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PRESIDENT AND STATE BILLS

STANDING DEPOSIT FACILITY (SDF)

DIRECTED ENERGY WEAPON (DEW)

NAINI LAKE

BLUE WASHING

**TOPPER'S
RECOMMENDED**

BEST CHOICE

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PRELIMS



POLITY & GOVERNANCE



RIGHT TO INFORMATION ACT

Context: Congress leader Gaurav Gogoi recently criticized the Digital Personal Data Protection (DPDP) Act, calling it “draconian” and expressing concern that it limits access to information.

Decoding the context: Other opposition leaders have also urged Union Minister Ashwini Vaishnaw to repeal Section 44(3) of the DPDP Act, arguing that it effectively dilutes the RTI framework.

Learning Corner:

- The DPDP Act propose to amend the **Section 8(1)(j)** of the RTI Act, 2005. This section prevents a public authority from sharing anyone’s personal information on two main grounds – that the disclosure will have no bearing on any public activity, and that revealing such information would cause unwarranted invasion of the privacy of an individual, unless such disclosure is justified in larger public interest.
- According to the proposed **DPDP** law, the two key grounds, that such information could be disclosed provided it serves a larger public interest, have been done away with.
- Union Minister **Vaishnav**, in response to the opposition claims, underlined that protection of personal information was important as the Supreme Court in the **Puttaswamy judgment** had held privacy to be an integral part of the Right to Life.

About RTI Act

- The **RTI Act** came into **force in October 2005**.
- **Roots:**
 - Emerged from grassroots movements, notably the **Mazdoor Kisan Shakti Sangathan (MKSS)** in Rajasthan, advocating for access to government records in the 1990s.
 - Built on earlier laws like the **Freedom of Information Act, 2002** (never implemented) and state-level RTI laws (e.g., Tamil Nadu, 1997; Rajasthan, 2000).
 - Influenced by **Article 19(1)(a)** of the Constitution (freedom of speech and expression), which implies the right to know.
- According to the official site of the Right to Information, “the basic object of the RTI Act is to empower the citizens, promote transparency and accountability in the working of the Government, contain corruption, and make our democracy work for the people in a real sense.” These are the four pillars of the Act.

Key Provisions of the RTI Act, 2005

- **Scope:** Applies to all public authorities (Central, State, and local governments, including bodies substantially funded by the government) across India.

- **Process:**
 - o **Application:** Citizens submit a written or electronic request to the Public Information Officer (PIO) or Assistant PIO of the concerned authority with a nominal fee (₹10; waived for BPL applicants).
 - o **Timeline:** Information must be provided within 30 days (48 hours for life/liberty matters). Appeals for non-compliance go to a First Appellate Authority (FAA) within the organization, followed by the Information Commission (Central/State).
 - o **Penalties:** PIOs face fines (up to ₹25,000) for delays, refusal, or misinformation (Section 20).
- **Exemptions (Section 8):**
 - o Information affecting national security, sovereignty, or foreign relations.
 - o Trade secrets, intellectual property, or personal privacy (unless public interest overrides).
 - o Cabinet papers and ongoing investigations (with caveats).
- **Section 4:** Mandates proactive disclosure of information (e.g., budgets, policies) by public authorities to reduce RTI requests.
- **Information Commissions:** The RTI Act, 2005, provided for a Central Information Commission and State Information Commissions to deal with appeals and complaints against public authorities.

Source : [Indian Express](#)

ARTICLE 143

Context: A key takeaway from the Supreme Court's judgment in the Tamil Nadu Governor case is its observation that when a Governor reserves a Bill for the President's assent on grounds of perceived unconstitutionality, the President ought to seek the Supreme Court's opinion.

Decoding the context: The Court noted that both the Sarkaria Commission and the Punchhi Commission categorically recommended the President to seek the opinion of this Court under Article 143 in respect of bills that may be apprehended to be patently unconstitutional.

Learning Corner:

- Article 143 of the Indian Constitution grants the President the power to seek advisory opinions from the Supreme Court on matters of public importance. This advisory jurisdiction allows the President to consult the Supreme Court on questions of law or fact.
- The April 8, 2025 judgement, says that, invoking Article 143, the President “ought to” seek its opinion where the Governor has reserved the Bill for his/her consideration on the ground of “perceived unconstitutionality.”
- Acknowledging that it's not mandatory for the government to accept its opinion, the SC added that the same “holds high persuasive value and should ordinarily be accepted by the legislature and the executive” and “merely because the jurisdiction under Article 143 is not binding does not

undermine the principles used by this Court to determine the constitutionality of the bill.”

- The ruling also spoke of the manner in which the SC would exercise its power in case of such a reference.
- Ruling said that the court “in such situations...has to be mindful as to whether the reference received from the President under Article 143 pertains to pure legal questions regarding interpretation of the Constitution or questions that are in the nature of a policy consideration. In case of the latter, the Supreme Court, having regard to the relevant facts and circumstances, can refuse to express its advisory opinion upon being satisfied that the questions presented to it are purely socio-economic or political questions and have no relation to the Constitution.”

Source : [Indian Express](#)

CHIEF JUSTICE OF INDIA (CJI)

Context: Justice Bhushan Ramkrishna Gavai is set to become the 52nd Chief Justice of India (CJI) on May 14, 2025, succeeding Justice Sanjiv Khanna, who retires on May 13.

Decoding the context: Justice Gavai will serve until his retirement on November 23, 2025, and will be the second Dalit to hold the position after Justice K.G. Balakrishnan.

Learning Corner:

- Article 124(2) of the Constitution empowers the President of India to appoint the CJI and other Supreme Court judges.

Functions:

- Leads judicial proceedings, including Constitution Benches for landmark cases (e.g., Article 370 abrogation, upheld by Justice Gavai in 2023).
- Administers the Supreme Court, assigning cases and forming benches.
- Acts as the “**Master of the Roster,**” deciding case allocations.
- Advises on judicial appointments via the Collegium system

Appointment Process:

- **Memorandum of Procedure (MoP):** The outgoing CJI recommends the senior-most Supreme Court judge as successor to the Union Law Ministry, followed by government approval and presidential appointment.
- **Seniority Norm:** The senior-most judge of the Supreme Court is typically appointed as the CJI.
- **Tenure:** Until retirement at age 65.
- **Removal:** As per Article 124(4), a judge, including the CJI, can be removed by the President on grounds of proved misbehavior or incapacity, following a special majority in both Houses of Parliament.

Source : [Hindustan Times](#)

ARTICLE 142

Context: Vice President Jagdeep Dhankhar criticised the Supreme Court for a judgement setting a timeline for the President to sign the bills passed by the states. VP was referring to the April 8 judgement in the state of Tamil Nadu versus the governor case, which was seen as a win for the states across India.

Decoding the context: Questioning the judgement for setting a timeline for the President of India to sign bills passed by the states, Dhankhar called for accountability by the judiciary. He also described Article 142 of the Indian Constitution as, “nuclear missile against democratic forces available to the judiciary 24x7”.

Learning Corner:

Constitutional Provision:

- Article 142(1): The Supreme Court in the exercise of its jurisdiction may pass such decree or make such order as is necessary for doing complete justice in any cause or matter pending before it, and any decree so passed or order so made shall be enforceable throughout the territory of India.
- Article 142(2): Grants the Supreme Court powers to secure attendance, evidence, or enforce decrees, subject to law.

Scope and Powers:

- Provides the Supreme Court with extraordinary powers to issue orders beyond existing laws if required for justice, making it a unique judicial tool.
- Used in diverse cases: environmental protection, fundamental rights enforcement, and legislative-executive disputes.
- **Examples:**
 - **Union Carbide Case (1989):** Ordered compensation for Bhopal gas tragedy victims, bypassing statutory limits.
 - **Coal Block Allocation Case (2014):** Cancelled 204 coal block allocations to ensure transparency.
 - **Illegal Demolitions Guidelines (2024):** Set norms to protect citizens' rights, cited by Justice B.R. Gavai.

Significance:

- **Judicial Flexibility:** Enables the Supreme Court to address legal gaps, ensuring justice in complex cases (e.g., 4.8 crore pending cases, 2025).
- **Federal Balance:** In the 2025 case, it reinforced states' rights against gubernatorial delays, strengthening cooperative federalism.
- **Public Interest:** Used in PILs to protect rights (e.g., environmental cases like Taj Trapezium, 1996).

Controversies:

- **Judicial Overreach:** Critics, including VP Dhankhar, argue Article 142 risks encroaching on legislative and executive domains, as seen in the 2025 ruling setting presidential timelines.
- **Lack of Accountability:** No clear limits on its use, raising concerns about subjective application (e.g., liquor ban on highways, 2016, later modified).

- **Historical Debates:** Similar criticisms arose in the National Judicial Appointments Commission (NJAC) Case (2015), where Article 142 was used to strike down NJAC, reinforcing the Collegium system.

Source : [Indian Express](#)

ARTICLE 355

Context: The Supreme Court today declined to pass any directions on a plea seeking deployment of paramilitary forces in West Bengal in light of the violence that broke out in Murshidabad over the Waqf (Amendment) Act.

Decoding the context: The petitioner sought for immediate deployment of paramilitary forces and the implementation of Article 355 of the Constitution.

Learning Corner:

- **Text of Article 355:** "It shall be the duty of the Union to protect every State against external aggression and internal disturbance and to ensure that the Government of every State is carried on in accordance with the provisions of this Constitution."

Key Features:

- **Duty of the Union (Central Government):**
 - o To protect states from:
 - External aggression (e.g., foreign invasion).
 - Internal disturbance (e.g., riots, insurgency, terrorism).
 - o To ensure the constitutional machinery in the state functions properly.
- **Part of Emergency Provisions:**
 - o Included in Part XVIII of the Constitution (Articles 352–360).
 - o It acts as a justification or pre-condition for the imposition of President's Rule (Article 356).
- **Not self-executing:** Article 355 does not automatically confer powers; it imposes a duty.
- **Constitutional Context:** Often read in conjunction with Article 356, which allows for President's Rule if a state government fails to comply with constitutional provisions.

Source : [News On AIR](#)

PRESIDENT AND STATE BILLS

Context: President Droupadi Murmu has withheld assent to Tamil Nadu's Bill seeking exemption from the mandate of National Eligibility-cum-Entrance Test (NEET)-based admissions for undergraduate medical courses in government medical colleges.

Decoding the context: The Tamil Nadu Admission to Undergraduate Medical Degree Courses Bill was passed unanimously in the Assembly in September 2021. After the Bill was returned by the Governor, an all-party meeting was held in February 2022. The Bill was then re-adopted in the Assembly.

Learning Corner:

- When a Bill is passed by the Legislature of a State, it is presented to the Governor for assent. In certain cases, the Governor may reserve the Bill for the consideration of the President.

Step-by-Step Legislative Process and Presidential Role

- After a state legislature passes a Bill, the Governor has 4 options under Article 200:
 - o Give assent to the Bill — it becomes law.
 - o Withhold assent — the Bill fails.
 - o Return the Bill (if not a money bill) for reconsideration. If passed again, must give or reserve assent.
 - o Reserve the Bill for the President's consideration.
- Some situations where the Governor must or may reserve a bill for the President's consideration:
 - o Bills that curtail the powers of the High Court (mandatory reservation).
 - o **Bills Affecting Union-State Relations (Article 288 & 304)** - If a state bill affects the powers of the Union Government (e.g., taxation, trade, or commerce under Article 288 or Article 304(b)), it requires Presidential assent.
 - o **Bills on Concurrent List (Article 254(2))** - If a state bill contradicts an existing Central law on a Concurrent List (List III) subject, the President's assent are needed to override the Central law.
 - o **Bills Related to Certain Special Categories (Article 31A, 31C)** - Bills involving compulsory acquisition of property (under Article 31A) or those implementing Directive Principles of State Policy (DPSP) overriding Fundamental Rights (Article 31C).
- **President's Powers over Reserved Bills (Article 201) - Once a Bill is reserved, the President can:**
 - o Give assent — the Bill becomes law.
 - o Withhold assent — the Bill is dead.
 - o Return the Bill (if not a money bill) to the State Legislature with a message for reconsideration.
- If the Bill is passed again (with or without amendments), the President is not bound to give assent.

Source : [Indian Express](#)

SPEAKERS AND DEFECTION

Context: The Supreme Court took a strong stand against prolonged inaction by Speakers in deciding disqualification petitions under the anti-defection law, asserting that it cannot remain “a mute spectator”.

Decoding the context: The court was hearing a case related to the disqualification of Bharat Rashtra Samithi (BRS) MLAs from Telangana who defected to the ruling Congress. The petitions, pending before the Speaker for an extended period, prompted the bench to question whether courts should remain powerless if no action is taken for years.

Learning Corner:

- The Tenth Schedule was inserted into the Indian Constitution by the 52nd Amendment Act of 1985. Its primary purpose is to curb political defections (often called “horse-trading”) by presiding over the issue of disqualification of legislators who defect from their political parties.

- **Grounds for Disqualification under Anti-Defection Law - A legislator (MP or MLA) can be disqualified:**
 - o If an elected member voluntarily gives up the membership of their political party.
 - o If they vote or abstain from voting in the legislature against the party's directive (whip) without prior permission.
 - o If an independent member joins a political party after the election.
 - o If a nominated member joins a party after six months of nomination.
- **Exceptions -**
 - o **Merger provision:** If 2/3rd of a legislative party merges with another party, it will not be considered defection. Earlier exception for split by 1/3rd members was removed by the 91st Amendment Act, 2003.

Role & Powers of the Speaker (or Chairman)

- **Final Authority:** The Speaker or Chairman is the final deciding authority on disqualification under the Tenth Schedule.
- **Quasi-Judicial Authority:** The Speaker's decision acts in a quasi-judicial capacity.
- **Judicial Review:** Initially, the Speaker's decision was not subject to judicial review. However, in the Kihoto Hollohan case (1992), the Supreme Court ruled that:
 - o Speaker's decision is subject to judicial review.
 - o Courts can review the legality and constitutionality of the Speaker's decision after it is made.
- **Criticism of Speaker's Role:**
 - o Bias concerns arise as the Speaker belongs to a political party.
 - o Delays in decision-making allow legislators to hold power despite defection.

Source : [Hindustan Times](#)



INTERNATIONAL RELATIONS

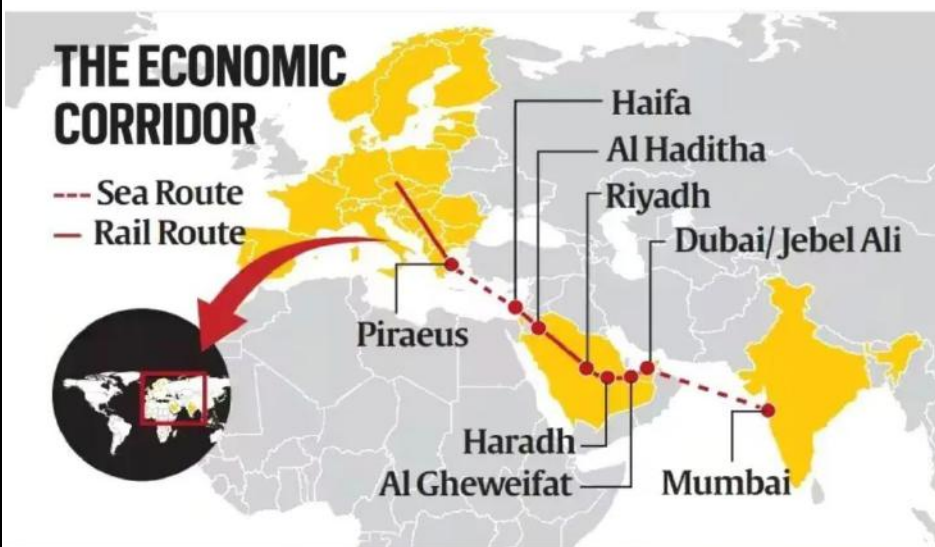


INDIA - MIDDLE EAST – EUROPE ECONOMIC CORRIDOR (IMEC)

Context: India and Italy recently reiterated their commitment to work jointly on the ambitious India-Middle East-Europe Economic Corridor (IMEEC or the IMEC).

Decoding the context: The project was mentioned during talks between External Affairs Minister S Jaishankar and Italian Deputy Prime Minister and Minister of Foreign Affairs, Antonio Tajani, in New Delhi.

Learning Corner:



- The IMEC is a landmark project announced during the G20 Leaders' event in New Delhi in 2023.

- It is aimed at stimulating economic development through enhanced connectivity and economic integration between Asia, the Middle East, and Europe.

- It will have two separate corridors, the east corridor connecting India to the Arabian Gulf and the northern corridor

connecting the Arabian Gulf to Europe, along with a railway route for supplementing trade exchanges between India, the UAE, Saudi Arabia, Jordan, Israel, and Europe.

- India, Saudi Arabia, the UAE, France, Germany, Italy, the European Union and the United States signed an MoU for its development, linked to the Partnership for Global Infrastructure and Investment (PGII).
- First announced in 2021 during the G7 (or Group of Seven) summit in the UK, the PGII has been billed as an alternative funding source to China's Belt and Road Initiative (BRI).

Challenges and progress

- The October 7, 2023 Hamas attack on Israel, and the ensuing Gaza conflict, cast uncertainty over the viability of IMEEC.
- Heightened tensions in the Middle East pose risks to infrastructure continuity and cooperation.
- During Prime Minister Modi's visit to France earlier this year, he, along with French President Emmanuel Macron, visited the port city of Marseille.
- President Macron highlighted Marseille's strategic potential as a primary entry point into the European market, describing IMEC as a "fabulous catalyst" for "concrete projects and investment."

Source : [Indian Express](#)

UNESCO'S MEMORY OF THE WORLD REGISTER

Context: Manuscripts of the Bhagavad Gita and Bharata's Natyashastra are among the 74 new additions to UNESCO's Memory of the World Register this year.

Decoding the context: With the latest additions, the Register now contains 570 entries.

Learning Corner:

- The United Nations Educational, Scientific and Cultural Organization (UNESCO) launched the Memory of the World (MoW) Programme in 1992 with the aim of “guarding against the collective amnesia, calling upon the preservation of the valuable archive holdings and library collections all over the world, and ensuring their wide dissemination”.
- The central project of the MoW Programme was to create a compendium of documents — manuscripts, oral traditions, audio-visual materials, and library and archive holdings — which are of “world significance and outstanding universal value”. This is the MoW Register.
- Beginning in 1997, the Register has been biennially updated — with the exception of a lengthy gap between 2017 and 2023. In any year, at most two submissions from a country are added.
- The Register contains 13 submissions by India, including two joint-submissions. These range from the Rig Veda (added in 2005) and the collective works of the Shaivite philosopher Abhinavagupta (added in 2023), to the archives of the first summit meeting of the Non Aligned Movement in Belgrade in 1961 (added in 2023) and the archives of the Dutch East India Company (added in 2003).
- The latter two entries were joint submissions, which India made with other countries.
- This year's entries champion India's ancient literary heritage. Both are specific manuscripts — not the text in general — preserved by the Bhandarkar Oriental Research Institute, Pune.

Natyashastra:

- Attributed to the sage Bharata, Natyashastra is an ancient Sanskrit treatise on performing arts.
- Comprising 36,000 verses, the “Nāṭyashastra embodies a comprehensive set of rules that define natya (drama), abhinaya (performance), rasa (aesthetic experience), bhava (emotion), sangita (music),” the UNESCO citation says. According to the citation in the Register, it was “codified around the 2nd century BCE.

Bhagavad Gita:

- Attributed to the sage Vyasa, Bhagavad Gita is a Sanskrit scripture comprising 700 verses that are organised in 18 chapters, embedded in the sixth book (Bhishma Parva) of the epic poem Mahabharata.
- “Bhagavad Gita is a central text in the continuous, cumulative ancient intellectual Indian tradition, synthesising various thought movements such as, Vedic, Buddhist, Jain, and Charvaka,” the UNESCO citation says.

Source : [Indian Express](#)

UN SECURITY COUNCIL REFORMS

Context: India has called out attempts to introduce new parameters such as religion and faith as the basis for representation in a reformed UN Security Council, asserting that this runs completely counter to the accepted basis of regional representation.

Decoding the context: India asserted that a consolidated model that does not cover expansion in both the permanent and non-permanent categories, would not achieve the purpose of reform.

Learning Corner:

Establishment and Legal Basis:

- Created under the UN Charter (1945), Chapter V (Articles 23-32) outlines the UNSC's composition, powers, and procedures.
- **Article 23:** Establishes the UNSC with 15 members—5 permanent (P5: USA, Russia, China, UK, France) and 10 non-permanent, elected for 2-year terms.
- **Article 24:** Confers primary responsibility for peace and security, with decisions binding on all UN members.
- **Article 27:** Grants veto power to P5 on substantive issues, requiring 9/15 votes for decisions.

Composition and Functions:

- **Permanent Members (P5):** China, France, Russia, the United Kingdom, and the United States. Hold veto power, reflecting post-WWII geopolitical realities.
- **Non-Permanent Members:** 10 (elected by the UN General Assembly for a two-year term based on regional representation, not eligible for immediate re-election).
- **Functions:**
 - Authorize peacekeeping missions, sanctions, and military actions.
 - Address threats to peace.
 - Approve the admission of new UN members (on recommendation from the General Assembly).
 - Recommend appointment of the UN Secretary-General.

India's Engagement:

- **Non-Permanent Member:** Served 8 terms (most recently 2021-2022), advocating for reforms and counter-terrorism measures.
- **G4 Advocacy:** India, with Brazil, Germany, and Japan, seeks permanent membership to reflect contemporary global realities (1.4 billion population, 5th largest economy).

Positions of various groups

- The G4 nations reiterated that any reform not accompanied by expansion of both permanent and non-permanent categories is incomplete in the view of the broad membership.
- The Uniting for Consensus (UfC) Group comprising Argentina, Canada, Colombia, Costa Rica, Malta, Mexico, Pakistan, the Republic of Korea, San Marino, Spain, Türkiye and Italy, maintains its position of increasing the number of Security Council seats exclusively in the non-permanent category.

- UfC proposes a 27-member Security Council, without any increase in the number of permanent members, which currently stands at five.

Source : [The Hindu](#)

BREAKTHROUGH PRIZE 2025

Context:The 2025 Breakthrough Prize in Fundamental Physics was awarded to 13,508 physicists across four collaborative projects at CERN, the European particle physics laboratory near Geneva, Switzerland.

Decoding the context:The award was announced on April 5th as part of the 11th annual Breakthrough Prizes. Six prizes worth \$3 million each were announced in Life Sciences, Mathematics and Fundamental Physics.

Learning Corner:

- The Breakthrough Prize is one of the most prestigious awards in science, often referred to as the "Oscars of Science".
- The awards were established in 2013 by Mark Zuckerberg and his wife Priscilla Chan, former Google chief Sergey Brin, Genomics Company 23&Me founder Anne Wojcicki, and tech investor couple Yuri and Julia Milner to recognize groundbreaking achievements in Life Sciences, Fundamental Physics, and Mathematics.

Breakthrough Prize In Life Sciences - The award in this category was given to three groups of scientists:

- **Weight-loss drugs** : Five scientists — Daniel J. Drucker, Joel Habener, Jens Juul Holst, Lotte Bjerre Knudsen, and Svetlana Mojsov — were awarded a prize for discovering and characterizing the GLP-1 hormone, which led to the development of weight loss and diabetes drugs like Ozempic and Wegovy.
- **Multiple Sclerosis treatment** : Multiple Sclerosis is an unpredictable chronic disease caused by the immune system attacking the protective sheath that covers nerve fibres of the central nervous system. Alberto Ascherio and Stephen L. Hauser were awarded the Prize for identifying the role of the B-cells of the immune system in Multiple Sclerosis (MS) and devising treatments targeted at the same.
- **Gene-editing technologies** : David R Liu was awarded the Prize for developing the base editing and prime editing technologies widely used to edit the DNA of living organisms. These are significant as they can edit the DNA without cutting its double helix, and rewrite entire stretches of defective DNA with a corrected version.

Breakthrough Prize In Fundamental Physics

- The Breakthrough Prize in Fundamental Physics was awarded to four collaborations at the Large Hadron Collider (LHC) in CERN – ALICE, ATLAS, CMS and LHCb.
- The LHC is the world's largest and most powerful particle accelerator, causing protons to accelerate and collide, thus helping scientists study the properties of matter. The four collaborations studied the Higgs boson. The Higgs boson, also known as the 'God Particle', is known to impart mass to every other particle.

Source : [Indian Express](#)

INTER-PARLIAMENTARY UNION (IPU)

Context: Lok Sabha Speaker Om Birla, during a series of bilateral meetings held on the sidelines of the 150th Inter-Parliamentary Union (IPU) Assembly in Tashkent, highlighted the deep-rooted historical and cultural ties between India and Uzbekistan.

Decoding the context: Birla is leading the Indian Parliamentary Delegation (IPD) for the 150th Inter-Parliamentary Union (IPU) Summit.

Learning Corner:

- The Inter-Parliamentary Union (IPU) is a global organization that fosters cooperation among national parliaments to promote peace, democracy, and sustainable development.
- Established in 1889, it is the oldest international parliamentary organization and plays a crucial role in parliamentary diplomacy.
- **Slogan is:** For democracy. For everyone.
- **Key Facts About IPU**
 - **Headquarters:** Geneva, Switzerland.
 - **Members:** 180 national parliaments and 15 associate members.
 - **Motto:** "For democracy. For everyone."
- **Core Objectives:**
 - Strengthening democratic governance and parliamentary institutions.
 - Promoting gender equality and youth participation in politics.
 - Defending human rights of parliamentarians worldwide.
 - Supporting peace-building efforts through parliamentary dialogue.
- **Structure of IPU**
 - **IPU Assembly:** The main decision-making forum where global political and social issues are discussed.
 - **Governing Council:** Sets policies and elects the Executive Committee.
 - **Executive Committee:** Oversees operations and administration.
 - **Standing Committees:** Focus on key themes like peace, democracy, development, and cooperation

Source : [DD News](#)

CRISIS IN THE COTTON FIELDS

Context: India's cotton economy isn't in great shape. This, despite the advantage the country has as a producer of the natural fibre and its textile exports facing only 27% duty – as against China's 54%, Vietnam's 46%, Bangladesh's 37%, Indonesia's 32% and Sri Lanka's 44% – under US President Donald Trump's "reciprocal tariff" policy.

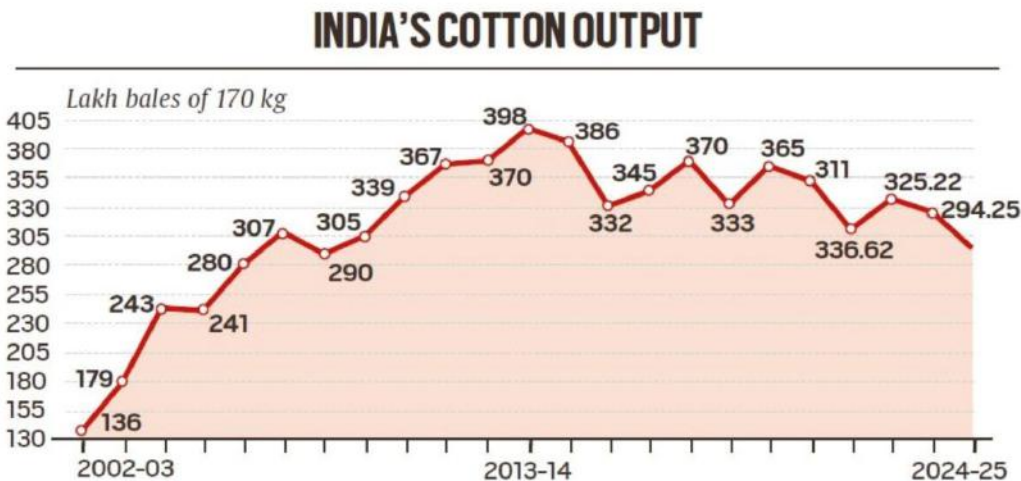
Decoding the context: The pink bollworm has brought down India's cotton production by a quarter in the

last decade. While a few seed companies have developed new genetically modified hybrids resistant to the dreaded insect pest, regulatory barriers are coming in the way of their commercialisation.

Learning Corner:

- India's cotton output in the 2024-25 marketing year (October-September) is projected at just over 294 lakh bales (lb; 1 lb=170 kg), the lowest since the 290 lb of 2008-09. Production has been on a

declining path since the peak of 398 lb in 2013-14.



- The cultivation of genetically modified (GM) cotton hybrids – incorporating alien genes isolated from a soil bacterium, *Bacillus thuringiensis* or Bt – had led to not only a near-trebling of production (from 136 lb to 398 lb), but also a 139-fold jump in

exports (from 0.8 lb to 117 lb), between 2002-03 and 2013-14.

- The above production slide, and India turning from a large cotton exporter to a net importer, is mainly courtesy of the pink bollworm (PBW).

About pink bollworm (PBW)

- The pink bollworm (PBW), known among farmers as gulabi sundhi, damages the cotton crop by burrowing its larvae into the cotton bolls. This results in the lint being cut and stained, making it unfit for use.
- The GM cotton now grown in India have two Bt genes, 'cry1Ac' and 'cry2Ab', coding for proteins toxic to the American bollworm, spotted bollworm and cotton leafworm pests. The double-gene hybrids initially provided some protection against the PBW too, but that effectiveness has dissipated over time.
- The reason for it is that the PBW is a monophagous pest, which feeds exclusively on cotton. This is unlike the other three pests that are polyphagous and survive on multiple host crops.
- Being monophagous enabled the PBW larvae to gradually build resistance to the toxins from the existing Bt cotton hybrids. The PBW population that became resistant from continuously feeding on these plants eventually overtook and replaced the ones that were susceptible.
- The pest's short life cycle (25-35 days from egg laying to adult moth stage), allowing it to complete at least 3-4 generations in a single crop season of 180-270 days, further accelerated the resistance breakdown process.

Source : [Indian Express](https://www.indianexpress.com)

READINESS FOR FRONTIER TECHNOLOGIES INDEX

Context: The 2025 Technology and Innovation Report, issued by UN Trade and Development (UNCTAD), stated that India ranked 36th in 2024 on the 'Readiness for Frontier Technologies' index, improving its position from 48th in 2022.

Decoding the context: Frontier technology can be defined as technology that will reshape industry and communications and provide urgently needed solutions to global challenges and have the potential to displace existing processes. This type of technology encompasses a range of technologies, including blockchain, Artificial Intelligence (AI), the Internet of Things (IoT), and Virtual Reality (VR).

Learning Corner:

- The Readiness for Frontier Technologies Index is a global ranking that assesses how prepared countries are to adopt and develop frontier technologies like AI, blockchain, IoT, and robotics. It is published by UN Trade and Development (UNCTAD) as part of its Technology and Innovation Report.
- **India ranked 36th out of 170 nations in the 2024 Index, improving from 48th in 2022. The index evaluates countries based on five key indicators:**
 - o Information and Communications Technology (ICT) Deployment – India ranks 99th
 - o Skills – India ranks 113th
 - o Research & Development (R&D) – India ranks 3rd
 - o Industrial Capacity – India ranks 10th
 - o Access to Finance – India ranks 70th

Key Insights from the Report

- **Developing countries outperforming expectations:** India, along with Brazil, China, and the Philippines, has shown strong technology readiness despite lower per capita income.
- **AI Investment:** India ranks 10th globally in private AI investment, with \$1.4 billion invested in 2023. The United States leads with \$67 billion, followed by China with \$7.8 billion.
- **AI's Economic Impact:** AI is projected to reach \$4.8 trillion in market value by 2033, affecting 40% of global jobs. The report emphasizes the need for reskilling and upskilling to ensure AI benefits workers rather than replacing them.

Source : [Indian Express](#)

EXERCISE INDRA

Context: The 14th edition of the Indian - Russia bilateral naval exercise INDRA, a cornerstone of the enduring maritime partnership between India and Russia, has concluded.

Decoding the context: Since its inception in 2003, Exercise INDRA epitomises the long-term strategic relationship between the two Navies.

Learning Corner:

- Exercise Indra is a biennial bilateral naval exercise between the Indian Navy and the Russian Navy.

Objectives and Significance

- **Enhancing Interoperability:** Exercise is designed to improve mutual understanding and coordination. The drills focus on interoperability in a wide range of operations—from tactical maneuvers to anti-air drills—thereby enhancing the ability of both sides to work together during times of crisis.
- **Strategic Maritime Partnership:** Beyond its operational focus, Indra serves as a symbol of the strategic relationship between India and Russia, echoing decades of defense collaboration.
- **Skill Enhancement and Knowledge Exchange:** Through subject matter expert exchanges (SMEEs), reciprocal visits, and joint pre-sail briefings, both navies gain valuable insights into each other's operational tactics, thereby enriching their tactical acumen and strategic planning.
- **Exercise Indra is typically conducted in two distinct phases:**
 - o **Harbour Phase:** This phase is geared toward planning and the exchange of technical and tactical information, ensuring both sides are aligned before heading out to sea.
 - o **Sea Phase:** The sea phase demonstrates and tests the operational effectiveness of both navies in a realistic maritime setting.

Source : [PIB](#)

BAY OF BENGAL INITIATIVE FOR MULTI-SECTORAL TECHNICAL AND ECONOMIC COOPERATION (BIMSTEC)

Context: External Affairs Minister (EAM) S. Jaishankar emphasized that BIMSTEC should adopt a more ambitious approach amid the ongoing global churn that is creating a new world order which is more regional and agenda-specific.

Decoding the context: Addressing a meeting of foreign ministers of the BIMSTEC in Bangkok, Jaishankar emphasised the central role of India, especially its landlocked northeastern region, in forging transport and connectivity linkages. The meeting was part of the preparations for the Bimstec Summit, and was held hours after US President unveiled his reciprocal tariffs.

Learning Corner:

- BIMSTEC is a regional organization comprising countries around the Bay of Bengal that aims to foster economic and technical cooperation. The organization bridges South Asia and Southeast Asia.
- **BIMSTEC comprises seven member states:**
 - o **South Asia:** Bangladesh, Bhutan, India, Nepal, Sri Lanka
 - o **Southeast Asia:** Myanmar, Thailand
- It was established on June 6, 1997, through the Bangkok Declaration.
- Initially known as BIST-EC (Bangladesh, India, Sri Lanka, Thailand Economic Cooperation), it was later renamed BIMSTEC after the inclusion of Myanmar in 1997.
- The permanent secretariat is located in Dhaka, Bangladesh.

- **Rotational Chairmanship:** Leadership is rotated among members by a pre-determined order, ensuring that each country plays a central role in driving the agenda. Decisions are made on a consensus basis.
- BIMSTEC Charter was adopted during the 5th BIMSTEC Summit (2022), giving the organization a legal framework.

Objectives

- Promote economic growth and social progress in the region.
- Encourage trade and investment cooperation.
- Foster transport and connectivity.
- Strengthen regional security.
- Enhance technical and scientific collaboration.
- Work towards sustainable development.

Source : [Hindustan Times](#)

BIOLOGICAL WEAPONS CONVENTION

Context: Fiftieth anniversary of the entry into force of Biological Weapons Convention (BWC) was marked recently.

Decoding the context: As the first multilateral disarmament treaty to ban an entire class of weapons of mass destruction, the BWC has played a crucial role in establishing the global norm that the use of disease as a weapon is unacceptable.

Learning Corner:

- The **Biological Weapons Convention (BWC)** is a landmark international treaty that prohibits the development, production, acquisition, stockpiling, and use of biological and toxin weapons.
- The concept of biological warfare—using disease-causing organisms or toxic substances as weapons—has troubled humanity for centuries. The BWC formally arose from the recognition that biological agents, if weaponized, could lead to devastating epidemics and widespread disruption.
- Negotiated in the shadow of the Cold War, the BWC was opened for signature on April 10, 1972, in ceremonies held in London, Moscow, and Washington, D.C.
- It entered into force on March 26, 1975, after the requisite number of states had ratified the treaty. The negotiations built upon earlier disarmament efforts, notably the 1925 Geneva Protocol, which had prohibited the use—but not the possession or development—of biological weapons.

Key Provisions

- The treaty is relatively concise in its text—even though it addresses an entire class of weapons, it consists of just 15 articles that set out clear prohibitions and obligations. **The main provisions include:**
 - **Prohibition on Development and Production:** States Parties undertake not to develop, produce, or acquire biological agents or toxins that have no justification for prophylactic, protective, or other peaceful purposes.

- o **Stockpiling and Retention:** The treaty prohibits the stockpiling, transfer, or possession of such agents and toxins, ensuring that no country can build secret arsenals of biological weapons.
- o **Obligations to Destroy Existing Stockpiles:** States are required to eliminate or destroy any existing weapons, facilities, or stockpiles that could be used for biological warfare.
- o **Peaceful Use of Biotechnology:** The convention underscores that scientific advances in biology and biotechnology must serve only peaceful and beneficial purposes.
- Despite its clear prohibitions, **the Biological Weapons Convention (BWC)** lacks formal verification measures, a significant shortcoming. Unlike nuclear and chemical weapons treaties, which have stringent verification regimes, the BWC relies solely on transparency and mutual trust among states, making enforcement challenging.
- **Membership:** As of now, 188 countries are parties to the treaty. India signed the BWC on January 15, 1973 and ratified it on July 15, 1974.

