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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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Polity & Governance

1.1. Central Prabhari Officer (CPO)

The Central Prabhari Officer (CPO) Portal is a digital platform launched by NITI Aayog to eliminate persistent implementation deficits in government welfare schemes. By replacing delayed reporting with continuous data-driven supervision, the portal ensures that grassroots insights directly inform policy decisions.

Core Objectives:

- **Address Implementation Deficits:** Overcomes weak feedback loops and fragmented coordination across Centre, State, and District levels.
- **Real-Time Governance:** Transforms administrative supervision from periodic paperwork to continuous tracking.
- **Accelerate Last-Mile Delivery:** Ensures welfare initiatives reach the most marginalized communities under the Aspirational Districts/Blocks Programmes (ADP/ABP).

1.2. Bonded Labour Rescue from Brick Kilns and Labour Rights in India

Context:

Over 400 labourers, including nearly 100 children, were rescued from brick kilns in Nizamabad, Telangana, after allegations of bondage-like working conditions, wage denial, confinement and abuse. The incident highlights persistent challenges of bonded labour, migrant worker exploitation and child labour in informal sectors.

Explanation:

- **Article 23 of the Constitution** prohibits **trafficking in human beings, begar and forced labour**; any violation is punishable by law.
- **Article 24** prohibits employment of children below 14 years in factories, mines and other hazardous employment.
- **Article 21** guarantees right to life with dignity, which includes freedom from exploitation and inhuman working conditions.
- **Directive Principles** such as **Article 39(e), Article 39(f), Article 41, Article 42 and Article 43** guide the State to protect workers, children and livelihood dignity.
- The **Bonded Labour System (Abolition) Act, 1976** abolishes bonded labour, cancels bonded debt and criminalises enforcement of bonded labour.
- The **Child and Adolescent Labour (Prohibition and Regulation) Act, 1986** restricts child labour and regulates adolescent labour.
- The **Inter-State Migrant Workmen Act, 1979** protects migrant workers through registration, wage safeguards and displacement allowance.
- Offences may also involve **human trafficking**, wrongful confinement, assault and sexual offences under criminal law.
- Legal response includes **identification, rescue, release certificate, rehabilitation assistance, compensation and prosecution of employers or contractors.**

1.3. OBC Reservation in Panchayats and the Triple Test Requirement

Context:

Uttar Pradesh has approved a dedicated commission to examine OBC reservation in Panchayati Raj institutions. This step is linked to judicial directions that OBC reservation in local body elections must be based on empirical data and follow the constitutional "triple test."

Explanation:

- **OBC reservation in Panchayats** aims to provide representation to socially and educationally backward classes in grassroots democracy.
- Panchayats are constitutional local self-government institutions under **Part IX** of the Constitution.
- **Article 243D** provides for reservation of seats in Panchayats for **Scheduled Castes, Scheduled Tribes and women**.
- Reservation for backward classes in Panchayats can be provided by State laws, but it must satisfy judicially evolved safeguards.
- The Supreme Court has laid down the **triple test** for OBC reservation in local bodies.
- The first requirement is setting up a **dedicated commission** to study backwardness in local bodies.
- The second requirement is conducting an **empirical inquiry** to collect objective data on backwardness.
- The third requirement is fixing the reservation proportion without breaching the overall constitutional reservation limits.
- OBC reservation cannot be based only on political claims or general population estimates.

1.4. UAPA and Bail Norms: 'Bail the Rule' vs Stringent Security Laws

Context:

The Supreme Court has again discussed the question of bail under the **Unlawful Activities (Prevention) Act, 1967**, especially where trials are delayed and the accused remains in jail for long periods. The issue highlights the balance between **national security** and **personal liberty under Article 21**.

Explanation:

- **UAPA, 1967** is India's main anti-terror law, used to deal with unlawful activities, terrorist acts, terror funding and membership/support of banned organisations.
- It allows the government to declare individuals or organisations as **terrorist** or **unlawful**.
- Bail under UAPA is stricter than ordinary criminal law because of **Section 43D (5)**.
- Under Section 43D (5), bail may be denied if the court finds that accusations are **prima facie true**.
- Normally, Indian criminal law follows the principle: **"bail is the rule, jail is the exception."**
- This principle flows from **Article 21**, which protects life and personal liberty.
- However, special laws like UAPA, NDPS Act and PMLA impose stricter bail conditions.
- Courts have held that prolonged incarceration and delayed trial can violate **Article 21**.
- Therefore, even under UAPA, bail may be granted if trial delay makes detention unreasonable.
- The key issue is balancing **state security, due process, speedy trial, presumption of innocence and liberty**.

1.5. Supreme Court on Religious Instruction and Minority Educational Institutions

Context:

While reviewing the scope of Article 30(1), which protects minority educational institutions, particularly concerning those that impart religious instruction, The Supreme Court has asked the Union Government to determine if such institutions should be treated as religious institutions under Article 26(a) rather than enjoying the greater autonomy granted by Article 30(1).

Explanation:

- A petition argued that institutions mainly teaching religion should fall under Article 26(a) dealing with religious and charitable institutions, not under Article 30(1) or Article 19(1)(g).

Why It Matters?

- Article 30(1) gives minority educational institutions greater autonomy and protection from excessive State interference.
- Bringing such institutions under Article 26(a) could allow stronger government regulation, monitoring and supervision.
- **Article 30 vs. Article 26:** A petition argued that schools primarily teaching religion should fall under Article 26(a) (freedom to manage religious affairs) rather than Article 30(1), which protects minority-run educational institutions.
- **"Educational Institutions of Choice":** The plea challenged whether "educational institutions of their choice" in Article 30 refers to religious education, arguing it should be interpreted as limited to secular/professional education.
- **Regulation of Minority Institutions:** The SC has previously held that the state has the right to regulate minority educational institutions in the national interest to ensure educational standards.
- The court noted that these matters fall within the policy domain of the government and chose not to intervene in this case and disposed the petition.

1.6. Supreme Court's "One Case One Data" Initiative and "Su Sahay" AI Chatbot

Context:

The Supreme Court of India has launched the "One Case One Data" digital initiative to integrate judicial administration from subordinate courts to the Supreme Court into a unified database system. The Court also introduced "Su Sahay", an AI-powered chatbot integrated with the Supreme Court website to improve access to justice and court-related services.

Explanation:

- India's judiciary has been undergoing digital transformation under the e-Courts Mission Mode Project implemented by the Department of Justice.
- "One Case One Data" aims to create a unified digital judicial database by assigning standardised case information across different court levels, improving interoperability and judicial data management.
- The initiative seeks to reduce duplication, improve case tracking, strengthen transparency and enhance judicial efficiency.
- Integrated judicial databases can support pendency analysis, faster case movement and better policy planning in the justice delivery system.

- "Su Sahay" is an Artificial Intelligence (AI)-based chatbot designed to help litigants access case status, filing procedures and court services through the Supreme Court website.
- AI in judiciary is increasingly used globally for legal research, document management and citizen assistance, though concerns remain regarding privacy, algorithmic bias and data security.

1.7. NCRB Report Shows Decline in Overall Crime but Sharp Rise in Cybercrime

Context:

The National Crime Records Bureau (NCRB) Crime in India Report 2024 shows that India's overall crime rate declined by around 6% compared to the previous year. However, cybercrime cases increased significantly by nearly 17%, highlighting growing digital security challenges and online financial fraud risks.

Explanation:

- The National Crime Records Bureau (NCRB) functions under the Ministry of Home Affairs and compiles nationwide crime statistics.
- NCRB publishes the annual **"Crime in India" report** based on data submitted by States and Union Territories.
- Crime rate refers to the number of registered crimes per lakh population, enabling inter-state comparison.
- Crimes in India are broadly classified under the Indian Penal Code (IPC) and Special and Local Laws (SLL).
- Cybercrime includes offences committed using computers, digital networks, mobile devices, or the internet.
- Common cybercrimes include online financial fraud, identity theft, phishing, ransomware, cyberstalking, and sexual exploitation.
- Rapid digitalisation, online banking, UPI transactions, and social media usage have expanded cyber vulnerabilities.
- India addresses cyber threats through institutions such as the Indian Cyber Crime Coordination Centre (I4C), CERT-In, and the National Cyber Crime Reporting Portal.
- NCRB data also tracks crimes against women, Scheduled Castes (SCs), Scheduled Tribes (STs), economic offences, suicides, and accidental deaths.
- The report indicated increases in cyber fraud and drug-overdose deaths, reflecting emerging socio-economic and public health concerns alongside traditional law-and-order issues.

1.8. Increase in Supreme Court Judge Strength

Context:

The Union Cabinet has approved increasing the sanctioned strength of the Supreme Court from 34 to 38 judges, including the Chief Justice of India. The decision aims to address the growing pendency of cases and improve the efficiency of judicial functioning.

Explanation:



- The Supreme Court of India is established under **Article 124** of the Constitution and functions as the highest constitutional court in the country.
- Under **Article 124(1)**, Parliament has the authority to determine the number of judges in the Supreme Court through legislation.

- The strength of Supreme Court judges is regulated by the **Supreme Court (Number of Judges) Act, 1956**, which has been amended multiple times to increase judicial capacity.
- Before this approval, the sanctioned strength was **34 judges** consisting of the Chief Justice of India and 33 other judges. The proposal seeks to increase it to **38 judges**.
- The Supreme Court Collegium recommends names for appointment, while the President appoints judges under the constitutional framework.

1.9. Forest Rights Act Ruling and Tharu Tribe Issue

Context:

The Lucknow Bench of the Allahabad High Court set aside the rejection of forest rights claims of the Tharu tribe in Uttar Pradesh, holding that decisions inconsistent with the Forest Rights Act, 2006 are invalid. The ruling strengthens protection against arbitrary denial of forest rights.

Explanation:

- The case concerns the **Tharu tribe of Lakhimpur Kheri (Uttar Pradesh)**, where **100+ families filed Community Forest Rights (CFR) claims** under FRA.
- The District Level Committee (DLC) rejected these claims in 2021, relying on older legal provisions instead of FRA.
- **The Forest Rights Act, 2006 recognizes individual and community rights of forest-dwelling tribes over land and resources**, with claims processed through DLCs.
- **The Court held that FRA, being a later central law, overrides earlier inconsistent orders**, reaffirming that "later law prevails."
- It emphasized that forest rights are "recognized and vested", meaning they already exist legally and are not merely granted by the state.
- The judgment clarified that DLCs cannot arbitrarily reject claims and must strictly follow FRA procedures, failing which it amounts to a legal violation.
- It directed that no eviction or interference with occupation and livelihood can occur until the full verification and recognition process is completed.
- The Court reaffirmed that traditional rights such as grazing and forest resource use are protected, even in protected forest areas.
- The case highlights a broader issue where many claims were historically rejected or forests diverted, reflecting conflicts between conservation laws and community rights.
- Overall, the ruling strengthens FRA implementation by asserting that as a central law, it overrides conflicting state actions, while also exposing ongoing gaps in enforcement and protection of tribal rights.

1.10. Delhi High Court Upholds Personality Rights

Context:

The Delhi High Court restrained unauthorised commercial use of a celebrity's name, image, and likeness, recognising personality rights. The interim order highlights judicial protection against misuse on digital platforms.

Explanation:

- Personality rights are legal protections that allow individuals, particularly celebrities, to control and profit from the commercial use of their identity, including their name, image, likeness, voice, and signature.

- They prevent unauthorized exploitation **(right of publicity)** and protect against unwanted public representation (**right to privacy**).
- Not explicitly codified in India but derived from **Article 21 (Right to Life and Personal Liberty)**.
- Closely linked to **Right to Privacy** (Justice K.S. Puttaswamy case, 2017).
- Also overlaps with **Intellectual Property Rights (IPR)** such as **copyright and trademark**.
- Courts grant **injunctions (interim orders)** to prevent unauthorised commercial exploitation.
- Increasing misuse on **digital platforms, AI-generated content, and advertisements**.
- Protects celebrities' **economic rights and reputation**.
- Recognised through judicial precedents like **ICC Development v. Arvee Enterprises (2003)**.

1.11. OCI Status, Eligibility and Rights of Overseas Indians

Context:

The OCI status of some foreign nationals is under scrutiny after allegations that they voted in Indian elections. OCI cardholders are allowed long-term stay and travel benefits in India, but they do **not** have political rights such as voting or contesting elections.

Explanation:

- **OCI** means **Overseas Citizen of India**; it is a special status given to eligible foreign citizens of Indian origin under the **Citizenship Act, 1955**.
- It is **not dual citizenship**, because the Indian Constitution does not permit simultaneous Indian and foreign citizenship.
- Eligible persons include foreign nationals who were Indian citizens earlier, were eligible to become Indian citizens on **26 January 1950**, or belonged to territories that later became part of India.
- A foreign-origin spouse of an Indian citizen or OCI cardholder may apply if the marriage is registered and has subsisted for at least **two years**.
- Persons with parents, grandparents or great-grandparents who were citizens of **Pakistan or Bangladesh** are not eligible for OCI registration.
- OCI cardholders get **lifelong visa facility** and exemption from local police registration for any length of stay in India.
- OCI cardholders **cannot vote**, become MPs/MLAs/MLCs, hold constitutional posts, obtain an Indian passport, or acquire agricultural land, plantation property or farmhouses in India

1.12. Pride of Hills Initiative and Infrastructure Development in Himalayan States

Context:

The Union Government has allocated ₹4,900 crore to Arunachal Pradesh under the "Pride of Hills" initiative. The programme aims to strengthen infrastructure, connectivity, and socio-economic development in Himalayan and hill States, particularly in strategically important border regions.

Explanation:

- India's Himalayan and hill States face unique developmental challenges due to difficult terrain, sparse population, fragile ecology, and poor physical connectivity.
- Border States such as Arunachal Pradesh are strategically important because they share international boundaries with China, Bhutan, and Myanmar.

- Infrastructure gaps in roads, tunnels, bridges, digital connectivity, power supply, and healthcare affect economic growth as well as national security preparedness.
- The "Pride of Hills" initiative is a Central Government programme aimed at improving infrastructure and connectivity in Himalayan and hill regions through targeted financial assistance.
- The initiative focuses on all-weather road connectivity, border infrastructure, tourism promotion, rural development, telecommunications, and access to public services.
- The current "Pride of Hills" initiative is a subset or special component of the larger "Special Assistance to States for Capital Investment" (SASCI) scheme. The scheme is operated by the Ministry of Finance.
- Improved connectivity supports faster movement of defence forces, disaster management operations, trade, and local economic activities.
- Arunachal Pradesh is a key frontier State in India's Act East Policy and Indo-Pacific strategy because it connects India with Southeast Asia through the North-East region.
- Development in hill States must balance strategic infrastructure creation with environmental sustainability because the Himalayan ecosystem is ecologically fragile and prone to landslides, earthquakes, and climate-related disasters.

