JULY- 2026 Edition

FOR UPSC EXAM

**COMPREHENSIVE | ANALYTICAL
EXAM-FOCUSED**

VIDHVATH VIMARSHA

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POLITY & CONSTITUTION

1. e-VSP Portal of Vidhi Sahitya Prakashan

Why in News?

The **e-VSP (Vidhi Sahitya Prakashan) Portal** of the **Legislative Department, Ministry of Law and Justice** has been launched to provide **digital access to Hindi legal literature**, including important judgments of the **Supreme Court and High Courts**, legal journals and reference books. The initiative aims to make legal knowledge more accessible, inclusive and citizen-friendly.

• What is the e-VSP Portal?

- The **e-VSP Portal** is a digital platform developed by the **Legislative Department** to provide centralized online access to publications of **Vidhi Sahitya Prakashan (VSP)**.
- It enables **law students, advocates, judicial officers, teachers, researchers and citizens** to access and download Hindi legal publications from a single portal, promoting wider dissemination of legal knowledge.

• Objectives of the Portal

- Expand digital access to **Supreme Court and High Court judgments**, legal journals and reference books in Hindi.
- Promote the use of **simple, lucid and citizen-friendly Hindi** in the legal domain.
- Strengthen legal awareness, accessibility and inclusiveness through digital technology.
- Encourage greater use of Hindi in legal education, research and professional discourse.

• Key Features

- Single-window digital repository for Hindi legal literature.
- Easy search, download and access to legal publications.
- Designed to connect a new generation of readers with authentic legal resources.
- Supports the vision of **Digital India** by making legal information accessible irrespective of geographical location.

• Significance

- Promotes **access to justice** by reducing language barriers in legal education and legal awareness.
- Strengthens the use of Hindi as a language of legal understanding while preserving India's constitutional and cultural heritage.
- Benefits students, lawyers, judges, academicians and citizens by improving availability of authentic legal reference material.
- Encourages digital governance and paperless dissemination of legal knowledge.

• What is Vidhi Sahitya Prakashan (VSP)?

- **Vidhi Sahitya Prakashan** is a publication initiative of the **Legislative Department** dedicated to publishing legal literature, judicial decisions, journals and reference materials in **Hindi**.
- It contributes to the development of standardized legal terminology and promotes the wider use of Hindi in the legal system.

Historic Perspective

- The promotion of Hindi in official work has been a constitutional objective since the adoption of the Constitution.
- Over time, the Government has introduced several initiatives for translation of laws, publication of legal literature and digitization of legal resources.
- The launch of the **e-VSP Portal** represents another milestone in integrating **Digital India** with legal education and access to justice.

Constitutional and Legal Dimensions

- **Article14** guarantees equality before law, which is strengthened through equitable access to legal information.
- **Article39A** directs the State to ensure equal justice and provide opportunities for securing justice.
- **Articles343-351** provide the constitutional framework relating to the Official Language and promotion of Hindi.
- The initiative supports the objectives of the **Official Languages Act,1963**, **Digital India Programme**, **National e-Governance Plan**, and the broader vision of improving legal literacy and access to justice.

Challenges

- Ensuring timely updating of judgments and legal publications.
- Maintaining accuracy and uniformity in legal translations.
- Expanding multilingual access beyond Hindi while preserving legal precision.
- Improving digital literacy and internet accessibility for users in remote areas.

Conclusion

The **e-VSP Portal** is an important step towards democratizing legal knowledge by combining digital governance with linguistic accessibility. By making authentic Hindi legal literature readily available, it strengthens legal awareness, promotes access to justice and supports the creation of a more inclusive, transparent and citizen-centric legal ecosystem.

2. Supreme Court Restricts Retrospective Environmental Clearances

Key Highlights & Summary

- **Quashing Executive Order:** The Supreme Court quashed the Union Government's 2021 Office Memorandum (OM) that allowed a perpetual mechanism for granting *ex-post facto* (retrospective) Environmental Clearances (EC).

- **Prospective Overruling:** To safeguard public exchequer investments (e.g., AIIMS, airports) and prevent immediate infrastructure disruptions, the judgment applies prospectively; existing cleared projects remain protected.
- **Administrative vs. Statutory Power:** The Bench ruled that executive instructions cannot alter or supplant subordinate legislation like the EIA Notification, 2006.
- **Amnesty via Proper Route:** The Centre retains power to grant post-facto ECs for exceptional projects in "supervening public interest," but strictly through valid statutory notifications under Section 3 of EPA, 1986, rather than administrative orders.
- **Rejection of Perpetual Amnesty:** The court emphasized that amnesty measures must be finite in duration, narrowly tailored, and confined to specific classes of deserving projects rather than operating as a permanent parallel regime.
- **Plenary Powers Safeguarded:** The ruling explicitly does not restrict the apex court's inherent constitutional powers to grant ex-post facto relief in fit cases to achieve complete justice.