Source : [UN](#)

ARCTIC COUNCIL

Context: International observers have raised concerns about escalating tensions in the Arctic, warning that if left unchecked, they could eventually spark conflict in the region.

Decoding the context: Unlike the Antarctic, which is demilitarised and environmentally protected by a dedicated international treaty, the Arctic lacks similar legal safeguards and is primarily governed by the **UN Convention on the Law of the Sea (UNCLOS)**. This allows nations to claim territories in the region and deploy military infrastructure.

Learning Corner:

- The Arctic Council is an intergovernmental forum established to promote cooperation, coordination, and interaction among the Arctic States, as well as with the indigenous peoples of the Arctic region, in the areas of sustainable development and environmental protection.
- The Arctic Council was established in 1996 with the signing of the Ottawa Declaration.
- **Purpose:**
 - o Promote cooperation among the Arctic States on environmental protection, sustainable development, and scientific research.
 - o Provide a platform for indigenous peoples of the Arctic to voice their concerns and contribute to policy discussions.
 - o Focus on climate change and its effects on the Arctic region, as it is warming at more than twice the global average.
- The Arctic Council includes eight member countries, all of which have territories in the Arctic region. **They are:** Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, Russia, Sweden, United States.
- **The Arctic Council is a non-binding forum, meaning it does not have the power to enforce its decisions.**



- It has become a crucial player in discussions on geopolitics, resource extraction, and security concerns in the Arctic, particularly in light of climate change and the potential opening up of new shipping routes.

- The Arctic Council also includes observer countries and **non-governmental organizations (NGOs)** that participate in meetings and contribute to research and policy discussions. Some of the observer countries include: China, Japan and India.

Source : [The Hindu](https://www.thehindu.com/news/international/arctic-council-meeting/article18454441.ece)



Economy



COUNTERCYCLICAL CAPITAL BUFFER

Context: The Reserve Bank of India, in its review of requirement of counter-cyclical capital buffer on Tuesday said it has decided against activating countercyclical capital buffer (CCyB) as it is not needed in the present circumstances.

Decoding the context: Counter-Cyclical Capital Buffer (CCyB) is a macroprudential tool mandated under the Basel III framework to enhance the resilience of banks during economic cycles.

Learning Corner:

- CCyB is an additional capital buffer (0-2.5% of risk-weighted assets) that banks must hold during periods of excessive credit growth to prevent systemic risks.
- **It aims to:**
 - Strengthen banks against potential losses during economic downturns.
 - Moderate credit booms to prevent asset bubbles.
- **Mechanism:**
 - Activation: RBI activates CCyB when credit growth (e.g., high credit-to-GDP gap) signals systemic risk, requiring banks to build capital reserves.
 - Deactivation: During downturns, RBI reduces or removes CCyB, freeing capital to support lending and economic recovery.
 - Capital is held as Common Equity Tier 1 (CET1), ensuring high-quality reserves.

Source : [Business Standard](#)

BOMBAY STOCK EXCHANGE (BSE)

Context: The Bombay Stock Exchange (BSE), Asia's oldest stock exchange, marked a historic milestone as it celebrated its 150th anniversary, and Finance Minister Nirmala Sitharaman was the chief guest at the celebration.

Decoding the context: Nirmala Sitharaman lauded the Bombay Stock Exchange's (BSE) technological advancements and its vital role in India's economic development.

Learning Corner:

- Founded in 1875 as the "Native Share & Stock Brokers' Association" in Mumbai, BSE is India's first stock exchange.
- BSE evolved from informal trading to a modern, technology-driven exchange, symbolizing India's financial growth.

Structure and Governance:

- A corporate entity since 2005, listed on the National Stock Exchange (NSE) in 2017.
- Regulated by the Securities and Exchange Board of India (SEBI), ensuring transparency and

investor protection.

Key Functions:

- Facilitates trading in equities, derivatives, mutual funds, and bonds, with over 5,500 listed companies (2025).
- Hosts the BSE SENSEX, India's benchmark index of 30 major companies, reflecting market trends.
- Processes 1,500 crore orders daily and 14 lakh orders per second, with transactions completed in under 200 microseconds.

Recent Achievements:

- Pioneered T+1 settlement, making India's markets faster than many global counterparts.
- Launched the BSE 150 Index during the 150th anniversary, tracking the top 150 companies by market capitalization and liquidity.

Economic Significance:

- Mirrors India's economic growth (5th largest economy, \$3.5 trillion GDP, 2025), with a market capitalization of ₹450 lakh crore (2025).
- Drives inclusivity through retail participation (120 million investors, 2025) and domestic institutional investors (DIIs), with ₹6.1 lakh crore inflows in FY24.
- Supports capital formation for industries, MSMEs, and startups, aligning with schemes like Make in India.

Source : [News On AIR](#)

LIQUIDITY COVERAGE RATIO

Context: The Reserve Bank of India announced amendments to the Liquidity Coverage Ratio (LCR) framework.

Decoding the context: Reserve Bank of India has allowed banks to set aside a lower stock of liquid assets against deposits raised through digital channels in the new guidelines.

Learning Corner:

- The Liquidity Coverage Ratio (LCR) is a Basel III requirement that ensures that a bank has sufficient high-quality liquid assets (HQLAs) to survive a 30-day period of significant financial stress.
- It aims to improve short-term resilience of banks.

Formula:

$$\text{LCR} = \frac{\text{Stock of High-Quality Liquid Assets (HQLAs)}}{\text{Total Net Cash Outflows over next 30 calendar days}} \times 100$$

30 days.

- The ratio should be $\geq 100\%$, meaning a bank should have liquid assets equal to or more than the net cash outflows expected during a stress period of

- High-Quality Liquid Assets (HQLAs) Include: Cash, Central bank reserves, Government securities (like G-Secs), High rated Corporate bonds (in some cases, with haircuts).
- High-Quality Liquid Assets (HQLAs) are those which are easily and immediately convertible into cash with minimal loss.

Purpose of LCR:

- Prevents bank failures due to liquidity crunch.
- Promotes banking system stability.
- Ensures confidence during financial stress scenarios.
- Implementation in India: Implemented by RBI in a phased manner starting 2015, fully in effect by January 1, 2019.

Source : [Livemint](https://www.livemint.com)

SUNRISE SECTORS

Context: Finance Minister Nirmala Sitharaman said India plans to increase the share of the manufacturing sector from 12% to 23% over the next two decades, aiming to create jobs and drive economic growth.

Decoding the context: India is focussing on 14 identified sunrise sectors like semiconductors, renewable energy components, medical devices, batteries and labour intensive industries, including leather and textile, to enhance the share of manufacturing in GDP, she said while speaking at Hoover Institution at Stanford University California.

Learning Corner:

- Sunrise sectors refer to newly emerging industries that show rapid growth potential, driven by technological innovation, increasing consumer demand, policy support, or global trends. These sectors are typically in early stages but are expected to be major contributors to economic growth and employment in the future.

Importance in Indian Context:

- Critical for economic diversification
- Promote Atmanirbhar Bharat (Self-reliant India)
- Attract foreign direct investment (FDI)
- Drive green growth and innovation
- Enable India's leadership in global value chains (GVCs)

Key Sunrise Sectors (14 Identified by Government)

- **Semiconductors:** Chip manufacturing, assembly, and testing (e.g., Tata's Gujarat, Assam plants).
- **Renewable Energy Components:** Solar panels, wind turbines, green hydrogen
- **Medical Devices:** Diagnostic equipment, implants, and wearables.
- **Batteries:** Lithium-ion, advanced chemistry cells for EVs and energy storage.
- **Labour-Intensive Industries:** Textiles, leather, footwear, and apparel.
- **Others:** Electronics, electric vehicles (EVs), aerospace, space technology, biotech, agri-tech, drones, and green hydrogen.

Source : [The Hindu](#)

STANDING DEPOSIT FACILITY (SDF)

Context: As the banking system liquidity moves into surplus and with limited credit offtake at the start of the financial year 2025-26 (FY26), commercial banks parked ₹4.13 trillion with the Reserve Bank of India (RBI) under the Standing Deposit Facility (SDF).

Decoding the context: This marked the highest amount banks have parked in the SDF since its introduction in April 2022.

Learning Corner:

- The standing deposit facility is a collateral-free liquidity absorption mechanism implemented by the RBI with the intention of transferring liquidity out of the commercial banking sector and into the RBI. It enables the RBI to take liquidity (deposits) from commercial banks without having to compensate them with government securities.
- Replaces the reverse repo rate as the floor of the Liquidity Adjustment Facility (LAF) corridor.

Key Features

- **Purpose:** Absorbs excess liquidity from the banking system to control inflation and stabilize money supply.
- **Rate:** Set at 25 basis points below the repo rate (e.g., 6.25% if repo is 6.50%).
- **Eligibility:** Scheduled commercial banks and small finance banks.
- **Operation:** Overnight facility; banks deposit funds at the end of the day.
- **No Collateral:** Unlike reverse repo, SDF does not require government securities.
- **Limit:** No cap on deposit amount, enhancing flexibility.

Significance

- Strengthens RBI's monetary policy transmission by efficiently managing liquidity.
- Reduces dependence on government securities for liquidity absorption.
- Supports financial stability amid surplus liquidity scenarios.
- Aligns with global best practices for central bank liquidity management.

Source : [Business Standard](#)

REGIONAL RURAL BANK

Context: The Department of Financial Services (DFS) has notified the amalgamation of 26 Regional Rural Banks (RRBs) under the "One State, One RRB" principle. This is the fourth phase of the RRB consolidation process.

Decoding the context: 26 RRBs across 10 states and one Union Territory have been merged, focusing on enhancing scale, efficiency, and cost rationalisation. Currently, 43 RRBs operate across 26 states and two Union Territories. Post-amalgamation, there will be 28 RRBs covering 700 districts with more than 22,000

branches. Around 92 percent of these branches are located in rural and semi-urban areas.

Learning Corner:

- RRBs were created on October 2, 1975, under the Regional Rural Banks Act, 1976, following recommendations of the Narasimham Working Group (1975) to address credit gaps in rural areas left by commercial banks and cooperatives.
- **Objective:** To provide affordable banking and credit facilities to small farmers, agricultural laborers, artisans, and rural entrepreneurs, fostering rural economic development.
- **First RRB:** Prathama Bank, established in Moradabad, Uttar Pradesh, sponsored by Syndicate Bank.
- **RRBs are jointly owned by:** Central Government: 50%, Sponsor Bank (usually a public sector bank): 35%, State Government: 15%.
- **Sponsorship:** Each RRB is linked to a sponsor bank (e.g., State Bank of India, Punjab National Bank) for operational and managerial support. Post- the present consolidation, the largest RRB in a state becomes the transferee bank, with its sponsor bank overseeing the amalgamated entity.
- RRBs are mandated to follow Priority Sector Lending (PSL) targets. As of 2025, the PSL target for RRBs is 75% of ANBC, significantly higher than the 40% required for other commercial banks, reflecting their primary role in rural and agricultural credit.

Significance of “One State, One RRB” Amalgamation

- **Scale Efficiency:** Larger RRBs reduce operational overlap, streamline administration, and lower costs.
- **Financial Stability:** Mergers enhance capital base (deposits: ₹6.6 lakh crore; advances: ₹4.7 lakh crore as of March 2024), reducing reliance on government recapitalization.
- **Technology Adoption:** Consolidated entities can invest in modern banking tech (e.g., core banking systems), competing with private banks and small finance banks.
- **Uniform Branding:** New names reflecting state identity (e.g., Bihar Gramin Bank) strengthen trust and regional connect.

Source : [Newsonair](https://www.newsonair.com)

REPO RATE

Context: The Reserve Bank of India's (RBI's) six-member Monetary Policy Committee (MPC) on April 9th decided to cut the repo rate by 25 basis points to 6%.

Decoding the context: The rate setting panel also changed the monetary policy stance from “neutral” to “accommodative”, signaling further reductions in the repo rate in the near future.

Learning Corner:

- The repo rate is the interest rate at which a central bank (Reserve Bank of India - RBI), lends money to commercial banks for a short period.
- The term "repo" stands for repurchase agreement, which means that banks borrow funds from the RBI by selling securities (usually government bonds) with an agreement to repurchase them at a later date, typically overnight or within a few days. The repo rate essentially represents the

cost of borrowing for these banks.

- When the RBI lowers the repo rate (like reducing it from 6.25% to 6% on April 9, 2025), it becomes cheaper for banks to borrow money. This typically encourages banks to lend more to businesses and individuals, boosting economic activity, increasing money supply, and potentially stimulating growth

About Reverse Repo

- The reverse repo rate is the interest rate at which the RBI borrows money from commercial banks. It's essentially the opposite of the repo rate. When banks deposit their excess funds with the RBI, they earn interest at the reverse repo rate. This rate is typically lower than the repo rate and helps the RBI absorb liquidity from the economy.
- If the RBI wants to reduce the amount of money circulating (to control inflation, for example), it might increase the reverse repo rate, incentivizing banks to park more funds with it instead of lending them out.

Source : [Indian Express](#)

BEAR MARKET

Context: The S&P 500 — a stock market index that tracks the performance of 500 of the largest publicly traded companies in the US — on Monday briefly entered bear market territory for the first time since 2022.

Decoding the context: A bear market (or for that matter, all types of market decline) takes place when investors are more motivated to sell than to buy stocks.

Learning Corner:

- A bear market refers to a condition in which a stock index declines by at least 20% from its most recent peak value. This designation lacks an official or standardized determination and serves primarily as an informal term to succinctly indicate a significant downturn in the stock index.
- A bear market is the opposite of a bull market, which refers to when a stock index has increased at least 20% from its recent low. Note that a bear market is different from a market correction which occurs when there is a decline of at least 10% or more.

Why does a bear market occur?

- There could be a host of different reasons. These include a weak economy, the anticipation of an economic slowdown, or investor sentiment that the market is too hot and prices too high. Events that are not purely economic — such as wars, oil supply shocks, etc — can also spook investors, leading to a dip in the market.
- A bear market often precedes a recession — a slowdown in economic output and is usually defined as at least two consecutive quarters of decline in gross domestic product (GDP). However, this is not always the case.
- The Indian stock market has also experienced bear markets over the years. One of the worst bear markets occurred during the 2008 global financial crisis. Between September 8, 2008, and

November 6, 2008, the Nifty 50 index had dropped over 35%.

Source : [Indian Express](#)

INDIA'S COAL BOOM

Context: India achieved a historic milestone by surpassing one billion tonnes (BT) of coal production on 20 March 2025, in FY 2024-25—11 days ahead of last year's 997.83 million tonnes (MT).

Decoding the context: The coal sector's success is attributed to the tireless efforts of Coal Public Sector Undertakings (PSUs), private players, and the dedicated workforce of around 5 lakh mine workers across more than 350 coal mines.

Learning Corner:

- India's coal production has reached 1047.57 MT (Provisional) in FY 2024-25, compared to 997.83 MT in FY 2023-24, marking a 4.99% growth.
- Coal imports fell 8.4% to 183.42 MT in April-December 2024 from 200.19 MT in the same period of FY 2023-24, saving \$5.43 billion (₹42,315.7 crore) in foreign exchange.
- Government initiatives like Commercial Coal Mining and Mission Coking Coal boosted domestic coal output by 6.11% during this period, reducing import dependence.

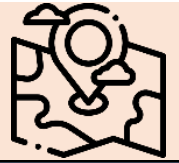
Economic significance of the coal sector:

- With the fifth-largest coal reserves and as the second-largest consumer, coal remains crucial, contributing 55% to the national energy mix and fuelling over 74% of total power generation.
- Despite renewable energy growth, coal-based thermal power will remain essential, with its share projected at 55% by 2030 and 27% by 2047.
- **Railways & revenue:** Coal stands as the single largest contributor to railway freight, with an average share of nearly 49% of total freight income amounting to Rs. 82,275 Crore in the fiscal year 2022-23 alone. This revenue contribution has surpassed 33% of total railway earnings.
- **Government earnings:** The coal sector contributes over Rs. 70,000 Crore annually to the central and state governments through royalties, GST, and other levies.
- **Employment:** The sector provides jobs to over 239,000 workers in Coal India Ltd and thousands more in contractual and transport roles.
- **Economic growth:** Substantial investments in capital expenditure, averaging Rs. 18,255 Crore annually over the past five years, have facilitated infrastructure development and resource optimization within coal sector PSUs.

Source : [PIB](#)



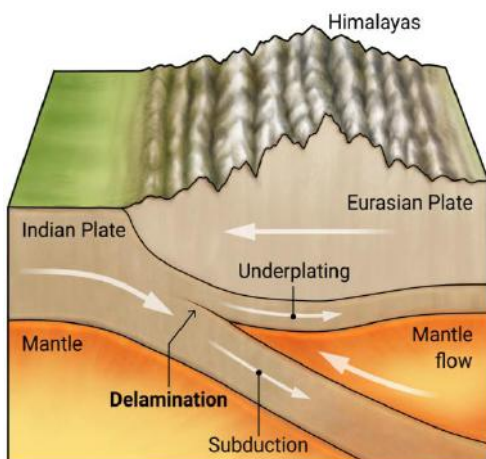
GEOGRAPHY



INDIAN PLATE

Context: Recent findings reveal that the Indian Plate is splitting into two, a phenomenon that could reshape the region's geological landscape.

Decoding the context: Published in the American Geophysical Union, this groundbreaking discovery points to delamination, where the plate is peeling apart and sinking into the Earth's mantle.

Learning Corner:

- The Indian Plate is a tectonic plate encompassing the Indian subcontinent, parts of the Indian Ocean, and regions of South China and western Indonesia, extending up to but excluding Ladakh, Kohistan, and Balochistan.

- Originally part of the supercontinent Gondwana, it broke away approximately 100 million years ago and began its northward journey, shaping the geological features of South Asia.

- **Boundaries:**

- o **North:** Convergent boundary with the Eurasian Plate, forming the Himalayas.
- o **West:** Transform boundary with the Arabian Plate (Owen Fracture Zone).
- o **Southwest:** Divergent boundary with the African Plate (Central Indian Ridge).
- o **Southeast:** Formerly fused with the Australian Plate as the Indo-Australian Plate, but recent studies suggest separation for at least 3 million years due to differing drift velocities.

- **Movement:** Currently moves northeast at 5 cm/year, while the Eurasian Plate moves north at 2 cm/year, causing compression at 4 mm/year and deformation of the Eurasian Plate.
- **Thickness:** Estimated at 100 km, half the thickness of other Gondwana-derived plates, possibly due to mantle plume activity that melted its lower part, enabling faster movement.

Historical Evolution

- **Gondwana Breakup (140–100 Mya):** The Indian Plate was part of Gondwana, alongside modern Africa, Australia, Antarctica, and Madagascar. Around 100 million years ago, it split from Madagascar, forming Insular India, an island continent.
- **Northward Journey:** Moving at up to 20 cm/year, one of the fastest plate movements recorded, it collided with the Eurasian Plate between 55–35 million years ago during the Eocene epoch, forming the Himalayas and Tibetan Plateau.

- Deccan Traps: As it passed over the Reunion hotspot ~65 million years ago, massive volcanic activity formed the Deccan Traps, potentially contributing to the Cretaceous–Paleogene extinction event.
- Recent studies, reveal that the Indian Plate is undergoing delamination, a process where its dense lower layer (mantle rock) peels away from the buoyant upper layer (continental crust) and sinks into the Earth's mantle. This phenomenon, observed beneath the Tibetan Plateau, is reshaping geological understanding.

Source : [Science](#)

ARAL SEA

Context: The Aral Sea, once the world's fourth-largest lake, continues to show signs of geological changes long after its environmental collapse.

Decoding the context: The geological research conducted recently shows that the dried land of the basin has been experiencing increasing upward movement of Earth's mantle over many decades since the water disappeared.

Learning Corner:

- Landlocked lake between Kazakhstan (north) and Uzbekistan (south)., the Aral Sea spanned 68,000 km² in 1960, fed by the Amu Darya and Syr Darya rivers.

- Known as the "Sea of Islands" due to over 1,100 islands, it supported thriving fisheries and local economies.

Environmental Collapse:

- Cause: Soviet-era diversion of Amu Darya and Syr Darya rivers for cotton irrigation in the 1960s reduced inflow, triggering rapid shrinkage.



- Extent: By 2014, the eastern basin dried completely, forming the Aralkum Desert (60,000 km²). By 2020, the sea was 10% of its original size, split into four basins: North Aral Sea, eastern and western South Aral Sea, and Barsakelmes Lake.

Impacts:

- **Ecosystem:** Loss of 20+ fish species, collapse of fisheries and desertification.
- **Health:** Toxic dust storms from Aralkum, carrying pesticides and salts, cause respiratory diseases, anemia (20x increase since 1960s), and high infant mortality.
- **Climate:** Regional climate shifts, with 2°C warmer summers, colder winters, and reduced precipitation, exacerbating water scarcity.

Geological Changes (2025 Research):

- **Upward Mantle Movement:** The loss of $\sim 1,000 \text{ km}^3$ of water (1.1 billion tons) since 1960 reduced surface weight, causing the Earth's crust and upper mantle to rise at $\sim 7 \text{ mm/year}$ (2016-2020).
- **Mechanism:** Viscoelastic relaxation of the asthenosphere drives this uplift, similar to post-glacial rebound, expected to continue for decades.

Source : [Economic Times](#)

YELLOW SEA

Context: China is now stepping up its game in the Yellow Sea by constructing a massive steel rig, following similar aggressive posturing in the South China Sea.

Decoding the context: This development has become a fresh source of conflict between China and South Korea.

Learning Corner:

- The Yellow Sea is a marginal sea of the western Pacific Ocean.
- **Location:** Lies between mainland China (west/north) and the Korean Peninsula (east), north of the East China Sea, bounded by the Yangtze River mouth to Jeju Island.



- It derives its name from the yellowish color of its waters, caused by sand particles from the Yellow River (Huang He) in China.

- **Key Features:** Includes Bohai Sea (northwest), Socotra Rock (Ieodo), and numerous islands (e.g., Jeju).

- **Important Ports:**

- o **China:** Tianjin, Qingdao, Dalian

- o **South Korea:** Incheon

- o **North Korea:** Nampo

Strategic Importance:

- **Economic Value:** Supports fishing (10% of China's fish catch), potential oil/gas reserves, and major shipping lanes (e.g., Qingdao port).
- **Military Significance:** Hosts Chinese naval bases (e.g., Qingdao, PLAN North Sea Fleet) and South Korean assets (e.g., Incheon).
- **Provisional Measures Zone (PMZ):** Established in 2001 by China and South Korea to manage overlapping Exclusive Economic Zones (EEZs), allowing joint fishing but prohibiting unilateral

structures.

Disputes and Issues:

- **EEZ Overlap:** China and South Korea's 200-nautical-mile EEZs overlap due to the sea's narrow width (~400 miles), with no finalized maritime boundary despite negotiations since 2015.
- **Socotra Rock (leodo):** Submerged reef claimed by both (80 miles from South Korea's Marado, 155 miles from China's Sheshan). South Korea's research station (2003) and China's buoys (2014) fuel tensions.

Source : [Economic Times](#)

CLOUDBURST

Context: Three people were killed and several residential and commercial structures collapsed after a cloudburst led to torrential rain, wind and hail across Ramban tehsil of Jammu and Kashmir.

Decoding the context: The extreme weather also led to the closure of the Jammu-Srinagar National Highway (NH-44), the only all-weather road connecting the Kashmir Valley to the rest of the country.

Learning Corner:

- A cloudburst is a sudden and very intense rainfall event over a small geographical area, typically less than 20–30 square kilometers, which can result in flash floods, landslides, and heavy destruction, especially in mountainous and hilly regions.
- **Rainfall intensity:** More than 100 mm (10 cm) per hour.
- **Duration:** Typically lasts 15 minutes to a few hours.
- Most common in Himalayan and Western Ghats regions.

Scientific Explanation (Causes):

- Formed when warm moist air rapidly rises, cools and condenses at high altitudes.
- Sudden release of water due to condensation of large moisture-laden clouds.
- Often linked with orographic lift – where moist air is forced upwards by mountain slopes.
- Absence of upper-level winds fails to disperse the cloud mass.
- Sometimes associated with localized convection and thunderstorm activity.

Vulnerable Areas in India:

- Himalayan Region: Jammu & Kashmir, Himachal Pradesh, Uttarakhand
- North-Eastern Hills: Sikkim, Arunachal Pradesh
- Western Ghats: Kerala, Karnataka during monsoon

Impacts:

- Sudden flash floods and mudslides
- Loss of life and property
- Destruction of roads, bridges, and infrastructure
- Disruption of communication and power supply
- Can worsen glacial lake outburst floods (GLOFs) in high-altitude regions

Key Points:

- Cloudbursts are not classified as cyclonic rainfall, but convectional.
- Forecasting is difficult due to very small area and short duration.
- IMD uses Doppler Radar to monitor and warn of cloudburst-prone conditions.
- Often occurs in monsoon season (July–September).

Source : [Times of India](#)

DAVIS STRAIT PROTO MICROCONTINENT

Context: Researchers have discovered a previously unknown proto-microcontinent, the Davis Strait Proto Microcontinent, beneath the Davis strait between Greenland and Canada.

Decoding the context: The Davis Strait proto-microcontinent is not an isolated phenomenon. Similar geological structures have been found elsewhere on the globe, including: 1. Jan Mayen, off Iceland 2. East Tasman Rise, southeast of Tasmania 3. Gulden Draak Knoll, off the western Australian coast.

Learning Corner:

- A proto-microcontinent is a fragment of relatively thick continental lithosphere (crust and upper mantle) separated from a major continent by thinner continental lithosphere, often submerged and incompletely rifted.
- Davis Strait Proto-Microcontinent is a submerged, thick fragment of continental crust discovered beneath the Davis Strait.
- **Location:** Davis Strait, connecting Labrador Sea and Baffin Bay, between Baffin Island (Canada) and southwestern Greenland.

Geological Significance:

- A submerged microcontinent composed of thick continental crust (approximately 19–24 km thick), surrounded by thinner crust (14–17 km thick).
- Formed during the Paleogene period (~58 million years ago) due to incomplete rifting between the North American and Greenland plates.
- Represents a "failed" or "proto" microcontinent, as it did not fully separate from the main continental masses.

Source : [Times of India](#)

THAR DESERT

Context: The Thar Desert in India saw a striking 38 per cent rise in greening annually over the last two decades, driven by a significant increase in monsoon rainfall and agricultural expansion, a new study showed.

Decoding the context: In fact, Thar was the only desert in the world with the highest concurrent increase in population, precipitation and vegetation during the last few decades, scientists from IIT Gandhinagar and

Bay Area Environmental Research Institute, NASA Research Park in the US established.

Learning Corner:

- **Location:** The Thar Desert is located in northwestern India, primarily in Rajasthan (over 60% of its Indian extent), with parts extending into Gujarat, Haryana, and Punjab. It also spills into eastern Pakistan (Sindh and Punjab provinces).
- **Area:** Covers approximately 2,00,000 sq. km in India, making it the world's 17th-largest desert and the 9th-largest hot subtropical desert.
- **Boundaries:**
 - o **North:** Punjab plains
 - o **East:** Aravalli Range
 - o **South:** Rann of Kutch
 - o **West:** Indus River valley in Pakistan

Physical Features

- **Topography:** Characterized by vast stretches of sand dunes (longitudinal and transverse), rocky outcrops, salt lakes, and sparse vegetation. The terrain includes shifting dunes (locally called dhrian) and fixed dunes stabilized by vegetation.
- **Rivers:** The Luni River is the only significant seasonal river in the region, flowing southwest into the Rann of Kutch. Most other water bodies are ephemeral.
- **Climate:** Arid with extreme temperatures—summers exceeding 45°C and winters dropping to near 0°C. Annual rainfall is low (100-500 mm), mostly during the southwest monsoon, with high variability.
- **Soil:** Predominantly sandy and saline, with low organic content, making it less fertile except in areas with irrigation.

Ecological Significance

- **Despite its aridity, the Thar supports unique flora and fauna:**
 - o **Flora:** Xerophytic plants like khejri (*Prosopis cineraria*), rohida, and cacti.
 - o **Fauna:** Great Indian Bustard (critically endangered), chinkara, desert fox, and blackbuck. Migratory birds like flamingos visit salt lakes (e.g., Sambhar Lake).
- **National Park:** The Desert National Park in Jaisalmer and Barmer districts is a biodiversity hotspot and a conservation area for the Great Indian Bustard.

Socio-Economic Aspects

- **Population:** Sparsely populated (around 83 persons/sq. km) with communities like Rajputs, Jats, and nomadic tribes (e.g., Banjaras). Livestock rearing (camels, goats, sheep) is a primary livelihood.
- **Agriculture:** Limited due to aridity, but irrigation projects like the Indira Gandhi Canal (world's longest canal, 649 km) have transformed parts of Sri Ganganagar, Bikaner, and Jaisalmer into fertile zones for wheat, cotton, and mustard.
- **Economy:** Mineral resources (gypsum, limestone, feldspar) and renewable energy (solar and

wind) are emerging sectors. Bikaner and Jodhpur are hubs for solar projects.

- **Culture:** Rich heritage with folk music (e.g., Manganiyar tradition), handicrafts, and tourism (e.g., Jaisalmer Fort, camel safaris).

Source : [Down To Earth](#)

PAMBAN RAIL BRIDGE

Context: The vertical lift span of the new Pamban Rail Bridge, inaugurated by Prime Minister Narendra Modi on Sunday (April 6, 2025), caused concern among senior railway officials when the lifted centre span became stuck midway as it was being lowered.

Decoding the context: For nearly a century, Pamban Rail Bridge remained the longest sea bridge in India until the Bandra-Worli Sea Link (Mumbai) came up.

Learning Corner:

- The Pamban Rail Bridge is a historic and vital railway bridge in India, connecting Rameswaram Island (Pamban Island) to the mainland in Tamil Nadu, across the Palk Strait.
- It was India's first sea bridge, originally opened in 1914 and was the only link to Rameswaram until a road bridge was opened in 1988.

Key Features

- **Original Structure:** The old Pamban Bridge was a bascule bridge, meaning it had a section that could be lifted to allow ships to pass.
- **New Vertical Lift Bridge:** Recently, a new Pamban Rail Bridge was inaugurated, featuring a vertical lift mechanism that allows ships to pass underneath more efficiently.
- **Length:** The bridge spans 2.07 kilometers across the Palk Strait.
- **Engineering Marvel:** The new bridge is designed to last 100 years, with stainless steel reinforcements and fully welded joints to withstand harsh marine conditions.

Source : [The Hindu](#)

HEARD ISLAND AND MCDONALD ISLANDS

Context: Heard and McDonald islands featured in a list released by the White House of "countries" that would have new trade tariffs imposed.

Decoding the context: Heard Island and McDonald Islands are among several "external territories" of Australia listed separately in the tariff list to Australia, which will see a 10% tariff imposed on its goods. External territories are part of Australia and not self-governing but have a unique relationship with the federal government. Such territories featured on the White House list were the Cocos (Keeling) Islands, Christmas Island and Norfolk Island.

Learning Corner:

- Heard Island and McDonald Islands (often abbreviated as HIMI) are a remote group of

subantarctic volcanic islands that form an external territory of Australia.

- Located in the southern Indian Ocean, the islands lie roughly 4,100 kilometers southwest of Perth, Australia, and about 1,600 kilometers north of Antarctica.
- As the only volcanically active subantarctic islands they 'open a window into the earth', thus providing the opportunity to observe ongoing geomorphic processes and glacial dynamics.

• **Composition:** The territory consists primarily of two island groups:

o **Heard Island:** The larger of the two, known for its rugged terrain, extensive glaciation, and active volcanic features.

o **McDonald Islands:** A smaller group that, while less extensive than Heard Island, has experienced notable volcanic activity in recent decades.

Geological and Volcanic Features

• **Volcanic Origin:** Both Heard and McDonald Islands are volcanic in origin. They lie on the Kerguelen Plateau, which is a vast submarine volcanic province.

• **Volcanism:** Heard Island is home to Big Ben, an impressive volcanic complex, whose highest point is Mawson Peak (approximately 2,745 meters above sea level). This active volcano is one of only two in the Australian external territories.

- McDonald Islands have also exhibited volcanic activity, including eruptions that have altered the shape and size of the landmass.

Ecological and Environmental Significance

- **Pristine Ecosystems:** The islands possess exceptionally well-preserved subantarctic ecosystems. Their isolation has helped protect these areas from invasive species and significant human disturbance.
- **Biodiversity Hotspot:** Despite being uninhabited, the islands serve as breeding grounds for a variety of marine birds (such as penguins, albatrosses, and petrels) and marine mammals, including seals.
- **Protected Status:** Recognized for their outstanding natural values, the territory is designated as a UNESCO World Heritage Site.
- These islands are administered by Australia and are managed as a nature reserve. Access is highly restricted, typically limited to research expeditions due to the challenging environmental conditions and the emphasis on conservation.



Source : [The Guardian](#)

PRIME MINISTER'S NATIONAL RELIEF FUND (PMNRF)

Context: Prime Minister Narendra Modi on Tuesday expressed grief over a firecracker explosion in the Banaskantha region of Gujarat that claimed 18 lives.

Decoding the context: PM Modi also announced an ex-gratia of ₹2 lakh from the Prime Minister's National Relief Fund (PMNRF) for the next of kin of each deceased and ₹50,000 to the injured.

Learning Corner:

- The Prime Minister's National Relief Fund (PMNRF) is a centrally managed trust established to provide immediate relief and rehabilitation to families affected by natural calamities, major accidents, and other unforeseen events.

Establishment and Evolution

- Origins:** The PMNRF was established shortly after independence, in 1948, in response to the displacement and suffering following the Partition. The then Prime Minister, Jawaharlal Nehru, launched the fund based on the principle of public solidarity and voluntary contribution for national emergencies.
- Evolution Over Time:** Over the decades, the remit of the PMNRF has expanded. Today, it plays a crucial role in providing relief for disasters such as floods, cyclones, earthquakes, and tsunamis, as well as assisting victims of riots, major accidents, and instances of medical emergencies like heart surgeries, kidney transplants, and cancer treatments.

Aspect	Details
Type of Fund	Public charitable trust
Governance	Managed by the Prime Minister (discretionary powers)
Audit	Not audited by CAG ; audited by independent auditors
Donations	Voluntary contributions from individuals, institutions, PSUs
Tax Benefit	Donations eligible for 100% tax deduction under Section 80G of IT Act
Receipts	Also accepts foreign contributions (FCRA compliant)
Administrative Cost	Nil – Entire fund used for relief purposes

Funding, Contributions, and Tax Benefits

- Voluntary Contributions Only:** PMNRF is unique because it is entirely financed through voluntary contributions from individuals, corporations, trusts, and institutions. It does not receive any budgetary support from the government.
- Tax Exemption:** All donations made to PMNRF are eligible for a 100% deduction from taxable income under Section 80(G) of the Income Tax Act, 1961.

- **Administration:** The fund is administered on an Honorary basis by Joint Secretary to the Prime Minister as Secretary of the fund. He is assisted on Honorary basis by an Officer of the rank of Director.
- **Spending:** The disbursement out of the fund is made at the discretion of the Prime Minister, and in accordance with the Prime Minister's directions.
- **Auditing:** The PMNRF is audited by an independent auditor outside the Government.

Source : [Business Standard](#)

KATCHATHEEVU

Context: Ahead of Prime Minister Narendra Modi's visit to Sri Lanka, the Tamil Nadu Legislative Assembly unanimously adopted a resolution, urging the Union government to take steps to retrieve the Katchatheevu island from Sri Lanka.

Decoding the context: The resolution moved by Chief Minister M.K. Stalin said: "Retrieval of Katchatheevu island is the only permanent solution to protect the traditional fishing rights of Tamil Nadu fishermen and to mitigate the sufferings faced by them due to the Sri Lankan Navy."

Learning Corner:

- Katchatheevu is a small, uninhabited island in the Palk Strait, between India and Sri Lanka.
- Katchatheevu covers an area of around 285 acres (approximately 115 hectares) and is situated roughly 33 kilometers from Rameswaram and 62 kilometers from Jaffna.

History

- Originally controlled by the Raja of Ramanathapuram (Tamil Nadu) during British rule.
- The British administration did not clearly define its sovereignty.
- After India's independence (1947) and Sri Lanka's independence (1948), both nations claimed the island.
- **1968 Agreement Between India and Sri Lanka**
 - o The Indo-Sri Lankan Maritime Agreement (1974) officially transferred Katchatheevu to Sri Lanka.
 - o The agreement was signed between Indian Prime Minister Indira Gandhi and Sri Lankan Prime Minister Sirimavo Bandaranaike.
 - o The treaty stated that Indian fishermen could continue to use the island for resting, drying their nets, and visiting the St. Antony's Church for religious purposes.