1.13. CBI Director Extension and Selection Committee

Context:

The Central Government has extended the tenure of CBI Director Praveen Sood by one year. The decision was taken on the recommendation of the statutory Selection Committee. The CBI functions under the Delhi Special Police Establishment (DSPE) Act, 1946.

Explanation:

- The Director of the CBI is appointed by the Central Government on the recommendation of a three-member committee under the provisions of the Delhi Special Police Establishment (DSPE) Act, 1946, as amended by the Lokpal and Lokayuktas Act, 2013.
- The Selection Committee consists of the Prime Minister, Leader of Opposition in Lok Sabha, and Chief Justice of India or a Supreme Court judge nominated by the CJI.
- The committee recommends senior IPS officers based on integrity, experience, and competence.
- The Director has a minimum tenure of two years to ensure institutional independence.
- The Central Government can grant annual extensions up to a maximum total tenure of five years.

1.14. Plea Bargaining under India's Criminal Justice System

Context:

The Union Home Ministry is reviewing reforms related to plea bargaining amid concerns regarding its limited use in India's criminal justice system. Experts argue that despite being introduced to reduce pendency and speed up trials, plea bargaining has not achieved significant success under existing criminal laws and the new Bharatiya Nagarik Suraksha Sanhita (BNSS).

Explanation:

- Plea bargaining is a pre-trial negotiation in which an accused agrees to plead guilty in exchange for reduced punishment or lesser charges.
- It was introduced in India through the Criminal Law (Amendment) Act, 2005 by inserting provisions in the Code of Criminal Procedure (CrPC).

- It generally applies to offences punishable with imprisonment up to seven years and excludes serious offences affecting society.
- The objective is to reduce judicial pendency, save litigation costs, and ensure faster disposal of criminal cases.
- Under the Bharatiya Nagarik Suraksha Sanhita (BNSS), plea bargaining provisions continue with procedural safeguards.
- Plea bargaining differs from compounding of offences because plea bargaining still results in conviction, while compounding can lead to acquittal.

1.15. Supreme Court Expands Definition of Acid Attack Victims under RPwD Act

Context:

Supreme Court extends Persons with Disabilities (RPwD) Act, 2016 to persons forced To consume acid & suffer internal injuries without external disfigurement. The judgment broadens access to disability benefits, rehabilitation, and state support for survivors.

Explanation:

- The Supreme Court of India interpreted provisions of the Rights of Persons with Disabilities (RPwD) Act, 2016 in an inclusive manner.
- Acid attack survivors often suffer permanent physical, psychological, social, and economic trauma.
- The RPwD Act includes "acid attack victims" among specified benchmark disabilities eligible for reservation, rehabilitation, and welfare benefits.
- The case highlighted that acid ingestion can damage internal organs such as the food pipe, stomach, intestines, and respiratory tract even without external scars.
- Disability in law is increasingly interpreted using the "social model of disability," focusing on barriers faced by individuals rather than only visible impairment.
- Article 14 of the Constitution guarantees equality before law and equal protection of laws, which influenced the Court's reasoning.
- The judgment strengthens victim-centric justice, rehabilitation rights, and access to compensation and social welfare schemes.
- The ruling also reflects the judiciary's broader role in expanding substantive rights and inclusive interpretation of welfare legislation.

1.16. Marathi Language Mandate for Taxi Drivers and Its Constitutional-Economic Implications

Context:

The Maharashtra government mandated basic Marathi proficiency for auto and taxi drivers, later extending the deadline after protests. The move has sparked debate over its constitutional validity, impact on migrant workers, and implications for economic efficiency.

Explanation:

- **Article 19(1)(d) & 19(1)(e)** guarantee freedom of movement and residence across India; **Article 19(1)(g)** ensures freedom to practice any profession.
- Restrictions on professions must be reasonable (Article 19(6)), not arbitrary or discriminatory.

- **Internal migration** is vital for urban economies (Mumbai, Delhi); migrant workers support **informal sector and services**.
- Imposing language requirements can create **entry barriers**, affecting **labour mobility, efficiency, and economic growth**.
- Raises issues of **parochialism vs cooperative federalism** and **unity in diversity**.
- Can impact **ease of doing business** and urban service delivery (transport accessibility, affordability).
- Also touches on **fundamental rights vs state policy**, **inclusive growth**, and **social cohesion in a unified market economy**.

1.17. Sikkim Declared India's First Paperless State Judiciary

Context:

The Chief Justice of India announced that Sikkim has become the first state in India to adopt a fully paperless judiciary. The move is part of broader judicial digitalisation efforts aimed at improving access to justice and overcoming geographical barriers.

Explanation:

- Judicial digitalisation is driven by the **e-Courts Mission Mode Project** under the **National e-Governance Plan (NeGP)**.
- **e-Courts Mission Mode Project:** A government initiative to digitise the judiciary by enabling e-filing, virtual hearings, and electronic case management for faster and accessible justice delivery.
- Enhances **access to justice (Article 39A)** by reducing barriers of distance, cost, and time.
- Particularly relevant for hilly and remote regions like Sikkim where physical access is difficult.
- Promotes transparency, efficiency, and speedy justice delivery, addressing pendency issues.
- Linked with initiatives like Digital India, e-Governance, and ICT in judiciary.
- Use of video conferencing, e-signatures, and cloud-based storage reduces dependency on physical infrastructure.
- Supports the principle of Rule of Law by making legal processes more accessible and citizen-friendly.
- However, it also raises concerns about digital divide, data privacy, and cybersecurity in judicial processes.
- Overall, reflects shift from paper-based legacy systems to technology-enabled judicial ecosystem for better governance.

2. International Relations

2.1. Khalistani Extremism Declared National Security Threat by Canada

Context:

Canada has officially designated Khalistani extremist groups as a national security threat, citing their involvement in promoting violent extremist activities. The development comes amid heightened concerns over diaspora-linked extremism and its implications for bilateral relations.

Explanation:

- **Khalistan movement** is a separatist movement seeking an independent Sikh state carved out of India's Punjab region.
- It gained prominence during the **1980s–1990s**, marked by insurgency, terrorism, and counter-insurgency operations in India.
- The movement declined in India but continues to have **diaspora support**, particularly in countries like Canada, UK, and Australia.
- **Extremism and radicalisation** involve the use of ideological narratives to justify violence and separatist agendas.
- The issue is linked to **transnational security threats**, where groups operate across borders using funding, propaganda, and institutional influence.
- The **Air India Flight 182 bombing (1985)** remains one of the deadliest aviation terror attacks linked to Khalistani extremists.
- Countries classify such groups under **national security frameworks**, including anti-terror laws, intelligence monitoring, and counter-extremism policies.
- The issue affects **India–Canada relations**, involving concerns over sovereignty, terrorism, and diplomatic engagement.
- It highlights challenges of balancing **freedom of expression** with prevention of **violent extremism and terrorism financing**.

2.2. CINBAX-II 2026

- **CINBAX-II 2026**, the second edition of the India–Cambodia military exercise, concluded on **16 May 2026 in Cambodia** after a 14-day bilateral defence training programme.
- The exercise involved **120 Indian Army personnel**, mainly from the **Maratha Light Infantry Regiment**, and **160 personnel from the Royal Cambodian Army**.
- Its main aim was to improve **tactical cooperation, interoperability and joint operational preparedness** between the two armies.
- Key training areas included **counter-terrorism operations, semi-urban drills, combat first aid, drone operations, sniper and mortar training, and disaster relief operations**.
- The exercise strengthens India's **Act East Policy**, expands defence cooperation with **ASEAN countries**, and supports India–Cambodia cooperation in **peacekeeping and regional security**.

2.3. India–Trinidad and Tobago Agreement on Girmitiya Heritage

Context:

India and Trinidad and Tobago recently signed an agreement to help people of Indian origin trace their ancestral roots and reconnect with family histories. The initiative is linked to preserving the legacy of the Girmitiya community and strengthening cultural ties with the Indian diaspora.

Explanation:

- "Girmitiya" refers to Indians taken as indentured labourers to British colonies during the 19th and early 20th centuries after the abolition of slavery.
- The term originated from the word "agreement," locally pronounced as "girmit."
- Large numbers of Indians migrated to Trinidad and Tobago, Fiji, Mauritius, Guyana, Suriname, and South Africa under the indenture system. Most migrants were taken from present-day Bihar, Uttar Pradesh, and surrounding regions.

2.4. India hosts 10th edition of Indian Ocean Dialogue

Context:

India hosted the tenth edition of the Indian Ocean Dialogue in New Delhi May 7 and 8 under the theme "Indian Ocean Region in a Transforming World".



What is Indian Ocean Dialogue?

- The Indian Ocean Dialogue is a premier track 1.5 forum for open and free flowing dialogue among various stakeholders - scholars, experts, analysts, and policy makers from governments, think tanks and civil societies on strategic issues of interest and concern facing the region and beyond.
- It is a flagship initiative of the Indian Ocean Rim Association (IORA), with its origins in the 13th Council of Ministers meeting, held in November 2013 in Perth, Australia.

What is the Indian Ocean Rim Association (IORA)?

- The Indian Ocean Rim Association (IORA) is an inter-governmental organisation formed in 1997 to foster regional economic cooperation. IORA has evolved into the peak regional group spanning the Indian Ocean.
- Members of IORA (23 countries): Australia, Bangladesh, the Comoros, France, India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Oman, Seychelles, Singapore, Somalia, South Africa, Sri Lanka, Tanzania, Thailand, the United Arab Emirates and Yemen.

2.5. Ethiopia–Sudan Tensions over Border Sovereignty and Insurgency

Context:

Ethiopia and Sudan recently exchanged accusations regarding territorial violations and support to armed groups. Sudan alleged drone strikes launched from Ethiopian territory with UAE involvement, while Ethiopia accused Sudanese forces of supporting militants linked to the Tigray conflict.

Explanation:

- Ethiopia and Sudan share a disputed border region called **al-Fashaga**, a fertile agricultural area internationally recognised as part of Sudan but cultivated for years by Ethiopian farmers.



- Border tensions increased after Sudan reasserted military control over parts of al-Fashaga during Ethiopia's internal instability linked to the Tigray conflict.
- The **Tigray People's Liberation Front (TPLF)** was formerly the dominant political force in Ethiopia before conflict erupted with the Ethiopian federal government in 2020.
- Ethiopia accused Sudanese military elements of supporting anti-government fighters and "mercenaries" linked to the TPLF insurgency.
- Sudan alleged that drone strikes against its territory originated from Ethiopia and involved cooperation with the United Arab Emirates.
- Sudan has been facing an ongoing civil war between the **Sudanese Armed Forces (SAF)** and the **Rapid Support Forces (RSF)**, leading to severe humanitarian and political instability.
- The dispute highlights the strategic importance of the **Horn of Africa**, which includes Ethiopia, Sudan, Eritrea, Somalia, and Djibouti.
- The Horn of Africa lies near the **Red Sea** and the **Bab-el-Mandeb Strait**, an important global maritime trade and energy route connecting the Mediterranean Sea and the Indian Ocean.
- Rising regional instability can increase refugee flows, disrupt trade routes, and intensify proxy conflicts involving external powers and regional actors.
- The African Union, headquartered in Addis Ababa, Ethiopia, often plays a mediatory role in regional conflicts and peace negotiations in Africa.

2.6. India–Cyprus Strategic Partnership and Defence Cooperation

Context:

India and Cyprus have elevated their bilateral ties to a **strategic partnership** and signed a pact for defence cooperation. The move is significant as Cyprus is an important EU member in the eastern Mediterranean and may act as a bridge for India's engagement with Europe and the IMEEC corridor.

Explanation:



- **Cyprus** is an island country in the **eastern Mediterranean Sea**, located near Turkey, Syria, Lebanon and Israel.
- It is a member of the **European Union**, making it diplomatically important for India's outreach to Europe.
- India and Cyprus support each other on issues of **sovereignty and territorial integrity**.
- Cyprus has traditionally supported India's position on **Jammu and Kashmir**, while India supports Cyprus on its territorial concerns.
- Cyprus remains divided between the internationally recognised **Republic of Cyprus** and the Turkish-controlled northern part.
- The new cooperation includes **defence, cybersecurity, maritime domain awareness and emerging technologies**.
- Cyprus can become an entry point for Indian companies into the **EU market**.
- The partnership is also linked to the **India-Middle East-Europe Economic Corridor (IMEEC)**.
- **IMEEC** aims to improve connectivity between India, West Asia and Europe through rail, shipping, energy and digital corridors.

2.7. India Re-Listed by EU for Aquaculture Exports

Context:

The European Union has re-included India in the list of countries permitted to export aquaculture products to EU markets from September 2026. The decision follows India's compliance with EU restrictions on the use of antimicrobials in food-producing animals.

Explanation:

- Aquaculture refers to the farming of fish, crustaceans, molluscs, and other aquatic organisms for commercial production.
- India is one of the world's largest producers and exporters of shrimp and seafood products, with the EU being an important export destination.
- The European Union imposes strict Sanitary and Phytosanitary (SPS) standards to ensure food safety and prevent health risks from imported food products.
- Antimicrobials and antibiotics are regulated in aquaculture because excessive use can cause Antimicrobial Resistance (AMR), a major global public health concern.
- The EU prohibits use of certain antimicrobials for growth promotion in food-producing animals and closely monitors residue levels in imported seafood.
- India improved traceability systems, residue monitoring, certification, and quality control measures to meet EU norms.
- Compliance with international food safety standards strengthens India's marine exports, foreign exchange earnings, and fisheries sector growth.

2.8. India–Vietnam Relations Elevated to Enhanced Comprehensive Strategic Partnership

Context:

India and Vietnam have agreed to elevate their bilateral ties to an "Enhanced Comprehensive Strategic Partnership," focusing on defence cooperation, maritime security, trade, connectivity, and supply-chain resilience. The development gains significance amid growing concerns over China's assertiveness in the South China Sea and the broader Indo-Pacific region.



