centred copyright framework. Suggest principles for balancing creativity, accountability and innovation. *(10 Marks, 150 Words)*

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

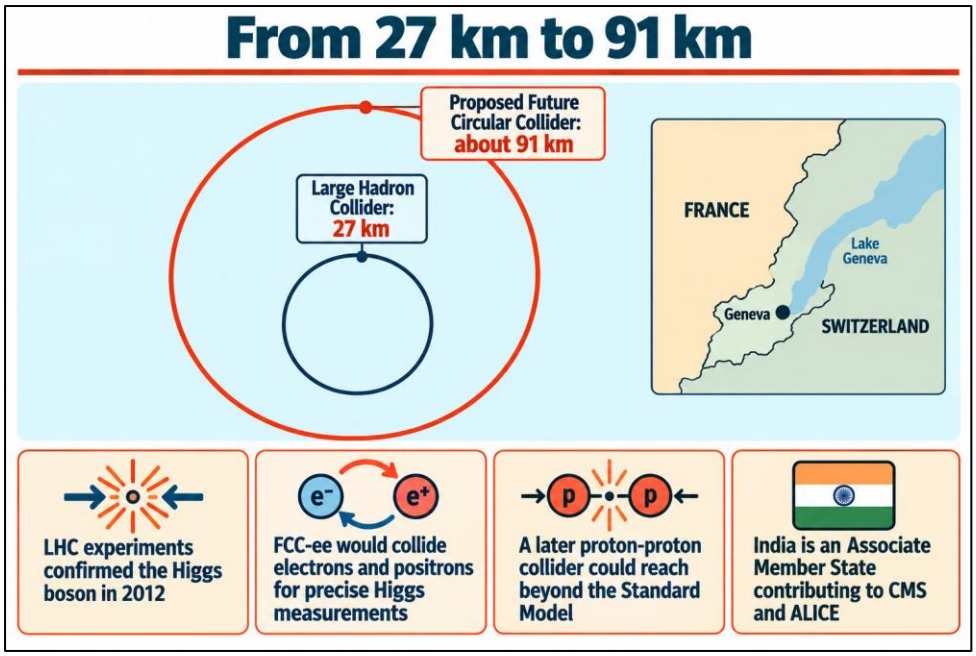
Context:

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.

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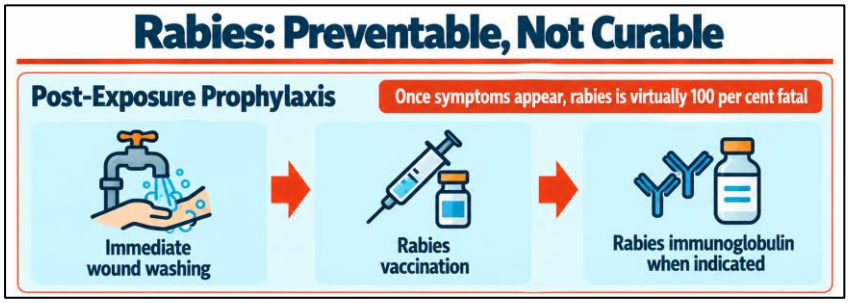
4.9 Elimination of Dog-Transmitted Rabies as a Public Health Problem in Bhutan

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.





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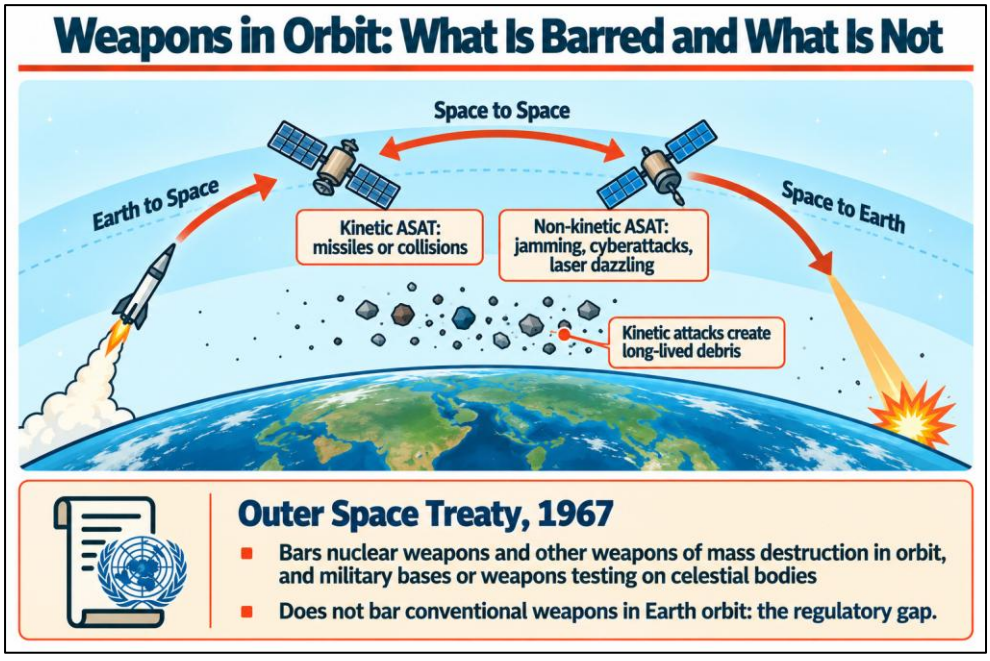
4.10 Weaponisation of Outer Space: U.S. Deployment of Space Control Weapons

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.



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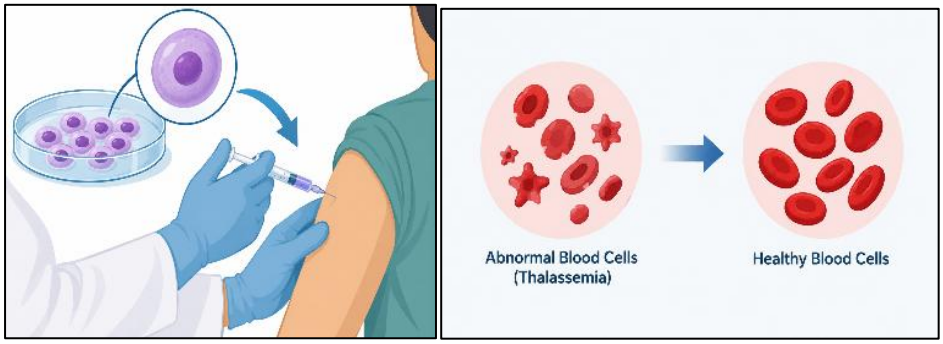
4.11 Stem Cell Therapy Regulation and Stem Cell Transplantation in Thalassemia

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**.



4.12 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.

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- **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.

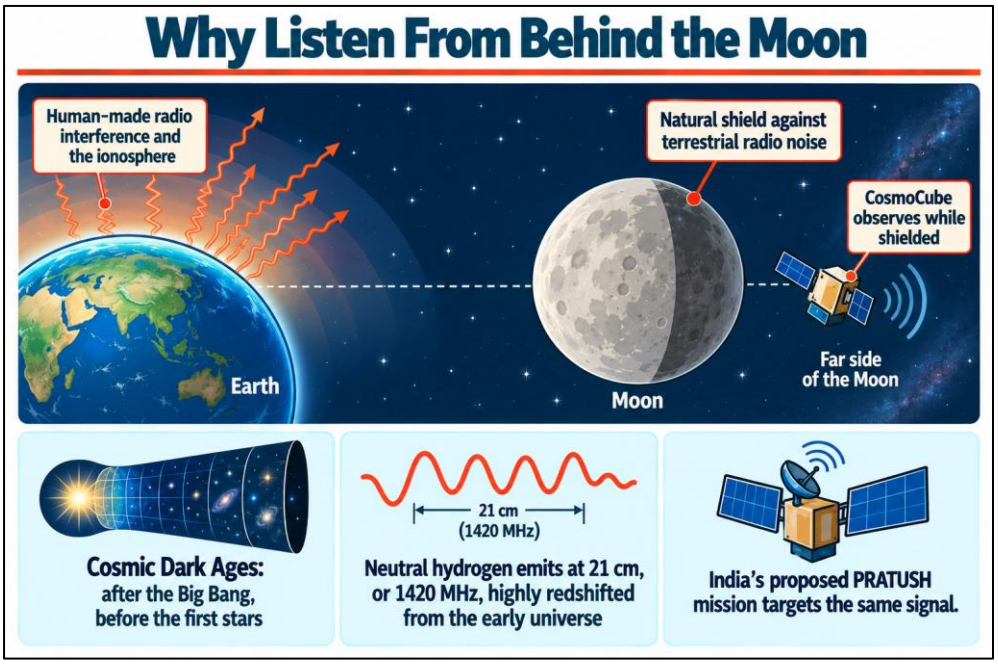
4.13 CosmoCube: Probing the Cosmic Dark Ages from Lunar Orbit

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.



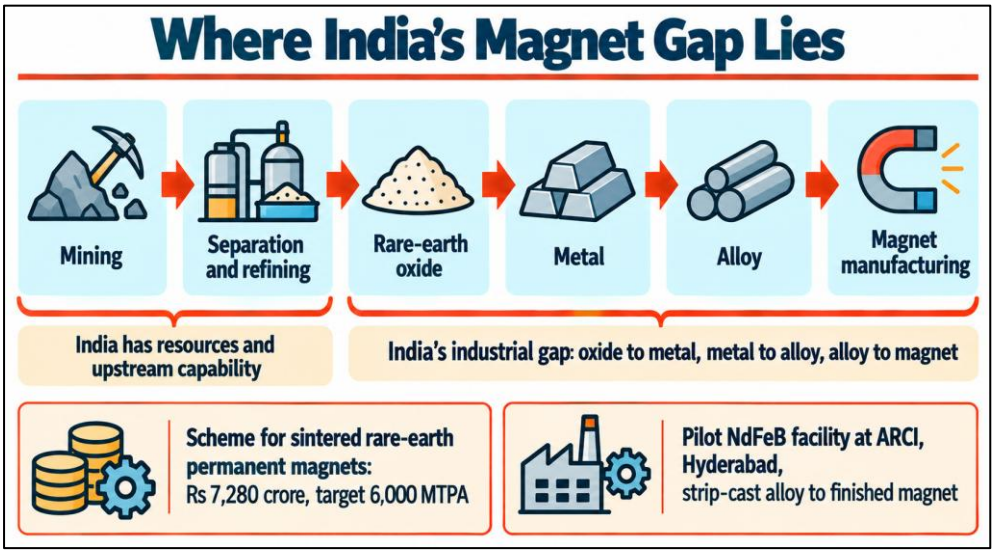
4.14 Rare-Earth Magnets: From Mineral Wealth to NdFeB Manufacturing

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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.

Prelims Capsule

4.15 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.

4.16 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.

4.17 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.

4.18 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.

4.19 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.

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- **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.

4.20 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.

4.21 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.

4.22 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.

4.23 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.

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- **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.

4.24 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**.

Prelims Practice Questions

1. With reference to the semiconductor value chain, consider the following statements:

1. The India Semiconductor Mission functions under the Department of Science and Technology.
2. A fab is a facility where integrated circuits are made on silicon wafers.
3. OSAT units carry out the assembly, testing and packaging of chips.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

2. Consider the following pairs:

1. Gyrotron: High-power microwave source used to heat plasma in fusion devices
2. Hall effect: Voltage across a conductor carrying current in a magnetic field
3. Quantum entanglement: Particles whose states cannot be described independently of each other

How many of the pairs given above are correctly matched?

(a) Only one
(b) Only two
(c) All three
(d) None

Answers

1. (b) 2. (c) 3. (a)

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5. Environment, Geography & Disaster Management

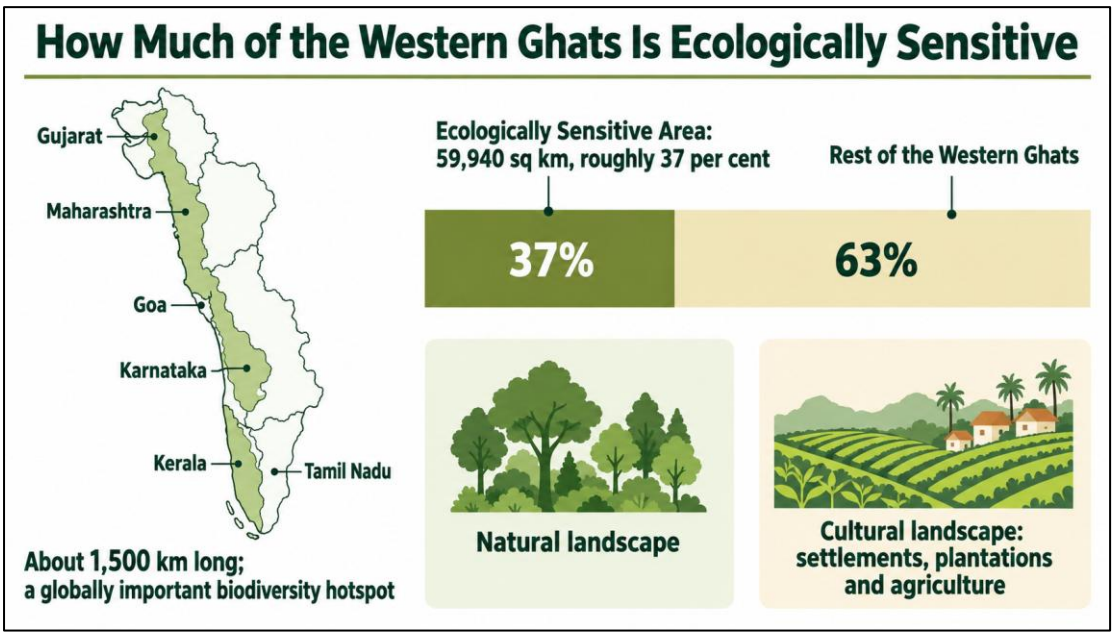
5.1 Kasturirangan Committee Report on Conservation of the Western Ghats

Context:

The Centre has issued a seventh draft notification identifying about 56,826 sq km of Ecologically Sensitive Areas (ESAs) across six Western Ghats States. Kerala wants the notified area confined largely to forests, leaving out many villages, farms and plantations. The dispute again shows how hard it is to conserve a biodiversity hotspot that is also densely inhabited.

Background:

- **Western Ghats:** a chain of about **1,500 km** along India's west coast across Gujarat, Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu; a global biodiversity hotspot and a **UNESCO World Heritage** property.
- **Gadgil Committee (2011):** the Western Ghats Ecology Expert Panel recommended broad, graded protection across most of the range.
- **Kasturirangan Committee (2013):** the High-Level Working Group proposed about **37%** of the Ghats, roughly 59,940 sq km, as ESA, focused on natural landscapes.
- **Legal basis:** ESAs are notified under the **Environment (Protection) Act, 1986**.
- **ESA vs ESZ:** ESAs are larger fragile landscapes; Eco-Sensitive Zones are buffers around national parks and sanctuaries.



Explanation:

The Kasturirangan approach:

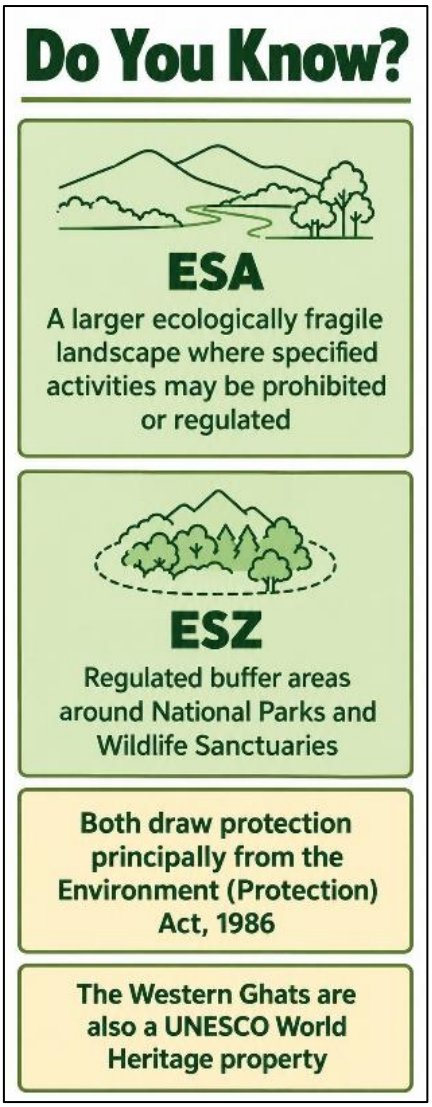
- **Two landscapes:** strict protection for relatively intact **natural landscapes**, with more flexibility in **cultural landscapes** of settlements, farms and plantations.
- **Satellite mapping:** ESAs were identified using data on vegetation, biological richness, fragmentation and landscape features.

Space for Notes

- **Village as unit:** the village was the basic administrative unit for demarcation.
- **Green growth:** sustainable agriculture, ecosystem services and community benefits were to be promoted outside the most sensitive areas.

What the latest draft proposes?

- **Area: 56,825.7 sq km** of ESA across six States, with Karnataka having the largest share.
- **Kerala:** 9,993.7 sq km in the draft; the State wants it cut to about **8,590.69 sq km across 98 villages**, excluding inhabited areas, farms and plantations.
- **Banned:** mining, quarrying and sand mining (existing mines to be phased out), new or expanded thermal power plants, and new red-category industries.
- **Limited:** large construction and township projects beyond set thresholds.
- **Hydropower:** not banned outright, but subject to cumulative-impact assessment and ecological-flow rules.
- **Property rights:** ownership of land is not extinguished merely because it falls within an ESA.



Why the boundaries are contested?