Fishermen Disputes

- Indian fishermen, especially from Tamil Nadu, frequently enter waters around Katchatheevu for fishing.
- The Sri Lankan Navy arrests and detains Indian fishermen who are accused of illegal fishing in Sri Lankan waters.
- Tamil Nadu fishermen claim traditional fishing rights over the area.

- The Sri Lankan government restricts Indian fishing activities, citing depletion of fish resources and violations of their maritime boundary.

Religious Significance

- The St. Antony's Church, located on Katchatheevu, is an important place of worship.
- It hosts an annual Catholic festival, attended by both Indian and Sri Lankan pilgrims. The event is an example of cultural and religious ties between the two nations.

Source : [The Hindu](#)

NAINI LAKE

Context: The Naini Lake, one of Nainital's key attractions, has recorded a water level of 4.7 feet — marking a five-year low.

Decoding the context: Nainital Lake in Nainital Town of the Nainital district, often called the Lake District of India, is one of the four important lakes of Kumaon; the other three are Sattal Lake, Bhimtal Lake and Naukuchiyatal Lake.

Learning Corner:

- Naini Lake, also known as Nainital Lake, is a natural freshwater lake located in the picturesque hill town of Nainital in the Kumaon region of Uttarakhand, India.
- **Naini Lake is of tectonic origin.** Originally, the lake was nearly circular, but over time, natural processes such as landslides have altered its shape into a distinctive crescent.
- **Location and Topography:** Nestled at an elevation of approximately 1,938 meters above sea level, the lake is surrounded by steep hills and dense forests. The area features a mixed vegetation of coniferous and deciduous trees, along with rocky outcrops.
- **The lake is bifurcated into two segments:** the upper part known as Mallital and the lower part called Tallital. Tallital, in particular, features a charming bridge—which even hosts a post office—adding to the lake's attraction..
- **Water Sources and Outflow:** The lake is fed by several small streams and drains that originate from the surrounding catchment basin. Its outflow is located at the southeastern end, ensuring a natural discharge of water which, along with subsurface flows, plays a critical role in maintaining its water balance.
- **Mythological Connections:** The lake is steeped in local folklore and is mentioned in ancient texts like the Skanda Purana, where it is known as "Tri-Rishi-Sarovar."

Source : [Indian Express](#)

MYANMAR EARTHQUAKE

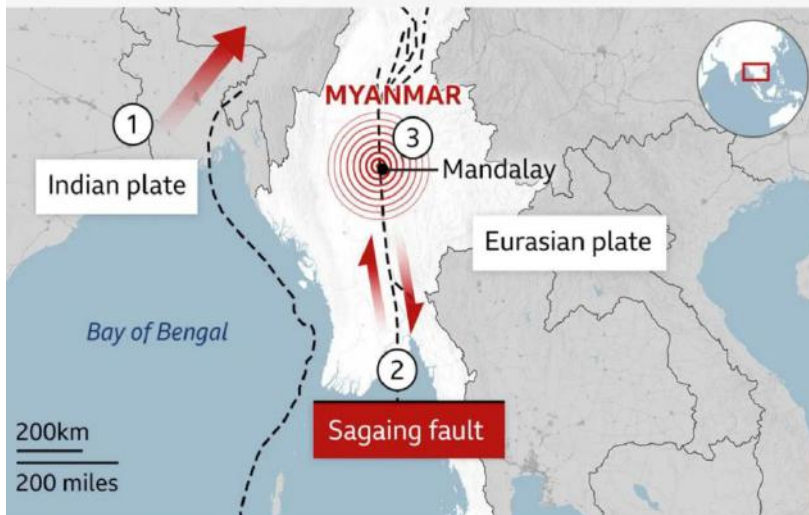
Context: A powerful earthquake of magnitude 7.7 and at least six aftershocks struck central Myanmar, bringing buildings down in the country's second-largest city, Mandalay, and killing at least 1,600 people.

Decoding the context: Neighbouring Thailand was also affected. Parts of Northeast India also felt the shake, although no casualties or significant damage to property has been reported.

Learning Corner:

- Earth's lithosphere consists of moving tectonic plates whose interactions shape the planet's geology. Earthquakes occur when these plates suddenly slip, releasing stored elastic strain energy as seismic waves that shake the ground.

Myanmar sits on a tectonic fault line



- 1 The Indian plate collides with the Eurasian plate
- 2 Friction builds up along the Sagaing fault
- 3 The fault slips along a 200km section, which releases energy felt as an earthquake

- Myanmar is positioned in a region where several tectonic plates meet. It lies at the confluence of the Indian Plate, Eurasian Plate, Sunda Plate, and the smaller Burma Microplate. This junction makes the region naturally predisposed to seismic activity.

- Myanmar earthquake took place due to the “strike slip faulting” between the Indian and Eurasian plates, meaning these two plates rubbed sideways against each other.

- The quake took place on the Sagaing Fault, which runs north to south through the centre of

Myanmar. A fault is a fracture or zone of fractures between two blocks of rock, which allows the blocks to move relative to each other, sometimes leading to earthquakes.

- The Sagaing fault marks the tectonic plate boundary between the Indian plate to the west and the Eurasian plate to the east. The Indian plate is moving north along the fault compared to the Eurasian plate.
- The earthquake that struck Myanmar was characterized by a shallow hypocenter—approximately 10 kilometers below the surface.
- Shallow-focus earthquakes tend to be especially destructive because the seismic energy does not have far to travel before reaching the surface. This allows for a greater proportion of the energy to affect structures and the ground itself.
- In regions with soft or loosely consolidated sediments, such as parts of central Myanmar and even areas as distant as Bangkok, seismic waves can be amplified, resulting in stronger shaking and more severe damage than would occur in rockier settings.

Source : [BBC](#)

ASBESTOS

Context: The Ministry of Education has banned the use of asbestos in construction or refurbishment of

Kendriya Vidyalayas (KVs) and Jawahar Navodaya Vidyalayas (JNVs), Minister of State for Education, Jayant Chaudhary said.

Decoding the context: International health agencies, including the World Health Organization (WHO) and the International Agency for Research on Cancer (IARC), have classified all main forms of asbestos as carcinogenic to humans.

Learning Corner:

- Asbestos is a group of naturally occurring silicate minerals characterized by their fibrous structure, remarkable durability, and resistance to heat and chemical damage.

Asbestos is not a single mineral but encompasses several distinct types, the most notable being:

- **Chrysotile (White Asbestos):** The most commonly used form, featuring long, curly fibers. Chrysotile is primarily found in serpentine rock and was favored for its flexibility and heat resistance.
- **Crocidolite (Blue Asbestos):** Composed of extremely thin, straight fibers, crocidolite is considered one of the most dangerous due to its potential for causing lung cancers.
- **Amosite (Brown Asbestos):** Known for its heat resistance, amosite fibers are straight and brittle, and they were commonly used in insulation products.
- **Others (Anthophyllite, Actinolite, Tremolite):** These forms occur naturally and have been found as contaminants in chrysotile deposits or used on a smaller scale in commercial applications.

Due to its unique physical properties, asbestos was widely used throughout the 20th century:

- **Building Materials:** Its fire-retardant and insulating properties made asbestos ideal for use in cement products, roofing shingles, floor and ceiling tiles, and insulation around pipes.
- **Manufacturing and Automotive Industry:** Asbestos found applications in products such as heat-resistant fabrics, automobile brakes, and friction materials in clutches and transmissions.
- **Other Applications:** The durability and chemical inertness of asbestos also led to its use in fireproof clothing, electrical insulation, and various industrial filters.

The very qualities that made asbestos valuable—its fibrous, durable nature—also render it dangerously carcinogenic when inhaled:

- Continuous inhalation of asbestos fibers can lead to conditions such as:
 - **Asbestosis:** A chronic lung disease resulting from scarring of lung tissue.
 - **Lung Cancer:** Particularly in individuals exposed at high levels, especially when combined with smoking.
 - **Mesothelioma:** A rare and aggressive cancer of the lining of the lungs (pleura) or abdomen (peritoneum).
- **Latency Period:** Diseases related to asbestos exposure often appear decades after the initial exposure, complicating diagnosis and the ability to trace the source of exposure.

Source : [Indian Express](#)



Environment and Ecology



BLUE WASHING

Context: The Central Pollution Control Board's 2025 reclassification of waste-to-energy (WTE) incineration from a highly polluting red category to a blue category is criticized as bluewashing, falsely portraying it as an essential environmental service.

Decoding the context: Until recently, the waste-to-energy incineration industries were classified by the CPCB as a 'red category', a highly polluting industry.

Learning Corner:

- Bluewashing involves organizations making misleading claims about their adherence to social, economic, or ethical standards—such as human rights, labor conditions, or community welfare—to gain public trust, boost brand image, or deflect criticism, without meaningful action.
- It parallels greenwashing (misleading environmental claims) but focuses on social and economic responsibility rather than ecological concerns.

Key Mechanisms

- **Tactics:**
 - **Vague Claims:** Broad statements like “committed to fairness” without measurable outcomes.
 - **Selective Disclosure:** Highlighting minor initiatives (e.g., a single ethical product) to obscure broader issues (e.g., sweatshops).
- **Symbolic Affiliations:** Joining voluntary initiatives (e.g., UNGC) for branding without compliance.
- **Misleading Certifications:** Using unverified labels to suggest ethical practices.
- **Recent Example - PepsiCo:** Claimed “positive water balance” but criticized by India Resource Center (2022) for incomplete water use accounting in water-stressed Indian regions (e.g., Tamil Nadu).

Source : [Down To Earth](#)

PHAWNGPUI NATIONAL PARK

Context: Forest fires that erupted in several parts of Phawngpui National Park, Mizoram, have affected nearly one-ninth of the park's total area, according to state forest officials.

Decoding the context: The fire originated from slash-and-burn (jhum) cultivation near Archhuang village on March 11, 2025, and spread into forest zones of the park.

Learning Corner:

- **Establishment:** Notified as a National Park in 1997, though often cited as established in 1992 for

conservation planning.

- **Area:** Covers 50 sq. km, encompassing Phawngpui Peak, Mizoram's highest point at 2,157 meters above sea level.
- **Location:** Situated in Lawngtlai District, southeastern Mizoram, under the Lai Autonomous District Council, near the India-Myanmar border.
- **Named after Phawngpui Peak, derived from the Lai language:** "phong" (meadow) and "pui" (great), reflecting its grassy ridges. Alternatively, means 'Place of bamboo grass' in Lai-Pawi dialect.
- Called Blue Mountain due to clouds veiling the peak, giving it a blue hue from afar.
- Features steep cliffs (e.g., Thlazuang Khâm, a semi-circular precipice), natural grasslands (e.g., Far Pak), and the Chhimtuipui River (Kalodyne) along its eastern boundary, marking the Myanmar border.
- **Flora:**
 - o Dominated by sub-tropical broadleaf and tropical evergreen forests, with patches of Himalayan oak, Indian pine, and bamboo groves.
 - o Rich in orchids, rhododendrons, daphnia flowers, therapeutic basil, and rare bamboo species (e.g., Eulalia triplicate).
 - o Grasslands and wildflowers enhance its scenic beauty.
- **Fauna:**
 - o Notable Mammals: Clouded leopard, Hoolock gibbon, Slow loris, Malayan sun bear.
 - o Birds: Blyth's tragopan, Mrs. Hume's pheasant (Mizoram's state bird), Wreathed hornbill, Fire-tailed sunbird, Grey sibia, Dark-rumped swift, Mt. Victoria babax.

Source : [Hindustan Times](#)

GUJARAT PARTICULATE MATTER (PM) EMISSION TRADING SCHEME (ETS)

Context: A new study on the world's first-ever market for trading particulate emissions, which are tiny particles that can impact human health, revealed that employing the market mechanism helped reduce pollution by 20-30 per cent in an industrial cluster in Surat.

Decoding the context: Published in the Quarterly Journal of Economics, the study saw researchers compare the emissions performance of participating plants with those complying with the business-as-usual pollution standards. It covered 162 plants, predominantly in the textile sector.

Learning Corner:

- The Gujarat Particulate Matter (PM) Emission Trading Scheme (ETS), launched in Surat in 2019, is the world's first market-based system for trading Particulate Matter (PM) emissions, aimed at reducing industrial air pollution.

Key Points on Gujarat PM ETS

- Initiated on June 5, 2019 (World Environment Day) by the Gujarat Pollution Control Board (GPCB)

in Surat, a textile and industrial hub.

- World's first ETS for PM emissions, unlike carbon or SO₂ trading systems (e.g., EU ETS, Kyoto Protocol) and India's first for any pollutant.
- **Developed by:** Gujarat Pollution Control Board (GPCB) in collaboration with the Energy Policy Institute at the University of Chicago (EPIC), Yale University, and Abdul Latif Jameel Poverty Action Lab (J-PAL).

Mechanism (Cap-and-Trade):

- **Cap:** Sets a total PM emission limit (initially 280 tonnes/month, reduced to 170 tonnes by 2022) for participating industries.
- **Permits:** 80% of permits allocated free based on emission sources (boilers, heaters); 20% auctioned at ₹5-100/kg.
- **Trading:** Industries exceeding caps buy permits from those under limits via the National Commodities and Derivatives Exchange (NeML).
- **Monitoring:** Continuous Emission Monitoring Systems (CEMS) track real-time PM emissions, replacing manual inspections.

Source : [Indian Express](#)

LICHENS

Context: Earth-based lifeforms known as lichens may be tough enough to survive on Mars, a new study suggests.

Decoding the context: Scientists came to this conclusion after blasting the lichens with a year's worth of Martian radiation in less than a day during a lab experiment — and the terrestrial lifeforms survived the process.

Learning Corner:

- Lichens are symbiotic organisms formed by a mutualistic relationship between fungi and photosynthetic partners (algae or cyanobacteria), known for their resilience in extreme environments.

Key Points on Lichens

- **Structure and Composition:**
 - o Lichens are composite organisms where fungi provide structure and protection, while algae/cyanobacteria perform photosynthesis, producing nutrients.
 - o Named as single species (e.g., *Diploschistes muscorum*, *Cetraria aculeata*), despite their symbiotic nature.
- **Resilience and Adaptability:**
 - o **Extremophiles:** Thrive in harsh terrestrial environments like deserts, polar regions, and

high altitudes, tolerating extreme temperatures (-50°C to 55°C), desiccation, and high radiation.

- o **Survival Mechanisms:** Low metabolic rates, anhydrobiosis (dormancy during water scarcity), and protective compounds (e.g., calcium oxalate, antioxidants) enable survival.
- **Ecological Significance:**
 - o **Pioneer Species:** Colonize bare surfaces (rocks, soil), facilitating soil formation and ecosystem development through rock weathering and nitrogen fixation.
 - o **Bioindicators:** Sensitive to air pollution, used to monitor environmental health (e.g., sulfur dioxide levels).
 - o **Biodiversity:** Over 20,000 species globally, with ~3,000 in India, found in Himalayas, Western Ghats, and Northeast.

Source : [Live Science](#)

ACTIVE MOBILITY

Context: India's metro cities is witnessing a troubling increase in accidental deaths and injuries involving pedestrians, cyclists, and street vendors. Despite the presence of service lanes and non-motorized transport (NMT) zones in many cities, the widespread encroachment and misuse by motorized vehicles has turned these safe pathways into accident zones.

Decoding the context: In such a grim urban scenario, active mobility—emphasizing walking and cycling in safe, inclusive, and sustainable environments—emerges not just as a transport alternative, but as a public health and urban resilience imperative.

Learning Corner:

- Active mobility refers to human-powered modes of transportation, primarily walking and cycling, that promote health, sustainability, and urban livability.
- **Scope:** Encompasses non-motorized transport (walking, cycling, skateboarding) and micro-mobility (e.g., e-bikes).

Significance:

- **Health Benefits:** Promotes physical activity, reducing non-communicable diseases (NCDs) like diabetes (77 million cases in India, IDF 2021) and obesity.
- **Environmental Impact:** Cuts vehicular emissions, supporting India's net-zero 2070 goal and National Clean Air Programme (NCAP), addressing 1.24 million annual pollution deaths.
- **Safety:** Dedicated infrastructure lowers accident risks; India reported 1.55 lakh road deaths in 2022, with 40% involving pedestrians/cyclists (MoRTH).
- **Economic Gains:** Reduces fuel costs and healthcare expenditure, saving ₹1.8 lakh crore annually if cycling doubles (TERI 2023).

- **Urban Sustainability:** Reduces congestion, noise, and vehicular load in cities.

Source : [The Hindu](#)

EUROPE IS WARMING FASTER

Context: While global temperatures have been rising rapidly, not every region has been warming at the same rate. Europe, for example, has warmed about twice as much as the world as a whole, as highlighted by the 2024 European State of the Climate Report.

Decoding the context: The European State of Climate Report — an annual publication of Copernicus Climate Change Service, which is part of the European Commission — captures climate trends in Europe, and is published in collaboration with the World Meteorological Organisation.

Learning Corner:

- The new edition of the report has said that the year 2024, which was the warmest ever for the planet, was the warmest for Europe as well, though there was a distinct East-West contrast within the continent. Eastern Europe was sunny and warm, while the western part was cloudier and wetter.
- The planet as a whole has seen its annual average temperature rise by about 1.3 degree Celsius from the pre-industrial baseline (the average of 1850-1900), though the year 2024 breached the 1.5 degree Celsius warming for the first time.
- Europe, however, has seen its average annual temperature rise by about 2.4 degree Celsius compared with pre-industrial times.

Factors Contributing to Greater Warming in Europe

- **Arctic effect:** A substantial part of Europe lies in the Arctic region. In fact, Europe has the largest inhabited landmass in the polar region. And the warming around the poles, particularly the North Pole, is much more pronounced.
- The reason for greater warming in the Arctic is the albedo effect. Melting Arctic ice exposes darker surfaces (land/water), which absorb more solar radiation than reflective ice. The melting of ice sheets is a little less in Antarctica, because of which warming in Antarctica is less pronounced than that in the Arctic.
- Warming is not uniform over the entire planet. Land areas have warmed more than the oceans, and higher-latitude areas have warmed more than tropical areas.
- Reduction in aerosols: Another factor contributing to higher warming rate in Europe is the reduction in aerosols emissions, the State of Climate report said. This is ironic since reduction in aerosols points to reduced air pollution and cleaner air to breathe.
- Aerosols are able to scatter sunlight back so that there is less absorption of solar radiation by the Earth's surface. Aerosols also help in cloud formation and clouds, in turn, have an impact on how much sunlight is reflected or absorbed.

- Europe having relatively cleaner air and less emission of aerosols contributes to a faster warming.

Source : [Indian Express](#)

EARTH DAY

Context: Every year on April 22, people around the world come together to celebrate Earth Day to raise awareness about environmental issues and encourage action to protect it.

Decoding the context: Earth Day 2025's theme is "Our power, our planet," an idea centered on taking action through education, advocacy and community support.

Learning Corner:

- Born in 1970 amid growing public concern over pollution, deforestation, and industrial waste, the inaugural Earth Day was the brainchild of U.S. Senator Gaylord Nelson and led by activist Denis Hayes.
- Global Reach: Coordinated by EARTHDAY.ORG (formerly Earth Day Network), now celebrated in 190+ countries, with 1 billion participants annually.
- **Objectives:**
 - o **Raise awareness about environmental issues:** climate change, pollution, deforestation, and biodiversity loss.
 - o **Promote sustainable practices:** renewable energy, waste reduction, and conservation.
 - o Mobilize governments, businesses, and citizens for policy changes and grassroots action.

Source : [NDTV](#)

ARSENIC POLLUTION

Context: Climate change could be resulting in higher levels of arsenic in rice, potentially increasing lifetime cancer and health risks for people in Asian countries by 2050, according to a new study published in The Lancet Planetary Health journal.

Decoding the context: The presence of arsenic in rice has long been known as a problem. Almost all rice contains arsenic. The harmful, naturally occurring chemical can accumulate in the soil of paddy fields, leaching into the grains of rice grown there. But the amounts found can vary considerably from well below the recommended limits set by regulatory bodies to several times higher.

Learning Corner:

- Arsenic (As) is a naturally occurring, odorless, tasteless metalloid found in the earth's crust, soil, water, and air.
- Arsenic can be found in various forms, including organic and inorganic. Inorganic arsenic is generally considered more toxic than organic arsenic.

- Sources of Arsenic Pollution
 - **Natural Sources**
 - Weathering of arsenic-rich rocks(e.g., Ganga-Brahmaputra basin)
 - Volcanic eruptions and geothermal activity.
 - **Anthropogenic (Human-Induced) Sources**
 - Use of arsenical pesticides and herbicides.
 - Mining and smelting of arsenic-containing ores.
 - Burning of fossil fuels, especially coal.
 - Industrial effluents and waste disposal.
- According to new study, rising temperatures and CO₂ alter soil chemistry, increasing arsenic absorption in rice, posing higher health risks in rice-dependent Asian countries by 2050
- **Another concern is arsenic in Groundwater -**
 - Arsenic contamination in groundwater is a public health emergency in parts of Eastern India, particularly in: West Bengal, Bihar, Uttar Pradesh, Assam, Jharkhand, Punjab (recent studies).
 - Often caused by the leaching of arsenic from sediments in the Ganges-Brahmaputra-Meghna (GBM) plain due to overextraction of groundwater.
- **Health Effects of Arsenic Exposure**
 - **Short-term:** Vomiting, abdominal pain, diarrhea.
 - **Long-term (chronic exposure):** Skin lesions, hyperpigmentation, Arsenicosis (chronic arsenic poisoning), Cancer, Cardiovascular diseases, Neurotoxicity and developmental effects in children.

Source : [The Hindu](#)

NITROGEN

Context: India, the world's second-largest emitter of nitrous oxide (N₂O) after China, faces significant climate risks, as N₂O has a global warming potential nearly 300 times greater than that of carbon dioxide (CO₂).

Decoding the context: Nitrogen is the fifth-most abundant element in the universe and the most prevalent gas in the Earth's atmosphere, comprising approximately 78% of the air—nearly three times more than oxygen. Although it accounts for only about 3% of human body weight, nitrogen is essential for life, playing a critical role in the structure of amino acids, proteins, and nucleic acids.

Learning Corner:

Major Nitrogen Compounds Relevant to Global Warming:

- **Nitrous Oxide (N₂O)**

- o A potent greenhouse gas.
- o Global warming potential (GWP) is about 298 times that of CO₂ over a 100-year period.
- o Third most significant greenhouse gas after CO₂ and methane (CH₄), contributing ~6% to global radiative forcing.
- o Has a long atmospheric lifetime: ~114 years.
- o Also contributes to stratospheric ozone depletion.
- **Ammonia (NH₃)**
 - o Indirectly affects global warming by contributing to aerosol formation.
 - o Not a direct GHG, but affects air quality and ecosystem health.

Sources of Nitrogen Emissions:

- **Natural Sources:** Microbial activity in soils and oceans, Forest fires.
- **Anthropogenic (Human-Induced) Sources:**
 - o **Agriculture:** Use of synthetic fertilizers, animal manure → microbial processes in soil release N₂O.
 - o Biomass burning.
 - o Wastewater treatment.
 - o Fossil fuel combustion.
 - o Industrial processes (e.g., nitric acid production).

Environmental Impact of Nitrogen Emissions:

- Enhances global warming due to high GWP of N₂O.
- Depletes stratospheric ozone, worsening UV exposure risks.
- Causes eutrophication of water bodies.
- Leads to acid rain formation (via NO_x).
- **Climate feedback:** Warmer soils enhance microbial N₂O production, amplifying emissions.

Source : [The Hindu](#)

ALFALFA

Context: With the US pushing India to reduce import duty on alfalfa (lucerne) fodder seed, the government is preparing the ground for restricting the genetically modified (GM) version of the crop from entering the country.

Decoding the context: The Americans grow both GM and non-GM varieties of alfalfa, which derives its name from the Arabic world al-fasfasa that means the best forage.

Learning Corner:

- Alfalfa, also known as Lucerne, is a perennial flowering legume.
- Native to South-Central Asia, now cultivated globally.

- Known for its high nutritional value and soil-enriching properties.

Agricultural Importance:

- Used primarily as fodder crop for livestock (rich in protein, vitamins, and minerals).
- Can be harvested multiple times a year due to rapid regrowth.
- Cultivated in temperate and subtropical regions, including parts of Punjab, Haryana, and Maharashtra in India.

Environmental & Ecological Role:

- Nitrogen-fixing plant (symbiotic relationship with Rhizobium bacteria).
- Improves soil fertility and reduces dependence on synthetic fertilizers.
- Helps in crop rotation and sustainable agriculture.
- Deep roots reduce soil erosion and improve water infiltration.

Climate & Soil:

- Prefers well-drained loamy soils, neutral to slightly alkaline pH.
- Requires cool temperatures for germination and warm conditions for growth.
- Needs moderate irrigation – drought-tolerant once established.

Fodder Use:

- High crude protein (15–20%) and digestibility.
- Used in dairy and meat industries for feeding cattle, sheep, goats, and horses.

Nutritional/Health Use (Human Consumption – Limited):

- Young alfalfa sprouts are consumed in salads.
- Known for antioxidant, cholesterol-lowering, and anti-inflammatory properties.
- Used in Ayurveda and herbal medicine.

Source : [Hindu Businessline](#)

UNESCO GLOBAL GEOPARKS

Context: UNESCO has added 16 additional sites from 11 nations to its Global Geoparks Network, which celebrates its tenth anniversary this year.

Decoding the context: The new geoparks are in China, North Korea, Ecuador, Indonesia, Italy, Norway, South Korea, Saudi Arabia, Spain, the United Kingdom, and Vietnam.

Learning Corner:

- UNESCO Global Geoparks are single, unified geographical areas with internationally significant geological heritage, managed with a holistic concept of protection, education, and sustainable development.
- They showcase geological diversity along with ecological, archaeological, historical, and cultural richness.
- At present, there are 229 UNESCO Global Geoparks in 50 countries.
- North Korea recorded its historic first with the inclusion of its site Mt. Paektu in the UNESCO Global Geoparks Network, while Saudi Arabia has made its debut on the list with two newly designated geoparks.

- As of April 30, 2025, India does not have any UNESCO Global Geoparks.

Criteria to be a UNESCO Global Geopark

- The criteria for an area to become a UNESCO Global Geopark are set out in the Operational Guidelines for UNESCO Global Geoparks. There are four fundamental features to a UNESCO Global Geopark.
 - o **Geological heritage of international value:** The area must have geological heritage of international value.
 - o **Effective management structure:** UNESCO Global Geoparks are managed by a body having legal existence recognized under national legislation.
 - o **Visibility:** UNESCO Global Geoparks promote sustainable local economic development mainly through geotourism. To stimulate the geotourism in the area, it is crucial that a UNESCO Global Geopark has visibility.
 - o **Networking:** Membership of the Global Geoparks Network (GGN) is obligatory for UNESCO Global Geoparks.
- Notably, sites are given the designation of UNESCO Global Geoparks for a period of four years after which the functioning and quality of each UNESCO Global Geopark is thoroughly re-examined during a revalidation process. According to UNESCO's official site-
 - o If, on the basis of the field evaluation report, the UNESCO Global Geopark continues to fulfill the criteria, the area will continue as a UNESCO Global Geopark for a further four-year period (so-called "green card").
 - o If the area no longer fulfills the criteria, the management body will be informed to take appropriate steps within a two-year period (so-called "yellow card").
 - o Should the UNESCO Global Geopark not fulfill the criteria within two years after receiving a "yellow card", the area will lose its status as a UNESCO Global Geopark (so-called "red card").

Source : [Indian Express](#)

NILGIRI TAHR

Context: Kerala and Tamil Nadu will jointly carry out a Nilgiri Tahr census from April 24 to 27. The survey will span 89 census blocks in Kerala and 176 blocks in Tamil Nadu over the four-day period.

Decoding the context: Kerala Forest Minister A.K. Sase announced the initiative, stating that the synchronised survey of the mountain ungulate is being conducted to commemorate the 50th anniversary of the establishment of Eravikulam National Park.

Learning Corner:

- **Scientific Name:** Nilgiritragus hylocrius.
- **Common Name:** Nilgiri Tahr (locally called Varayadu in Tamil/Malayalam).
- **Taxonomy:** Belongs to the Bovidae family (related to goats and antelopes), it is the only

mountain ungulate species in southern India.

- **Status:** Classified as Endangered on the IUCN Red List due to habitat loss and population decline.
- **Habitat:** Found exclusively in the Western Ghats, primarily in Tamil Nadu and Kerala, at elevations between 1,200 and 2,600 meters.
- **Key Locations:**
 - **Tamil Nadu:** Mukurthi National Park, and Anamalai Hills.
 - **Kerala:** Eravikulam National Park, Silent Valley National Park and Parambikulam Tiger Reserve.
- **Population:** Estimated at around 3,000 individuals (as of recent surveys), with Eravikulam hosting the largest population (~700-800).
- **Geographical Significance:** Thrives in montane grasslands and shola forests, a unique ecosystem of the Western Ghats.

Physical and Behavioral Characteristics

- **Appearance:** Males are larger, with curved horns, darker coats (greyish-brown), and a distinctive saddle-like patch after maturity. Females are smaller, with lighter coats and shorter horns.
- **Adaptations:** Agile climbers suited to steep, rocky terrains; grazes on grasses and herbs in montane ecosystems.
- **Behavior:** Lives in small herds (10-20 individuals), with males often solitary except during mating season (monsoon, June-August).

Ecological Importance

- **Role in Ecosystem:** As a herbivore, it maintains grassland ecosystems by grazing, preventing shrub overgrowth and supporting shola forest dynamics.
- **Indicator Species:** Its presence reflects the health of high-altitude ecosystems in the Western Ghats, sensitive to climate change and habitat disturbance.

Conservation Efforts

- **Project Nilgiri Tahr (2023):** Launched by the Tamil Nadu government to protect the species, declared the State Animal of Tamil Nadu. Aims to map habitats, boost populations, and raise awareness.
- **Operation Tahr:** Efforts to relocate small populations to new habitats (e.g., Mukurthi) to reduce overcrowding risks.
- **International Frameworks:** Covered under CITES Appendix I, restricting trade in its parts.

Source : [The Hindu](#)

ARCTIC BOREAL ZONE (ABZ)

Context: According to a new study published in Nature Climate Change, the increasing ferocity of wildfires

means that more than 30 % of Arctic Boreal Zone has now stopped capturing carbon and is instead releasing it.

Decoding the context: The consequences of these changes create a dangerous feedback loop. According to the study, as wildfires become more common and more intense, they burn through the natural carbon reservoirs that have historically helped regulate the earth's climate. The carbon released from these fires further fuels global warming, which in turn creates conditions for more frequent and intense wildfires.

Learning Corner:

- **Location:** The ABZ spans the high-latitude Northern Hemisphere, roughly above 50°N, encompassing parts of the Arctic and sub-Arctic (boreal) regions. It includes:
 - o **Countries:** Canada, Russia, United States (Alaska), Nordic countries (Norway, Sweden, Finland), and Greenland (Denmark).
 - o **Area:** Covers approximately 26 million square kilometers, including boreal forests (taiga), treeless tundra, wetlands, and permafrost regions.

Physiography:

- **Boreal Forests (Taiga):** World's largest terrestrial biome, dominated by coniferous trees (pines, spruces, firs).
- **Tundra:** Treeless areas with low shrubs, grasses, and permafrost (permanently frozen soil).
- **Transition Zone:** Gradual shift from forested taiga to barren tundra.
- **Climate:** Cold, subarctic, with long winters (-50°C to 0°C) and short summers (0°C to 20°C). Annual precipitation is low (15-100 cm), often as snow.

Ecological Significance

- **Flora:** Cold-tolerant species like conifers, mosses, lichens, and tundra grasses.
- **Fauna:** Polar bears, Arctic foxes, caribou, migratory birds (e.g., ducks), and fish in Arctic rivers. The ABZ is a breeding ground for over half of North America's migratory birds.
- Historically, the ABZ acted as a carbon sink, storing vast amounts of carbon dioxide (CO₂) in permafrost soils (1,460-1,600 petagrams of organic carbon, nearly twice the atmospheric carbon).
- Recent studies (e.g., Nature Climate Change, 2025) indicate that 34-40% of the ABZ has become a carbon source, releasing more CO₂ than it absorbs due to permafrost thaw, wildfires, and microbial activity.
- **Arctic Amplification:** The ABZ warms 2.5-4 times faster than the global average due to reduced sea ice (albedo effect) and greenhouse gas emissions.

Source : [The Hindu](#)

AGASTHYAMALA

Context: The Supreme Court has directed the Central Empowered Committee (CEC) to conduct an

extensive survey of the entire tropical forest ecosystems of the Agasthyamalai landscape in the southernmost Western Ghats to identify non-forestry activities and encroachments.

Decoding the context: SC termed the survey as an interim measure "to initiate the process of restoration of the pristine forest areas and to protect the tiger habitats, wildlife reserves and sanctuaries falling under the Agasthyamalai biosphere".

Learning Corner:

- Agasthyamala, also known as Agastya Mala, is a prominent peak in the Western Ghats, located at



FACT FILE

- Established in 2001
- Area **3,500.36 sq km**
- Area in Kerala **1,828 sq km**
- Area in Tamil Nadu **1672.36 sq km**



Between
8° 8' and
9° 10' North Latitude,
76° 52' and 77° 34'
East Longitude

- Home to 2,254 species of higher plants
- About 400 endemic to the area

18 biosphere reserves in India

9 included in UNESCO network

Population in tribal settlements 3,000

- Sanctuaries in the reserve
- Shendurney, Peppara, Neyyar wildlife sanctuaries
- Kalakad Mundanthurai tiger reserve

the border of Kerala and Tamil Nadu. It is part of the Agasthyamala Biosphere Reserve, which is recognized for its rich biodiversity and ecological significance.

Key Features

- Includes the Agasthyarkoodam peak (approx. 1,868 m) – the second highest peak in Kerala.

• **Geographical Location:** Lies between Thiruvananthapuram district (Kerala) and Tirunelveli district (Tamil Nadu).

• **Rivers Originating Here:** The Thamirabarani River originates from the eastern side, while the Neyyar and Karamana Rivers flow westward.

Ecological and Cultural Importance

- Lies within the Western Ghats, a biodiversity hotspot.
- UNESCO Recognition:** The Agasthyamala Biosphere Reserve was included in the UNESCO World Network of Biosphere Reserves in 2016.
- Spiritual Significance:** Named after Sage Agastya, a revered figure in Hindu mythology, believed to have meditated in this region.
- The Biosphere Reserve is inhabited by the Kanikaran (also known as Kanis), who are classified as a Particularly Vulnerable Tribal Group (PVTG). Their traditional knowledge of medicinal plants is significant, and it notably led to the development of the herbal drug Jeevani, which is considered a major success story in bioprospecting and benefit-sharing in India.

Source : [The Hindu](#)

BANDIPUR TIGER RESERVE

Context: The night traffic ban through Bandipur has been a contentious issue for Kerala, whose MPs have time and again raised it even in Parliament.

Decoding the context: The ban, in effect since 2010, has helped reduce the death of wild animals by being run over by vehicles, apart from providing reprieve from habitat disturbance at night. Though the ban was legally challenged, it was upheld by the High Court of Karnataka and subsequently by the Supreme Court of India which reinforced its necessity to protect the region's rich biodiversity.

Learning Corner:

- Bandipur Tiger Reserve is situated in the districts of Mysore and Chamarajanagar in Karnataka.
- It is surrounded by Mudumalai Tiger Reserve in the South, Wayanad Wildlife Sanctuary in the South West & on the North West Side the Kabini Reservoir separates the Bandipur and Nagarahole Tiger Reserve.
- In 1973, Bandipur was designated as a Tiger Reserve under Project Tiger, marking one of the earliest efforts of the Indian government to safeguard its endangered tiger population.
- Geographically, it is an “ecological confluence” as the western and Eastern Ghats meet.



- **Flora:** Predominantly tropical dry deciduous forests, moist deciduous, and scrub forests.
- **Major tree species:** Teak, Rosewood, Indian Kino tree, Axlewood, Indian gooseberry
- **Fauna:**
 - **Flagship species:** Royal Bengal Tiger
 - **Other prominent species:**
 - Elephants, Indian Gaur, Leopard, Sloth bear, Wild dog (Dhole)
 - Chital, Sambar deer, Barking deer
 - Rich birdlife: Peafowl, Hornbills, Eagles, Owls

Source : [The Hindu](#)

SAHYOG PORTAL

Context: The Centre informed the Karnataka High Court that Elon Musk-owned X's description of the government's Sahyog portal as a “censorship portal” is “**unfortunate**” and “condemnable”.