Essential Definitions

- **Ex-Post Facto Environmental Clearance:** Approval granted to developmental or industrial projects after construction or operations have already commenced without prior green permissions.
- **Office Memorandum (OM):** An executive order or administrative instruction issued by government departments to regulate internal procedure, which lacks statutory power to overwrite delegated laws.
- **Precautionary Principle:** An environmental management doctrine requiring preventative regulatory evaluation *before* undertaking activities that carry risks of severe environmental degradation.

Legal and Constitutional Framework

- **Article 14 & Article 21:** The Court held that indefinite, unguided retrospective clearances fail the tests of reasonableness and proportionality, violating equality before law and the right to a clean environment under Article 21.
- **Article 142:** Preserves the Supreme Court's plenary power to pass decrees necessary for doing complete justice, allowing judicial intervention for special cases.
- **Environment (Protection) Act, 1986 (Section 3):** Empowers the Central Government to take measures for protecting the environment, which must be executed through formal statutory notifications.
- **EIA Notification, 2006:** The primary delegated legislation establishing mandatory prior environmental clearance regimes across key developmental sectors.

Conclusion

The judgment strikes a balanced chord between environmental protection and economic reality. By barring perpetual executive amnesties while leaving scope for statutory, public-interest exceptions, the Supreme Court re-anchored the core tenet of environmental law—prior evaluation—without causing chaotic disruptions to public infrastructure.

3. Foreign Contribution (Regulation) Amendment Bill,2026

Why in News?

The **Foreign Contribution (Regulation) Amendment Bill,2026**, reintroduced during the **Monsoon Session**, proposes major changes to the **Foreign Contribution (Regulation) Act (FCRA),2010**, including stricter regulation of foreign-funded Civil Society Organisations (CSOs), expanded powers of the Central Government, asset vesting provisions and broader grounds for cancellation of FCRA registration.

• What is Foreign Contribution (Regulation) Act (FCRA)?

- The **FCRA** regulates the acceptance and utilization of **foreign contributions and foreign hospitality** by individuals, associations and NGOs to ensure that such funds do not adversely affect **national security, sovereignty, public interest or democratic institutions**.
-
- **Foreign Contribution** refers to any donation, transfer or delivery of currency, security or article from a **foreign source**, subject to statutory provisions.

• Major Provisions of the Amendment Bill,2026

- Introduces **Section16A**, under which cancellation or voluntary surrender of FCRA registration results in vesting of foreign-funded assets with a **designated authority**.
- Unutilized foreign contributions and proceeds from the liquidation or auction of such assets are proposed to be credited to the **Consolidated Fund of India (CFI)**.
- Expands grounds for cancellation of registration, including actions considered against **public interest** or initiation of prosecution in specified cases.
- Empowers the Central Government under **Clause16L** to exempt specified persons or organisations from FCRA provisions in public interest.

• Key Definitions

- **Foreign Contribution:** Donation, delivery or transfer received from a foreign source in the form of currency, securities or specified articles.
- **Designated Authority:** Government-authorised body responsible for taking custody, management or disposal of assets created using foreign contributions.
- **Intelligible Differentia:** A constitutional doctrine under **Article14**, requiring any classification by law to be based on a reasonable and rational distinction.

• Significance

- Seeks to strengthen transparency, accountability and oversight over foreign-funded entities.
- Aims to prevent misuse of foreign funds affecting national sovereignty and internal security.

- Reinforces financial compliance and regulatory monitoring of NGOs receiving foreign contributions.

Historic Perspective

- The **Foreign Contribution (Regulation) Act** was first enacted in **1976** during the Emergency to regulate foreign influence in India's political and public life.
- It was replaced by the **FCRA,2010**, which introduced a comprehensive regulatory framework for registration, utilisation and monitoring of foreign contributions.
- The **FCRA (Amendment) Act,2020** further tightened compliance requirements by restricting fund transfers, reducing administrative expenditure limits and strengthening government oversight.

