La Excellence
— IAS Academy —

AUGUST, 2026

Prelims Fact Sheet

Your Monthly Guidance for UPSC Prelims



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

50+ Key Facts I Segregated Section wise

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1. Polity and Governance

1.1. Legislative Privileges vs Freedom of Speech

Context:
A seven-judge Constitution Bench of the Supreme Court will examine whether legislative privileges can override citizens' fundamental right to freedom of speech and expression, arising from a 2003 Tamil Nadu Assembly privilege dispute involving *The Hindu*.

Explanation:

- **Article 19(1)(a)** guarantees citizens **freedom of speech and expression**, subject to reasonable restrictions under **Article 19(2)**.
- **Articles 105 and 194** provide powers, privileges and immunities to Parliament and State Legislatures, respectively.
- **Articles 105(3) and 194(3)** deal with privileges of the Houses, their members and committees; legislatures may act against breach of privilege or contempt of the House.
- Legislative privileges aim to ensure the independence and effective functioning of legislatures, rather than confer personal benefits on members.
- The case concerns whether critical speech/publication outside the House can constitute breach of legislative privilege.
- The Supreme Court will examine the interplay among **Article 194(3), Article 19 and Article 21**.
- A **Constitution Bench** ordinarily consists of at least **five judges** under **Article 145(3)**.

1.2. Caste Census to Use Open-Ended Self-Identification Format

Context:
The **Registrar General of India (RGI)** has decided that caste enumeration in the upcoming Census will use an open-ended question instead of a predefined drop-down list. Enumerators will record the caste stated by respondents verbatim, without classifying surnames or sub-castes into broader categories.

Explanation:

- **Census** is **a Union subject under Entry 69 of the Union List** in the Seventh Schedule.
- It is conducted under the **Census Act, 1948**; the Office of the Registrar General & Census Commissioner, India functions under the **Ministry of Home Affairs (MHA)**.
- **Article 246** empowers Parliament to legislate on subjects in the Union List.
- Independent India's regular Census has enumerated Scheduled Castes (SCs) and Scheduled Tribes (STs), but not a comprehensive caste-wise enumeration of all communities.
- The Socio-Economic and Caste Census (SECC), 2011 collected caste information separately from the regular Population Census.
- Open-ended enumeration relies on **self-identification**, recording the respondent's stated caste rather than selecting from predetermined categories.
- Caste data can assist evidence-based assessment of demography, social justice and affirmative-action policies, while requiring careful classification and data processing.

1.3. Data Protection Law and the Right to Information

Context:
The Supreme Court has sought the Centre's response on petitions challenging the **Digital Personal Data Protection (DPDP) Act, 2023** for allegedly weakening the Right to Information framework. The Court will examine whether the amended law creates excessive protection for personal information at the cost of transparency.

Explanation:



- The **Right to Information (RTI) Act, 2005** promotes governmental transparency and flows from **Article 19(1)(a)**.
- Earlier, **Section 8(1)(j)** protected private information but permitted disclosure where **larger public interest** justified it.
- **Section 44(3)** of the DPDP Act replaced this with a broader exemption for information relating to personal information.
- However, **Section 8(2)** still permits disclosure when public interest outweighs the harm caused.
- The dispute involves balancing the **right to information** against the **right to privacy under Article 21**, recognised in the **K.S. Puttaswamy judgment**.

1.4. Rah-Veer Scheme

Context:

Recently, government data showed that only **813 Good Samaritans** received rewards under the Rah-Veer Scheme in five years, despite rising road fatalities. Fear of police procedures and hospital formalities continues to discourage bystanders from assisting accident victims.

Explanation:



- A **Good Samaritan (Rah-Veer)** voluntarily provides emergency assistance to a road-accident victim without expecting compensation.
- The **golden hour** is the first hour after severe injury, when prompt treatment can prevent death.
- The **Rah-Veer Scheme** offers eligible helpers **₹25,000** and a certificate.
- **Section 134A of the Motor Vehicles Act, 1988** protects Good Samaritans from civil or criminal liability for unintended consequences of assistance.
- They cannot be compelled to reveal their identity or become witnesses and should not face unnecessary questioning or detention.

1.5. Nationwide Survey Reports No Manual Scavengers

Context:

Recently, the Government informed Parliament that the 2024–25 nationwide survey identified no manual scavengers. However, 182 sanitation workers died in hazardous sewer and septic-tank cleaning between January 2023 and June 2026, indicating that the two legally distinct problems must not be conflated.

Explanation:

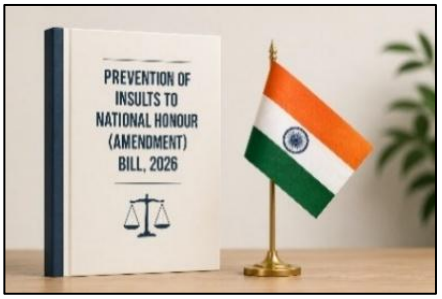


- **Article 17** abolishes untouchability; manual scavenging is also prohibited by the **2013 Act**.
- A manual scavenger manually handles human excreta in an insanitary latrine, open drain, pit or railway track before its complete decomposition.
- **Section 7** separately prohibits hazardous manual cleaning of sewers and septic tanks without prescribed protective equipment and safety precautions.
- **NAMASTE scheme** (National Action for Mechanised Sanitation Ecosystem), launched in 2023, is jointly implemented by the Ministries of Social Justice and Empowerment and Housing and Urban Affairs.
- It promotes mechanisation, training, health insurance, rehabilitation and sanitation-worker entrepreneurship.

1.6. Prevention of Insults to National Honour (Amendment) Bill, 2026

Context:

The Rajya Sabha has passed the Prevention of Insults to National Honour (Amendment) Bill, 2026, which amends the Prevention of Insults to National Honour Act, 1971 to extend penal provisions to acts showing disrespect towards Vande Mataram, including deliberate obstruction during its singing.



Explanation:

- The **Prevention of Insults to National Honour Act, 1971** protects the dignity of the National Flag, the Constitution and the National Anthem by prescribing penalties for intentional disrespect.
- The 2026 Amendment Bill proposes to extend similar legal protection to the National Song, Vande Mataram, including penal provisions against deliberate obstruction during its singing.
- Vande Mataram was composed by **Bankim Chandra Chatterjee** in **1875** and first appeared in the novel **Anandamath (1882)**.
- The first two stanzas were adopted as the **National Song** in **1937** by the Indian National Congress and retained this status after Independence.
- The National Anthem is Jana Gana Mana, while Vande Mataram is the National Song; both hold national significance, though they have distinct constitutional and legal recognition.

1.7. Regulation of Sophisticated Weapons in Law Enforcement and Crowd Control

Context:

Following reports of a Bihar police constable carrying an **AK-47** during a protest, questions have arisen regarding the legal use of sophisticated firearms in crowd-control situations.



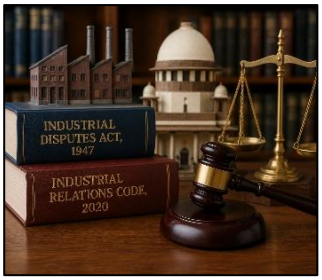
Explanation:

- **'Police' and 'Public Order'** are **State subjects** under the **Seventh Schedule** of the Constitution, while the Ministry of Home Affairs (MHA) issues model guidelines and Standard Operating Procedures (SOPs) for police forces.
- The **MHA SOPs (2014)** permit sophisticated firearms (e.g., **AK-47, INSAS, SLR**) mainly for VIP security, anti-Naxal operations, counter-terrorism and high-risk security duties, not for routine crowd control.
- Crowd management follows an escalation-of-force principle using negotiation, warnings, barricades, water cannons, tear smoke, batons and non-lethal weapons before considering firearms.
- The **Bharatiya Nagarik Suraksha Sanhita, 2023** (BNSS) and State police manuals require minimum necessary and proportionate force, with firearms used only to protect life or prevent imminent serious violence.
- Any misuse of firearms during policing may attract departmental action, criminal liability and judicial scrutiny under constitutional safeguards protecting the **right to life (Article 21)**.

1.8. Supreme Court Clarifies the Meaning of "Industry" under India's Labour Laws

Context:

Recently, a nine-judge Constitution Bench of the Supreme Court clarified the application of the term "industry" under India's old and new labour laws. The 1978 interpretation will govern older disputes, while the Industrial Relations Code, 2020 must be interpreted independently.



Explanation:

Why the Definition Matters?

- The meaning of **"industry"** determines which establishments and workers can access remedies concerning retrenchment, collective bargaining and unfair labour practices.
- Workers outside this definition may not receive specialised protections or approach labour courts under industrial-relations law.

The 1978 Triple Test:

- In ***Bangalore Water Supply and Sewerage Board v. A. Rajappa* (1978)**, the Supreme Court interpreted **Section 2(j) of the Industrial Disputes Act, 1947** broadly.
- Its **triple test** classified an activity as an industry when it involved systematic activity, employer–employee cooperation, and production or distribution of goods or services.
- **Profit motive** and capital investment were not essential. Therefore, hospitals, educational institutions, municipalities and charitable organisations could qualify as industries.
- Only essential **sovereign functions**, such as defence, law enforcement and administration of justice, remained outside its scope.

Position under the 2020 Code:

- The **Industrial Relations Code, 2020**, effective from November 2025, replaced the Industrial Disputes Act with a separate definition under Section 2(p).
- It expressly excludes certain charitable institutions, domestic services and specified sovereign activities from the meaning of industry.

Supreme Court's Ruling:

- The majority held that the 2020 Code is an **independent legislation** with distinct language, objectives and exclusions.
- Therefore, the 1978 test cannot automatically become the guiding basis for interpreting the new Code.
- Pending cases under the 1947 Act will continue under the old triple test, preserving **legal certainty.**
- Future disputes must be decided according to the language and modern industrial context of the 2020 Code.
- The older judgment remains valid, and cases already concluded will not be reopened.

Differences and Implications:

- The Chief Justice supported independent interpretation but suggested that the older test could be updated for modern working arrangements.
- Three judges opposed reconsidering the settled precedent because frequent changes could weaken judicial consistency.
- A narrower definition may give employers flexibility but exclude vulnerable workers from collective protections and labour-court remedies.
- Future interpretation must **balance ease of doing business with dignity and social justice** under Articles 23, 39 and 42.

Conclusion:

The ruling separates the new labour framework from the 1978 precedent while protecting older disputes. Future courts must promote industrial efficiency without weakening workers facing unequal bargaining power.

1.9. National Legal Services Authority and Free Legal Aid

Context:

NALSA recently directed that the contracts of certain Legal Aid Defence Counsels (LADCs) should not be renewed. The move has opened a debate on improving the quality of publicly funded criminal defence without weakening the legal-aid system.

Explanation:



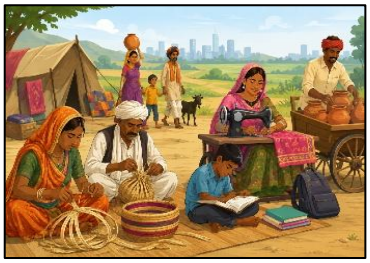
- **Article 39A**, a Directive Principle inserted by the **42nd Amendment, 1976**, directs the State to provide **free legal aid** and equal justice.
- **Article 14** (equality before law) and **Article 22(1)** (right to consult a lawyer on arrest) reinforce this goal.
- **NALSA** is a **statutory body** constituted under the **Legal Services Authorities Act, 1987**, which came into force in 1995; it is not a constitutional body.
- The Chief Justice of India is its Patron-in-Chief and a serving or retired Supreme Court judge is the Executive Chairman.
- It functions through State, District and Taluk Legal Services Authorities and the Supreme Court Legal Services Committee.
- It frames legal-aid schemes, provides free counsel and court fees, organises Lok Adalats, promotes legal literacy and supports victim compensation.
- Section 12 lists eligible categories: women, children, SC/ST, persons with disabilities, industrial workers, persons in custody, victims of trafficking and the poor.
- The **Legal Aid Defence Counsel (LADC) System** provides dedicated, publicly funded lawyers to eligible accused persons in criminal cases.

1.10. SEED Scheme for De-notified, Nomadic and Semi-Nomadic Communities

Context:

The Ministry of Social Justice and Empowerment recently highlighted its welfare measures for De-notified, Nomadic and Semi-Nomadic communities. These are implemented mainly through the Scheme for Economic Empowerment of DNTs (SEED) and a dedicated welfare board.

Explanation:



- **De-notified Tribes (DNTs)** are communities once notified as "criminal tribes" under the colonial **Criminal Tribes Act, 1871**, and de-notified after its repeal in 1952.
- Nomadic Tribes move regularly for livelihood, while Semi-Nomadic Tribes remain settled for part of the year.
- DNT, NT and SNT are **not separate constitutional categories**; individual communities may be listed as SC, ST, OBC or none of these.
- Colonial stigma, absence of identity documents, permanent address, land and housing restrict their access to education, healthcare and welfare schemes.
- The **Idate Commission**, constituted in 2015, submitted its report in 2017.
- The **Development and Welfare Board for De-notified, Nomadic and Semi-Nomadic Communities (DWBDNC)** was set up in 2019 to coordinate implementation.
- **SEED** has four components: coaching for competitive examinations, health cover through Ayushman Bharat–PM-JAY, livelihood and skill support, and housing assistance.

1.11. PM-AJAY: Smart Classrooms in SC-Dominated Villages

Context:

Under Pradhan Mantri Anusuchit Jaati Abhyuday Yojana (PM-AJAY), Kathua district of Jammu and Kashmir has established Smart Classrooms in government schools of SC-dominated villages, including remote and border areas, to promote digital and inclusive education.

Explanation:



- **PM-AJAY** is a **Centrally Sponsored Scheme** of the Ministry of Social Justice and Empowerment aimed at reducing poverty and improving socio-economic indicators among Scheduled Caste (SC) communities.
- It was formulated by merging three existing schemes: Pradhan Mantri Adarsh Gram Yojana (PMAGY), Special Central Assistance to SC Sub Plan (SCA to SCSP) and Babu Jagjivan Ram Chhatrawas Yojana (BJRCY).
- Its major components include development of **SC-dominated villages into Adarsh Grams**, Grants-in-Aid for socio-economic development projects, and construction/repair of hostels.
- Village development focuses on reducing infrastructure and service gaps in areas such as education, sanitation, drinking water, roads and livelihoods.
- Kathua's Smart Classrooms illustrate its role in promoting **digital inclusion and educational infrastructure** in disadvantaged areas.

1.12. Constitutional Safeguards Against Arbitrary Arrest

Context:

The Supreme Court has reinforced safeguards against arbitrary arrest, holding that an arrested person must be meaningfully informed of the grounds of arrest. The ruling strengthens the protection of personal liberty and dignity under Articles 21 and 22 of the Constitution.

Explanation:



- **Article 21** guarantees life and personal liberty except according to **procedure established by law**, which must be just, fair and reasonable.
- **Article 22(1)** gives an arrested person the right to know the **grounds of arrest** and to consult and be defended by a legal practitioner.
- **Article 22(2)** requires production before the nearest **magistrate within 24 hours**, excluding journey time.
- Article 22 also contains provisions concerning **preventive detention**, which differs from punitive detention following an offence.
- In **Arnesh Kumar v. State of Bihar (2014)**, the Supreme Court stressed that arrest should not be routine and its necessity must be justified.
- **Maneka Gandhi v. Union of India (1978)** linked Articles **14, 19 and 21**, popularly called the **Golden Triangle** of fundamental rights.
- These safeguards seek to balance **State police powers** with individual **liberty, dignity and procedural fairness**.

1.13. AMRUT: Urban Infrastructure and Digital Planning

Context:

The Ministry of Housing and Urban Affairs is promoting GIS-based Master Plans under AMRUT and AMRUT 2.0. However, a parliamentary panel has noted that sewerage connections cover only about 30% of households in participating urban areas.

About AMRUT:

- Launched in 2015 by the **Ministry of Housing and Urban Affairs** as a **Centrally Sponsored Scheme**, to improve basic urban services and make cities more liveable, inclusive and environmentally sustainable.
- Covers water supply, sewerage, septage management, storm-water drainage, non-motorised transport and green spaces.



- **Funding pattern**: central assistance of one-third of project cost for cities above 10 lakh population and one-half for smaller cities; 90% for North-Eastern and Himalayan states.
- States prepare annual action plans; Urban Local Bodies implement projects as per local needs.
- Also supports institutional reforms, capacity-building and scientific urban Master Plans.

AMRUT 2.0:

- Launched in 2021 to make cities water-secure, extending universal water supply coverage through household tap connections to all statutory towns.
- Built on the principle of a **circular economy** of water - wastewater treatment, reuse of treated water and rejuvenation of water bodies.
- Extends GIS-based planning to Class-II towns (population 50,000–99,999), using satellite imagery and drone surveys to map land use, roads, water networks, drains, sewer lines and public facilities.
- These databases can be integrated with the PM Gati Shakti National Master Plan for coordinated infrastructure development.

1.14. Centre Opposes Creamy Layer Principle for SC/ST Reservations

Context:

Recently, the Union government opposed petitions seeking income-based exclusion within Scheduled Caste (SC) and Scheduled Tribe (ST) reservations. It argued that economic advancement alone does not eliminate historical discrimination and that policy changes require empirical study.



Explanation:

- **Articles 15(4) and 16(4)** enable affirmative action; **Articles 341 and 342** govern the Presidential Lists of SCs and STs.
- The **creamy layer** principle excludes socially advanced sections of Other Backward Classes; it is not merely an income test.
- It was firmly established for OBC reservations in **Indra Sawhney (1992)**.
- SC/ST reservations address **untouchability, historical discrimination and tribal disadvantage**, which may persist despite economic progress.
- **State of Punjab v. Davinder Singh (2024)** permitted evidence-based **sub-classification** within SCs; this differs from excluding individuals through the creamy-layer principle.

1.15. Indian Statistical Institute Bill, 2026: Governance Reforms and Autonomy Concerns

Context:

Recently, the Indian Statistical Institute Bill, 2026 was introduced in the Lok Sabha to repeal the Indian Statistical Institute Act, 1959. It proposes a new statutory governance structure, while faculty members have raised concerns over institutional autonomy and inadequate consultation.



Explanation:

- **Indian Statistical Institute (ISI)** was founded by statistician **P.C. Mahalanobis** in Kolkata in 1931.
- The **ISI Act, 1959** declared it an **Institution of National Importance** empowered to grant degrees and diplomas.
- The Bill converts ISI from a registered society into a **not-for-profit body corporate**.

- The **President of India** will be the Visitor, with review, inquiry and binding-direction powers.
- An **11-member Board of Governors** will become the principal policymaking executive body.
- An **Academic Council**, Finance Committee and centre-level Management Councils are proposed.
- Critics fear increased government influence and reduced internal representation.