Decoding the context: The HC is currently hearing a challenge by X against the government's use of Section 79(3)(b) of the Information Technology Act, 2000 (IT Act) to moderate and order the removal of content on social media.

Learning Corner:

- The Sahyog Portal is an initiative by India's Ministry of Home Affairs (MHA), developed under the Indian Cyber Crime Coordination Centre (I4C) to streamline the process of issuing notices to intermediaries for the removal or disabling of access to unlawful online content.
- Launched in 2024, the portal aims to create a safer cyberspace by automating and expediting content takedown requests under Clause (b) of Sub-section (3) of Section 79 of the Information Technology (IT) Act, 2000.
- Section 79 protects platforms (like x or instagram) from liability for the content that a third party (users) posts on their service. Part (3)(b) of Section 79 states that platforms can lose this protection if they fail to remove unlawful content after the Government or its agencies notify it about said content.

Key Features of the Sahyog Portal:

- **Centralized Platform:** Brings together authorized government agencies and IT intermediaries, facilitating coordinated action against unlawful online information.
- **Automated Notices:** Enables authorized agencies to issue takedown notices directly to intermediaries, ensuring timely removal of content used to commit unlawful acts.
- **Dashboard Monitoring:** Provides stakeholders with a national dashboard to monitor the status of requests, including the number of notices issued, actions taken, and pending requests.

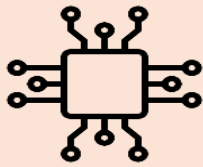
Operational Process:

- **Issuance of Notices:** Authorized agencies, including central ministries, state police, and law enforcement agencies, can flag objectionable content and raise requests for its removal through the portal.
- **Intermediary Action:** Upon receiving a notice, intermediaries are expected to act promptly to remove or disable access to the specified content. They can also seek additional information or provide reasons for non-compliance if applicable.
- **Monitoring and Compliance:** The portal allows for tracking the status of each request, ensuring transparency and accountability in the content removal process.

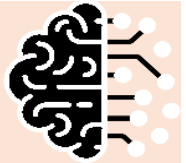
Controversies and Legal Challenges:

- The Sahyog Portal has faced criticism from some quarters, notably from X Corp (formerly Twitter), which referred to it as a "censorship portal." X Corp challenged the government's use of Section 79(3)(b) of the IT Act, arguing that it leads to a parallel and unlawful content censorship regime.
- The Indian government has defended the portal, stating that it provides a structured mechanism for coordination between intermediaries and law enforcement agencies to address unlawful online content.

Source : [Indian Express](#)



SCIENCE & TECHNOLOGY



DIGITAL THREAT REPORT 2024

Context: Recently, the Digital Threat Report 2024 for the Banking, Financial Services, and Insurance (BFSI) sector was released by the Indian Computer Emergency Response Team (CERT-In), the Computer Security Incident Response Team in the Finance sector (CSIRT-Fin), and SISA, a global Cybersecurity company.

Decoding the context: The report acknowledged the targeting of crypto exchanges as a new strategy. WazirX, one of India's major crypto exchanges, was hit by a cyber attack where hackers allegedly stole nearly half of the platform's crypto reserves worth more than \$230 million. More recently, hackers stole digital assets worth over \$1.5 billion from Dubai-based crypto exchange Bybit, in what is said to be the largest crypto heist till date.

Learning Corner:

- **Deepfakes and AI-generated Content:** The report identifies deepfakes and AI-generated content as powerful tools for cyber intrusion, particularly in social engineering attacks.
- **Prompt Hacking Risks:** Prompt hacking—manipulating AI models into producing harmful or unintended responses—is more common when LLMs are hosted locally (on company servers or devices), compared to when accessed via secure APIs from providers like OpenAI (ChatGPT) or DeepSeek.
- **Jailbreaking of AI Systems**
 - o Despite using secure APIs, OpenAI's ChatGPT has faced successful jailbreak attempts.
 - o Jailbreaking is the process of removing software restrictions imposed by the device's manufacturer to install unauthorized software, modify the device's operating system, and access hidden features.
 - o For instance, in 2023, ChatGPT users discovered that they could bypass the AI chatbot's safeguards by asking it to pretend to be a dead grandmother. This technique came to be known as the 'grandma exploit'.
- Beyond jailbreaking, the report noted that malicious LLMs such as WormGPT and FraudGPT are capable of writing convincing phishing emails, coding highly effective malware programmes, and automating the development of exploits.
- **The report urges policymakers to:**
 - o Introduce clear and comprehensive regulations for AI and machine learning use in the BFSI sector.
 - o Mandate security testing of APIs used in AI-powered applications to detect and fix hidden vulnerabilities.

Source : [Indian Express](#)

VITAMIN D

Context: A report by the Indian Council for Research on International Economic Relations (ICRIER) has sounded the alarm over a worsening public health crisis in India: Vitamin D deficiency.

Decoding the context: With one in five Indians affected, the think tank has called for a national campaign, pricing reforms, food fortification and better diagnostics to tackle what it describes as a “silent epidemic”.

Learning Corner:

- Vitamin D is a fat-soluble vitamin essential for calcium and phosphorus absorption, and thus crucial for bone health. It also plays roles in immune function, cell growth, and inflammation reduction.

Type	Source
D2 (Ergocalciferol)	Plant-based sources, fortified foods
D3 (Cholecalciferol)	Synthesized in human skin on exposure to sunlight; also from animal sources like fish, eggs, liver

•

ICRIER Report Findings:

- Prevalence is highest in eastern India (38.81%), with urban areas more affected than rural ones due to lifestyle factors.
- Despite India’s abundant sunlight, deficiency is widespread due to systemic, cultural, and policy barriers.

Causes of Vitamin D Deficiency - The ICRIER report identifies multiple factors driving the crisis

- **Lifestyle Changes:**
 - **Urbanization:** Indoor-centric lifestyles, high-rise buildings, and office work reduce sun exposure, especially in metros (40-60% deficiency).
 - **Screen Time:** Increased device use among youth limits outdoor activity, particularly affecting adolescents.
- **Environmental Factors:**
 - **Pollution:** High particulate matter in cities blocks UVB rays, hindering Vitamin D synthesis (e.g., Delhi’s air quality index often exceeds 300).
 - **Climate:** Extreme summers/winters discourage outdoor activity in regions like Rajasthan or Northeast.
- **Dietary Shortfalls:**
 - **Low Intake:** Only 8-14% of Indians meet recommended dairy consumption (rich in Vitamin D). Foods like fish, eggs, and fortified milk are costly or culturally avoided (60% vegetarian population).

- o **Lactose Intolerance:** Limits milk consumption, especially in southern/eastern India.
- o **Unfortified Staples:** Wheat, rice, and oils lack mandatory Vitamin D fortification, unlike iodized salt.
- **Biological and Cultural Factors:**
 - o **Skin Tone:** Darker skin (high melanin) requires 3-6 times more sun exposure for Vitamin D synthesis, a challenge for most Indians.
 - o **Clothing Norms:** Practices like burqa/purdah or full-body coverage reduce skin exposure, particularly among women.
- **Sunscreen Use:** Increasing use in urban areas blocks UVB rays.
- **Socio-Economic Barriers:**
 - o **High Costs:** Testing costs ₹1,500+, and supplements range ₹48-130 for 10 tablets, unaffordable for low-income groups. 18% GST on supplements adds burden.
 - o **Obesity:** Impairs Vitamin D metabolism, with India's obesity rate rising (22% adults, NFHS-5).

The ICRIER report underscores Vitamin D deficiency's far-reaching consequences

- **Skeletal Disorders:** 46% of children at risk of rickets; 80-90% of elderly face osteoporosis, increasing fractures and disability.
- **Non-Communicable Diseases (NCDs):** Linked to cardiovascular diseases (30% higher risk), type 2 diabetes (25% prevalence in adults), and cancers (e.g., breast, prostate).
- **Mental Health:** Associated with depression and fatigue, affecting quality of life.
- **Immunity:** Weakens resistance to infections (e.g., tuberculosis, COVID-19), straining healthcare systems.
- **Maternal/Child Health:** Deficiency in pregnant women correlates with neonatal issues (e.g., low birth weight)

Source : [Down To Earth](#)

LONG RANGE GLIDE BOMB 'GAURAV'

Context: Defence Research and Development Organisation (DRDO) successfully conducted the Release Trials of Long-Range Glide Bomb (LRGB) 'Gaurav' from the Su-30 MKI aircraft.

Decoding the context: The Long-Range Glide Bomb 'Gaurav' enhances the standoff capabilities of the Indian Air Force and reflects India's commitment to self-reliance under the Aatmanirbhar Bharat initiative in defence manufacturing.

Learning Corner:

- Gaurav is a 1,000 kg class, air-launched, precision-guided glide bomb designed to strike high-value

targets at long distances with pinpoint accuracy.

- **Development:**Indigenously designed and developed by the Defence Research and Development Organisation (DRDO).
- **Range:**Capable of gliding up to 100 km when launched from high altitudes (e.g., 40,000 feet).
- **Guidance System** - Uses a hybrid navigation system combining:
 - **Inertial Navigation System (INS):** Tracks position via accelerometers and gyroscopes.
 - **Global Positioning System (GPS):** Ensures precise targeting, with potential integration of NavIC (India's satellite navigation system) in future iterations.

About Glide Bombs

- A glide bomb is an air-launched, unpowered weapon equipped with aerodynamic surfaces (e.g., wings or fins) that enable it to glide over a long distance toward a target after release from an aircraft.
- Unlike traditional free-fall bombs, it uses precision guidance to achieve high accuracy, making it effective for standoff strikes (attacking from a safe distance).
- **Key Characteristics:**
 - **No Propulsion:** Relies on the aircraft's initial velocity and altitude for range, distinguishing it from missiles (e.g., BrahMos).
 - **Guidance Systems:** Typically uses Inertial Navigation System (INS), GPS, or laser guidance for precision (e.g., within meters).
 - **Range:** Varies from 30-100 km, depending on design and release altitude (e.g., Gaurav achieves 100 km).
 - **Warheads:** Configurable for multiple targets—fragmentation (soft targets like personnel) or penetration (hardened structures like bunkers).
 - **Platforms:** Deployed from fighter jets (e.g., Su-30 MK-I for Gaurav, Rafale, F-16 globally).
- **How It Works**
 - **Launch:** Dropped from an aircraft at high altitude (e.g., 40,000 feet) and speed (e.g., Mach 0.8).
 - **Glide Phase:** Aerodynamic wings or fins extend, allowing the bomb to glide, conserving momentum to cover long distances.
 - **Guidance:** Onboard systems (INS-GPS, laser) track the target, adjusting flight path via control surfaces for accuracy.
 - **Impact:** Strikes with precision, minimizing collateral damage compared to unguided bombs.

Source : [PIB](#)

GENOME INDIA PROJECT

Context: The first part of India's ambitious programme to map the genetic diversity of its people is now complete, and its data are ready to be used.

Decoding the context: The Genome India Project (GIP) has catalogued entire gene sequences of 10,000 individuals from 83 population groups. This database will eventually be expanded significantly, but it is already a precious set of information with important implications in health and medicine.

Learning Corner:

Genome India Project (GIP)

- Flagship initiative of the Government of India to catalogue the genetic diversity of India's population.
- Launched in 2020, led by the Indian Institute of Science (IISc), Bengaluru, in collaboration with 20 academic and research institutions.
- Inspired by the Human Genome Project (HGP), which mapped the human genome globally but lacked sufficient representation of Indian genetic diversity.

Significance of GIP

- **Healthcare and Precision Medicine**
 - Enables early detection of disease susceptibility (e.g., diabetes, cancers, rare disorders).
 - Facilitates tailored medical treatments — personalized medicine based on a person's genetic makeup.
 - Useful in developing population-specific drugs.
- **Public Health Policy**
 - Helps in epidemiological planning and creating targeted interventions for specific regions or communities.
 - Key for addressing rare diseases, many of which are unique to certain Indian sub-populations.
- **Population Genomics and Anthropology**
 - Traces ancestry, migrations, and evolutionary history of various Indian communities.
 - Useful in understanding genetic adaptations to regional environments.
 - Complements studies on population bottlenecks and founder effects in isolated communities.
- **Scientific and Strategic Importance**
 - Establishes India's leadership in genomic science and research.
 - Makes India self-reliant in genomic databases, reducing dependence on Western datasets which lack Indian representation.
 - Opens up opportunities in biotech, pharma, AI-based genomics, and medical research.

Source : [Indian Express](#)

DIRECTED ENERGY WEAPON (DEW)

Context: Recently, the first successful trial of the Mk-II(A) Laser- Directed Energy Weapon (DEW) system took place in Kurnool, Andhra Pradesh.

Decoding the context: The laser-based weapon system capable of disabling fixed-wing and swarm drones, places India among a select group of countries — alongside the United States, China, and Russia — that possess such advanced directed-energy weapon technology.

Learning Corner:

- A Directed Energy Weapon (DEW) is a ranged weapon that uses highly focused energy—such as lasers, microwaves, particle beams, or sound beams—to damage or destroy targets without physical projectiles.
- DEWs offer precision, speed-of-light engagement, and cost-effectiveness compared to traditional kinetic weapons. The Mk-II(A) is a laser-based DEW.

Key Characteristics of DEWs:

- **Precision:** Engages targets with pinpoint accuracy, minimizing collateral damage.
- **Speed:** Operates at the speed of light (approximately 300,000 km/s), enabling near-instantaneous response.
- **Cost-Effectiveness:** Costs per shot are minimal, unlike expensive missiles or ammunition.
- **Versatility:** Can be tuned to disable, damage, or destroy targets, including electronics and warheads.

Mk-II(A) DEW System: Key Features

- The Mk-II(A) Laser-DEW is a 30-kilowatt vehicle-mounted system developed by DRDO's Centre for High Energy Systems and Sciences (CHESS) in Hyderabad, in collaboration with other DRDO labs (LRDE, IRDE, DLRL), academic institutions, and Indian industries.
- **Technical Specifications:**
 - **Power Output:** 30 kilowatts, capable of generating a high-energy laser beam to burn through targets.
 - **Range:** Effective up to 3.5 km, with potential for enhancement through technological advancements.
 - **Target Detection:** Uses radar or an inbuilt Electro-Optic (EO) system for precise target acquisition.
- **Capabilities:**
 - Destroys fixed-wing unmanned aerial vehicles (UAVs) and drone swarms by causing structural failure.
 - Disables enemy surveillance sensors and antennae, effectively blinding reconnaissance systems.
- Fully developed in India, showcasing self-reliance in defense technology under Atmanirbhar Bharat.

Source : [Hindustan Times](https://www.hindustan-times.com)

TPU, GPU AND CPU

Context: Google recently launched a new computer chip, called Ironwood. It is the company's seventh-generation TPU, or tensor processing unit, which has been designed to run artificial intelligence (AI) models.

Decoding the context: Processing units are essentially hardware units that are the brain of a computer. In this context, it is important to understand the difference between CPU, GPU and TPU.

Learning Corner:

About CPU (Central Processing Unit)

- Developed in the 1950s, a CPU is a general-purpose processor that can handle various tasks.
- A CPU has at least a single core — the processing unit within the CPU that can execute instructions. In the initial years, CPUs used to have just one core but today, they can contain from two to up to 16 cores. As each core of the CPU can handle one task at a time, the ability to multitask is determined by the number of cores in the hardware.

About GPU (graphics processing unit)

- Unlike a CPU, a GPU is a specialised processor (it is a type of application-specific integrated circuit, or ASIC) which has been designed to perform multiple tasks concurrently rather than sequentially (like in a CPU).
- Modern GPUs comprise thousands of cores which break down complex problems into thousands or millions of separate tasks and work them out in parallel, a concept known as parallel processing. This makes GPUs far more efficient than CPUs.
- Initially developed for graphics rendering in gaming and animation, GPUs today are far more flexible and have become the bedrock of machine learning.

About TPU (Tensor Processing Unit)

- A TPU is also a type of ASIC, meaning it is designed to perform a narrow scope of intended tasks. First used by Google in 2015, TPUs were specially built to accelerate machine learning workloads.
- TPUs are engineered to handle tensor — a generic name for the data structures used for machine learning — operations. They excel in processing large volumes of data and executing complex neural networks efficiently, enabling fast training of AI models.
- While AI models can take weeks to be trained with the help of GPUs, the same process can be executed within hours using TPUs.

Source : [Indian Express](#)

RARE EARTH MAGNETS

Context: China has reportedly suspended exports of vital minerals and magnets, triggering concerns of widespread disruptions for global industries ranging from automotive and aerospace to semiconductors and defense.

Decoding the context: The move is seen as retaliation for escalating US tariffs.

Learning Corner:

- Rare Earth Magnets are permanent magnets that generate a magnetic field without external power, using alloys of REEs like neodymium, praseodymium, dysprosium, and samarium, combined with metals like iron, cobalt, or boron.
- They are the strongest permanent magnets available, with high magnetic strength, durability, and resistance to demagnetization.
- **Types:**
 - **Neodymium-Iron-Boron (NdFeB) Magnets:**
 - **Composition:** Neodymium, iron, boron.
 - **Features:** Highest magnetic strength, used in electric vehicles (EVs), wind turbines, hard disk drives, and drones.
 - **Limitations:** Susceptible to corrosion, lower temperature resistance (up to 230°C).
 - **Samarium-Cobalt (SmCo) Magnets:**
 - **Composition:** Samarium, cobalt.
 - **Features:** High-temperature stability, corrosion resistance, used in aerospace, military, and medical equipment.
- **Key REEs Used:**
 - **Neodymium (Nd):** Most critical for NdFeB magnets, used in EVs and wind turbines.
 - **Praseodymium (Pr):** Enhances magnet performance, often used with neodymium.
 - **Dysprosium (Dy):** Improves high-temperature performance, critical for heavy REE applications.
 - **Samarium (Sm):** Key for SmCo magnets, vital for defense systems.

Applications:

- **Defense:** Permanent magnets in missile guidance systems, radar, sonar, and underwater mine detection.
- **Renewable Energy:** NdFeB magnets in wind turbine rotors and EV motors.
- **Consumer Electronics:** Used in smartphones, hard disk drives, digital cameras, and audio equipment.
- **Medical:** SmCo magnets in MRI machines and surgical lasers.
- **Strategic:** Critical for space shuttle components, jet engines, and robotics.

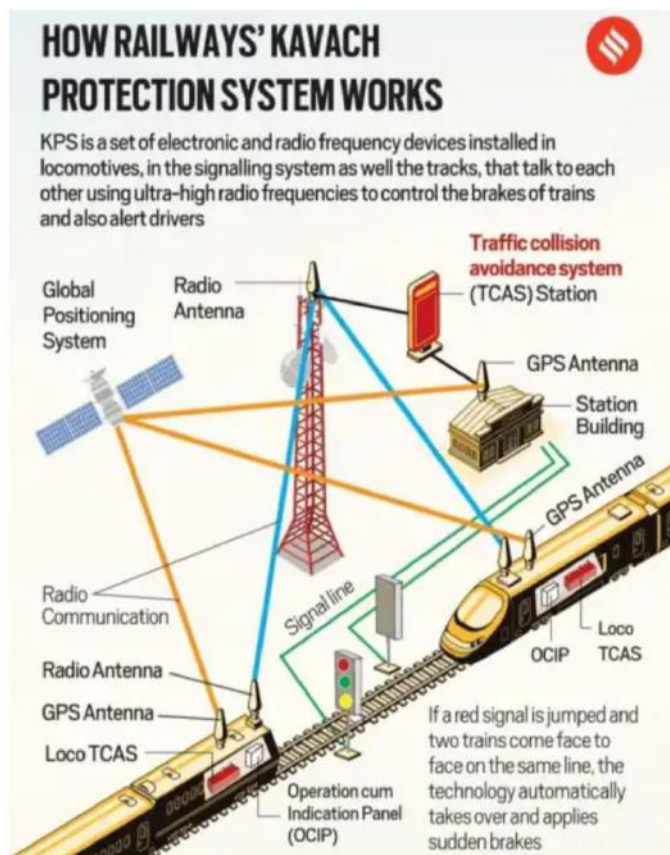
Source : [Times of India](https://timesofindia.com)

KAVACH

Context: In a major step to upgrade Mumbai's suburban train travel, Union Minister for Railways Ashwini Vaishnaw announced that Kavach 5.0, the latest in the series of Automatic Train Protection (ATP) systems, will be implemented to increase the number of trains by 30 percent.

Decoding the context:Currently, Kavach 4.0 version is under implementation in the different parts of Indian Railways.

Learning Corner:



• Kavach is India's very own advanced Automatic Train Protection (ATP) system developed by the Research Design and Standards Organisation in collaboration with the Indian industry to prevent train collisions by automatically activating the braking system of the train.

Key Features of Kavach:

• **Collision Prevention:** Automatically applies brakes if a train passes a red signal (Signal Passed at Danger, SPAD) or approaches another train on the same track, preventing head-on or rear-end collisions.

• **Speed Regulation:** Enforces speed restrictions by reducing train speed if the loco pilot fails to comply, e.g., slowing from 130 km/h to 30 km/h in restricted zones.

• **On-Board Display of Signal Aspect (OBDSA):** Provides real-time signal information in the loco pilot's cab, reducing reliance on visual signals, especially in low-visibility conditions like fog.

- **Emergency Response:** Relays SoS messages during emergencies for swift coordination.
- **Centralized Monitoring:** Enables live tracking of train movements via the Network Monitor System for better operational oversight.

Source : [Indian Express](https://www.indianexpress.com)

ONE NETWORK FOR DIGITAL COMMERCE (ONDC)

Context: The government-backed Open Network for Digital Commerce (ONDC) has announced that its MD and CEO, T Koshy, has stepped down following the completion of his three-year tenure at the company.

Decoding the context:ONDC offers small retailers an opportunity to provide their services and goods to buyers across the country through an e-commerce system, where buyers are able to purchase products that are sold on any platform. It is not an application, platform, intermediary or software but a set of specifications designed to foster open, unbundled, and interoperable open networks.

Learning Corner:

- The Open Network for Digital Commerce (ONDC) is an innovative, government-backed initiative launched by the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of

Commerce, to democratize e-commerce in India.

- Incorporated on December 31, 2021, as a Section 8 non-profit company, ONDC aims to shift e-commerce from a platform-centric model to an open-network model.

Key Features:

- **Open-Source Protocols:** Uses open specifications and network protocols, independent of specific platforms, similar to HTTP (web), SMTP (email), or UPI (payments).
- **Interoperability:** Allows a buyer on one platform (e.g., Amazon) to purchase from a seller on another (e.g., Flipkart) without needing to register on both.
- **Network-Centric Model:** Unlike platform-centric models, ONDC connects Buyer Applications, Seller Applications, and Gateways for seamless transactions.
- **Standardized Operations:** Protocols for cataloguing, inventory management, order fulfillment, and vendor discovery ensure uniformity.
- **Inclusivity:** Empowers small businesses by providing access to digital commerce without high platform commissions.

Objectives

- **Democratize E-Commerce:** Reduce dominance of large platforms (e.g., Amazon, Flipkart) and curb digital monopolies.
- **Promote Inclusivity:** Enable MSMEs, small retailers, and local businesses to compete in the digital marketplace.
- **Enhance Consumer Choice:** Allow buyers to access a wider range of sellers, products, and services across platforms.
- **Cost Efficiency:** Lower transaction costs by reducing platform fees (e.g., ONDC's food delivery fees are ~20% of those charged by Swiggy/Zomato).
- **Drive Innovation:** Foster a competitive ecosystem through open-source collaboration.

Source : [Business Standard](#)

FIXED-DOSE COMBINATION DRUGS

Context: In a major crackdown on drug safety violations, India's Central Drugs Standard Control Organisation (CDSCO) has banned 35 fixed-dose combination (FDC) drugs.

Decoding the context: The April 11 order directs an immediate halt on manufacturing, sale, and distribution of these drugs, citing that they were approved without mandatory safety and efficacy evaluations under the New Drugs and Clinical Trials (NDCT) Rules, 2019. State drug regulators had approved them without following central oversight procedures.

Learning Corner:

- Fixed-Dose Combination (FDC) Drugs are medications that combine two or more active

pharmaceutical ingredients (APIs) in a fixed ratio within a single dosage form (e.g., tablet, injection).

- FDCs classified as “New Drugs” require central approval for safety and efficacy, per NDCT Rules, 2019. Only CDSCO, not State Licensing Authorities (SLAs), can approve new FDCs.

Advantages of FDCs

- **Improved Compliance:** Fewer pills mean better adherence to therapy.
- **Synergistic Action:** Combining drugs with complementary actions can enhance efficacy.
- **Cost-Effective:** Reduces overall cost of treatment by lowering packaging and distribution costs.
- **Prevents Resistance:** Especially in TB/HIV treatment, combining drugs reduces chance of microbial resistance.

Concerns and Risks

- **Irrational Combinations:** Some FDCs (e.g., antibiotics + probiotics) lack scientific validation, contributing to antimicrobial resistance (AMR), a global health threat.
- **Increased Adverse Effects:** Multiple active ingredients raise the risk of drug interactions and side effects.
- **No Individualized Dosage:** Fixed ratios may not suit all patients.
- **Regulatory Loopholes:** Some manufacturers market FDCs without proper Central Drug Authority approval under state-level licenses.

Source : [Business Today](#)

VEHICLE – TO –GRID (V2G) TECHNOLOGY

Context: The Kerala State Electricity Board (KSEB) and the Indian Institute of Technology Bombay (IIT Bombay) have initiated a pilot project to explore the implementation of Vehicle-to-Grid (V2G) technology across the State.

Decoding the context: This collaboration aims to assess the feasibility of integrating Electric Vehicles (EVs) into the State’s power grid.

Learning Corner:

- Vehicle-to-Grid (V2G) technology enables electric vehicles (EVs) to act as decentralized energy storage units by supplying stored electricity back to the power grid, enhancing grid stability and renewable energy integration.
- V2G technology enables bidirectional energy flow—EVs not only consume power (charging) but can also supply stored power back to the grid (discharging).

Key Points on V2G Technology

- **Mechanism:**
 - V2G allows EV batteries to draw power from the grid and return it during peak demand

via bi-directional chargers.

- o Requires smart grid infrastructure and real-time grid management, to balance charging and discharging.
- o **Example:** EVs charge during low-demand periods (e.g., daytime with solar surplus in Kerala) and discharge during high-demand periods (e.g., nighttime).
- **Benefits:** Grid Stability: EVs act as distributed storage, reducing grid overload and blackout risks.
- **Renewable Energy Integration:** Stores excess solar/wind energy, supporting India's 500 GW renewable target by 2030.
- **Emission Reduction:** Promotes cleaner grids, aligning with India's net-zero goal by 2070, reducing 1.24 million annual pollution-related deaths.
- **Cost Savings:** EV owners earn revenue by selling power, while utilities avoid costly external purchases.

Source : [The Hindu](#)

TARDIGRADES

Context: The Axiom Mission 4 will see India, Poland, and Hungary's first government-sponsored human spaceflight in more than 40 years next month.

Decoding the context: Among the studies set to be carried out in the mission is ISRO's Voyager Tardigrades project, which will investigate the revival, survival, and reproduction of tardigrades – creatures that have long fascinated scientists.

Learning Corner:

Water Bears Or Tardigrades

- Tardigrades are microscopic, eight-legged animals measuring 0.1 to 0.5 millimetres, found across terrestrial, marine, and freshwater environments worldwide, and are renowned for surviving extreme conditions—from arid deserts to the heights of the Himalayas.
- They can also go without food or water for up to years, although their average lifespan is not more than a decade.
- Remarkable resilience has enabled tardigrades to survive on Earth for approximately 600 million years and makes them likely to endure significant climatic changes in the foreseeable future.
- **Survival Mechanism – Cryptobiosis:**
 - o Enter a hibernation-like state by curling into a ball called a tun.
 - o They retract legs and head into their cuticle (exoskeleton) and shut down almost all body processes.
 - o Resume normal activity when favorable conditions return.

Why is ISRO taking Tardigrades to space?

- Tardigrades are the only known animals capable of surviving even in the cold vacuum of Space.

- In 2007, a crewless Russian capsule on a European Space Agency (ESA) mission exposed some 3,000 tardigrades to the vacuum of space for 10 days, and they were left out there in low-Earth orbit. Over two-thirds of the animals survived the mission and even gave birth to offspring upon returning to Earth.
- The ISRO project will examine the revival of dormant tardigrades, count the number of eggs laid and hatched during a mission, and compare the gene expression patterns of spaceflown vs. ground control populations.
- The research seeks to identify molecular mechanisms of resilience, potentially furthering understanding about the limits of life in extreme environments.

Source : [Indian Express](#)

NON-NUCLEAR HYDROGEN BOMBS

Context: In a significant advancement in weapon technology, China has successfully detonated a new hydrogen-based explosive device. This breakthrough, developed by the China State Shipbuilding Corporation (CSSC), marks a step forward in China's military capabilities.

Decoding the context: Unlike traditional hydrogen bombs, which rely on nuclear fusion, this device uses a chemical reaction involving magnesium hydride. The result is a powerful fireball capable of producing sustained heat, with no nuclear materials involved.

Learning Corner:

Hydrogen Bomb

- **Definition:** A thermonuclear weapon that uses nuclear fusion of hydrogen isotopes (deuterium, tritium) to release massive energy, triggered by a fission-based atomic bomb.
- **Mechanism:** Fission (splitting atomic nuclei) initiates fusion (combining hydrogen nuclei), releasing energy far greater than atomic bombs.
- **Key Features:**
 - **Explosive yield:** Megatons (millions of tons of TNT equivalent).
 - Causes widespread destruction via blast, heat, and radioactive fallout.

Non-Nuclear Hydrogen Bomb

- **Definition:** A novel explosive device using chemical reactions with magnesium hydride (MgH_2) to release hydrogen gas, creating a sustained fireball without nuclear materials.
- **Mechanism:**
 - Conventional explosive fractures magnesium hydride into micron-scale particles.
 - Thermal decomposition releases hydrogen gas, which ignites with air, producing a fireball $>1,000^\circ\text{C}$ lasting over 2 seconds (15x longer than TNT).
 - Self-sustaining combustion loop enhances thermal damage

Source : [The Hindu](#)

AGENTIC AI

Context: India is grappling with a critical shortage of agentic AI professionals as demand surges.

Decoding the context: The current talent pool of under 100,000 is struggling to meet the projected need of 200,000 by 2026, leading to soaring salaries and intense competition among GCCs, IT firms and startups.

Learning Corner:

- Agentic AI refers to artificial intelligence systems that can autonomously plan, make decisions, and take actions to achieve goals without step-by-step human instructions.
- These systems act as "agents"— they exhibit initiative, autonomy, and goal-directed behavior.

Key Features:

- **Autonomy:** Can operate independently of direct human control.
- **Proactivity:** Not just reactive; initiates actions to meet objectives.
- **Planning & Reasoning:** Can break down complex tasks, plan steps, and revise plans dynamically.
- **Memory and Learning:** Retains past experience to improve future decisions.
- **Interaction:** May collaborate with humans or other AI agents (multi-agent systems).

Examples:

- AI Personal Assistants that manage schedules, book tickets, and handle emails autonomously.
- Robotic agents performing tasks in disaster zones, space missions, or factories.
- Autonomous vehicles with goal-oriented navigation.

Source : [Economic Times](#)

HYPERSONIC MISSILES

Context: Russian President Vladimir Putin launched Perm, a nuclear-powered submarine with hypersonic Zircon missiles. Perm is the first of its kind to be equipped with Zircon (also spelled Tsirkon) missiles as a standard feature.

Decoding the context: According to the Russian news agency TASS, Putin described its launch as a “milestone event” for the Russian navy.

Learning Corner:

- Hypersonic missiles are advanced weapons that travel at speeds of Mach 5 (five times the speed of sound) or higher ($\geq 6,174$ km/h). They are designed for high-speed, maneuverability, and rapid strike capability.

Advantages of Hypersonic missiles

- The main feature of a hypersonic missile is its maneuverability, meaning its trajectory can be altered according to the intended target. These are generally slower than intercontinental ballistic missiles.
- Hypersonic weapons can potentially evade missile shields and early warning systems. Ground-based radars or terrestrial radars cannot detect hypersonic missiles until late in the flight of the weapon. This makes it difficult for the responders to the missile attack to try to intercept the missile.

- Hypersonic weapons can enable responsive, long-range strike options against distant, defended or time-critical threats (such as road-mobile missiles) when other forces are unavailable, denied access or not preferred.
- Conventional hypersonic weapons use only kinetic energy, energy derived from motion, to destroy unhardened targets or even underground facilities.

Feature	Hypersonic Missiles	Ballistic Missiles
Speed	Mach 5 or higher	Mach 20+ (for ICBMs)
Trajectory	Low-altitude, maneuverable	High-arc trajectory (parabolic)
Propulsion	Scramjet (HCMs) or Gliding (HGVs)	Rocket engines
Detectability	Difficult to detect due to low flight & maneuverability	Easier to detect due to predictable path
Interceptability	Hard to intercept due to unpredictable movements	Can be intercepted by anti-ballistic missile systems
Primary Use	Quick precision strikes	Long-range strategic attacks

• The two types of hypersonic weapons systems are Hypersonic Glide Vehicles (HGVs) and Hypersonic Cruise Missiles (HCMs).

• HGVs are launched from a rocket before gliding to the intended target, while HCMs are powered by air-breathing high-speed engines

or 'scramjets' after acquiring their target.

What to know about ZIRCON

- According to Russia, the Zircon can reach eight times the speed of sound, has a range of 625 miles and can carry a 660-pound warhead.
- If this is accurate, Zircon would be one of the fastest in the world, "making it nearly impossible to defend against due to its speed alone."

Source : [Indian Express](#)

INDIA'S THREE-STAGE NUCLEAR PROGRAMME

Context: A fiery exchange erupted in Rajya Sabha when Congress MP Jairam Ramesh questioned the progress of phase 2 of the nuclear programme of India, the status of the fast breeder reactor in Kalpakkam, and the plans for setting up thorium reactors for Phase 3.

Decoding the context: India's nuclear journey began shortly after Independence with the establishment of the Atomic Energy Commission in 1948. In 1956, Asia's first research reactor, Apsara, was commissioned at the Bhabha Atomic Research Centre (BARC) in Trombay. India was the second Asian nation to build a nuclear power plant in 1969 at Tarapur, just after Japan and long before China.

Learning Corner:

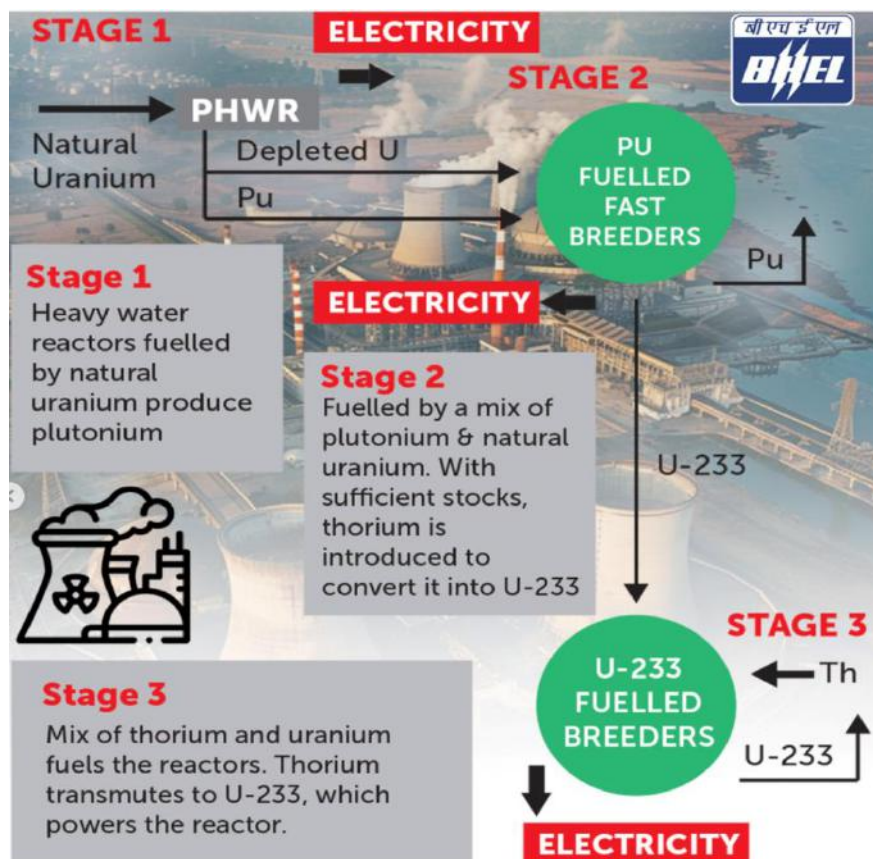
- India owes the vision of the three-phase programme of nuclear power to ensure energy security to Dr Homi J Bhabha, the father of India's nuclear programme, and Dr Vikram Sarabhai, who recognised the need for developing Fast Breeder Reactor (FBR).