Constitutional and Legal Dimensions

- **Article14:** Equality before law; discretionary exemption powers may invite scrutiny on grounds of arbitrariness.
- **Article19(1)(c):** Freedom to form associations; stricter regulatory provisions may affect the functioning of NGOs and civil society organisations.
- **Article25:** Freedom of religion; provisions relating to cancellation in cases involving alleged religious conversions may have constitutional implications.
- Governed by the **Foreign Contribution (Regulation) Act,2010**, as amended, and administered by the **Ministry of Home Affairs (MHA)**.

Challenges

- Balancing national security concerns with the autonomy of legitimate civil society organisations.
- Broad expressions such as **"public interest"** may lead to differing interpretations.
- Asset forfeiture upon voluntary surrender may discourage genuine voluntary organisations.
- Ensuring transparency while avoiding excessive regulatory uncertainty for developmental and humanitarian institutions.

Conclusion

The **Foreign Contribution (Regulation) Amendment Bill,2026** seeks to strengthen regulatory oversight over foreign funding in the interest of national security and financial transparency. However, effective implementation will require a balanced framework that safeguards constitutional freedoms, promotes accountability and preserves the constructive role of civil society in India's democratic and developmental landscape.

4. The Public Examinations (Prevention of Unfair Means) Amendment Bill,2026

Why in News?

The **Public Examinations (Prevention of Unfair Means) Amendment Bill,2026** has been introduced to strengthen the legal framework against **paper leaks, organised examination fraud and other unfair practices** in public examinations. The Bill proposes stricter punishments, time-bound investigations and fast-track judicial mechanisms to safeguard the integrity of recruitment and entrance examinations.

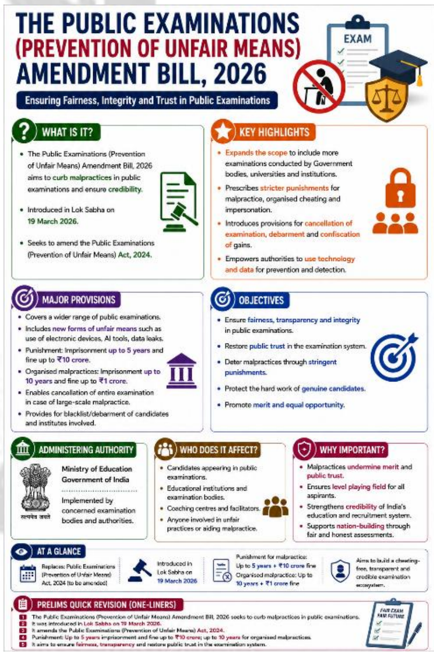
Key Points for UPSC CSE

• What is the Public Examinations (Prevention of Unfair Means) Act?

- The Act aims to **prevent unfair means in public examinations** conducted by designated public authorities such as recruitment agencies and examination bodies.
- It seeks to ensure **transparency, fairness, credibility and merit-based selection** in public examinations.

• Major Provisions of the Amendment Bill,2026

- Enhances punishment for individuals involved in paper leaks and examination fraud to **5-10 years imprisonment** with fines up to **₹50lakh**.
- Prescribes **7-10 years imprisonment** and a minimum **₹10crore fine** for organised examination-related crimes.
- Extends the debarment period for service providers involved in examination malpractices from **4years to 8years**, with penalties up to **₹5crore**.
- Empowers the Central Government to establish a **Special Task Force (STF)** for investigation and mandates completion of investigations within **2months**.
- Requires States and Union Territories to designate **Special Fast Track Courts** for day-to-day trial of offences.



• Key Definitions

- **Unfair Means:** Includes paper leaks, impersonation, unauthorized assistance, tampering with examination systems, manipulation of digital infrastructure and other fraudulent practices during public examinations.
- **Organised Exam Fraud:** Systematic examination-related offences committed by criminal syndicates, coaching networks, service providers or organised groups.
- **Special Fast Track Court:** A designated Sessions Court entrusted with expeditious trial of specified offences.

• Significance

- Enhances deterrence against organised examination fraud.
- Strengthens public confidence in recruitment and entrance examinations.
- Promotes merit-based selection and transparency in public employment and education.
- Supports the use of technology and specialised investigation for securing examination systems.

Historic Perspective

- India has witnessed several instances of **paper leaks and examination malpractices**, raising concerns regarding the credibility of competitive examinations.