1.16. Supreme Court's New Gender-Sensitive Judicial Guidelines

Context:

Recently, the Supreme Court released *Judgments and Gender: Sensitivity and Compassion in Writing Judgments*, prepared by a committee chaired by former Justice Aniruddha Bose. Unlike its 2023 handbook's focus on stereotypical language, the new report emphasises trauma-informed courtroom conduct and compassionate judgment writing.



Explanation:

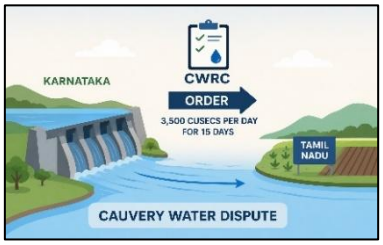
- The **2023 Handbook on Combating Gender Stereotypes** provided a glossary to replace patriarchal expressions in judgments.
- The new report, based on **125 trial-court judgments**, targets moralistic reasoning and insensitive courtroom practices.
- It promotes **survivor-centric, trauma-informed justice**, judicial empathy and emotional intelligence.
- Judges should prevent hostile cross-examination, irrelevant questions about sexual history and remarks that re-traumatise survivors.
- It recommends **in-camera trials**, privacy protection, counselling and dignified treatment of witnesses.
- These principles reinforce **Articles 14, 15 and 21** - equality, non-discrimination, dignity and privacy.

1.17. Cauvery Water Dispute: CWRC Orders Karnataka to Release Water to Tamil Nadu

Context:

The Cauvery Water Regulation Committee (CWRC) recently directed Karnataka to release 3,500 cusecs of water per day for 15 days to Tamil Nadu after assessing rainfall, reservoir storage, inflows, and hydrological conditions.

Explanation:



- Cauvery is an **inter-State River** originating at Talakaveri (Brahmagiri Hills, Karnataka) and flowing through Karnataka, Tamil Nadu, Kerala, and Puducherry before draining into the Bay of Bengal.
- The dispute arose due to competing irrigation and drinking water demands, with Tamil Nadu relying on historic agreements (1892 & 1924) and Karnataka seeking a larger share after Independence.
- Under **Article 262** and the **Inter-State River Water Disputes Act, 1956**, the **Cauvery Water Disputes Tribunal (CWDT)** was constituted in 1990 and delivered its final award in 2007.
- In 2018, the Supreme Court modified the Tribunal's award and directed the establishment of the **Cauvery Water Management Authority (CWMA)** and the **Cauvery Water Regulation Committee (CWRC)** for implementation.
- **CWRC** recommends water releases after assessing reservoir storage, inflows, rainfall, IMD forecasts, and basin hydrology, especially during distress years.
- The **CWRC** monitors daily water levels, inflows and storage in key reservoirs: Hemavathy, Harangi, Krishnarajasagara (KRS) and Kabini (Karnataka); Mettur and Bhavanisagar (Tamil Nadu); and Banasurasagar (Kerala), along with rainfall, IMD forecasts, and basin hydrology before recommending releases.

1.18. Delhi Government's Water ATM Initiative

Context:

The Delhi Government has approved a project to install 250 Water ATMs across the National Capital at an estimated cost of ₹58 crore. The initiative will begin with government schools and aims to improve access to safe drinking water.

Explanation:

- A Water ATM is an automated dispensing system that provides **safe, purified drinking water** through technologies such as Reverse Osmosis (RO), Ultraviolet (UV) disinfection, Ultrafiltration (UF), or ozonation, depending on source-water quality.
- Water ATMs are commonly installed at schools, hospitals, railway stations, bus terminals, and public places to ensure affordable and reliable access to potable water.
- They support public health by reducing water-borne diseases and improving **drinking water quality**.
- The initiative complements **Jal Jeevan Mission (Urban)** and **Sustainable Development Goal (SDG) 6** – Clean Water and Sanitation, which aim to ensure universal access to safe and affordable drinking water.
- Regular water quality testing, maintenance, and source sustainability are essential for their long-term effectiveness.

1.19. District Collectors Empowered to Process Citizenship Applications under the CAA

Context:

Recently, the Ministry of Home Affairs (MHA) authorised District Collectors in six States and the Union Territories of Jammu and Kashmir and Ladakh to process and decide specified citizenship applications. Pending applications under the Citizenship (Amendment) Act, 2019 will be transferred to the concerned Collectors.

Explanation:



- **Articles 5–11** deal with citizenship at the commencement of the Constitution; **Article 11** empowers Parliament to regulate it by law.
- Citizenship is **Entry 17 of the Union List**; the **Citizenship Act, 1955** provides for birth, descent, registration, naturalisation and incorporation of territory.
- The **CAA, 2019** covers **Hindus, Sikhs, Buddhists, Jains, Parsis and Christians** from **Afghanistan, Bangladesh and Pakistan** who entered India by **31 December 2014**, cutting the **naturalisation** residence period from **11 years to five**.
- Citizenship is **not automatic** – it needs an application, document and background verification and an **oath of allegiance**.
- It does not apply to **Sixth Schedule** areas of Assam, Meghalaya, Mizoram and Tripura or to **Inner Line Permit** areas.
- The **2024 Rules** set up **Empowered and District-Level Committees** under **Section 6B**; the 2026 change shifts this work to Collectors in **Gujarat, Rajasthan, Punjab, West Bengal, Assam, Tripura, Jammu and Kashmir and Ladakh**.
- Collectors receive applications electronically, verify documents, hold inquiries and administer the oath under **authority delegated by the Centre**, not an independent State power.

1.20. Zonal Councils: Forums for Cooperative Federalism and Inter-State Coordination

Context:

Recently, the 31st Southern Zonal Council meeting was held at Mamallapuram, Tamil Nadu, under the chairmanship of the union home minister. Southern States agreed that pending water disputes should be resolved quickly through dialogue, mutual trust and coordination among the concerned governments.

Explanation:

- **Zonal Councils** are **statutory advisory bodies** under **Part III of the States Reorganisation Act, 1956** – not constitutional bodies or courts.
- Proposed by **Jawaharlal Nehru** after linguistic reorganisation, **five councils** began in 1957: Northern, Central, Eastern, Western and Southern.
- The **Southern Zonal Council** covers Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, **Puducherry, Lakshadweep and the Andaman and Nicobar Islands**.
- The **Union Home Minister** chairs all five; a Chief Minister of the zone is **Vice-Chairperson by annual rotation**.
- Each State sends its Chief Minister and two ministers nominated by the Governor; **Standing Committees of Chief Secretaries** prepare the groundwork, with the secretariat under the Ministry of Home Affairs.
- They discuss inter-State borders, water, power, transport, linguistic minorities and internal security, but their **recommendations are not legally binding**.
- They differ from the **Inter-State Council** under **Article 263**; the north-east has a separate **North Eastern Council (1971)**.

1.21. India to Host 5th Coast Guard Global Summit (CGGS) in 2027

Context:

India will host the 5th Coast Guard Global Summit (CGGS) in New Delhi in February 2027, coinciding with the Golden Jubilee of the Indian Coast Guard. The summit will promote information sharing, capacity building and cooperation among maritime law-enforcement agencies.

Explanation:

- **Coast Guard Global Summit (CGGS)** is a platform for coast guards and maritime law-enforcement agencies to strengthen international cooperation and **exchange operational expertise and best practices**.
- The **Indian Coast Guard (ICG)** was raised on 1 February 1977 and formally inaugurated on 19 August 1978; it operates under the Ministry of Defence.
- It is governed by the **Coast Guard Act, 1978** and protects India's maritime interests, including its **Exclusive Economic Zone (EEZ)**.
- Key functions include maritime surveillance, search and rescue (SAR), anti-smuggling operations, marine-environment protection and assistance to fishermen.
- The summit reflects India's **MAHASAGAR – Mutual and Holistic Advancement for Security and Growth Across Regions** vision.
- MAHASAGAR builds upon India's earlier **SAGAR** vision and promotes cooperative maritime security and development.
- **Global maritime commons** include ocean spaces requiring international cooperation for safe and secure navigation.

1.22. India's Development Partnership with Palestine and the Two-State Solution

Context:

India has begun work on a super-speciality hospital in Jenin in the West Bank and is exploring deployment of an Indian field hospital in Gaza. India also reiterated its support for a negotiated Two-State Solution to the Israel-Palestine conflict.

Explanation:

- **Palestine** comprises the **West Bank and Gaza Strip**; the West Bank lies west of the **Jordan River**, while Gaza is a narrow coastal territory along the **Mediterranean Sea**.
- **Ramallah** serves as the administrative headquarters of the **Palestinian Authority (PA)**, established following the **Oslo Accords (1993)**.

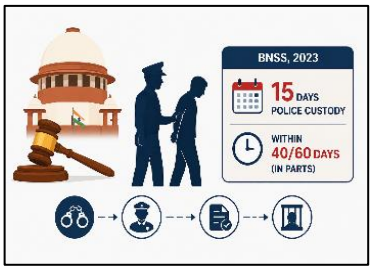
- India recognised the **State of Palestine in 1988** and established diplomatic relations with it in 1996.
- India supports a **negotiated Two-State Solution**, envisaging Israel and an independent, viable Palestinian state living side by side in peace and security.
- India's engagement includes development assistance, healthcare, capacity-building, medicines and humanitarian aid.
- India also maintains diplomatic relations with Israel, reflecting its policy of maintaining ties with both sides.
- Palestine has **non-member observer State** status at the **United Nations** since 2012.

1.23. Supreme Court Clarifies Scope of Police Custody under BNSS

Context:

The Supreme Court has held that Section 187(2) of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023 enlarges the period during which police custody can be sought. The maximum 15 days of police custody can now be taken in parts within the initial 40 or 60 days of the permissible detention period.

Explanation:



- BNSS, 2023 replaced the **Code of Criminal Procedure (CrPC), 1973** and came into force on July 1, 2024.
- **Section 58, BNSS** requires an arrested person to be produced before a magistrate within 24 hours, excluding journey time.
- Under Section 187, a magistrate may authorise detention when investigation cannot be completed within 24 hours.
- **Police custody** cannot exceed 15 days in aggregate, but may be authorised in parts during the initial 40 days of a 60-day detention period or 60 days of a 90-day detention period.
- **Judicial custody** may extend up to **60 or 90 days**, depending on the offence; failure to file the charge sheet within this period can trigger default bail.
- Section 38, BNSS provides an arrested person the right to meet an advocate during interrogation, though not throughout interrogation.
- **Article 22** of the Constitution provides key safeguards against arbitrary arrest and detention.

1.24. Removal Proceedings Against a High Court Judge

Context:

Parliamentary proceedings for the removal of Justice Yashwant Varma are likely to continue despite his resignation, as the removal motion was initiated before he demitted office. A three-member committee constituted by the Lok Sabha Speaker has reportedly found the charges against him proved.

Explanation:



- **High Court judges** can be removed by the **President** under **Article 217 read with Article 124(4)** for *proved misbehaviour or incapacity.*
- The process is regulated by the **Judges (Inquiry) Act, 1968.**
- A removal motion requires signatures of at least **100 Lok Sabha MPs or 50 Rajya Sabha MPs.**
- Once admitted, a three-member committee investigates the charges: a Supreme Court judge, a High Court Chief Justice and a distinguished jurist.
- If charges are proved, each House must pass the motion by a special majority: majority of total membership plus two-thirds of members present and voting.
- Both Houses must pass it in the same session, after which the President may order removal.
- **Article 121** restricts parliamentary discussion on judges' conduct except upon a removal motion.

1.25. Rise in ED Cases under the Prevention of Money Laundering Act (PMLA)

Context:
The Enforcement Directorate (ED) registered 1,080 cases under the Prevention of Money Laundering Act (PMLA), 2002 in FY2025-26, the highest in four years. However, the conviction rate remains low despite an increase in investigations and prosecutions.

Explanation:

- The **Prevention of Money Laundering Act (PMLA), 2002** aims to prevent money laundering, confiscate proceeds of crime, and combat financing of illegal activities.
- **Money laundering** is the process of disguising illegally obtained money as legitimate through placement, layering, and integration.
- The **Enforcement Directorate (ED)**, under the Department of Revenue, Ministry of Finance, is the primary agency for investigating offences under PMLA and attaching illegally acquired assets.
- PMLA investigations are initiated based on a scheduled (predicate) offence listed in the Act.
- The Act empowers the ED to search, seize, arrest, attach property, and file complaints before Special PMLA Courts.
- India is a member of the **Financial Action Task Force (FATF)**, whose anti-money laundering standards guide the country's legal and institutional framework.

1.26. Supreme Court Directs Centre to Frame SOPs to Curb 'Digital Arrest' Scams

Context:
The Supreme Court has directed the Centre, RBI, State Governments, and telecom authorities to frame Standard Operating Procedures (SOPs) to prevent "digital arrest" scams. It also ordered speedy grievance redressal, zero FIR registration, and timely restoration of victims' financial losses.

Explanation:



- **Digital Arrest Scam** is a cyber fraud where criminals impersonate police, CBI, ED, RBI or other government officials through calls/video calls and falsely claim that the victim is under investigation or "digitally arrested."
- Fraudsters use fear, fake documents, spoofed numbers and video conferencing to extort money by forcing victims to transfer funds.
- The **National Cyber Crime Reporting Portal (NCRP)** (1930 Helpline) enables citizens to report cybercrimes and facilitates rapid financial fraud response.
- The **Indian Cyber Crime Coordination Centre (I4C)**, under the Ministry of Home Affairs, coordinates cybercrime prevention, investigation, capacity building and public awareness.
- **Zero FIR** allows registration of an FIR at any police station irrespective of jurisdiction, ensuring immediate legal action.
- The Supreme Court directed preparation of **Standard Operating Procedures (SOPs)**, coordinated action among agencies, victim compensation mechanisms and faster criminal investigation.

1.27. Debate on Transparency in the Supreme Court Collegium System

Context:
Supreme Court Judge Justice Ujjal Bhuyan has raised concerns over the Collegium's lack of transparency in judicial appointments, warning that unexplained recommendations may undermine public confidence and allow unsuitable candidates to be elevated to constitutional courts.

Explanation:

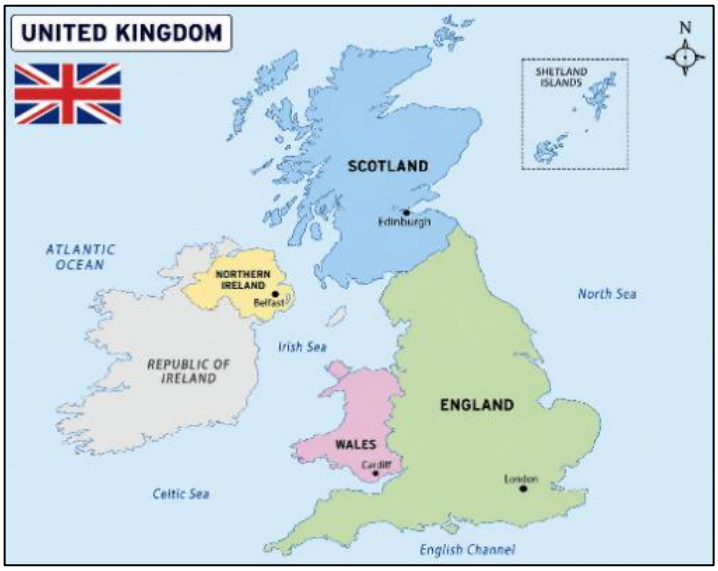


- The **Collegium System** is the mechanism through which judges of the Supreme Court and High Courts are appointed and transferred by the judiciary.
- It evolved through the **Three Judges Cases** (1981, 1993, 1998) and is **not mentioned in the Constitution**.
- The Collegium comprises the Chief Justice of India (CJI) and the four senior-most Supreme Court judges for appointments to the Supreme Court.
- Judicial appointments are made under **Articles 124 and 217** of the Constitution, while transfers are governed by **Article 222**.
- The system aims to safeguard judicial independence, but concerns persist regarding opacity, lack of codified criteria, and limited public accountability.

1.28. United Kingdom Debates Adopting a Written Constitution

Context:

The newly elected U.K. Prime Minister Andy Burnham has expressed support for adopting a written Constitution, arguing that Britain needs a clear constitutional framework alongside greater devolution of powers to regional authorities.



Explanation:

- The United Kingdom has an **uncodified (unwritten) Constitution**, unlike countries such as India and the United States, which have a single authoritative constitutional document.
- The U.K.'s constitutional framework is derived from Acts of Parliament (statutes), Common Law, Constitutional Conventions, Judicial Decisions, and Constitutional Treaties.
- Under the principle of **Parliamentary Sovereignty**, the U.K. Parliament is the supreme law-making authority and can amend constitutional rules through ordinary legislation.
- A written (codified) Constitution consolidates fundamental principles, distribution of powers, citizens' rights, and institutional structures into a single legal document with higher constitutional status.
- The debate also relates to **Devolution**, under which powers have been transferred from Westminster to Scotland, Wales, and Northern Ireland, while England has limited regional devolution.

1.29. Obscenity, Profanity and Free Speech under the Bharatiya Nyaya Sanhita

Context:

A Zero FIR was registered over alleged remarks against the Prime Minister, invoking provisions of the Bharatiya Nyaya Sanhita (BNS), 2023 relating to insult, public mischief and defamation. The incident has revived debate on the legal distinction between obscenity, profanity, vulgarity and protected free speech.

Explanation:

- **Obscenity** in India is punishable under **Section 296 of the Bharatiya Nyaya Sanhita (BNS), 2023**, covering obscene acts and songs in public places.

- Courts distinguish obscenity from profanity or vulgarity; offensive or abusive language alone is not automatically obscene.
- The Supreme Court now applies the **Community Standards Test** (replacing the **Hicklin Test**) to determine obscenity.
- **Article 19(1)(a)** guarantees freedom of speech, subject to reasonable restrictions under **Article 19(2)**, including decency and morality.
- Relevant BNS provisions may also include Section 352 (intentional insult), Section 353 (public mischief) and defamation provisions, each requiring specific legal ingredients.
- **Zero FIR** allows registration of an FIR at any police station irrespective of territorial jurisdiction.

1.30. Supreme Court Examines Composition of Chief Election Commissioner Selection Committee

Context:

The Supreme Court is hearing petitions challenging the Chief Election Commissioner and Other Election Commissioners (Appointment, Conditions of Service and Term of Office) Act, 2023, under which the Chief Justice of India (CJI) was replaced by a Union Cabinet Minister in the selection committee.