Three-stage nuclear programme

Stage I: Pressurised Heavy Water Reactors (PHWRs)

- **Fuel and Operating Principle:** In the first stage, India relies on Pressurised Heavy Water Reactors that use natural uranium as fuel.
- **Key Characteristics:** These reactors utilize heavy water (deuterium oxide) as both a moderator and coolant, allowing them to efficiently sustain the nuclear chain reaction with low-enriched fuel.
- **Outcome:** A byproduct of this stage is the production of plutonium-239 in the spent fuel, which is essential for the next phase of the programme.

Stage II: Fast Breeder Reactors (FBRs)



• **Role of Plutonium:** Stage II capitalizes on the plutonium produced in Stage I. Fast Breeder Reactors use a mix of plutonium and natural uranium in a process known as “breeding.”

• **Breeding Process:** These reactors are designed to generate more fissile material than they consume. Fast neutrons (without slowing by a moderator) convert the fertile uranium-238 into additional plutonium, thereby increasing the fissile inventory.

• **Objective:** The goal is to build up a significant stock of fissile material that will bridge the gap between the limited uranium resources and the future utilization of thorium.

- **Implementation Status:** The Prototype Fast Breeder Reactor (PFBR) at Kalpakkam is a critical milestone in this stage, although its progress has faced delays.

Stage III: Thorium-Based Reactors

- **Rationale for Thorium:** India possesses one of the world’s largest reserves of thorium (approximately 25% of the global share), but only limited uranium resources. Thorium-232, which is not fissile in its natural state, needs to be converted (or “bred”) into uranium-233 through neutron irradiation.
- **Reactor Development:** The final stage envisions advanced thermal breeder reactors—such as Advanced Heavy Water Reactors (AHWRs) and other concepts like molten salt reactors—that utilize a thorium–uranium-233 fuel cycle.
- **Long-Term Vision:** Once the necessary fissile material has been accumulated in Stage II and the technology for breeding uranium-233 from thorium is perfected, India aims to achieve sustained nuclear power generation that relies primarily on its abundant thorium resources.

- **Impact:** This stage is expected to drastically reduce dependence on imported uranium and pave the way for a self-reliant nuclear energy programme lasting for centuries.

Source : [Indian Express](#)

FLUORIDE CONTAMINATION

Context: The Uttar Pradesh Jal Nigam, the state's water authority, has identified a significant problem of excessive fluoride in the groundwater of 120 hamlets, impacting nearly 2 lakh people.

Decoding the context: Sonbhadra, UP's second-largest district, has been struggling with fluoride contamination. Rich deposits of granite, an igneous rock, have leached "excess" fluoride into the groundwater, making it unfit for human consumption.

Learning Corner:

- Fluoride contamination refers to the presence of fluoride in water at concentrations higher than the levels considered safe for human consumption.
- While fluoride in small amounts can be beneficial for dental health—helping to prevent tooth decay—excessive fluoride intake can lead to serious health issues.
- Fluoride Contamination is a serious issue in Rajasthan, Gujarat, Andhra Pradesh, Telangana, Karnataka, Madhya Pradesh, and Uttar Pradesh.
- Fluoride contamination primarily occurs in groundwater due to:
 - o **Natural sources**
 - Weathering of fluoride-rich rocks (e.g., granites, basalts).
 - Volcanic activity releases fluoride into the environment.
 - o **Industrial pollution**
 - Fluoride is released from industries like aluminum, steel, glass, and fertilizer production.
 - o **Agricultural practices**
 - Excessive use of phosphate fertilizers and pesticides leads to fluoride leaching into water.
 - o **Coal combustion**
 - Burning coal releases fluoride into air and water sources.
- The World Health Organization (WHO) recommends a safe fluoride level of 0.5 – 1.5 mg/L in drinking water. More than 1.5 mg/L can lead to fluorosis (bone and teeth damage).

Health Impacts of Excess Fluoride

- **Dental Fluorosis:** When children consume water with high fluoride levels, it can result in dental fluorosis. This condition causes changes in the appearance and structure of tooth enamel, ranging from mild discoloration to severe enamel pitting.
- **Skeletal Fluorosis:** Prolonged ingestion of high fluoride levels can lead to skeletal fluorosis—a crippling disease characterized by pain and damage to bones and joints. Over time, the accumulation of fluoride in bones can increase the risk of fractures and cause stiffness and

calcification of ligaments.

Prevention and Control Measures - Water Treatment Methods

- Activated Alumina Filters – Absorbs fluoride from water.
- Reverse Osmosis (RO) Filtration – Highly effective in fluoride removal.
- Nalgonda Technique – Uses alum, lime, and bleaching powder to remove fluoride from water (low-cost method).

Source : [Indian Express](#)

VIBE CODING

Context: Vibe coding is transforming how software is written.

Decoding the context: Vibe coding became an overnight buzzword in Silicon Valley after being coined by OpenAI co-founder Andrej Karpathy.

Learning Corner:

- Vibe coding is an emerging programming approach where developers utilize artificial intelligence (AI) tools, particularly large language models (LLMs), to generate code based on natural language prompts. This method shifts the programmer's role from manually writing code to guiding and refining AI-generated outputs.

Key Aspects of Vibe Coding:

- **Natural Language Interaction:** Developers describe desired functionalities or solutions in everyday language, and the AI translates these descriptions into executable code.
- **AI-Assisted Development:** Tools like Cursor, Replit, and GitHub Copilot facilitate this process by integrating AI capabilities into the development environment, enabling rapid prototyping and development.
- **Accessibility:** This approach lowers the barrier to software development, allowing individuals with limited coding experience to create functional applications by focusing on conceptual design rather than syntax.

While vibe coding offers efficiency, it also presents challenges:

- **Code Understanding:** Relying heavily on AI-generated code may lead to situations where developers lack a deep understanding of the underlying implementation, potentially complicating debugging and maintenance.
- **Quality Assurance:** Ensuring the reliability and security of AI-generated code requires rigorous testing and validation processes.
- **Skill Evolution:** Developers are encouraged to adapt by enhancing skills in prompt engineering and critical evaluation of AI outputs to maintain effective oversight of the development process.

Source : [Fortune](#)



HISTORY AND ART & CULTURE



KOCH RAJBONGSHIS

Context: The Assam Cabinet announced the withdrawal of around 28,000 pending cases at the state's Foreigner Tribunals against members of the Koch Rajbongshi community.

Decoding the context: Foreigner Tribunals are quasi-judicial bodies are tasked with determining whether individuals fall within the definition of a "foreigner" under the Foreigners Act, 1946. Chief Minister Himanta Biswa Sarma said the decision was taken as the state government considered them an "indigenous community".

Learning Corner:

- The community traces its lineage to the Koch Dynasty of the Kamata Kingdom, which rose to power in the 16th century. Today, its members are spread across Assam and West Bengal, as well as parts of Bihar, Meghalaya, Bangladesh, Nepal and Bhutan, reflecting the geographical spread of the kingdom.
- In Assam, the community has a significant presence in the western districts. In 2020, the state government created a Kamatapur Autonomous Council for the advancement of the Koch Rajbongshi community.
- While the community has OBC status in Assam, it is one of six communities that has long been demanding Scheduled Tribe status.
- Another demand that gathered steam in the 1990s, though stronger among West Bengal-based groups, has been for a separate Kamatapur state comprising parts of northern West Bengal and western Assam.

Citizenship Concerns and "D-voter" Tag:

- The transborder nature of the community has played a role in the "D-voter" (Doubtful voter) tag being attached to many Koch Rajbongshis, putting a question mark on their citizenship.
- Foreigner Tribunals are tasked with adjudicating whether "suspected foreigners" (D-voters and cases referred to them by the border police) are foreigners, that is, people who entered India after March 25, 1971, according to the 1985 Assam Accord.
- The selective withdrawal of cases against Koch Rajbongshis has raised questions regarding similar relief for other communities. In 2022, the Assam government identified five Assamese Muslim sub-groups—Goriya, Moriya, Julha, Deshi, and Syed—as "indigenous" but has not extended a similar withdrawal of cases against them.

Source : [Indian Express](#)

JALLIANWALA BHAG

Context: The Prime Minister Shri Narendra Modi paid homage to the martyrs of Jallianwala Bagh.

Decoding the context: The Jallianwala Bagh massacre occurred on April 13, 1919, in Amritsar, Punjab,

during the Baisakhi festival.

Learning Corner:

- Occurred during British rule, amidst growing unrest against repressive policies post-World War I (1914–1918).
- The Rowlatt Act (1919), passed by the Imperial Legislative Council, allowed indefinite detention without trial, sparking nationwide protests.
- Punjab, under Lieutenant-Governor Michael O'Dwyer, faced severe wartime restrictions, forced recruitment, and economic strain, fueling anti-British sentiment.
- Immediate Trigger: On April 10, 1919, the arrest and deportation of nationalist leaders Dr. Satyapal and Dr. Saifuddin Kitchlew in Amritsar led to protests, which turned violent after police firing killed several Indians.
- This prompted a peaceful gathering on April 13 to protest the arrests and Rowlatt Act, coinciding with Baisakhi celebrations.

Events of the Massacre

- Nearly 20,000–25,000 people (including women and children) gathered in Jallianwala Bagh, a walled garden with only one narrow exit. Most were unaware of the martial law prohibiting assemblies, as the notice was poorly publicized.
- Brigadier-General Reginald Dyer's Actions: Dyer, the acting military commander of Amritsar, arrived with force. Without warning, Dyer ordered his troops to fire on the unarmed crowd at 5:30 PM, targeting the densest areas.
- **Casualties:**
 - **Official British estimates:** 379 dead, 1,200 injured.
 - **Indian National Congress inquiry (1920):** Over 1,000 dead, 1,500+ injured.

Consequences

- Sparked outrage across India, uniting diverse groups against British rule. Amritsar became a focal point of resistance, with protests escalating nationwide.
- Mahatma Gandhi launched the Non-Cooperation Movement (1920–1922), inspired by the massacre's injustice, marking a shift from moderate to mass-based agitation. Rabindranath Tagore renounced his knighthood in protest.
- **British Response:**
 - The Hunter Commission (1919–1920), set up to investigate, mildly censured Dyer, relieving him of active duty without prosecution.
 - The British House of Lords praised Dyer, while the Commons condemned him; he retired to England, unpunished.
- **Udham Singh's Retribution:**
 - On March 13, 1940, Udham Singh, a survivor, assassinated Michael O'Dwyer (former Lieutenant Governor of Punjab Province, who had backed General Dyer) in London, seeking justice for Jallianwala. Hanged in 1940, Udham Singh became a martyr.

- International Impact: Exposed British imperialism's brutality, weakening its moral legitimacy globally.

Investigations and Legacy

- **Hunter Commission (1919–1920):**
 - o Formed under William Hunter, it included British and Indian members (e.g., Chimanlal Setalvad, Pandit Jagat Narayan).
 - o Criticized Dyer for "grave error" in firing without warning but avoided systemic blame. Indian members dissented, demanding stronger accountability.
- **Congress Inquiry (1920):** Led by Madan Mohan Malaviya and Motilal Nehru, it estimated higher casualties and condemned British apathy.

Source : [Business Standard](#)

CHETTUR SANKARAN NAIR

Context: Prime Minister Narendra Modi attacked the Congress for having "abandoned" the memory of Chettur Sankaran Nair, who resigned as the sole Indian on the Viceroy's Executive Council after the Jallianwala Bagh massacre of 1919.

Decoding the context: Chettur Sankaran Nair is the subject of an upcoming film called Kesari Chapter 2. The film is an adaptation of the 2019 book, *The Case That Shook the Empire: One Man's Fight for the Truth* about the Jallianwala Bagh Massacre.

Learning Corner:

- Chettur Sankaran Nair was a prominent Indian jurist, statesman, and nationalist leader during the British Raj, remembered for his bold criticism of British policies and his advocacy for Indian rights.
- Born on July 11, 1857, in Mankara village, Palakkad district, Malabar (now Kerala), into an aristocratic Chettur family following matrilineal succession.
- Graduated with an Arts degree (1877) from Presidency College, Madras, and earned a Law degree (1879) from Madras Law College.
- Served as Public Prosecutor (1899) and Advocate-General of Madras (1906–1908), a rare position for an Indian.
- Appointed puisne judge at the Madras High Court (1908–1915), contributing landmark judgments:
 - o **Budasna v. Fatima (1914):** Ruled converts to Hinduism cannot be treated as outcasts, promoting social inclusion.
 - o Upheld inter-caste and inter-religious marriages, reflecting progressive values.
- An early member of INC (founded 1885), Nair was elected its President in 1897 at the Amravati session, the youngest ever and the only Malayali to hold the post.
- Appointed to the Raleigh University Commission (1902) by Lord Curzon, influencing education policy.

- **Viceroy's Executive Council:** Served as Education Member (1915–1919), the only Indian in the council, pushing for constitutional reforms.
- Supported the Montagu-Chelmsford Reforms (1918), introducing dyarchy for greater Indian participation, though he sought more liberal provisions.
- **Simon Commission (1928):** Chaired the Indian Central Committee to cooperate with the Simon Commission, preparing a report reiterating Dominion Status.

Role in Jallianwala Bagh Aftermath - Resignation in Protest:

- As the sole Indian in the Viceroy's Executive Council, Nair was appalled by the Jallianwala Bagh Massacre (April 13, 1919), where British troops under Reginald Dyer killed hundreds.
- Resigned in July 1919, protesting the British justification of martial law in Punjab under Michael O'Dwyer, despite advice from Motilal Nehru to stay and reform from within.
- His resignation shocked the British, leading to the revocation of martial law and amplifying nationalist sentiments.
- **Gandhi and Anarchy (1922):** Authored the book, critiquing both Gandhi's Non-Cooperation Movement (fearing it would lead to disorder) and British repression, especially O'Dwyer's Punjab policies.
- Accused O'Dwyer of abetting the massacre, sparking a defamation lawsuit in London (1924).
- **O'Dwyer v. Nair Trial:** Sued by O'Dwyer in the King's Bench, London, Nair faced a biased system. He lost the case and was ordered to pay £500 in damages; he refused to apologize, choosing principle over compromise.

Source : [Indian Express](#)

KAILASH MANSAROVAR YATRA

Context: The Ministry of External Affairs (MEA) recently announced that the Kailash Mansarovar Yatra, which has not taken place since 2020, will resume this year.

Decoding the context: While the yatra had initially been suspended due to the Covid-19 pandemic, deteriorating relations between India and China meant that it did not resume even after the pandemic. Ties between the two neighbours had nosedived following a number of border skirmishes in 2020, most notably on June 15 in the Galwan Valley in Ladakh.

Learning Corner:

- Lake Mansarovar, known locally as Mapam Yumtso, is a high altitude freshwater lake near Mount Kailash in the Ngari Prefecture of the Tibet Autonomous Region (TAR).
- Both the lake and the adjacent 6,638-metre high mountain, which Hindus believe is the home to Lord Shiva, are sacred in Hinduism, Buddhism, Jainism, and the Tibetan Bon religion.
- Pilgrims generally trek to Lake Mansarovar, and then circumambulate the nearby Mount Kailash.

There are two primary routes to reach Lake Mansarovar from India.

- **Lipulekh Pass Route:** Lipulekh pass lies at an altitude of 5,115 metres, on the border between

Uttarakhand and TAR, near the trijunction with Nepal. It is an ancient passageway between the Indian subcontinent and the Tibetan Plateau.

- While the Lipulekh pass route is the most direct way to get to Mansarovar from India — the lake is roughly 50 km from the border — the terrain makes the journey very challenging. Currently, this route entails roughly 200 km of hard trekking.
- **Nathu La Pass Route:** Nathu La pass lies at an altitude of 4,310 metres on the border between Sikkim and TAR. It is one of two mountain passes in the region — the other being Jelep La — that

have connected Sikkim and Tibet since ancient times.



- The route to Mansarovar from Nathu La is much longer in terms of distance — close to 1,500 km. But it is fully motorable, meaning pilgrims can make it all the way to the lake without any trekking. (They would only need to trek 35-40 km for the

circumambulation of Mount Kailash).

- **Nepal Route:** No private operators function on the two official routes. There is, however, a third route through Nepal in which private companies do operate. In theory, this route has been accessible to Indians since 2023, when China reopened its border with Nepal. But visa and permit requirements, as well as high costs due to China-imposed fees, have meant that few have likely availed this option.

Source : [Indian Express](#)

CHAMPARAN SATYAGRAHA

Context: Champaran Satyagraha was launched by Mahatma Gandhi in April 1917. This year marks the 108th anniversary of the movement.

Decoding the context: It is commemorated as an awakening of Indian peasants against the colonial planters and policies in India. To a large extent, it drew inspiration from Gandhi's South African experience.

Learning Corner:

Background and Causes

- Indigo was a celebrated product of India, down the centuries, raised and processed locally by peasants. But in the 17th century, European-owned slave plantations in the West Indies also began to produce it.
- When the English conquered Bengal, European indigo planters appeared soon enough. Obtaining

zamindaris, they coerced peasants into raising indigo, for the dye to be processed out of the plants in their “factories”.

- In the early 19th century, white planters had forced cultivators in this part of present-day northwest Bihar into agreements known as teenkathia, under which they were obligated to grow indigo on 3/20ths of their landholdings.
- However, production of synthetic dye brought down the price of Bihari indigo and the profitability of its European plantations. As indigo prices and the planters’ profits fell, the planters began correspondingly to increase the rent-burden on the peasants, invoking their rights as zamindars.
- Alongside these exactions, the planters made full use of the traditional zamindari practice of begar, forced unpaid or ill-paid labour (abwabs), requisitioning at will the peasants’ cattle, plough and carts, or compelling them to provide labour for their plantations.
- Local farmer Rajkumar Shukla invited Gandhi in 1916 to investigate the plight of indigo farmers.

Events (April 1917):

- Gandhi arrived in Champaran on April 10, 1917, and began a fact-finding mission, meeting farmers in villages like Motihari and Bettiah.
- He defied British orders to leave, facing arrest threats, which galvanized local support.
- Used Satyagraha (non-violent resistance) to mobilize peasants, supported by leaders like Rajendra Prasad, Brajkishore Prasad, and Anugrah Narayan Sinha.
- Conducted surveys, documenting grievances of 8,000+ farmers, exposing forced cultivation, illegal taxes, and landlord oppression.

Outcomes:

- Champaran Agrarian Enquiry Committee (1917): Formed by the British due to Gandhi’s pressure, with Gandhi as a member, leading to reforms.
- Abolition of Tinkathia: The Champaran Agrarian Act, 1918, ended forced indigo cultivation, reduced rents, and refunded 25% of illegal dues to farmers.

Source : [Indian Express](#)

MUZIRIS PORT

Context: Historian M.G.S. Narayanan who played a pivotal role in shaping the Muziris Heritage Project, passed away recently.

Decoding the context: A towering figure in Indian academic history, MGS Narayanan undertook a historical enquiry into Kerala’s historical past and debunked several historical myths. He was the former chairperson of the Indian Council of Historical Research (ICHR).

Learning Corner:

- Muziris Port is an ancient port on Kerala’s Malabar Coast (near Kodungallur, Thrissur), active from

3rd century BCE to 4th century CE, known as a hub of the historic spice route.

- **Location:** North Paravur-Kodungallur-Mathilakam area (Ernakulam-Thrissur border).
- **Trade:** Exported spices (black pepper, cinnamon), pearls, ivory, semi-precious stones; imported gold, wine, olive oil from Romans, Greeks, Persians, and Arabs.
- **Cultural Significance:** A cosmopolitan center hosting Christianity (St. Thomas, 52 CE), Judaism, Islam (Cheraman Juma Masjid, 629 CE), and Jainism (Tamil-Brahmi script evidence).
- **Decline:** Muziris likely declined due to a massive flood in 1341 CE, which altered the course of the Periyar River, leading to the silting up of the port and the rise of Cochin (Kochi) as a new harbor.

Muziris Heritage Project (MHP):

- Launched in 2009 by Kerala Tourism to conserve 3,000-year-old heritage across 150 sq km.
- Includes 25+ museums, restored monuments (Paliyam Palace, Paravur Synagogue, Cheraman Juma Masjid), and Pattanam excavations.

Important Contemporary Ports in India (3rd Century BCE–4th Century CE)

- **Tamralipti (Tamluk, West Bengal):**
 - Major eastern port under Mauryas, Guptas; linked to Southeast Asia, China.
 - Traded rice, textiles, spices; mentioned in Buddhist texts (Jatakas).
 - Connected to Ganga River trade routes.
- **Bharukaccha (Bharuch, Gujarat):**
 - Western port under Satavahanas, Western Kshatrapas; traded with Rome, Persia.
 - Exported cotton, agate, beads; imported wine, metals.
- **Arikamedu (Puducherry):**
 - Southern port near Chola capital; active 2nd century BCE–2nd century CE.
 - Traded beads, pottery, textiles with Romans (evidenced by Roman ceramics).
 - Archaeological finds confirm Mediterranean trade links.
- **Poompuhar (Kaveripattinam, Tamil Nadu):**
 - Chola dynasty's primary port; mentioned in Sangam literature (Silappathikaram).
 - Traded pearls, spices, silk with Southeast Asia, Rome.

Source : [The Hindu](#)

CHITTORGARH FORT

Context: The Rajasthan government informed the Supreme Court that it is “actively considering” a complete ban on mining activities up to 10 kilometres from the outer boundary of the historic Chittorgarh Fort, seeking time to place on record its affidavit.

Decoding the context: The matter arises from a long-standing legal battle between Birla Corporation Limited and the State of Rajasthan and others, regarding mining operations near the Fort, a UNESCO World Heritage site.

Learning Corner:

- **Geographical Position:** Situated in Chittorgarh (often spelled Chittor Fort), Rajasthan, atop a 180-meter-high hill overlooking the Berach River (a tributary of the Banas River), approximately 112 km from Udaipur.



- **Area:** Sprawls over 280 hectares (692 acres), making it one of the largest forts in India and a UNESCO World Heritage Site (listed in 2013 under "Hill Forts of Rajasthan").

- **Origins:** Traditionally dated to the 7th century AD, attributed to Chitrangada Mori of the Mori Kingdom.

- **Rajput Rule:** Became the capital of the Mewar kingdom under the Sisodia

Rajputs from the 8th century onward. The fort symbolizes Rajput resistance, honor, and sacrifice.

Key Events:

- **First Siege (1303):** Alauddin Khalji of the Delhi Sultanate attacked. This led to jauhar (mass self-immolation) by women to avoid capture.
- **Second Siege (1535):** Bahadur Shah of Gujarat besieged the fort, leading to another jauhar led by Rani Karnavati.
- **Third Siege (1567-68):** Mughal Emperor Akbar captured the fort, marking the decline of Mewar's dominance. The fort was abandoned as a capital after this—Udaipur became the new capital.

Architectural Features

- **Design:** A classic example of a hill fort with concentric layers of defense—seven massive gates (e.g., Padan Pol, Bhairon Pol, Ram Pol), thick stone walls, and natural elevation.
- **Monuments Inside:**
 - **Vijay Stambh (Tower of Victory):** Built by Rana Kumbha in 1448 to commemorate his victory over Mahmud Khalji of Malwa. A nine-story, 37-meter-high tower adorned with Jain and Hindu carvings.
 - **Kirti Stambh (Tower of Fame):** A 22-meter-high, 12th-century Jain tower dedicated to Adinath, showcasing intricate sculptures.
 - **Rana Kumbha Palace:** The oldest structure, partially in ruins, where Rani Padmini is said to have performed jauhar.
 - **Padmini Palace:** A picturesque structure near a lotus pool, linked to the legend of Padmini.
- **Temples:** Over 20 temples, including the Kumbha Shyam Temple (Vishnu), Meera Temple (dedicated to poet-saint Meerabai), and Kalika Mata Temple (originally a Sun temple from the 8th century, it was later dedicated to Goddess Kali).
- **Water Bodies:** 22 surviving reservoirs (e.g., Gaumukh Kund) out of 84 originally built, showcasing

advanced water harvesting for self-sufficiency.

- **UNESCO Status:** Recognized in 2013 as part of the Hill Forts of Rajasthan (alongside Kumbhalgarh, Ranthambore, etc.) for its architectural grandeur and historical legacy.

Source : [Indian Express](#)

SHYAMJI KRISHNA VERMA

Context: Recently, Prime Minister Shri Narendra Modi paid tributes to the great freedom fighter Shyamji Krishna Verma on his death anniversary.

Decoding the context: Shyamji Krishna Verma is remembered as a pioneer of the Indian revolutionary movement in Europe.

Learning Corner:

- Shyamji Krishna Varma was a prominent freedom fighter, lawyer, scholar, and nationalist revolutionary during the Indian independence movement. He was a pioneer of Indian nationalism in Europe.

Key Facts & Contributions

- **Born:** 4 October 1857, Mandvi, Gujarat (Kutch region)
- **Education:** Studied Sanskrit and law; later went to Oxford University in England.
- **Profession:** Barrister; also appointed Diwan of a princely state in India for a short period.

Major Contributions:

- **India House (1905, London):** Founded India House, a hostel and hub for Indian students and revolutionaries in London. India House became a center of nationalist and revolutionary activity abroad.
- **The Indian Sociologist (1905):** Started this monthly journal to promote nationalist ideas and expose British colonial rule. The British government banned its publication for spreading seditious content.
- **Support to Revolutionaries:**
 - Mentored and supported Vinayak Damodar Savarkar, Lala Har Dayal, and Madam Cama.
 - Advocated armed revolution against British rule.
- **Exile:** Faced persecution in Britain; moved to Paris and later Switzerland, continuing his work in exile.
- Died in Geneva, Switzerland in 1930.
- In 2003, his ashes were brought back to India by the Government of Gujarat and enshrined at Kranti Teerth, Mandvi (Kutch).

Source : [PIB](#)

TIPITAKA

Context: Prime Minister Modi who is on a state visit to Thailand was gifted the holy scripture of 'World

Tipitaka" by his Thailand counterpart Paetongtarn Shinawatra.

Decoding the context: The Tipitaka, also known as the Tripitaka in Sanskrit, is a revered compilation of Lord Buddha's teachings and serves as the principal Buddhist scripture.

Learning Corner:

- The Tripitaka, also known as the Pali Canon, is the earliest and most authoritative collection of Buddhist scriptures.
- The term Tripitaka (Sanskrit: त्रिपिटक) or Tipitaka (Pali: तिपिटक) translates to "Three Baskets," referring to the three main divisions of Buddhist scriptures:
 - o **Vinaya Pitaka (Basket of Discipline)**
 - Deals with monastic rules and discipline for monks (bhikkhus) and nuns (bhikkhunis).
 - Contains over 220 rules for monastics.
 - Also includes stories and justifications for the rules (origin stories).
 - Significance: Establishes the Sangha's code of conduct, promoting harmony and discipline.
 - o **Sutta Pitaka (Basket of Discourses)**
 - Contains the teachings and sermons of Gautama Buddha.
 - **Divided into 5 Nikayas (collections):**
 - Digha Nikaya – Long Discourses
 - Majjhima Nikaya – Middle Length Discourses
 - Samyutta Nikaya – Connected Discourses
 - Anguttara Nikaya – Numerical Discourses
 - Khuddaka Nikaya – Minor Collection (includes Dhammapada, Jataka tales, etc.)
 - **Significance:** The main source of Buddhist philosophy and ethical teachings.
 - o **Abhidhamma Pitaka (Basket of Higher Doctrine)**
 - Contains philosophical and psychological analysis of Buddhist doctrine.
 - More abstract and systematic.
 - Deals with classification of mind, matter, mental states, etc.
 - Significance: Basis for later Buddhist metaphysics and psychology
- The Tripitaka was originally transmitted orally by Buddhist monks before being written down in various languages, including Pali, Sanskrit, Chinese, and Tibetan.
- The Theravāda school preserves the only complete Tripitaka in Pali, while other Buddhist traditions have their own versions, such as the Sarvāstivāda Tripitaka in Sanskrit.
- The texts were compiled and finalized during early Buddhist councils, particularly the First Buddhist Council, held shortly after the Buddha's death.

Source : [CNBC](#)

VIJAYANAGARA EMPIRE

Context: A set of copper plates dating back to early 15th Century from the reign of Devaraya I of the Sangama Dynasty were unveiled by Falcon Coins Gallery with the Archaeological Survey of India (ASI).

Decoding the context: These copper plates, belonging to the Vijayanagara Empire, written in Sanskrit and Kannada and Nāgarī characters, are unique as they were issued during the coronation of King Devaraya I. Notably, the seal features an image of Vamana instead of the customary Varaha, the royal insignia of the Vijayanagara Empire.

Learning Corner:

- The Vijayanagara Empire (1336–1646 CE) was one of the most powerful and culturally significant kingdoms in South India.
- Founded in 1336 CE by Harihara I and Bukka Raya I of the Sangama Dynasty.
- The capital city, Vijayanagara, was located on the banks of the Tungabhadra River.

Dynasties and Key Rulers

- **The empire was ruled by four dynasties:**
 - **Sangama Dynasty (1336–1485)**
 - **Harihara I & Bukka I:** Consolidated the empire.
 - **Deva Raya II:** Strengthened military and patronized literature.
 - **Saluva Dynasty (1485–1505)**
 - **Tuluva Dynasty (1505–1565)**
 - **Krishnadevaraya (1509–1529)**
 - Expanded the empire and defeated Bijapur, Golconda, Bahmani Sultanate, and the Gajapatis of Odisha.
 - Ashtadiggajas (eight great poets) adorned his court, including Tenali Rama.
 - Amuktamalyada, a Telugu literary work, was written by him.
 - Constructed Vittala Temple and Hazara Rama Temple in Hampi.
 - **Achyuta Deva Raya (1529–1542 CE)**
 - Successor of Krishna Deva Raya; faced internal rebellions.
 - **Aravidu Dynasty (1570–1646)**

Administration and Governance

- Centralized monarchy with provincial governors.
- Amaranayaka System (similar to Iqta system): Military commanders were given land (Nayakas) in exchange for military services.
- Revenue System: Land revenue was the primary source of income, collected based on fertility

and irrigation.

- Judicial System: Local village councils handled disputes.

Economy and Trade

- Agriculture: Rice, cotton, and spices were major crops.
- Trade: Flourished with Persia, Arabia, and Southeast Asia.
- Currency: Gold coins called Pagodas were widely used.

Art and Architecture

- Hampi: The capital had grand temples, markets, and palaces.
- Dravidian Style: Temples like Virupaksha Temple and Vittala Temple.
- Sculptures and Frescoes: Depicted mythological themes.

Decline of the Empire

- Battle of Talikota (1565): A coalition of Deccan Sultanates defeated Vijayanagara.
- Plundering of Hampi: The capital was destroyed.
- Gradual Decline: The Aravidu dynasty ruled in a weakened state until the 17th century.

Source : [The Hindu](#)

SARHUL FESTIVAL

Context: Adivasis in Jharkhand and the larger Chhotanagpur region will welcome the new year and the spring season with the Sarhul festival on Tuesday (1st April) .

Decoding the context: While the festival is widely known as Sarhul among the Nagpuri-speaking populations, different tribes have their own names and particular ways of celebrating it. For instance, the Santal community calls it Baha Parab, whereas among the Ho and Munda peoples it is often referred to as Baa Parab.

Learning Corner:

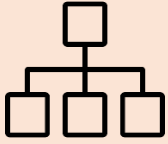
- The Sarhul Festival is a spring celebration observed predominantly by the tribal communities of Jharkhand and the broader Chhotanagpur region, which also extends to parts of Odisha, West Bengal, Chhattisgarh, and even regions beyond mainland India.
- Sarhul not only marks the onset of spring and the new year for these communities but also stands as a symbolic celebration of the union between the Sun and the Earth.

Historical and Cultural Significance

- Nature Worship and Renewal: Sarhul—literally means "worship of the Sal tree" in the Nagpuri language. The Sal tree (*Shorea robusta*) holds a sacred status among Adivasi communities because it is believed to be the abode of Sarna Maa, the village deity who safeguards natural and social harmony.
- New Year and Agricultural Cycle: Sarhul is closely linked to agricultural activities. The ceremonies serve as precursor to the ploughing of fields and the sowing of crops, marking the transition from the winter dormancy to the vibrant period of growth.

- The three day festival centers around sacred groves, known as Sarna Sthals, where key rituals are performed.
 - o Day 1: The village pahan (priest) who observes a rigorous fast, fetches water for the ceremonies, houses and Sarna Sthals are cleaned, and Sal flowers gathered for rituals.
 - o Day 2: The rituals include offering Sal flowers to the deity, sacrificing a rooster, and seeking prosperity, safety, and good harvest. Holy water is sprinkled across the village, with performances of traditional songs and dances such as Jadur, Gena and Por Jadur. Young men engage in ceremonial fishing and crab-catching for the feast.
 - o Day 3: A community feast is held with handia (rice beer) and local delicacies. The festival concludes with the pahan's blessings and prayers for the community.
- During the 19th and early 20th centuries, when tribes such as the Munda, Oraon, and Santal were sent to faraway places as indentured labour, Sarhul traveled with them. Today, the festival is celebrated in locations ranging from the tea gardens of Assam to the Andaman and Nicobar Islands, Nepal, Bangladesh, and Bhutan.

Source : [Indian Express](#)

*GOVT. INITIATIVES, SCHEMES AND POLICIES, ORGANISATION*

ADARSH SANSKRIT VILLAGE PROGRAMME

Context: The Uttarakhand cabinet approved the Adarsh Sanskrit village programme, which aims to teach the language to one village in each district of the hill state.

Decoding the context: The move is aimed at promoting Sanskrit, the second official language of the state, and comes on the heels of other similar schemes, such as financial incentives to girls and SC/ST students who opt for Sanskrit in schools.

Learning Corner:

- The Adarsh Sanskrit Village Programme is an initiative by the Uttarakhand government to promote Sanskrit, the state's second official language, by integrating it into the daily life of one village in each of the state's 13 districts.

Objectives of the Adarsh Sanskrit Village Programme

- **Promote Sanskrit as a Living Language:**
 - Encourage villagers to use Sanskrit in daily conversations, greetings, and community activities, moving beyond its traditional confinement to academic or religious contexts.
 - Make Sanskrit as familiar as local languages like Hindi, Garhwali, or Kumaoni.
- **Preserve Cultural Heritage:**
 - Connect communities with Indian philosophy and knowledge systems embedded in Sanskrit texts, fostering an understanding of Dharma Shastras, epics (e.g., Mahabharata, Ramayana), and other cultural works.
- Counter the perception that Sanskrit is tied to specific castes or communities, promoting inclusivity across social groups, including Muslims, Dalits, and tribals.
- **Educational and Social Development:**
 - Teach Sanskrit through structured courses, shlokas, and stories from texts like the Panchatantra and Durga Saptashati, making learning accessible and engaging.
 - Promote social values through Sanskrit-based education.
- Create employment opportunities by linking Sanskrit proficiency to industry needs, supported by industry associations.

Status of Sanskrit in India

- Sanskrit is one of the oldest known Indo-Aryan languages, forming the basis of Vedic literature,

Hindu philosophy, and classical Indian sciences (Ayurveda, Astronomy, Mathematics).

- As per Census 2011, only about 24,821 people reported Sanskrit as their mother tongue.
- It is more commonly used as a second or third language, especially in religious, academic, and traditional contexts.
- There are a few Sanskrit-speaking villages, especially in Karnataka, Madhya Pradesh, and Uttarakhand (e.g., Mattur in Karnataka, Jhiri in Madhya Pradesh)
- Sanskrit is one of the 22 scheduled languages listed in the Eighth Schedule, added in the original Constitution of 1950.
- Article 351 directs the Union to promote Hindi as a link language while enriching it with vocabulary from other Indian languages, primarily Sanskrit.

Source : [Indian Express](#)

VIBRANT VILLAGE PROGRAMME (VVP)

Context:The Union Cabinet has approved phase two of the Vibrant Villages Programme (VVP) for the comprehensive development of strategic villages along all international land borders, with a total outlay of ₹6,839 crore.

Decoding the context:While VVP-I was aimed at villages along the China border, the second phase of the programme will be implemented in select strategic villages in Arunachal Pradesh, Assam, Bihar, Gujarat, Jammu and Kashmir, Ladakh, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Rajasthan, Sikkim, Tripura, Uttarakhand, Uttar Pradesh, and West Bengal, until the financial year 2028-29.