Explanation:

- India and Vietnam share close historical, cultural, and strategic relations rooted in civilisational and anti-colonial connections.
- Vietnam is an important member of Association of Southeast Asian Nations, which is central to India's Act East Policy and Indo-Pacific strategy.
- India and Vietnam upgraded ties to a Comprehensive Strategic Partnership in 2016, especially strengthening defence and maritime cooperation.
- The South China Sea is a strategically important sea route connecting the Pacific and Indian Oceans and carries a major share of global trade.
- Both India and Vietnam support freedom of navigation, overflight rights, and peaceful dispute resolution under the United Nations Convention on the Law of the Sea (UNCLOS), 1982.

2.9. India Calls for Unified SCO Action Against Terrorism

Context:

India's Defence Minister Rajnath Singh urged Shanghai Cooperation Organisation (SCO) members to adopt a unified and consistent approach to eliminate terrorism, emphasizing zero tolerance and rejecting double standards, especially on state-sponsored cross-border terrorism in its recent meet in **Bishkek, Kyrgyzstan** on April 28, 2026.

Explanation:

- **SCO (Shanghai Cooperation Organisation)** is a Eurasian political, economic, and security grouping established in **2001** at Shanghai.
- Originated from the **Shanghai Five (1996)**: China, Russia, Kazakhstan, Kyrgyzstan, Tajikistan; later expanded.
- Current members: **China, Russia, India, Pakistan, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Iran (recently added)**.
- Focus areas: **regional security, counter-terrorism, anti-extremism, connectivity, economic cooperation**.
- Key body: **RATS (Regional Anti-Terrorist Structure)** based in Tashkent for intelligence sharing and coordination.
- SCO works on principles of **sovereignty, non-interference, consensus-based decision making**.

2.10. Selection Process of the UN Secretary-General

Context:

The process to select the next UN Secretary-General is underway, with candidates presenting their visions before the UN General Assembly. The selection comes at a time of global crises, making the leadership role crucial.

Explanation:

- The **Secretary-General (SG)** is the **chief administrative officer** of the UN as per **Article 97 of the UN Charter**.
- The SG is **appointed by the UN General Assembly on the recommendation of the UN Security Council (UNSC)**.
- The **UNSC has 15 members**: 5 Permanent Members (USA, UK, Russia, China, France) with **veto power**, and 10 non-permanent members elected for 2-year terms.
- Any one of the **P5 can block a candidate** using veto, making UNSC recommendation decisive.
- The **General Assembly (193 members)** formally appoints the SG by majority vote.
- Traditionally, the SG serves a **5-year term**, renewable once.
- There is an **informal regional rotation system** among continents (Africa, Asia-Pacific, Latin America, Western Europe, Eastern Europe).
- The SG acts as a **global diplomat, mediator, and spokesperson**, using "good offices" for conflict resolution.

2.11. PRAGATI 2026: Multinational Military Exercise in Meghalaya

Context:

A 13-nation military exercise, **PRAGATI 2026**, has commenced at the **Umroi Military Station in Meghalaya**. Apart from India, soldiers from 12 friendly countries are participating to strengthen professional exchange and military-to-military cooperation.

Explanation:

- **Military exercises** are organised to improve interoperability, joint training, tactical coordination and defence diplomacy among participating armed forces.
- **PRAGATI 2026** involves India and countries such as Bhutan, Cambodia, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, Philippines, Seychelles, Sri Lanka and Vietnam.
- Such exercises are important for India's **Act East Policy**, regional security cooperation, capacity building, counter-insurgency preparedness and stronger ties with neighbouring and Indo-Pacific countries.

3. ECONOMY

3.1. India's 1st Mega Greenfield Shipyard at Thoothukudi

India signed a tripartite Memorandum of Understanding to establish its first **Mega Greenfield Shipyard** at Thoothukudi, Tamil Nadu. The project will be developed jointly by **HD Korea Shipbuilding & Offshore Engineering (HD KSOE)**, **NSHIP-TN** and **Sagarmala Finance Corporation Limited (SMFCL)**.

- The proposed shipyard will have an annual capacity of **2.5 million Gross Tonnage (GT)** and is expected to create around **15,000 direct jobs**, making it one of the most significant maritime industrial investments in India's recent history.

3.2. Withholding Tax Cut to Attract Foreign Investors

Context:

The Government of India is considering reducing withholding tax on government bonds for foreign investors to attract greater foreign capital inflows. The move comes amid concerns over foreign exchange reserves, capital outflows, and pressure on the rupee due to global economic uncertainty.

Explanation:

- Withholding tax is a tax deducted at source on income earned by non-resident investors, such as interest earned on government securities and bonds.
- India currently imposes relatively high withholding tax rates on foreign investors compared to several other economies.
- Lower withholding tax can increase attractiveness of Indian government bonds for Foreign Portfolio Investors (FPIs) seeking better post-tax returns.
- FPIs invest in stocks, bonds, and financial assets, while Foreign Direct Investment (FDI) involves long-term investment in productive sectors.
- Higher foreign capital inflows help strengthen foreign exchange reserves, stabilise the rupee, and support the Current Account Deficit (CAD).
- India's forex reserves are managed by the Reserve Bank of India (RBI) to ensure external sector stability and currency confidence.
- Global geopolitical tensions, oil price volatility, and capital flight from emerging markets affect exchange rates and investment flows.

3.3. RBI's Reduced Risk Buffer and Higher Dividend Transfer to Centre

Context:

The RBI has transferred a record **₹2.69 lakh crore surplus/dividend** to the Centre for FY2025-26 after reducing its **Contingent Risk Buffer (CRB)** from **7.5% to 6.5%**. The reduction increased the transferable surplus, helping the government's fiscal position amid lower expected tax and excise collections.

Explanation:

- **RBI dividend** refers to the surplus income transferred by the Reserve Bank of India to the Central Government after meeting its expenses and risk provisions.
- RBI earns income mainly from **interest on government securities**, **foreign exchange operations**, **liquidity operations**, and returns on its investments.

- Before transferring surplus, RBI keeps a part of its funds as a safety cushion called the **Contingent Risk Buffer (CRB)**.
- **CRB** protects RBI against unexpected risks such as **currency depreciation, market losses, monetary policy risks, and financial stability shocks**.
- The CRB is part of the RBI's **Economic Capital Framework (ECF)**, which decides how much capital RBI should retain and how much surplus can be transferred.
- The ECF was reviewed by the **Bimal Jalan Committee**, which recommended a CRB range of **5.5% to 6.5%**.
- A lower CRB generally means **higher dividend transfer** to the government.
- A higher RBI dividend improves Centre's **non-tax revenue** and can help manage the **fiscal deficit**.
- However, excessive dividend dependence may reduce RBI's financial cushion during crises.

3.4. RBI Variable Rate Repo Auction and Transient Liquidity Injection

Context:

The RBI injected ₹81,590 crore into the banking system through a three-day Variable Rate Repo auction. This was done to manage temporary liquidity fluctuations, as banking system surplus liquidity had sharply declined.

Explanation:

- **Liquidity** refers to the availability of cash or easily usable funds in the financial system.
- When banks face short-term shortage of funds, RBI can inject liquidity so that money market rates remain stable.
- **Transient liquidity** means temporary liquidity stress caused by short-term factors such as tax outflows, government cash balances, currency demand, or market settlement pressures.
- **Repo** means banks borrow money from RBI by selling government securities with an agreement to repurchase them later.
- **Variable Rate Repo (VRR)** is a liquidity injection tool where RBI lends money to banks, but the interest rate is decided through auction.
- In a **fixed rate repo**, the rate is pre-decided by RBI; in **VRR**, banks bid for funds and the cut-off rate emerges through auction.
- VRR is part of RBI's **Liquidity Adjustment Facility (LAF)** framework.
- It helps RBI manage short-term liquidity without changing the policy repo rate.
- A **cut-off rate** is the rate at which the final accepted bid gets funds in the auction.
- If demand is lower than the notified amount, it may show that banks are not facing severe liquidity stress.
- Such operations are important for monetary transmission, call money rate stability, and overall financial market stability.

3.5. Gold Loan Concentration in Southern India

Context:

Gold loans have become the fastest-growing segment in India's lending market, with outstanding loans rising sharply. Five southern States — Tamil Nadu, Andhra Pradesh, Karnataka, Telangana and Kerala — account for nearly 75% of India's total gold loan outstanding.

Explanation:

- **Gold loan** is a secured loan in which borrowers pledge gold ornaments or coins as collateral to obtain quick credit from banks, NBFCs or other lenders.
- Southern India has a strong cultural preference for gold ownership, higher household gold holdings, dense jewellery networks and wider lending infrastructure, making it India's major **gold loan market**.

- Gold loans are popular because they offer faster processing, lower documentation, flexible end-use and relatively easier access compared to unsecured personal loans.
- The sector includes both **banks and Non-Banking Financial Companies (NBFCs)**, with NBFCs playing a major role due to faster customer service and wider reach.
- Rising gold prices increase the collateral value of pledged gold, allowing borrowers to access higher loan amounts.
- Gold loans are used by households, small traders and informal sector workers for consumption needs, business working capital, medical expenses and emergency liquidity.
- From a regulatory angle, the issue involves **RBI supervision, Loan-to-Value ratio, secured lending, household debt, financial inclusion and regional credit patterns**.

3.6. SEBI Classifies Large Benchmark Indices as "Significant Indices"

Context:

Securities and Exchange Board of India (SEBI) has introduced a new regulatory framework to classify certain stock market benchmark indices as "Significant Indices" if very large amounts of mutual fund money are linked to them. Major indices such as BSE Sensex and NIFTY 50 are expected to fall under this category.

Explanation:

- SEBI is the statutory regulator of India's securities market, established under the SEBI Act, 1992.
- A stock market index measures the performance of a selected group of securities and reflects overall market trends.
- Benchmark indices are used by mutual funds to compare their performance with the broader market.
- Examples of major Indian benchmark indices include the BSE Sensex and NIFTY 50.
- An index provider selects constituent stocks using criteria such as market capitalisation, liquidity, and free-float methodology.
- AUM (Assets Under Management) refers to the total market value of investments managed by a mutual fund or financial institution.
- Passive investment instruments such as Index Funds and Exchange Traded Funds (ETFs) replicate benchmark indices instead of actively selecting stocks.
- Large benchmark-linked investments can influence stock prices, capital flows, and market stability; therefore, governance and transparency of indices become important.
- SEBI's proposal defines a "significant index" based on average cumulative AUM exceeding ₹20,000 crore over six months.
- Greater regulation of significant indices may improve investor protection, reduce conflict of interest, and strengthen market integrity in India's growing passive investment ecosystem.

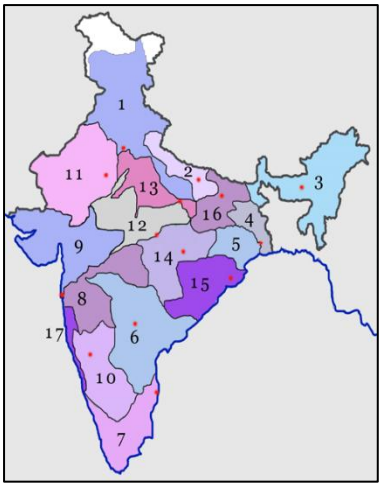
3.7. South Coast Railway Zone: India's 18th Railway Zone

Context:

The Ministry of Railways has announced that the new **South Coast Railway (SCoR)** zone, headquartered at **Visakhapatnam**, will become operational from June 1. The move fulfils a long-pending commitment made to Andhra Pradesh under the Andhra Pradesh Reorganisation Act, 2014.

Explanation:

- Indian Railways is divided into administrative units called Railway Zones for efficient management of operations, infrastructure, freight, and passenger services.



- A railway zone is headed by a General Manager (GM) and consists of multiple railway divisions managed by Divisional Railway Managers (DRMs).
- India currently has **18 railway zones**; the newest is the **South Coast Railway (SCoR)** headquartered at **Visakhapatnam**.
- The new zone integrates the **Guntakal, Guntur, Vijayawada**, and the newly created **Visakhapatnam division**.
- The demand for a separate railway zone for Andhra Pradesh had existed for nearly four decades and gained importance after the bifurcation of the State in 2014.
- Railway zones are created administratively by the Ministry of Railways based on operational efficiency, freight traffic, infrastructure requirements, and regional demands.
- The proposal for a new railway zone is examined by the **Railway Board**, which is the apex executive and policy-making body of Indian Railways established in 1905.
- The Railway Board functions under the Ministry of Railways and supervises railway planning, safety, finance, infrastructure expansion, and coordination among railway zones.
- The South Coast Railway zone is strategically important because Andhra Pradesh has major ports and heavy freight movement; the zone reportedly handles nearly 17% of India's railway freight loading.
- Creation of new railway zones can improve regional connectivity, freight logistics, project implementation, and administrative efficiency, but may also increase financial costs, coordination challenges, and political demands for further restructuring.

3.8. Revenue Deficit in States and Emerging Fiscal Stress

Context:

The Union Finance Ministry has warned that several Indian States with revenue deficits and high debt levels may face fiscal stress, especially amid external shocks. Nine out of 18 large States are projected to be in revenue deficit for 2026–27, limiting their fiscal flexibility.

Explanation:

- **Revenue Deficit**: Occurs when revenue expenditure is greater than the revenue receipts, indicating that the government is unable to meet its routine expenses from its regular income.
- **Revenue Receipts**: Include tax revenues (GST, income tax share) and non-tax revenues (fees, dividends, interest).
- **Revenue Expenditure**: Covers salaries, pensions, subsidies, interest payments that is non-asset creating expenditure.
- Persistent revenue deficit implies states spending more than they earn and borrowing for consumption, not investment.
- Leads to higher fiscal deficit and rising public debt.
- Affects ability to invest in capital expenditure (infrastructure, growth).

3.9. Intermediary-Led Competition and Profitability Stress in General Insurance

Context:

A report has highlighted that aggressive competition through intermediaries such as agents, brokers, bancassurance partners and OEM channels is affecting the profitability of general insurers. It also reflects IRDAI's concern over rising commissions and weakening underwriting discipline in the insurance sector.

Explanation:

- **General insurance** covers non-life risks such as health, motor, fire, marine, travel and property insurance.
- Insurance companies collect **premium** from policyholders and pay claims when insured risks occur.
- **Underwriting** means assessing risk before issuing an insurance policy and deciding the premium.
- If insurers focus only on growth and ignore risk-based pricing, it weakens **underwriting discipline**.
- **Intermediaries** are distribution channels that sell insurance products on behalf of insurers.
- They include **agents, brokers, bancassurance partners, OEMs**, web aggregators and corporate agents.
- **Bancassurance** means selling insurance through banks.
- **OEM channels** are common in motor insurance, where insurance is sold through vehicle manufacturers or dealers.
- High dependence on intermediaries can increase **commission costs** for insurers.
- When commission-led growth becomes excessive, premium growth may rise but profitability may fall.
- IRDAI regulates the insurance sector and has introduced the **Expense of Management framework** to control operational and commission-related expenses.