- **Livelihoods:** farmers and plantation communities fear curbs on land use and income.
- **Blunt demarcation:** treating a whole village as sensitive can sweep in dense settlements and farms along with forests.
- **Federal dimension:** States want flexibility for differences in population density and existing forest protection.
- **Ecological risk:** too much dilution could fragment a connected landscape and weaken watershed, biodiversity and landslide protection, as recent extreme rainfall has shown.

Way Forward:

- **Finer mapping:** use high-resolution cadastral and ecological maps instead of whole-village rules.
- **Non-negotiables:** protect contiguous forests, wildlife corridors, headwaters and landslide-prone slopes.
- **Clear rules for livelihoods:** permit sustainable farming and ordinary activities under predictable regulations.
- **Shared governance:** involve Gram Sabhas, local bodies, scientists and States in boundary-setting, and plan by carrying capacity rather than project by project.

Space for Notes

Value Addition: Gadgil vs Kasturirangan:

- **Gadgil Committee**: broader ecological coverage, graded sensitivity and stronger emphasis on decentralised local participation.
- **Kasturirangan Committee**: a narrower ESA centred on natural landscapes, with more room for development in cultural landscapes.
- The debate is not simply **conservation versus development**, but about the **extent, method and governance** of ecological regulation.

Conclusion:

The Kasturirangan framework tried to reconcile ecological protection with a lived-in landscape. A durable settlement needs scientifically credible boundaries, firm protection for intact ecosystems and transparent safeguards for livelihoods, so that conservation supports sustainable development instead of fuelling recurring conflict.

Mains Practice Question:

Q. How can ecologically sensitive area regulation protect the Western Ghats while addressing legitimate livelihood and federal concerns? *(15 Marks, 250 Words)*

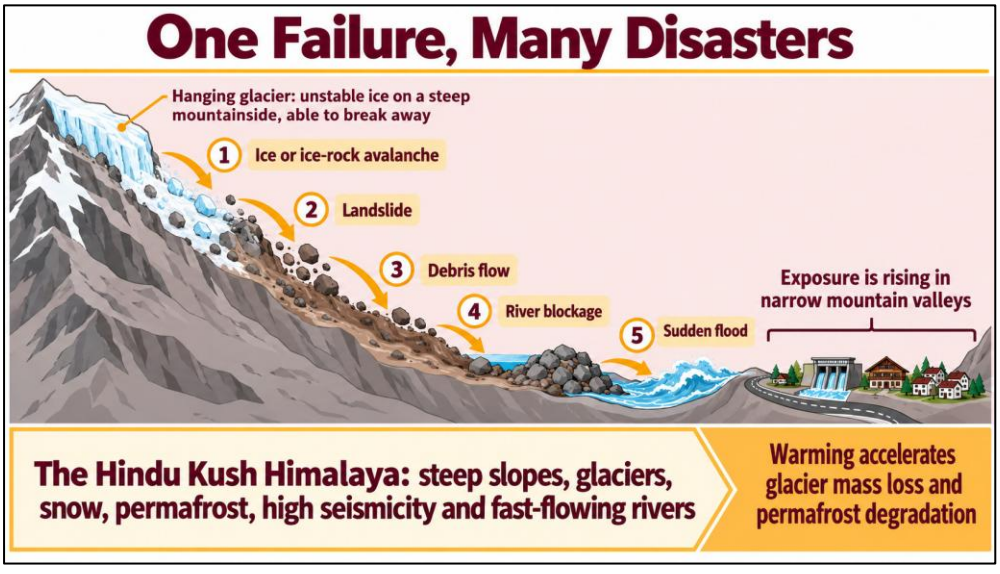
5.2 Hanging Glaciers and Climate-Resilient Himalayan Disaster Management

Context:

In August 2026, an ice-rock collapse near Langtang Lirung in Nepal's Rasuwa district sent a flood of water and debris down the **Bhote Koshi-Trishuli** river system, destroying settlements, roads, bridges and hydropower plants. Local weather had reportedly stayed stable before the event, renewing concern about unstable **hanging glaciers** across the Himalayas.

Background:

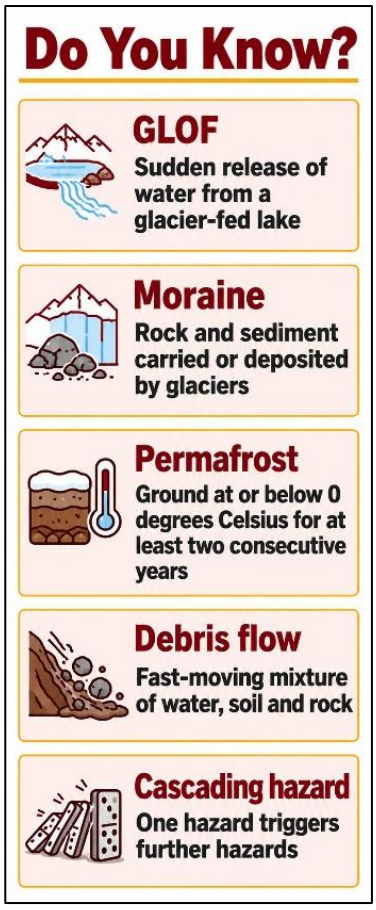
- **Hindu Kush Himalaya (HKH)**: young, fragile mountains with steep slopes, glaciers, high seismicity and fast-flowing rivers.
- **Hanging glacier**: a glacier perched on a steep slope or cliff, from which large masses of ice can break off suddenly.
- **Key terms: permafrost** is ground that stays at or below 0°C for at least two years; a **moraine** is rock and sediment deposited by a glacier.
- **Disaster Management Act, 2005**: sets up the National Disaster Management Authority (NDMA) and State and district authorities.



Explanation:

How Himalayan hazards are changing?

- **Weakening slopes:** warming loosens ice-rock bonds and thaws permafrost, destabilising high slopes.
- **Retreating glaciers:** expose unsupported rock faces and create or enlarge glacial lakes.
- **Rain is not the only trigger:** short bursts of extreme rain cause floods even in a weak monsoon, and ice-rock failures can strike in calm weather.
- **Non-stationarity:** past rainfall and flood records no longer reliably predict future extremes.
- **Faster loss:** the International Centre for Integrated Mountain Development (ICIMOD) finds HKH glacier loss has accelerated sharply since 2000.



Cascading and transboundary risk:

- **Growing mass:** a falling ice block picks up snow, rock, soil and water, multiplying its destructive force.
- **Chain reactions:** it can dam a river or breach a moraine-dammed lake, causing a **Glacial Lake Outburst Flood (GLOF)** and debris flows far downstream.
- **Indian exposure:** simulations suggest avalanche flows in the **Badrinath-Mana** sector could exceed 50 m in height, threatening pilgrims, roads and dams.
- **Across borders:** hazards starting in Nepal or Tibet can hit India and Bangladesh through shared river systems.
- **Hydropower at risk:** sediment-laden floods damage turbines and reservoirs, disrupting power supply and cross-border electricity trade.

Managing the new risk:

- **Future-oriented zoning:** hazard maps must include glacier change, unstable slopes, lakes and climate projections.
- **Land-use control:** restrict settlements, hotels and infrastructure in exposed valleys and avalanche corridors.
- **Monitoring:** combine satellites, weather stations, river gauges, seismic sensors and field observation of glaciers.
- **Dam safety:** retrofit existing dams and design new ones for bigger floods, debris and sediment loads.
- **Last-mile warning:** alerts must reach people with evacuation routes, drills and trained community teams.

Way Forward:

- **Regional mechanism:** a permanent HKH multi-hazard monitoring and real-time data-sharing system among India, Nepal and China.
- **Carrying capacity:** make multi-hazard and carrying-capacity studies mandatory before major Himalayan projects.
- **Local capacity:** give districts and villages trained staff, equipment, funds and warning authority.

Space for Notes

Space for Notes

- **Prevention over relief:** shift spending from rebuilding after disasters to anticipatory risk reduction, with climate-justice support for mountain communities.

Value Addition:

- A recent basin-scale study identified **219 hanging glaciers in the Alaknanda basin** of the Garhwal Himalaya, showing the need for systematic inventories rather than one-off site checks.
- The **Sendai Framework for Disaster Risk Reduction, 2015-2030** stresses understanding risk, strengthening risk governance, investing in resilience and better preparedness.
- **Early Warnings for All** is a UN initiative to cover everyone with multi-hazard early-warning systems.

Conclusion:

Himalayan disasters can no longer be understood as isolated floods, landslides or avalanches. Climate change is reshaping the mountains and creating cascading risks, so policy must combine cryosphere science, risk-sensitive development, resilient infrastructure, empowered local bodies and cross-border early warning.

Mains Practice Question:

Q. "Himalayan infrastructure planning must move from isolated hazard assessment to multi-hazard risk management." Discuss. ***(15 Marks, 250 Words)***

5.3 UNCCD COP17: Rangelands at the Centre of Global Land Restoration

Context:

The 17th Conference of the Parties (COP17) to the UN Convention to Combat Desertification (UNCCD) concluded in **Ulaanbaatar, Mongolia**, in August 2026. Held during the International Year of Rangelands and Pastoralists, it put rangelands and herders at the centre of global land-restoration policy.

Background:

- **UNCCD:** adopted in **1994**, a legally binding Rio Convention on desertification, land degradation and drought; its secretariat is in **Bonn**, Germany.
- **COP:** the Convention's supreme decision-making body.
- **Rangelands:** grasslands, savannas, shrublands, steppes and pastures covering about **54%** of Earth's land and supporting about 2 billion people, including some 500 million pastoralists.
- **India's link:** India hosted COP14 in 2019 and aims to restore **26 million hectares** of degraded land by 2030.



Space for Notes

Explanation:

Why rangelands matter?

- **Multi-functional:** they support livelihoods, biodiversity, carbon storage, food and water regulation, not just grazing.
- **Twin crisis:** their degradation is both an ecological and a livelihood problem, so restoration depends on herders' welfare.
- **Pastoralists as stewards:** COP17 recognised them as custodians, bringing traditional knowledge into global policy.
- **Mobility:** it highlighted **transboundary pastoral movement**, since herds often cross administrative and national borders.

COP17 outcomes:

- **Rangelands Flagship Initiative:** mobilised **$1.2 billion across 45 projects** for restoration and sustainable management.
- **Mongolia's Steppe Plan:** combines work on rangelands, the water-land nexus and nature-based infrastructure.
- **Drought tools:** the **International Drought Resilience Observatory (IDRO)** and a **Drought Resilience Index (DRI)** aim to shift from reactive relief to preparedness.
- **Broader scope:** restoration policy now extends beyond forests and farms to long-neglected ecosystems.

Way Forward:

- **Include herders:** involve pastoral communities in planning and restoration.
- **Protect mobility:** safeguard seasonal movement and traditional land-use knowledge.
- **India's herders:** pastoral communities such as the Gaddis, Rabaris and Van Gujjars need secure grazing rights, which the Forest Rights Act partly recognises.
- **Outcome-based finance:** scale funding with measurable ecological and livelihood results, and plan land, water and drought together.

Value Addition:

- **DLDD:** Desertification, Land Degradation and Drought.
- **IYRP 2026:** International Year of Rangelands and Pastoralists.
- **IDRO:** International Drought Resilience Observatory.
- **DRI:** Drought Resilience Index.

Conclusion:

COP17 brought rangelands into the mainstream of global land restoration. Its message is that restoring degraded land needs not only ecological work but also recognition of pastoral livelihoods, mobility, traditional knowledge and proactive drought resilience.

Mains Practice Question:

Q. "Restoration of rangelands requires pastoral communities to be recognised as partners." Discuss the role of mobility, tenure and traditional knowledge.

(10 Marks, 150 Words)

5.4 Equal-Area Mapping and Territorial Concerns

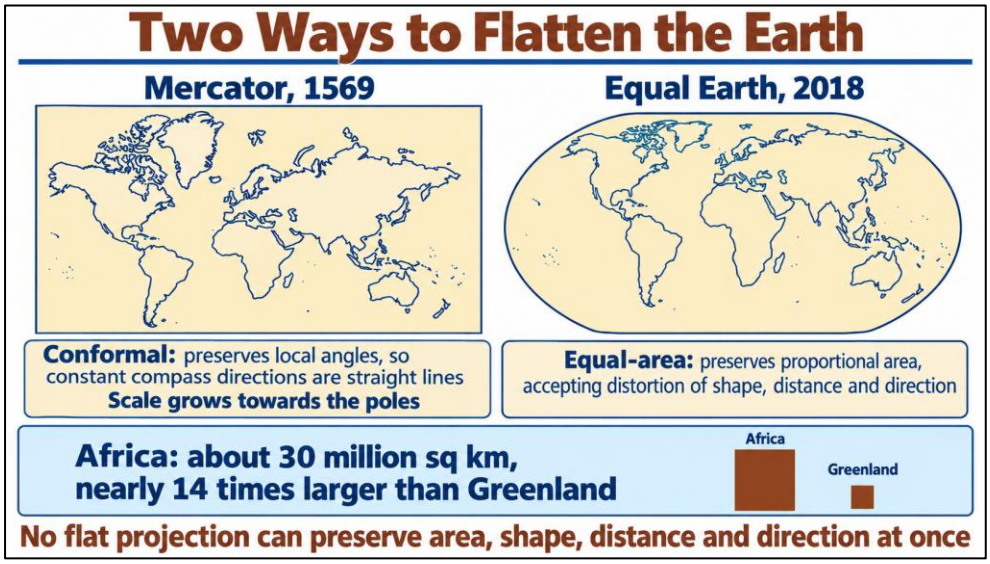
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Context:

The UN General Assembly has adopted the **"Correct the Map"** resolution by 164 votes to one, encouraging equal-area map projections that show the true relative size of continents, especially Africa. India voted in favour but stressed that projection choices cannot affect sovereignty, territorial integrity or official boundaries.

Background:

- **Map projection:** a method of showing the round Earth on a flat surface; every projection distorts area, shape, distance or direction.
- **Mercator (1569):** designed by **Gerardus Mercator** for navigation, it shows constant compass bearings as straight lines but enlarges areas towards the poles.
- **Equal Earth (2018):** an equal-area projection developed by Bojan Šavrič, Tom Patterson and Bernhard Jenny.
- **Scale of distortion:** Africa, about 30 million sq km, is nearly **14 times larger than Greenland**, yet the two can look similar on a Mercator map.



Explanation:

Why the resolution was moved?

- **Sponsors:** Togo introduced it for the African Group, with backing from the African Union.
- **Fairer comparison:** equal-area maps compare population density, forests, farmland and resources where real area matters.
- **Cognitive justice:** the idea that how knowledge is represented should not reinforce historically unequal perceptions.
- **Maps shape minds:** maps used in schools, media and institutions influence how people judge the importance of regions, especially the Global South.

Mercator, Equal Earth and the debate:

- **Mercator's place:** still suited to marine navigation, and its digital form, **Web Mercator**, powers online maps because square tiles allow smooth zooming.
- **Equal Earth's limits:** it preserves area but distorts shape, angles, direction and distance, so no single flat map fits every purpose.

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- **Non-binding:** the resolution neither bans Mercator nor makes Equal Earth compulsory; the right projection depends on the map's purpose.
- **U.S. objection:** the sole "No" vote argued that references to "cognitive justice" and "memorial reparation" politicised a technical matter, calling it a "radical ideological project".

India's territorial concern:

- **Qualified support:** India backed equal-area mapping but said its vote did not endorse Equal Earth or any particular political map.
- **The trigger:** a separate UN Geospatial map of 2026 placed **Arunachal Pradesh and Aksai Chin** between Indian and Chinese claim lines.
- **India's position:** Arunachal Pradesh is an integral part of India, and Aksai Chin is part of the Union Territory of **Ladakh**, as shown on India's official map.
- **Key distinction:** a **map projection** is the mathematics of representing the Earth; **political cartography** concerns borders and sovereignty, and one does not settle the other.

Way Forward:

- **Purpose-led choice:** use equal-area maps for thematic comparisons and Mercator for navigation.
- **Neutral UN maps:** international bodies should follow member States' official boundaries or carry clear disclaimers.
- **Map literacy:** teach students how projections distort, so that maps inform rather than mislead.

Value Addition:

- The United States cast the **sole vote against** the resolution; six countries abstained.
- **Web Mercator** remains common in digital mapping because it supports rectangular tiles and zooming.
- Equal-area maps are especially useful for thematic mapping of **deforestation, land use, population density and resources.**
- The resolution does not alter recognised borders or decide territorial sovereignty.

Conclusion:

"Correct the Map" shows that cartography involves both mathematical choices and political consequences. Equal-area projections can improve geographical understanding, but projection reform must stay separate from sovereignty; for India, better maps are welcome only if they respect its established territorial position.

Mains Practice Question:

Q. "Maps influence perceptions of the world, but projection choices do not determine territorial sovereignty." Discuss. ***(15 Marks, 250 Words)***

5.5 Himalayan Glaciers and the Threat of "Peak Water"

Context:

A recent study warns that Hindu Kush Himalayan glaciers are losing mass faster, pushing the region towards **"peak water"** around mid-century. After that point, glaciers are expected to supply less meltwater over the long term, affecting water supply, hydropower, farming and disaster risk.

Space for Notes

Background:

- **Hindu Kush Himalaya (HKH):** spans eight countries (Afghanistan, Pakistan, India, Nepal, Bhutan, China, Bangladesh and Myanmar) and is often called the **"Third Pole"**.
- **Rivers:** it feeds the **Indus, Ganga and Brahmaputra** and other major Asian rivers.
- **Peak water:** the point at which annual glacier meltwater runoff reaches its maximum before declining.
- **ICIMOD:** the International Centre for Integrated Mountain Development, Kathmandu, an intergovernmental body of the eight HKH countries.