Learning Corner:

- The Vibrant Villages Programme (VVP) phase 1 was a centrally sponsored scheme launched by the Government of India in 2023 to develop border villages with sparse population, limited connectivity, and infrastructure.
- Vibrant Villages Programme -II (VVP-II) is a Central Sector Scheme (100% Centre funding), furthering its commitment for the vision of Viksit Bharat@2047 for 'Safe, Secured & Vibrant land borders'.
- The Programme would help in the comprehensive development of the villages located in the blocks abutting international land borders (ILBs), other than the Northern border already covered under VVP-I.
- The objective of the programme is to create better living conditions and adequate livelihood opportunities to ensure prosperous and safe borders, control trans-border crime and assimilate the border population with the nation and inculcate them 'as eyes and ears of the border guarding forces', crucial for internal security.
- The interventions would be border-specific, state and village specific, based on Village Action Plans prepared in a collaborative approach.

Key Components:

- **Infrastructure Development:** Roads, housing, water supply, electricity, internet, and mobile connectivity.
- **Social Development:** Healthcare, education, skill development, and livelihood opportunities.
- **Tourism and Cultural Promotion:** Promoting local culture, traditions, and eco-tourism.
- **Security Dimension:** Enhances eyes and ears on the border — discouraging migration and boosting strategic presence.
- **Convergence Model:** Coordination among multiple central and state schemes like PMGSY, Jal Jeevan Mission, PMAY-G.

Source : [The Hindu](#)

GREEN CREDIT PROGRAMME

Context: The Green Credit Programme (GCP) rolled out by the Ministry of Environment, Forest and Climate Change was flagged by the Ministry of Law and Justice before its rollout, over legality of the business model built into it.

Decoding the context: Prime Minister Narendra Modi and Sheikh Mohammed bin Zayed Al Nahyan, the President of the UAE, officially unveiled the GCP on December 1, 2023, during the annual United Nations climate conference in Dubai. It was dubbed as a mechanism to incentivise “pro-planet” actions in response to climate change, and one which would promote the Centre’s Mission LiFE (Lifestyle for Sustainable Environment).

Learning Corner:

- At its core, the GCP seeks voluntary participation (read investments) of individuals, companies, industries, and other entities across seven different activities — such as tree plantation, waste management, and water conservation — that will lead to improvements in the environment.
- This participation will be incentivised by generating “green credits”, which can then be traded on a domestic market platform to potential buyers looking to meet sustainability targets, or existing legal obligations. For instance, could be exchanged for meeting compliance of compensatory afforestation.
- The credits can also be used by listed companies as part of their environmental, social and governance disclosures under SEBI’s Business Responsibility and Sustainability framework, indicating efforts taken by these companies on environmental sustainability.

How will green credits be calculated?

- Initially piloted for tree plantation and eco-restoration, including soil moisture conservation and rainwater harvesting.
- The Indian Council of Forestry Research and Education (ICFRE), Dehradun, serves as the nodal agency for GCP pilot on tree plantation and eco-restoration.
- Plantations will be carried out in degraded land parcels including open forest, scrubland,

wasteland and catchment areas, and they must be five hectares in size or above.

- Forest departments identify land parcels and allocate them to registered entities, with plantations to be completed in two years.
- Green Credit Calculation: 1 grown tree = 1 green credit, subject to a minimum of 1,100 trees per hectare.

Criticism & Concerns

- GCP has been criticised for incentivising forest diversion for industries, by generating tradable credits which could also be used to meet legal obligations such as compensatory afforestation.
- It has also been criticised for promoting plantations on degraded lands, open forests and scrub lands, which experts have argued offer unique and important ecological services.
- Under the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 2023, non-forest land equivalent to forest land used for industries and development projects is mandated for compensatory afforestation. Only if non-forest land is unavailable, twice the size of degraded or unclassed forest land is used for compensatory afforestation.
- However, GCP mandates use of degraded forest land for plantations. It also has complementary provisions which allow exchange of credits, generated by paying money, for meeting the compensatory afforestation compliance. This translates into compensating for older forests with existing forest land, rather than adding non-forest land into the forest cover, as laid down in the Van Adhiniyam.

Source : [Indian Express](#)

MISCELLANEOUS

NIVESHAK DIDI

Context:Phase 2 of the “Niveshak Didi” initiative was launched recently.

Decoding the context:During Phase 1, more than 55,000 beneficiaries participated in IPPB Financial Literacy Camps across India, with approx. 60% female beneficiaries mostly in the youth & economically active age group.

Learning Corner:

- **Phase 1:** Initiated in 2022 by the India Post Payments Bank (IPPB) in collaboration with the Investor Education and Protection Fund Authority (IEPFA) under the Ministry of Corporate Affairs (MCA), with support from the Department of Posts, Ministry of Communications.
- **Phase 2 (April 2025):** Expanded to deepen outreach, with a Memorandum of Agreement (MoA) signed between IEPFA and India Post Payments Bank (IPPB) to train more women and conduct additional camps.
- **Core Ideology:** “By the women, for the women,” recognizing that rural women feel more comfortable discussing financial matters with other women, fostering trust and engagement.
- **Objective:** To empower rural and semi-urban women with financial literacy, enabling them to make informed decisions about savings, investments, digital banking, and fraud prevention.

Key Features

- **Women-Led Model:**
 - Trains women postal workers and community leaders as “**Niveshak Didis**” (female educators) to deliver financial education in local languages and culturally relatable ways.
 - Leverages the trust and social connect of women like female postwomen (dakiyas) to bridge literacy gaps.
- **Focus Areas:**
 - **Banking Products:** Understanding savings accounts, fixed deposits, and loans.
 - **Digital Banking:** Promoting UPI, mobile banking, and paperless transactions via IPPB’s platforms.
 - **Investment Awareness:** Educating on safe investments and risks of unregulated schemes.
 - **Fraud Prevention:** Teaching how to identify financial scams and protect personal information.
 - **Financial Planning:** Encouraging responsible money management for household and

future security.

- **Delivery Methods:**

- o Village-level camps, door-to-door outreach, and interactive sessions.
- o Use of IPPB's network (1.65 lakh post offices, 3 lakh postal employees) for grassroots penetration.

Source : [PIB](#)

PANCHAYAT ADVANCEMENT INDEX (PAI)

Context: In a push for data driven governance, the Department of Panchayati Raj has come up with the first ever Panchayat Advancement Index (PAI).

Decoding the context: There are 2.5 lakh gram panchayats in the country. Out of these, data of around 2.16 lakh gram panchayats from 29 States have been assessed.

Learning Corner:

- The **Panchayat Advancement Index (PAI)** is a comprehensive, multi-domain, and multi-sectoral tool introduced by the Ministry of Panchayati Raj in India to assess the holistic development, performance, and progress of Gram Panchayats across the country.
- The PAI reflects India's commitment to achieving the SDG 2030 Agenda through participatory, bottom-up development.
- The first baseline report, released for FY 2022-23, analyzed data from 2,16,285 panchayats with validated inputs.

Purpose of PAI:

- Measures the overall well-being and development status of local communities under a panchayat's jurisdiction.
- Identifies development gaps and supports evidence-based planning and policy-making at the grassroots level.
- Encourages panchayats to adopt best practices and set local targets to enhance their performance.

Indicators:

- Panchayat Advancement Index (PAI) is a composite Index & has been compiled based on 435 unique local Indicators (331 mandatory & 104 optional) consisting of 566 unique data points across 9 themes of LSDGs (Localization of Sustainable Development Goals) aligned with National Indicator Framework (NIF) of the Ministry of Statistics and Programme Implementation (MoSPI).
- **Nine Themes of Localized SDGs:**
 - o Poverty-Free and Enhanced Livelihoods Panchayat
 - o Healthy Panchayat
 - o Child-Friendly Panchayat

- o Water-Sufficient Panchayat
 - o Clean and Green Panchayat
 - o Self-Sufficient Infrastructure in Panchayat
 - o Socially Just and Socially Secured Panchayat
 - o Panchayat with Good Governance
 - o Women-Friendly Panchayat
- Based on the PAI scores & thematic Scores achieved by different Gram Panchayats, these GPs are grouped into one of the five categories
 - o **Achiever:** 90+ score (none achieved this in 2022-23)
 - o **Front Runner:** 75 to <90 (e.g., 699 panchayats, 0.3%)
 - o **Performer:** 60 to <75 (e.g., 77,298 panchayats, 35.8%)
 - o **Aspirant:** 40 to <60 (e.g., 1,32,392 panchayats, 61.2%)
 - o **Beginner:** <40 (e.g., 5,896 panchayats, 2.7%)

Source : [The Hindu](#)

KHELO INDIA YOUTH GAMES

Context: The seventh edition of the Khelo India Youth Games will be staged in five cities of Bihar from May 4 to 15.

Decoding the context: This edition is expected to feature over 10,000 athletes competing in more than 25 sports disciplines.

Learning Corner:

- The Khelo India Programme is a national initiative launched by the Government of India in 2018 to promote a robust sports culture at the grassroots level.

Key Components of the Khelo India Programme:

- **Creation and Upgradation of Sports Infrastructure:** Developing and modernizing sports facilities across the country to provide athletes with world-class training environments.
- **Sports Competitions and Talent Development:** Organizing events like the Khelo India Youth Games to scout and nurture young athletes.
- **Promotion of Inclusiveness through Sports:** Ensuring equal opportunities for women, differently-abled individuals, and other marginalized groups to participate in sports.
- **Revival of Indigenous Games:** Traditional Indian sports like Mallakhamba, Kalaripayattu, and Gatka are promoted.
- **Major Initiatives Under Khelo India:**
 - o Khelo India Youth Games (KIYG) – Annual multi-sport event for under-17 and under-21 athletes.
 - o Khelo India University Games (KIUG) – National-level competition for university students.

- o Khelo India Winter Games – Held in Jammu & Kashmir and Ladakh to promote winter sports.
- o Khelo India Centres – Specialized training centers for different sports.

Khelo India Youth Games (KIYG):

- The Khelo India Youth Games are an integral part of the Khelo India Programme, serving as a platform for young athletes under the age categories of 17 and 21 to showcase their talents.
- The inaugural edition was held in 2018 in New Delhi, featuring 18 sports disciplines.
- 2024 (6th Edition): Held from January 19 to 31 across four cities in Tamil Nadu—Chennai, Madurai, Trichy, and Coimbatore. The event featured 26 sports disciplines, including traditional games like Kalaripayattu and Mallakhamb.
- 2025 (Upcoming 7th Edition): Scheduled from May 4 to 15, 2025, with Bihar hosting events across five cities: Patna, Rajgir, Gaya, Bhagalpur, and Begusarai. Additionally, select disciplines such as shooting, gymnastics, and track cycling will be held in New Delhi.

Source : [The Hindu](#)

ZERO HOUR

Context: Lok Sabha on Thursday (April 3, 2025) made a record when the Zero Hour lasted for more than five hours and a whopping 202 MPs spoke.

Decoding the context: Fulfilling the promise made in the Business Advisory Committee (BAC) meeting, Speaker Om Birla ensured the extension of Zero Hour.

Learning Corner:

- Zero Hour is an important parliamentary device in India that allows Members of Parliament (MPs) to raise urgent matters without prior notice. It is an informal practice that takes place immediately after Question Hour, typically starting at 12 noon—hence the name "Zero Hour."

Key Features of Zero Hour

- The concept of Zero Hour originated in India, not borrowed from any foreign parliamentary system.
- Not Mentioned in Rules of Procedure: Unlike Question Hour, Zero Hour is not formally listed in parliamentary rules but has evolved as a convention.
- Raising Urgent Issues: MPs can bring up matters of public importance that require immediate attention.
- Notice Requirement: MPs must submit their requests before 10 AM on the day of the session to the Speaker (Lok Sabha) or Chairman (Rajya Sabha). Note: Here, same day request is sufficient unlike other devices like question hour where prior notice is required.
- Discretion of Presiding Officers: The Speaker or Chairman decides whether to allow the issue to be raised.

Source : [The Hindu](#)

SENTENELESE

Context: A man was arrested in Andaman and Nicobar Islands for allegedly entering the prohibited tribal reserve area of the North Sentinel Island, home to the indigenous Sentinelese people, one of the last uncontacted tribes in the world.

Decoding the context: According to the police, Mykhailo Viktorovych Polyakov is a 24-year-old US national who arrived in Port Blair on March 26 and ventured to North Sentinel Island from the Khurmadera beach of the archipelago, police said.

Learning Corner:

- The Sentinelese are an indigenous people who inhabit North Sentinel Island, located in the Andaman and Nicobar Islands of India.
- Along with the Great Andamanese, the Jarawas, the Onge, the Shompen, and the Nicobarese, the Sentinelese are one of the six indigenous (and often reclusive) peoples of the Andaman and Nicobar Islands.
- They are one of the most isolated tribes in the world and have consistently resisted contact with outsiders. Their language, known as Sentinelese, remains largely unclassified, and very little is known about its structure or relation to other Andamanese languages.
- They are believed to be the direct descendants of the first humans who migrated out of Africa, living in isolation for ~60,000 years.
- **Population Estimate:** Between 50 and 200 individuals, though exact numbers are unknown.
- **Lifestyle:** They are hunter-gatherers, relying on fishing, hunting, and foraging.
- **Hostility to Outsiders:** The Sentinelese have historically attacked anyone attempting to approach their island, including missionaries and fishermen.
- They are designated as particularly vulnerable tribal group (PVTG) and as a Scheduled Tribe.
- **Legal Protection:** Protected under the Andaman and Nicobar Protection of Aboriginal Tribes Regulation (ANPATR), 1956. The entire North Sentinel Island along with 5 km coastal sea from high water mark is notified as tribal reserve.

Source : [Hindustan Times](#)

MAINS

PAPER 1

FAIR SHARE FOR HEALTH AND CARE REPORT

GS I – Issues related to Women

Context: The World Health Organization (WHO) released a new report titled- Fair Share for Health and Care Report, addressing the gender gap in global healthcare.

Key Highlights of the Report:

- Women comprise 67% of the paid global health and care workforce. Additionally, they **perform an estimated 76% of all unpaid care activities**. This highlights significant gender **disparities in both paid and unpaid care work**.
- Women in low- or middle-income countries could be USD 9 trillion **better off if their pay and access to paid work were equal** to that of men.
- Women are not adequately represented on decision-making tables. Women are **overrepresented in lower-status roles**, comprising the majority of nurses and midwives. They are, however, underrepresented in leadership roles. Medical specialties are still dominated by men. Women made up 25% to 60% of doctors but between **30% and 100% of nursing staff across 35 countries**.
- Chronic underinvestment in health and care work has led to a vicious cycle of unpaid care work, **reducing women's participation** in paid labour markets, hindering economic empowerment, and impeding gender equality.
- Caregiving, primarily performed by women, tends to be undervalued, leading to lower wages, poor working conditions, decreased productivity, and a negative economic impact on the sector.
- **Pay gaps** limit women's investment in their family and community, which is where they are likely to reinvest. Globally, on average, **90% of women's earnings are directed towards their families' well-being**, compared to only 30-40% of men's.
- Women in healthcare disproportionately experienced higher levels of gender-based violence.
- According to some estimates, a quarter of workplace violence across all sectors of the globe occurs in healthcare. At least **half of all employees in the healthcare sector** have reported **experiencing violence at some point in the workplace**.
- In India, **women spent around 73% of their total daily working time** (that is, the combined average time spent on unpaid and paid work recorded through **national daily time-use surveys**) **on unpaid work**, compared to **men who spent around only 11%** of their daily working time on unpaid work. In the United Kingdom, nearly 4.5 million people took on unpaid work during **Covid-19**, 59% of whom were women, with nearly 3 million working simultaneously.
- Decades of underinvestment in health and care work contribute to a growing global crisis of care. Stagnation in progress towards **Universal Health Coverage (UHC)** leaves billions without full access to essential health services, further burdening women with unpaid care work.

Key Recommendations made by the Report:

- Improve working conditions for all forms of health and care work, especially for highly feminised occupations.
- Include women more equitably in the paid labour workforce
- Enhance conditions of work and wages in the health and care workforce and ensure equal pay for work of equal value.
- Address the gender gap in care, support quality care work, and uphold the rights and well-being of caregivers.

- Ensure that national statistics account for, measure, and value all health and care work.
- Invest in robust public health systems.
-

GANDHIJI IN SOUTH AFRICA

GS I – Modern Indian History: Personalities

Context: Mahatma Gandhi, a prominent leader in India's struggle for independence, is widely recognized for his philosophy of nonviolent resistance, known as Satyagraha. Before his return to India in 1915, Gandhi spent a significant period in South Africa, where he developed and refined his ideas on social justice, civil rights, and nonviolent protest.

What led Gandhiji to start Satyagraha in South Africa?

- On 7th June 1893, **Mahatma Gandhi** faced racial discrimination when he was forced to leave a **first-class compartment on a train in Pietermaritzburg, South Africa**. Despite purchasing a ticket, a European passenger demanded his removal, citing that **non-whites were not allowed in first-class compartments**.
- This incident became a pivotal moment for Gandhi, sparking his fight against racial oppression and the development of his philosophy of **Satyagraha (nonviolent resistance)**.

Contributions of Gandhiji in South Africa:

- He mobilized support for the welfare of Indians and **established the Transvaal British Indian Association in Johannesburg in 1903**.
- He organized Indians in **Durban and founded the Natal Indian Congress in 1894** to advocate for voting rights for Indians.
- He founded the **Phoenix Settlement in Durban in 1904** as a community living experiment.
- He established the Tolstoy Farm near Johannesburg in 1910 to prepare **Satyagrahis (followers of nonviolence)**. It was aimed to foster self-reliance, promote communal harmony, and provide training in practical skills.
- He compelled the South African government to **pass the Indian Relief Act in 1914 which** abolished several discriminatory laws and recognized the rights of Indians in South Africa.
- He launched his first Satyagraha (nonviolent resistance) campaign in Johannesburg in 1906 against **an ordinance that imposed restrictions on Asians**. He organized mass meetings and encouraged civil disobedience to challenge discriminatory laws.
- He faced imprisonment multiple times for his nonviolent protests, including the famous **Volkstus Satyagraha in 1913**.

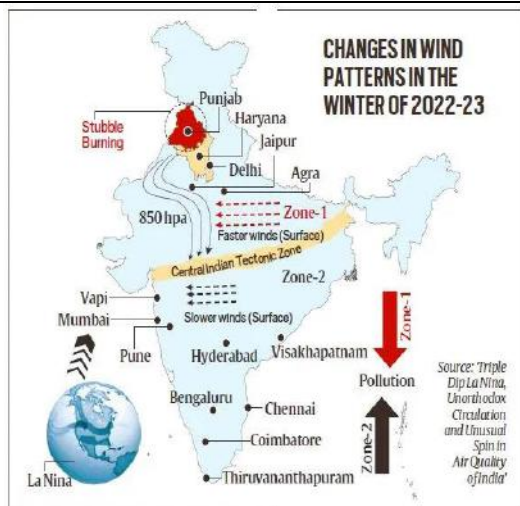
LA NINA LINKS WITH AIR QUALITY

GS I – Important geophysical phenomena

Context: A new study has been published by researchers at the Pune-based Indian Institute of Tropical Meteorology and the Bengaluru-based National Institute of Advanced Studies, suggesting that even air quality in India could be influenced by El Nino and La Nina events.

Key findings of the study:

- From October to January, northern Indian cities, like Delhi, typically have high **levels of PM2.5 due to various meteorological factors** and pollution transport from regions like Punjab and Haryana. The western and southern parts of the country have always had **relatively lower levels of pollution**, because of their proximity to oceans.
- The **winter of 2022**, however, showed a significant deviation from this normal. **Northern Indian cities**, including Delhi, were **cleaner** than usual, while cities in the west and the south, like Mumbai, Bengaluru,



and **Chennai**, experienced worse-than-usual air quality.

- PM2.5 concentrations in Ghaziabad and Noida reduced significantly, while Delhi saw a slight reduction. In contrast, Mumbai and Bengaluru experienced rises in PM2.5 levels. Northern Indian cities had cleaner air than western and southern cities.

- The most crucial factor in explaining the anomaly of winter 2022 was a change in the normal wind direction. During winter, the wind usually blows in the north-westerly direction. For example, from Punjab towards Delhi and further into the **Gangetic plains**. It is a reason for transporting agricultural waste pollutants from Punjab and Haryana into Delhi.

- In the winter of 2022, however, the **wind circulation was in the north-south direction**. The pollutants being carried from Punjab and Haryana **bypassed Delhi** and surrounding areas and **flew over Rajasthan and Gujarat** to southern regions.

- Extended **La Nina** persisted for an unusually long **three years** by the winter of 2022, impacting wind patterns. The three consecutive years of La Niña conditions (2020-23) — a rare “**Triple-Dip**” phenomenon — had widespread impacts on the ocean and climate across the globe. The 2022 event is particularly strong. And the impact on air circulation became evident only in the third year of La Nina. So, there may be an accumulative effect. The study suggests an **unclear impact of El Nino on air quality in India**.

Image Source: The Indian Express

RAPID ICE MELT IN WEST ANTARCTICA

GS I –Important Geophysical Phenomena

Context: According to a new study, the rapid melting of West Antarctica’s ice sheet due to warm waters around it is now unavoidable, no matter how much carbon emissions are cut.

Ice sheet:

- An ice sheet is essentially a mass of glacial ice that covers *more than 50,000 square kilometers* of land.
- It contains about 99% of the fresh water on Earth and is sometimes called *continental glaciers*.

Major ice sheets in the world:

- Greenland and Antarctica** collectively possess around **two-thirds of the Earth's freshwater**.
- The present Antarctic ice sheet accounts for 90% of Earth's total ice volume.

Reasons for melting of the West Antarctic Ice Sheet:

- Ice shelves stabilize the land-based glaciers just behind them. The melting of ice sheets occurs through various mechanisms. One key process involves **warm ocean waters eroding ice shelves**, which are the edges of an **ice sheet** floating on the ocean.
- As these ice shelves thin or disintegrate, the **glaciers behind them accelerate**, releasing **more ice into the ocean** and consequently causing sea level rise.

The findings of the recent study:

- It shows significant and widespread future warming of the West Antarctica Sea and increased ice shelves melting. This will most likely lead to an increased sea level rise, which will affect coastal communities across the world, including in India.
- India has a long coastline and a dense population and is therefore vulnerable to sea level rise. If coastal communities cannot afford to defend against the rising seas, for example by building walls, the people would

have to move elsewhere or become refugees.

Note:

- Thwaites Glacier is referred to as the "*doomsday glacier*" because it would raise global sea levels by around 65cm if it collapses entirely.
- **Ice shelf:** As ice sheets extend to the coast and over the ocean, they become ice shelves.
- **Icecap:** A mass of glacial ice covering less area than an ice sheet is called an ice cap.
- **Ice field:** A series of connected ice caps is called an ice field.
- **Individual glaciers-** They make up the ice fields, ice caps, and eventually ice sheets.
- **Sea ice:** It is the free-floating ice that surrounds the polar regions created by sea water freezing.

STRATEGIC IMPORTANCE OF THE ANDAMAN AND NICOBAR ISLANDS

GS I – Geography

Context: The Indian government's renewed focus on developing the Andaman and Nicobar Islands (ANI) underscores their strategic significance in the Indo-Pacific region, prompting efforts to enhance infrastructure and security.

Strategic Importance of the A&N Islands:

- It is located 700 nautical miles southeast of the Indian mainland, the Andaman and Nicobar Islands add **300,000 sq. km to India's exclusive economic zone**, with the potential for **undersea hydrocarbon and mineral deposits**.
- The islands' strategic location astride the **Malacca Strait**, makes them a crucial asset for **India's ability to monitor and project power in the Indo-Pacific region**. The Malacca Strait is a critical maritime choke point, with more than 90,000 merchant ships carrying about **30% of the world's traded goods passing through it annually**.
- The islands share maritime boundaries with Myanmar, Thailand, Indonesia, and Bangladesh, giving India substantial ocean space under the **United Nations Convention on the Law of the Sea (UNCLOS) in terms of exclusive economic zone and continental shelf**.
- The islands can serve as the **first line of defence against any attempt from the East** to undermine India's maritime security, especially in the face of China's growing influence in the Indo-Pacific region.
- **Port Blair** can become a regional hub for navies to collaborate on disaster relief, medical aid, counter-piracy, search and rescue, and other maritime security initiatives.

Issues/Challenges for developing of the A&N Islands:

- The shift from **India's Look East policy to a stronger Act East policy**, along with the growing recognition of the significance of maritime power and the increasing capabilities of the Chinese PLA Navy, has underscored the need to develop Indian island territories, especially the Andaman and Nicobar group.
- **Lack of political prioritisation** until recently, with the realisation of the islands' strategic importance only now.
- Challenges of **distance from the mainland and difficulties in developing infrastructure**.
- Complex **environmental clearance procedures** and regulations on forest and tribal conservation.
- Coordination challenges due to the involvement of multiple ministries and agencies. The conflict between long-term strategic vision and immediate political gains.

Strategic infrastructure development that is required in A&N Islands:

- Ensuring comprehensive maritime domain awareness and surveillance over the islands.
- Bolstering deterrence capabilities against any naval misadventures from the East.
- Developing infrastructure to support **India's maritime economy, especially in the southern group of islands**.
- Improving transportation and connectivity to facilitate development and tourism. Developing **Galathea Bay transshipment port** on Great Nicobar Island.

- The plan to connect the A&N Islands to the mainland through **Submarine Optical Fibre Cable (OFC)** needs revitalisation. This will provide cheaper and better connectivity and access to **Digital India's benefits**.
- Enhancing transportation and connectivity for development and tourism.
- The **military must increase forces and deploy** the appropriate assets at the **Andaman Nicobar Command (ANC)** to maintain island security. This includes basing surveillance and fighter aircraft there, as well as conducting frequent detachments.
- Exploring partnerships with the **Quad and Indo-Pacific Oceans Initiative (IPOI)** for development initiatives.
- Seeking infrastructure development concessions akin to those on India's northern borders.

PAPER 2

FISCAL FEDERALISM

GS II –Federalism

Context: Tamil Nadu Chief Minister M.K. Stalin alleged that the centre was withholding funding for the state's Metro Rail and other vital projects.

Fiscal Federalism:

- It explains the way in which financial powers and responsibilities are divided between the different levels of government in a country.

Significance of Fiscal Federalism in India:

- It helps the governments at different levels in the country to address** the regional imbalances via mechanisms like tax sharing, grants-in-aid, and performance-based incentives.
- It ensures fiscal discipline through** frameworks like the Fiscal Responsibility and Budget Management (FRBM) Act which helps in maintaining macroeconomic stability and sustainability.
- It promotes** cooperation and coordination between the centre and states, through negotiations regarding the sharing of resources and responsibilities.
- By empowering state and local governments with financial autonomy and resources it supports decentralization which helps to strengthen grassroots democracy and responsive governance.
- It helps to incorporate dynamic changes** like the shift towards a market-oriented economy and undertake taxation reforms like the introduction of GST.

Challenges to Fiscal Federalism in India:

- In the gross tax revenue, the share of states** has decreased from 35% in 2015-16 to 30% in 2023-24.
- The centre's direct support** to states, in the form of grants-in-aid, has declined from ₹1.95 lakh crore in 2015-16 to ₹1.65 lakh crore in 2023-24.
- There has been disproportionate growth between the centre and the state's revenue.** The centre's tax revenue has increased by 2.3 times from ₹14.6 lakh crore to ₹33.6 lakh crore whereas the states' share in the tax revenue has only doubled from ₹5.1 lakh crore to ₹10.2 lakh crore during 2015-16 to 2023-24.
- There is an increase in conditional grants** as several grants to states are contingent on fulfilling certain conditions, including the insistence on specific labelling, which imposes the centre's preferences over state priorities.
- There is an erosion of the state's autonomy regarding taxation due to the implementation of GST** as the ability of states to set tax rates on their own revenue sources has been significantly diminished.

GOVERNOR

GS II – Issues and challenges pertaining to the federal structure

Context: In a significant decision, a bench of Justices J B Pardiwala and R Mahadevan of the Supreme Court declared the action of Tamil Nadu Governor R N Ravi in reserving 10 Bills for the consideration of the President in November last year after their due reconsideration by the state Assembly as erroneous and illegal.

Governor:

- The Governor, along with the Chief Minister, the Council of Ministers, and the Advocate General of the state, constitute the state executive.
- Articles 153 to 167 in Part VI of the Indian Constitution outline the structure and functions of the state

executive.

- He is neither elected directly by the people nor indirectly elected by a specially constituted electoral college. He is the central nominee, appointed by the President by warrant under his seal.

Powers of the Governor:

Executive Powers:

- The Governor has the authority to appoint key officials such as the Chief Minister, ministers, the Advocate General, the State Election Commissioner, and the Chairman and members of the State Public Service Commission while overseeing executive actions in his/her name.
- He/She can create rules for state business, seek information from the Chief Minister, and serve as the Chancellor of state universities.
- The Governor can recommend a constitutional emergency to the President and act as the President's representative during the President's Rule.

Legislative Powers:

- The Governor holds key legislative powers, including summoning or proroguing the legislature, addressing sessions, and appointing presiding officers and nominated members.

Veto Power of Governor:

- The Governor can exercise veto power over bills, either assenting, withholding assent, returning them for reconsideration, or reserving them for the President in certain cases.

Financial Powers:

- The Governor oversees the state budget, approves money bills and grants, and makes advances from the Contingency Fund.
- He/She also establishes a Finance Commission every five years to review the financial position of panchayats and municipalities.

Judicial Powers:

- The Governor has the power to grant pardons, reprieves, and commutations for sentences related to state laws and is consulted by the President on the appointment of state high court judges.
- The Governor makes appointments, postings, and promotions of district judges in consultation with the state high court and appoints other judicial officers in consultation with the high court and the State Public Service Commission.

Issues Related to the Office of Governor in India:

- Politicians and former bureaucrats affiliated with the ruling party have been appointed in several instances as Governors. This has led to questions about the post's impartiality and non-partisanship.
- There are no written grounds or procedures for removing governors. This leads to arbitrary removals especially when there is a change of political power at the Union Govt. level.
- The governors have become the 'agents of the centre' as they are appointed and removed by the central government.
- The discretionary power of the governor recommending the president's rule on account of the failure of constitutional machinery in the state has not always been based on 'objective material'. Political partisanship, whims, and fancies have also played their part.
- The constitutional mandate of the Governor to act on the advice of the council of ministers is not clearly distinguished from his statutory authority as chancellor. This has resulted in many conflicts between the governor and the state government.
- The office of the governor has been accused of playing a partisan role in the appointment of CM in cases where a single party lacks the majority.
- The office of the Governor has been associated with the politics of delay in the convening and dissolution of state legislative assembly.
- There is no time limit set for how long a Governor can withhold assent to a Bill. This has been misused by the Office of the Governor to withhold assent to Bills passed by the State Legislative Assemblies.

Recommendations related to the Office of Governor made by Commissions:

The Administrative Reforms Commission (1969):

- It recommended that non-partisan persons having long experience in public life and administration should be appointed as the Governors of a State.

Sarkaria Commission (1988):
Appointment of Governor:

- The Governor should be appointed after consultations with the Chief Minister of the State
- The Governor should be eminent in some walks of life and from outside the State
- The person should be a detached figure without intense political links, or should not have taken part in politics in the recent past
- The person should not be a member of the ruling party

Removal of Governor:

- The Governor should be removed before the end of the term (5 years) only on the grounds that doubts are raised about his morality, dignity, constitutional propriety, etc.
- In the process of removal before the end of the term, the State Government may be informed and consulted
- **Article 356** should be used very sparingly and as a matter of last resort. It can be invoked only in the event of political crisis, internal subversion, physical breakdown, and non-compliance with the Constitutional directives of the Centre.

National Commission to Review the Working of the Constitution (NCRWC), 2002:

- The Governor should be appointed by a committee comprising the Prime Minister, Home Minister, Speaker of the Lok Sabha, and the Chief Minister of the State concerned.

The Second Administrative Reforms Commission (ARC), 2008:

- The Inter-State Council needs to come up with some guidelines for governors to follow when they are using their discretionary power.

Punchhi Commission (2010):

- It proposed giving Governors a fixed term of 5 years and removing them through an impeachment process (similar to that of the President) by the State Legislature. The doctrine of pleasure (for the removal of Governors) should be deleted
- It reiterated the recommendation of the Sarkaria Commission regarding the appointment of Governors. The person shouldn't be active in politics
- The convention of making the Governors as chancellors of universities should be done away with
- Articles 355 and 356 should be amended to allow the Union Government to bring specific troubled areas under its rule for a limited period, instead of the whole State.

News:

- Article 163 of the Constitution deals with the powers of the Governor generally.
- Article 200 specifically deals with the issue of granting assent to Bills. Both provisions are read together to determine the contours of the Governor's power on this issue.
- When a Bill passed by the legislature of a state is presented to the Governor, the Governor has four options:
 - grant assent to the Bill;
 - withhold assent to the Bill;
 - return the Bill for reconsideration; or
 - reserve the Bill for the consideration of the President.
- Article 200 reads: "When a Bill has been passed by the Legislative Assembly of a State or, in the case of a State having a Legislative Council, has been passed by both Houses... it shall be presented to the Governor and the Governor shall declare either that he assents to the Bill or that he withholds assent therefrom or that he reserves the Bill for the consideration of the President."
- An indefinite timeline in deciding on Bills can in effect, amount to paralyzing the elected government. This was essentially the Tamil Nadu government's argument — that the Governor virtually exercises a "pocket veto" by delaying his decision on granting assent

GROUP OF SEVEN (G7)

GS II – Regional and global groupings and agreements involving India and/or affecting India's interests.

Context: G7 is an intergovernmental political and economic forum of the most developed and advanced economies of the world.

Group of Seven (G7):

- It is an intergovernmental political and economic forum of the most developed and advanced economies of the world consisting of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.
- It is an informal grouping that operates outside of formal treaties and lacks a permanent bureaucracy.
- It brings together the world's advanced economies to influence global trends and tackle pervasive and crosscutting issues, as well as emergent global crises.
- Its agenda includes ensuring trade security, building regional partnerships, and countering the influence of China to bolster economic and security stability in the region.
- It cannot enact laws directly and decisions are taken through consensus.

Significance of G7 for India:

- India being the **5th largest economy** with rapid economic growth can get access to **cutting-edge technologies** in the areas of renewable energy, artificial intelligence, and digital technology and helps to **expand into new markets** by participating in the G7 summit.
- **By participating in the G7 summit**, India can counter China's influence in the Indo-Pacific by developing strategic partnerships with Western countries within the framework of G7.
- The G7 countries are major contributors to development assistance, and their funding decisions can impact positively on India's development agenda.
- India has historic and strategic ties with Russia alongside its growing relationships with Western nations which plays a critical role in maintaining stability and pursuing strategic interests amidst global geopolitical shifts.
- The G7 countries have greatly impacted global climate policy, and closer cooperation with them could help India reduce its emissions and adapt to the impacts of climate change.

JUDICIAL APPOINTMENTS IN INDIA

GS II – Judiciary

Context: The row over the discovery of wads of currency notes at the residence of Delhi High Court judge Justice Yashwant Varma has given the debate on judicial appointments a new lease of life.

Evolution of Judges Appointment/Collegium System:

- First Judges Case, 1981 (S P Gupta Vs Union of India): A seven-judge Constitution Bench held that the President of India is the final authority to appoint and he need not follow the advice of the judges whom he consults. It meant 'consultation is not concurrence'.
- Second Judges Case, 1993 (Supreme Court Advocates-on-Record Association Vs Union of India): A nine-judge Constitution Bench overruled the decision given in the SP Gupta Case and devised a specific procedure called 'Collegium System' for the appointment and transfer of judges in the higher judiciary. It accorded primacy to the CJI in matters of appointment and transfers while also ruling that the term 'consultation' would not diminish the primary role of the CJI in judicial appointments.
- Third Judges Case (1998): The 1993 decision was reaffirmed with minor modifications in 1998, on a reference made by the President under Article 143 of the Constitution. It was held that the recommendation of appointment etc should be made by the chief justice of India and his four senior-most colleagues instead of the earlier two and is referred to as the Collegium.

National Judicial Appointment Commission (NJAC):

- The 99th Constitutional Amendment Act of 2014 which established the NJAC and the NJAC Act, was passed by Parliament in 2014 to set up a commission for appointing judges, replacing the Collegium system. This

would essentially increase the government's role in the appointment of judges.

- The National Judicial Appointments Commission (NJAC) Act of 2014 was a significant legal development in India aimed at reforming the appointment of judges in the higher judiciary. However, it was struck down as unconstitutional by the Supreme Court in a landmark judgment in the case of Supreme Court Advocates-on-Record Association v. Union of India (2015). The Supreme Court was of the view that there was no question of accepting an alternative procedure that did not ensure the primacy of the judiciary in the matter of selection and appointment of judges in the higher judiciary.

Composition of NJAC:

The NJAC was to comprise of:

- The Chief Justice of India as the ex officio Chairperson,
- two senior-most Supreme Court Judges as ex officio members,
- The Union Minister of Law and Justice as ex officio member, and
- Two eminent persons from civil society — one of whom would be nominated by a committee consisting of the CJI, Prime Minister, and the Leader of Opposition in the Lok Sabha, and the other would be nominated from the SC/ST/OBC/minority communities or women.