3.10. Centre Extends Bid Timeline for Rare Earth Magnet Manufacturing Scheme

Context:

The Ministry of Heavy Industries has extended the bidding deadline for the ₹7,280 crore scheme aimed at promoting rare earth magnet manufacturing in India. The extension was made following requests from industry stakeholders to facilitate wider participation in the bidding process.

Explanation:

- Rare earth magnets are high-strength permanent magnets mainly made using **Rare Earth Elements (REEs)** such as **Neodymium, Praseodymium, Samarium, and Dysprosium**.
- These magnets are critical for **electric vehicles (EVs), wind turbines, semiconductors, defence systems, robotics, smartphones, and aerospace technologies**.
- Rare earth elements belong largely to the **Lanthanide series** in the periodic table.
- China dominates the global supply chain of rare earth processing and magnet manufacturing, creating concerns regarding **strategic dependence and supply chain security**.
- India possesses notable rare earth reserves, especially in **monazite sands** found along coastal regions.
- The scheme seeks to strengthen **domestic manufacturing, import substitution, critical mineral security, and self-reliance under Atmanirbhar Bharat**.
- The issue is linked with India's push for **clean energy transition, advanced manufacturing, and strategic technologies**

3.11. Bharat Maritime Insurance Pool (BMIP) and Maritime Risk Coverage

Context:

Amid rising geopolitical tensions in West Asia and increasing risks to maritime trade, the Government of India has launched the Bharat Maritime Insurance Pool (BMIP). The initiative aims to ensure uninterrupted marine insurance coverage for Indian-flagged vessels operating in high-risk regions.

Explanation:

- The Bharat Maritime Insurance Pool (BMIP) is a government-supported marine insurance mechanism created to provide risk coverage for Indian shipping vessels.
- The scheme operates under the Department of Financial Services (DFS) with a sovereign guarantee support mechanism.

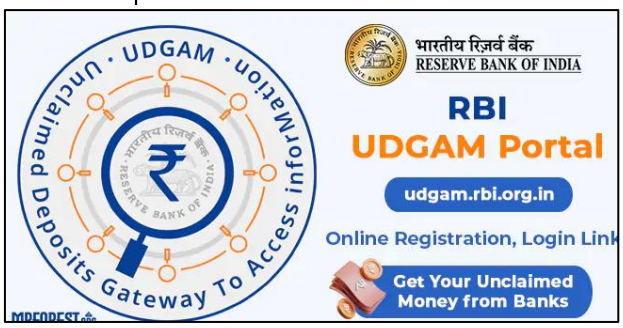
- Marine insurance protects ships, cargo, freight, and related maritime interests against losses arising from sea transport.
- Coverage under BMIP includes hull and machinery insurance, cargo insurance, Protection and Indemnity (P&I) insurance, and war-risk insurance.
- Hull and machinery insurance covers physical damage to ships and onboard machinery.
- Protection and Indemnity (P&I) insurance covers third-party liabilities such as crew injury, pollution, collision liabilities, and repatriation costs.
- War-risk insurance covers losses arising from war, piracy, armed conflict, terrorism, or geopolitical instability.
- India's maritime trade is highly dependent on strategic sea routes such as the Strait of Hormuz and the Red Sea region.
- Rising geopolitical tensions in West Asia increase shipping costs, insurance premiums, and supply-chain vulnerabilities for global trade.

3.12. UDGAM Portal and Tracing of Unclaimed Deposits

Context:

The Reserve Bank of India informed the Supreme Court of India that 30 banks have been integrated with the UDGAM portal to help depositors and legal heirs trace unclaimed deposits of deceased or inactive account holders. These banks account for nearly 90% of deposits held in the Depositor Education and Awareness Fund (DEAF).

Explanation:



- **UDGAM** stands for **Unclaimed Deposits – Gateway to Access Information** and is a centralized web portal launched by the RBI to enable individuals to search for unclaimed bank deposits across multiple banks through a single platform.
- A bank deposit becomes "unclaimed" when there has been no customer-initiated transaction or activity for **10 years or more**, after which the amount is transferred to the **Depositor Education and Awareness Fund (DEAF)** maintained by the RBI.
- DEAF was established by the RBI in **2014** to receive unclaimed deposits from banks and to promote depositor awareness and financial literacy.
- The portal facilitates only the **identification and tracing** of unclaimed deposits; actual settlement or withdrawal of funds must be carried out through the concerned bank as per applicable banking procedures and succession norms.
- Dormant accounts and unclaimed deposits commonly arise due to death of account holders, absence of nominee details, migration, forgotten accounts, or lack of awareness among legal heirs.
- The petition before the Supreme Court highlighted that deposits held in post offices, provident funds, and insurance schemes are not yet integrated into the portal, creating difficulties for legal heirs in tracing all financial assets of deceased persons.
- The initiative is significant for improving financial transparency, depositor protection, banking accessibility, and reducing idle unclaimed funds, while also encouraging better nominee registration and financial record maintenance.

4. SCIENCE AND TECHNOLOGY

4.1. PCOS Renamed as PMOS to Improve Diagnosis and Awareness

Context:

The Endocrine Society has proposed renaming Polycystic Ovary Syndrome (PCOS) as Polyendocrine Metabolic Ovarian Syndrome (PMOS). The change aims to better reflect the disorder's hormonal, metabolic, and reproductive dimensions and improve early diagnosis and treatment.

Explanation:

- PCOS is one of the most common endocrine disorders affecting women of reproductive age and is associated with hormonal imbalance and metabolic dysfunction.
- The condition is diagnosed using criteria such as irregular ovulation (oligo-anovulation), hyperandrogenism, and polycystic ovaries detected through ultrasound or Anti-Müllerian Hormone (AMH) levels.
- Symptoms include irregular menstruation, acne, excess hair growth, obesity, infertility, and insulin resistance.
- The term "PCOS" is considered misleading because ovarian cysts are not always present and the disorder involves multiple endocrine and metabolic disturbances.
- Associated comorbidities include type-2 diabetes, hypertension, dyslipidaemia, endometrial cancer, and psychological stress.
- The proposed PMOS terminology highlights endocrine, metabolic, and ovarian dysfunction together, aiming to reduce stigma and improve clinical understanding.

4.2. GalaxEye's 'Drishti' – India's First Dual-Mode Earth Observation Satellite

Context:

Indian startup GalaxEye has launched its satellite 'Drishti' aboard a SpaceX rocket, marking a major milestone in private space innovation. The satellite can capture both optical and radar images simultaneously, enhancing Earth observation capabilities.



Explanation:

- **GalaxEye** is an Indian space-tech startup focused on advanced **Earth Observation (EO) technologies** and satellite imaging solutions.
- '**Drishti**' is designed to provide **synchronous optical and Synthetic Aperture Radar (SAR) imaging**, a first-of-its-kind capability globally.
- EO satellites are crucial for **agriculture monitoring, disaster management, climate studies, urban planning, and defence surveillance**.
- **Optical imaging** uses visible spectrum light to generate high-resolution images but is limited by **cloud cover and night-time conditions**.
- **SAR (Synthetic Aperture Radar)** uses microwave signals, enabling **all-weather, day-night imaging**, and works on the principle of **microwave backscatter**.
- The integration of optical with SAR payloads allows **continuous, reliable, and high-frequency data capture** of the same geographical location.

4.3. First Indigenous Hydrogen Train: India's Green Rail Transition

Context:

India's first indigenous hydrogen-powered train is a 10-car set approved for the **Jind–Sonipat section in Haryana**. Powered by a **1200 kW fuel-cell propulsion system**, the train can reach a top speed of **75 kmph**. This zero-emission technology produces only water vapor, aligning with India's sustainable mobility goals. The initiative places India in a select group of countries utilizing hydrogen transport, including **Germany, Japan, China & United States.**

How Hydrogen Fuel Cell Technology Works?

- **Chemical Reaction:** Electricity is generated through an electrochemical reaction between hydrogen and oxygen, entirely avoiding combustion.
- **Energy Flow:** Hydrogen stored in high-pressure tanks enters the fuel-cell stack, where it produces electricity to power the train's traction motors.
- **Key Benefits:** Compared to traditional diesel engines, this system offers zero tailpipe emissions, higher energy efficiency, and significantly reduced noise pollution.

Safety Infrastructure:

To support this new technology, an indigenous hydrogen storage and refueling facility has been established at Jind. Safety measures include:

- Hydrogen leak and flame detectors
- Round-the-clock monitoring of the refuelling system
- Accompaniment by certified, trained technical personnel during initial operations.

4.4. Discovery of an Ultra-Short Period Blue Straggler–Brown Dwarf Binary System

Researchers from Gauhati University, the Indian Institute of Astrophysics (IIA), and the Aryabhatta Research Institute of Observational Sciences (ARIES), in collaboration with Italian astronomers, have discovered the first confirmed blue straggler star hosting a brown dwarf companion in an extremely compact binary system.

Key Discovery Details:

- **The Cosmic Dance:** The binary system completes one orbit in just **5.6 hours** (0.234 days), making it one of the shortest-period stellar binaries ever recorded.
- **The Companion:** The brown dwarf companion has a mass of only **0.056 solar masses**, placing it well below the hydrogen-burning limit.
- **The "Brown Dwarf Desert":** The system exists within this region—an observed rarity where brown dwarf companions are seldom found closely orbiting stars.
- **Evolutionary Path:** Scientists suggest the system evolved from a complex triple-star interaction, where gravitational forces and mass transfer caused stars to merge, eventually forming the blue straggler and stabilizing its tight orbit.

Why This Discovery Matters for India?

- **Advancing Fundamental Science:** This breakthrough showcases the growing capability of Indian scientific institutions in understanding complex stellar evolution, binary interactions, and substellar objects.
- **Global Collaboration:** The study, supported by the **DST INSPIRE programme**, was published in the *Monthly Notices of the Royal Astronomical Society: Letters*, solidifying India's position in frontier astrophysical research.

Static Background:

- **Blue Straggler Stars:** Stars that appear unusually hotter, brighter, and younger than neighboring stars, despite forming at the same time. They are believed to gain extra mass through stellar mergers or mass transfer.
- **Brown Dwarf:** A substellar object that is more massive than a planet but less massive than a true star (\(<0.075\) solar masses), meaning it cannot sustain stable hydrogen fusion.

4.5. Private Sector Firing Trials of Indigenous Suryastra Rockets

Context:

Pune-based private defence manufacturer **Nibe Ltd.** has conducted firing trials of indigenous **Suryastra rockets** with strike ranges of **150 km and 300 km** at the Integrated Test Range. This marks an important milestone in India's private sector-led defence manufacturing and long-range rocket capability.

Explanation:

- India is promoting **defence indigenisation** through Make in India, Atmanirbhar Bharat, private sector participation, and reduced dependence on imported weapon systems.
- **Rocket systems** are artillery weapons used for long-range precision or area strikes, strengthening battlefield firepower and deterrence capability.
- The development reflects the rise of India's **Defence Industrial Base**, involving private firms, testing infrastructure like the **Integrated Test Range**, and indigenous defence technology.

4.6. SMILE Mission: Studying Earth's Magnetic Shield Against Solar Storms

Context:

China and the European Space Agency are launching the **SMILE mission** to study how Earth's magnetic shield interacts with solar winds and solar storms. The mission will help improve understanding of space weather, which can affect satellites, GPS, communication systems, aviation and power grids.

Explanation:

- The Sun continuously emits **solar wind**, which consists of charged particles, magnetic fields and energy flowing through space.
- Earth is protected by its **magnetosphere**, a magnetic shield created mainly by Earth's internal magnetic field.
- The magnetosphere deflects many harmful charged particles from the Sun and helps make Earth suitable for life.
- When solar particles interact with Earth's upper atmosphere near polar regions, they produce **auroras**, also called northern and southern lights.
- Strong solar activity can create **solar storms** or **geomagnetic storms**, which may disturb satellites, radio communication, GPS navigation, power grids and airline operations.
- The **SMILE mission** stands for **Solar wind Magnetosphere Ionosphere Link Explorer**.
- It is a joint mission of **China** and the **European Space Agency (ESA)**.
- The mission will capture images of Earth's magnetosphere and study the interaction between **solar wind, magnetosphere and ionosphere**.
- It will provide better real-time understanding of **space weather** and help forecast harmful solar events.
- The mission will carry scientific instruments to observe **X-rays, ultraviolet wavelengths, charged particles and magnetic fields**.

4.7. India Expands Semiconductor Mission to Strengthen Domestic Chip Manufacturing

Context:

The Union Cabinet has approved additional semiconductor projects under the India Semiconductor Mission (ISM), taking the total number of approved semiconductor and chip-related facilities to 12. The initiative aims to reduce import dependence, strengthen supply-chain resilience, and position India as a major player in the global semiconductor ecosystem.

Explanation:

- Semi-conductor chips or integrated circuits are essential for smartphones, computers, automobiles, defence systems, AI, telecommunications, and industrial equipment.
- The global semiconductor supply chain is highly concentrated in countries such as Taiwan, South Korea, the United States, Japan, and China.
- India launched the India Semiconductor Mission (ISM) in 2021 with a financial outlay of ₹76,000 crore to promote semiconductor manufacturing and design.
- Semiconductor fabrication plants (fabs) manufacture chips using advanced lithography and wafer-processing technologies in highly controlled clean-room environments.
- The semiconductor ecosystem also includes ATMP/OSAT facilities for Assembly, Testing, Marking, Packaging, and outsourced semiconductor assembly.
- India seeks to develop a full semiconductor value chain including chip design, fabrication, packaging, materials, and research capabilities.
- Semiconductor self-reliance is linked to economic security, digital sovereignty, electronics manufacturing, and strategic sectors such as defence and space.
- Supply-chain disruptions during the COVID-19 pandemic and geopolitical tensions highlighted the importance of domestic chip production.
- India's semiconductor strategy complements initiatives such as Make in India, Production Linked Incentive (PLI) schemes, and electronics manufacturing expansion.