Explanation:

- **Article 324** vests the superintendence, direction and control of elections in the Election Commission of India (ECI).
- Earlier, the Constitution did not prescribe a procedure for appointing the **Chief Election Commissioner (CEC)** and **Election Commissioners (ECs)**.
- In Anoop Baranwal v. Union of India (2023), the Supreme Court directed appointments through a committee comprising the **Prime Minister, Leader of Opposition, and Chief Justice of India**, until Parliament enacted a law.
- Parliament enacted the 2023 Act, replacing the **CJI** with a **Cabinet Minister** nominated by the Prime Minister in the selection committee.
- The challenge concerns the independence, impartiality, and institutional autonomy of the Election Commission vis-à-vis the Executive.

2. International Relations

2.1. Makkah Joint Defence Agreement: An Emerging West Asian Security Triangle

Context:

The **Makkah Joint Defence Agreement (MJDA)** was recently signed by Saudi Arabia, Türkiye and Pakistan, creating a trilateral collective-defence framework. Emerging amid regional conflicts and uncertainty over United States security guarantees, it may reshape West Asia's strategic balance.



Explanation:

Nature and Purpose:

- **Collective defence** means that an armed attack against one member is treated as an attack against all members.
- **Collective deterrence** seeks to prevent aggression by signalling that an attack would invite a coordinated response from three countries.
- The agreement may promote intelligence-sharing, joint exercises, military training, interoperability and defence-industrial cooperation.
- However, it is not equivalent to the **North Atlantic Treaty Organization (NATO)** because its command structure and precise military obligations remain unclear.

Strategic Composition:

- Pakistan is a nuclear-weapon-possessing state but is not a party to the **Nuclear Non-Proliferation Treaty.**
- Türkiye is a NATO member, where collective defence is separately governed by **Article 5 of the North Atlantic Treaty.**
- Saudi Arabia is a founding member of the **Gulf Cooperation Council (GCC),** but Pakistan and Türkiye are not GCC members.
- All three countries are members of the **Organisation of Islamic Cooperation (OIC).**

Strategic Motivations:

- Saudi Arabia seeks additional security options as American commitments in West Asia appear less predictable.
- Türkiye may gain political influence, defence markets and opportunities to export weapons and military technology.
- Pakistan could obtain economic support and strategic relevance, although overseas commitments may strain its limited resources.

Limitations and Regional Effects:

- Different approaches towards Iran, Israel, the Muslim Brotherhood and regional conflicts could weaken internal cohesion.
- Türkiye's NATO obligations and Saudi Arabia's dependence on Western weapons may restrict the grouping's strategic autonomy.
- The agreement could encourage counter-alliances, arms competition and greater regional polarisation.

Implications for India:

- India must monitor whether the partnership strengthens Pakistan's military capabilities or changes the regional balance.
- Regional instability could threaten India's energy imports, trade routes, diaspora and maritime interests.
- India should maintain relations with all three members while deepening partnerships with Iran, Israel and other Gulf countries.

Conclusion:

The MJDA reflects growing efforts by regional powers to diversify their security partnerships. India should avoid alarmism and pursue balanced diplomacy, energy security and strategic preparedness.

2.2. Indian Air Force Participates in Exercise Pitch Black and Udara Shakti 2026

Context:

Recently, the Indian Air Force (IAF) concluded participation in Exercise Pitch Black 2026 in Australia and Exercise Udara Shakti 2026 in Malaysia. The exercises strengthened air-combat coordination, interoperability and defence cooperation in the Indo-Pacific region.



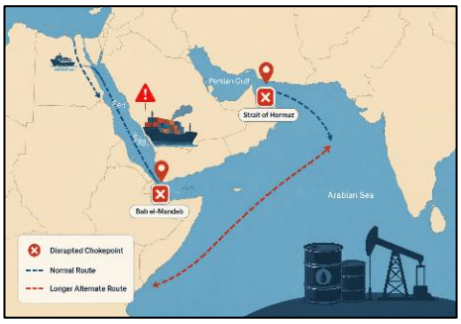
Explanation:

- **Exercise Pitch Black** is a multinational air-combat exercise hosted by the Royal Australian Air Force (RAAF) in Australia.
- In its 2026 edition, the IAF deployed Rafale fighter aircraft and operated with air forces from over 20 countries.
- It involved **Large Force Employment (LFE)** missions, where many aircraft jointly conduct complex operations in a simulated high-threat environment.
- **Exercise Udara Shakti** is a **bilateral air exercise between India and Malaysia**, involving the IAF and Royal Malaysian Air Force (RMAF).
- In 2026, IAF aircraft trained alongside **Su-30MKM** and **F/A-18 Hornet** aircraft of Malaysia.
- The exercises covered air-combat tactics, joint mission planning, maintenance practices and Subject Matter Expert Exchanges (SMEE).
- Such exercises improve **interoperability**, meaning the ability of different countries' armed forces to operate effectively together.

2.3. Red Sea Shipping Disruptions and Strategic Maritime Chokepoints

Context:

Shipping traffic through the Bab el-Mandeb Strait has declined sharply following Houthi attacks on Saudi oil installations along the Red Sea coast. The disruption has heightened concerns over global energy supplies and maritime trade, while traffic through the Strait of Hormuz also remains below normal.



Explanation:

- The **Bab el-Mandeb Strait** is a strategic **maritime chokepoint** connecting the Red Sea with the Gulf of Aden and the Arabian Sea, making it vital for trade between Europe and Asia via the Suez Canal.
- The **Strait of Hormuz** links the Persian Gulf with the Gulf of Oman and the Arabian Sea and carries a significant share of the world's crude oil and LNG exports.
- The **Houthis** are an armed group based in Yemen that has targeted commercial shipping and regional energy infrastructure during the ongoing West Asian conflict.
- For India, secure sea lanes through the Red Sea, Bab el-Mandeb and Hormuz are crucial for energy security, trade and uninterrupted imports of crude oil and fertilizers.

3. Economy

3.1. SEBI's Information Technology Resilience Index for Market Infrastructure Institutions

Context:

Recently, the Securities and Exchange Board of India (SEBI) introduced an Information Technology Resilience Index (ITRI) to assess and strengthen the technological resilience of Market Infrastructure Institutions (MIIs) such as stock exchanges and depositories.



Explanation:

- **Market Infrastructure Institutions (MIIs)** provide the critical infrastructure necessary for the functioning of securities markets and include stock exchanges, clearing corporations and depositories.
- In India, MIIs operate within the regulatory framework of **SEBI**, a **statutory body** established under the **SEBI Act, 1992**.
- The **ITRI** measures the ability of an MII's information-technology systems to remain secure, reliable and operational, including during disruptions.
- It assesses nine broad parameters, including availability, security, integrity, governance, reliability and monitoring, business continuity, modularity and flexibility, and scalability.
- **Business continuity** refers to an institution's ability to maintain or quickly restore critical operations following technological failures or disruptions.
- MIIs must establish an **Early Warning System (EWS)** to identify deterioration in ITRI parameters before it causes system slowdown, performance problems or disruptions.

3.2. India's Honey Economy and the Role of Bees in Sustainable Agriculture

Context:

India's honey production has nearly doubled over the past decade, with around 70% of output being exported. However, sustaining this growth requires protecting bee populations, improving scientific beekeeping, traceability, quality standards and diversifying export markets.

Explanation:

- **Bees are key pollinators;** according to FAO estimates, pollinators contribute to nearly one-third of global crop output and improve yields of many major food crops.
- **Apiculture (beekeeping)** provides honey, beeswax, propolis, royal jelly and pollen, while generating supplementary rural income and supporting agricultural productivity.
- India is among the world's major honey producers; production increased from about 76,000 tonnes in 2013-14 to 1.51 lakh tonnes in 2025-26.
- Nearly **70% of Indian honey production is exported**, but dependence on a few markets increases vulnerability to tariffs and trade barriers.
- Export competitiveness requires quality testing, traceability, GI branding, residue/pesticide management and compliance with sanitary standards.
- The **National Beekeeping and Honey Mission (NBHM)** promote scientific beekeeping and development of the honey value chain.
- Protecting pollinators also supports biodiversity, ecosystem services, food security and sustainable agriculture.

3.3. Mobile Phone Manufacturing Scheme to Boost Domestic Electronics Production

Context:

Recently, the Ministry of Electronics and Information Technology (MeitY) notified the Mobile Phone Manufacturing Scheme (MPMS), a ₹62,500-crore incentive programme aimed at promoting Indian smartphone brands, domestic assembly and local value addition. It builds on the earlier PLI Scheme for Large Scale Electronics Manufacturing.



Explanation:

- India introduced the **Production Linked Incentive (PLI) Scheme for Large Scale Electronics Manufacturing** in 2020 to attract investment and expand domestic electronics production.
- The new **MPMS** provides incentives linked to **incremental production/sales** of mobile phones, with additional benefits for sourcing specified components domestically.
- It particularly promotes Indian brands, defined through Indian ownership, incorporation and locally held intellectual property/trademarks.
- Indian brands can receive a **5% incentive**, along with a **3% design and R&D incentive**, subject to prescribed conditions.
- The scheme seeks to raise domestic value addition in mobile manufacturing from about **18–23% to 35–40%**.
- It targets cumulative production of about ₹39 lakh crore, exports of ₹15 lakh crore and around 60,000 direct jobs.
- MPMS reflects India's broader strategy of Make in India, import substitution, export promotion and integration into Global Value Chains (GVCs).

3.4. ECMS Deepens India's Electronics Manufacturing Value Chain

Context:

The Ministry of Electronics and Information Technology recently approved 31 additional proposals under the Electronics Components Manufacturing Scheme (ECMS). In all, 106 approved projects envisage ₹69,548 crore of investment and about 74,628 direct jobs.



Explanation:

- An electronic product is built from **raw materials, components, sub-assemblies and final assemblies,** for example, a camera module fitted into a finished smartphone.
- India has expanded electronics assembly, especially mobile phones, but still depends heavily on imported components and manufacturing equipment.
- **Domestic value addition** means a larger share of a product's value is created within India rather than through imported inputs.
- **ECMS**, notified in April 2025, is administered by the **Ministry of Electronics and Information Technology (MeitY)**.
- It supports four segments: sub-assemblies, bare components, supply-chain materials and capital goods for electronics manufacturing.
- Incentives are linked to additional turnover, capital expenditure or a combination, depending on the product category.
- Covered products include camera and display modules, **printed circuit boards**, connectors, capacitors, relays, optical transceivers and **rare-earth magnets**.
- Deeper component manufacturing reduces import dependence, strengthens supply-chain resilience and boosts exports, complementing the semiconductor mission and production-linked incentive schemes.

3.5. US–Japan Currency Intervention and Its Impact on Global Markets

Context:

The United States and Japan have reaffirmed their commitment to cooperate in stabilising the foreign exchange market after the Japanese yen weakened sharply against the US dollar.



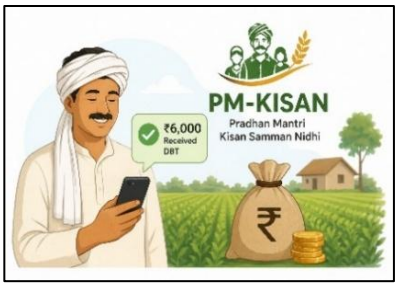
Explanation:

- A country's **currency exchange rate** is the value of its currency relative to another; it may be market-determined or influenced through central bank intervention.
- **Currency intervention** involves a central bank buying or selling its own or foreign currency in the foreign exchange (Forex) market to reduce excessive volatility.
- A **stronger yen** can reduce **carry trade**, where investors borrow at low interest rates in Japan and invest in higher-yielding assets abroad, affecting global capital flows.
- Exchange rate movements influence exports, imports, inflation, foreign investment and external debt servicing.
- In India, the Reserve Bank of India (RBI) manages exchange rate volatility without targeting a fixed exchange rate under a managed float regime.
- The coordinated intervention has implications for global capital flows, emerging markets and India's financial markets.

3.6. Cabinet Extends PM-KISAN Scheme till 2030–31

Context:

The Union Cabinet has approved the continuation of the Pradhan Mantri Kisan Samman Nidhi **(PM-KISAN)** Scheme from 2026–27 to 2030–31 with a financial outlay of ₹3.15 lakh crore.



Explanation:

- **PM-KISAN**, launched in February 2019, is a **Central Sector Scheme** implemented by the **Ministry of Agriculture & Farmers Welfare**.
- The scheme uses Aadhaar authentication, digital beneficiary verification, and **Public Financial Management System (PFMS)** for transparent fund transfers.
- It aims to support expenditure on seeds, fertilizers, irrigation, farm machinery, and other agricultural inputs while reducing dependence on informal credit.
- PM-KISAN complements initiatives such as PM **Fasal Bima Yojana (PMFBY), Kisan Credit Card (KCC), e-NAM**, and the Digital India programme.
- It is a key instrument for income support, financial inclusion, rural welfare, and strengthening agricultural productivity.

3.7. Public Sector Banks Achieve Historic Low Gross NPAs and Record Profits

Context:

According to the Ministry of Finance, Public Sector Banks (PSBs) recorded their lowest-ever Gross Non-Performing Assets (GNPA) ratio of 1.9% in FY 2025–26, while achieving a record net profit of ₹1.98 lakh crore. Strong credit growth, especially in MSME and retail lending, reflects improved asset quality and banking sector resilience.

Explanation:



- A **Non-Performing Asset (NPA)** is a loan where interest or principal remains **overdue for more than 90 days**, as per Reserve Bank of India (RBI) norms.
- **Gross NPA (GNPA)** represents the total value of bad loans before deducting provisions, while Net NPA (NNPA) equals GNPA minus provisions, indicating the actual stressed assets on banks' books.
- A lower GNPA ratio signifies better asset quality, improved credit discipline and stronger financial stability of banks.
- **Capital to Risk-weighted Assets Ratio (CRAR)** measures a bank's capital adequacy and ability to absorb losses, ensuring compliance with Basel III norms.
- **Public Sector Banks (PSBs)** are majority-owned by the Government of India and play a crucial role in financial inclusion, priority sector lending, MSME financing and infrastructure development.
- Measures such as the Insolvency and Bankruptcy Code (IBC), SARFAESI Act, ECLGS, bank recapitalisation, digital monitoring and prudent provisioning have contributed to reducing NPAs and strengthening the banking sector.

3.8. RBI's USD–INR Swap Facility and Foreign Exchange Inflows

Context:

Recently, the RBI's special USD–INR forex swap facility mobilised about **$127.23 billion** through FCNR(B) deposits, taking total inflows under the facility to roughly $136.38 billion by August 31, 2026. Owing to the strong response, the RBI closed the FCNR(B) component one month earlier than originally planned.

Explanation:



- A **foreign-exchange swap** involves exchanging two currencies immediately and reversing the transaction on a future date under predetermined terms.
- The facility, introduced on **June 8, 2026**, covered **FCNR(B) deposits, External Commercial Borrowings (ECBs)** and **Overseas Foreign Currency Borrowings (OFCBs)**.
- **FCNR(B)** accounts are term deposits maintained by **Non-Resident Indians** with authorised Indian banks in permitted foreign currencies. Principal and interest are repaid in foreign currency; therefore, depositors generally do not bear rupee exchange-rate risk.
- Under the FCNR(B) swap window, banks sell the mobilised dollars to the RBI and receive rupees. At maturity, banks return the rupees and receive dollars from the RBI to repay depositors.
- The swap was available for eligible FCNR(B) deposits having a tenure of **three to five years** and was conducted **at par**, providing banks an inexpensive hedge against currency risk.
- **ECBs** are foreign-currency loans raised by eligible Indian entities from recognised non-resident lenders. Under this special facility, eligible ECBs were restricted mainly to specified public-sector undertakings.
- **OFCBs** are overseas foreign-currency borrowings raised by Authorised Dealer Category-I banks.
- Such inflows strengthen foreign-exchange reserves, support Balance of Payments financing and improve external-sector liquidity. However, they remain future repayment liabilities.
- RBI's purchase of dollars releases rupees into the banking system. Excess liquidity may require **sterilisation** through liquidity-absorption measures.
- The FCNR(B) window closed on **August 31, 2026**, while the ECB and OFCB components continue until **December 31, 2026**.
- Foreign-currency deposits and external borrowings are regulated under **FEMA, 1999**.

3.9. India's Potential as a Global Shipbuilding Hub

Context:

Recently, the defence minister highlighted India's potential to become a global shipbuilding hub, citing its skilled workforce, steel industry and growing technological capabilities. New capacity-expansion projects of GRSE and Yantra India Ltd. were also inaugurated to strengthen indigenous defence manufacturing.

Explanation:



- **Shipbuilding** includes the design, construction, repair and maintenance of commercial and naval vessels and is a strategically important manufacturing industry.
- **Garden Reach Shipbuilders & Engineers (GRSE)** is a **Defence Public Sector Undertaking (DPSU)** under the **Ministry of Defence**, headquartered in Kolkata.
- GRSE builds warships and other vessels for the Indian Navy, Coast Guard and overseas customers.
- Yantra India Limited (YIL) is also a **Defence Public Sector Undertaking** under the Ministry of Defence, formed after the corporatisation of the Ordnance Factory Board.
- The government promotes indigenous defence production through **Atmanirbhar Bharat** and **Make in India**, reducing import dependence.
- Domestic shipbuilding supports strategic autonomy, maritime security, defence exports, MSMEs and skilled employment.
- India's location along major Indian Ocean sea lanes provides additional strategic advantages.

3.10. Government Measures to Control Sugar Prices and Ensure Domestic Availability

Context:

Recently, the Government announced measures to contain rising sugar prices, including stock limits, checks against hoarding and duty-free import of raw sugar. The price rise has been attributed mainly to lower domestic production, festive demand, crop damage and tightening global supplies.

Explanation:



- India is among the world's major producers and consumers of sugar, with sugarcane also serving as a feedstock for ethanol production.
- Sugar production is estimated at **306 LMT** in the current season, lower than initial estimates, partly due to **Red Rot, Top Borer and waterlogging**.
- The government stated that sugar diversion to ethanol declined from about **12% in 2022-23 to 9% in 2025-26**; most ethanol now comes from grains, particularly maize.
- Ethanol production from surplus sugar can improve sugar-mill liquidity and facilitate timely payment of cane dues to farmers.
- To curb **hoarding**, a **400-tonne stock limit** has been imposed on dealers for August-November 2026.
- The government has also permitted **duty-free import of 10 LMT of raw sugar** and encouraged early crushing to augment supply.
- Such supply-side interventions seek to balance consumer price stability and farmers' interests.

3.11. India's Coking Coal Import Dependence and Rising Steel Costs

Context:

Indian steelmakers face margin pressure as global coking coal prices rise amid supply disruptions in major producing countries. India, the world's second-largest crude steel producer, imports about 95% of its coking coal requirement, making domestic steel production vulnerable to global price shocks.