Arguments in favor of NJAC:

- The collegium system is a closed-door affair without a formal and transparent system and has also been accused of nepotism.
- It is important to have checks and balances to retain public confidence in judicial appointments.
- Democracy being a basic feature of the constitution, requires that no organ of the state, including the judiciary, enjoys absolute freedom.
- It helps in guarding the basic structure of Separation of powers and the Independence of the Judiciary from the executive as the Chairperson of the NJAC is the Chief Justice of India.

Arguments against NJAC:

- NJAC would jeopardize the independence of the judiciary as guaranteed under the existing collegium system because, as a part of the basic structure of the Constitution, it is the sole right of the judiciary to appoint judges.
- The introduction of Article 124 A in itself violates the basic structure of "Primacy of the CJI" as laid down in the second judges' case of 1993.
- It amounts to complete arbitrariness. Since the appointment of two eminent persons lacks the process of evaluation and is completely up to the decision of the CJI, the Prime Minister, and the leader of Lok Sabha, it amounts to a violation of Article 14 of the Constitution, which provides for equality and non-arbitrariness in decision making.
- It is cited by critics that the judiciary is the only independent institution left in the country. It is harmful to allow political influence over it.
- The involvement of the legislature in the appointment of judges might lead to the creation of a culture of 'reciprocity' which means that judges might have the feeling of having to pay back the political executive as a consideration for their appointment to the post of judge.

Recommendations:

- The Law Commission in its 214th Report on Proposal for Reconsideration of Judges cases I, II, and III recommended the following:
- To seek a reconsideration of the three judgments before the Supreme Court.
- A law to restore the primacy of the CJI and the power of the executive to make appointments.

MULTILATERAL DEVELOPMENT BANKS

GS II –International organization

Context: Multilateral Development Banks are institutions whose members include multiple developed and developing countries.

Multilateral Development Banks (MDBs):

- They are **international financial institutions** that provide financing and professional advice for economic and social development projects in developing countries.
- They are formed and capitalised by **multiple countries** through pooled resources and shared representation on their boards.
- They originated in the aftermath of **World War II** to rebuild war-ravaged nations and stabilise the global financial system.
- Unlike commercial banks, MDBs do not seek to maximise profits for their shareholders. Instead, they prioritise development goals, such as ending extreme poverty and reducing economic inequality.
- They often lend at low or no interest or provide grants to fund projects in **infrastructure, energy, education, environmental sustainability**, and other areas that promote development.
- **Major MDBs include the World Bank Group, the Asian Development Bank, the African Development Bank, the European Bank for Reconstruction and Development, and the Inter-American Development Bank.**

Issues/Challenges faced by MDBs:

- MDBs are often constrained by the amount of capital they have available to lend. This can **limit their ability to finance large-scale development projects**, especially in the face of growing needs.
- The world faces new and complex challenges like **climate change, pandemics, and technological disruption**. MDBs have not fully adapted to these growing challenges in their strategies and approaches to effectively address these issues.
- The current voting structure in some MDBs gives more power to developed countries. Developing nations are **pushing for a greater say in decision-making** to reflect their needs and priorities.
- Concerns exist about the **transparency of MDB decision-making processes** and the need for stronger accountability mechanisms to prevent corruption and mismanagement. For example, the **United States holds a considerable 15.85%** of the voting power in the World Bank, granting it substantial influence over the institution's decisions.
- One-size-fits-all lending conditions from MDBs, such as **uniform interest rates or repayment schedules**, are challenging for countries of the global south due to their diverse economic structures and **financial capabilities**.

Way Forward:

- MDBs can play a crucial role in mobilising resources for climate change mitigation and adaptation projects in developing countries. This could involve creating **dedicated climate finance facilities, offering green bonds**, and developing innovative risk-sharing instruments for renewable energy projects.
- Encouraging MDBs to facilitate knowledge exchange between developing countries. This could involve **connecting countries facing similar challenges** and fostering collaboration on successful development strategies.
- As middle-income countries develop, creating clear pathways for them to **"graduate" from concessional loans** to market-rate financing from private sources. This frees up MDB resources for low-income countries that still need significant support.
- Strengthening safeguards to ensure MDB-funded projects **avoid negative social or environmental impacts** and promote **inclusive sustainable development**.

India and MDBs:

- India is a member of **four of the five constituents** of the World Bank Group viz., the **International Bank for Reconstruction and Development (IBRD), International Development Association (IDA), International Finance Corporation (IFC), and Multilateral Investment Guarantee Agency (MIGA)**. India is not a member

of ICSID (International Centre for Settlement of Investment Disputes). World Bank assistance in India started in 1948 when funding for the **Agricultural Machinery Project** was approved.

- India is a founding member of the **Asian Development Bank (ADB)** and the bank's fourth-largest shareholder. Since commencing operations in 1986, ADB has aligned its operations in the country to the government's developing priorities. This approach will be pursued through the forthcoming country partnership strategy, 2023–2027.
- India is a founding member of the Asian Infrastructure Investment Bank (AIIB) with the **second-highest voting share after China**. It is headquartered in Beijing.
- India, the founding member of the **New Development Bank (NDB)**, is the second-largest recipient of NDB's financial support at USD 7.5 billion after China. It was established in 2015 by the **BRICS countries (Brazil, Russia, India, China and South Africa)**.

ROLE OF GLOBAL SOUTH IN BUILDING PEACE

GS II –Agreements involving India and/or affecting India's interests

Context:The Ukraine war is a chance for the Global South to emerge as a force that is credible and neutral in shaping global stability.

Global South:

- It was coined by the American academic Carl Oglesby in 1969 to denote a set of countries beset by the “dominance” of the Global North through political and economic exploitation.
- The phrase “Global South” refers broadly to the regions of Latin America, Asia, Africa, and Oceania separated by the Brandt line.
- It denotes regions outside Europe and North America, mostly low-income and often politically or culturally marginalized.
- China and India are the leading proponents of the Global South.

Significance of the Global South as a Peacemaker:

- The Global South, with its tradition of non-alignment, is often viewed as a credible and impartial interlocutor.
- **Global South countries' civilizational ethos** is widely recognized and respected and the **philosophy of 'VasudhaivaKutumbakam'** of India resonates globally, promoting harmony.
- Countries from the Global South are among the largest contributors to United Nations peacekeeping missions, lending stability in post-conflict zones.
- Global South platforms serve as alternative forums for dialogue and de-escalation, independent of Western-dominated institutions.
- The shared colonial legacies give Global South countries the normative legitimacy to advocate for sovereignty, equity, and non-intervention.
- Global South's experience in addressing both internal and regional conflicts, positions it as a potential peacemaker.
- By promoting gender-balanced peace initiatives, the Global South contributes to more inclusive and sustainable peace processes.

Challenges for the Global South as a Peacekeeper:

- Compared to established global powers like the USA and the UK, the Global South countries' diplomatic network and influence are relatively limited, affecting their capacity to mediate complex international disputes effectively.
- A Global South-led mission requires a pre-existing and enforceable ceasefire, without which peacekeeping efforts may risk becoming entangled in active conflict zones.
- The persistent tensions among the countries of the Global South can limit their ability to be perceived as an impartial peacemaker.

- Lack of consensus on contested borders, particularly in conflicts like Russia-Ukraine, complicates operational deployment and increases the risk of renewed hostilities.
- **Resource constraints** due to attention and investment needed for domestic development challenges like poverty and infrastructure deficits.

ROLE OF SPEAKER IN ANTI-DEFECTION LAW

GS II –Parliament and State Legislatures—Structure, Functioning, Conduct of Business, Powers and Privileges and Issues Arising out of these.

Context: The role of the Speaker in defection cases is crucial for ensuring the stability and integrity of the government and the democratic system.

Anti-Defection Law:

- The 52nd Amendment Act of 1985 added a new Schedule i.e. Schedule 10 to the Indian Constitution that provided for the disqualification of the members of Parliament and state legislatures on the ground of defection from one political party to another. This act is often referred to as the 'anti-defection law'.
- Later, the 91st Amendment Act of 2003 omitted an exception provision i.e., disqualification on the ground of defection not to apply in case of split.

Disqualification on Grounds of Defection under the Tenth Schedule:

- If an elected member willingly gives up his membership in a political or legislative party.
- If he votes or refrains from voting in such a house, opposed to any guidance issued by his political party or anyone approved to do so, without getting prior permission.
- As a pre-condition for his disqualification, his refraining from voting must not be tolerated by his party or the authorized person within 15 days of such incident.
- If any independently elected member joins any legislative party.
- If any nominated member joins any political party post the expiry of six months.

Role of Speaker in Anti-Defection Law:

- The final assessor in the case of disqualification under the Tenth Schedule lies in the hands of the speaker of the house. The speaker or presiding officer is regarded as the custodian of the process of democratic rules in the parliament and the state assemblies.
- The standing of the speaker is very high as he is placed next to the President, the Vice-President, and the Prime Minister. The speaker can debar a member only if an allegation of disqualification is placed before him under Para 2 of the Tenth Schedule.
- Under the light of Articles 102 and 191 of the Constitution and the Tenth Schedule, the speaker's exercise is judicial, as he can make a judgment only after a member files a disqualification petition.

Is the decision of the Presiding Officer subject to Judicial Review?

- The act provided that the presiding officer's ruling was ultimate and could not be interrogated in any court of law. But, in the *Kihoto Hollohan* case (1992), the Supreme Court stated this provision as unconstitutional on the basis that it seeks to take away the authority of the Supreme Court and the High Courts. The court specified that while deciding on an issue under the 10th Schedule, the presiding officer must function as a tribunal. Therefore, his/her ruling (similar to other tribunals) was subject to judicial evaluation on the grounds of malafides, perversity, etc.
- However, the court dismissed the argument that the vesting of adjudicatory powers in the presiding officer is by itself void on the grounds of political bias. However, it specified that there shall not be any judicial involvement until the Presiding Officer has given his order.

Kihoto Hollohan vs. Zachillu and others the case of 1992:

- The Supreme Court stated that judicial review cannot be carried out at a stage before the making of a decision by the speaker or chairman, and no intervention would be allowed at an interlocutory stage of the trials carried by the speaker or chairman. However, before this case, the verdict of the speaker or chairman was considered final and was not subject to judicial evaluation. This provision was regarded as unconstitutional by the Supreme Court.

SHIFTING DIPLOMATIC POSTURE OF JAPAN

GS II –Effect of policies and politics of developed and developing countries on India’s interests

Context:In the recent past of changing geopolitics, the world is witnessing a turning point as Japan, long a symbol of post-war pacifism, strengthens its military capabilities

Japan’s Shifting Diplomatic Posture:

- Japan has **significantly increased its defence budget**, ending the self-imposed cap of 1% of GDP. From 1960 to 2020, Japan’s military spending remained at or **below 1% of GDP**. Japan’s Prime Minister announced that Japan will **increase annual defence spending to 2% of GDP by 2027**.
- Japan is **acquiring new military capabilities**, including offensive weapons like cruise missiles, and easing restrictions on arms exports.
- Japan is working closely with the **US on joint military exercises** and exploring deeper integration of command structures. The key **Japan-US joint military exercises** are Keen Sword, Orient Shield, and Valiant Shield (a ballistic missile defence-focused exercise). The **Global Combat Air Programme (GCAP)** is a multinational initiative led by the **United Kingdom, Japan, and Italy** to jointly develop a sixth-generation stealth fighter by 2035.
- Japan has decided to **ease its strict defence export rules**, allowing it to **collaborate with Britain and Italy** to build a next-generation fighter jet for export under certain conditions.
- Japan is strengthening its relationships with other regional powers like **India and Australia**, promoting a **"free and open Indo-Pacific" vision through the Quadrilateral Security Dialogue (QUAD) and Pacific Island Forum (PIF)**.
- Japan's strong stance in support of Ukraine against Russia is seen as a signal of its commitment to upholding international norms and deterring similar aggression in Asia.
- Japan is attempting to **reconcile with South Korea**, a historical adversary, in an effort to create a more cohesive regional security architecture.

Factors that led Japan to Shift its Diplomatic Posture:

- China's growing military power and **assertive claims in the East China Sea**, particularly regarding disputed territories like the **Senkaku Islands**, have created a sense of urgency for Japan to strengthen its defences.
- North Korea's continued **development of nuclear weapons and ballistic missiles** remains a major security concern for Japan.
- The **perceived erosion of US commitment to Asian security** under the Trump administration, along with the **rise of isolationist tendencies in the US**, has pushed Japan to become **more self-reliant** in its defence. Examples include the **failure of the USA’s Middle East policy to maintain peace**.
- A growing number of **conservative voices** in Japan advocate for a **more active security role** and argue that Japan, as a normal power has a responsibility to contribute to regional stability and defend its interests.
- Decades of relying solely on the US for security have led some to question the sustainability of this approach, especially in the face of a changing regional landscape.

Significance of Japan’s Shifting Diplomatic Posture on India:

- Both India and Japan see **China as a strategic concern**. Japan's increased military capabilities and focus on the Indo-Pacific could strengthen the ability of both countries to deter Chinese aggression. **Both India and Japan** are members of the **Quad grouping, G20 and G-4, International Thermonuclear Experimental Reactor (ITER)**. The **India-Japan Act East Forum** was established in 2017 which aims to provide a platform

for India-Japan collaboration under the fabric of India's "Act East Policy" and Japan's "Free and Open Indo-Pacific Strategy".

- The new strategy emphasises cooperation with **like-minded countries like India**. This could lead to **more joint military exercises, technology sharing**, and potentially relaxed export restrictions on Japanese defence equipment for India. Japan is one of the few countries with whom India has a **2+2 ministerial dialogue**. India and Japan's defence forces also organise a series of bilateral exercises such as **JIMEX (naval), Malabar exercise (Naval Exercise), 'Veer Guardian' and SHINYUU Maitri (Air Force), and Dharma Guardian (Army)**.
- The new **Japanese Official Development Assistance (ODA) Loan framework** for strategic purposes could provide India with much-needed funding for infrastructure projects in border areas with China. This would improve India's defence preparedness and connectivity. **India** has been the **largest recipient** of the **Japanese ODA Loan framework** for the past decades. **Delhi Metro** is one of the most successful examples of **Japanese cooperation** through the utilisation of ODA. India's **Western Dedicated Freight Corridor (DFC)** project is funded by a soft loan provided by the Japan International Cooperation Agency.
- A stronger Japan could be a more reliable economic partner for India, potentially leading to increased trade and investment. **Japan's bilateral trade** with India **totalled USD 20.57 billion** during FY 2021-22. India was the 18th largest trading partner for Japan, and Japan was the 12th largest trading partner for India in 2020.

Issues/Challenges Due to Japan's Shifting Diplomatic Posture on India:

- Both India and Japan are developing long-range strike capabilities. This could lead to an arms race in the region, potentially straining resources. Competition between Japan and India to **export defence equipment** in common nature of market and allies like Africa, Philippines, and South America might harm India's interests in the long run.
- It might become challenging for India to balance more **assertive powers** in competing blocks like the **Quad grouping** and **BRICS**.
- Ideological conflicts may arise in areas such as human rights, nuclear proliferation, and international interventions, where India's stance can differ from the Japanese stance.

SICKLE-CELL DISORDER (SCD)

GS II –Health

Context: The U.S. Food and Drug Administration (FDA) approved a pair of gene therapies for sickle cell disease, including the first treatment based on the breakthrough CRISPR gene editing technology.

Sickle-Cell Disorder (SCD):

- It is an **inherited haemoglobin disorder** characterised by a **genetic mutation** that **causes red blood cells (RBCs) to assume a sickle or crescent shape** rather than their normal round shape.
- This **abnormality** in RBCs **results in increased rigidity, impairing their ability to circulate effectively** throughout the body. Consequently, individuals with SCD often experience complications such as **anaemia, organ damage, recurrent and severe pain episodes, and a shortened lifespan**.

Symptoms:

- **Chronic anaemia** which leads to fatigue, weakness, and paleness.
- Painful episodes cause sudden and intense pain in the bones, chest, back, arms, and legs.
- **Delayed growth and puberty**.

Treatment:

- **Blood Transfusions** can help relieve anaemia and reduce the risk of pain crises.
- **Hydroxyurea** can help **reduce the frequency of painful episodes** and prevent some of the disease's long-term complications.
- **Gene Therapy** can also be treated by bone marrow or **stem cell** transplantation by methods like **Clustered**

regularly interspaced short palindromic repeats (CRISPR).

Challenges related to the treatment and accessibility of SCD:

- There is a **lack of understanding about SCD** among the public and healthcare providers, leading to delayed diagnosis and inadequate treatment.
- Many rural and tribal areas lack specialised healthcare facilities and trained medical personnel for managing SCD.
- The long-term management of SCD can be financially burdensome for many families due to the cost of medications, regular check-ups, and potential hospitalizations.
- Inconsistent availability of essential medications for SCD treatment, such as **hydroxyurea and pain relievers**, is a concern in certain regions.
- The **absence of systematic newborn screening** and early detection initiatives results in missed opportunities for early intervention and genetic counselling.
- Rural, **remote, and tribal communities** face challenges in accessing quality healthcare due to geographical isolation, lack of transportation, and socioeconomic factors. **Stigma and discrimination** further hinder access to healthcare services.

Government initiatives regarding SCD:

- **National Sickle Cell Anaemia Elimination Mission** aimed at enhancing the care for all **Sickle Cell Disease (SCD)** patients and reducing the disease's prevalence through an integrated approach **encompassing screening and awareness campaigns**. It targets the **complete elimination of sickle cell disease as a public health concern by 2047**.
- **National Health Mission (NHM) 2013** is a flagship programme that encompasses provisions for disease prevention and management, with a **specific focus on hereditary anomalies such as sickle cell anaemia**. It focuses on **raising awareness, facilitating early detection, and ensuring timely treatment** of sickle cell anaemia. It facilitates drugs like hydroxyurea to treat SCD in its **"essential medicines List"**.
- **The National Guidelines for Stem Cell Research 2017** restricts the **commercialisation of stem cell therapies** to clinical trials, except for Bone marrow transplantation (BMT) for SCD. Gene editing on stem cells is permitted only for in-vitro studies.
- **National Guidelines for Gene Therapy Product Development and Clinical Trials 2019** provides guidelines for the development and clinical trials of gene therapies for inherited genetic disorders. India has also approved a **five-year project** to develop CRISPR techniques for sickle cell anaemia treatment.
- **State Haemoglobinopathy Mission of Madhya Pradesh** aims to address the challenges in screening and management of the disease.
- **Rights of Persons with Disabilities (RPwDs) Act, 2016** includes SCD that provides for benefits such as **reservation in higher education (minimum 5%), government jobs (minimum 4%), and allocation of land (minimum 5%)**, for persons with benchmark disabilities and those with high support needs.

TRENDS IN MATERNAL MORTALITY IN INDIA

GS II –Health

Context: Comparing India's Maternal Mortality Ratio (MMR) to Nigeria is unfair, the Union Health Ministry said on Wednesday while reacting to the recently released United Nations Maternal Mortality Estimation Inter-Agency Group (MMEIG) report titled 'Trends in maternal mortality 2000-2023', which has indicated that India has made significant strides in reducing MMR but it registered 19,000 maternal deaths in 2023 contributing almost 7.2% to global mortality.

Trends in Maternal Mortality:

- India recorded 19,000 maternal deaths, accounting for 7.2% of global maternal mortality, making it the 2nd largest contributor in 2023.
- The global MMR declined from 328 to 197 per 100,000 live births, a 40% reduction from an estimated 443,000 deaths in 2000 to 260,000 in 2023.

- The annual rate of reduction (ARR) of global MMR dropped from 2.2% (2000–2023) to just 1.6% (2016–2023).

Issues/Concerns Regarding India's Maternal Mortality Progress:

- There is still a persistent gap in maternal healthcare access and quality in India. Even though there is a reduction in its MMR to 80 per 100,000 live births, India still accounted for 7.2% of global maternal deaths.
- The Ministry of Health and Family Welfare flagged concerns over comparing India (145 crore) with Nigeria (23.26 crore) on maternal deaths, stating that using absolute numbers without adjusting for population size can misrepresent India's relative progress.
- India's MMR declined at 6.36% (2000–2020), higher than the global AAR of 2.07%, yet it is not fast enough to meet the SDG 3.1 target.
- Despite initiatives like the National Health Mission (NHM) and Janani Suraksha Yojana (JSY), less institutional delivery in rural areas remains a concern due to a lack of access to skilled birth attendants and emergency obstetric care.
- India is witnessing an increase in the number of indirect maternal deaths, especially due to non-communicable diseases like diabetes and hypertension.

Way Forward:

- Measures should be taken to strengthen Primary Health Care (PHC) by focusing on Health and Wellness Centers (HWCs) to provide quality maternal healthcare access to rural women in the underserved.
- There is a need to increase healthcare investments in high-risk states like Uttar Pradesh, Bihar, and Madhya Pradesh by leveraging mobile health units, telemedicine, and Accredited Social Health Activists can bridge access gaps.
- Maternal health policies should be aligned with SDG 5 (Gender Equality) and SDG 10 (Reduced Inequalities) to ensure that maternal care is accessible to all women, especially marginalized groups.

VARDHAMAN MAHAVIRA

GS II – Indian Culture

Context: Prime Minister Narendra Modi said that values enshrined by Jainism offer an answer to global challenges of terrorism, war, and environmental degradation. He added that his government was committed to preserving the teachings of the ancient religion.

Vardhaman Mahavira:

- He was born in 540 B.C. in Kundagram, near Vaishali (modern-day Bihar). His birthday is celebrated as Mahavir Jayanti.
- He belonged to the Ikshvaku dynasty.
- At the age of thirty, he left his family, gave up his worldly possessions, and became a monk in search of a solution to eliminate pain, sorrow, and suffering.
- Mahavir spent the next twelve and a half years in complete silence and meditation, working to overcome his desires, feelings, and attachments. He discarded his clothes and followed extreme austerities, enduring hardships.
- Finally, he attained enlightenment, called kevalagyana in Jainism; after fasting for two-and-a-half days without water in the full glare of the sun and this entitled him to be called the Jina (conqueror).
- He attained nirvana at the age of 72 (527 B.C.) in the town of Pava in modern-day Bihar.

Contemporary Relevance of Teachings of Lord Mahavira:

- Lord Mahavira's teaching of Ahimsa advocates ending all forms of violence, including physical, verbal, and psychological, and promotes compassion towards all living beings. In today's world, plagued by armed conflicts, terrorism, and nuclear threats, this principle calls for peaceful resolutions and compassionate dialogue.
- Mahavira's principle of detachment from material possessions encourages a sustainable lifestyle,

fostering minimalism and curbing greed, values that align with Mission LiFE (Lifestyle for Environment) and SDG 12 (Responsible Consumption and Production) to address environmental degradation and climate change

- Anekantavada teaches that truth has many dimensions, promoting respect for diverse perspectives and helping reduce religious intolerance, racial discrimination, and societal divisions. It resonates with constitutional morality, freedom of thought and expression, and secularism in the Indian Constitution.
- Mahavira's principles of honesty and respecting others' rights promote transparency and integrity in today's world, combating corruption and unethical practices. These teachings guide the creation of ethical businesses that prioritize social responsibility.
- Brahmacharya (Celibacy/ Self-restraint) is interpreted in modern times as self-discipline that helps address issues like substance addiction, mental health, and emotional instability.

WAQF (AMENDMENT) BILL, 2024

GS II – Government policies and interventions

Context: The passage of the Waqf (Amendment) Bill in Parliament was a “watershed moment in the country's collective quest for socio-economic justice, transparency and inclusive growth,” Prime Minister Narendra Modi said.

Waqf:

- It refers to properties dedicated exclusively for religious or charitable purposes under Islamic law, and any other use or sale of the property is prohibited.

Key legislative changes and developments in the administration of Waqf properties in India through the Waqf Act:

- The Waqf Act of 1954 provided a pathway toward the centralization of Waqfs. Central Waqf Council of India, a statutory body was established in 1964 by the Government of India under this Waqf Act of 1954 to oversee the work under various state Waqf boards which were established under provisions of Section 9(1) of the Waqf Act, 1954.
- **The Waqf Act of 1995** was enacted to govern the administration of Waqf Properties (Religious Endowments) in India. It provides for the power and functions of the Waqf Council, the State Waqf Boards, and the Chief Executive Officer, and also the duties of Mutawalli. This Act also describes the power and restrictions of a Waqf Tribunal that acts in lieu of a civil court under its jurisdiction. The Waqf Tribunals are deemed to be a civil court and required to exercise all the powers and functions exercised by a civil court under the Code of Civil Procedure, 1908. The decision of a Tribunal shall be final and binding on the parties. No suit or legal proceedings shall lie under any civil court. Thus, making the Waqf Tribunal decisions above any civil court.
- Some provisions of the Act were amended in 2013 to make waqf management more efficient and transparent. However, during the course of the implementation of the Act, it was felt that the Act did not prove effective in improving the administration of Waqf.
- **The Waqf Repeal Bill of 2022 was introduced** for the purpose of achieving a more equitable arrangement and treatment of bodies such as waqf and other recognized religious entities established under similar intent, the aforesaid Waqf Act, 1995 as amended was tabled in Rajya Sabha on December 8, 2023.

Key Provisions of the Waqf (Amendment) Bill 2024:

- Muslim-created trusts under any law will no longer be considered Waqf, ensuring individuals retain full control over their trusts.
- Only practicing Muslims (for at least five years) can dedicate their property to Waqf.
- Women must receive their inheritance before Waqf's dedication, with special provisions for widows, divorced women, and orphans.
- Section 40 of the original Waqf Act (1995) has been removed, preventing Waqf Boards from arbitrarily declaring properties as Waqf.
- The Waqf tribunals consist of 3 members i.e., a district judge, a state government officer (joint secretary level), and an expert in Muslim law and jurisprudence. Aggrieved parties can appeal directly to the concerned High Court within 90 days of receiving the Waqf tribunal's order.

- An officer above the rank of Collector will investigate government properties claimed as Waqf to prevent any unwarranted claims.
- Waqf institutions' mandatory contribution to Waqf Boards was reduced from 7% to 5% allowing more funds to be allocated for charitable purposes.
- Waqf institutions earning over Rs 1 lakh must undergo audits by State-appointed auditors.
- A centralized portal will automate Waqf property management, improving efficiency and transparency.
- The Waqf Boards will include two non-Muslim members for inclusivity, and among Muslim members, at least two must be women.
- The Limitation Act of 1963 will now apply to Waqf property claims, reducing prolonged litigation.

Need for Waqf (Amendment) Bill 2024:

- The principle "once a Waqf, always a Waqf" ensures Waqf properties remain permanent, often causing complex disputes.
- The Waqf Act of 1995 has failed to prevent mismanagement and land encroachments.
- Under the Waqf Act of 1995, Waqf Tribunal decisions cannot be appealed, which limits judicial review and reduces transparency.

Issues/Concerns related to the Waqf (Amendment) Bill 2024:

- It grants the government the authority to regulate Waqf properties and determine their status, thereby reducing the autonomy of Waqf Boards.
- It allows non-Muslim officials on Waqf Boards which violates the community's right to manage its religious affairs under Article 26.
- It lacks a clear definition of "practicing Muslims" for Waqf property allocation, which may lead to legal challenges due to varied interpretations by religious scholars.

WOMEN'S RESERVATION ACT, 2023

GS II – Government policies and interventions

Context: The **Constitution (106th Amendment) Act, 2023**, reserves **one-third of all seats** for women in **Lok Sabha, State legislative assemblies**, and the **Legislative Assembly of the National Capital Territory of Delhi**, including those reserved for **SCs and STs**.

Women's Reservation Act, 2023:

- The **Constitution (106th Amendment) Act, 2023**, reserves **one-third of all seats** for women in **Lok Sabha, State legislative assemblies**, and the **Legislative Assembly of the National Capital Territory of Delhi**, including those reserved for **SCs and STs**.
- The reservation will be **effective after the publication of the census conducted following the Act's commencement** and endures for 15 years, with potential extension determined by parliamentary action.
- The rotation of seats allocated for women will be governed by parliamentary legislation after each **delimitation process**.
- Currently, around **15%** of the total members of the 17th Lok Sabha (**2019-2024**) are women while in state legislative assemblies, women on average constitute **9%** of the total members.

Arguments in favor of the Act:

- Women's representation in politics is a vital step towards gender equality. However, according to the **Global Gender Gap Report 2022**, India ranks 48th out of 146 in Political Empowerment.
- The number of women MPs has increased from 5% in the first Lok Sabha to 15% in the **17th Lok Sabha**, but the number continues to be quite low. A 2003 study about the effect of reservation on women in panchayats showed that women elected under the reservation policy invest more in the public goods closely linked to women's concerns.
- If a group is not represented proportionally in the political system, its ability to influence policy-making is limited. The **Convention on the Elimination of All Forms of Discrimination Against Women** provides that

discrimination against women must be eliminated in political and public life.

- A more diverse legislature that includes a significant number of women can bring a broader range of perspectives to the decision-making process. This diversity can lead to better policy formulation and governance.
- Women's reservation in politics empowers women at various levels. It not only encourages more women to participate in politics but also inspires women to take on leadership roles in other sectors.
- Women in politics often prioritize and advocate for issues that directly affect women, such as gender-based violence, women's health, education, and economic empowerment. Their presence can lead to the prioritization of these issues in policy discussions.
- Women leaders in politics can serve as role models for young girls, encouraging them to aspire to leadership positions in various fields. Representation in politics can break stereotypes and inspire future generations.

Arguments against the Act:

- Women are **not a homogeneous community like, say like, a caste group**. Therefore, the same arguments made for caste-based reservations cannot be made for women.
- Reserving seats for women is opposed by some who claim that **doing so violates the Constitution's guarantee of equality**. If there is a reserve, they claim, women won't be competing on merit, which could decrease their status in society.

Current status of women's representation in India:

- There are 82 women Members of Parliaments in LS (15.2%) and 31 women in RS(13%). While the number has increased significantly since the 1st Lok Sabha (5%) but is still far lower than in many countries.

Note:

- According to recent UN Women data, **Rwanda (61%), Cuba (53%), and Nicaragua (52%)** are the top three countries in women representation. Bangladesh (21%) and Pakistan (20%) as well are ahead of India in the case of female representation.

Way Forward:

- Establishing an independent monitoring system or committees that explicitly prohibit family members from influencing the decision-making process of women representatives can be implemented by **reducing the influence of a patriarchal mindset**.
- Creating awareness among women about their rights and the importance of their participation in politics is essential. Educational programs and awareness campaigns can help to increase women's political participation.
- **Gender-based violence** and harassment are major obstacles to women's participation in politics. Addressing these issues through policy and legal measures can create a safer and more supportive environment for women in politics.
- Reforms such as introducing **proportional representation** and preferential voting systems can help to increase women's representation in politics by ensuring that more women get elected.

PAPER 3

DECARBONIZING LOGISTICS SECTOR

GS III – Industry

Context: India's logistics sector, vital for economic growth and Vision India@2047, is among the most carbon-intensive. With a net-zero target by 2070, greening logistics is key to sustainable and inclusive development.

Current Emissions Profile of India's Logistics Sector:

- India's logistics sector contributes about 13.5% of the country's total greenhouse gas (GHG) emissions.
- Road transport dominates, managing nearly 90% of passenger and 70% of freight movement, and accounts for over 88% of sectoral emissions, trucks alone contribute around 38% of CO₂ emissions (IEA, 2023).
- Domestic aviation contributes about 4% to emissions, while coastal and inland shipping emit less than road freight. Warehousing also adds significantly due to high energy use.

Major Challenges in the Decarbonising Logistics Sector:

- India's logistics sector relies heavily on roads, with 64.5% of freight transported by diesel trucks, making rapid decarbonization challenging due to the technological and economic dependence on fossil fuels.
- Over 85% of trucks in India are owned by small operators, hindering coordinated adoption of green technologies, emission tracking, and data sharing, which makes large-scale decarbonization efforts difficult.
- The high cost of EVs (20-50% more than ICE vehicles) and limited access to green finance, coupled with the scarcity of charging stations and India's reliance on fossil fuels for electricity, makes the transition to cleaner transport options economically and infrastructurally challenging.
- Underdeveloped and infrequent public transport systems in many areas hinder the use of public transport for freight, perpetuating reliance on carbon-intensive private vehicles, which contributes to emissions and inefficiency in logistics operations.

Way Forward:

- India should prioritize rail freight using its electrified network to reduce emissions, emulating countries like the US and China that have invested in expanding rail infrastructure.
- India should incentivize EV adoption and alternate fuels like CNG and biofuels through subsidies, infrastructure support, and a robust policy framework.
- India can decarbonize air freight by investing in sustainable aviation fuels (SAFs) and greener aircraft technologies while integrating low-carbon solutions in other transport sectors.
- Promoting green warehouses with renewable energy, energy-efficient materials, and automation will enhance sustainability and reduce emissions in the logistics sector.

COMMERCE SECTOR IN INDIA

GS III – Industries

Context: According to a recent report by Invest India, an Investment Promotion and Facilitation Agency, India's E-Commerce Sector is projected to reach USD 325 billion by 2030.

E-commerce:

- It is a short form for **Electronic Commerce**. It encompasses the buying and selling of goods and services over the Internet.
- It eliminates geographical barriers, allowing transactions to occur seamlessly across borders.

- It includes a wide range of activities, from online retailing to **digital payments**, and continues to evolve with advancements in technology and changes in consumer behaviour.

Driving factors behind developing E-commerce:

- The rise in smartphone usage has been a significant catalyst for e-commerce growth in India. It has democratised access to online platforms. **1.18 billion** people, representing over **80%** of India's population, will have access to smartphones **by 2026**.
- The **Unified Payments Interface (UPI)** has emerged as a significant player in digital transactions, facilitating transactions worth **USD 1.5 trillion in 2022**.
- **The affordability of cheap internet** plays a pivotal role in India's internet penetration. Now one gigabyte of data is priced at approximately **USD 0.17 (Rs 13.5)**, which gives incentive to a substantial number of the population to opt for online activities. India ranks 7th on the list of countries with the cheapest mobile data.
- The growth of e-commerce in India has been supported by the development of efficient logistics and supply chain networks. Government initiatives such as the **National Logistics Policy** streamline deliveries to the last mile, enhancing logistical efficiency and cost-effectiveness.
- India's growing middle-class population and increasing disposable incomes have fuelled the demand for e-commerce. According to the World Economic Forum, nearly **80% of households in 2030 will be middle-income** in India.
- E-commerce offers consumers the convenience of shopping from the comfort of their homes or on the go, saving time and effort. For **example**, food delivery platforms like **Zomato and Swiggy** have gained immense popularity due to the convenience they offer to consumers, allowing them to order meals without leaving their homes or offices.
- E-commerce platforms provide consumers with a vast array of product choices and competitive pricing options, making it easier to find desired products at affordable rates. This has been a significant draw for consumers, particularly in smaller cities and rural areas **where product availability and pricing can be limited**.
- Recent reports highlight the growing prominence of **Rural-Centric E-Commerce**. It expects a significant portion of demand to originate from **tier 2-4 towns and rural areas by 2026**.

Issues/Challenges faced by E-commerce:

- Cases of counterfeit and substandard goods being sold on popular e-commerce platforms have been reported in India. It can undermine consumer trust and lead to legal and financial consequences for e-commerce companies.
- Internet penetration remains relatively low in certain areas. **Postal addresses are not standardised**, affecting logistics. Due to a lack of supply chain integration, high delivery charges, and more time taken to deliver the product.
- Clear legislation is needed to regulate e-commerce practices domestically and internationally. The **rise of social commerce**, where consumers can make purchases directly through social media platforms, poses a potential challenge to the traditional regulatory framework.
- The e-commerce industry is susceptible to technological disruptions, such as the **emergence of new business models, advancements in artificial intelligence**, and cybersecurity threats like data breaches, hacking, and phishing attacks. Customers are sceptical of paying by credit card due to the increasing **threat of fraud** by hackers.

FARM MACHINERY INDUSTRY

GS III – Agriculture

Context: Globally, the market for farm machinery is bigger than that for tractors. That is starting to happen in India too, with rising agricultural labour shortages driving demand for farm machinery from harvesters to rotavators.

Farm Machinery:

- It includes tractor-mounted implements (tillage tools, crop protection chemical sprayers, balers, loaders, trolleys, and laser land levellers) as well as self-propelled harvester combines, rice transplanter, and cane

harvesters.