4.8. India's Rising Fungal Disease Burden and Diagnostic Challenges

Context:

Fungal diseases are infections caused by fungi that affect the skin, nails, lungs, eyes, blood or internal organs. They are gaining public health importance due to rising cases, antifungal resistance, weak diagnostic capacity and greater risk among immunocompromised people.

Explanation:

- **Fungal diseases**, also called **mycoses**, are infections caused by fungi such as yeasts, moulds and dermatophytes.
- Fungi are naturally present in soil, air, water, plants, animals and the human body, but some species can become pathogenic under suitable conditions.
- Common superficial fungal infections affect the **skin, hair and nails**, such as ringworm, athlete's foot and nail fungal infection.
- Some fungi infect mucous membranes and cause diseases such as **oral thrush** and vaginal candidiasis.
- Serious fungal diseases can affect the **lungs, brain, blood and internal organs**, especially in people with weak immunity.

- Examples include **candidiasis, aspergillosis, cryptococcosis, mucormycosis and histoplasmosis.**
- Fungal infections spread through inhalation of spores, direct skin contact, contaminated surfaces or overgrowth of normal body fungi.
- Hot and humid climates favour fungal growth, making tropical countries more vulnerable.
- Major risk factors include diabetes, HIV/AIDS, cancer treatment, organ transplant, prolonged antibiotic use, steroid use and poor hygiene.
- Treatment generally involves **antifungal drugs**, but delayed diagnosis and **antifungal resistance** can make some infections difficult to manage.

4.9. Carbon-Free Ferrocene Analogue Developed Using Boron Rings

Context:

Researchers from **IIT Madras and IISc Bengaluru** have developed a stable, carbon-free analogue of **ferrocene** by using **boron rings** and **osmium**. This marks an important development in organometallic and inorganic chemistry.

Explanation:

- **Ferrocene** is a landmark **organometallic compound** discovered in the 1950s, with the formula $Fe(C_5H_5)_2$.
- It is called a **"sandwich compound"** because one **iron atom** is placed between two flat carbon-based **cyclopentadienyl rings**, like a filling between two slices of bread.
- Ferrocene changed modern chemistry because it showed that metals can form highly stable compounds with organic ring systems in unusual structures.
- Its stability is due to strong bonding between the central metal atom and the electron-rich carbon rings.
- Ferrocene is important in **organometallic chemistry, catalysis, electrochemistry, fuel additives, materials science and medicinal chemistry.**
- It shows useful **redox behaviour**, meaning it can gain or lose electrons easily, making it valuable in sensors, batteries and electron-transfer studies.
- The recent study by **IIT Madras and IISc Bengaluru** is significant because researchers created a **carbon-free analogue of ferrocene.**
- Instead of carbon rings, they used **boron rings**, and instead of iron, the compound involved **osmium**, a transition metal.
- **Boron** is placed next to carbon in the periodic table and can form unique bonding arrangements.
- This discovery expands the idea of sandwich compounds beyond traditional carbon-based chemistry.

4.10. WHO Declares Ebola Outbreak in Congo and Uganda a Global Health Emergency

Context:

The World Health Organization has declared the Ebola outbreak caused by the **Bundibugyo virus** in the Democratic Republic of Congo and Uganda as a **Public Health Emergency of International Concern (PHEIC).** WHO clarified that it is **not a pandemic emergency**, but the risk of cross-border spread requires a coordinated international response.

Explanation:

- **Ebola Virus Disease (EVD)** is a severe, often fatal viral haemorrhagic fever transmitted through **bodily fluids** such as blood, vomit, saliva and semen.
- The disease was first identified in **1976** near the **Ebola River** in present-day Democratic Republic of Congo.

- The present outbreak is linked to the **Bundibugyo ebolavirus**, a rarer Ebola strain for which approved vaccines and therapeutics are limited.
- Common symptoms include **fever, weakness, vomiting, diarrhoea, internal bleeding, and organ failure**.
- The disease has a high **case fatality rate**, especially where healthcare systems are weak.
- Outbreak control measures include **isolation, contact tracing, quarantine, PPE use, vaccination, and safe burial practices**.
- The **World Health Organization (WHO)** and **Africa CDC** play major roles in surveillance and emergency response.
- Frequent outbreaks in Central Africa are linked to **forest ecosystems, human-animal interaction, conflict zones, and poor health infrastructure**.
- A **Public Health Emergency of International Concern (PHEIC)** is declared under the **International Health Regulations, 2005** when an extraordinary health event risks international spread and may need global coordination.
- WHO's role includes **risk assessment, issuing temporary recommendations, coordinating surveillance, mobilising medical supplies, supporting contact tracing and guiding countries on travel/health measures**.
- WHO has advised against blanket border closures, as such steps can disrupt aid, surveillance and health response.

4.11. India's First Orbital Data Centre Satellite

Context:

Bengaluru-based startup Pixxel, in collaboration with US firm Axiom Space, is planning to launch India's first orbital data centre satellite. The mission aims to test whether data processing and AI workloads can be performed directly in space instead of relying entirely on Earth-based data centres.

Explanation:

- An orbital data centre is a satellite-based computing facility that processes and stores data in space.
- Conventional satellites usually transmit raw data to Earth, whereas orbital data centres can process information onboard before transmission.
- Space offers natural cooling due to vacuum conditions, potentially reducing energy consumption of data centres.
- Radiation, microgravity, heat dissipation, and hardware reliability are major technological challenges in space computing.

4.12. China's Atlas Drone Swarm System and Emerging Warfare Technologies

Context:

China has showcased the Atlas drone swarm system, a mobile platform capable of launching and coordinating multiple drones simultaneously. The system highlights advancements in autonomous warfare and raises concerns for regional security, including India and the Indo-Pacific.

Explanation:

- Drone swarm refers to **multiple unmanned aerial vehicles (UAVs)** operating in coordination using algorithms and artificial intelligence.



- Swarm systems rely on **autonomous decision-making, real-time communication, and distributed control**, reducing human intervention.
- Such systems create a **force multiplier effect**, overwhelming enemy defenses through numbers and coordination.
- Swarm drones can be used for **reconnaissance, electronic warfare, and precision strikes**.

4.13. DRDO's ULPGM-V3: Precision Strike and Anti-Drone Capability

Context:

DRDO has successfully carried out final development trials of the UAV-Launched Precision Guided Missile **ULPGM-V3**. The missile is designed for **precision strikes, anti-drone combat**, and **network-centric warfare**, strengthening India's indigenous drone-launched missile capability.

Explanation:

- **ULPGM** stands for **UAV-Launched Precision Guided Missile**.
- It is a **drone-launched missile system** developed by **DRDO** for modern battlefield requirements.
- The latest version, **ULPGM-V3**, is an upgraded variant compared to earlier **V1 and V2** versions.
- **V1** was a basic free-fall precision missile, while **V2** had longer range, mid-course target updates, and better battlefield utility.
- **V3** adds capability to engage **drones, helicopters, moving targets, armoured vehicles, tanks, bunkers and fortified structures**.
- It has an advanced guidance system using **multiple sensors** to track targets accurately.
- It can operate in **day and night conditions**, increasing all-weather battlefield usefulness.
- The missile has **fire-and-forget capability**, meaning once launched, it can independently track and hit the target.
- It can carry different types of warheads such as **anti-armour warheads, fragmentation warheads**, and **bunker-busting warheads**.
- It is useful against **asymmetric threats**, where small drones and mobile targets are increasingly used in warfare.
- The project reflects India's focus on **indigenous defence technology**, involving DRDO and private defence companies.
- The system supports **network-centric warfare**, where drones, sensors, communication systems and command centres share real-time data

4.14. DRDO–IAF Trial of TARA Glide Weapon System

Context:

The Defence Research and Development Organisation (DRDO) and the Indian Air Force (IAF) have successfully conducted the maiden trial of the Tactical Advanced Range Augmentation (TARA) glide weapon system off the Odisha coast. TARA is India's first indigenous glide weapon kit designed to convert conventional unguided bombs into precision-guided munitions.

Explanation:



- A glide weapon is a precision-guided, unpowered, stand-off munition equipped with wings or flight control surfaces that allow it to glide toward a target after being released from an aircraft, rather than falling along a standard ballistic trajectory. It allows aircraft to strike ground targets from a safe distance, often over 100 km, outside the range of enemy air defenses.

Key aspects of glide weapons include:

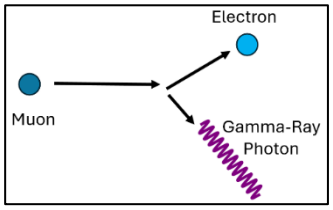
- **Stand-off Capability:** They are launched far from the target, ensuring pilot safety.
- **Precision Targeting:** Often equipped with guidance systems (satellite/laser), turning "dumb" bombs into smart, accurate weapons.
- **Low Detectability:** Due to their small radar signature, lack of engine noise, and low flight altitude, they are very difficult for surface-to-air missiles to intercept.
- **Cost-Effectiveness:** They can be developed by fitting kits onto existing conventional bombs, making them cheaper than cruise missiles.
- **TARA (Tactical Advanced Range Augmentation):** India successfully tested this indigenous glide kit on May 7, 2026, to upgrade conventional warheads.
- **Gaurav:** A 1000 kg Indian indigenous precision-guided glide bomb.

4.15. Muons and Their Expanding Scientific Applications

Context:

Muons, produced by cosmic-ray interactions in the atmosphere, are highly penetrating subatomic particles increasingly used beyond fundamental physics. Their unique properties enable advanced imaging techniques like muography, making them valuable across multiple scientific and practical domains.

Explanation:



- **Muons are subatomic particles** (leptons) formed when cosmic rays collide with Earth's atmosphere.
- Around 10,000 muons reach every square metre per minute, making them naturally abundant.
- They resemble electrons but are ~207 times heavier ("fat electrons").
- Due to their mass, they can penetrate hundreds of metres of rock and dense materials.
- They are highly unstable, surviving only ~2.2 microseconds before decaying into electrons and neutrinos.
- Their penetrating ability is used in **muography (muon tomography)** to image large internal structures.
- **Archaeology:** Detection of hidden chambers in pyramids (e.g., Giza).
- **Volcanology:** Mapping internal magma pathways in volcanoes (e.g., Mount Vesuvius).
- **Nuclear science:** Imaging damaged reactors like **Fukushima** for internal assessment.
- **Security & industry:** Used in cargo scanning, customs inspection, and structural integrity analysis of large infrastructure.

4.16. Manus AI Deal Blocked - Rise of Agentic AI in Geopolitics

Context:

China blocked Meta's $2-billion acquisition of Manus AI citing national security concerns, highlighting how advanced AI systems are now viewed as strategic assets. The episode reflects intensifying US–China technological rivalry and the growing importance of next-generation "agentic" AI systems.

- **What is Manus AI:** Manus is described as a *general AI agent* capable of performing complex, multi-step tasks beyond simple chatbot responses.
- **Key Capability:** Unlike traditional AI (like chatbots), it uses *tool-calling*, enabling interaction with external apps (emails, calendars) and real-time web data retrieval.
- **Functional Nature:** It can execute tasks autonomously—such as coding, planning, and decision-making—making it closer to human-like digital assistants.
- **Strategic Concern:** China fears transfer of critical data, algorithms, and talent to foreign firms, treating AI as a core national asset.
- **What is Agentic AI:** Agentic AI refers to systems that can *independently plan, decide, and act* to achieve goals with minimal human intervention.
- **Examples of Use:** Automated research assistants, personal productivity agents, cybersecurity monitoring systems, and enterprise decision tools.

4.17. Rising Ethane Imports and Global Petrochemical Supply Chains

Context:

China's ethane imports reached 3.462 million tons in 2026, with the United States emerging as the sole supplier. Increased imports were driven by strong petrochemical demand and disruptions in West Asian feedstock supplies due to regional geopolitical tensions.



Explanation:

- Ethane (C_2H_6) is a colourless, odourless hydrocarbon belonging to the alkane family and is a major component of natural gas.
- Ethane is primarily obtained during natural gas processing and petroleum refining.
- It is a fossil-fuel-based hydrocarbon and is highly flammable.
- The most important application of ethane is as a petrochemical feedstock for producing ethylene through steam cracking.
- Ethylene is a basic petrochemical used in manufacturing polyethylene plastics, PVC products, synthetic fibres, packaging materials, detergents, solvents, and industrial chemicals.
- Ethane-based ethylene production is generally cheaper and more energy-efficient than naphtha-based production.
- Ethane is also used as a refrigerant in cryogenic systems because of its low boiling point.
- In laboratories and industries, ethane may be used as a calibration gas and specialty fuel gas.
- Large-scale ethane trade is linked with natural gas production, LNG infrastructure, shale gas extraction, and global petrochemical industries.
- The United States is a major global exporter of ethane due to abundant shale gas reserves.

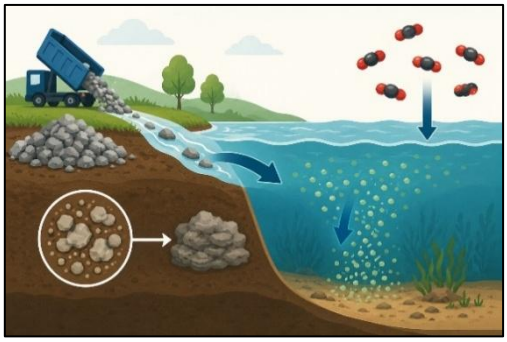
5. ENVIRONMENT

5.1. Enhanced Alkalinity and Doubts over Rock-Based Climate Mitigation

Context:

A climate mitigation method called **enhanced alkalinity** involves spreading crushed silicate rocks on land or in water to help oceans absorb and store more **CO_2**. New research has raised doubts, saying that minerals released from rocks may get trapped in secondary minerals like **clay**, reducing the method's carbon-storage efficiency.

Explanation:



- **Enhanced alkalinity** is a proposed **carbon dioxide removal technique** aimed at increasing the natural ability of oceans to absorb CO_2.
- It involves spreading crushed **silicate rocks** or alkaline minerals on land, rivers, coasts or oceans.
- When these rocks dissolve, they release ions such as **calcium, magnesium and bicarbonate**, which increase water alkalinity.
- Higher alkalinity helps convert dissolved CO_2 into more stable forms, supporting long-term **carbon sequestration**.
- The method is linked to natural **rock weathering**, but enhanced alkalinity tries to accelerate this process artificially.
- It is considered part of **geoengineering** or negative emissions strategies.
- The concern is that released minerals may form secondary minerals like **clay**, trapping alkalinity before it reaches the ocean.
- This can reduce the ability of oceans to absorb and store atmospheric carbon dioxide.
- Other challenges include mining impacts, energy use for crushing rocks, ecological risks and monitoring difficulties.