Explanation:



- **Coking coal (metallurgical coal)** is a high-quality coal used to manufacture coke, an essential input in conventional iron and steel production.
- In the **Blast Furnace–Basic Oxygen Furnace (BF-BOF)** route, coke acts mainly as a fuel and reducing agent, helping convert iron ore into molten iron.
- Coking coal differs from thermal coal, which is primarily used for electricity generation and industrial heating.
- India has substantial coal reserves but limited availability of **high-grade coking coal**, resulting in heavy **import dependence**.
- Australia has traditionally been India's largest coking-coal supplier; Russia, the US and Mozambique are other sources.
- Coking coal forms a significant share of **steel production costs**; therefore, higher international prices and freight costs squeeze steelmakers' margins.
- Diversifying imports and increasing domestic coking-coal production can improve raw-material security.

3.12. Sovereign Green Bonds and the Emergence of 'Greenium' in India

Context:

India's **Sovereign Green** Bonds (SGrBs) are witnessing strong investor demand, allowing them to trade at a persistent "greenium" over comparable conventional government securities. The demand, particularly from insurance companies, indicates growing appetite for green financial instruments.



Explanation:

- **Green Bonds** are debt instruments whose proceeds finance environmentally sustainable projects such as renewable energy, clean transport and climate-resilient infrastructure.
- **Sovereign Green Bonds (SGrBs)** are issued by the Government of India, with the RBI conducting their auctions as part of government borrowing.
- India introduced SGrBs in 2022-23 under its **Sovereign Green Bond Framework**.
- **Greenium** refers to the **lower yield** investors accept on green bonds compared with similar conventional bonds, reflecting willingness to pay a premium for green assets.
- Bond prices and yields move inversely; stronger demand raises bond prices and lowers yields.
- **Basis point (bps)** is one-hundredth of a percentage point; **100 bps = 1%**.
- SGrBs support climate finance, sustainable infrastructure and India's environmental commitments.

3.13. MSME Development (Amendment) Bill, 2026

Context:

Recently, Parliament passed the **MSME Development (Amendment) Bill, 2026**, amending the **MSMED Act, 2006**. It seeks to formalise enterprises, resolve delayed-payment disputes and improve the ease of doing business.



Explanation:

MSME Classification and Registration:

- The **MSMED Act, 2006** provides the statutory framework for promoting and developing Micro, Small and Medium Enterprises.
- MSMEs are classified using the twin criteria of **investment in plant, machinery or equipment** and **annual turnover**.
- The Bill gives statutory permanence to **Udyam Registration**, a free, digital, voluntary and self-declaration-based registration system.
- The **Udyam Assist Platform** helps formalise informal micro-enterprises.

Delayed-Payment Dispute Resolution:

- **Micro and Small Enterprises Facilitation Councils (MSEFCs)** deal with delayed-payment disputes involving Micro and Small Enterprises.
- The Bill introduces **Online Dispute Resolution** and permits States to establish multiple MSEFCs.
- Mediation must ordinarily be completed within **90 days**, followed by referral to arbitration within **30 days**. The arbitral award must be delivered within **90 days after completion of pleadings**.
- If a challenge to an award remains pending for more than six months, courts must order payment of at least **50% of the awarded amount** to the supplier.
- Mediated settlements and arbitral awards may be recovered as **arrears of land revenue**.

TReDS and MSME Liquidity:

- **TReDS** is an RBI-regulated electronic platform that enables MSMEs to obtain early payment by discounting their unpaid invoices.
- The Bill requires **Central Public Sector Enterprises** to settle MSME invoices through TReDS.

Decriminalisation:

- Specified criminal offences are replaced with **warnings and graded civil penalties**, promoting trust-based regulation and ease of doing business.

3.14. Bhogapuram Greenfield International Airport Inaugurated in Andhra Pradesh

Context:

Prime Minister Narendra Modi inaugurated the **Alluri Sitarama Raju International Airport** at Bhogapuram, Andhra Pradesh.



Explanation:

- A **greenfield airport** is a **new airport built from scratch** on previously undeveloped land, unlike a **brownfield airport**, which expands or modernises an existing airport.
- Greenfield airports allow modern infrastructure, planned expansion, and higher operational efficiency.
- Airports are developed under the **National Civil Aviation Policy (NCAP), 2016**, with many projects using the Public-Private Partnership (PPP) model to attract private investment.
- Proposed project under a **Public-Private Partnership (PPP)** model, the greenfield airport is expected to strengthen regional connectivity, trade, tourism, and economic growth in North Andhra.
- Improved air connectivity promotes regional development, tourism, logistics, exports, employment, and investment, while supporting the **UDAN (Ude Desh ka Aam Nagrik)** scheme's objective of enhancing air accessibility.

3.15. Samudra Manthan: National Offshore Exploration Scheme

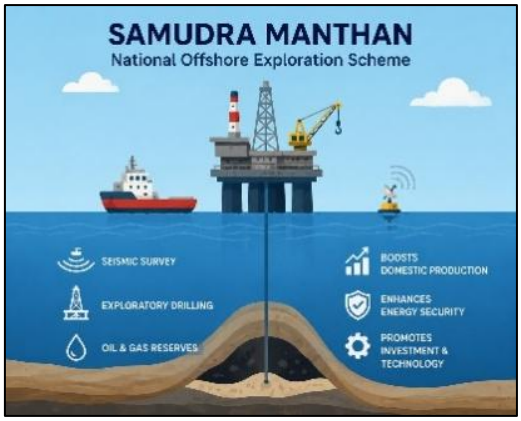
Context:

The Union Cabinet has approved the ₹84,084-crore National Offshore Exploration Scheme (Samudra Manthan) to accelerate offshore oil and gas exploration until FY 2030–31.

Explanation:

- **Samudra Manthan** is a flagship **Ministry of Petroleum and Natural Gas (MoPNG)** scheme to promote offshore hydrocarbon exploration and reduce import dependence.
- Offshore exploration identifies crude oil and natural gas beneath the seabed using seismic surveys, geological mapping, and exploratory drilling.

- The scheme supports **deepwater and ultra-deepwater** drilling, where exploration is technologically challenging and capital-intensive.
- It provides financial support for eligible exploratory wells, strengthens offshore data acquisition, and develops common exploration infrastructure.
- It also promotes oil and gas manufacturing and service hubs under Make in India and Atmanirbhar Bharat.
- The objective is to discover new reserves, enhance energy security, attract private investment, reduce geological risk, and increase domestic hydrocarbon production.



3.16. Transmission Constraints, Renewable Energy Curtailment and Grid Stability in India

Context:

India's renewable energy sector is facing financial stress as nearly 21 GW of commissioned renewable capacity is awaiting grid connectivity due to delays in transmission infrastructure. The Government has also informed Parliament that India curtailed 8,133 GWh of solar power during April-June 2026 to maintain grid security, reflecting a widening mismatch between renewable capacity addition and transmission network expansion.

Explanation:



- **Renewable energy curtailment** is the intentional reduction of electricity generation when the grid cannot evacuate or absorb power.
- Curtailment is carried out by grid operators to maintain **grid stability**, frequency balance and reliable supply when generation exceeds demand or available transmission capacity.
- The main causes are transmission constraints, grid congestion, mismatch between generation and demand, and delays in transmission projects.
- **Power evacuation** refers to transmitting electricity from the generating station to the grid through the **Inter-State Transmission System (ISTS)**.
- Projects under **Temporary General Network Access (T-GNA)** receive temporary grid access until permanent transmission infrastructure is commissioned.
- Since solar power is intermittent, its output varies with sunlight, requiring flexible generation, energy storage such as **Battery Energy Storage Systems (BESS)** and **Pumped Storage Projects (PSPs)**, and improved grid management.
- India operates a National Grid managed by the **Grid Controller of India Limited (GRID-INDIA)**, which ensures secure and stable operation of the power system.
- Curtailment reduces capacity utilisation, revenues, and investor confidence, affecting India's 500 GW non-fossil fuel capacity target by 2030.
- Transmission bottlenecks have led to significant renewable energy curtailment, affecting project viability and clean energy integration.
- Strengthening **Green Energy Corridors**, expanding inter-State transmission networks, deploying smart grids, forecasting renewable generation and increasing storage capacity are essential to reduce curtailment and support India's clean energy transition.

3.17. India's Hub-and-Spoke International Aviation Strategy

Context:

The **Ministry of Civil Aviation** inaugurated **Hub & Spoke International Flight Operations from Amritsar**, making it the second spoke airport after Varanasi under India's International Aviation Hub Strategy.

Explanation:



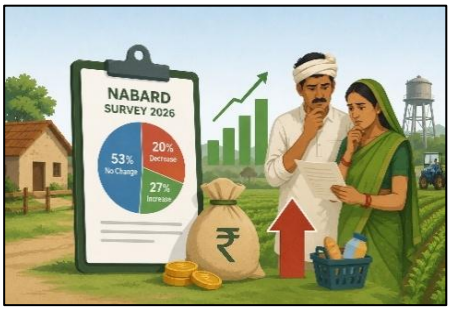
- The **Hub-and-Spoke model** is an aviation network in which passengers from **spoke airports** are routed through a central **hub airport** to access multiple domestic and international destinations efficiently.
- Under the scheme, passenger's complete check-in, baggage tagging, immigration and customs at the spoke airport, enabling seamless transfers at the hub without repeating these formalities.
- The strategy seeks to develop Indian airports as **international transit hubs**, reducing dependence on foreign hubs such as Dubai, Doha, Singapore and Istanbul for connecting flights.
- The initiative improves network connectivity, aircraft utilisation, load factors, operational efficiency and passenger convenience, while supporting tourism, trade and regional economic development.
- India's aviation sector is regulated by the Ministry of Civil Aviation (MoCA), Directorate General of Civil Aviation (DGCA), Airports Authority of India (AAI) and Bureau of Civil Aviation Security (BCAS).
- The strategy complements **UDAN (Ude Desh ka Aam Nagrik)**, airport infrastructure expansion and the vision of **Viksit Bharat @2047** by creating a globally competitive aviation ecosystem.

3.18. NABARD Rural Economic Conditions & Sentiments Survey 2026

Context:

The latest NABARD Rural Economic Conditions & Sentiments Survey found that over half of India's rural households reported no increase in income during the past year, while one-fifth experienced a decline. The findings highlight stagnating rural incomes amid rising living costs and weakening income expectations despite optimism for the near term.

Explanation:



- NABARD (National Bank for Agriculture and Rural Development) is the **apex development financial institution** for agriculture and rural development, providing policy support, refinancing and rural credit.
- The **Rural Economic Conditions & Sentiments Survey**, conducted since September 2024, tracks rural households' income, consumption, employment, government transfers and economic expectations.
- **Rural household income** mainly depends on agriculture, allied activities, wage labour, non-farm enterprises and government transfers, making it vulnerable to inflation, weather and market conditions.
- Inflation reduces the **real purchasing power** of households; when a large share of income is spent on consumption expenditure, savings and investment capacity decline.
- Government support through subsidies, Direct Benefit Transfer (DBT), MGNREGS and PM-KISAN helps supplement rural incomes, while sustained **inclusive growth**, higher agricultural productivity and non-farm employment are essential for improving rural livelihoods.

3.19. CBDT Issues Crypto Asset Reporting Guidance under OECD's CARF

Context:

The Central Board of Direct Taxes (CBDT) has issued guidance to implement India's reporting obligations under the OECD Crypto-Asset Reporting Framework (CARF). The framework enables automatic exchange of crypto-asset transaction information with partner jurisdictions to improve tax transparency and curb tax evasion.

Explanation:



- Crypto-assets are digitally represented assets that use **Distributed Ledger Technology (DLT)**, such as blockchain, and include cryptocurrencies and certain digital tokens.
- **Crypto-Asset Service Providers (CASPs)**, such as crypto exchanges and brokers, must undertake Know Your Customer (KYC), identify reportable users, maintain transaction records and submit prescribed information to tax authorities.
- India has adopted CARF through amendments to the Income-tax Act, 1961 and the Income-tax Rules, 1962, with CBDT issuing implementation guidance.
- CARF complements the **Common Reporting Standard (CRS)** by covering crypto-assets, reducing opportunities for offshore tax evasion and improving cross-border tax transparency through **automatic exchange of information (AEOI)**.

3.20. National Investment Policy for Urea (NIPU)-2026

Context:

The Union Cabinet has approved the National Investment Policy for Urea (NIPU)-2026 to promote fresh investments in gas-based urea plants and enhance domestic urea production. The policy aims to reduce India's import dependence, strengthen fertilizer self-reliance and ensure adequate urea availability for agriculture.

Explanation:



- Urea is the most widely used **nitrogenous fertilizer** in India, containing **46% nitrogen**, making it essential for improving crop productivity, especially during the Kharif and Rabi seasons.
- India is among the world's largest consumers of urea, but domestic production is insufficient, requiring significant urea imports, which expose the country to global price and supply disruptions.
- The **National Investment Policy for Urea (NIPU)** was first introduced in 2012 and subsequently amended in 2013, 2014 and 2015 to encourage investment in gas-based urea plants and revive domestic manufacturing.
- NIPU-2026 introduces a clearer incentive structure by separating fixed and variable costs, providing a **Return on Equity (RoE) band of 12–16%**, and reducing foreign exchange risk through rupee-denominated cost conversion.
- Fertilizers are sold to farmers through the **Direct Benefit Transfer (DBT)** system using **Point of Sale (PoS)** devices linked with Aadhaar authentication, while the Government compensates manufacturers through fertilizer subsidy.
- India is also promoting **Integrated Nutrient Management (INM)**, balanced fertilizer use and alternatives such as **Nano Urea** to improve nutrient-use efficiency and maintain long-term soil fertility.

3.21. Unified Payments Interface (UPI): Ten Years of India's Digital Payments Revolution

Context:

Recently, the Unified Payments Interface (UPI) completed ten years, emerging as the world's largest real-time payment system by transaction volume. In FY 2025–26, UPI processed over 24,162 crore transactions worth about ₹314 lakh crore and accounted for 84% of India's digital payments.

Explanation:

- **UPI**, launched in **2016**, is an **instant, interoperable payment system** developed by the **National Payments Corporation of India (NPCI)** under **Reserve Bank of India (RBI)** oversight.



- It enables **24×7 real-time bank-to-bank transfers** using identifiers such as a **UPI ID**, without requiring users to repeatedly enter bank-account details.
- UPI supports **Person-to-Person (P2P)** and **Person-to-Merchant (P2M)** payments through multiple participating apps.
- Its **interoperability** allows customers of different banks and payment apps to transact on a common network.
- UPI forms a key pillar of India's **Digital Public Infrastructure (DPI)** and promotes **financial inclusion** and low-value digital payments.
- In FY 2025–26, **P2M transactions formed 63% of volume**, while **P2P transactions contributed 71% of value**.
- UPI accounted for nearly **49% of global real-time payment transaction volume in 2025**.
- It is currently operational in **11 countries**, supporting the internationalisation of India's digital-payment infrastructure.

3.22. Index of Core Industries: New Base Year and Expanded Core-Sector Basket

Context:

Recently, India's Index of Core Industries (ICI) recorded 5.4% year-on-year growth in July 2026, compared with the final 6% growth in June. The new ICI series uses 2022–23 as its base year and includes nine core industries.

Explanation:



- The **Index of Core Industries (ICI)** is a **monthly measure of production** in industries supplying essential energy and materials to the economy.
- It is compiled by the **Office of the Economic Adviser** under the **Department for Promotion of Industry and Internal Trade (DPIIT)**, Ministry of Commerce and Industry.
- The **base year is now 2022–23 = 100**, replacing 2011–12 — the reference point against which later production changes are measured.
- The basket now has **nine industries**: coal, crude oil, natural gas, refinery products, fertilisers, steel, cement, electricity and **iron ore**.
- **Iron ore is the new addition**, for its wide industrial use in steel; the series also shifts to **gross steel production** and keeps only **raw coal** to avoid double counting.
- **Sectoral weights** come from the **Index of Industrial Production (IIP)**, adjusted to total 100; **electricity has the highest weight**, then refinery products and steel. The IIP is compiled by the **National Statistical Office (MoSPI)**.
- July's **5.4% growth** means weighted output was higher than in July 2025 — not inflation or a GDP contribution; **iron ore, cement and electricity led**, while natural gas, crude oil and fertilisers contracted.
- A **provisional estimate** may later be revised; the ICI is a key **leading indicator** of industrial activity.

3.23. SEBI's Closing Auction Session (CAS) and Market Manipulation

Context:

SEBI has stated that the newly introduced **Closing Auction Session (CAS)** will strengthen its ability to detect manipulation in determining stock-market closing prices. SEBI has also acted against entities for allegedly placing and rapidly cancelling large orders during CAS to influence prices.

Explanation:

- **SEBI**, established under the **SEBI Act, 1992**, is the statutory regulator of India's securities market and works to protect investors and ensure fair and transparent markets.



- **Closing Auction Session (CAS)** is a mechanism for determining the **official closing price** of stocks through an auction-based process involving buy and sell orders near market close.
- CAS replaces the earlier **Volume Weighted Average Price (VWAP)**-based closing-price mechanism for eligible securities and improves price discovery.
- Market manipulation involves artificial interference with prices or trading activity to create a misleading appearance of demand, supply or price.
- Large orders placed and quickly cancelled can create **false demand/supply signals** and distort price discovery.
- Closing prices are significant because they can affect the valuation and settlement of **derivative contracts** and benchmark-linked products.
- SEBI can investigate suspicious trading patterns and impose penalties under the securities-law framework.

3.24. India's Soybean-Oil Imports Rise amid Black Sea Disruptions

Context:

India's soybean-oil imports were recently projected to reach a record 6.2 lakh tonnes in August 2026. Competitive prices, festival demand and disruption of sunflower-oil shipments from the Black Sea pushed refiners towards soybean oil.



Explanation:

- **Soybean oil** is extracted by crushing soybeans; the residual protein-rich **soymeal** is used mainly as animal feed.
- Soybean is a **leguminous kharif oilseed crop** that fixes atmospheric nitrogen through bacteria in its root nodules.
- India's **edible-oil basket** includes palm, soybean, sunflower, mustard, groundnut and rice-bran oils.
- Russia and Ukraine are major sunflower-oil suppliers; attacks on **Black Sea** ports delayed shipments, and refiners substituted the cheaper, available soybean oil.
- Flexible imports can prevent shortages and check **food inflation**, but high import dependence raises the import bill and exposes consumers to global prices, freight and exchange-rate risks.
- Cheap imports can also depress domestic oilseed prices and discourage Indian farmers.
- India met only about **44% of its edible-oil demand** domestically in 2023–24.
- The **National Mission on Edible Oils–Oilseeds (2024)** aims to raise oilseed production and productivity, while **NMEO–Oil Palm** promotes domestic crude palm oil.