Explanation:

Understanding peak water:

- **Early surge:** warming first speeds up melting and increases the glacier-melt contribution to rivers.
- **The turn:** as glaciers shrink, their dwindling ice reserves cannot sustain the higher meltwater supply.
- **Long decline:** after peak water, the glacier-melt contribution declines over the long term.

Why it matters for India?

- **Dry-season stress:** less meltwater when rain is low and demand is high.
- **Farms and power:** irrigation, drinking-water schemes and hydropower depend on predictable seasonal flows; many projects were designed on past flow data and may produce less in lean seasons later.
- **Disaster risk:** retreating glaciers create unstable lakes and raise the risk of **Glacial Lake Outburst Floods (GLOFs)**.
- **Data gap:** only **21 of about 40,000** HKH glaciers are monitored on the ground.
- **Downstream millions:** the Indus, Ganga and Brahmaputra basins support hundreds of millions of people in India alone.

What India needs?

- **Better monitoring:** field stations, satellites and automatic sensors for glaciers, snow and lakes.
- **Plan for change:** build declining meltwater into reservoir, irrigation and hydropower plans.
- **GLOF safety:** stronger early warnings and hazard mapping for glacial lakes.
- **Regional cooperation:** basin-level data sharing, since Himalayan rivers and hazards cross borders.
- **Use water better:** efficient irrigation and storage can cushion the fall in dry-season flows.

Conclusion:

Peak water marks a shift from the danger of too much meltwater to the longer-term threat of too little. India needs Himalayan water planning that tackles today's disaster risks while preparing for declining glacier-melt contributions in the coming decades.

Mains Practice Question:

Q. What is glacier "peak water"? Examine its implications for water security, hydropower and disaster risk in Himalayan river basins. ***(10 Marks, 150 Words)***

5.6 National Air Quality Monitoring and Swachh Vayu Sarvekshan 2026

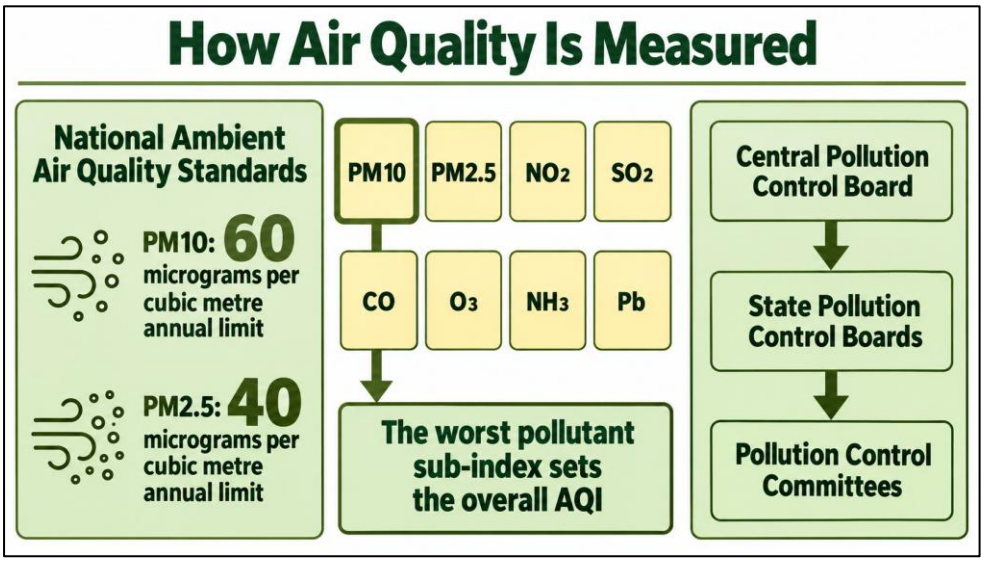
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Context:

India observed Swachh Vayu Diwas on 7 September, the International Day of Clean Air for Blue Skies. Under the National Clean Air Programme (NCAP), 108 of 130 cities reduced annual PM10 levels in 2025-26 from the 2017-18 baseline, and Lucknow topped the million-plus category in **Swachh Vayu Sarvekshan 2026**.

Background:

- **NAAQS:** the National Ambient Air Quality Standards set permissible pollutant levels; the annual standard is **60 µg/m³ for PM10** and **40 µg/m³ for PM2.5**.
- **Air Quality Index (AQI):** covers eight pollutants (PM10, PM2.5, NO_2, SO_2, CO, O_3, NH_3 and lead); the worst sub-index sets the overall value, from Good (0-50) to Severe (401-500).
- **Monitoring:** manual stations under the National Air Quality Monitoring Programme and real-time Continuous Ambient Air Quality Monitoring Stations, run by the Central and State Pollution Control Boards.
- **NCAP (2019):** covers **130 cities** in 24 States and UTs through city action plans, aiming for up to **40% reduction in PM10** or meeting the national standard, against 2017-18.



Explanation:

How NCAP has performed?

- **Progress:** **72 cities** cut PM10 by more than 20%, and 26 by more than 40%.
- **The gap:** only **14 cities** actually met the national PM10 standard.
- **Funding:** about **₹16,423.55 crore** was given as performance-linked grants, of which roughly **70.5%** was used.
- **Measures:** control of road dust, vehicle and industrial emissions, waste burning and construction debris, plus greening.
- **Knowledge gap:** source-apportionment studies are needed to know which sources to target in each city.

Swachh Vayu Sarvekshan 2026:

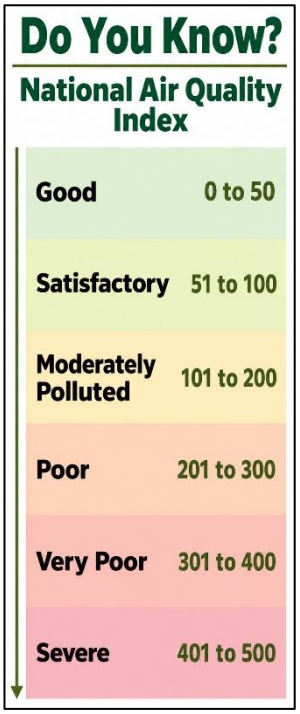
- **What it is:** an annual ranking under NCAP, by the Ministry of Environment, Forest and Climate Change, of how well the 130 cities implement their plans.
- **Categories:** cities above 10 lakh, 3 to 10 lakh and below 3 lakh people; **Lucknow, Indore and Jabalpur** led the largest group.

Space for Notes

- **What it measures:** effort, not clean air; PM10 reduction carries only **2.5%** weightage.
- **Example:** Lucknow's PM10 fell from about 250 to 137 µg/m³, yet stays above the 60 µg/m³ standard.

Critical analysis and way forward:

- **Relative is not absolute:** a city can cut pollution sharply and still breach the NAAQS.
- **Airsheds, not cities:** pollution crosses city and State lines, so planning must cover whole airsheds.
- **Wider coverage:** extend monitoring to small towns, industrial clusters and rural areas.
- **Health-based targets:** focus more on **PM2.5**, which goes deeper into the lungs, and tie funds to verified falls in exposure.



Value Addition:

- **NAAQS vs AQI:** NAAQS are legal benchmarks for air quality; the AQI is a public communication tool.
- **NCAP:** the national policy framework for reducing urban air pollution.
- **PRANA portal:** the Portal for Regulation of Air-pollution in non-attainment cities tracks physical and financial progress of NCAP city plans.

Conclusion:

India's clean-air programme shows that coordinated action can cut particulate pollution, but improvement from a polluted baseline is not the same as clean air. The next stage needs stronger monitoring, airshed planning and outcome-based funding to move cities from relative progress to compliance with health-protective standards.

Mains Practice Question:

Q. "Improvement from a polluted baseline is not equivalent to clean air." Discuss the need for airshed-based and exposure-focused air-pollution governance in India. *(15 Marks, 250 Words)*

5.7 Earth-System Stability and the Planetary Boundaries Framework

Context:

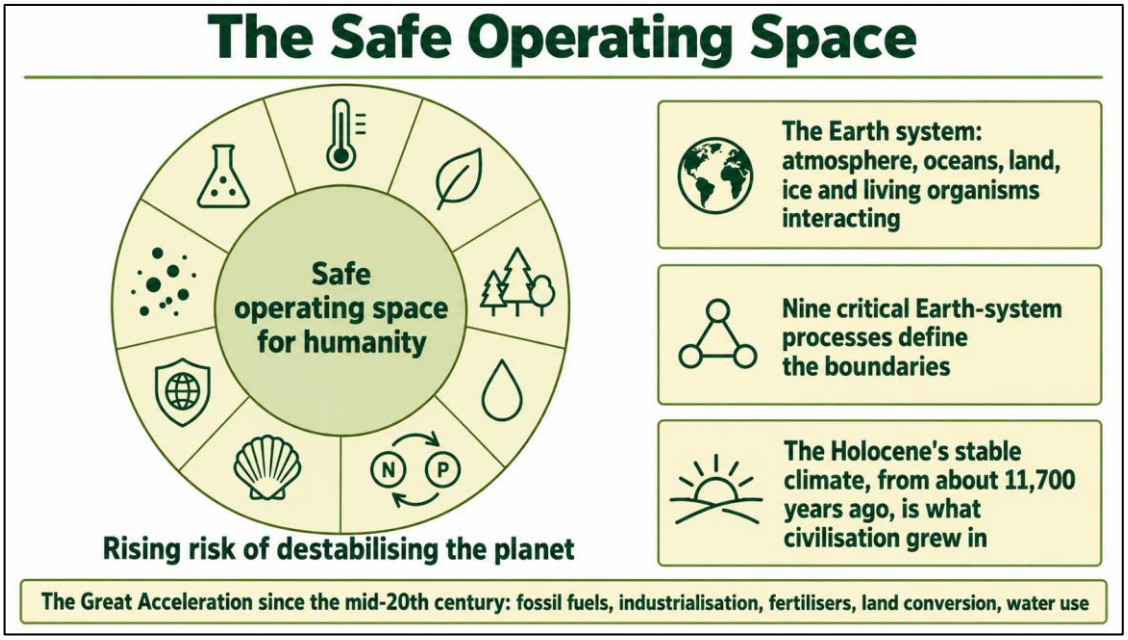
The **Planetary Health Check 2026** reports that seven of nine planetary boundaries have been crossed, with pressure worsening on all seven. It shows that climate change, biodiversity loss, freshwater disruption, pollution and ocean change interact as one problem of Earth-system stability.

Background:

- **Planetary boundaries:** a framework proposed in 2009 by scientists led by Johan Rockström, setting safe limits for nine Earth-system processes.
- **Safe operating space:** within these limits, Earth stays close to the stable conditions of the **Holocene**, the roughly 11,700-year period in which civilisation developed.

Space for Notes

- **Great Acceleration:** since the mid-20th century, rapid growth in fossil-fuel use, industry, fertilisers, land conversion and water use has sharply raised pressure.
- **In simple terms:** the boundaries are guardrails; crossing one does not mean collapse, but it raises the risk of lasting damage.



Explanation:

Seven boundaries crossed:

- **High-risk zone:** climate change, **biosphere integrity** (biodiversity loss), **biogeochemical flows** (excess nitrogen and phosphorus) and **novel entities** (plastics, synthetic chemicals and other human-made substances).
- **Increasing-risk zone:** land-system change, freshwater change and **ocean acidification**, the most recently crossed boundary.
- **Freshwater change:** humans have altered both **blue water** (rivers, lakes, groundwater) and **green water** (soil moisture used by plants).
- **Still within limits:** stratospheric ozone and atmospheric aerosol loading, though aerosol pollution is severe regionally, including in South Asia, where it harms health and can weaken monsoon rainfall.

How the boundaries interact?

- **Deforestation cascade:** cutting forests reduces biodiversity, alters water flows and weakens carbon absorption at once.
- **Sinks turning sources:** warming drives droughts and fires that can turn forests from carbon sinks into carbon sources.
- **Nutrient overload:** excess nitrogen and phosphorus damage freshwater and marine ecosystems.
- **Ocean double stress:** warming and acidification together threaten marine food webs.

Tipping points and India:

- **Not collapse, but risk:** crossing a boundary means entering a zone of rising systemic risk.
- **Tipping point:** when self-reinforcing feedbacks push a system into a new state that may be hard or impossible to reverse.

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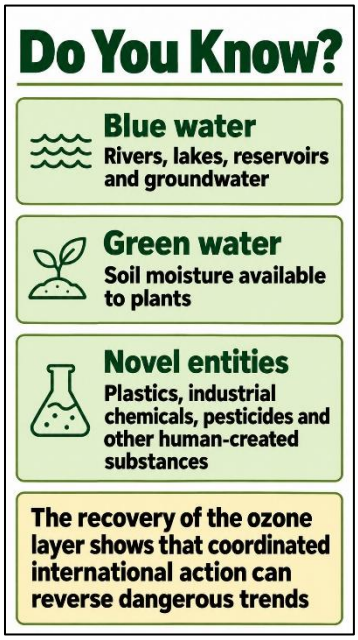
- **India's exposure:** heat stress, groundwater depletion, biodiversity loss, air pollution and land degradation all interact.
- **Integrated policy:** climate, water, farming, biodiversity and pollution policies must be designed together to avoid trade-offs.

Way Forward:

- **Decarbonise and protect sinks:** cut emissions while restoring forests, wetlands and soils.
- **Smarter farming:** reduce excess fertiliser use through efficient and regenerative practices.
- **Precaution on chemicals:** regulate plastics and hazardous novel substances before harm is proven.

Value Addition:

- **Safe operating space:** the range within which Earth-system functioning is expected to remain relatively stable.
- **Resilience:** a system's capacity to absorb disturbance while keeping its essential functions.
- **Positive feedback:** an initial change that triggers processes amplifying that change.
- **Anthropocene:** a widely used term for an era in which human activity dominates Earth-system processes.



Conclusion:

The planetary-boundaries framework shows that climate change is only one part of a wider Earth-system crisis. Long-term human security requires development within ecological limits, cutting emissions while conserving biodiversity, restoring natural systems and controlling pollution together.

Mains Practice Question:

Q. "Environmental crises interact through feedbacks and cannot be managed effectively in isolation." Discuss with examples from forests, freshwater and climate. *(15 Marks, 250 Words)*

5.8 India Electric Mobility Index and State-Level EV Governance

Context:

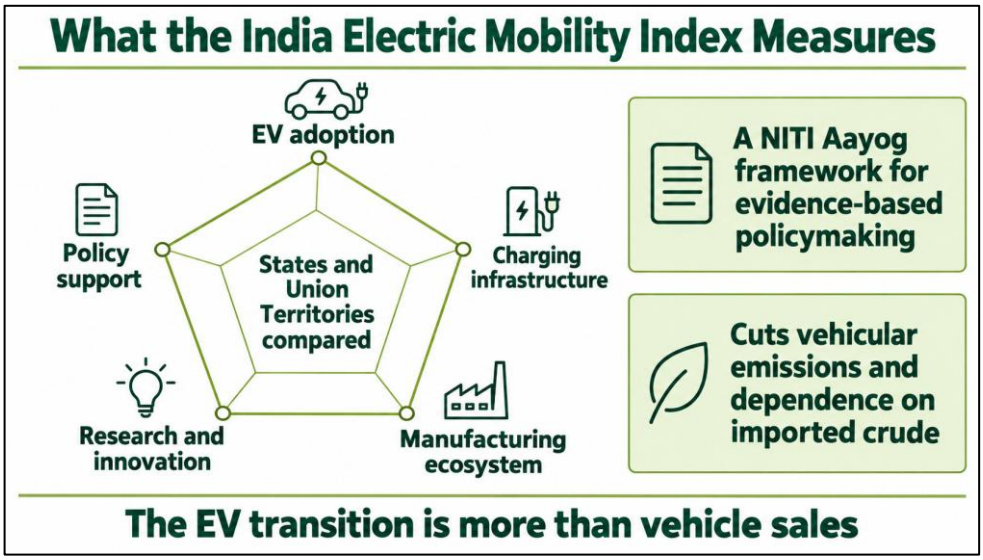
NITI Aayog has released the second edition of the **India Electric Mobility Index (IEMI)** to compare how States and Union Territories are managing the shift to electric vehicles (EVs). With **29 of 36** States and UTs now having notified EV policies, the index puts the spotlight on State-level implementation.

Background:

- **IEMI:** a NITI Aayog framework that tracks States and UTs on EV adoption, charging infrastructure, manufacturing, research and innovation, and policy support.

Space for Notes

- **Why EVs:** they cut vehicle emissions and India's dependence on imported crude oil.
- **Central schemes:** Faster Adoption and Manufacturing of Electric Vehicles (FAME), **PM E-DRIVE** and **PM-eBus Sewa**.
- **Supply side:** Production Linked Incentive (PLI) schemes for automobiles, auto components and **Advanced Chemistry Cell (ACC)** batteries.
- **In simple terms:** the index asks not whether a State has an EV policy, but whether it is actually ready for EVs.



Explanation:

Why State-level governance matters?

- **Implementation on the ground:** charging networks, permits, land and power connections depend largely on States and local bodies.
- **Spotting gaps:** comparing States shows where policies are turning into real ecosystems and where they are not.
- **Healthy federalism:** rankings encourage **competitive and cooperative federalism**, as States learn from better performers.
- **Beyond paperwork:** the focus shifts from policy notification to outcomes such as EV sales and working chargers.
- **State levers:** electricity is a Concurrent List subject and road transport largely a state function, so State tariffs, permits and road taxes shape what an EV costs to own and run.

The policy ecosystem:

- **Demand side:** FAME and PM E-DRIVE support buyers and charging, while PM-eBus Sewa expands electric public transport.
- **Supply side:** PLI schemes build domestic vehicle, component and battery manufacturing.
- **State incentives:** many State EV policies add road-tax and registration-fee waivers on top of Central support.
- **Both needed:** adoption without manufacturing raises imports, while manufacturing without demand leaves plants idles.
- **Small vehicles lead:** most of India's EV sales so far are two- and three-wheelers, where costs have fallen fastest.