5.2. Union Cabinet Approves ₹37,500-Crore Coal Gasification Package

Context:

The Union Cabinet has approved a ₹37,500-crore incentive package to promote coal gasification projects in India. The scheme aims to reduce import dependence on products such as LNG, methanol, ammonia, and urea while supporting the target of 100 million tonnes of coal gasification by 2030.

Explanation:



- Coal gasification is a process in which coal or lignite is converted into syngas (synthetic gas) through partial oxidation at high temperatures.
- Syngas mainly contains carbon monoxide, hydrogen, carbon dioxide, and methane and can be used to produce methanol, ammonia, synthetic natural gas (SNG), fertilizers, and chemicals.
- India possesses large coal reserves but depends heavily on imports of LNG, coking coal, methanol, ammonia, and urea, affecting energy security and foreign exchange reserves.

- Surface coal gasification is considered a cleaner alternative compared to direct coal combustion because pollutants can be removed during processing.
- The scheme provides financial incentives, extended coal linkage tenure, and support for downstream industries to encourage private investment.
- Coal gasification is linked to India's goals of energy security, import substitution, industrial growth, and diversification of the energy mix.

5.3. Green Methanol Production from Invasive Weed in Kutch

Context:

India's first green methanol plant is being set up in Kandla to convert the invasive weed *Prosopis juliflora* into marine fuel. The project aims to reduce emissions in shipping and address ecological damage caused by the species in Kutch.



Explanation:

- ***Prosopis juliflora*** is an invasive alien species (IAS) introduced in India during British colonial rule that has spread aggressively in Banni grasslands (Kutch), displacing native biodiversity and degrading ecosystems.
- IAS are non-native species that outcompete local flora/fauna, affecting ecology and livelihoods; management includes eradication, control, and utilisation.
- **Methanol (CH_3OH) is a liquid fuel and chemical feedstock, used in shipping as a cleaner alternative to bunker fuel.**
- Conventional methanol is produced from fossil fuels (coal/natural gas) via gasification or reforming, leading to emissions.
- **Green methanol** is produced from renewable biomass or CO_2 + green hydrogen, reducing lifecycle carbon footprint.
- The process involves **biomass gasification. Biomass is heated in limited oxygen (gasification) to produce syngas (CO + H_2). This syngas is then converted using a catalyst into liquid methanol fuel.**
- Aligns with **International Maritime Organization (IMO)** norms to reduce shipping emissions (CO_2, NOx, SOx).
- Supports India's goals of **energy transition, green ports, and circular economy** by converting waste biomass into fuel.
- Also addresses **land restoration and invasive species management** while generating economic value.

5.4. Colombia's "Cocaine Hippos" and India's Vantara Relocation Proposal

Context:

Colombia is struggling to control the rapidly growing population of invasive "cocaine hippos" introduced by Pablo Escobar. India's Vantara has proposed relocating these animals as a humane alternative to culling.

Explanation:

- Hippopotamus is a **large semi-aquatic mammal native to sub-Saharan Africa**, commonly found in rivers and lakes.
- It is known for its **aggressive and territorial behaviour**, especially in water, and is considered one of the most dangerous large animals.



- Hippos **spend daytime in water** to regulate body temperature and come out at night to graze on grass.
- They typically **give birth in water**, and calves can swim soon after birth, reflecting adaptation to aquatic habitats.
- In the 1980s, **Pablo Escobar imported four hippos to Colombia**, which were left unmanaged after his death.
- Due to **absence of natural predators and favourable conditions**, their population has grown to around 200, spreading across river systems.
- ®These hippos are classified as an **invasive species**, as they are non-native and disrupt local ecosystems.
- They threaten **indigenous biodiversity**, alter water chemistry (nutrient loading, algal blooms), and increase risks of human-wildlife conflict.
- Scientists recommend **population control (including culling)**, as sterilisation is costly and relocation is logistically complex.
- India's **Vantara wildlife centre has proposed relocation**, offering veterinary care and habitat management as a humane alternative, though feasibility and acceptance remain uncertain.

5.5. E100 (100% Ethanol) as Approved Automotive Fuel in India

Context:

The Ministry of Road Transport and Highways has proposed recognizing E100 (100% ethanol) as an approved fuel under the Central Motor Vehicles Rules. This will enable certification and large-scale deployment of vehicles running entirely on ethanol.

Explanation:

- Ethanol is a **biofuel** produced from sugarcane, maize, and biomass etc.
- India promotes **ethanol blending (E10, E20)** to reduce crude oil imports. India already achieved E20 (a petrol blend containing 20% ethanol and 80% petrol).
- E100 refers to **pure ethanol fuel**, requiring specially designed engines.
- Governed under **Central Motor Vehicles Rules (CMVR)** for fuel standards and vehicle approval.
- **Homologation** = official, mandatory certification process that ensures a vehicle or its components comply with government safety, technical, and environmental regulations before it can be sold or used on public roads.
- Ethanol is **renewable & cleaner-burning. Hence Ethanol blended fuel** reduces greenhouse gas emissions.
- E100 implementation aims to achieve energy independence, reduce carbon emissions, and boost farmer incomes.
- key benefits include lowering the massive oil import bill and achieving Net-Zero targets.
- However, challenges include the need for special Flex-Fuel Vehicles (FFVs), lower fuel efficiency, and high-water consumption for feedstock.

5.6. Kalai-II Hydroelectric Project and White-bellied Heron Habitat Concerns

Context:

The proposed 1,200 MW Kalai-II Hydroelectric Project in Arunachal Pradesh has come under scrutiny because project documents reportedly did not adequately mention the presence of the critically endangered White-bellied Heron habitat in the region. The issue highlights tensions between hydropower expansion and biodiversity conservation in ecologically sensitive Himalayan ecosystems.

Explanation:

- The Kalai-II project is a proposed hydropower project on the Lohit River basin, a tributary of the Brahmaputra River in Arunachal Pradesh.
- The project involves diversion of forest land and requires approval under the Forest (Conservation) Act, 1980 and environmental clearance under the Environment Protection Act, 1986.
- Arunachal Pradesh is part of the Eastern Himalaya biodiversity hotspot, known for rich endemic flora and fauna.
- The White-bellied Heron (*Ardea insignis*) is one of the world's rarest birds and is classified as Critically Endangered by the IUCN Red List.
- The species inhabits undisturbed riverine forests and freshwater ecosystems in Bhutan, northeast India and parts of Myanmar.
- It is protected under Schedule I of the Wildlife Protection Act, 1972, providing the highest legal protection in India.
- Hydropower projects can affect river ecology through habitat fragmentation, altered water flow, sedimentation and disturbance to nesting areas.

5.7. Barn Swallows in Manipur Show Shift from Migration to Resident Breeding

Context:

A study has found that some **barn swallows** in Manipur's Imphal Valley have stopped long-distance migration and are now breeding locally throughout the year. The finding highlights how birds may alter migration and nesting behaviour due to ecological and human-induced changes.

Explanation:

- **Barn swallow** is a small passerine bird scientifically known as **Hirundo rustica**.
- It is a widespread **migratory species**, usually breeding in temperate regions and migrating to warmer areas during winter.
- In India, barn swallows are generally winter visitors, but some populations are now showing **resident breeding behaviour**.
- The Manipur study suggests a shift from **migratory trait to sedentary trait** in parts of the Imphal Valley.
- Possible reasons include **climate change, land-use change, urbanisation, suitable nesting sites and year-round food availability**.
- Barn swallows are **insectivorous birds**, so their presence can indicate ecological changes in insect populations.
- The study is important for understanding **avian migration, behavioural adaptation, speciation, subspecies variation and ecological plasticity**.

5.8. Nicobarese Tribal Opposition to Proposed Wildlife Sanctuaries in Great Nicobar Region

Context:

The Tribal Council in Nicobar has opposed the notification of three wildlife sanctuaries in Little Nicobar, Meroe, and Menchal islands, alleging lack of consultation with indigenous communities. The issue is linked to concerns over tribal rights, cultural practices, and the implementation of the Great Nicobar Island development project.

Explanation:

- Great Nicobar Island is part of the Andaman and Nicobar archipelago and is ecologically important due to tropical forests, coral reefs, mangroves, and endemic wildlife.
- The proposed sanctuaries aim to protect species such as the leatherback turtle and Nicobar megapode, which are ecologically sensitive and protected under the Wildlife (Protection) Act, 1972.
- The Forest Rights Act (FRA), 2006 recognises traditional forest rights of Scheduled Tribes and forest-dwelling communities over land, resources, and cultural practices.
- Indigenous Nicobarese communities argue that the sanctuary declaration and eco-sensitive zone process lacked prior consultation and informed consent.
- The Great Nicobar Infrastructure Project includes a transshipment port, airport, township, and power infrastructure with strategic and economic significance.
- The issue highlights the balance between biodiversity conservation, tribal rights, environmental governance, and strategic development in island ecosystems.

5.9. Tiger Rediscovered in D'Ering Memorial Wildlife Sanctuary

Context:

A tiger was recently photographed through a camera trap inside Arunachal Pradesh's D'Ering Memorial Wildlife Sanctuary after nearly two decades.

Explanation:

- D'Ering Memorial Wildlife Sanctuary is located near Pasighat in East Siang district of Arunachal Pradesh along the Brahmaputra floodplains.
- It is named after Daying Ering, a noted political leader and former chairman of the Ering Commission.
- The sanctuary consists mainly of riverine forests, grasslands, marshes, and wetlands supporting rich biodiversity.
- It is known for species such as tiger, elephant, wild buffalo, hispid hare, and Chinese pangolin.
- Camera trapping is an important wildlife monitoring technique used in tiger estimation and biodiversity assessment.
- The sighting is being viewed as evidence of improving ecological conditions and successful long-term conservation and monitoring efforts in the region.

5.10. Hasdeo Forest Diversion and Compensatory Afforestation under CAMPA

Context:

Rajasthan Rajya Vidyut Utpadan Nigam Limited (RVUNL) has sought permission to divert forest land in the ecologically sensitive Hasdeo-Arand region of Chhattisgarh for coal mining and proposed compensatory afforestation elsewhere. The proposal has revived debates regarding biodiversity conservation, tribal livelihoods and the effectiveness of compensatory afforestation.



Explanation:

- Hasdeo-Arand is a dense forest region spread across Korba, Surguja and Surajpur districts of Chhattisgarh and is considered one of central India's largest contiguous forest landscapes.

- The region is ecologically important due to rich biodiversity including elephants, leopards, sloth bears and several Schedule-I species under the Wildlife Protection Act, 1972.
- Hasdeo forests also function as a major catchment area for the Hasdeo River and support tribal communities dependent on forest resources.
- Forest diversion for mining requires approval under the Forest (Conservation) Act, 1980 and environmental clearance under the Environment Protection Act, 1986.
- Compensatory afforestation refers to planting forests on non-forest or degraded land when forest land is diverted for non-forest purposes.
- CAMPA stands for Compensatory Afforestation Fund Management and Planning Authority, created to manage funds collected from user agencies for afforestation and ecological restoration.
- The Compensatory Afforestation Fund Act, 2016 institutionalised utilisation of these funds by Centre and States.

5.11. NGT Directs Southern States on Utilisation of Clean Air Funds

Context:

The National Green Tribunal (NGT) has directed southern States and Puducherry to ensure strict and time-bound implementation of State Action Plans under the National Clean Air Programme.

Explanation:



- **National Clean Air Programme (NCAP)** is a central sector scheme launched in 2019 aiming to reduce **PM10 and PM2.5 concentrations** in non-attainment cities.
- Targets include **20–30% reduction (later revised to 40% by 2026)** in particulate pollution levels using 2017 as the base year.
- Cities prepare **State Action Plans (SAPs) / City Action Plans (CAPs)** focusing on sector-specific interventions like transport, industry, construction, and waste management.
- **Particulate Matter (PM2.5 & PM10)** are key pollutants causing respiratory and cardiovascular diseases, making air pollution a major **public health concern**.
- Funds are allocated under schemes like **NCAP and Fifteenth Finance Commission grants** for air quality improvement.
- **NGT** is a statutory body under the **National Green Tribunal Act, 2010**, empowered to enforce environmental laws and provide relief and compensation.
- **Under-utilisation of funds** reflects governance and implementation gaps, affecting pollution mitigation outcomes.

Southern cities, though less highlighted than Delhi-NCR, are witnessing **rising urban pollution due to vehicular emissions, industrialisation, and construction dust.**

5.12. Canine Distemper Virus Threat to Tigers in Kanha Tiger Reserve

Context:

A sixth tiger has reportedly died in Madhya Pradesh's Kanha Tiger Reserve due to suspected Canine Distemper Virus infection. The incident raises concerns about disease transmission from domestic or stray dogs to wildlife in protected areas.

Explanation:

- **Canine Distemper Virus (CDV)** is a highly contagious viral disease mainly affecting dogs, but it can also infect wild carnivores such as tigers, lions, leopards, foxes and wolves.
- It spreads through **respiratory droplets, body fluids and close contact** with infected animals, especially unvaccinated domestic or stray dogs near forest areas.
- In big cats, CDV can cause **fever, lung infection, neurological symptoms, weakness and death**, making it a serious wildlife health concern.
- **Kanha Tiger Reserve** is located in Madhya Pradesh and forms part of the Central Indian tiger landscape.
- Disease spillover from domestic animals to wildlife is an example of the **One Health approach**, which links human, animal and environmental health.
- Such outbreaks highlight the need for **wildlife disease surveillance, vaccination of dogs near buffer zones, carcass testing, habitat management and control of human–wildlife interface**.

5.13. Separate Free-Ranging Asiatic Lion Population and Conservation Concerns

Context:

The government is considering the creation of a separate free-ranging Asiatic lion population outside Gujarat after consultation with states and scientific bodies. This is significant because India's Asiatic lions remain concentrated in and around Gir, making them vulnerable to disease outbreaks, disasters and genetic risks.