3.25. Handloom Sector and Its Significance in India's Economy

Context:

India's handloom sector, supporting over 35 lakh weavers and allied workers, remains a major source of rural non-farm employment and cultural heritage. However, declining returns, fragmented markets, skill erosion and fading traditional weaving practices threaten its sustainability.



Explanation:

- **Handloom** refers to fabric woven manually on a loom without the use of power; it is a labour-intensive and decentralised industry.
- The sector is closely associated with the **Swadeshi Movement (1905)** and Gandhian self-reliance, with the spinning wheel becoming a symbol of economic resistance.

- National Handloom Day – August 7 commemorates the launch of the Swadeshi Movement in 1905.
- Handlooms provide employment to over 35 lakh workers, with women forming nearly 70% of the workforce.
- India has **Geographical Indication (GI)-tagged** handloom traditions such as **Banarasi Brocades, Kanchipuram Silk and Pochampally Ikat**.
- The Handlooms (Reservation of Articles for Production) Act, 1985 protects specified products for exclusive handloom production.

3.26. India's Free Trade Agreement (FTA) Strategy and Trade Deficit

Context:

A recent analysis highlights that India's trade with several major Free Trade Agreement (FTA) partners, including ASEAN, Japan, South Korea and Singapore, has become increasingly import-driven, raising concerns over widening trade deficits and limited integration into Global Value Chains (GVCs).

Explanation:



- A **Free Trade Agreement (FTA)** is an agreement between two or more countries to reduce or eliminate tariffs and other trade barriers on goods and services.
- FTAs aim to increase trade, investment, market access, technology transfer and participation in **Global Value Chains (GVCs)**—international production networks where different stages of manufacturing occur across countries.
- India has FTAs with ASEAN, Japan, South Korea, Singapore, UAE, Australia, and recently concluded one with the United Kingdom.
- A **trade deficit** occurs when a country's imports exceed exports, while a trade surplus occurs when exports exceed imports.
- The effectiveness of FTAs depends not only on tariff reduction but also on domestic manufacturing competitiveness, logistics, standards compliance, infrastructure and ease of doing business.

3.27. ONGC to Reserve Part of Mangaluru Oil Storage for Strategic Petroleum Reserve

Context:

The Union Government has announced that 50% of ONGC's upcoming 1.75 million Metric Tonne (MMT) crude oil storage facility at Mangaluru will be reserved as a Strategic Petroleum Reserve (SPR). The remaining capacity will be used by ONGC for commercial operations, strengthening India's energy security.

Explanation:

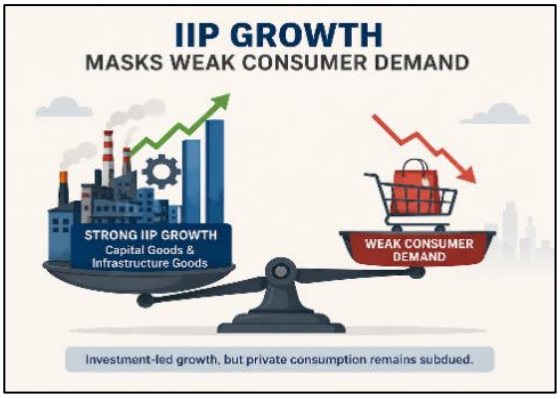


- **Strategic Petroleum Reserve (SPR)** is a stockpile of crude oil maintained by a country to meet emergency requirements during wars, natural disasters or global supply disruptions.
- India depends on imports for over 85% of its crude oil needs, making **energy security** a strategic priority.
- Crude oil stored in **underground rock caverns** is safer, economical and suitable for long-term storage than surface tanks.
- India's existing SPR facilities are located at Visakhapatnam (Andhra Pradesh), Mangaluru (Karnataka) and Padur (Karnataka), managed by Indian Strategic Petroleum Reserves Limited (ISPRL).
- The government is expanding SPR capacity through Phase II projects at Chandikhol (Odisha) and Padur (Karnataka).
- Strategic reserves differ from **commercial reserves**: SPR is released only during national emergencies, whereas commercial stocks are maintained by oil companies for routine market operations.

3.28. IIP Growth Masks Weak Consumer Demand

Context:

India's Index of Industrial Production (IIP) recorded strong year-on-year growth in June 2026, driven mainly by capital goods and infrastructure-related production. However, consumer goods output remained weak, indicating subdued private consumption despite robust industrial growth.



Explanation:

- The Ministry of Statistics and Programme Implementation (MoSPI) has revised the **base year of the Index of Industrial Production (IIP)** from **2011–12 to 2022–23**.
- Index of Industrial Production (IIP) is a high-frequency economic indicator that measures changes in the volume of industrial production.
- It is compiled and released monthly by the **National Statistical Office (NSO), MoSPI**.
- IIP covers three sectors: Mining, Manufacturing, and Electricity, with Manufacturing carrying the highest weight.
- It uses Use-Based Classification: Primary, Capital, Intermediate, Infrastructure/Construction, Consumer Durables, and Consumer Non-durables.
- Base year revision updates weights, basket of items, and industrial structure to reflect current economic realities.
- IIP is widely used for **economic policymaking**, industrial performance assessment, GDP estimation, and monetary policy decisions by the RBI.

4. Environment and Ecology

4.1. Glaw Lake Becomes Arunachal Pradesh's First Ramsar Site

Context:

India has designated Glaw Lake in Arunachal Pradesh as its 101st Ramsar Site, making it the State's first wetland of international importance under the Ramsar Convention.



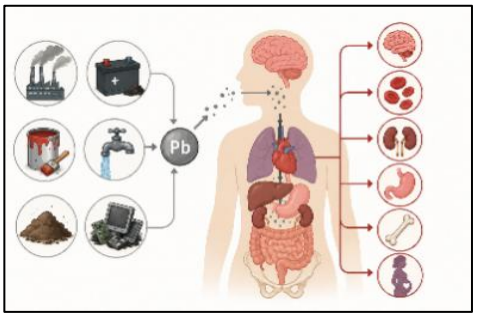
Explanation:

- **Wetlands** are areas where water covers the land permanently or seasonally and include lakes, marshes, mangroves, floodplains and peatlands.
- The **Ramsar Convention** is an international treaty adopted in 1971 at Ramsar, Iran, for the conservation and wise use of wetlands; World Wetlands Day is observed on 2 February.
- A **Ramsar Site** is a wetland designated as being of **international importance** based on ecological, hydrological and biodiversity criteria.
- **Glaw Lake** is a pristine freshwater lake in the Eastern Himalayas, fed by perennial mountain streams and located within **Kamlang Tiger Reserve**, supporting rich biodiversity including over 150 tree species and 49 orchid species.
- Wetlands provide ecosystem services such as water security, flood moderation, groundwater recharge, carbon sequestration and habitat for migratory birds.

4.2. Lead Pollution and Toxic Exposure Around Urban Schools in India

Context:

A recent report by the **Center for Global Development (CGD)** found that many urban schools in low- and middle-income countries, including India, are located close to toxic sites. In New Delhi, nearly 90% of private schools surveyed were found near sites contaminated with lead, mercury, cadmium, arsenic and pesticides, raising concerns over children's health.



Explanation:

- **Lead (Pb)** is a **heavy metal** naturally present in the Earth's crust, but excessive exposure from human activities makes it a major environmental pollutant.
- Major sources include informal e-waste recycling, lead-acid battery recycling, smelting, mining, paints, industrial emissions and contaminated soil and dust.
- Children are especially vulnerable because they absorb lead more readily, and even **low blood lead levels** can permanently affect health.
- Lead damages the brain, nervous system, kidneys and cardiovascular system, causing **reduced IQ, learning disabilities, behavioural disorders, anaemia and developmental delays.**
- Lead persists in the environment and enters the body through inhalation, ingestion of contaminated food, water or dust, and occupational exposure.
- Reducing exposure requires scientific e-waste management, Extended Producer Responsibility (EPR), safe battery recycling, pollution monitoring, environmental regulations, and regular blood lead surveillance in high-risk populations.

4.3. Meghalaya Launches Mission Clouded Leopard



Context:

Recently, Meghalaya launched **Mission Clouded Leopard** to protect the mainland clouded leopard (*Neofelis nebulosa*), its state animal. The programme focuses on habitat restoration, scientific monitoring, landscape connectivity, frontline capacity and community participation.

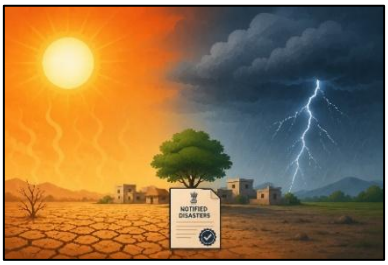
Explanation:

- Clouded leopards belong to genus *Neofelis*: mainland clouded leopard and Sunda clouded leopard.
- The mainland species occurs from the eastern Himalayas to Southeast Asia and southern China; in India, mainly in the Northeast, Sikkim and northern West Bengal.
- It is a nocturnal, largely arboreal forest cat, identified by cloud-shaped coat markings and a long balancing tail.
- Status: **IUCN - Vulnerable; CITES - Appendix I; Wildlife (Protection) Act, 1972 - Schedule I.**
- India's national **Conservation Action Plan** promotes habitat corridors, camera traps, genetics, environmental DNA and transboundary cooperation.

4.4. Heatwaves and Lightning Recognised as Notified Disasters

Context:

The Union government has included **heatwaves and lightning** as notified natural calamities under the **SDRF–NDRF Operational Guidelines for 2026–31**, following the **Sixteenth Finance Commission's** recommendation. The decision comes amid growing evidence that climate change is intensifying extreme heat and disproportionately affecting vulnerable groups, particularly the elderly.



Explanation:

- Earlier, states could use only up to **10% of their annual State Disaster Response Fund (SDRF) allocation** for disasters not included in the centrally notified list, after recognising them as state-specific local disasters.
- The inclusion of heatwaves and lightning allows expenditure on these hazards under the **regular SDRF funding window, outside the 10% ceiling.**
- The **SDRF** is the primary fund available to states for immediate relief, including assistance for deaths, medical emergencies and essential relief measures.
- The **National Disaster Response Fund (NDRF)** supplements state resources when a disaster is exceptionally severe.
- **Response funds** provide immediate assistance, whereas **mitigation funds** support measures such as cooling centres, cool roofs, early-warning systems and heat-resilient infrastructure.
- The **Finance Commission**, constituted under **Article 280**, recommends allocations for disaster-response and mitigation funds.
- **Heat stress** occurs when the body cannot adequately release accumulated heat, especially under high temperature and humidity.
- A *Lancet Planetary Health* study estimates that at **3°C global warming**, over **80% of India's elderly population** could experience at least **180 hours of intolerable heat annually.**
- Elderly people are more vulnerable because ageing weakens sweating, blood circulation and thermoregulation.
- The **Indo-Gangetic Plain** faces heightened risk due to extreme temperatures, humidity, dense population, urban heat-island effects and prolonged exposure.
- Necessary measures include **Heat Action Plans**, reliable electricity, cooling access, worker protection and heat-health early-warning systems.

4.5. Climate Whiplash, Fire Clouds and Drought Intensify Europe's Wildfire Crisis

Context:

Europe is experiencing an exceptionally severe wildfire and drought season, affecting countries such as **Greece, Spain, Portugal, Italy and Cyprus**. Prolonged heatwaves, changing rainfall patterns and rapid shifts between wet and dry conditions are intensifying fires while damaging agriculture and reducing water availability.

Explanation:



- **Wildfires** are uncontrolled fires spreading through forests, grasslands or shrublands. Although fire is natural in some ecosystems, extreme heat, drought, low humidity and strong winds make it more frequent and destructive.
- **Climate whiplash** refers to rapid shifts between unusually wet and dry conditions. Wet periods encourage dense vegetation growth, but subsequent heat and drought dry this vegetation, turning it into abundant **flammable fuel**.
- Intense wildfires can generate **pyrocumulonimbus (PyroCb) clouds**. Heat from the fire forces smoke, ash and water vapour high into the atmosphere, producing thunderstorm-like clouds.
- PyroCb clouds may create strong winds and lightning. Lightning can ignite new fires far from the original fire, while downdrafts can cause flames to spread unpredictably.
- Wildfires release large quantities of **carbon dioxide** and destroy vegetation that absorbs carbon. This creates a **positive climate feedback**, in which warming increases fires and fires further intensify warming.
- **Meteorological drought** results from deficient rainfall; **agricultural drought** occurs when soil moisture becomes inadequate for crops; and **hydrological drought** involves declining rivers, reservoirs and groundwater.
- Higher temperatures increase **evapotranspiration**, accelerating the loss of water from soil and vegetation.
- Drought and heat stress reduce crop, corn, grape and hop yields, increasing irrigation demand, food prices and farmers' losses.
- Adaptation requires drought-resistant crops, efficient irrigation, soil-moisture conservation, forest-fuel management, early-warning systems and coordinated firefighting.

4.6. India's First Guide to Grasslands and Other Open Natural Ecosystems

Context:

India recently launched its first-ever Guide to Grasslands and Other Open Natural Ecosystems at UNCCD COP17 in Ulaanbaatar, Mongolia. The Guide seeks to improve recognition, conservation and sustainable management of these long-neglected landscapes.

Explanation:



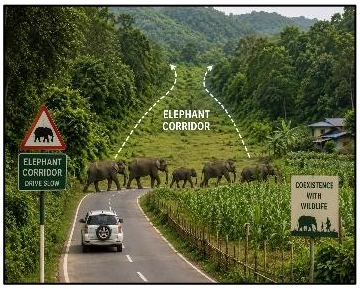
- **Open Natural Ecosystems (ONEs)** are naturally open landscapes dominated by grasses, shrubs or sparse trees, where low tree cover is the normal condition.
- They include **grasslands, savannas, scrublands, rangelands, deserts, rocky plateaus and ravines.**
- Unlike degraded forests, ONEs are naturally open; classifying them as wastelands and raising dense plantations destroys their specialised biodiversity.
- They sustain the Great Indian Bustard, lesser florican, blackbuck and Indian wolf, besides pastoral and tribal livelihoods.
- Deep roots conserve soil, regulate water and store **below-ground carbon**, improving resilience to drought and climate change.

- The Guide maps major Indian ONEs such as **Banni**, the **Thar Desert**, **Terai grasslands** and **Deccan savannas**, covering pastoralism, grazing and fire ecology.
- The **UNCCD**, adopted in 1994, is a legally binding **Rio Convention** with its secretariat at **Bonn, Germany**; the **Conference of the Parties** is its decision-making body.
- India hosted **UNCCD COP14** in New Delhi in 2019; COP17 focuses on rangelands, pastoralists and **Land Degradation Neutrality**.

4.7. Elephant Corridors and Human–Elephant Conflict in India

Context:

Recently, the Supreme Court directed the Union government to conduct a fresh survey of elephant corridors and stressed that these pathways should not be blocked merely due to fear of crop damage. The Court also sought alternatives to coercive methods used to divert elephants.



Explanation:

- **Elephant corridors** are narrow natural pathways connecting two or more larger **elephant habitats**, allowing safe movement between them.
- Asian elephants have large **home ranges** and move long distances for food, water, breeding and seasonal migration.
- India's 2023 assessment identified **150 elephant corridors across 15 States**.
- India has four major elephant landscapes: Western Ghats, North-Eastern Hills and Brahmaputra floodplains, Shivalik Hills and Gangetic plains, and Central India–Eastern Ghats.
- Roads, railways, canals, mining and settlements cause **habitat fragmentation**, obstructing traditional elephant routes.
- Such fragmentation can push elephants into farms and settlements, increasing **human–elephant conflict**.
- Connected corridors facilitate **gene flow**, prevent genetic isolation and provide seasonal access to resources.
- The **Asian elephant (Elephas maximus)** is listed as **Endangered** on the IUCN Red List.

4.8. Mining near Kaziranga National Park and Protection of Wildlife Corridors

Context:

Recently, the Supreme Court-constituted Central Empowered Committee (CEC) criticised the Assam government over inadequate action against mining near the southern boundary of Kaziranga National Park, particularly around the Parkup Pahar Range, an important wildlife corridor.



Explanation:

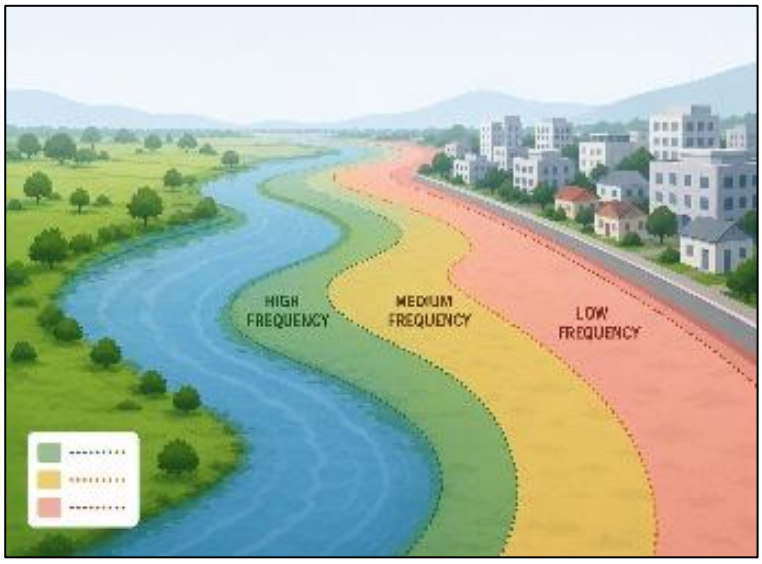
- **Kaziranga National Park (KNP)** is located in Assam, mainly across the floodplains of the Brahmaputra River, and is a **UNESCO World Heritage Site**.
- It is globally known for the **Indian one-horned rhinoceros** and also supports tigers, elephants and wild water buffaloes.
- During Brahmaputra floods, animals move from Kaziranga towards the higher Karbi Anglong Hills through designated wildlife corridors.
- The **Parkup Pahar Range** along Kaziranga's southern boundary forms part of this ecologically important landscape.
- Mining, quarrying and construction can fragment these corridors and disturb natural **watersheds and drainage systems**.
- The Supreme Court had earlier restricted mining and related activities along Kaziranga's southern boundary and the catchments of streams originating in Karbi Anglong.
- The CEC assists the Supreme Court in monitoring compliance with forest and wildlife conservation orders.