- The **Public Examinations (Prevention of Unfair Means) Act,2024** established a dedicated legal framework to address organised examination fraud.
- The **2026 Amendment Bill** further strengthens enforcement through stricter penalties, specialised investigations and expedited judicial processes.

Constitutional and Legal Dimensions

- **Article14:** Ensures equality before law by protecting fairness and equal opportunity in public examinations.
- **Article16:** Guarantees equality of opportunity in matters of public employment, making examination integrity essential for merit-based recruitment.
- **Article21:** The right to a fair and speedy trial is relevant to proposed investigation and trial timelines.
- The Bill operates alongside the **Bharatiya Nagarik Suraksha Sanhita (BNSS),2023** and other criminal laws governing investigation and prosecution of offences.

Challenges

- Ensuring effective implementation across States and examination agencies.
- Balancing strict timelines with procedural fairness and judicial independence.
- Addressing cyber-enabled examination fraud and emerging technological threats.
- Strengthening digital security, coordination among agencies and institutional capacity.

Conclusion

The **Public Examinations (Prevention of Unfair Means) Amendment Bill,2026** represents a significant step towards protecting the credibility of India's examination system through stronger deterrence, specialised enforcement and faster adjudication. However, lasting success will depend on robust institutional capacity, secure examination technologies and balanced implementation that upholds both examination integrity and principles of natural justice.

5. Madhya Pradesh Uniform Civil Code (UCC) Bill,2026

Why in News?

The **Madhya Pradesh Legislative Assembly** has passed the **Madhya Pradesh Uniform Civil Code (UCC) Bill,2026**, introducing a common legal framework governing marriage, divorce, inheritance and live-in relationships. The legislation has intensified the national debate on personal law reforms, gender justice and constitutional secularism.

• What is Uniform Civil Code (UCC)?

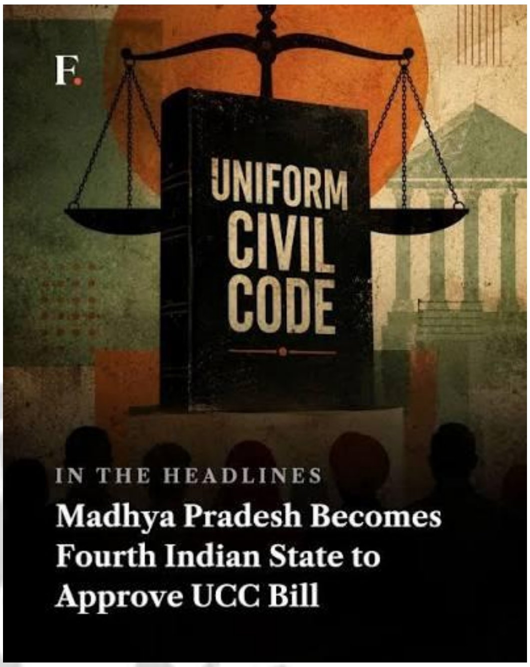
- A **Uniform Civil Code** refers to a common set of civil laws governing **marriage, divorce, adoption, succession and inheritance**, applicable equally to all citizens irrespective of religion.
- The Bill mandates registration of marriages, divorces and live-in relationships, prohibits polygamy, criminalizes practices such as **triple talaq** and **nikah halala**, and provides equal inheritance rights to children irrespective of gender.

• Salient Features of the Madhya Pradesh UCC Bill

- Introduces uniform civil regulations for personal matters across communities.

- Makes registration of marriages, divorces and live-in relationships compulsory.
- Seeks to promote gender equality through uniform inheritance provisions.
- **Scheduled Tribes** notified under the Constitution remain outside its ambit.

Historic Perspective



- The idea of a Uniform Civil Code was debated during the **Constituent Assembly** but was placed under the **Directive Principles of State Policy (DPSPs)** instead of Fundamental Rights.
- **Goa** continues to follow a common civil code derived from the Portuguese Civil Code and is often cited as India's only operational example of a UCC.
- In recent years, several States have initiated discussions or legislative measures on implementing a Uniform Civil Code.

Constitutional and Legal Dimensions

- **Article44 (DPSP):** Directs the State to endeavour to secure a Uniform Civil Code throughout the territory of India.
- **Articles25 and26:** Guarantee freedom of religion, subject to public order, morality, health and other Fundamental Rights.
- **Articles14 and15:** Promote equality before law and prohibit discrimination, forming the constitutional basis for arguments supporting a UCC.
- **Articles342 and366(25):** Recognize Scheduled Tribes, who have been exempted from the Bill to protect their customary practices.
- Personal laws fall under the **Concurrent List (Entry5,ListIII)**, enabling both Parliament and State Legislatures to enact laws.