Explanation:

- **Asiatic lions** are found naturally only in India, mainly in the **Gir landscape of Gujarat**, making them an isolated population.
- A single concentrated population faces risks from **epidemics, natural disasters, habitat pressure, genetic bottleneck and human–wildlife conflict**.
- The Supreme Court had earlier supported translocation of some lions to **Kuno National Park, Madhya Pradesh**, to create a second secure habitat.
- **Free-ranging population** means lions living in open natural habitats, not permanently kept in enclosures.
- Diseases such as **Canine Distemper Virus (CDV)** can spread from dogs or other animals to wild carnivores and may threaten big cat populations.
- Lion conservation requires **habitat preparedness, prey base management, disease surveillance, veterinary care, genetic monitoring and inter-state coordination**.
- India's big cat conservation is linked with **Project Lion, Wildlife Protection Act, 1972, National Board for Wildlife, protected areas and landscape-level conservation**.

5.14. Decline of Dragonfly and Damselfly Species in the Western Ghats

Context:

A recent biodiversity survey across the Western Ghats reported that nearly 35% of historically recorded dragonfly and damselfly species could not be documented, indicating possible ecological decline.

Explanation:

- Dragonflies and damselflies belong to the order Odonata and are important indicator species of freshwater ecosystem health.



- Dragonflies are generally stronger fliers with broader bodies, while damselflies are slender and usually fold wings at rest.
- Their life cycle includes aquatic larval stages, making them highly sensitive to water pollution and habitat degradation.
- Western Ghats is a UNESCO World Heritage biodiversity hotspot extending along India's western coast
- Researchers highlighted habitat loss, pollution, hydropower projects, forest fires, tourism pressure, and climate change as major threats to these freshwater-dependent insects.

5.15. Seasonal Salinity Changes and Cyanobacteria in Chilika Lake Ecology

Context:

A recent genomic study on Odisha's Chilika Lake found that seasonal and salinity changes strongly influence cyanobacterial communities and ecological functions in the lagoon. The study highlighted how environmental stress can alter biodiversity, nutrient cycling and the stability of fragile coastal ecosystems.

Explanation:

- Chilika Lake is Asia's largest brackish water lagoon located on the east coast of Odisha at the mouth of the Daya River flowing into the Bay of Bengal.
- A brackish water ecosystem contains a mixture of freshwater and seawater, making salinity variation a key ecological factor.
- Chilika Lake is recognised as a Ramsar Wetland Site and is famous for biodiversity, fisheries, migratory birds and Irrawaddy dolphins.
- Cyanobacteria are photosynthetic microscopic organisms that help in nitrogen fixation, oxygen production and carbon sequestration in aquatic ecosystems.
- Excessive cyanobacterial growth can cause harmful algal blooms, reducing dissolved oxygen and threatening fisheries, biodiversity and public health.
- Salinity, phosphate, silicate, biological oxygen demand (BOD) and water transparency influence aquatic microbial composition and nutrient cycling.
- Metagenomic sequencing is an advanced genomic technique used to study genetic material collected directly from environmental samples.

5.16. India's Emergency Cell Broadcast Messaging System

Context:

India has operationalised a nationwide emergency alert system that sends instant warning messages directly to mobile phones. It was recently demonstrated through a countrywide test involving loud alarms and multilingual alerts.

Explanation:

- **Cell Broadcast Technology**: It enables simultaneous transmission of alerts to all mobile devices within a defined geographic area without requiring individual phone numbers.
- Difference from SMS Alerts: Unlike SMS, which may be delayed due to congestion and is sent individually, cell broadcast delivers instant messages to all devices connected to a cell tower.

- Global Adoption: Developed in the 1990s, this technology is widely used in regions such as Europe, the United States, Japan, and South Korea for emergency warnings.
- Institutional Framework in India: The system is implemented under the telecommunications administration with alignment to international telecom standards and protocols.
- **Use Cases**: It is used for disaster alerts such as cyclones, floods, earthquakes, and other public safety emergencies requiring immediate communication.
- **Operational Mechanism**: Powered by the **SACHET platform (developed by C-DOT)**, Alerts are transmitted via cell towers to all connected devices in a specific area, ensuring location-based and targeted dissemination.
- Key Features and Advantages: The system overrides silent mode, uses distinctive alert tones, requires no app or subscription, and maintains user privacy by not using personal data.
- Relevance in Disaster Management: It enhances early warning systems, improves last-mile connectivity, and helps reduce casualties and damage during increasing climate-related disasters.

5.17. Sikkim's Natural Farming Model Gains National Recognition

Context:

The Prime Minister highlighted Sikkim as a model for the country in adopting natural/organic farming, emphasizing its early transition and success in promoting sustainable agriculture and boosting tourism and rural income.

Explanation:



- **Natural farming** is a chemical-free farming system relying on **local inputs (cow dung, urine, bio-cultures)**, soil biology, and ecological processes; linked with **Zero Budget Natural Farming (ZBNF)**.
- Focus on **soil health, biodiversity, low input cost, climate resilience**, and reduced dependence on synthetic fertilizers/pesticides.
- **Pros**: improves **soil fertility**, reduces input costs, enhances **sustainability**, promotes **nutritional quality**, eco-friendly and climate adaptive.
- **Cons**: lower yields initially, requires **knowledge/skill-intensive practices**, transition period risk, market linkage challenges for premium pricing.
- **Sikkim became India's first fully organic state (2016)** by banning chemical inputs and converting entire cultivable land.
- Government support through **policy push, certification, farmer training, and supply chains** ensured success.
- Result: improved **brand value, export potential, eco-tourism growth**, and preservation of fragile **Himalayan ecosystem**.

5.18. Light Pollution Threatens Dark Sky Regions and Astronomy

Context:

Light pollution is increasingly affecting some of the world's clearest skies, including Chile's Atacama Desert, a major hub for astronomical research. Rising urbanisation and industrial activity are degrading ideal observing conditions.

Explanation:

- **Light pollution** refers to excessive or misdirected artificial light that brightens the night sky.
- It reduces visibility of **celestial objects** and affects astronomical observations.
- Ideal observation sites require **dry climate, high altitude, low humidity, and minimal light pollution**.
- **Atacama Desert (Chile)** is one of the best locations due to clear skies and over **300 cloudless nights/year**.
- Hosts major observatories like **Paranal Observatory** and projects like **Extremely Large Telescope (ELT)**.
- Expansion of **urbanisation, mining, and energy projects** increases sky brightness.
- Impacts **astronomy, ecosystems, and human circadian rhythms**.
- Highlights need for **dark sky conservation policies and regulation of artificial lighting**.

6. GEOGRAPHY

6.1. Mexico City Sinking Rapidly: A Growing Urban Crisis

Context:

Mexico City (Capital of Mexico) is sinking at an alarming rate of nearly 20–25 cm per year, as observed by recent satellite data from NISAR satellite. The phenomenon is clearly visible from space, making it one of the fastest-subsiding cities in the world.



Explanation:

- The city is built on the former **Lake Texcoco**, composed of soft clay that is highly compressible.
- Massive **groundwater extraction** to meet urban demand has significantly depleted the aquifer.
- Loss of underground water reduces soil support, leading to land subsidence.
- The clay layers undergo irreversible compaction, meaning the land cannot recover.
- Some regions are sinking at 2 cm per month, especially near the airport and central zones.
- Over the past century, parts of the city have sunk by more than 10–12 metres.
- Uneven sinking causes tilting of buildings, cracks in roads, and misalignment of structures.
- Critical infrastructure like subways, drainage systems, and pipelines is severely affected.
- Subsidence worsens the water crisis by damaging water supply networks and increasing leakages.
- **Satellite monitoring (InSAR) helps track changes and supports better urban planning and disaster management.**

6.2. Terms in News: Western Disturbances, ENSO, Heat Wave and Wet Bulb Temperature

Context:

India is witnessing multiple climate-related extreme weather events during summer, including heat waves, humidity stress, and irregular rainfall patterns. Terms such as Western Disturbances, El Niño, La Niña, Wet Bulb Temperature and Heat Index have again become important in understanding India's monsoon and extreme weather conditions.



Key Highlights:

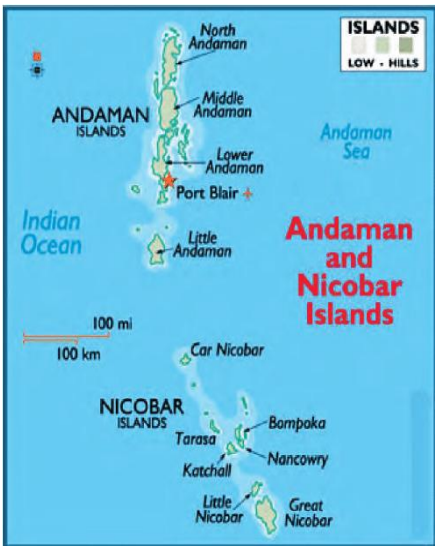
- Western Disturbances are extra-tropical cyclones originating near the Mediterranean region and moving eastward with the subtropical westerly jet stream. They bring winter rainfall and snowfall to northwestern India and the Himalayas.
- El Niño Southern Oscillation (ENSO) is a coupled ocean-atmosphere phenomenon in the equatorial Pacific Ocean influencing global climate patterns.
- El Niño refers to abnormal warming of sea surface temperatures in the eastern and central Pacific Ocean, often weakening Indian monsoon rainfall and increasing drought and heat wave frequency in India.
- La Niña refers to abnormal cooling of Pacific Ocean waters, generally strengthening Indian monsoon rainfall and sometimes increasing floods.

- Neutral ENSO conditions occur when neither El Niño nor La Niña dominates the Pacific circulation.
- Thermocline is the transition layer separating warmer surface ocean water from colder deep water and plays an important role in ENSO dynamics.
- Heat Wave in India is declared by IMD based on departure from normal maximum temperature or when temperatures cross specific thresholds in plains and coastal areas.
- Wet Bulb Temperature measures combined effects of heat and humidity and indicates the lowest temperature achievable through evaporation. High wet bulb values are dangerous because the human body cannot cool efficiently through sweating.
- Heat Index or "feels like temperature" combines temperature and humidity to represent perceived human discomfort during extreme heat conditions.

6.3. Nicobar Visit Highlights Tribal Concerns over Great Nicobar Project

Context:

Opposition leader visited Great Nicobar Island and met the Nicobarese community, who expressed concerns over the proposed ₹72,000-crore infrastructure project, including fears of displacement, ecological damage, and loss of ancestral lands.



Tribes of Andaman & Nicobar:

Andaman Group (Negrito tribes):

1. **Sentinelese:**
   - **Location:** *North Sentinel Island*
   - **Key point:** Completely isolated; no external contact allowed
2. **Jarawa:**
   - **Location:** *South Andaman & Middle Andaman*
   - **Lifestyle:** Nomadic hunter-gatherers
3. **Onge:**
   - **Location:** *Little Andaman Island*
   - **Status:** Particularly Vulnerable Tribal Group (PVTG), declining population
4. **Great Andamanese:**
   - **Location:** *Strait Island*
   - **Status:** Highly reduced population

Nicobar Group (Mongoloid tribes):

1. **Shompen:**
   - **Location:** *Great Nicobar Island*
   - **Nature:** Semi-nomadic hunter-gatherers
2. **Nicobarese:**
   - **Location:** *Nicobar Islands*
   - **Key point:** Most assimilated tribe; practice agriculture & Christianity widely.

7. HISTORY

7.1. Veera Pasi: Remembering a Local Hero of the 1857 Revolt

Context:

Opposition leader unveiled a statue of Veera Pasi in Rae Bareli, Uttar Pradesh, highlighting the role of marginalised communities in the 1857 Revolt.

- Veera Pasi is remembered in local folklore as a Pasi warrior and companion of Rana Beni Madhav Baksh Singh, who fought against the British during the Revolt of 1857.
- The Revolt of 1857 was India's first major anti-colonial uprising, involving soldiers, peasants, zamindars, local rulers and various social groups across North India.
- Many local and marginalised heroes were not prominently recorded in colonial or mainstream histories, but survived through oral traditions, folk songs and community memory.
- The Pasi community is a Dalit community with significant presence in Uttar Pradesh, making such commemorations socially and politically important.
- The event has brought attention to Dalit history, local memory, and the political importance of the Pasi community in Uttar Pradesh.

7.2. Return of Chola-Era Copper Plates and Cultural Repatriation

Context:

The Netherlands has returned the **Chola-era Anaimangalam copper plates** to India, marking an important step in the repatriation of Indian heritage objects. These plates are valuable historical records linked to the **Chola dynasty**, land grants, temple culture and medieval South Indian administration.

Explanation:



- **Copper plate inscriptions** were official royal records used in ancient and medieval India to document **land grants, tax exemptions, donations and administrative orders**.
- The returned plates are associated with the **Chola period**, especially the age of **Rajaraja Chola I and Rajendra Chola I**.
- The Cholas ruled mainly from the **Kaveri delta region** of present-day Tamil Nadu and were known for **naval power, temple architecture, bronze images and efficient administration**.
- These plates mention grants to a **Buddhist vihara near Nagapattinam**, showing religious patronage and maritime-cultural contacts.
- Such inscriptions help reconstruct **political history, revenue systems, village administration, land measurements and royal genealogy**.
- Repatriation means the return of cultural property taken away through colonial or illegal channels.

7.3. Somnath Temple: History, Reconstruction and Civilisational Significance

Context:

The Prime Minister highlighted the historical and cultural importance of the Somnath Temple while marking milestones related to its reconstruction and national heritage. The article emphasised Somnath as a symbol of civilisational continuity, cultural resilience and spiritual unity in India.

Key Highlights:

- Somnath Temple is located at Prabhas Patan near Veraval in Gujarat on the Arabian Sea coast and is one of the 12 Jyotirlingas dedicated to Lord Shiva.
- The temple has immense religious significance in Shaivism and is associated with ancient pilgrimage traditions mentioned in Puranic literature.
- Historically, Somnath became a prosperous temple due to maritime trade, royal patronage and donations from rulers across western India.
- The temple was repeatedly attacked and looted, most notably by Mahmud of Ghazni in 1025 CE, making it a symbol of resistance and reconstruction.
- Several rulers including the Chalukyas, Solankis, Marathas and local dynasties contributed to rebuilding the shrine across centuries.
- After Independence, Sardar Vallabhbhai Patel initiated the reconstruction of Somnath as a symbol of national revival and cultural restoration.

The present temple was inaugurated in 1951 by President Dr. Rajendra Prasad despite political debates regarding state involvement in religious reconstruction.

7.4. Exposition of Buddha Relics in Ladakh during Buddha Purnima

Context:

Sacred Piprahwa relics of Gautam Buddha were ceremoniously brought to Leh (Ladakh) for public display on occasion of Buddha Purnima. The relics are being displayed across Leh and Zanskar, offering a rare spiritual opportunity for devotees.