4.9. NGT Examines Changes to River Ganga Floodplain Regulations

Context:

Recently, the National Green Tribunal (NGT) sought the Centre's response to a petition challenging amendment to the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016. The amendment removes the earlier **"construction-free zone"** tag and introduces a graded definition of floodplains based on flood frequency.

Explanation:



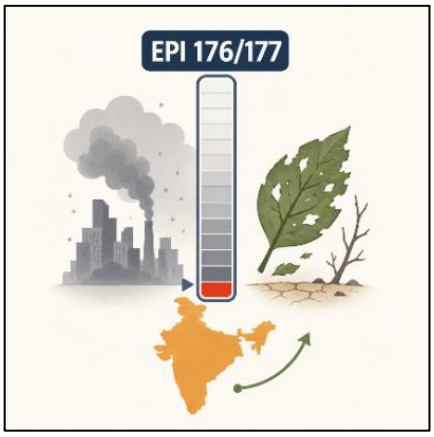
- A floodplain is low-lying land adjoining a river that is naturally inundated when the river overflows; it helps store floodwater, recharge groundwater and maintain river ecology.
- The **2016 Ganga Authorities Order**, issued under the **Environment (Protection) Act, 1986**, provided a regulatory framework for protecting and rejuvenating the River Ganga.
- Earlier, the Order envisaged construction-free zones in the Ganga's floodplains, while their precise extent was to be determined with reference to local conditions.
- The amended framework classifies floodplains according to **flood-return periods**: **active floodplain**—inundated at least once in 5 years; **regulatory zone**—once in 5–25 years; and **warning zone**—once in 25–100 years.
- The petition argues that replacing the construction-free approach could weaken protection of **active floodplains** and conflicts with earlier judicial directions.
- The **NGT**, established under the **National Green Tribunal Act, 2010**, adjudicates cases concerning **environmental protection, forests and natural resources**.
- The NGT has sought responses but has not stayed the amendment.

4.10. India Ranks 176th in Environmental Performance Index 2026

Context:

Recently, India ranked **176th among 177 countries** in the **Environmental Performance Index (EPI) 2026**, scoring 22.46. Its weak performance in environmental health, air quality and biodiversity has renewed concerns, despite methodological debates.

Explanation:



- The **EPI** is a composite index developed by Yale University to assess national environmental outcomes.
- The 2026 edition covers **47 indicators** across **12 issue categories** and 177 countries.
- Indicators fall under three objectives: **Environmental Health, Ecosystem Vitality and Climate Change**.
- Countries are scored from **0 to 100** using a **distance-to-target** method.
- India ranked **176th**, above only Laos; Estonia ranked first.
- The index highlights pollution, ecosystem and public-health risks.
- Rankings across different EPI editions are **not directly comparable** because datasets and methodology change.

4.11. CAG Audit Flags Irregularities in FAME Electric Vehicle Scheme

Context:
The Comptroller and Auditor General (CAG) flagged ₹467.96 crore of FAME incentives given to EV manufacturers violating localisation norms. It also highlighted major delays in FAME-II charging infrastructure, with only 148 of 2,877 approved city charging stations commissioned.



Explanation:

- **FAME India (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles)** was launched in **2015** by the **Ministry of Heavy Industries** to promote electric and hybrid mobility.
- **FAME-I (2015–2019)** supported demand incentives, technology development, pilot projects and charging infrastructure.
- **FAME-II (2019–2024)** had an enhanced outlay and greater emphasis on public/shared transport, e-buses and charging infrastructure.
- Demand incentives reduce the upfront cost of eligible EVs to encourage adoption.
- The **Phased Manufacturing Programme (PMP)** promoted progressive **localisation/domestic manufacturing** of EV components and reduced import dependence.
- **Original Equipment Manufacturers (OEMs)** had to satisfy prescribed eligibility and localisation requirements to receive incentives.
- CAG, a constitutional authority under Article 148, audits government expenditure and promotes financial accountability.
- Charging infrastructure remains critical for reducing range anxiety and accelerating EV adoption.

4.12. Raichur Converts Legacy Dumpsite into Miyawaki Forest

Context:
Under Swachh Bharat Mission-Urban 2.0, Raichur, Karnataka, has scientifically remediated about 62,252 MT of legacy waste at the Yakalaspura dumpsite, reclaiming nearly 22 acres. Part of the reclaimed land is being transformed into a Miyawaki forest using native species.



Explanation:

- **Legacy waste** refers to old municipal solid waste accumulated over years at dumpsites, causing leachate, methane emissions, soil-water contamination and air pollution.
- **Biomining/bioremediation** involves excavating, segregating and processing legacy waste to recover recyclables, refuse-derived fuel and reclaim land.
- **SBM-U 2.0**, launched in **2021**, aims to make cities **Garbage Free** through scientific solid-waste management and remediation of legacy dumpsites.
- The **Miyawaki method**, developed by Japanese botanist **Akira Miyawaki**, creates dense, multilayered forests using **native plant species**.
- Species are planted closely to encourage rapid growth and ecological competition.
- Such urban forests can improve biodiversity, carbon sequestration, microclimate, soil quality and air quality.
- However, Miyawaki plantations are human-created forests and should not substitute conservation of natural forests and native ecosystems.

4.13. Great Indian Bustard Conservation and Revival of Deccan Grasslands

Context:
A Wildlife Institute of India (WII) study has identified 16 priority conservation areas in the Deccan landscape for recovery of the critically endangered Great Indian Bustard (GIB). It highlights traditional low-intensity agriculture, fallow lands and grasslands as crucial for habitat restoration and possible reintroduction.

Explanation:



- **Great Indian Bustard (*Ardeotis nigriceps*)** is a large, ground-dwelling bird of India's arid and semi-arid grasslands.
- It is classified **Critically Endangered** on the **IUCN Red List** and is protected under **Schedule I of the Wildlife (Protection) Act, 1972**.
- Desert National Park, Rajasthan, is its principal remaining stronghold; small populations survive elsewhere.
- Major threats include grassland conversion, intensive agriculture, power-line collisions, pesticides, overgrazing, urbanisation and feral dogs.
- Traditional cultivation of pulses and oilseeds, mixed cropping and fallow fields creates an open agro-grassland mosaic suitable for GIB.
- Small, isolated populations face genetic bottleneck, low genetic variability and inbreeding depression.
- Conservation requires habitat connectivity, protection of open natural ecosystems and scientifically planned reintroduction.

4.14. EU Carbon Border Adjustment Mechanism (CBAM) and India's Export Preparedness

Context:

The Department of Commerce organised an awareness session to prepare Indian exporters for the EU's Carbon Border Adjustment Mechanism (CBAM). Meanwhile, BRICS Environment Ministers opposed CBAM as a unilateral and discriminatory trade measure and reiterated the principles of climate equity and CBDR-RC.

Explanation:



- **CBAM** is the EU mechanism that imposes a carbon price on specified carbon-intensive imports, linking trade with the embedded emissions generated during production.
- It aims to prevent **carbon leakage**, were production shifts to countries with less stringent climate policies.
- Key covered sectors include iron & steel, aluminium, cement, fertilisers, electricity and hydrogen.
- The transitional phase began in October 2023, requiring emissions reporting; the definitive regime started in 2026, involving CBAM certificates.
- Indian exporters therefore require reliable **emissions accounting, accreditation, verification and reporting** systems.
- Developing countries have raised concerns over protectionism, WTO compatibility and climate equity.
- BRICS invokes **CBDR-RC**, a principle under the **UNFCCC and Paris Agreement**, recognising differences in countries' historical responsibilities and capabilities.
- **NABCB** provides accreditation, while **EEPC India** promotes engineering exports.

4.15. India's Progress on Nationally Determined Contributions (NDCs)

Context:

India has made significant progress towards its climate commitments under the Paris Agreement, including achieving the target of 50% installed electricity capacity from non-fossil fuel sources five years ahead of schedule. India has also announced enhanced NDC targets for 2035.

Explanation:

- **Nationally Determined Contributions (NDCs)** are country-specific climate commitments communicated under the **Paris Agreement (2015)** of the **UNFCCC**, aimed at limiting global warming.



- India's existing quantitative NDCs for **2030** include reducing the emissions intensity of GDP by 45% from 2005 levels, achieving **about 50% cumulative installed electric power capacity from non-fossil fuel sources,** and creating an additional carbon sink of 2.5–3 billion tonnes CO_2 equivalent through forest and tree cover.
- By 2020, India reduced the emissions intensity of its GDP by 36% from 2005 levels, and by 2021 had created an additional carbon sink of **2.29 billion tonnes CO_2 equivalent**.
- Non-fossil sources crossed 50% of installed electricity capacity in June 2025 and reached 54.18% by June 2026.
- India's enhanced 2035 NDCs target 47% emissions-intensity reduction, 60% non-fossil installed electricity capacity, and an additional 3.5–4.0 billion tonnes CO_2 equivalent carbon sink.
- **Biennial Transparency Reports (BTRs)** are submitted under the Paris Agreement's **Enhanced Transparency Framework** to report climate action and progress.

4.16. India's E20 Ethanol Blending Programme: Benefits and Sustainability Concerns

Context:

India has rapidly expanded E20 petrol, containing 20% ethanol, to reduce crude-oil imports, save foreign exchange and promote cleaner fuels. Concerns remain regarding feedstock sustainability, food security, water use and compatibility of older vehicles.



Explanation:

- **E20** is petrol blended with **20% ethanol**, a renewable biofuel generally produced in India from sugarcane-based feedstocks, maize and surplus/damaged foodgrains.
- The **Ethanol Blended Petrol (EBP) Programme** aims to reduce crude-oil import dependence, foreign-exchange expenditure and certain vehicular emissions.
- India achieved around 20% ethanol blending in 2025, ahead of its original 2030 target.
- Ethanol has a higher-octane number but lower energy density than petrol, potentially affecting mileage.
- Older E5/E10 vehicles may face compatibility concerns because ethanol is **hygroscopic** and can affect some rubber, plastic and fuel-system components.
- Large-scale ethanol production raises the food-versus-fuel, land-use and water-footprint debate, particularly for sugarcane.
- Second-generation (2G) ethanol from agricultural residues can improve long-term sustainability.

4.17. Climate Cycles Intensified Late Bronze Age Droughts

Context:

Recently, a *Science Advances* study linked extreme Eastern Mediterranean droughts around **1250 BCE** to the convergence of long-term orbital drying and shorter Atlantic climate variability. These droughts coincided with, and possibly intensified, the **Late Bronze Age collapse**.



Explanation:

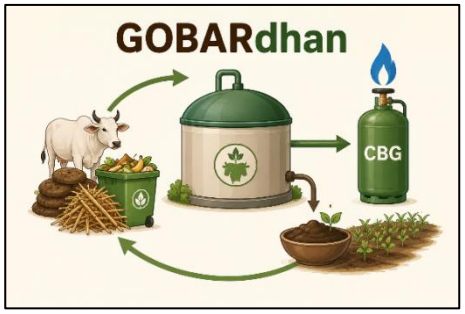
- The **Late Bronze Age collapse** occurred broadly between **1300 and 900 BCE**.
- It affected the **Mycenaeans** of Greece, **Minoans** of Crete and **Hittites** of Anatolia.
- **Paleoclimate** reconstructs past climates using proxy evidence and climate models.

- Slow changes in Earth's orbit caused gradual **Holocene aridification**.
- Shorter **Atlantic Ocean–atmosphere variability** intensified this underlying drying trend.
- Their convergence crossed a **hydroclimatic threshold**, reducing rainfall, water availability and agricultural output.
- Drought likely amplified food insecurity and existing social stresses; it was not necessarily the sole cause of collapse.

4.18. GOBARdhan Scheme

Context:

Recently, the Union Cabinet approved the **GOBARdhan National Unified Scheme** with an outlay of ₹23,731 crore until 2035–36. It aims to expand domestic **compressed biogas (CBG)** production through assured offtake, administered pricing and capital support.



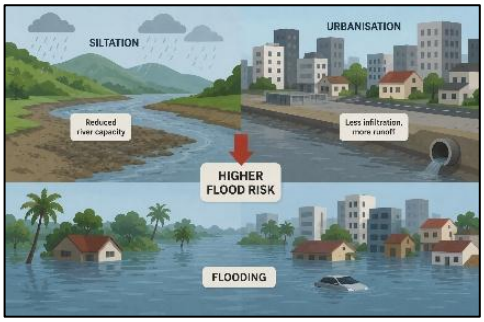
Explanation:

- **GOBARdhan** stands for **Galvanising Organic Bio-Agro Resources Dhan**.
- It converts cattle dung, agricultural residue, press mud and municipal organic waste into useful products.
- **Anaerobic digestion**, or decomposition without oxygen, produces methane-rich **biogas**.
- Purified and compressed biogas becomes **CBG**, which can substitute **Compressed Natural Gas (CNG)** and blend with **Piped Natural Gas (PNG)**.
- The remaining **bio-slurry** can be used as organic manure.
- The scheme promotes a **circular economy**, waste management, rural employment, energy security and lower greenhouse-gas emissions.

4.19. Siltation and Urbanisation Intensify Kerala's Flood Risk

Context:

Recently, extremely heavy rainfall caused flooding in several parts of Kerala, particularly Kottayam, Pathanamthitta and Alappuzha. River and reservoir siltation, wetland loss and rapid urbanisation have reduced the landscape's capacity to absorb and safely drain excess water.



Explanation:

- **Siltation** is the deposition of soil and sand in riverbeds, causing **aggradation** and reducing river carrying capacity.
- Sediment accumulation also lowers **reservoir storage capacity** and may obstruct natural drainage.
- **Wetlands and floodplains** act as natural sponges by storing excess rainfall and moderating flood peaks.
- Their conversion into built-up land removes this **ecosystem service**.
- Roads, concrete and other **impervious surfaces** reduce infiltration and increase **surface runoff** and urban flooding.
- Flood mitigation requires catchment protection, wetland restoration, regulated land use, stormwater drainage and scientifically planned desiltation.

4.20. Pradhan Mantri Surya Sarovar Yojana for Floating Solar Power

Context:

The Union Cabinet has approved the ₹5,070-crore Pradhan Mantri Surya Sarovar Yojana to promote floating solar power through financial assistance for projects on reservoirs and other water bodies. The scheme aims to achieve 5,000 MW of floating solar capacity by 2030–31.



Explanation:

- **Floating Solar Photovoltaic (FPV)** systems are solar panels installed on reservoirs, lakes, dams and other water bodies instead of land.
- The scheme will be implemented by the **Solar Energy Corporation of India (SECI)** and provides **Central Financial Assistance (CFA)** for eligible projects.
- Projects must include **Battery Energy Storage Systems (BESS)** to improve grid stability, meet peak demand and reduce renewable energy curtailment.
- Floating solar reduces land acquisition issues, lowers water evaporation, suppresses algae growth and improves panel efficiency through natural cooling.
- It supports India's Renewable Energy targets, Nationally Determined Contributions (NDCs), energy security and the **Panchamrit** commitments announced at COP26.
- Major potential exists in large reservoirs, with projects complementing ground-mounted and rooftop solar installations.

4.21. India's Paddy Cultivation Emerges as a Major Source of Methane Emissions

Context:

A recent study published in Nature Food has identified India's irrigated paddy fields among the world's largest sources of methane (CH_4) emissions. The study highlights that continuous flooding, residue incorporation and increased nitrogen fertilizer use have significantly increased greenhouse gas emissions from rice cultivation.

Explanation:

- **Methane (CH_4)** is a potent **greenhouse gas (GHG)** with a much higher **Global Warming Potential (GWP)** than carbon dioxide over a 20-year period.
- In flooded paddy fields, oxygen-deficient (**anaerobic**) conditions promote **methanogenic archaea**, which decompose organic matter and release methane.
- Continuous irrigation, incorporation of crop residues, and excessive **nitrogen fertilizer** application further enhance methane emissions from rice cultivation.
- Mitigation measures include **Alternate Wetting and Drying (AWD)**, improved water management, residue management, optimized fertilizer use and cultivation of low-emission rice varieties.

5. Geography

5.1. Cloudbursts in India: Causes, Forecasting Challenges and Disaster Preparedness

Context:

Recent cloudburst incidents in Jammu & Kashmir and the Northeast have renewed attention to these highly localized extreme rainfall events.



Explanation:

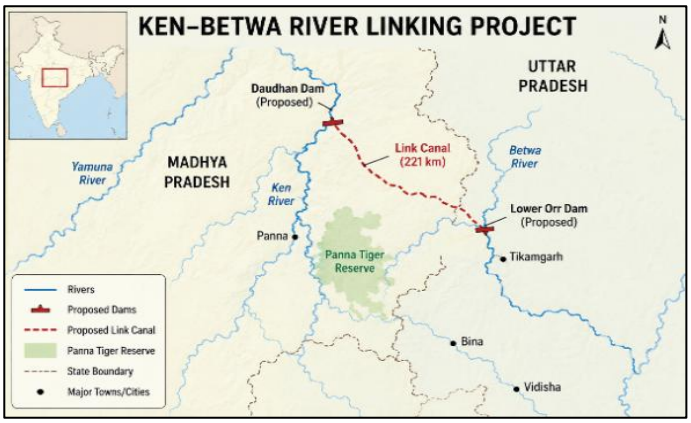
- A **cloudburst**, as defined by the India Meteorological Department (IMD), is rainfall of **10 cm or more within one hour over an area of about 20–30 sq. km.**
- It commonly occurs in mountainous regions due to **orographic lifting**, where moist air rises, cools, condenses into **cumulonimbus clouds**, and releases intense rainfall.
- Cloudbursts often trigger flash floods, landslides, debris flows, and soil erosion.
- They are difficult to forecast because they are highly localized, short-lived, **mesoscale weather events**, often beyond the resolution of numerical weather models.
- Doppler Weather Radars (DWRs), Automatic Weather Stations (AWS), nowcasting, AI-based forecasting, and **Mission Mausam** aim to improve early warning systems.
- Disaster impacts are amplified by poor drainage, deforestation, riverbed encroachments, and construction in hazard-prone zones.

5.2. Ken–Betwa River Linking Project and Protests over Rehabilitation

Context:

Protests have intensified against the Ken–Betwa River Linking Project in Madhya Pradesh over alleged irregularities in rehabilitation, compensation, and Gram Sabha consent.