Space for Notes

Charging and other bottlenecks:

- **Charging confidence:** a reliable, well-spread public charging network is essential; gaps deter buyers even with subsidies.
- **Digital access:** the **Unified Bharat e-Charge app** aims to make finding and paying for charging easier.
- **Grid readiness:** distribution companies must plan for new charging load, especially for bus depots and truck corridors, and offer predictable EV tariffs.
- **Battery dependence:** India still imports most battery cells and the critical minerals they need.

Way Forward:

- **Charging beyond metros:** extend networks to smaller cities and highways.
- **Joined-up planning:** coordinate EV adoption with power, urban transport and manufacturing plans.
- **Peer learning:** use IEMI data to replicate successful State practices.
- **Batteries at home:** build cell manufacturing and battery recycling to cut import dependence.
- **Public transport first:** prioritise electric buses and commercial fleets, which run long distances and give the biggest emission gains.

Conclusion:

India's EV transition depends as much on multi-level governance as on technology. By comparing States on adoption, infrastructure, manufacturing, innovation and policy, the IEMI helps shift the debate from policy intent to measurable implementation.

Mains Practice Question:

Q. Discuss how India can integrate electric mobility with public transport, electricity-system planning, domestic manufacturing and battery circularity.

(15 Marks, 250 Words)

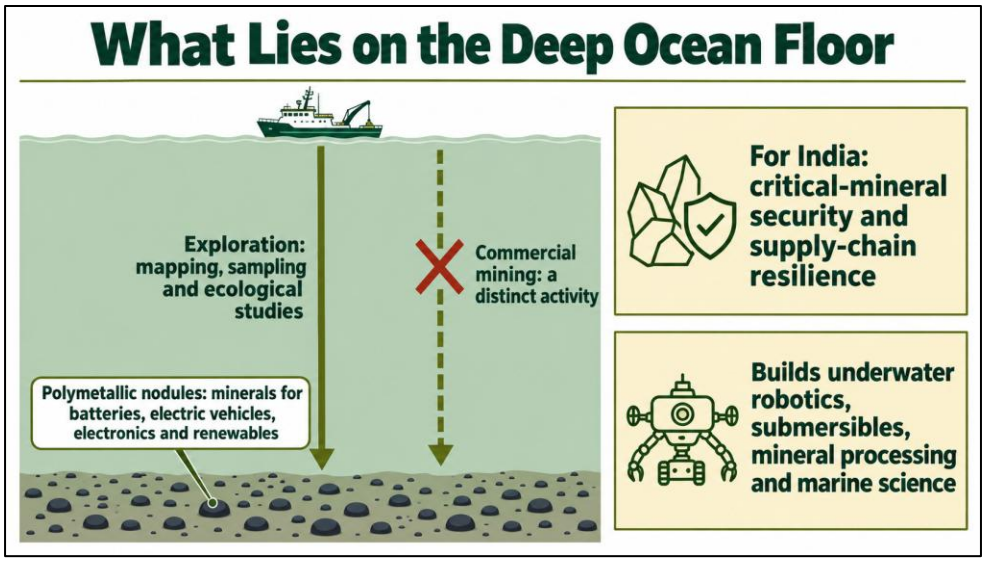
5.9 Seabed Mining and Its Environmental Consequences

Context:

Interest in deep-sea mining is rising because seabed nodules contain nickel, cobalt, copper and manganese needed for batteries and clean energy. India is building exploration capability, but limited knowledge of deep-ocean ecosystems keeps the environmental case for commercial extraction under scrutiny.

Background:

- **Polymetallic nodules:** potato-sized lumps on the deep seabed rich in nickel, cobalt, copper and manganese.
- **UNCLOS and "the Area":** under the UN Convention on the Law of the Sea, the seabed beyond national jurisdiction is the Area, the **common heritage of humankind.**
- **International Seabed Authority (ISA):** organises and controls mineral activities in the Area; headquartered in **Kingston, Jamaica.**
- **India's contracts:** ISA exploration rights over **75,000 sq km** in the Central Indian Ocean Basin for nodules and **10,000 sq km** on the Central and Southwest Indian Ridges for sulphides, under the **Deep Ocean Mission.**



Space for Notes

Explanation:

Why India wants to explore the deep sea?

- **Critical minerals:** supplies are concentrated in a few countries, creating import and geopolitical risk.
- **Resource security:** seabed deposits could support battery, EV and renewable-energy supply chains.
- **Science and technology:** exploration maps the ocean floor, finds new species and builds submersibles and underwater robotics.

The risks of mining:

- **Habitat destruction:** mining machines crush seabed organisms and disturb the floor.
- **Loss of nodules:** many species live on nodules that take millions of years to form.
- **Sediment plumes:** stirred-up mud can spread far beyond mining sites.
- **Knowledge deficit:** many deep-sea species are undescribed, and recovery may take decades or centuries, or never happen.
- **Unfinished rules:** the ISA has struggled for years to finalise a mining code for commercial exploitation.

Exploration is not mining: India's approach:

- **Different activities:** exploration studies and samples; mining extracts commercially, so the ability to explore does not justify extraction.
- **Precaution first:** set environmental baselines, ecological thresholds and long-term monitoring before any large-scale operation.
- **Protect and reduce:** keep sensitive areas as deep-sea reserves, and cut demand through recycling, efficiency and substitution.
- **Sequence:** study first, understand impacts, establish real need, protect sensitive areas and mine only if necessary.

Conclusion:

Deep-sea minerals can support India's clean-energy and strategic goals, but the ocean floor is a living ecosystem, not just a store of metals. Sustainable policy must keep exploration separate from exploitation so that mineral security does not cause irreversible ecological loss.

Mains Practice Question:

Q. Critically examine whether the demand for critical minerals justifies commercial deep-sea mining in conditions of substantial scientific uncertainty.

(10 Marks, 150 Words)

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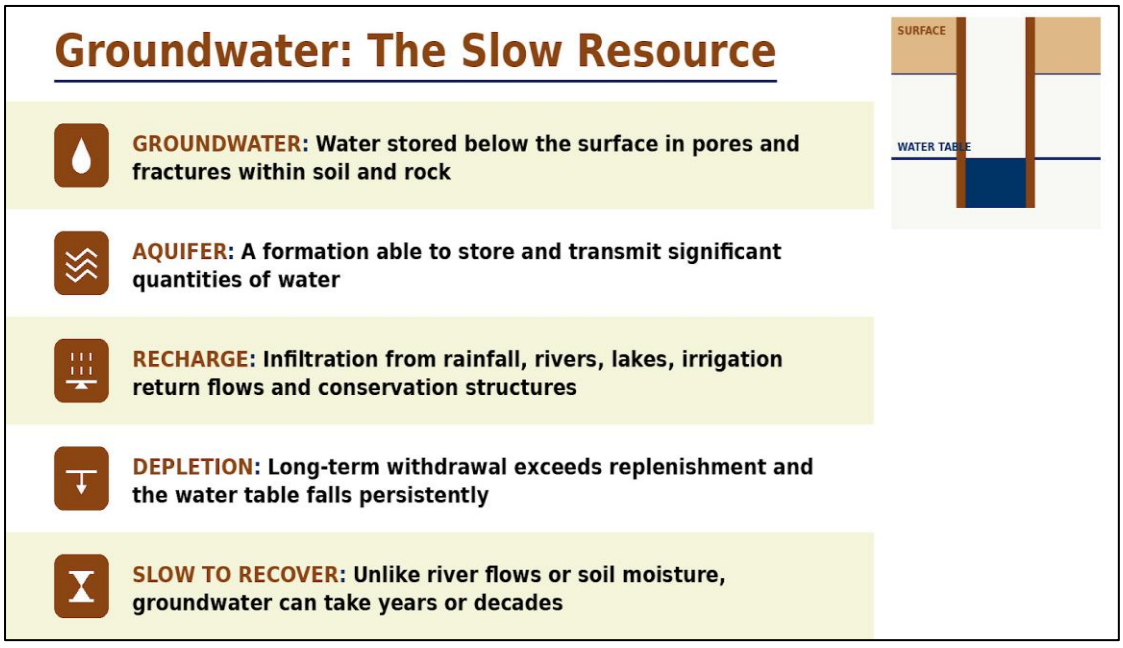
5.10 Persistent Groundwater Decline in India: Findings of the WMO Report

Context:

The World Meteorological Organization's (WMO) **State of Global Water Resources 2025** reports persistently below-normal groundwater in several regions, including north-western India, during 2022-25. The cause is a basic imbalance: groundwater is being pumped faster than rainfall and rivers can recharge it.

Background:

- **Recharge**: rain, rivers, lakes and irrigation water seep into underground aquifers.
- **Depletion**: occurs when extraction exceeds recharge year after year, steadily lowering the water table.
- **Central Ground Water Board (CGWB)**: under the Ministry of Jal Shakti, it assesses groundwater with the States.
- **WMO**: the UN specialised agency for weather, climate and water.



Explanation:

What the WMO report shows?

- **Multi-year deficit**: persistent groundwater deficits in parts of India and other regions during 2022-2025.
- **North-western India**: widespread below-normal to much-below-normal levels, showing cumulative depletion.
- **Northern India**: below-normal **terrestrial water storage** in 2025.
- **Global trend**: **34%** of monitored stations were below normal in 2025, against 25% in 2024.

Space for Notes

Why stress persists and why it matters?

- **Irrigation dominates:** about **87%** of India's groundwater extraction goes to irrigation, encouraged by water-hungry crops and subsidised power.
- **Cities:** urban growth raises demand while concrete surfaces cut natural recharge.
- **Erratic monsoons:** longer dry spells reduce recharge and push farmers to pump more during droughts.
- **Uneven picture: 730 of 6,762** assessment units were over-exploited in 2025, even as the national share of safe units improved.
- **Impacts:** deeper water tables raise farm costs, hurt drinking water for poorer households, worsen salinity and remove a key buffer against drought.

Way Forward:

- **Crop and irrigation shift:** less water-intensive crops and **micro-irrigation** in stressed regions.
- **Recharge:** rainwater harvesting, watershed development and managed aquifer recharge.
- **Community management:** aquifer mapping and village water budgets, as under the **Atal Bhujal Yojana**.
- **Right signals:** align power and crop incentives with groundwater availability and monitor extraction in real time.

Value Addition:

- **Stage of Groundwater Extraction** = annual extraction ÷ annual extractable resource × 100.
- India's national stage of extraction in 2025 was about **60.63%**.
- The **CGWB** conducts groundwater-resource assessments jointly with States and UTs.
- National averages hide severe local depletion, so **aquifer-level management** is more useful than national indicators alone.

Conclusion:

India's groundwater problem is one of severe local over-extraction within an uneven national picture. Sustainable management needs aquifer-based planning, efficient irrigation, demand control and recharge, so that groundwater remains a buffer against climate variability.

Mains Practice Question:

Q. Discuss the reforms needed to align cropping patterns, electricity incentives and groundwater governance with aquifer sustainability. ***(10 Marks, 150 Words)***

5.11 Antarctic Ozone Hole, World Ozone Day and the Global Ozone Protection Regime

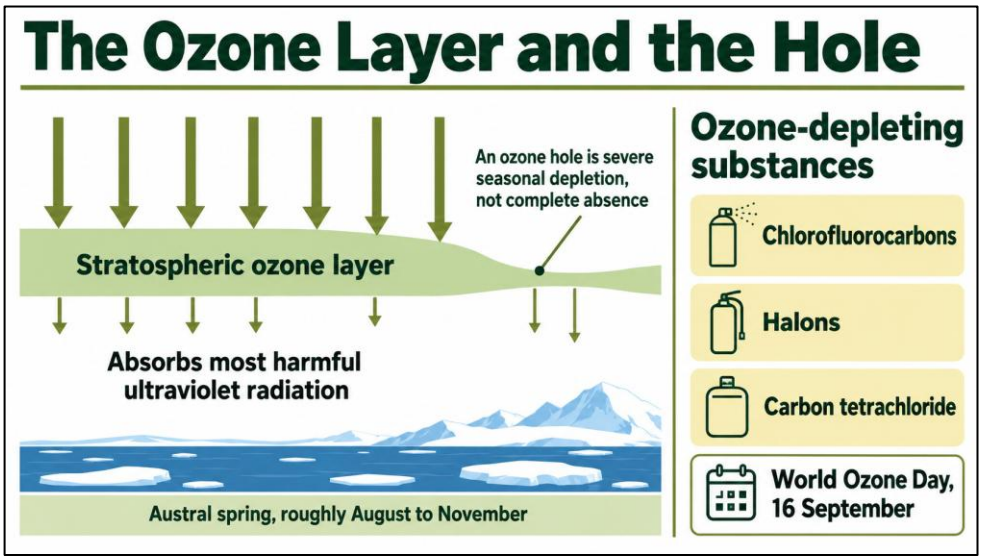
Context:

The Copernicus Atmosphere Monitoring Service reported that the 2026 Antarctic ozone hole grew rapidly to about **25 million sq km** on 12 September, about 5 million sq km above the seasonal average, amid unusually cold stratospheric conditions. **World Ozone Day** on 16 September renewed attention on the global ozone regime.

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Background:

- **Ozone layer:** a thin band of ozone (O_3) in the stratosphere that absorbs most of the Sun's harmful ultraviolet radiation.
- **Ozone hole:** severe seasonal depletion, not complete absence, mainly over Antarctica in the southern spring (August to November).
- **Ozone-depleting substances (ODS):** chlorofluorocarbons (CFCs), halons and carbon tetrachloride.
- **World Ozone Day:** 16 September marks the signing of the Montreal Protocol in 1987.



Explanation:

Why the Antarctic hole forms?

- **Polar Stratospheric Clouds (PSCs):** extreme winter cold forms these clouds.
- **Chemical activation:** reactions on PSC surfaces convert chlorine and bromine compounds into reactive forms.
- **Polar vortex:** a ring of winds isolates the cold Antarctic air, prolonging these conditions.
- **Arctic contrast:** the Arctic vortex is weaker and warmer, so severe ozone holes are much rarer there.
- **Spring sunlight:** when the Sun returns, reactive halogens destroy ozone in a chain (catalytic) reaction.
- **This year:** the very cold stratosphere explains the rapid growth; long-term ODS cuts set the recovery path, but each year's size also depends on temperature and the vortex.

The global ozone regime:

- **Vienna Convention, 1985:** the framework for cooperation on ozone protection.
- **Montreal Protocol, 1987:** controls production and use of ODS; in **2009** it became the first treaty ratified by every country.
- **Kigali Amendment, 2016:** phases down **hydrofluorocarbons (HFCs)**, which replaced ODS and barely harm ozone but have a high **Global Warming Potential (GWP)**.
- **India's commitments:** India phased out CFC production and use by 2010 and, under Kigali, will freeze HFC use in 2028 before cutting it by 85% by 2047.

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Ozone, climate and India:

- **A shared agenda:** Kigali links ozone policy with climate policy, since cutting HFCs limits warming.
- **India Cooling Action Plan, 2019:** a long-term plan to reduce cooling demand and refrigerant use.
- **Industrial shift:** recent policy limits new HFC production capacity, pushing cleaner refrigerants and efficient cooling.
- **Recovery outlook:** scientific assessments expect the Antarctic ozone layer to return to 1980 levels around 2066.
- **Vigilance needed:** monitoring must catch illegal emissions, as when unexpected CFC-11 releases were traced to eastern China in 2018.

Value Addition:

- **ODS are not the same as all greenhouse gases:** CFCs damage ozone and also cause warming.
- **HFCs:** mainly a climate concern rather than an ozone-depletion concern.
- **PSC + polar vortex + sunlight** together explain why severe depletion is concentrated over Antarctica.
- A large hole in one year must be read alongside both **chemical trends and weather conditions.**

Conclusion:

The 2026 expansion shows that ozone recovery is a slow process shaped by past emissions and each year's stratospheric weather. The Vienna-Montreal-Kigali framework remains proof that science-based international cooperation and technology change can fix a planetary-scale problem.

Mains Practice Question:

Q. What explains the effectiveness of the global ozone-protection regime? Discuss its lessons for wider environmental cooperation.

(15 Marks, 250 Words)

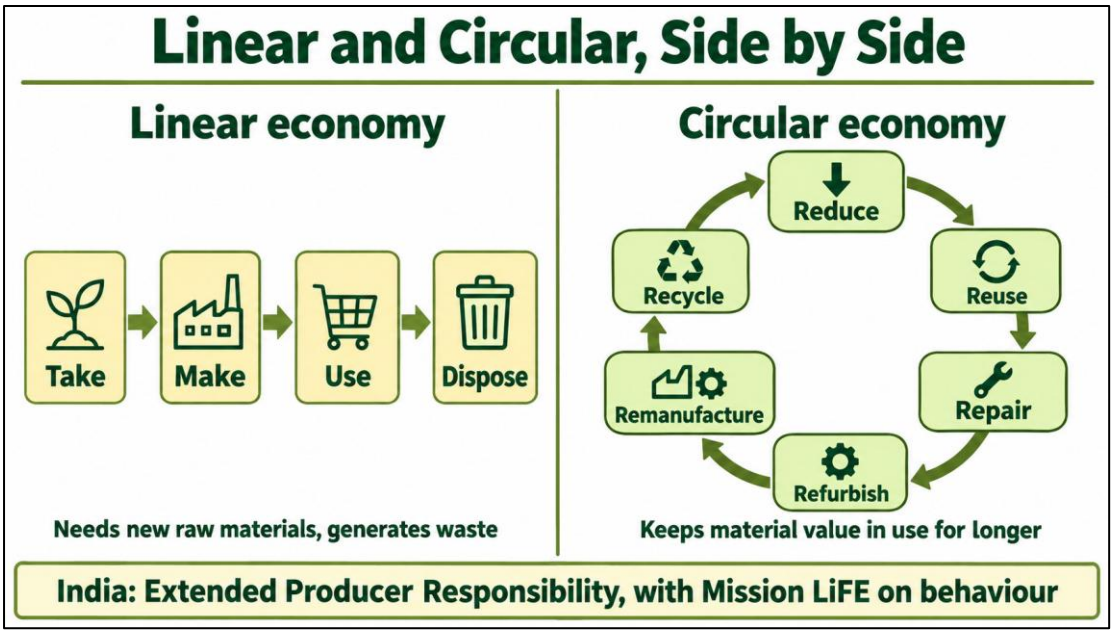
5.12 World Circular Economy Forum 2026: Advancing Resource Efficiency and Circularity

Context:

The **World Circular Economy Forum (WCEF) 2026** opened in Gandhinagar, Gujarat, under the theme "Circular Economy: Transition for People and Prosperity". It is the first WCEF held in South Asia and focused on practical ways to use resources efficiently, reduce waste and keep materials in use for longer.