Challenges

- Balancing gender justice with protection of religious and cultural diversity.
- Addressing concerns regarding minority rights and customary practices.
- Harmonizing diverse personal laws while respecting constitutional freedoms.
- Ensuring effective implementation and public acceptance across communities.

Conclusion

The Madhya Pradesh Uniform Civil Code Bill,2026 represents an important development in India's ongoing discourse on personal law reforms. While it seeks to advance equality and uniformity in civil matters, its long-term success will depend on balancing constitutional values of equality, religious freedom, federalism and social consensus.

6. Prevention of Insults to National Honour (Amendment) Bill,2026: Elevating *Vande Mataram*

Why in News?

The **Prevention of Insults to National Honour (Amendment) Bill,2026** has been introduced in the **Rajya Sabha** to amend the **Prevention of Insults to National Honour Act,1971**, seeking to extend statutory protection to **Vande Mataram** by placing it on par with the **National Anthem (Jana Gana Mana)** for specified purposes under the law.

Key Points for UPSC CSE

• What is the Prevention of Insults to National Honour (Amendment) Bill,2026?

- The Bill proposes to provide **statutory protection** to **Vande Mataram** by making its intentional prevention, disruption or disrespect a punishable offence under the amended Act.
- It seeks to prescribe punishment of **imprisonment up to three years, fine, or both**, for deliberate acts of disrespect, similar to provisions applicable to the National Anthem.

• What is Vande Mataram?

- **Vande Mataram**, composed by **Bankim Chandra Chattopadhyay**, first appeared in his novel **Anandamath (1882)**.
- It played a significant role during India's freedom movement and was adopted as the **National Song** by the Constituent Assembly on **24 January 1950**, while **Jana Gana Mana** was adopted as the **National Anthem**.

Historic Perspective

- **Vande Mataram** became a powerful symbol of the Indian freedom struggle and inspired numerous nationalist movements against British rule.
- Historically, the National Song and National Anthem have enjoyed different legal treatment, with statutory protection primarily available to the National Anthem under the **Prevention of Insults to National Honour Act,1971**.
- The Amendment Bill seeks to bridge this distinction by extending similar legal safeguards to the National Song.

Constitutional and Legal Dimensions

- **Prevention of Insults to National Honour Act,1971:** Penalizes disrespect towards national symbols such as the National Flag and National Anthem; the Bill proposes to include **Vande Mataram** within its ambit.
- **Article51A(a):** Imposes a Fundamental Duty upon every citizen to respect the Constitution, the National Flag and the National Anthem.
- **Article19(1)(a):** Guarantees freedom of speech and expression, subject to reasonable restrictions under **Article19(2)**.
- The proposed legislation may invite constitutional scrutiny regarding the balance between **Fundamental Duties** and **Fundamental Rights**.

Challenges

- Balancing statutory protection of national symbols with freedom of speech and conscience.

- Addressing differing historical and religious perceptions regarding the National Song.
- Ensuring uniform implementation without infringing constitutional liberties.
- Clarifying the legal distinction between executive guidelines and statutory obligations.

Conclusion

The proposed Amendment Bill reflects an effort to strengthen respect for India's national symbols by extending legal protection to **Vande Mataram**. Its implementation, however, will require a careful balance between promoting national unity and preserving constitutional freedoms, ensuring that legislative objectives remain consistent with India's democratic and pluralistic ethos.

ECONOMY

1. Viksit Bharat - Guarantee for Rozgar and Ajeevika Mission (Gramin) Yojana

Key Highlights & Summary

- The nationwide launch of the Viksit Bharat - Guarantee for Rozgar and Ajeevika Mission (Gramin) Yojana (VB - G Ram G) took place from Tirupati district, Andhra Pradesh.
- The scheme expands guaranteed employment from 100 days under MGNREGA to a firm 125 days of work per rural household.

- The central allocation targets an expenditure of ₹1.51 lakh crore in the first year, aiming for ₹7.5 lakh crore over five years across 2.86 lakh panchayats.
- It mandates providing work within 15 days of demand, failing which unemployment allowances and interest-backed wage payments are legally enforced.
- Decentralized grassroots planning empowers Gram Sabhas to independently select and execute local developmental projects ranging from infrastructure to disaster resilience.