Explanation:



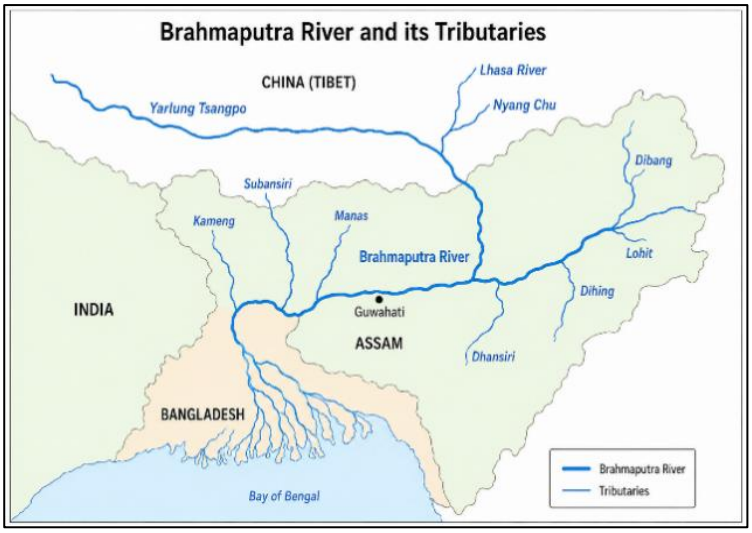
- The Ken–Betwa Link Project is India's **first river interlinking project** under the National Perspective Plan (NPP), aimed at transferring surplus water from the Ken River to the Betwa River.
- The project includes the **Daudhan Dam**, a **221-km canal**, hydropower generation and irrigation facilities benefiting Madhya Pradesh and Uttar Pradesh.
- The Ken River is a tributary of the Yamuna, while the Betwa River is also a Yamuna tributary; both belong to the Ganga Basin.
- Major concerns include forest diversion, submergence within the **Panna Tiger Reserve**, biodiversity loss, displacement of local communities, and compliance with **Forest Rights Act, 2006** and environmental clearance norms.

5.3. Unprecedented Floods in Assam: Causes and Contributing Factors

Context:

Assam has witnessed severe flooding due to persistent heavy rainfall, rising water levels in the Brahmaputra and its tributaries, and intense localized weather events.

Explanation:



- The Brahmaputra River Basin is highly flood-prone due to **high monsoon rainfall**, snowmelt, low-gradient floodplains, and heavy sediment deposition, which frequently alters river channels.
- **Cloudbursts** are localized extreme rainfall events (generally **over 100 mm per hour**) that can trigger flash floods and landslides, though they are not the sole cause of Assam's floods.
- Climate change increases the frequency and intensity of **extreme precipitation events**, while **deforestation**, wetland loss, and encroachment reduce natural water retention and increase surface runoff.
- **Tributaries** such as the **Subansiri, Jia Bharali (Kameng), Dhansiri, and Dikhow** contribute significantly to flood peaks in the Brahmaputra during the southwest monsoon.
- Experts attribute the scale of flooding to a combination of extreme rainfall, climate change, deforestation, and changes in river morphology.

5.4. Climate and Geological Factors Behind the 2024 Wayanad Landslide

Context:

A study published in Landslides found that the 2024 Wayanad disaster resulted from an interplay of extreme monsoon rainfall and pre-existing geological weaknesses. Rainfall triggered the slope failure, while geology and geomorphology controlled its location, movement and destructive intensity.



Explanation:

- A **landslide** is the downslope movement of rock, soil or debris under **gravity** when driving forces exceed the slope's resisting strength.
- **Wayanad, Kerala**, lies in the **Western Ghats**, characterised by steep slopes, deeply weathered rocks **and heavy southwest monsoon rainfall.**
- Ancient **crystalline rocks** in the region contain fractures, shear zones and foliations, which act as natural planes of weakness.
- Rainwater entering fractures promotes chemical weathering, converting hard rocks into weaker weathered material.
- Prolonged or intense rainfall causes soil saturation, raises pore-water pressure and reduces shear strength, triggering slope failure.
- Hence, rainfall may be the immediate trigger, while lithology, slope, structural geology, geomorphology and weathering determine landslide susceptibility.
- Landslide Hazard Zonation (LHZ) maps areas according to their relative susceptibility to landslides.

6. Science and Technology

6.1. AI-Designed Bacteriophages to Combat Drug-Resistant Bacteria

Context:

Scientists have used AI-based genome language models to design complete genomes of bacteriophages, viruses that infect bacteria. Using bacteriophage **ΦX174 (Phi X174)** as a template, researchers produced functional synthetic phages capable of killing bacteria resistant to some naturally occurring viruses.

Explanation:

- **Bacteriophages (phages)** are viruses that specifically infect bacterial cells and are generally composed of genetic material (DNA or RNA) enclosed within a protein capsid.
- During the **lytic cycle**, a phage attaches to a bacterium, injects its genome, replicates using the host machinery and causes cell lysis, releasing new phages.
- **Lysogenic phages** can integrate their genetic material into the bacterial chromosome as a prophage without immediately killing the host.
- **Phage therapy** uses bacteriophages to target pathogenic bacteria and is being explored as an alternative or complement to antibiotics, particularly against antimicrobial resistance (AMR).
- Genome language models learn patterns in biological sequences and can generate novel DNA sequences; designing entire functional viral genomes represents an application of AI in synthetic biology.
- **ΦX174** is a well-studied bacteriophage with a small single-stranded DNA (ssDNA) genome, making it useful in molecular biology and synthetic-genome research.

6.2. Traditional Diets Shape Distinct Gut Microbiomes of Indian Tribal Communities

Context:

A study of eight Indian tribal populations found distinctive gut microbial diversity strongly influenced by traditional dietary practices. Researchers stress microbiome biobanking to conserve this diversity and enable development of population-specific probiotic interventions.



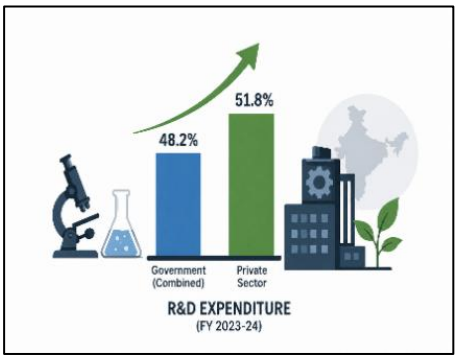
Explanation:

- **Gut microbiome** refers to the community of microorganisms and their genetic material inhabiting the gastrointestinal tract; diet is a major determinant of its composition.
- Gut microbes aid digestion, nutrient metabolism, vitamin synthesis, immune regulation and protection against pathogens.
- Indian tribal microbiomes show considerable diversity due to distinct dietary patterns, geography, culture and evolutionary adaptations.
- **Bifidobacterium**, widely used as a probiotic, ferments carbohydrates and produces beneficial **short-chain fatty acids (SCFAs)**.
- High dairy consumption among some trans-Himalayan tribes is associated with distinctive *Bifidobacterium adolescentis* strains and lactose-metabolising microbial functions.
- **Probiotics** are live microorganisms that confer health benefits when administered in adequate amounts.
- **Biobanking** preserves biological samples and microbial diversity for future research and therapeutic applications.

6.3. Private Sector Becomes India's Largest Contributor to R&D Expenditure

Context:

Official data released by the Department of Science and Technology (DST) shows that private industry accounted for 51.8% of India's Gross Expenditure on Research and Development (GERD) in 2023-24, surpassing the combined contribution of all levels of government for the first time. India's overall R&D expenditure reached 0.83% of GDP.



Explanation:

- **Research and Development (R&D)** comprises systematic scientific and technological activities aimed at creating new knowledge, products and processes.
- **GERD (Gross Expenditure on Research and Development)** measures total national R&D spending by government, higher education, public sector enterprises, private industry and other institutions, expressed in absolute terms or as a percentage of GDP.
- India's R&D statistics are compiled by the Department of Science and Technology **(DST)** through the National Science and Technology Management Information System **(NSTMIS)** using UNESCO and OECD definitions.
- Private industry's share in GERD increased from **45.5% (2021-22)** to **51.8% (2023-24)**, marking a structural shift in India's innovation ecosystem.
- Stronger private-sector R&D, in-house R&D centres, and collaboration between industry, academia and government are essential for innovation, technology development and global competitiveness.

6.4. Study Links Urban Diets to Changes in Gut Microbiome in India

Context:

A recent study published in Gut Microbes found that urbanisation and increased consumption of processed foods are reshaping the gut microbiome of Indians.



Explanation:

- The **gut microbiome** includes bacteria, viruses, fungi and other microorganisms that influence digestion, immunity and metabolism.
- **Megamonas** was found to be more abundant among urban populations and is associated with obesity, hypertension and elevated blood glucose.
- **Holdemanella**, linked with fibre consumption and better glucose tolerance, declined with urbanisation except where traditional diets were retained.
- Processed foods, sugary drinks and low-fibre diets can reduce microbial diversity and cause **gut dysbiosis**.
- The study shows that diet and environment, rather than genetics alone, reshape the microbiome and influence NCD risk.

6.5. Anthropic's AI Watermarking and the Challenge of Identifying AI-Generated Content

Context:

Anthropic plans to introduce machine-readable watermarks for content generated or processed by its Claude AI models, partly in response to the European Union's AI Act. The move has raised concerns about false attribution, especially for human-created text subsequently processed by AI.

Explanation:

- **AI watermarking** embeds identifiable signals or **provenance metadata** into AI-generated or AI-processed content to help trace its origin.



- Watermarks can be visible or machine-readable; the latter are designed for detection by software rather than human observation.
- **Content provenance** records information about the origin and processing history of digital content, helping identify deepfakes and synthetic media.
- The **EU AI Act** establishes transparency requirements for certain AI-generated or manipulated content.
- Watermarking images and videos is comparatively feasible, while reliable identification of AI-generated text remains technically difficult.
- Editing, translation, summarisation, format conversion or removal of metadata can weaken detection mechanisms.
- **False positives and false negatives** may wrongly classify human or AI-generated content, making watermarking an aid rather than conclusive proof of authorship.

6.6. India's Lunar Future: NASA's Moon Base Programme and ISRO

Context:

NASA has invited the **Indian Space Research Organisation (ISRO)** to join its proposed Moon Base programme, seeking a sustained human outpost near the lunar south pole around 2030. The invitation builds on the **Artemis Accords** and expanding India–United States space cooperation.



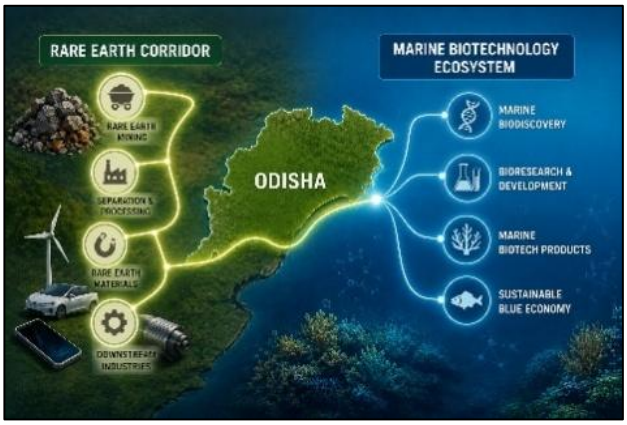
Explanation:

- The lunar south pole contains **water ice** in permanently shadowed craters, while elevated areas receive prolonged sunlight.
- This ice could provide water, oxygen and hydrogen for life support and fuel production.
- NASA's **Artemis programme** seeks human return and long-term lunar presence through international and commercial partnerships.
- India joined the non-binding **Artemis Accords** in 2023, supporting peaceful, transparent and sustainable civil space exploration.
- **Chandrayaan-3** made India first to land in the south polar region, while the **NISAR satellite** demonstrated NASA–ISRO cooperation.
- Cooperation could improve technology and interoperability, but India must protect strategic autonomy amid the competing **China–Russia lunar programme**.

6.7. Odisha's Rare Earth Corridor and Marine Biotechnology Ecosystem

Context:

The Centre and Odisha have discussed an integrated science-led development roadmap combining the **Rare Earth Corridor, marine biotechnology, critical minerals, space technology and life sciences**. The initiative seeks to leverage Odisha's coastline, mineral resources and scientific institutions for strategic and sustainable growth.



Explanation:

- **Rare Earth Elements (REEs)** comprise **17 metallic elements** - 15 lanthanides plus **scandium and yttrium** - critical for electronics, permanent magnets, clean energy, defence and space technologies.

- **Rare Earth Corridors** announced for **Odisha, Kerala, Andhra Pradesh and Tamil Nadu** aim to integrate mining, processing, research and manufacturing.
- India's coastal **monazite sands** are important sources of **rare earths and thorium**, an **atomic mineral**.
- **OMBRIC (Odisha Marine Biotechnology Research & Innovation Corridor)** links research institutions for biotechnology-based sustainable utilisation of marine bio-resources.
- **BioE3 Policy** promotes **Biotechnology for Economy, Environment and Employment**.
- **Deep Ocean Mission**, under the **Ministry of Earth Sciences**, focuses on deep-sea resources, technologies, biodiversity and ocean research.

6.8. AI-Generated Satellite Imagery and Deepfake Risks

Context:

Google rolled back an AI image-generation feature in Google Earth after users produced realistic fake satellite images depicting violence, disasters and other fabricated events. The episode highlights risk of AI-generated geospatial deepfakes, particularly misinformation, fraud and manipulation of satellite evidence.

Explanation:



- **Satellite imagery** is remotely sensed data acquired by Earth-observation satellites using optical, infrared, microwave or radar sensors.
- **Generative AI** can create synthetic content from user prompts; when designed to convincingly imitate genuine imagery, such content may function as a **deepfake**.
- **Geospatial deepfakes** manipulate locations, landscapes, infrastructure or events in satellite/map imagery, potentially creating false geographical evidence.
- Such imagery can facilitate misinformation, real-estate fraud, fabricated disaster or conflict visuals, and manipulation of public perception.
- **Watermarking** and metadata can identify AI-generated content, but watermarks may be removed or cropped.
- Satellite images themselves are not automatically conclusive evidence because resolution, update frequency, cloud cover and interpretation can affect reliability.
- Key safeguards include **content provenance, digital watermarking, metadata authentication, fact-checking and human verification**.
- In India, **deepfakes and AI-generated misinformation** intersect with the broader regulatory framework governing digital platforms and cyber offences.

6.9. Gujarat Bans Unstandardised Analogue Dairy Products

Context:

Gujarat has prohibited the manufacture, storage, transport and sale of **unstandardised analogue paneer, cheese and butter**, following similar action by Maharashtra and Chhattisgarh. The measure aims to protect public health and prevent consumer deception.



Explanation:

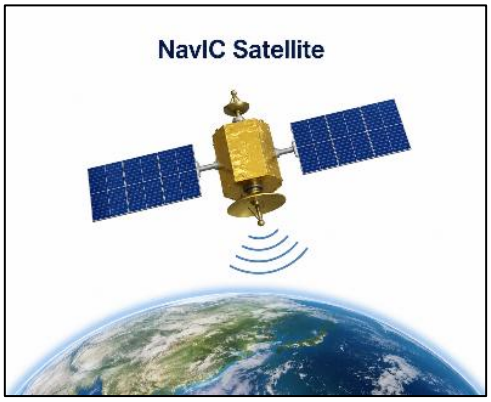
- A **dairy analogue** imitates a dairy product by replacing milk fat or solids wholly or partly with **vegetable oils or other non-dairy ingredients**.
- **Paneer** is a standardised milk product; an analogue cannot legally be sold as paneer.

- Such substitutes are distinct from permitted standardised products like **frozen dessert, processed cheese** and **mixed-fat spread**.
- The **Food Safety and Standards Authority of India (FSSAI)** regulates food under the **Food Safety and Standards Act, 2006**.
- Food labels must disclose the product's **true nature, ingredients and nutritional information**.
- Misbranding an analogue as genuine dairy constitutes **misleading labelling** and violates food-safety law.

6.10. NavIC Constellation Unable to Provide Standalone Navigation Services

Context:

The Government informed Parliament that NavIC can no longer independently provide standalone positioning services because only three satellites are currently providing Positioning, Navigation and Timing (PNT) services, whereas at least four operational satellites are required.



Explanation:

- **NavIC (Navigation with Indian Constellation)** is India's regional satellite navigation system, developed by ISRO under the **Indian Regional Navigation Satellite System (IRNSS)**.
- It was designed as a **7-satellite constellation** to provide Positioning, Navigation and Timing (PNT) services over India and **up to 1,500 km beyond its borders**.
- A minimum of **four operational satellites** is required for standalone positioning; currently, only **three satellites** are operational for PNT.
- NavIC receivers can still use GPS (USA), Galileo (EU), GLONASS (Russia), and BeiDou (China) in a multi-constellation GNSS environment.
- NVS-series satellites are the second-generation NavIC satellites with improved atomic clocks and enhanced navigation capabilities.

6.11. Adi Vaani and Digital Preservation of Tribal Languages

Context:

Recently, the Ministry of Tribal Affairs (MoTA) inaugurated the National Conclave on Tribal Languages & Museums in Mysuru, Karnataka. It launched the upgraded Adi Vaani platform, the Jago AI assistant, and signed an MoU with the Central Institute of Indian Languages (CIIL) for tribal-language documentation and corpus development.

Explanation:



- India has numerous **tribal languages and dialects**, many of which depend largely on **oral traditions**; inadequate documentation can threaten their intergenerational transmission.
- **Adi Vaani** is a technology-based initiative of the **Ministry of Tribal Affairs** for preserving, documenting and improving access to tribal languages. Its upgraded version includes an iOS application and five additional languages.
- **Jago** is MoTA's **AI conversational assistant** that provides accessible information on tribal welfare schemes, programmes, initiatives and repositories.
- MoTA and CIIL, Mysuru signed an MoU for language documentation and corpus development. A *language corpus* is a structured collection of spoken or written language data used for research and digital tools.
- Technologies discussed include Automatic Speech Recognition (ASR), Text-to-Speech (TTS), machine translation, digital keyboards and fonts.

- **Multilingual education** using tribal languages can improve classroom comprehension while supporting preservation of indigenous knowledge and culture.
- **Tribal Research Institutes (TRIs)** undertake research, documentation and preservation of tribal culture and heritage.
- The Conclave also focuses on **Tribal Freedom Fighter Museums (TFFMs)** and community-led preservation of tribal history.

6.12. 'Chipflation': Memory Chip Shortage Pushes Up Electronics Prices

Context:

Recently, prices of consumer electronics such as **air** conditioners, smartphones, televisions and computers have risen sharply due to a global shortage of memory chips. The shortage is linked partly to growing Artificial Intelligence (AI) demand diverting semiconductor manufacturing capacity towards advanced chips.