Background:

- **Circular economy:** replaces the linear "take, make, use, dispose" model with reduce, reuse, repair, refurbish, remanufacture and recycle.
- **WCEF:** an international forum on circularity started by Finland's innovation fund Sitra in 2017.
- **Extended Producer Responsibility (EPR):** makes producers responsible for the end-of-life management of their products.
- **India's EPR coverage:** rules under the Environment (Protection) Act, 1986 apply EPR to plastic packaging, e-waste, batteries, tyres and used oil.
- **Mission LiFE:** Lifestyle for Environment, India's campaign for environmentally responsible consumption, announced in 2021.



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Explanation:

Why circularity matters?

- **Resource efficiency:** reusing and recovering materials reduces extraction of virgin resources.
- **Less waste:** longer product life and material recovery shrink what reaches landfills.
- **Value retention:** repair, refurbishment and remanufacturing keep the value already built into products.
- **Upstream shift:** policy moves from managing waste after it is created to designing it out of production and consumption.
- **Jobs and security:** repair and recycling create local enterprises, and recovering lithium, cobalt and copper from e-waste reduces import dependence.

India's circular-economy architecture:

- **EPR with digital compliance:** producers register and file returns on online portals, which changes their incentives.
- **Consumer side:** Mission LiFE targets behaviour changes and mindful use.
- **Global cooperation:** India launched the **Resource Efficiency and Circular Economy Industry Coalition (RECEIC)** during its G20 Presidency.
- **Regional signal:** hosting WCEF in South Asia highlights circularity in fast-growing developing economies, where most future consumption growth will occur.
- **Recovery targets:** battery and e-waste rules require minimum recovery of materials such as lithium and cobalt from end-of-life products.

Challenges:

- **Informal sector:** much recycling is done by waste pickers and small dealers outside formal systems and safety nets.
- **Weak segregation:** poor collection and sorting at source lowers the quality of recovered material.
- **Box-ticking:** EPR can become a paper compliance exercise, with certificates traded without real recovery of material.

Space for Notes

- **Design gaps:** many products are hard to repair, which India's Right to Repair portal seeks to address.
- **Weak markets for recycled material:** recycled inputs often cost more than virgin material, so manufacturers have little reason to use them without standards or mandates.

Way Forward:

- **Effective EPR:** verify actual recovery, not just certificates.
- **Repair and reuse:** promote durable design, spare parts and repair services.
- **Inclusion:** bring informal workers into formal recycling chains with safety, recognition and fair pay.
- **Behaviour and industry together:** link Mission LiFE's consumer campaigns with industrial circularity targets.
- **Global exchange:** use RECEIC to share practical solutions and finance among G20 partners.

Conclusion:

The circular economy redesigns how value is created instead of only managing the waste of overuse. WCEF 2026 shows that lasting circularity needs producers, consumers, regulators and industry to act together, keeping economic value while easing pressure on natural resources.

Mains Practice Question:

Q. Examine the measures needed to promote repair, reuse, remanufacturing and responsible consumption in India. *(15 Marks, 250 Words)*

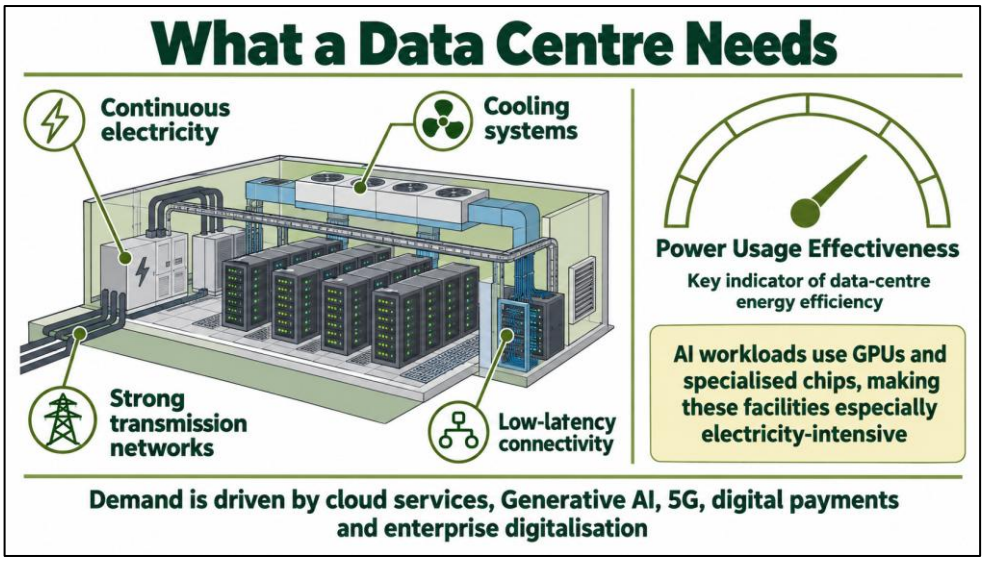
5.13 Data Centre Expansion in India: Energy, Water and Climate Constraints

Context:

India's growth in artificial intelligence (AI), cloud computing, digital payments and 5G is driving rapid data-centre expansion. The Power Ministry projects that AI-driven facilities alone could need an additional **26.3 GW** of electricity by 2031-32, making their energy use and emissions a major policy concern.

Background:

- **Data centre:** a facility housing servers, storage and networking equipment that store and process digital data.
- **Demand drivers:** cloud services, generative AI, 5G, digital payments and enterprise digitalisation.
- **AI intensity:** AI workloads run on graphics processing units (GPUs) and specialised chips that use far more power than conventional computing.
- **Power Usage Effectiveness (PUE):** total facility energy divided by the energy used by computing equipment; a value closer to 1.0 means less is wasted on cooling and support systems.
- **In simple terms:** every online search, payment or AI query runs on electricity in a data centre somewhere.



Explanation:

Why the boom creates a climate challenge?

- **Electricity intensity:** dense, always-on hardware sharply raises power demand.
- **Cooling load:** servers generate heat, so much of the electricity goes to cooling, not computing.
- **Grid pressure:** large facilities need uninterrupted, high-quality power, adding concentrated load on generation and transmission.
- **Water stress:** many cooling systems use large volumes of water, a concern in water-scarce cities.
- **Emissions:** where grid power is still largely coal-based, every new data centre adds to emissions unless it secures clean power.
- **Clean-power gap:** renewable supply must be matched by transmission, storage and grid reliability.

What makes a data centre green?

- **Renewable electricity:** sourcing clean power through on-site plants or long-term purchase agreements.
- **Efficient hardware:** energy-efficient servers and power systems.
- **Advanced cooling:** technologies such as liquid cooling that cut energy and water use.
- **Better PUE:** tracking and improving PUE as a standard measure of efficiency.
- **Heat reuse:** waste heat from servers can warm nearby buildings or serve industrial processes.

Where and how to build?

- **Siting needs:** dependable power, transmission capacity, efficient cooling, connectivity and access to clean energy, not just cheap land.
- **Planning link:** data centres must be planned with urban, power-sector and renewable-energy investment.
- **Spread the load:** smaller edge data centres in tier-2 cities can bring services closer to users and ease pressure on a few hubs.
- **State initiative:** Gujarat's green data-centre policy ties investment incentives to renewable-energy use and sustainability standards.
- **Dual identity:** data centres are increasingly treated as both digital infrastructure and major energy consumers, needing approval from power planners as well as IT departments.

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Way Forward:

- **Plan ahead:** build projected data-centre demand into long-term power and transmission planning.
- **Standards:** set PUE and renewable-energy benchmarks for large facilities.
- **Smart incentives:** align State incentives with measurable sustainability outcomes.
- **Water-wise cooling:** encourage low-water cooling in water-stressed cities.
- **Right location:** steer large facilities to regions with spare grid capacity and abundant renewable power.

Conclusion:

Data centres are essential to India's AI and digital ambitions, but computing capacity cannot be planned apart from electricity and climate policy. The sustainable path combines digital growth with clean power, efficient cooling, stronger grids and measurable efficiency standards.

Mains Practice Question:

Q. How can India reconcile growth in digital infrastructure with energy security, climate commitments and local resource constraints? ***(15 Marks, 250 Words)***

5.14 Rising Sea Levels and Coastal Vulnerability in India: Mumbai as a Case Study

Context:

The Brihanmumbai Municipal Corporation (BMC) has commissioned a fresh climate-risk assessment of Mumbai's **149-km coastline**, as a UN report warns that accelerating sea-level rise threatens low-lying cities such as Mumbai and Kolkata. The study will map areas exposed to flooding and the land-use changes that raise risk.

Background:

- **Causes:** sea-level rise comes mainly from **thermal expansion** of warming seawater and melting land glaciers and ice sheets.
- **Pace:** global sea level rose about **4.7 mm a year** in 2014-23 and about **5.9 mm in 2024**; at least 50 cm of future rise is effectively locked in.
- **Relative sea-level rise:** can be higher where coastal land is sinking at the same time.
- **Coastal Regulation Zone (CRZ) Notification, 2019:** regulates construction along India's coast under the Environment (Protection) Act, 1986.

Explanation:

Why India's coasts are vulnerable?

- **Hazards:** coastal flooding, erosion, saltwater intrusion and salinisation of groundwater.
- **Exposed assets:** ports, roads, power systems, drainage, fisheries and coastal livelihoods.
- **Lost buffers:** destruction of mangroves, wetlands and salt marshes removes natural protection against storm surges.
- **Dense settlement:** crowded low-lying cities raise both economic losses and displacement risk.

Space for Notes

Mumbai: a case of compound risk:

- **Geography:** a low-lying island city with dense population and heavy construction.
- **Compound flooding:** heavy rain plus high tide plus higher seas stop rainwater from draining to the sea.
- **Human factors:** land reclamation, concretisation and narrowing of natural channels such as the **Mithi River** worsen flooding.
- **Existing plan:** the **Mumbai Climate Action Plan, 2022** identified coastal flooding, urban heat, air pollution and loss of green cover as major risks.

Building coastal resilience:

- **Nature first:** restore mangroves and coastal wetlands as natural defences.
- **Future-proof infrastructure:** design drainage, seawalls and critical assets for projected sea levels.
- **Risk-based planning:** restrict building in high-risk zones and use dynamic shoreline mapping.
- **Prepare for the worst:** strengthen early warnings and plan managed relocation where protection is unviable.
- **Local data:** tide gauges and land-subsidence monitoring can project relative sea-level rise for each city.

Conclusion:

India must move from reacting to coastal floods to planning for them in advance. That means combining ecosystem restoration, resilient infrastructure, risk-sensitive land use and protection of vulnerable communities, starting with cities like Mumbai.

Mains Practice Question:

Q. Explain how sea-level rise, land subsidence and wetland loss combine to increase the vulnerability of Indian coastal cities. Suggest adaptation measures. *(10 Marks, 150 Words)*

5.15 Super El Niño, ENSO and Rising Heat-Mortality Risk in India

Context:

The current El Niño is expected to become a very strong event and last into early 2027. A Climate Impact Lab study estimates about **15,800 additional heat-related deaths** in India between September 2026 and February 2027, while the 2026 southwest monsoon ended on 30 September with rainfall about 12.6% below the Long Period Average (LPA).

Background:

- **ENSO:** the El Niño-Southern Oscillation, a linked ocean-atmosphere cycle over the tropical Pacific.
- **Phases:** **El Niño** is the warm phase, **La Niña** the cool phase, and conditions in between are ENSO-neutral.
- **Normal state:** easterly **trade winds** push warm water west, allowing cold water to rise (**upwelling**) near South America.
- **During El Niño:** trade winds weaken, warm water shifts east, upwelling falls and the **Walker Circulation** is reorganised.
- **"Super El Niño":** an informal term for an exceptionally strong El Niño, not a separate official category.

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Explanation:

Why this El Niño is exceptional?

- **Near-certain persistence:** the World Meteorological Organization (WMO) puts the chance of El Niño lasting through February 2027 at nearly **100%**, and it could become the strongest on record.
- **Hot Pacific:** sea-surface temperatures in the Niño-3.4 region are exceptionally high.
- **Global heat:** El Niño releases stored ocean heat, temporarily lifting global temperatures; land temperatures are projected about **1.2°C above normal**.
- **Climate change link:** warming does not cause ENSO, but a hotter baseline makes a strong El Niño far more dangerous.

Implications for India:

- **Monsoon:** El Niño usually weakens the Indian summer monsoon, though the link is not one-to-one.
- **Other drivers:** a positive **Indian Ocean Dipole (IOD)** and the **Madden-Julian Oscillation (MJO)** can offset or add to its effects.
- **Agriculture:** low rain and heat dry the soil, raise irrigation needs and stress crops and livestock.
- **Water and power:** higher evaporation and cooling demand strain reservoirs and electricity grids.

Why heat kills?

- **An estimate, not a count:** the 15,800 figure is projected extra mortality compared with normal temperatures.
- **Non-linear risk:** deaths rise sharply once temperatures pass locally adapted thresholds.
- **Hidden dangers:** warm nights stop the body recovering, and high humidity limits cooling by sweating.
- **Who is most exposed:** outdoor workers, the elderly, crowded urban settlements and poor households without cooling or reliable power.

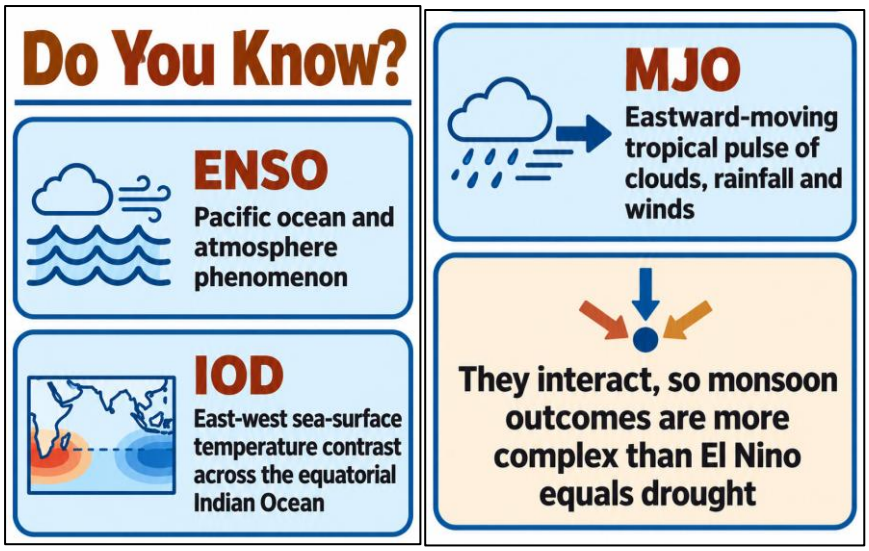
Way Forward:

- **Forecasts to action:** turn seasonal forecasts into district-level heat and crop plans.
- **Heat-Health Action Plans:** cooling centres, drinking water, hospital readiness and changed work hours for outdoor workers.
- **Integrated planning:** use ENSO forecasts in reservoir, power-demand and disaster planning, and track heat deaths better.

Value Addition:

- **Niño-3.4 region:** roughly 5°N to 5°S and 170°W to 120°W in the equatorial Pacific.
- The U.S. National Oceanic and Atmospheric Administration (NOAA) declares El Niño when Niño-3.4 anomalies reach at least **+0.5°C**, with matching atmospheric changes that persist.
- **Walker Circulation:** the east-west atmospheric circulation over the tropical Pacific.
- **Teleconnection:** the influence of a climate anomaly in one region on weather far away.

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Conclusion:

A strong El Niño is most dangerous when added to long-term warming. India's preparedness must go beyond monsoon forecasting to an integrated climate-risk strategy covering health, farming, water and energy, with early warnings turned into timely local action.

Mains Practice Question:

Q. How should India integrate seasonal climate forecasts with heat-action plans, occupational protection and public-health preparedness?

(15 Marks, 250 Words)

5.16 Weakening Natural Carbon Sinks and Risks to Net-Zero Targets

Context: A Wood Mackenzie report estimates that forests, soils and oceans absorbed about 40% of human-caused carbon dioxide in 2025. As warming and degradation weaken these natural sinks, reaching net zero becomes harder, shifting pressure to faster emission cuts and reliable carbon removal.

Background:

- **Carbon sink:** anything that absorbs more carbon than it releases; major natural sinks are oceans, forests, soils and wetlands.
- **How they work:** plants remove CO_2 through **photosynthesis** and store it in biomass and soil; oceans absorb it through physical and biological processes.
- **Net zero:** balancing remaining human emissions with equal removals, not eliminating every emission.
- **Carbon dioxide removal (CDR):** natural or technological methods that take CO_2 out of the atmosphere.