Essential Definitions

- VB - G Ram G Yojana: A transformative rural employment and livelihood guarantee framework designed to secure 125 days of wage employment and build sustainable rural assets.
- Market Intervention Scheme: A price support mechanism deployed by the government to protect horticulture and agricultural producers from distress sales during price crashes.

- Gram Sabha: The primary body of the panchayati raj system consisting of all registered voters within a village, entrusted with decentralized decision-making powers.

Legal and Constitutional Framework

- Article 41: Directs the State to secure the right to work, to education, and to public assistance in cases of unemployment within the limits of its economic capacity.
- Article 243G: Empowers Panchayats with powers and authority to function as institutions of self-government, particularly regarding economic development and social justice.
- Mahatma Gandhi National Rural Employment Guarantee Act, 2005: The landmark legislative predecessor which has been structurally upgraded into the new Viksit Bharat framework.
- Seventh Schedule: Economic and social planning as well as employment welfare fall under concurrent legislative jurisdiction, enabling robust federal cooperation.

Conclusion

The rollout of the Viksit Bharat - G Ram G Yojana represents a critical evolution in India's rural welfare architecture. By raising employment guarantees to 125 days, digitizing wage tracking, and embedding decentralized Gram Sabha autonomy, the initiative successfully bridges the gap between income security and permanent rural infrastructure development.

UPSC Relevance

Highly relevant for General Studies Paper II (Welfare Schemes for Vulnerable Sections, Governance, and Panchayati Raj Institutions) and General Studies Paper III (Inclusive Growth, Rural Development, and Employment Generation).

2. NITI Aayog Report on Strategic Roadmap for Making Ayurveda Global

Key Highlights & Summary

- NITI Aayog released a comprehensive report titled "Strategic Roadmap for Making Ayurveda Global" on 2nd July 2026 in collaboration with PwC.

- The roadmap adopts a three-pillar framework based on Availability, Acceptability, and Propagation to expand Ayurveda's international footprint.
- It proposes a phased strategic timeline extending up to 2047, fully aligned with the broader national vision of Viksit Bharat@2047.
- Key focus areas include global workforce standardization, international R&D, regulatory compliance, insurance integration, and strategic brand positioning.
- The initiative aims to position India as a global leader in traditional medicine while bolstering exports, employment, and knowledge-based soft power.

Essential Definitions

- Ayurveda: India's traditional system of medicine focusing on holistic healing, balance of bodily systems, and preventive healthcare through natural remedies.

- Medical Value Travel: Traveling to another country to receive specialized medical and wellness treatments, combining traditional healthcare systems with modern tourism.
- Soft Power: The ability to shape the preferences of others through appeal and attraction, largely driven by culture, historical traditions, and healthcare practices like Ayurveda.

Legal and Constitutional Framework

- Article 21: The Right to Life implicitly guarantees access to safe, diverse, and holistic healthcare systems including traditional medical practices.
- Article 47: Directs the State to raise the level of nutrition and the standard of living and to improve public health as part of Directive Principles of State Policy.
- Article 51A(f): Imposes a fundamental duty on citizens to value and preserve the rich heritage of India's composite culture and traditional wisdom.
- Seventh Schedule: Public health, sanitation, and hospitals fall under State List provisions, while medicinal drugs and research fall under Concurrent and Union domains.

Conclusion

The strategic roadmap released by NITI Aayog provides a structured pathway to institutionalize Ayurveda on the global stage. By bridging regulatory gaps, promoting evidence-based validation, and fostering international collaborations, the framework transforms traditional Indian medicine into a key driver of global health diplomacy and economic growth.

UPSC Relevance

Highly relevant for General Studies Paper II (Issues Relating to Development and Management of Social Sector/Services relating to Health) and General Studies Paper III (Economy, Export Promotion, and Science and Technology applications).

3. BHAVYA Scheme and Accord Highest Priority to Exports

Key Highlights & Summary

- The Union Government has urged all State Governments to fully utilize the Bharat Audyogik Vikas Yojna (BHAVYA) Scheme to accelerate manufacturing and export competitiveness.
- Approved with an outlay of ₹33,660 crore, the BHAVYA Scheme targets the development of 100 investment-ready plug-and-play industrial parks across India from 2026-27 to 2031-32.
- At the Board of Trade meeting, a seven-point action agenda was outlined to achieve a USD 1 trillion export target, backed by a ₹25,000 crore Export Promotion Mission.
- The initiative emphasizes streamlined land acquisition, notified labour codes, localized testing infrastructure, and robust trade remedies through the Directorate General of Trade Remedies (DGTR).
- It promotes a coordinated Centre-State strategy to integrate micro, small, and medium enterprises (MSMEs) deeply into global value chains.