Explanation:



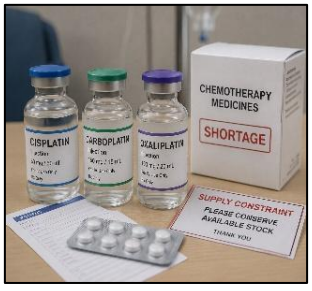
- **Semiconductors** are materials used to manufacture electronic chips that control, process or store data in electronic devices.
- **Memory chips** store digital information; major types include **Dynamic Random Access Memory (DRAM)** and **NAND flash memory**.
- The **AI boom** has increased demand for advanced and high-performance memory, encouraging manufacturers to shift production capacity towards more profitable AI-related chips.
- This has reduced supplies of conventional memory used in **smartphones, computers and household appliances**.
- Since semiconductor manufacturing requires highly specialised fabrication facilities and long capacity-expansion periods, supply cannot increase immediately.
- Rising chip costs increase manufacturers' **input costs**, which may be passed on to consumers through higher retail prices.
- This technology-driven increase in electronics prices is informally described as **"chipflation"**, combining *chip* and *inflation*.

6.13. Platinum-Based Chemotherapy Drug Shortage and India's Medicine Supply Challenge

Context:

Recently, patients and hospitals across India reported shortages of cisplatin, carboplatin and oxaliplatin, important platinum-based chemotherapy medicines. Disrupted platinum supplies, rising input costs and controlled medicine prices have affected domestic production and timely cancer treatment.

Explanation:



- **Cisplatin, carboplatin and oxaliplatin** are **platinum-based chemotherapy** medicines for cancers of the lungs, head and neck, ovaries, cervix, testis and digestive system.
- They form **cross-links** in the cancer cell's **DNA**, blocking replication and causing cell death.
- India makes the finished medicines but imports platinum and related **active pharmaceutical ingredients (APIs)**; **South Africa** is the leading producer, with supplies also routed through the UAE and Tanzania.
- West Asian conflict, disruption around the **Strait of Hormuz** and costly logistics have restricted raw-material availability.

- Platinum prices also rose on demand from the jewellery, automobile, electronics, semiconductor and clean-energy industries.
- The **National Pharmaceutical Pricing Authority (NPPA)** fixes **ceiling prices** under the **Drugs (Prices Control) Order, 2013**, and in June 2026 raised those of cisplatin and carboplatin by **50% for six months**.
- Remedies include diversified suppliers, domestic API capacity, shortage monitoring and **buffer stocks** – an inexpensive medicine helps no one if it is unavailable.

6.14. Rotating Detonation Engine: A New Propulsion Technology

Context:

Indian defence start-up D-Propulse recently demonstrated an indigenous 5-kilonewton air-breathing Rotating Detonation Engine (RDE) at a DRDO facility. The experimental technology may support future missiles, drones and high-speed aircraft.



Explanation:

- Conventional engines burn a fuel–air mixture through **deflagration**, in which the flame front travels slower than sound.
- A detonation is a much faster combustion process; its flame front moves at supersonic speed along with a powerful shock wave.
- An **RDE** uses a ring-shaped or **annular combustion chamber** into which fuel and oxidiser are continuously injected.
- After ignition, one or more detonation waves rotate continuously around the annulus, repeatedly compressing and burning the fresh mixture.
- High-pressure gases expand through a nozzle and generate thrust in accordance with **Newton's third law of motion**.
- Detonation gives **pressure-gain combustion**, unlike the nearly constant-pressure combustion of conventional combustors, improving thermodynamic efficiency and allowing smaller, lighter engines.
- An air-breathing engine draws oxygen from the atmosphere, whereas a rocket engine carries its own oxidiser for operation in space.
- Unlike a **Pulsed Detonation Engine**, which fires separate detonations in a tube, an RDE produces nearly continuous thrust.
- Stable detonation control, extreme heat, shock loads and durable materials remain the principal challenges.

6.15. BCG Vaccine and 'Trained Immunity' Against Alzheimer's Disease

Context:

A 2026 study recently found that the Bacillus Calmette–Guérin (BCG) vaccine can produce long-lasting changes in innate immune cells, including those linked to the central nervous system. Its principal approved purpose remains protection against tuberculosis.



Explanation:

- **BCG** stands for **Bacillus Calmette–Guérin**, named after the scientists Albert Calmette and Camille Guérin.
- It is a **live attenuated vaccine** made from a weakened strain of **Mycobacterium bovis**, a close relative of **Mycobacterium tuberculosis**.
- First used in humans **in 1921,** it is one of the oldest vaccines still widely administered.
- It trains the immune system to recognise mycobacteria and act quickly on exposure.

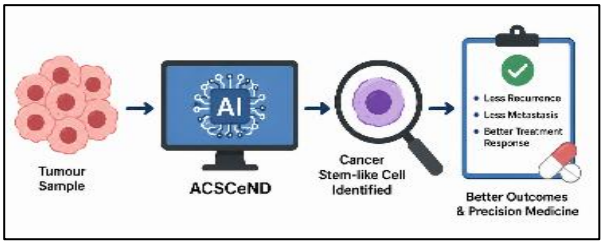
- It works best against severe childhood tuberculosis, including **tuberculous meningitis and miliary tuberculosis.**
- Protection against adult pulmonary tuberculosis is variable and may decline with time.
- Under the **Universal Immunisation Programme,** one dose is given **intradermally at birth** in the left upper arm, with no routine booster.
- BCG is also used as immunotherapy for certain non-muscle-invasive bladder cancers.
- It can produce **trained immunity**, a broad and non-specific strengthening of innate immune responses, though new uses need larger trials.

6.16. ACSCeND: AI-Based Detection of Cancer Stem-Like Cells

Context:

Researchers from S.N. Bose National Centre for Basic Sciences and Ashoka University have developed ACSCeND, an AI framework to identify hidden cancer stem-like cells from tumour gene-expression data. It may help predict tumour recurrence, metastasis and treatment response, supporting precision medicine.

Explanation:



- **Cancer stem-like cells (CSCs)** are rare tumour cells capable of self-renewal and differentiation, contributing to recurrence, metastasis and therapy resistance.
- **ACSCeND** stands for **AI-based Cancer Stem-like Cell Profiler and Neoplasm Deconvoluter.**
- It identifies three developmental states: pluripotent-like, multipotent-like and unipotent-like cancer stem cells.
- It integrates single-cell sequencing knowledge with deep learning to analyse conventional bulk tumour **RNA sequencing (RNA-seq)** data.
- Unlike a single **"stemness" score**, it helps reveal **tumour heterogeneity** and hidden cell populations.
- Analysis of over 25,000 tumour samples linked pluripotent-like CSC enrichment with poorer survival, recurrence and reduced immunotherapy response.
- Such **AI-genomics** approaches can identify biomarkers, potential drug targets and high-risk patients, advancing precision medicine.

6.17. SpaceX Falcon 9 Rocket Stage Set to Impact the Moon

Context:

Astronomers are tracking the spent upper stage of a SpaceX Falcon 9 rocket, launched in January 2025, which is expected to collide with the Moon after remaining in an unstable orbit. Scientists view the event as a rare opportunity to study lunar dust, impact craters, and seismic activity.

Explanation:

- A **rocket stage** is a discarded part of a launch vehicle after it has exhausted its fuel. Uncontrolled upper stages may remain in Earth-Moon space if not deorbited.
- Artificial impacts on the Moon help scientists study impact cratering, lunar regolith (dust), ejecta, and seismic waves, improving understanding of the Moon's geology.
- The **Moon has no significant atmosphere**, so incoming objects strike its surface directly, creating impact craters.
- Increasing lunar missions by NASA, ESA, ISRO, CNSA, JAXA, and private companies raise concerns over space debris, lunar heritage protection, and space traffic management.
- The **Outer Space Treaty (1967)** governs peaceful use of outer space but lacks specific provisions on lunar debris management, prompting international discussions under the **United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS).**

6.18. Rising Power Demand from AI Data Centres in India

Context:

The Ministry of Power has projected that AI-driven data centres in India could require an additional 26.3 GW of electricity by 2031–32, nearly double its earlier estimate. The government plans to meet much of this demand through renewable energy while strengthening transmission infrastructure and grid reliability.

Explanation:



- A **data centre** is a facility that houses servers, storage systems and networking equipment to process, store and transmit digital data for cloud computing, AI and internet services.
- Artificial Intelligence (AI) workloads require **High-Performance Computing (HPC)**, including **Graphics Processing Units (GPUs)** and specialized AI chips, making AI data centres highly electricity-intensive.
- Rapid growth in cloud computing, digital payments, 5G, enterprise digitalisation and **Generative AI** is driving expansion of data centre infrastructure in India.
- Data centres require uninterrupted power, efficient cooling systems, robust transmission networks and low-latency connectivity, making location and grid stability critical.
- India is promoting renewable energy, **green data centres**, energy-efficient cooling and grid modernization to support digital infrastructure while reducing carbon emissions and ensuring energy security.

6.19. H1N1 Influenza: Transmission, Symptoms and Prevention

Context:

Recently, H1N1 (swine flu) cases have increased in Delhi, with doctors advising vaccination and precautions while cautioning against panic. Experts have indicated that genetic analysis may help determine whether changes in the circulating virus contributed to the surge.

Explanation:



- **H1N1** is a subtype of **Influenza A virus**, named after its surface proteins **Haemagglutinin (H)** and **Neuraminidase (N)**.
- It is commonly called swine flu because related influenza viruses historically circulated among pigs; the 2009 H1N1 pandemic involved sustained human-to-human transmission.
- It primarily spreads through respiratory droplets and aerosols released during coughing, sneezing or talking.
- Common symptoms include fever, cough, sore throat, headache, fatigue and muscle aches; severe infection may cause **pneumonia or respiratory distress**.
- Elderly persons, young children, pregnant women and people with comorbidities face greater risk of complications.
- Diagnosis may involve **RT-PCR**, while **oseltamivir** is an antiviral used for treatment, particularly in high-risk or severe cases.
- **Seasonal influenza vaccination**, respiratory hygiene and ventilation help reduce infection and severe disease.

6.20. Gaganyaan's Ablative Heat Shield and Crew Safety During Re-entry

Context:

Recently, the Indian Space Research Organisation (ISRO) reported that Gaganyaan's Thermal Protection System (TPS) has been developed and tested, while preparations for the first uncrewed G1 mission are progressing. The heat shield will protect the crew module from extreme temperatures during atmospheric re-entry.

Explanation:



- **Gaganyaan** is India's human-spaceflight programme for **low-Earth orbit**; its **Orbital Module** has a habitable **Crew Module** and an unpressurised **Service Module**.
- During **re-entry** at about **7.5–8 km per second**, compression of the air ahead creates an extremely hot **shock layer**.
- The outer surface may approach **1,800°C**, while the interior must stay below about **150°C**.
- A **Thermal Protection System (TPS)** may be **ablative, radiative or heat-sink** – sacrificing material, re-radiating heat, or storing it within its mass.
- Gaganyaan's **ablative heat shield** absorbs heat, decomposes and forms an insulating **char** layer; escaping gases (**outgassing**) carry heat away and create a cooler boundary layer.
- As the material is consumed it is **single-use**, but proven, reliable and able to handle rapidly changing heat loads.
- ISRO earlier demonstrated the technology through **SRE** and **CARE**; a reliable shield is vital because astronauts cannot react fast enough during re-entry.

6.21. Growing Threat of Uncontrolled Space Debris Re-entering Earth

Context:

A recent report highlights that nearly one tonne of uncontrolled space debris re-enters Earth's atmosphere every week, with increasing incidents linked to the rapid rise in satellite launches and ageing spacecraft.

Explanation:



- **Space debris (space junk)** includes defunct satellites, spent rocket stages, mission-related objects, and fragments from collisions or explosions orbiting Earth.
- Most debris burns up due to atmospheric friction during re-entry, but larger objects may survive and reach the surface.
- The growth of Low Earth Orbit (LEO) satellite constellations has increased congestion and collision risk, known as the **Kessler Syndrome**.
- **Space Situational Awareness (SSA)** tracks objects to prevent collisions and predict re-entries.
- International guidelines are issued by the **Inter-Agency Space Debris Coordination Committee (IADC)** and the **UN Committee on the Peaceful Uses of Outer Space (COPUOS)**.
- Sustainable space operations require de-orbiting, passivation, active debris removal, and adherence to 25-year disposal guidelines.

7. History & Culture

7.1. Sarnath Inscribed on the UNESCO World Heritage List

Context:
The ancient Buddhist site of Sarnath in Uttar Pradesh has been inscribed on the UNESCO World Heritage List during the 48th session of the World Heritage Committee held in Busan, South Korea. With this inscription, Sarnath becomes **India's 45th UNESCO World Heritage Site**.



Explanation:

- Sarnath, located near **Varanasi** (Uttar Pradesh), is one of the four principal Buddhist pilgrimage sites associated with the life of **Gautama Buddha**.
- It is the place where Lord Buddha delivered his **First Sermon (Dhammacakkappavattana Sutta)** after attaining enlightenment, marking the beginning of the Buddhist Sangha.
- The site contains important monuments such as the **Dhamek Stupa**, **Chaukhandi Stupa**, **Ashokan Pillar** (whose Lion Capital is the National Emblem of India), monasteries and ancient temples.
- **UNESCO World Heritage Sites** are places of **Outstanding Universal Value (OUV)** recognized under the **1972 World Heritage Convention** and are inscribed by the World Heritage Committee.

7.2. Vaishya Tekri Excavations and Emperor Ashoka's Association with Ujjain

Context:
Recently, the Madhya Pradesh government began fresh excavations at Vaishya Tekri, Ujjain, to investigate Buddhist remains potentially associated with Emperor Ashoka and the Mauryan period. The site may provide further evidence about ancient Ujjain's Buddhist and Mauryan connections.



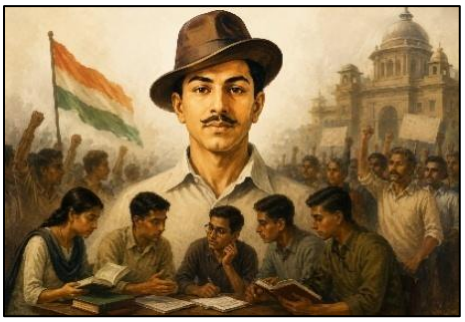
Explanation:

- **Ashoka (c. 268–232 BCE)** was the grandson of **Chandragupta Maurya** and son of **Bindusara**; according to tradition, he served at **Ujjain** before becoming emperor.
- Ujjain was the capital of Avanti, located on the Shipra River, and an important trade centre.
- Ashoka's Kalinga War profoundly influenced his policy of Dhamma, emphasising compassion, tolerance, non-violence and welfare.
- His ideas are known mainly through **Major Rock Edicts, Minor Rock Edicts and Pillar Edicts**, generally written in **Prakrit using Brahmi script**.
- In the northwest, some inscriptions used **Kharosthi**, while Greek and Aramaic inscriptions are also known.
- Ashoka appointed **Dhamma Mahamattas** to promote Dhamma and public welfare.
- His **13th Major Rock Edict** describes the Kalinga War and Ashoka's remorse.
- **Rummindei Pillar inscription** identifies **Lumbini** as Buddha's birthplace; the **Maski inscription** explicitly mentions the name **Ashoka**.
- Ashoka patronised Buddhism and stupas, while his Dhamma was broader than Buddhism.

7.3. Bhagat Singh: Revolutionary Nationalism and the Role of Students in India's Freedom Struggle

Context:
Recently, renewed student mobilisation around education, employment, social justice and constitutional rights has brought Bhagat Singh's political legacy back into public discussion. His life continues to inspire young people to study, organise and take part in democratic struggles.

Explanation:



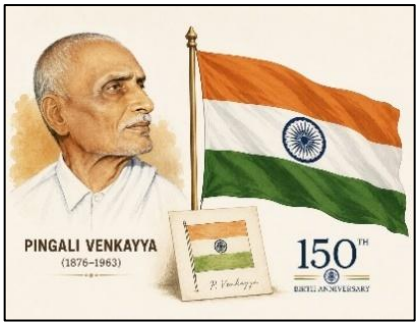
- **Bhagat Singh (1907–1931)** was a revolutionary nationalist associated with the **Hindustan Socialist Republican Association (HSRA)**.
- He helped establish the **Naujawan Bharat Sabha (1926)** at Lahore to mobilise youth against colonialism and communalism.
- Bhagat Singh and **Batukeshwar Dutt** threw non-lethal bombs in the Central Legislative Assembly (1929) to protest the Public Safety Bill and Trade Disputes Bill.
- He was tried in the **Lahore Conspiracy Case** for the killing of British police officer **J.P. Saunders**.
- Bhagat Singh, **Sukhdev and Rajguru** were executed on **23 March 1931**; the day is commemorated as **Shaheed Diwas**.
- His ideological outlook evolved towards socialism, secularism, rationalism and anti-imperialism.
- His writings include **"Why I Am an Atheist"** and **"To Young Political Workers."**

7.4. 150th Birth Anniversary of Pingali Venkayya

Context:

The Prime Minister paid tribute to Pingali Venkayya on his 150th birth anniversary, recognising his seminal contribution to India's freedom struggle and his role in designing the Indian National Flag (Tiranga).

Explanation:



- **Pingali Venkayya (1876–1963)** was a freedom fighter, agriculturist, and the designer of the prototype of the Indian National Flag.
- At the 1921 **All India Congress Committee (AICC) session** in Bezwada (now Vijayawada), he presented a flag design to Mahatma Gandhi, which was later modified.
- On 22 July 1947, the Constituent Assembly adopted the present National Flag.
- The Tiranga has three horizontal bands—Saffron, White, and Green—with the **navy-blue Ashoka Chakra (24 spokes)** at the centre, replacing the earlier charkha.
- The Flag Code of India, 2002 regulates the display and use of the National Flag, while respect for the flag is protected under the **Prevention of Insults to National Honour Act, 1971**.

7.5. Malhar Ragas and India's Classical Music Tradition

Context:

Recently, the Vice President inaugurated MALHAR 2026 in New Delhi, a youth-centric celebration of Indian classical music. The event highlighted the Malhar family of ragas, traditionally associated with the monsoon, and the role of music in preserving India's cultural heritage.

Explanation:



- Indian classical music has two major traditions: Hindustani music of northern India and Carnatic music of southern India.
- A raga is a melodic framework based on a particular arrangement and treatment of musical notes, while tala provides the rhythmic framework.
- **Malhar** refers to a family of ragas traditionally associated with the **monsoon and rains**, particularly in the Hindustani tradition.
- Important variants include Miyan ki Malhar, Megh Malhar, Gaud Malhar and Sur Malhar.

- Miyan ki Malhar is traditionally associated with **Miyan Tansen**, the celebrated musician at Mughal Emperor **Akbar's court**.
- Hindustani music developed important vocal forms such as **Dhrupad, Khayal, Thumri and Tarana**.
- Indian classical music is largely transmitted through the **Guru-Shishya tradition** and represents India's intangible cultural heritage and cultural soft power.

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