Explanation:

- **Buddha relics** refer to the physical remains and sacred objects associated with Gautama Buddha, such as ashes, bones, or items used by him, which are traditionally enshrined in stupas and monasteries and hold deep religious significance in Buddhism.
- Buddha Purnima commemorates the birth, enlightenment, and Mahaparinirvana of Buddha, making it one of the most important festivals for Buddhists globally.
- Excavators discovered the **Piprahwa Relics** in 1898 at the Piprahwa Stupa in Uttar Pradesh, believed to be ancient Kapilavastu, the birthplace/early childhood place of Lord Buddha (Lumbini, located in modern-day Nepal, is currently recognized as the birthplace of Lord Buddha). These relics, unearthed by British colonial engineer William Claxton Peppé.

7.5. St. Francis Xavier and Cultural Controversy in Goa

Context:

A controversy arose after derogatory remarks about St. Francis Xavier, Goa's patron saint, leading to protests and legal action. The issue highlights religious sentiments and cultural significance associated with the saint.

- St. Francis Xavier was a 16th-century Spanish Jesuit missionary and member of the Society of Jesus.
- He arrived in India in 1542 during Portuguese rule and worked in Goa and coastal regions.
- Known as the "Apostle of the Indies" for spreading Christianity in Asia.
- His mortal remains are kept in Basilica of Bom Jesus (UNESCO World Heritage Site), Goa.
- The body is considered incorruptible, attracting religious significance.
- Exposition of relics is held periodically, drawing pilgrims globally.
- Goa was a major centre of Portuguese colonial influence and Christian missionary activity.
- Reflects issues of religious harmony, cultural heritage, and freedom of expression.

7.6. Komagata Maru Incident (1914) and Colonial Discrimination

Context:

The Komagata Maru incident of 1914 is being revisited as a symbol of racial discrimination under colonial rule. The ship carrying Indian migrants was denied entry into Canada, highlighting exclusionary immigration policies and imperial injustice.

Key highlights:

- In 1914, the Japanese ship *Komagata Maru*, chartered by Gurdit Singh, carried 376 passengers (mostly Sikhs from Punjab) from Hong Kong to Canada.
- Canada enforced the "Continuous Journey Regulation" (1908), requiring migrants to arrive directly from their country of origin - effectively targeting Indians.
- The ship was denied docking at Vancouver and remained stranded for about 2 months, facing shortages of food and water.
- The incident exposed racial discrimination and exclusionary immigration laws in British dominions despite Indians being British subjects.
- The passengers were forced to return to India; upon arrival at Budge Budge (Calcutta), British authorities attempted to arrest leaders.
- This led to a clash in which around 20 passengers were killed, many arrested.
- The episode became a rallying point for the Ghadar Movement, which aimed to overthrow British rule in India.
- It highlighted contradictions of colonial citizenship, equality before law, and imperialism.
- The incident strengthened anti-colonial nationalism and revolutionary activities among overseas Indians.

7.7. 500 years of First Battle of Panipat (1526)

Context:

The year 2026 marks 500 years of the First Battle of Panipat, where Babur defeated Ibrahim Lodi. This victory led to the establishment of the Mughal Empire in India, laying the foundation for early modern imperial rule.

- **Battle Between & Location:** Fought between **Zahir-ud-din Babur** and **Ibrahim Lodi** near **Panipat (present-day Haryana).**
- **Political Context:** Conflict between **Central Asian invading forces** and the **Lodi dynasty of the Delhi Sultanate.**
- **Nature of War:** Primarily a **political and dynastic struggle**, not a religious conflict.
- Common belief: Babur won due to superior gunpowder weapons, however, victory was mainly due to innovative tactics (Tulughma & Araba), not just new technology.
- **Tulughma Strategy:** Army divided into **left, right, and centre**, with further subdivisions, enabling **encirclement of enemy forces.**
- **Araba System:** Use of **carts tied with rawhide ropes** forming defensive barricades to protect artillery and infantry.
- **Military Innovation:** Early use of **gunpowder firearms and field artillery in open battle**, combined with mobility.

Significance:

- Marked the **beginning of Mughal rule in India & End of Delhi Sultanate**
- Demonstrated **superiority of strategy over numerical strength**
- Introduced **new battlefield tactics combining cavalry, artillery, and defense systems.**

7.8. Nalanda University Revives the Ancient Śāstrārtha Debate Tradition

Context:

Nalanda University in Bihar has formally included **Śāstrārtha**, an ancient Indian tradition of philosophical and scholarly debate, in its convocation programme. The initiative, called **Śāstrārtha 2026**, aims to revive India's classical culture of reasoned dialogue and academic disputation.

Explanation:

- **Śāstrārtha** literally means a discussion or debate based on **śāstra** or authoritative knowledge texts.
- It was an important intellectual tradition in ancient India, especially in centres of learning such as **Nalanda, Vikramashila, Takshashila and Kanchi**.
- It involved structured debate on philosophy, religion, logic, metaphysics, ethics and social questions.
- Major Indian traditions such as **Buddhism, Jainism, Nyaya, Vedanta, Mimamsa and Samkhya** used debate to defend doctrines and refine ideas.
- Śāstrārtha was not merely argument; it emphasised **reasoning, evidence, scriptural interpretation and intellectual discipline**.
- It helped preserve India's traditions of **pluralism, critical inquiry and dialogic learning**.

7.9. Restoration of the Kakatiya-era Thousand Pillar Temple Pavilion

Context:

The Archaeological Survey of India (ASI) has restored the sunken dance pavilion (Kalyana Mandapam) of the Thousand Pillar Temple at Hanamkonda, Telangana, after a 42-year-long conservation effort. The restoration revived the Kakatiya-era architectural structure using traditional sand-box foundation techniques and scientific stone-by-stone reconstruction methods.



Key Highlights:

- The Thousand Pillar Temple is located at Hanamkonda in Telangana and was built during the Kakatiya dynasty in the 12th century under King Rudra Deva.
- The temple is dedicated to the trinity of Shiva, Vishnu and Surya, reflecting the syncretic temple traditions of medieval South India.
- Kakatiya architecture is known for highly polished dolerite stone, intricately carved pillars, star-shaped platforms, mandapams and advanced structural engineering techniques.
- The temple's famous Kalyana Mandapam (dance pavilion) reportedly sank due to weakening of the traditional sand-box foundation system caused by water seepage and structural neglect.
- Sand-box technique is an ancient temple foundation technology using sand, lime, gravel and charcoal layers to absorb vibrations and improve stability during earthquakes or soil movement.
- The monument is protected by the Archaeological Survey of India (ASI), the premier organisation responsible for conservation of centrally protected monuments under the Ancient Monuments and Archaeological Sites and Remains Act, 1958.
- The Kakatiya Rudreshwara (Ramappa) Temple in Telangana was inscribed as a UNESCO World Heritage Site in 2021, highlighting the global recognition of Kakatiya architectural heritage.

7.10. Sant Dhanna Bhagat Ji and the Bhakti Tradition

Context:

The Government of Haryana marked the birth anniversary of Sant Dhanna Bhagat Ji on April 27, 2026. The occasion highlights his contributions as a prominent Bhakti saint known for simple devotion and egalitarian teachings.

Explanation:

- Sant Dhanna Bhagat (15th century) was a Bhakti saint from Rajasthan, associated with the Nirguna Bhakti tradition (emphasizing devotion to a formless God).
- He was a Vaishnav devotee and is believed to have been influenced by the teachings of Ramananda, a key Bhakti reformer.
- His teachings stressed faith, humility, and direct devotion (bhakti) over ritualism, priesthood, and caste-based hierarchy.
- He is one of the saints whose hymns are included in the Guru Granth Sahib, the holy scripture of Sikhism.
- The Bhakti Movement (7th–17th century) was a socio-religious reform movement that spread across India, promoting devotion as the path to salvation.
- It opposed rigid caste practices and emphasized equality, accessibility of God, and use of vernacular languages for religious expression.

8. SOCIETY AND SOCIAL JUSTICE

8.1. JANANI Platform

Context:

The Union Ministry of Health & Family Welfare launched the **JANANI** (Journey of Antenatal, Natal and Neonatal Integrated Care) platform to establish continuous, longitudinal digital health records for women throughout their reproductive years.

Developed as a major upgrade to the legacy Reproductive and Child Health (RCH) portal, JANANI aligns with the broader *Ayushman Bharat Digital Mission (ABDM)* architecture to track maternal and child health outcomes comprehensively.

Key Features and Capabilities:

- **Longitudinal Health Records:** Digitally integrates the entire continuum of care—from antenatal and delivery preparation to postnatal, newborn care, and family planning.
- **Digital MCH Cards:** Introduces QR-enabled Mother and Child Health (MCH) cards that allow beneficiaries to easily carry and access their medical records.
- **Interoperability:** Seamlessly links with national health initiatives like **U-WIN** (immunization) and **POSHAN** (nutrition) to provide holistic, data-driven services.
- **Automated Alert System:** Generates real-time alerts for high-risk pregnancies and creates automated due-lists for medical interventions.
- **Migration Tracking:** Features pan-India search functionalities that ensure continuity of care for migratory populations and prevent data duplication.
- **Beneficiary Access:** Allows users to self-register via web or mobile apps, enabling them to easily locate nearby healthcare facilities and access nutritional guidance.

9. INTERNAL SECURITY

9.1. Operation WHITE STRIKE:

Context:

The **Narcotics Control Bureau (NCB)** conducted **Operation WHITE STRIKE** in the Mumbai logistics corridor and seized a major cocaine consignment, exposing a transnational narcotics syndicate. The operation shows how drug trafficking is increasingly linked with organised crime, money laundering, logistics networks and internal security threats.

Narcotics Control Bureau: Basic Details:

- **NCB** is India's **nodal drug law enforcement agency**.
- It functions under the **Ministry of Home Affairs**.
- It coordinates anti-drug action with **state police, customs, DRI, intelligence agencies and international agencies**.
- Its role includes **intelligence collection, investigation, seizure operations, inter-agency coordination and international cooperation**.

NDPS Act, 1985:

- The **Narcotic Drugs and Psychotropic Substances Act, 1985** is India's main anti-drug law.
- It criminalises **production, possession, sale, purchase, transport, trafficking and consumption** of narcotic drugs and psychotropic substances.
- It provides for **strict punishment**, including imprisonment, fines and seizure of illegally acquired property.
- It also regulates **precursor chemicals** used in the manufacture of narcotic substances.

Significance:

- Shows the importance of **intelligence-led policing**.
- Highlights the need to monitor **ports, warehouses, transport networks and financial flows**.
- Strengthens India's response to **transnational organised crime** and narco-financing.

Way Forward:

India needs stronger **inter-agency coordination**, technology-based surveillance, faster NDPS trials, international intelligence sharing, and parallel focus on **de-addiction, rehabilitation and awareness**.

9.2. BRO's Project Deepak

Context:

Project Deepak of the **Border Roads Organisation (BRO)** celebrated its **66th Raising Day on 4 May 2026**. It highlights BRO's role in **border connectivity, defence logistics and disaster response** in the Western Himalayas.

Border Roads Organisation (BRO):

- **Formation:** BRO was formed on **7 May 1960**.
- **Headquarters: New Delhi**.
- **Ministry:** It functions under the **Ministry of Defence**.
- **Nature:** BRO is a **road construction executive force** supporting the Indian Armed Forces; it is generally treated as an executive organisation, not a constitutional body.

Project Deepak:

- Project Deepak is one of the oldest and most significant infrastructure projects undertaken by the Border Roads Organisation (BRO).
- Established in 1961 and headquartered in Shimla, it is responsible for constructing and maintaining critical, high-altitude roads in the Western Himalayas to enhance India's border security and regional connectivity.
- It maintains around 1,100 km of strategic road network.

Significance:

- Supports troop movement, equipment transport and border preparedness.
- Strengthens connectivity towards the **Ladakh sector**.
- Connects remote tribal regions with markets, healthcare and education.
- Helps in rescue and relief during landslides, snow blockages and high-altitude emergencies.

9.3. India Assumes Chair of the Common Criteria Development Board (CCDB)

India assumed the Chairmanship of the Common Criteria Development Board (CCDB) from April 2026 to April 2028, solidifying its leadership in setting global IT security standards.

The **Common Criteria Development Board (CCDB)** is the foundational technical body of the **Common Criteria Recognition Arrangement (CCRA)**. It functions as the technical core of the global IT certification framework, with responsibilities that include:

- **Standards Evolution:** Managing the ongoing evolution of the **Common Criteria** (ISO/IEC 15408) and the **Common Evaluation Methodology** (CEM).
- **Technical Harmonization:** Developing, updating, and harmonizing the security evaluation criteria used to test and certify IT products worldwide.
- **Facilitating Global Trade:** Establishing the technical protocols that allow certificates issued in one member nation to be mutually recognized globally, eliminating the need for redundant re-testing.

India's Institutional Role:

India has been a **Certificate Authorizing Nation** under the CCRA since September 16, 2013. Under this framework:

- **National Representation:** The **Ministry of Electronics and Information Technology (MeitY)** acts as the primary representative for India.
- **Certification Body:** The **STQC Directorate** functions as the official national certification body.
- **International Reciprocity:** IT security certificates issued by India are recognized by the other 38 member countries (including 20 certificate-authorizing nations), which enables seamless international trade in secure IT products.

9.4. NCB Arrests Factory Owner in Captagon Manufacturing Case

Context:

The **Narcotics Control Bureau (NCB)** has arrested a factory owner in Dehradun for allegedly allowing his facility to be used for illicit manufacturing of **Captagon tablets**. The arrest is linked to **Operation RAGEPILL**, under which India made its first major seizure of Captagon tablets/powder worth around ₹182 crore.

Explanation:

- **Captagon** is an illicit synthetic stimulant linked to **fenethylline**, an amphetamine-type psychotropic substance.

- It is abused mainly for temporary **alertness, euphoria, reduced fatigue, increased stamina and suppressed fear**.
- Its harmful effects may include **addiction, anxiety, aggression, insomnia, cardiovascular stress, hallucinations and long-term neurological damage**.
- Captagon trafficking is a major concern in the **Middle East**, where it has been linked to organised crime and conflict networks.
- **Operation RAGEPILL** is an NCB-led anti-narcotics operation that uncovered an international trafficking network involving Captagon.
- The operation led to seizure of about **227.7 kg of Captagon tablets/powder** and highlighted concerns over India being used as a **transit or manufacturing point**.