Essential Definitions

- BHAVYA Scheme (Bharat Audyogik Vikas Yojna): A central sector scheme aimed at creating world-class, plug-and-play industrial infrastructure with multimodal logistics connectivity to ease investment grounding.

- Plug-and-Play Industrial Park: Ready-to-move-in manufacturing zones equipped with pre-established power, water, effluent treatment, and digital connectivity utilities to reduce initial capital expenditure.
- Board of Trade: The apex consultative platform under the Department of Commerce that bridges federal policy-making with states and industry bodies to drive export growth.

Legal and Constitutional Framework

- Article 19(1)(g): Protects the right of citizens to practice any profession, or to carry on any occupation, trade, or business, providing a foundation for industrial freedom.
- Article 39(b) and (c): Directs the State to distribute material resources to subserve the common good and prevent the concentration of wealth, guiding balanced regional industrial development.
- Seventh Schedule (Union List - Entry 7: Industries, Entry 41: Trade and Commerce with foreign countries): Empowers Parliament to legislate on major industrial and export policies.
- State and Concurrent Jurisdiction: Involves state-level implementation of labour codes, land reforms, and infrastructure development to synergize national export objectives.

Conclusion

The strategic synergy between the BHAVYA Scheme and high-priority export missions establishes a resilient foundation for India's economic transformation. By tackling structural bottlenecks like high logistics costs and infrastructure gaps, the initiative ensures that domestic manufacturing scales efficiently to meet international demands.

4. National SC-ST Hub (NSSH) & Business Accelerator Programme: Empowering Inclusive Growth

- **Scheme Architecture & Institutional Framework:** Launched under the Ministry of Micro, Small and Medium Enterprises (MSME), the National SC-ST Hub (NSSH) is implemented through the National Small Industries Corporation (NSIC). It aims to cultivate an entrepreneurial ecosystem among Scheduled Caste (SC) and Scheduled Tribe (ST) communities by providing end-to-end support in market linkages, technology adoption, capacity building, and financial access.
- **Core Mandate & Policy Synergy:** The initiative works in alignment with the Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012, which mandates a 25% annual public procurement target from MSEs by Central Ministries, Departments, and Public Sector Enterprises (CPSEs), including a dedicated 4% sub-target specifically earmarked for SC/ST-owned enterprises.

- **Business Accelerator Programme (BAP) as a Catalyst:** BAP acts as an advanced intervention module under NSSH, partnering with premier management institutions (such as IIM Sambalpur and IIM Shillong). It transitions informal, experience-led SC/ST enterprises into structured, compliance-ready entities through tailored mentorship, strategic pricing frameworks, and data-driven market positioning.

- **Constitutional Foundations:** NSSH reinforces constitutional obligations under Article 46 (Directive Principles of State Policy to promote the educational and economic interests of SCs, STs, and other weaker sections) and operationalizes the spirit of Article 38 (minimizing inequalities in income, status, facilities, and opportunities).

- **Legal & Statutory Landscape:** The scheme operates within the framework of the MSME Development (MSMED) Act, 2006, addressing structural bottlenecks such as delayed payments, access to institutional credit (facilitated via Stand-Up India and CGTMSE), and formalization of business operations in competitive government procurement networks.

- **Quantifiable Impact & Grassroots Outcomes:** Interventions under BAP have directly enabled SC/ST entrepreneurs to secure high-value CPSE tenders (e.g., Power Grid Corporation, SAIL). This showcases a successful shift toward high-yield, compliance-heavy sectors like hydraulic manufacturing, renewable energy, and fire safety engineering.

- **Strategic Alignment with Viksit Bharat @2047:** By driving socio-economic empowerment through entrepreneurship rather than rely solely on traditional welfare models, the scheme fosters inclusive growth, bridges regional economic disparities, and aligns with national economic goals for self-reliance.

Conclusion: The National SC-ST Hub Scheme and its Business Accelerator Programme exemplify a strategic shift from passive welfare assistance to active economic empowerment. By dismantling systemic entry barriers, building technical capacity, and enabling compliance with public procurement norms, the scheme leverages market-led mechanisms to drive inclusive growth. Strengthening institutional coordination and expanding mentorship access will remain crucial to unlocking the full potential of marginalized entrepreneurs on India's journey toward Viksit Bharat @2047.