Explanation:

Why sinks are weakening?

- **Deforestation and degradation:** reduce the land's capacity to store carbon.
- **Wildfires:** release stored carbon quickly back into the air.
- **Warmer oceans:** can absorb less CO_2.
- **Feedbacks:** permafrost thaw and possible Amazon dieback could turn sinks into sources, causing further warming.
- **Land-use change:** draining peatlands and wetlands for farming releases carbon stored over centuries.

Space for Notes

Implications for net zero:

- **More CO_2 stays aloft:** weaker sinks shrink the remaining carbon budget.
- **Residual emissions:** hard-to-abate sectors will need more removals to balance them.
- **Technology bets:** greater reliance on **Direct Air Capture (DAC)** and **Bioenergy with Carbon Capture and Storage (BECCS)**, both unproven at scale.
- **India's stake:** India targets net zero by **2070** and an additional forest carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent by 2030.

Way Forward:

- **Cut emissions first:** sinks cannot substitute for deep reductions in gross emissions.
- **Protect ecosystems:** forests, wetlands and soils serve both mitigation and resilience as nature-based solutions.
- **Credible removals:** invest in carbon removal with strong measurement, reporting and verification.
- **Blue carbon:** protect mangroves, seagrasses and salt marshes, which store carbon at high rates per hectare.

Conclusion:

Natural carbon sinks are not an unlimited substitute for cutting emissions. Credible net-zero strategies must reduce gross emissions quickly, protect and restore ecosystems, and keep engineered removals for genuinely residual emissions.

Mains Practice Question:

Q. How do warming and ecosystem degradation weaken natural carbon sinks? Discuss the implications for net-zero pathways. ***(10 Marks, 150 Words)***

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

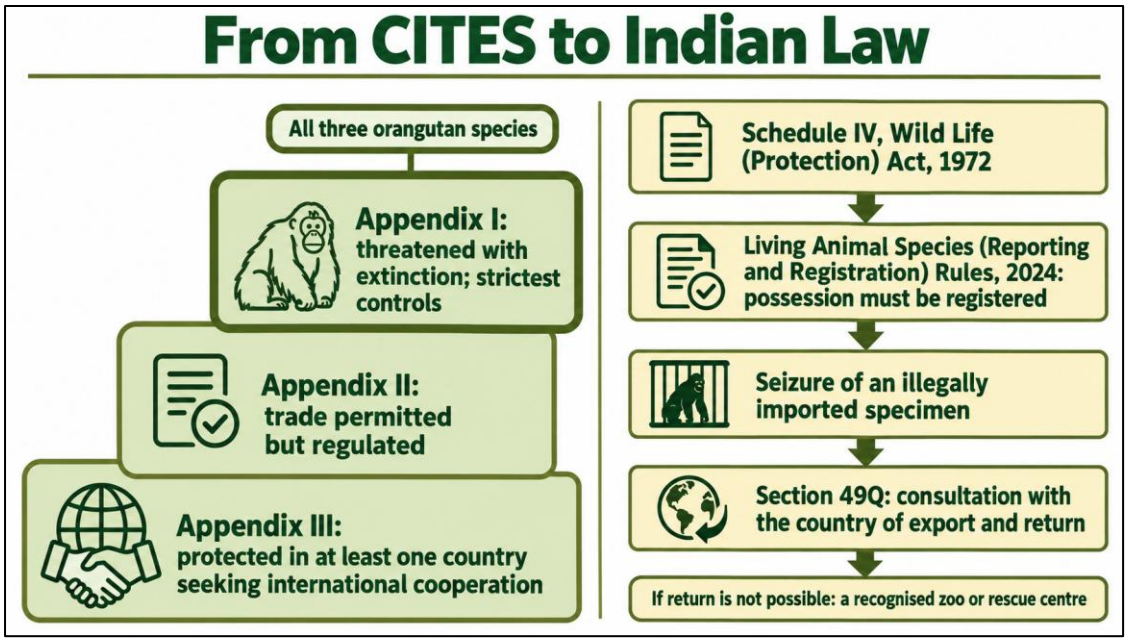
Context:

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.

Space for Notes



- **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.

5.18 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.

Space for Notes

- **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.

5.19 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:

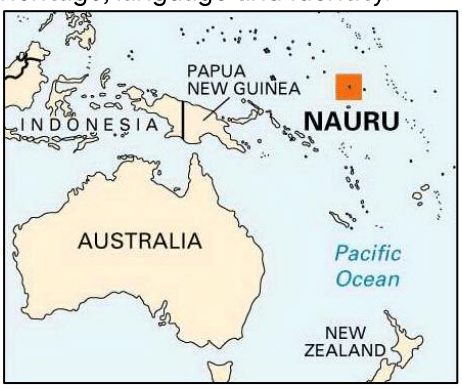
- **Location:** a major dam on the **Tons River**, an important tributary of the **Yamuna**, on the Himachal Pradesh-Uttarakhand border.
- **Part of a plan:** one of three Upper Yamuna storage projects, with **Lakhwar and Renukaji**, envisaged under the **1994 Yamuna water-sharing agreement.**
- **Uses:** 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.

5.20 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.

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5.21 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.

5.22 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.

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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.

5.23 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.

5.24 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.

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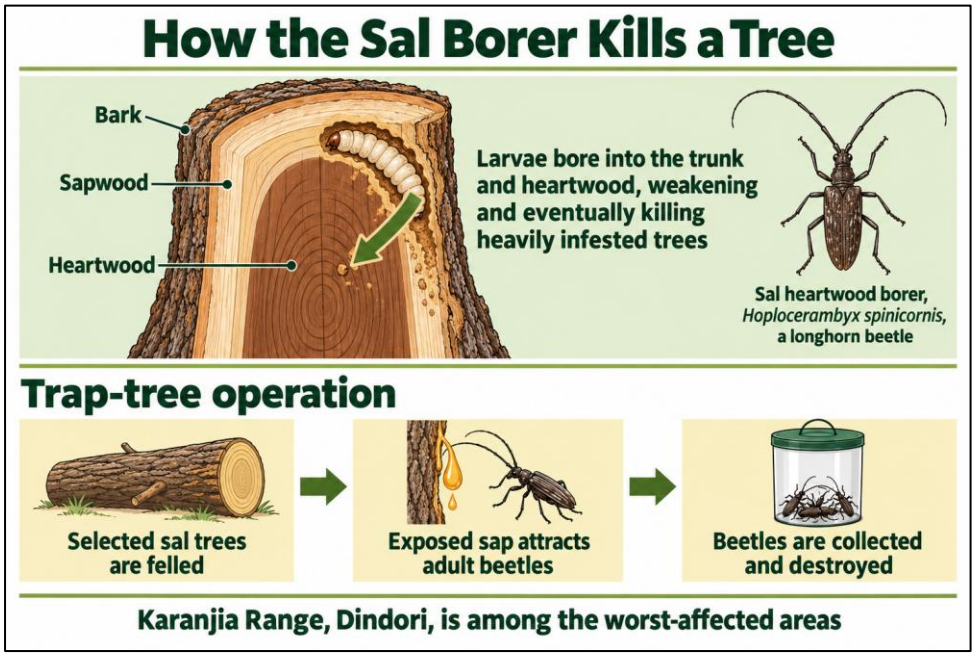
- **Harm:** it forms dense mats that block sunlight, oxygen exchange, boats and fishing; its decay lowers dissolved oxygen.
- **The technology:** an unmanned surface vehicle fitted with a robotic harvester.
- **Circular use:** harvested biomass may become value-added products.
- **Scheme:** funded under the **National Plan for Conservation of Aquatic Ecosystems (NPCA)** of the Environment Ministry.

5.25 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.



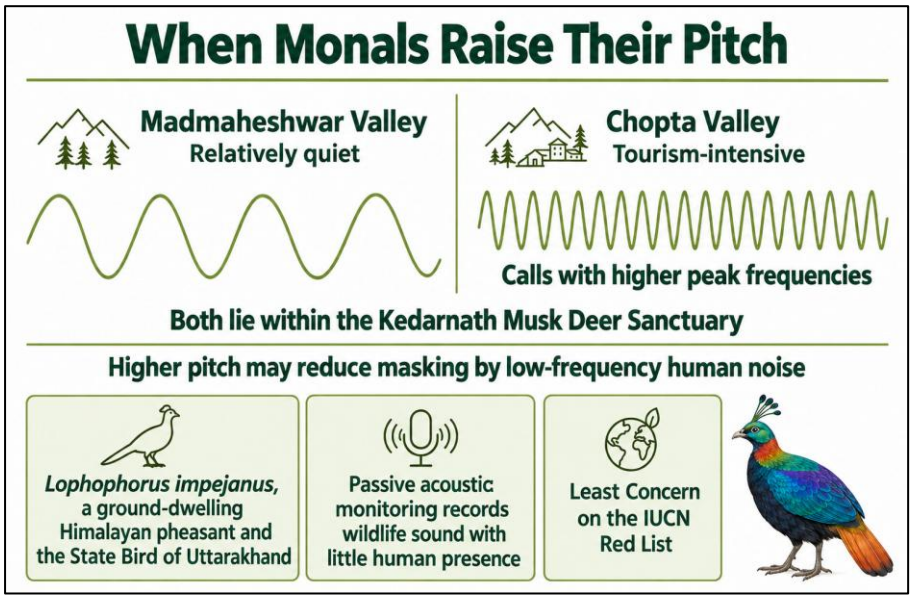
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5.26 Impact of Anthropogenic Noise on the Calls of the Himalayan Monal

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.



5.27 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.

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- **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.

5.28 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.

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

Context:

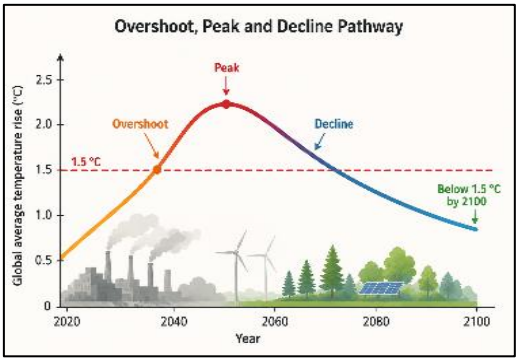
The UN Environment Programme's (UNEP) **Limiting Overshoot** report warns that temporarily crossing the 1.5°C warming threshold is becoming unavoidable. It sets out an "overshoot, peak and decline" pathway to limit how far and how long warming exceeds the threshold.

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.

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- **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.

5.30 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.

5.31 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.

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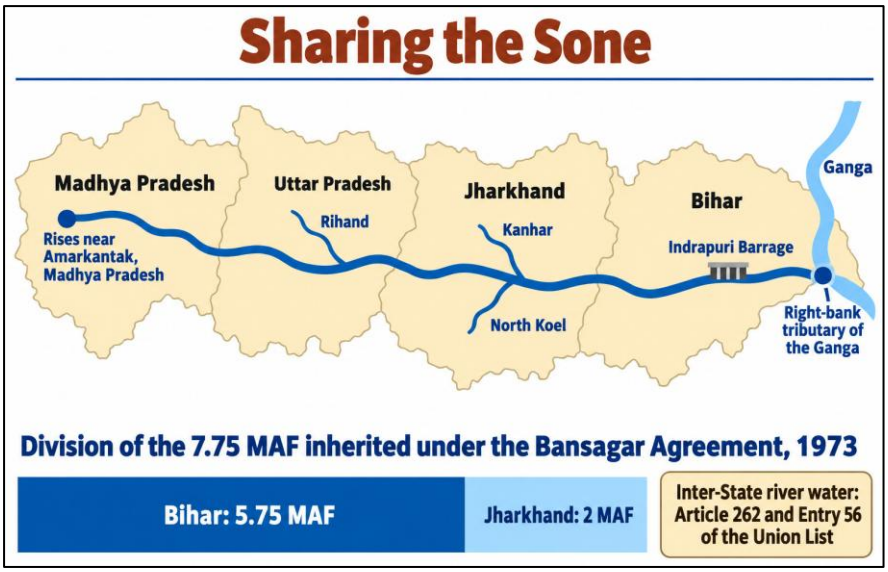
- **Species hit:** mostly the **Himalayan griffon** (*Gyps himalayensis*), with Eurasian griffons and cinereous vultures.
- **Lesson:** relocating dumps away from power infrastructure cuts risk without removing a food source.
- **Wider toolkit:** complements vulture-safe drugs, habitat protection and bird-safe power lines.

5.32 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.**



5.33 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.

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- **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.



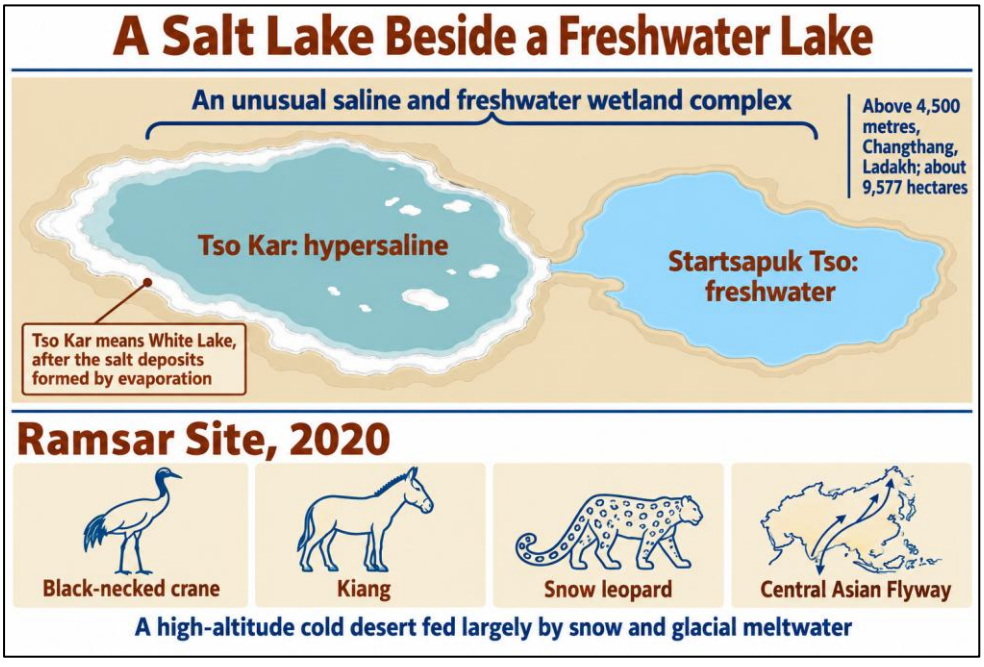
- **Why it matters:** long records of past monsoon swings help test climate models and plan for future variability.

5.34 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.



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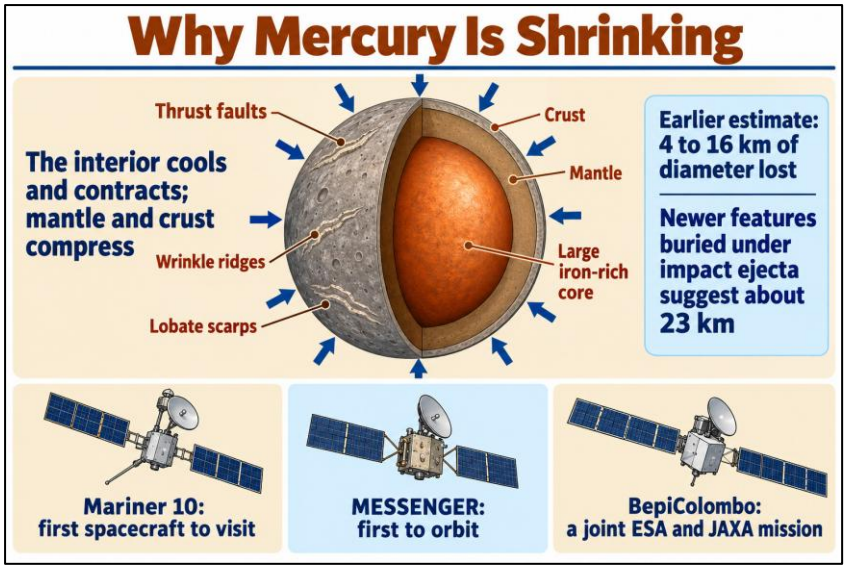
5.35 Planetary Cooling and the Contraction of Mercury

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.



5.36 Himalayan Erosion as a Source of Carbon Dioxide

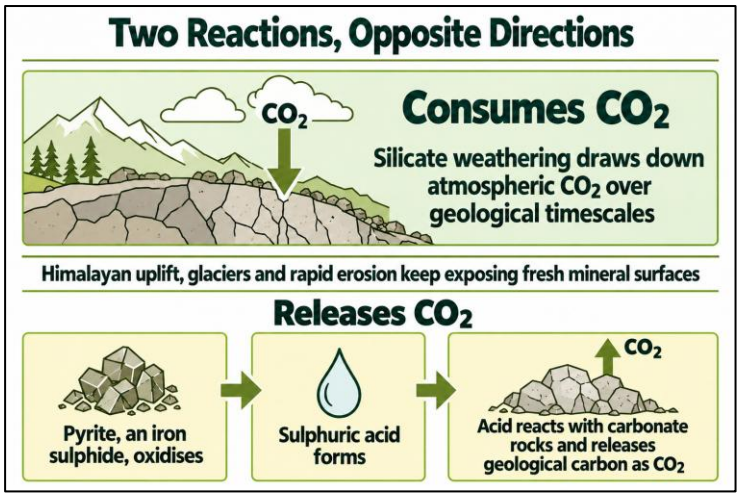
Context:

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.