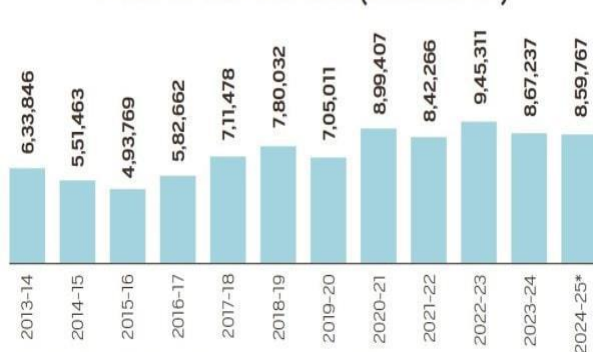
- Globally, the market for farm machinery, at approximately \$100 billion, is above the \$60 billion for tractors.
- In India, it's the other way- tractors at Rs 60,000 crore and farm machinery at Rs 10,000 crore
- While rotavators and subsoilers enable deep tilling to exploit the fertility and nutrient potential of the lower soil layers – making more effective use of the farmer's tractor – harvesters and transplanters address the increasing agricultural labour shortages.
- Harvesting an acre of wheat takes 5-7 labourers working a whole day. The harvested crop has to further be tied into bundles and taken for threshing (separating the grain from straw), requiring extra labour and an additional day that costs Rs 5,000 or more in total. But a combine can harvest, thresh, clean, and deliver an acre of grain to the farmer's tractor trolley in 25-30 minutes. The operator charges Rs 2,000-3,000 per acre.

Issues/Challenges related to the Farm Machinery Industry:

- There is a **lack of adequate information and awareness** amongst farmers about the technology and the management of machinery.
- The **Micro, Small, and Medium Enterprises (MSMEs) face a shortage of skilled personnel. Semi-skilled workers, lacking proper equipment**, often fabricate agricultural tools and machinery. The absence of qualified supervisors in small-scale fabrication makes it challenging to ensure quality. Moreover, finding qualified personnel for testing machinery is also difficult.
- Farm machinery is **expensive, and farmers may not have the resources to invest in new equipment**. This can lead to a lack of access to the latest technology and reduced efficiency in farming operations.
- Farm machinery technology is **evolving rapidly, and manufacturers must continually invest in research** and development to keep up which can be challenging for smaller manufacturers who may not have the resources to innovate quickly.
- Farm machinery is **highly dependent on weather conditions** and adverse weather can cause delays and disrupt farming operations resulting in lost productivity and reduced profitability.
- Farm machinery **requires regular maintenance and repairs** to keep it running efficiently which can be costly and time-consuming, especially for smaller farmers.

Indian Government Initiatives to Promote Farm Machinery:

DOMESTIC TRACTOR SALES (in unit numbers)



Note: Data is for April-March fiscal years; *April-February. Source: Tractor and Mechanization Association.

Note:

- India's tractor market is about 9 lakh units per year, with sales rising from 2020-21 (see chart). In value terms – a 45 hp tractor costs roughly Rs 7 lakh for the farmer – that comes to over Rs 60,000 crore.

INLAND FISHERIES

GS III – Infrastructure

Context: India has recently overtaken China to become the largest contributor of inland capture water fisheries, thereby emerging as one of the top three fish-producing countries in the world.

Inland Fisheries:

- It refers to the harvesting, management, and conservation of fish generally in freshwater bodies such as rivers, lakes, reservoirs, ponds, etc.
- It is mainly done by two methods:
 - Capture fisheries: It is the method of obtaining fish directly from lakes, rivers, or ponds with the help of fishing gear or nets, etc.
 - Culture fisheries: It is the method of obtaining fish by raising and harvesting them in controlled environments with tools of breeding or feed management, etc.

Significance/Benefits of Inland Fisheries:

- It provides nutritional and food security as fishes are rich in protein, omega-3 fatty acids, and Vitamin D. They act as cheap alternatives and help in dietary diversity and nutritional requirements.
- It provides economic benefits like employment opportunities, development of rural infrastructure, diverse supply chain, exports of processed products increasing foreign exchange earnings, etc.
- It helps to maintain healthy ecosystems by controlling invasive species and supporting biodiversity. Bioremediation helps in habitat restoration and removal of excess nutrients from urban or agricultural runoff and reduces the likelihood of toxic algal blooms.
- Ecological balance is sustained as fishes being an important component of aquatic food webs benefit other species as well.
- Traditional knowledge systems of the community and their strong cultural ties contribute to cultural heritage.
- Recreational fishing also promotes physical and mental well-being.

Issues/Challenges associated with Indian Inland Fisheries:

- Slow adoption of cutting-edge technologies such as innovative hatchery technologies, water-efficient aquaculture practices, etc.
- Limited extension services such as lack of standardised prices, and shortage of soil and water testing facilities limit the scope of development of the sector.
- Lack of timely credit, inadequate price discovery mechanism due to lack of efficient electronic trading platform, post-harvest losses, etc.
- Inadequate cold chain facilities, inadequate post-harvest infrastructure, etc.
- Inadequate mechanisation and use of traditional boats often result in water pollution and improper aquaculture management.
- Sustainability issues due to the rising demand for animal protein, fish stocks are often being fully exploited, overfished, or severely depleted at various places.

NITROGEN POLLUTION

GS III – Environmental Pollution

Context: According to a recent assessment, in 2010, one-fourth of sub-basins faced severe scarcity of clean water, 88 percent of which were "dominated by nitrogen pollution".

Nitrogen Pollution:

- It refers to the **excessive presence of nitrogen compounds in the environment**, primarily in water bodies like rivers and lakes.
- According to the **United Nations Environment Programme (UNEP)**, each year, 200 million tonnes of reactive nitrogen, 80% of the total, is lost to the environment.

Sources of Nitrogen Pollution:

- **Agricultural activity** is one of the main drivers of nitrogen pollution has been the rising consumption of **nitrogen-based fertilizer**, which can leach into groundwater or runoff into surface water bodies.

- **Industrial processes like manufacturing processes**, particularly those involved in the **production of nitrogen-based chemicals** and fertilisers, release nitrogen compounds into the environment.
- **Combustion of fossil fuels in industries** also emits nitrogen oxides (NO_x) into the atmosphere.
- Livestock waste, primarily from **manure and urine**, contains nitrogen compounds such as **ammonia**. Improper storage and management of livestock waste can lead to nitrogen runoff, contaminating water bodies and contributing to eutrophication.
- Wildfires and burning of **cow dung cake as a fuel** release nitrogen oxide (NO_x) and nitrous oxide (N₂O) into the atmosphere. These emissions contribute to **air pollution** and can have regional and global impacts on atmospheric chemistry and **climate**.

Consequences/Impacts of Nitrogen Pollution:

- Excess nitrogen acts as a **nutrient fertiliser for aquatic plants**, leading to excessive growth of **algae** and other aquatic vegetation. This phenomenon is known as **eutrophication** and leads to algal blooming. This **creates oxygen-depleted zones (dead zones)**, where aquatic life suffocates and dies.
- Nitrogen pollution can have direct and indirect effects on human health. High levels of nitrogen dioxide (NO₂) in the air can exacerbate respiratory conditions such as **asthma and increase the risk of respiratory infections**.
- Nitrate contamination of drinking water can also pose health risks, particularly to infants, by causing **methemoglobinemia or blue baby syndrome**.
- Nitrous oxide (N₂O) released into the atmosphere can lead to the depletion of the **stratospheric ozone layer**, which protects the Earth from harmful ultraviolet (UV) radiation. It can increase the **risk of skin cancer, cataracts, and other health problems in humans**, as well as harm marine ecosystems and agricultural crops.

Government measures to reduce Nitrogen Pollution:

- **Bharat Stage (BS VI) Emission Standards** have made stricter emission standards for vehicles and industries aimed to **curb the release of nitrogen oxides and particulate matter**, which are precursors to air and water pollution.
- **Nutrient-Based Subsidy (NBS)** incentivizes the use of **controlled-release fertilisers**, encouraging more efficient nutrient management.
- **Soil Health Cards** issued to farmers, these cards provide soil nutrient status and customised fertiliser recommendations, **promoting balanced nutrient application**.
- **Nano Urea** is a fertiliser patented and sold by the **Indian Farmers Fertiliser Cooperative Limited (IFFCO)**, which **reduces the unbalanced and indiscriminate use of conventional urea** and increases crop productivity.

PAHALGAM TERROR ATTACK

GS III – Internal Security

Context: The recent terror attack in Pahalgam, Jammu and Kashmir, which claimed the lives of over two dozen civilians, once again highlights the grim reality of cross-border terrorism faced by India. Orchestrated by The Resistance Front (TRF), a Pakistan-backed outfit, the incident is a stark reminder of the enduring threats to India's national security and the complexities it adds to foreign policy, particularly with Pakistan.

Implications on Internal Security:

- Such attacks erode public trust in state institutions, particularly in conflict-prone regions like Jammu & Kashmir.
- Increased deployment of forces and prolonged counter-insurgency operations stretch logistical and human resources.
- Terror incidents often fuel local radicalization, providing fodder for recruitment by terrorist outfits.
- Attacks on civilian spaces, especially during peak tourist seasons, disrupt economic activities and create a fear psychosis.

- These attacks expose gaps in intelligence sharing and operational synergy between central and state security agencies.

Implications on Foreign Policy:

- Cross-border attacks perpetuate hostility, limiting diplomatic engagement and trust-building efforts.
- While India garners international support post such attacks, repeated incidents can raise questions about internal stability.
- India's decision to reconsider the Indus Waters Treaty and scale down diplomatic ties post-Pahalgam signals a shift towards assertive diplomacy.
- Such incidents push India to strengthen counter-terrorism partnerships with countries like the USA, Israel, and France.

Way Forward:

- Establishing integrated intelligence grids at the state and district levels for real-time data sharing.
- Deploying AI, drones, and surveillance systems in vulnerable areas for early threat detection.
- Better equipment, training, and counter-terrorism capabilities are essential for proactive engagement.
- Leveraging global platforms like FATF and the UN to diplomatically isolate state sponsors of terrorism.
- Community engagement, education, and social media monitoring to prevent youth radicalization.
- Implementing stricter safety audits and emergency response mechanisms in tourist-heavy zones.

SOCIAL PROTECTION

GS III – Inclusive Growth

Context: According to the State of Social Protection Report 2025 released by the World Bank nearly two billion people in low- and middle-income countries (LIC and MIC) were without adequate social protection as of 2022.

Social Protection:

- It refers to a set of **public policies and programs** aimed at reducing poverty and vulnerability by ensuring income security and access to essential services.
- It includes **social assistance, social insurance, and labour market interventions** targeted especially at the poor, informal workers, elderly, and disabled.
- It acts as a tool for **inclusive development and human dignity**.
- It aligns with **SDG 1.3**, promoting equity and social justice.

Status of Social Protection:

- 1.6 billion people in LICs and MICs receive no social protection. Globally, 88% of people living in extreme poverty lack either adequate or any social protection. In LICs and sub-Saharan Africa, this figure is as high as 98% and 97% respectively. In LMICs, over 30% of individuals are without sufficient coverage.
- Between 2010 and 2022, social protection coverage in LICs and MICs rose from 41% to 51%. Despite this progress, many populations remain uncovered, leaving them vulnerable to economic shocks, climate change, and conflicts.
- At the current rate, it would take until 2043 to fully extend social protection coverage to people living in extreme poverty, and until 2045 to reach the poorest 20%
- High-income countries spend 5.3 times more of GDP and 85.8 times more per capita than LICs.
- Social protection systems remain unprepared for climate shocks, conflict, and pandemics.

State of Social Protection in India:

- India's social protection coverage doubled from 24.4% in 2021 to 48.8% in 2024, according to the International Labour Organization (ILO)'s World Social Protection Report (WSPR) 2024–26.
- An estimated 24.8 crore Indians have escaped multi-dimensional poverty over the past decade (2013 and

2023).

Challenges regarding India's Social Protection System:

- Despite being established for worker welfare, the welfare boards have been ineffective. India spends around 5% of GDP on social protection (excluding health), compared to the global average of around 13% (World Social Protection Report 2024-26, ILO).
- Digital tools like eShram have great potential, but face challenges such as low awareness and limited internet access.
- India has not ratified key ILO conventions like the Social Security (Minimum Standards) Convention, 1952 (No. 102), limiting the push toward universal norms.
- The absence of a unified database hampers targeted delivery, and current systems mainly respond to emerging categories like gig and platform economy workers, rather than proactively addressing evolving workforce challenges.
- India's aging population will strain pensions and healthcare, as the support ratio (working-age individuals per senior aged 65 or older) has declined from 14:1 in 1997 to 10:1 in 2023, and is projected to fall further to 4.6:1 by 2050 and 1.9:1 by 2100.

STATUS OF SNOW LEOPARDS IN INDIA

GS III – Conservation of Wildlife

Context: The Ministry of Environment, Forest, and Climate Change (MoEFCC) released the Report on the Status of Snow leopards in India.

Snow Leopard (*Panthera Uncia*):

- It is declared the State animal of Ladakh and Himachal Pradesh.
- It is considered a medium-sized cat and weighs around 30-55kg.
- Their exquisite, smoky-grey fur is patterned with dark grey to black rosettes which helps to camouflage them against rocky slopes.
- The 12 snow leopard range countries -Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan.

Key findings of the report:

- The 70% of land used by snow leopards is still unprotected.
- The majority of their habitat (which is between altitudes of 10,500 to 17,000 feet) remains inaccessible.
- Unlike tigers, zebras, or even leopards, snow leopards evade detection by artificial intelligence software.

Recommendations from the report to conserve Snow Leopard:

- It has proposed establishing a dedicated Snow Leopard Cell at WII under MoEFCC with a primary focus on long-term population monitoring.
- States and UTs can consider adopting a periodic population estimation approach (every 4th year) in the Snow leopard range to identify challenges, address threats, and formulate effective conservation strategies.
- Landscape-level management planning and coordination for effective implementation and management.
- Engage Indian security forces on the border of neighbouring countries (Pakistan, Nepal, Bhutan, and China) through proper training, and focus programs to raise awareness and foster long-term cooperation for the conservation of critical snow leopard habitats.

Note:

- Khelo India Winter Games 2024 has adopted a snow leopard as its mascot and named it 'Sheen-e She' or Shan in Ladakh region.

Snow Leopard Population Assessment in India (SPAI):

- It was launched by MoEFCC in 2019 as part of the Global Snow Leopard and Ecosystem Protection Program(GSLEP) called Population Assessment of the World's Snow Leopards (PAWS).
- It was endorsed in the 2013 Bishkek Declaration, GSLEP is an alliance of all 12 snow leopard range countries and non-governmental partners.
- SPAI covered over 70% of the potential snow leopard range in the country across the trans-Himalayan region, including Union Territories of Ladakh and J&K, and states like Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh.

WATER TRADING

GS III – Environmental Conservation

Context: NITI Aayog released a document on water trading mechanisms to promote the reuse of treated wastewater.

Water Trading:

- It is a water market mechanism that considers water as a commodity rather than a public good.
- It can be traded amongst users according to their needs.
- A water company, rather than creating its own water source, can buy the water from a third party and sell it to the users.
- Enabling elements for Water Trading:
 - Ownership of water - should be indisputable.
 - Water entitlements- could be transferred.
 - Water Reuse Certificates (WRCs) - as tradable permits.

Need for reuse of treated wastewater through water trading:

- Only about 40% of urban wastewater is treated in India, and even that is not being reused.
- Wide temporal and spatial variations in the distribution of water. For example, India receives more than 80 % of the rainfall during four months of the year.
- The National Water Policy of 2002 & 2012 has proposed a private hand in water management and has emphasised public-private partnership.
- Wastewater, including agricultural runoff, is the leading cause of water pollution. It is intricately linked to human and ecosystem health, with over 80% of global wastewater estimated to enter water bodies untreated. (UN World Water Report 2023)
- Around 80% of people living under water stress lived in Asia, in particular, northeast China, as well as India. (UN World Water Report 2023)
- Around 89% of groundwater extracted is used for irrigation, and crops such as paddy and sugarcane consume more than 60% of irrigation water. India is also a large virtual net export of water because of agricultural products export.

Challenges/Issues for reuse of treated wastewater through water trading:

- Treating the wastewater and supplying it to the farm fields or the industrial units will involve certain costs that may not be competitive with the cost of fresh water. As fresh water is available at a substantially low or sometimes even at no cost.
- Since the process of wastewater generation is continuous, the treatment process also should be continuous. However, the demand may not remain constant throughout the year. For example, the crops may not require irrigation for a certain period; demands in industrial units may also vary. This would require either storage of treated wastewater or discharging the treated water to other freshwater sources.
- To make water/treated wastewater a tradable commodity, it is necessary to have a demand.
- Maintenance of the plant, disruption in the sewage network, quality problems in inlet sewage or treated

sewage, disruption in the distribution network, etc. could interrupt supply.

- In India, water is neither considered a commodity nor possesses any significant economic value. This is mainly because of the due consideration of the essentiality of water as a fundamental human right.

Way Forward:

- Formation of Independent Regulatory Authority (IRAs) with statutory powers to determine water allocation and pricing of treated wastewater.
- Creation of a trading platform and induction of all stakeholders into it. Fixing the reuse target and finalising the norms of treated wastewater quality along with credits and value of Water Reuse Certificates (WRCs).
- Identification of Industrial Clusters, Municipal/Residential units, Agriculture lands, and Environmental needs where the treated wastewater could be reused.
- Preparation of site-specific plans for reuse where GIS tools could be used for initial planning, and social mobilisation through NGOs would be required to overcome the stigma of the use of treated wastewater.
- Establishment of regular monitoring mechanisms and social impact assessment under the supervision of IRAs.
- The water neutrality concept advocates that the total water demand should be the same after a new development is built as it was before. Promoting water reuse can aid in achieving water neutrality.



Practice Questions



Q1. Consider the following statements regarding the Sahyog Portal:

1. It is an initiative launched by the Ministry of Electronics and Information Technology (MeitY) to streamline grievance redressal related to online content.
2. The portal enables authorized agencies to issue takedown notices to IT intermediaries under Section 79(3)(b) of the IT Act, 2000.
3. Major IT platforms like Google, Microsoft, and Telegram have onboarded the portal.

Which of the statements given above is/are correct?

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

Solution (b)

Q2. With reference to the Sarhul Festival, consider the following statements:

1. It is primarily celebrated by the Munda, Ho, and Oraon tribal communities.
2. The festival marks the beginning of the winter season and is dedicated to the worship of the Sun God.
3. The consumption of 'Handia,' a traditional rice beer, is an important part of the celebrations.

Which of the statements given above is/are correct?

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

Solution (a)

Q3. Why are shallow-focus earthquakes generally more destructive than deep-focus earthquakes?

- (a) They occur in densely populated regions.
- (b) The seismic energy has less distance to travel before reaching the surface.
- (c) They occur only in oceanic regions.
- (d) Their magnitude is always higher than deep-focus earthquakes.

Solution (b)

Q4. Which of the following statements regarding asbestos are correct?

4. Asbestos is a naturally occurring silicate mineral composed of fibrous crystals.
5. Chrysotile is a type of asbestos.
6. Asbestos exposure is linked to diseases like asbestosis, lung cancer, and mesothelioma.
7. India has completely banned the use of all forms of asbestos.

Select the correct answer using the code below:

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

Solution (c)

Q5. Which of the following countries are members of the Arctic Council?

8. Canada
9. Finland
10. Brazil
11. India

Select the correct answer using the code below:

- (a) 1 and 2 only
- (b) 1, 2, and 3 only

(c) 1, 2, and 4 only

(d) 1, 2, 3, and 4

Solution (a)

Q6.The Green Credit Programme (GCP) aims to:

1. Encourage voluntary environmental activities through market-based incentives.
2. Allow individuals and industries to earn and trade green credits.
3. Replace India's carbon credit market with green credits.
4. Promote only afforestation as a method of earning green credits.

Select the correct answer using the codes below:

(a) 1 and 2 only

(b) 1, 2, and 3 only

(c) 2 and 4 only

(d) 1, 2, 3, and 4

Solution (a)

Q7.Naini Lake, a famous freshwater lake in India, is located in which state?

(a) Himachal Pradesh

(b) Uttarakhand

(c) Sikkim

(d) Arunachal Pradesh

Solution (b)

Q8."Vibe Coding," a term coined by Andrej Karpathy, refers to:

- (a) A new programming language based on AI models.
- (b) The use of AI tools to generate and refine code using natural language prompts.
- (c) A blockchain-based coding technique for secure software development.
- (d) A method of writing code through brain-computer interfaces.

Solution (b)

Q9.Which language was used in Krishna Deva Raya's literary work 'Amuktamalyada'?

(a) Kannada

(b) Telugu

(c) Tamil

(d) Sanskrit

Solution (b)

Q10.The primary challenge in developing hypersonic missiles is:

- a) Achieving speeds faster than Mach 2
- b) Maintaining structural integrity at high temperatures
- c) Detecting them using radar
- d) Deploying them from submarines

Solution (b)

Q11.The third stage of India's nuclear program focuses on which fuel?

a) Uranium-238

b) Plutonium-239

c) Thorium-232

d) Deuterium

Solution (c)

Q12.Which of the following countries is NOT a member of BIMSTEC?

a) Nepal

b) Maldives

c) Myanmar

d) Bhutan

Solution (b)

Q13.Which religious site is located on Katchatheevu Island?

a) Velankanni Church

b) St. Antony's Church

c) Meenakshi Temple

d) Rameswaram Temple

Solution (b)

Q14.Consider the following statements regarding Fluoride Contamination:

1. Fluoride contamination in water can occur through both natural geological processes and excessive use of phosphate fertilizers.

2. Prolonged exposure to high levels of fluoride can cause both dental and skeletal fluorosis.
3. The Nalgonda Technique, commonly used for fluoride removal, is a high-cost water purification method that involves the use of activated carbon and ultraviolet filtration.

Which of the statements given above is/are correct?

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

Solution (a)

Q15. The Anti-Defection Law was introduced in the Constitution by which of the following amendments?

- a) 42nd Amendment Act, 1976
- b) 44th Amendment Act, 1978
- c) 52nd Amendment Act, 1985
- d) 91st Amendment Act, 2003

Solution (c)

Q16. With reference to Heard Island and McDonald Islands (HIMI), consider the following statements:

1. They are located in the Arctic Ocean and are under the jurisdiction of Australia.
2. The islands are known for active volcanism and are part of a UNESCO World Heritage Site.
3. They are inhabited by indigenous communities who depend on fishing and tourism.

Which of the statements given above is/are correct?

- a) 1 and 2 only
- b) 2 and 3 only
- c) 1 and 3 only
- d) 2 only

Solution (d)

Q17. With reference to the bilateral military exercise INDRA, consider the following statements:

1. It is a joint exercise conducted annually between India and Russia involving only naval forces.
2. The exercise aims to enhance interoperability and strategic cooperation between the two nations.
3. The first edition of INDRA was held in 2015.

Which of the statements given above is/are correct?

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

Solution (b)

Q18. With reference to the Prime Minister's National Relief Fund (PMNRF), consider the following statements:

4. It is a statutory fund created by an Act of Parliament.
5. It is used to provide financial assistance for medical treatment of major diseases.
6. The Comptroller and Auditor General (CAG) of India audits the fund annually.

Which of the statements given above is/are correct?

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

Solution (b)

Q19. With reference to the Bandipur Tiger Reserve, consider the following statements:

7. It is part of the Nilgiri Biosphere Reserve.
8. It was declared a tiger reserve in 2006 under Project Tiger.

9. It lies at the confluence of the Western Ghats and Eastern Ghats.

Which of the statements given above is/are correct?

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

Solution (b)

Q20.With reference to the Readiness for Frontier Technologies Index published by UNCTAD, consider the following statements:

1. The index evaluates countries based on indicators like ICT deployment, skills, R&D, industrial capacity, and access to finance.
2. India ranks among the top 5 globally in all indicators assessed by the index.
3. India improved its overall rank from 48th in 2022 to 36th in 2024.
4. Artificial Intelligence (AI) is projected to impact more than 70% of global jobs by 2033.

Which of the above statements are correct?

- A) 1 and 3 only
- B) 1, 3 and 4 only
- C) 2 and 3 only
- D) 1, 2 and 4 only

Solution (A)

Q21.With reference to the iconic bridges of India, consider the following pairs:

BridgeLocation

1. Pamban Rail BridgeTamil Nadu
2. Bhupen Hazarika Setu (Dhola-Sadiya)Jammu & Kashmir
3. Bogibeel BridgeAssam
4. Bandra-Worli Sea LinkGujarat

Which of the pairs are correctly matched?

- A. 1 and 3 only
- B. 1, 3 and 4 only
- C. 1 and 2 only
- D. 2 and 4 only

Solution (A)

Q22.Consider the following statements about the Vibrant Villages Programme:

1. It is implemented by the Ministry of Defence.
2. It aims to promote the development of border villages.
3. The programme covers only villages along the western border.

Which of the above statements are correct?

- A. 2 only
- B. 1 and 2 only
- C. 1, 2 and 3
- D. 3 only

Solution (A)

Q23.Under which of the following circumstances is a State Bill required to be reserved for the consideration of the President of India?

4. When the bill seeks to impose a tax on water or electricity consumed by the Union government.
5. When the bill contradicts an existing Central law on a subject under the Concurrent List.
6. When the bill aims to curtail the powers of the High Court.
7. When the bill is introduced during a session of the State Legislature following Governor's address.

Select the correct answer using the code given below:

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

Solution (c)

Q24.With reference to the Repo Rate and Reverse Repo Rate in India, consider the following statements:

1. The Repo Rate is the rate at which the RBI borrows money from commercial banks.

2. A reduction in the Repo Rate typically encourages increased borrowing by businesses and individuals.
3. The Reverse Repo Rate is always higher than the Repo Rate to absorb excess liquidity from the banking system.
4. A shift in monetary policy stance from "neutral" to "accommodative" indicates a possible tightening of interest rates in the future.

Which of the statements given above is/are correct?

- A. 1 and 3 only
- B. 2 only
- C. 2 and 4 only
- D. 1, 3 and 4 only

Solution (B)

Q25.With reference to the Panchayat Advancement Index (PAI), consider the following statements:

1. It is a composite index introduced by the Ministry of Panchayati Raj to assess the performance of Gram Panchayats across India.
2. The PAI is based on nine themes aligned with the Sustainable Development Goals (SDGs).
3. All Gram Panchayats scored above 60 in the first baseline report for FY 2022–23.
4. "Achiever" is the highest category under PAI classification, awarded to panchayats scoring 90 and above.

Which of the statements given above is/are correct?

- A) 1 and 2 only
- B) 1, 2 and 4 only
- C) 1, 3 and 4 only
- D) 2 and 3 only

Solution (B)

Q26.With reference to the Thar Desert, consider the following statements:

5. The Luni River is the only major river flowing through the Thar Desert and it ultimately drains into the Arabian Sea.
6. The Desert National Park located in the Thar region is a critical habitat for the Great Indian Bustard.
7. The Indira Gandhi Canal has contributed significantly to the greening of parts of the desert, especially in Rajasthan.
8. The Aravalli Range forms the western boundary of the Thar Desert.

Which of the statements given above is/are correct?

- A. 1 and 4 only
- B. 2 and 3 only
- C. 1, 2 and 3 only
- D. 1, 2, 3 and 4

Solution (B)

Q27.With reference to the Chittorgarh Fort, consider the following statements:

9. The fort served as the capital of the Mewar kingdom under the Sisodia Rajputs.
10. The Kirti Stambh in the fort was built by Rana Kumbha to commemorate his victory over the Malwa Sultan.
11. Chittorgarh Fort is one of the UNESCO World Heritage Sites listed under "Hill Forts of Rajasthan."
12. The fort witnessed three major sieges, the last one being by Emperor Akbar.

Which of the statements given above is/are correct?

- A. 1, 3 and 4 only
- B. 1 and 2 only
- C. 2 and 4 only
- D. 1, 2, 3 and 4

Solution (A)

Q28.With reference to the Koch Rajbongshi community, consider the following statements:

1. The community traces its lineage to the Koch Dynasty that ruled the Kamata Kingdom.
2. Koch Rajbongshis are currently classified as a Scheduled Tribe (ST) in Assam.
3. The Assam government created a Kamatapur Autonomous Council for the Koch Rajbongshis.
4. Foreigner Tribunals in Assam were set up under the Assam Accord of 1985.

Which of the statements given above is/are correct?

- A. 1 and 3 only
- B. 1, 2 and 4 only
- C. 1, 3 and 4 only
- D. 2 and 4 only

Solution (A)

Q29.With reference to the India-Middle East-Europe Economic Corridor (IMEEC), consider the following statements:

1. The corridor is an extension of the Belt and Road Initiative (BRI).
2. It includes both shipping and railway components across Asia, the Middle East, and Europe.
3. India and the UAE have signed an agreement on logistics cooperation under IMEEC.
4. The IMEEC was announced during the 2021 G7 Summit in the UK.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 2, 3 and 4 only
- D. 1, 3 and 4 only

Solution (B)

Q30.With reference to Kathak, consider the following statements:

5. Kathak originated during the Bhakti movement and was traditionally performed in South Indian temples.

6. Mughal patronage introduced elements like intricate footwork and pirouettes into Kathak.
7. Kumudini Lakhia is credited with transforming Kathak into a group performance.
8. The Jaipur Gharana is known for its emphasis on narrative expression and subtle abhinaya.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1, 2 and 3 only
- D. 2, 3 and 4 only

Solution (B)

Q31.With reference to the Jallianwala Bagh massacre of 1919, consider the following statements:

9. The massacre occurred in response to violent protests led by Mahatma Gandhi.
10. The Hunter Commission recommended severe legal action against General Dyer.
11. Rabindranath Tagore renounced his knighthood as a protest against the massacre.
12. Udham Singh assassinated General Dyer in Caxton Hall, London.

Which of the statements given above is/are correct?

- A. 1 and 4 only
- B. 3 only
- C. 2 and 3 only
- D. 3 and 4 only

Solution (B)

Q32.With reference to Fixed-Dose Combination (FDC) drugs in India, consider the following statements:

1. FDCs are pharmaceutical products that combine two or more active drugs in a single dosage form.
2. All FDCs in India can be approved at the state level without needing central clearance.

3. FDCs can help in reducing drug resistance, especially in diseases like TB and HIV.
4. The Central Drugs Standard Control Organisation (CDSCO) is the nodal authority for regulating FDCs.

Which of the statements given above are correct?

- A. 1, 3, and 4 only
- B. 1 and 2 only
- C. 2, 3, and 4 only
- D. 1, 2, 3, and 4

Solution (A)

Q33.With reference to the Chief Justice of India (CJI), consider the following statements:

1. The CJI is appointed by the President under Article 124(2) of the Constitution.
2. The tenure of the CJI is fixed at five years.
3. The CJI can act as the President of India if both the President and Vice-President's offices are vacant.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2, and 3

Solution (C)

Q34.Which of the following best describes Vehicle-to-Grid (V2G) Technology?

- A. Technology that enables wireless charging of electric vehicles.
- B. A system that allows electric vehicles to transmit power back to the grid.
- C. A hydrogen fuel-based vehicle charging system.
- D. A solar panel system integrated into vehicle roofs.

Solution (B)

Q35.With reference to "Active Mobility", consider the following statements:

4. It includes only non-motorized modes of transport powered by electricity.
5. It contributes to reduced greenhouse gas emissions in urban areas.
6. It is promoted under the Smart Cities Mission.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Solution (B)

Q36.With reference to UNESCO's Memory of the World (MoW) Register, consider the following statements:

1. The MoW Programme was launched in 1992 to preserve and promote globally significant documentary heritage.
2. Only literary manuscripts and ancient religious texts are eligible for inclusion in the Register.
3. The Bhagavad Gita and Bharata's Natyashastra manuscripts preserved in Pune were added to the Register.
4. The MoW Register is updated every year with no limit on the number of submissions from a country.

Which of the statements given above is/are correct?

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

Solution (a)

Q37.With reference to the Kailash Mansarovar Yatra, consider the following statements:

1. Lake Mansarovar is a high-altitude freshwater lake located in the Tibet Autonomous Region of China.

2. The Nathu La Pass route is the shortest and involves minimal trekking compared to the Lipulekh Pass route.
3. Mount Kailash is considered sacred only in Hinduism and Buddhism.
4. The route through Nepal is operated exclusively by the Ministry of External Affairs, Government of India.

Which of the statements given above is/are correct?

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

Solution (b)

Q38. With reference to Article 142 of the Indian Constitution, consider the following statements:

5. It empowers the Supreme Court to pass any order necessary for doing complete justice in any matter pending before it.
6. The powers under Article 142 can be exercised only in criminal cases.
7. The orders passed under Article 142 are enforceable throughout the territory of India.

Which of the statements given above is/are correct?

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

Solution (b)

Q39. With reference to the Champaran Satyagraha (1917), consider the following statements:

8. It was the first civil disobedience movement launched by Mahatma Gandhi in India.
9. It was launched primarily against the excessive land revenue demands made by the British government.

10. The teenkathia system required peasants to grow indigo on a portion of their land compulsorily.

Which of the above statements is/are correct?

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

Solution (b)

Q40. With reference to the Aral Sea crisis, consider the following statements:

11. It is a freshwater lake located in Central Asia.
12. The shrinkage of the Aral Sea is primarily due to river diversion for irrigation.
13. It borders Kazakhstan and Turkmenistan.

Which of the statements given above is/are correct?

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

Solution (b)

Q41. With reference to arsenic contamination in groundwater in India, consider the following statements:

1. Arsenic is non-essential and toxic for human health.
2. Arsenic contamination is caused by natural leaching from aquifers, especially in alluvial plains.
3. Arsenic in drinking water can be easily identified by its taste and smell.
4. The Bureau of Indian Standards (BIS) has set permissible limit for arsenic in drinking water.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 1, 2, and 4 only

C. 1, 3, and 4 only

D. 1, 2, 3, and 4

Solution (B)

Q42. With reference to the Liquidity Coverage Ratio (LCR), consider the following statements:

1. It is a requirement under Basel III norms.
2. It ensures that a bank holds high-quality liquid assets sufficient to cover total liabilities for one year.
3. LCR is aimed at enhancing the short-term resilience of a bank to liquidity disruptions.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 1 and 3 only
- C. 2 and 3 only
- D. 1, 2 and 3

Solution (B)

Q43. Consider the following statements regarding nitrous oxide (N_2O):

4. It is a greenhouse gas with a global warming potential higher than that of carbon dioxide.
5. It contributes to the depletion of the stratospheric ozone layer.
6. The primary anthropogenic source of N_2O is the transport sector.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 1 and 3 only
- C. 2 and 3 only
- D. 1, 2 and 3

Solution (A)

Q44. Which of the following statements about Article 355 of the Indian Constitution is/are correct?

7. It empowers the Union to take over the governance of any state in case of political defections.

8. It places a duty upon the Union to protect states against external and internal threats.

9. It is often cited as the basis for imposing President's Rule in a state.

Select the correct answer using the codes below:

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Solution (B)

Q45. With reference to India's first satellite Aryabhata, consider the following statements:

10. It was launched from Indian soil using an indigenously developed launch vehicle.
11. It was intended for scientific research and experiments in space.
12. The satellite was named after ancient Indian mathematician Aryabhata.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Solution (B)

Q46. Which of the following best defines a Sunrise Sector?

- A. A sector that has existed for more than 50 years
- B. A sector that has declining returns on investment
- C. A newly emerging sector with high growth and innovation potential
- D. A sector with government monopoly only

Solution (C)

Q1. Which of the following best describes a cloudburst?

- A. Heavy rainfall over a large region for a long duration

- B. Sudden and intense rainfall over a small area in a short time
- C. Snowfall followed by rain in mountainous areas
- D. Cyclonic storm causing thunder and lightning

Solution (B)

Q47. With reference to recent advancements in weapon technology, consider the following statements:

1. A hydrogen bomb operates purely through chemical reactions involving hydrogen compounds.
2. China's newly tested hydrogen-based explosive does not involve nuclear fusion or radiation.

Which of the statements given above is/are correct?

- A. 1 only
- B. 2 only
- C. Both 1 and 2
- D. Neither 1 nor 2

Solution (B)

Q48. With reference to the Standing Deposit Facility (SDF) introduced by the Reserve Bank of India, consider the following statements:

1. SDF requires banks to deposit government securities with the RBI as collateral.
2. SDF has replaced the reverse repo rate as the floor of the Liquidity Adjustment Facility (LAF) corridor.
3. There is no upper limit on the amount that can be parked under SDF.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Solution (B)

Q49. With reference to the Davis Strait Proto-Microcontinent, consider the following statements:

4. It is a submerged landmass located between Greenland and Canada.
5. It was formed due to the complete rifting of the North American and Greenland plates.
6. Its discovery provides insights into the processes of microcontinent formation.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2, and 3

Solution (C)

Q50. With reference to ancient Indian maritime trade, consider the following statements:

1. Muziris was a prominent port on the west coast of India that traded extensively with the Roman Empire.
2. The decline of Muziris is linked to a major flood that changed the course of the Periyar River in the 14th century CE.
3. Arikamedu, an inland port in Gujarat, was active in Indo-Greek trade.

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Solution (A)