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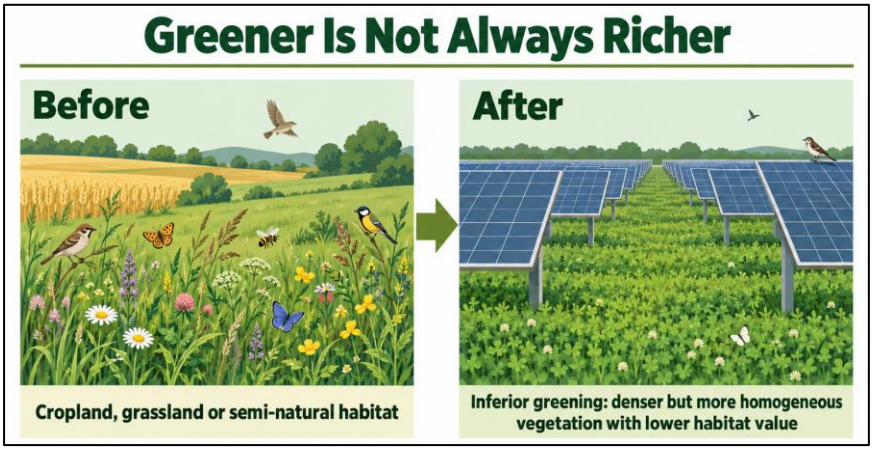
- **Tracing the process:** researchers used **sulphur and oxygen isotopes.**
- **Finding:** in the upper Indus, CO_2 released through sulphide oxidation may exceed uptake by silicate weathering.
- **Lesson:** steep, fast-eroding mountains can be **net carbon sources**, while flatter downstream floodplains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

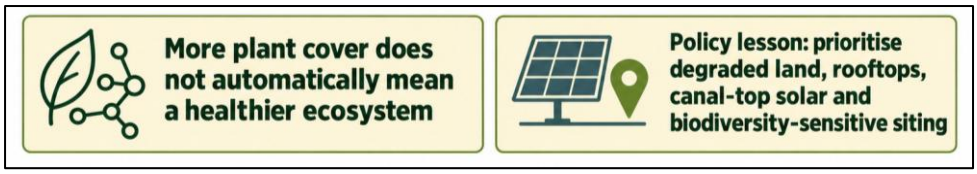
5.37 Large-Scale Solar Farms and 'Inferior Greening'

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.





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Prelims Capsule

5.38 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**.

5.39 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).

5.40 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.

5.41 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.

5.42 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.

5.43 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.

5.44 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.

5.45 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**.

Space for Notes

- **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.

Space for Notes

Prelims Practice Questions

1. Consider the following statements regarding ozone depletion:

1. The Antarctic ozone hole forms mainly during the Southern Hemisphere spring.
2. Polar stratospheric clouds help convert chlorine compounds into forms that destroy ozone.
3. The Kigali Amendment to the Montreal Protocol phases down hydrofluorocarbons, which are potent greenhouse gases.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

2. Which of the following are known as the Rio Conventions?

1. United Nations Convention to Combat Desertification (UNCCD)
2. Convention on Biological Diversity (CBD)
3. United Nations Framework Convention on Climate Change (UNFCCC)
4. Convention on International Trade in Endangered Species (CITES)

Select the correct answer using the code given below:

(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

3. Consider the following pairs:

1. Tso Kar: Ladakh
2. Bakhira Lake: Uttar Pradesh
3. Vembanad Lake: Kerala
4. Taklamakan Desert: Mongolia

How many of the pairs given above are correctly matched?

(a) Only one
(b) Only two
(c) Only three
(d) All four

Answers

1. (d) 2. (b) 3. (c)

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6. Indian Society & Social Justice

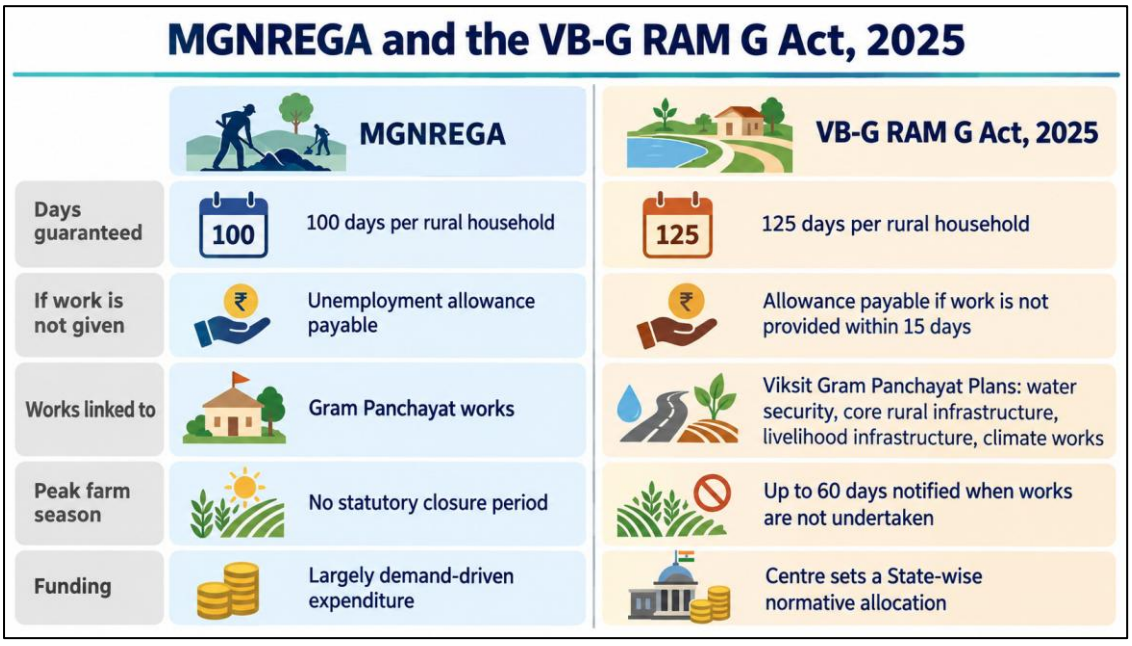
6.1 Right to Work and the Changing Rural Employment Guarantee

Context:

The Supreme Court has revived the debate on whether the right to work should remain a Directive Principle or be read into the right to life under Article 21. The question has gained weight after the VB-G RAM G Act, 2025 replaced the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), changing the guarantee and how it is funded.

Background:

- **Article 41:** a Directive Principle asking the State, within its economic capacity, to secure the right to work and public assistance in cases such as unemployment.
- **Olga Tellis v. Bombay Municipal Corporation (1985):** the right to livelihood is part of Article 21, though this does not create a right to a government job.
- **Sanjit Roy v. State of Rajasthan (1983):** paying less than the statutory minimum wage in relief work can amount to forced labour under **Article 23**.
- **MGNREGA:** a demand-driven law that gave rural households up to 100 days of unskilled wage work, or an unemployment allowance.



Explanation:

What the new law changes?

- **Longer guarantee:** the Viksit Bharat Guarantee for Rozgar and Ajeevika Mission (Gramin) Act, or VB-G RAM G Act, promises **125 days** per rural household.
- **Capped funding:** the Centre sets a **State-wise normative allocation**; spending beyond it falls on the State.
- **Cost sharing: 60:40** between Centre and State for most States, and **90:10** for specified North-Eastern and Himalayan States.
- **Government's case:** allocations improve budget predictability, infrastructure planning and convergence.

Space for Notes

Concerns about a shrinking guarantee:

- **Ceiling versus demand:** fixed allocations can limit work regardless of genuine rural need.
- **Unequal States:** a higher State share may disadvantage fiscally weaker States and widen regional gaps.
- **Early signs:** critics estimate a **68% fall** in person-days in July-August 2026, compared with an average of about 44 crore person-days in those months over the previous five years.
- **Non-retrogression:** rolling back an established social entitlement may conflict with this constitutional principle.

Value Addition:

- **Counter-cyclical role:** demand for rural work rises during droughts, farm distress, reverse migration and economic shocks.
- **Twin benefits:** such programmes provide income support and durable community assets such as water-conservation structures.
- **Delivery matters:** social audits, timely wages and decentralised planning turn a statutory guarantee into an accessible entitlement.

Conclusion:

The real test of a right to work is whether workers can claim it when they need it. That requires funding that follows demand, timely wages, strong Gram Panchayats and safeguards so that fiscal limits do not erode livelihood security.

Mains Practice Question:

Q. "An employment guarantee is meaningful only when financing responds to actual demand." Discuss with reference to fiscal federalism, timely wages and social accountability. *(10 Marks, 150 Words)*

6.2 Institutional Discrimination against Dalits, Tribal Communities and Minorities: The UN CERD Review

Context:

The UN Committee on the Elimination of Racial Discrimination (CERD) has reviewed India's combined 20th and 21st periodic reports, its first review since 2007. Its 2026 concluding observations raise concerns about institutional discrimination affecting Dalits, tribal communities, minorities, refugees and non-citizens. It has called for investigation and accountability.

Background:

- **ICERD:** the International Convention on the Elimination of All Forms of Racial Discrimination, a legally binding UN treaty adopted in **1965** and in force from 1969; India is a State Party.
- **Scope:** covers discrimination based on race, colour, descent, or national or ethnic origin.
- **CERD:** a body of **18 independent experts** serving in their personal capacity, not as government representatives, that reviews States' reports and issues concluding observations, not court judgments.
- **Status:** a treaty-monitoring body, not a principal UN organ; similar bodies monitor the conventions on women, children, torture and persons with disabilities.

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- **Indian safeguards:** Articles 14 to 17 and 46, the Protection of Civil Rights Act, 1955 and the SC/ST (Prevention of Atrocities) Act, 1989.
- **India's stance:** India has long held that caste is not "race" or "descent" under ICERD and should be dealt with domestically.



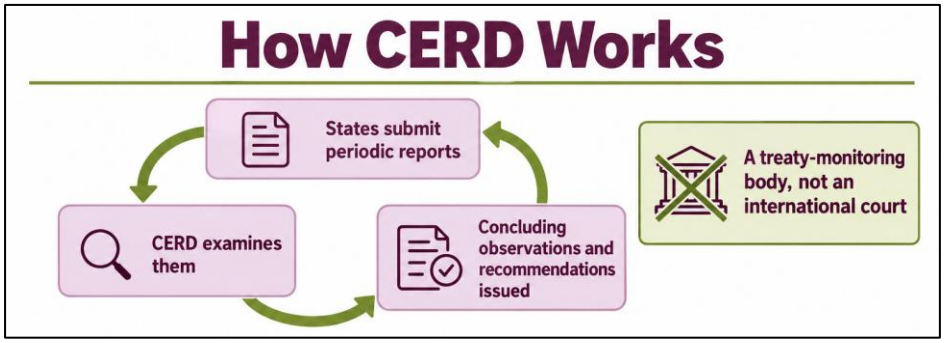
Explanation:

How institutional discrimination works?

- **Unequal enforcement:** biased policing, slow investigations and weak accountability limit access to justice.
- **Occupational exclusion:** hazardous manual sewer cleaning persists despite being banned, showing how inherited disadvantage survives formal equality.
- **Paperwork exclusion:** document-heavy procedures hurt communities with weaker access to birth or land records.
- **Developmental exclusion:** unequal access to education, health, housing and land reproduces disadvantage across generations.

What CERD flagged?

- **Violence and impunity:** alleged law-enforcement violence against minorities, Dalits and non-citizens, with little information on inquiries, punishment or compensation.
- **Hate speech:** the Bharatiya Nyaya Sanhita does not expressly criminalise racist hate speech.
- **Refugees:** returning Rohingya refugees may breach **non-refoulement**, the principle against sending people back to persecution.
- **Documentation risks:** the National Register of Citizens and electoral-roll revisions could exclude eligible people without papers.
- **Data gaps:** reliance on the 2011 Census and delayed crime data hide current conditions of vulnerable groups.



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Way Forward:

- **Better data:** publish disaggregated social data while protecting privacy.
- **Stronger watchdogs:** independent, diverse rights commissions with their own investigators; GANHRI, the global alliance of human-rights institutions, has questioned the NHRC's independence.
- **Justice and dignity:** prompt investigation, prosecution and compensation, and full mechanisation of sewer cleaning.
- **Tribal consultation:** enforce land and forest-rights safeguards, and make grievance bodies accessible to marginalised groups.

Conclusion:

Institutional discrimination runs deeper than individual prejudice because it settles into routine administration. India's goal of substantive equality needs not only strong laws but institutions that can detect structural exclusion, enforce accountability and deliver equal citizenship in practice.

Mains Practice Question:

Q. "Formal equality is necessary but insufficient for substantive equality." Discuss reforms that can improve access to justice and public institutions for marginalised communities. *(10 Marks, 150 Words)*

6.3 Caste-based Purification and Untouchability

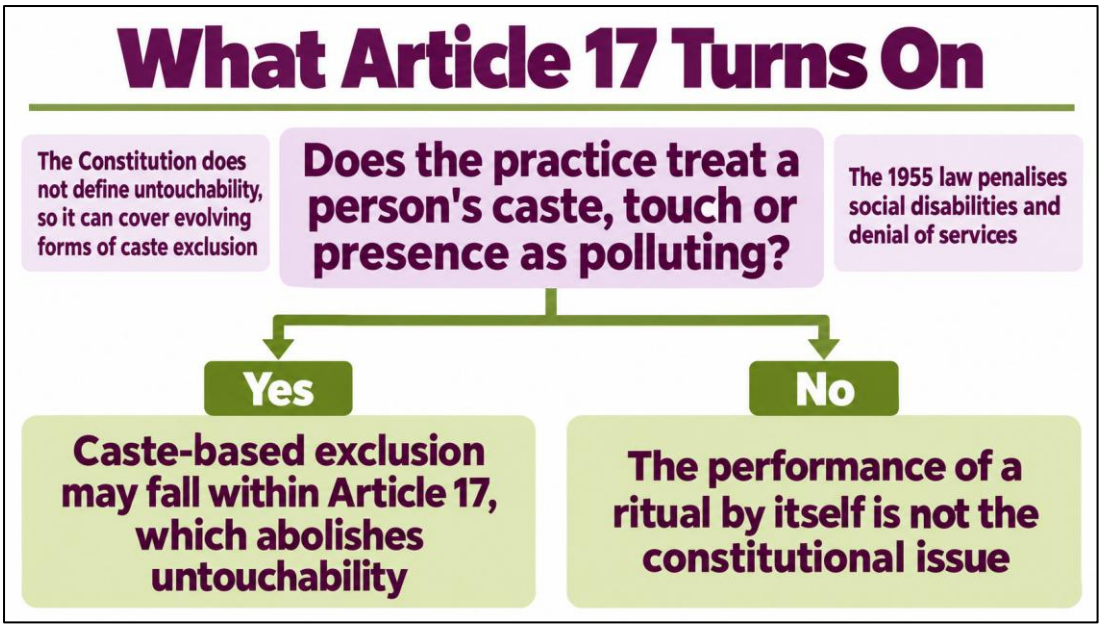
Context:

A **shuddhikaran** (purification) ritual was performed at Haldwani's Ramlila ground two days after Congress president Mallikarjun Kharge, a Dalit leader, addressed a rally there. The incident raises an Article 17 question: when does purification become a caste-based claim that a person's presence pollutes a place?

Background:

- **Article 17:** abolishes untouchability and forbids its practice in any form; the Constitution does not define the term, letting courts address its changing forms.
- **Protection of Civil Rights Act, 1955:** penalises enforcing social disabilities and denying services on grounds of untouchability.
- **SC/ST (Prevention of Atrocities) Act, 1989: Section 3(1)(r)** punishes intentional insult or intimidation of SC/ST members in public view.
- **Social boycott:** Article 17 does not mention it, but a caste-based boycott can fall within it when it imposes exclusion rooted in untouchability.

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Explanation:

How courts read untouchability?

- **Sukanya Shantha v. Union of India (2024):** the Supreme Court linked untouchability with ideas of **"purity and pollution"** and stigma attached to a person's existence, touch or presence.
- **Surya Narayan Choudhary v. State of Rajasthan (1988):** the High Court struck down compulsory purification of Dalit devotees before temple entry under **Articles 14, 15 and 17.**
- **Beyond touch:** discrimination can work through symbolic rituals as much as direct exclusion.

The legal test in Haldwani:

- **Key question:** was the ritual performed because of the leader's caste identity or presence?
- **Evidence:** organisers' statements, witnesses, the ritual's stated purpose and whether similar rituals followed rallies by non-Dalit leaders.
- **Not enough alone:** timing or the word "shuddhikaran" cannot by itself prove caste discrimination.
- **Hitesh Verma v. State of Uttarakhand (2020):** an insult is an atrocity only when it is linked to caste identity.
- **Section 3(1)(r) elements:** intentional insult, intent to humiliate an SC/ST member, an accused who is not SC/ST, and an act in public view.

Why it matters?

- **Dignity:** symbolic purification brands a community as impure and reinforces hierarchy.
- **Due process:** liability must rest on evidence, protecting dignity without prejudging the facts.
- **Social change:** awareness and sensitive policing are needed so that untouchability does not survive in new forms.

Conclusion:

The constitutional objection is not to purification rituals as such, but to their use to enforce caste notions of pollution and exclusion. Article 17 must reach these evolving forms of untouchability, while legal liability must rest on evidence linking the act to caste.

Mains Practice Question:

Q. Discuss how institutions should address symbolic practices of caste exclusion while ensuring evidence-based findings and procedural fairness.

(10 Marks, 150 Words)

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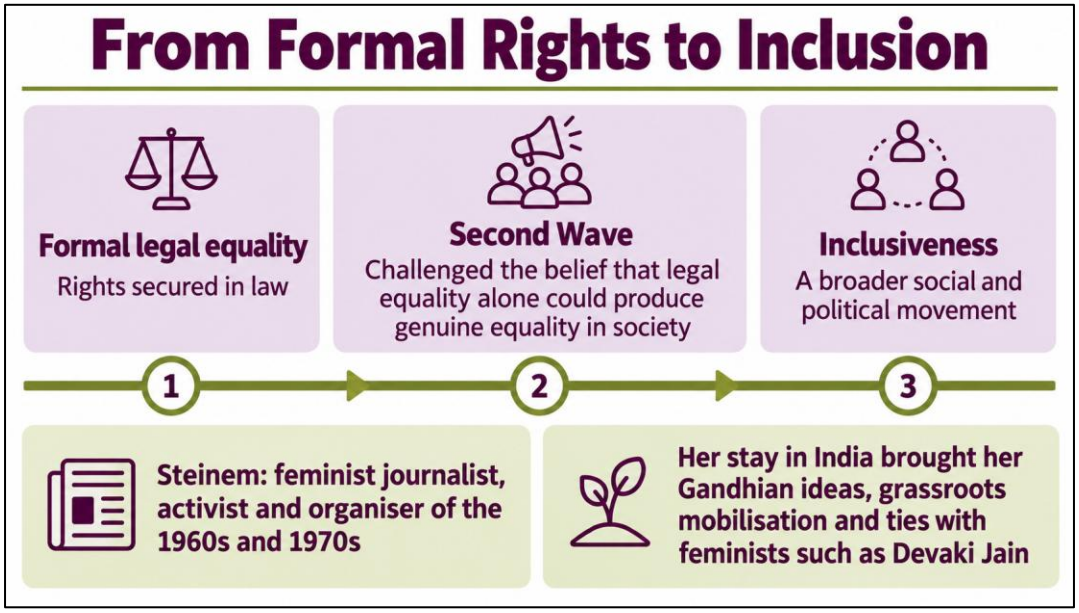
6.4 Evolution and Inclusiveness of Feminist Movements

Context:

Gloria Steinem, a defining figure of the Second Wave of feminism, died on 3 September 2026, aged 92. Her life mirrors feminism's evolution from formal legal equality to equality in everyday life, and later to intersectional approaches that see how gender interacts with race, caste, class and sexuality.

Background:

- **Waves of feminism:** the First Wave won legal rights such as the vote; the Second Wave (1960s to 1980s) challenged inequality in daily life; later waves stressed diversity among women.
- **Gloria Steinem:** an American journalist, activist and organiser who became a leading feminist voice in the 1960s and 1970s.
- **Indian connection:** her early stay in India, including at Miranda House, exposed her to Gandhian ideas and grassroots movements; she worked for decades with Indian feminists such as Devaki Jain.
- **Intersectionality:** a term coined by Kimberlé Crenshaw in 1989 for how overlapping inequalities reinforce one another.



Explanation:

Steinem and the Second Wave:

- **New question:** she shifted debate from "Do women have equal rights?" to "Can women actually exercise them?"
- **Media as a tool:** she co-founded **Ms. magazine**, bringing workplace discrimination, reproductive rights and domestic violence into the mainstream.
- **Exposing exploitation:** her 1963 undercover report as a Playboy Bunny revealed objectification and poor working conditions.

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- **Politics:** she helped found the **National Women's Political Caucus** to increase women's political participation.
- **"The personal is political":** inequalities at home and work reflect wider structures of power.

From one womanhood to many:

- **The critique:** Second Wave feminism often treated women as one group, reflecting white, middle-class experience.
- **Intersectional turn:** feminists recognised that race, class, caste, sexuality and income shape women's lives differently.
- **Steinem's evolution:** she increasingly took up race, caste, poverty and LGBTQ+ rights, moving beyond a men-versus-women frame.
- **Indian echo:** Dalit feminists similarly argued that mainstream Indian feminism overlooked caste.

Lessons for India:

- **Self-correction:** movements grow stronger by listening to internal criticism.
- **Differently placed women:** policy must reach Dalit, tribal, rural and minority women, not an average woman.
- **Better data:** gender data split by caste, region and income can reveal overlapping disadvantage.

Conclusion:

Steinem's life traces feminism's expansion from formal rights to substantive equality and then to intersectional justice. Its continued relevance, in India as elsewhere, depends on recognising diversity among women and the overlapping disadvantages they face.

Mains Practice Question:

Q. How does intersectionality improve the understanding of women's unequal experiences? Discuss with reference to caste, class and other social locations in India. *(10 Marks, 150 Words)*

6.5 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:

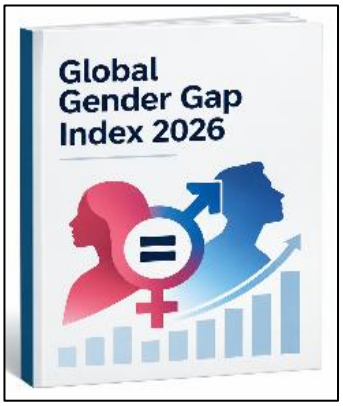
- **Origin:** the **Chief Minister's Breakfast Scheme** was launched in **2022** for Classes I to V.
- **Expansion:** now extended to Classes VI to VIII and renamed the **Perunthalaivar Kamarajar Breakfast Scheme**.
- **Aim:** breakfast before school to reduce classroom hunger and improve nutrition, 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.

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6.6 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.

6.7 Ninth Rashtriya Poshan Maah: The National Nutrition Month

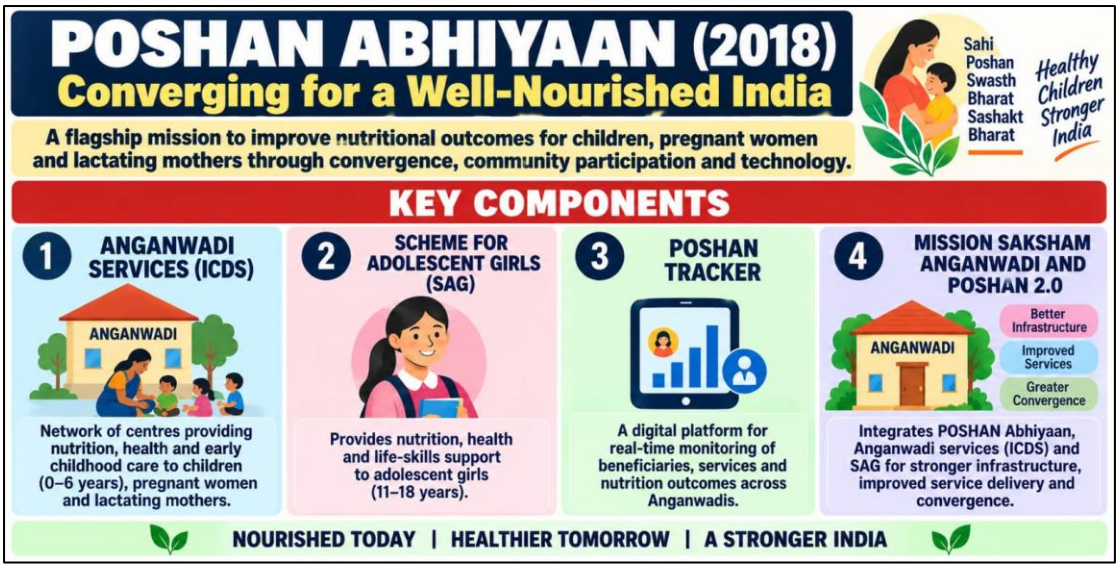
Context:

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.

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Prelims Capsule

6.8 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.

6.9 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.

Space for Notes

6.10 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.

Prelims Practice Questions

1. Consider the following statements:

1. Article 17 abolishes untouchability and forbids its practice in any form.
2. The Protection of Civil Rights Act, 1955 was enacted to give effect to Article 17.
3. Article 17 can be enforced only against the State, not against private individuals.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

2. Which of the following are dimensions of the World Economic Forum's Global Gender Gap Index?

1. Economic Participation and Opportunity
2. Educational Attainment
3. Health and Survival
4. Political Empowerment

Select the correct answer using the code given below:

(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

3. Consider the following statements:

1. The "first 1,000 days" refers to the first 1,000 days after a child joins school.
2. PM POSHAN provides hot cooked meals to children in government and government-aided schools.
3. Rashtriya Poshan Maah is observed every September under POSHAN Abhiyaan.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answers

1. (a) 2. (d) 3. (b)

7. Internal Security

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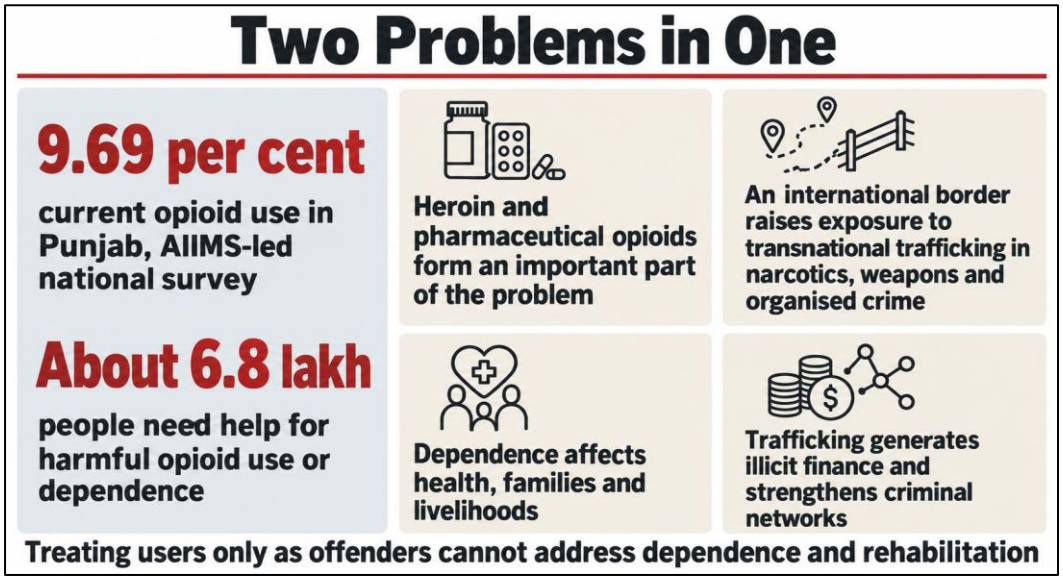
7.1 Punjab's Drug Crisis: A Public Health and Internal Security Challenge

Context:

Punjab faces a persistent drug crisis that combines opioid dependence, organised trafficking and cross-border smuggling, increasingly by drones. Over 15% of the State's population reportedly uses some substance, and rising de-addiction admissions show why policing alone cannot solve the problem.

Background:

- **NDPS Act, 1985:** the Narcotic Drugs and Psychotropic Substances Act is the main law regulating drugs and penalising their unauthorised production, possession and trafficking.
- **Narcotics Control Bureau (NCB):** set up in 1986 under the Ministry of Home Affairs to coordinate action against drug trafficking.
- **Golden Crescent:** Punjab lies close to this major opium-producing region of Afghanistan, Iran and Pakistan.
- **Demand reduction:** the **National Action Plan for Drug Demand Reduction (NAPDDR)** and the **Nasha Mukt Bharat Abhiyaan (NMBA)**, launched in 2020 and nationwide since 2023, run under the Ministry of Social Justice and Empowerment.



Explanation:

The current situation:

- **Heroin dominates:** it is the most widely abused and most seized drug in the region.
- **Young victims:** most opioid-dependent people are aged **18 to 35**.
- **Rising treatment demand:** admissions at State de-addiction centres and registrations for outpatient opioid treatment keep climbing.
- **Two-sided problem:** a supply side run by organised networks and a demand side rooted in health and social distress.

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Why the crisis persists?

- **Organised supply chains:** arresting street peddlers leaves financiers, suppliers, transporters and cross-border networks intact.
- **Drone trafficking:** small drones drop consignments across hard-to-watch border stretches; the Border Security Force (BSF) has expanded counter-drone systems.
- **Illicit finance:** drug money is layered through businesses, informal transfers and financial networks.
- **Dependence and relapse:** opioid dependence is a chronic health condition needing long treatment and reintegration, not short detox.
- **Social vulnerability:** unemployment, family distress and peer networks raise risk among some youth, though no single factor explains addiction.

Enforcement plus public health:

- **Supply side:** the NCB, BSF and Punjab Police target trafficking, drone drops and distribution networks.
- **Follow the money:** the Enforcement Directorate (ED) can pursue drug proceeds under the **Prevention of Money Laundering Act (PMLA), 2002.**
- **Treatment:** accessible de-addiction centres, supervised medication, counselling and family support are essential.
- **Less stigma:** treating addiction as an illness encourages people to seek help early.
- **Prevention:** schools and communities need evidence-based programmes, not fear-based messages.

Way Forward:

- **Network policing:** intelligence-led action against traffickers, financiers and repeat offenders, not just seizures.
- **Border technology:** more anti-drone surveillance and BSF-Police coordination.
- **Opportunity for youth:** education, skilling and jobs to address root causes.
- **Measure results:** reliable data to check whether enforcement and treatment are actually reducing dependence.

Value Addition:

- **Drug supply reduction:** disrupting production, trafficking and distribution.
- **Drug demand reduction:** preventing initiation and reducing use through awareness and social interventions.
- **Harm reduction:** reducing health damage among people already using drugs.
- **Whole Person Recovery:** combining medical care, counselling, rehabilitation and social reintegration, as reflected in NAPDDR.

Conclusion:

Punjab's drug crisis cannot be solved by policing or rehabilitation alone. A lasting response combines secure borders, disruption of criminal finance, evidence-based treatment, prevention and social reintegration, with firmness towards traffickers and care for people who are dependent.

Mains Practice Question:

Q. Design an integrated strategy addressing cross-border trafficking, criminal finance, prevention, treatment and social reintegration. ***(15 Marks, 250 Words)***

7.2 FATF Report on Technology-Driven Digital Hawala Networks

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Context:

A Financial Action Task Force (FATF) report warns that traditional **hawala** networks are increasingly using digital tools and virtual assets, with nearly **70%** of surveyed jurisdictions reporting such technology use, creating new channels for money laundering and terrorist financing.



Explanation:

- **Hawala:** an informal value-transfer system in which money moves through intermediaries (**hawaladars**), often without cash physically crossing borders.
- **FATF's term:** Hawala and Other Similar Service Providers (HOSSPs).
- **Digital hawala:** combines trust-based networks with encrypted messaging, mobile wallets, fintech apps, instant payments and virtual assets.
- **Stablecoins and VASPs:** stablecoins, whose value is pegged to assets such as a currency, are used for settlement, and Virtual Asset Service Providers handle exchange, transfer or custody.
- **Harder to trace:** rapid conversion between cash and crypto, multi-account routing and AI-based structuring hide illicit flows.
- **Professional laundering:** FATF lists underground banking and hawala among key channels of professional money-laundering networks.
- **FATF:** an intergovernmental standard-setter set up in **1989** to combat money laundering, terrorist financing and proliferation financing.

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8. History and Art & Culture

8.1 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**.

8.2 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.

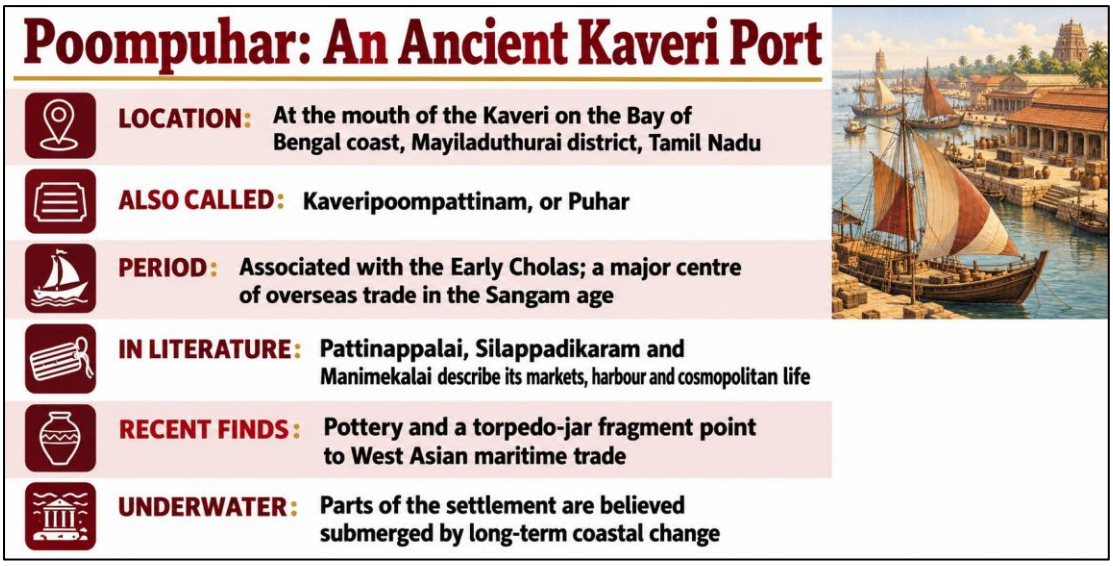
8.3 Poompuhar: Underwater Archaeology and Ancient Maritime Trade

Space for Notes

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.



Prelims Capsule

8.4 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.

Space for Notes

8.5 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).

Prelims Practice Questions

1. Consider the following statements about Sarnath:

1. The Buddha delivered his first sermon at Sarnath.
2. The Lion Capital adopted as India's National Emblem was found at Sarnath.
3. The Dhamek Stupa at Sarnath was built by Kanishka.

Which of the statements given above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

2. Consider the following pairs:

1. Shekhawati havelis: Rajasthan
2. Poompuhar: Tamil Nadu
3. Ramanathaswamy Temple: Kerala

How many of the pairs given above are correctly matched?

(a) Only one
(b) Only two
(c) All three
(d) None

Answers

1. (a) 2. (b)

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