5. National Workshop on Sixteenth Finance Commission Recommendations for Panchayati Raj Institutions (PRIs)

Why in News?

The Ministry of Panchayati Raj organized a National Workshop of State Panchayati Raj Ministers to deliberate on the effective implementation of the **Sixteenth Finance Commission (SFC) recommendations (2026-31)** for Rural Local Bodies (RLBs), with emphasis on fiscal decentralization, Own Source Revenue (OSR) mobilization and performance-based grants.

Key Points for UPSC CSE

• Historic Financial Devolution to Rural Local Bodies

- The Sixteenth Finance Commission has recommended **₹4,35,236crore** for Rural Local Bodies during **2026-27 to 2030-31**, representing an increase of nearly **84%** over the comparable Fifteenth Finance Commission allocation.

- The objective is to strengthen **grassroots democracy, fiscal decentralization and local self-governance**, thereby supporting the vision of **"Viksit Panchayat for Viksit Bharat."**

• **Composition of Grants under the Sixteenth Finance Commission**

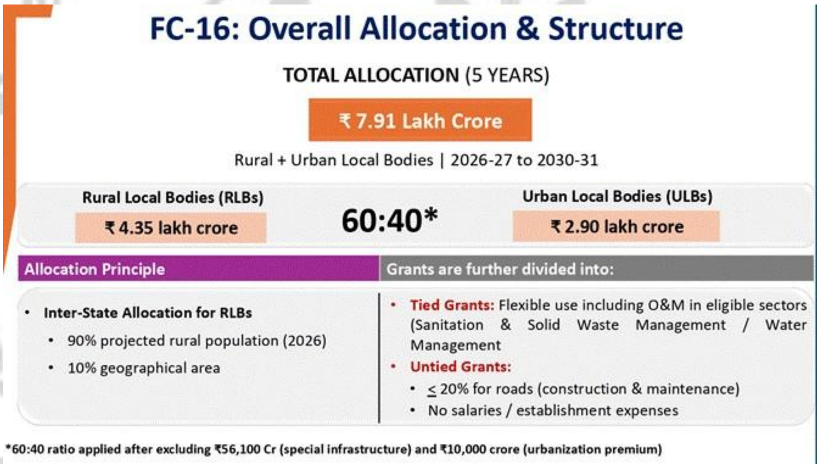
- **Basic Grants:** ₹3,48,188crore.
- **Tied Grants:** ₹1,74,094crore exclusively for sanitation, drinking water and solid waste management.
- **Untied Grants:** ₹1,74,094crore to enable Panchayats to address locally determined developmental priorities.
- **Performance Grants:** ₹87,048crore, equally shared between Rural Local Body Performance Grants and State Performance Grants, encouraging better governance and financial discipline.

• **Focus on Own Source Revenue (OSR)**

- **Own Source Revenue (OSR)** refers to revenue generated directly by Panchayats through property tax, user charges, fees, rents, markets and other local sources without depending entirely on higher levels of government.
- The Ministry is preparing a **Model OSR Rules Framework** to help States strengthen financial autonomy and reduce excessive dependence on grants.
- Higher OSR improves fiscal sustainability and enhances the capacity of Panchayats to provide quality public services.

• **Digital Governance for Accountable Panchayats**

- The Ministry is strengthening an integrated digital ecosystem through:
    - **SAMARTH Panchayat Portal** for financial administration.
    - **eGramSwaraj** for planning, budgeting and accounting.
    - **AuditOnline** for digital auditing.
    - **PFMS integration** for transparent fund flow.
    - **SVAMITVA Scheme** for property mapping and improved tax collection.



- These initiatives improve transparency, accountability, efficiency and evidence-based decision-making.

• **Performance-Based Governance and Capacity Building**

- Performance-linked grants encourage Panchayats to improve financial management, transparency, service delivery and planning.
- States emphasized reducing compliance burden, strengthening asset maintenance, enhancing capacity building and ensuring flexibility for geographically difficult, tribal, hilly and disaster-prone regions.
- The **Panchayat Advancement Index (PAI)** is emerging as an important tool for assessing Panchayat performance and promoting competitive federalism.

• **Constitutional and Legal Provisions**

- **Part IX (Articles243-243O)** of the Constitution provides the constitutional framework for Panchayati Raj Institutions.
- **Article243G** empowers Panchayats to function as institutions of self-government.
- **Article243H** authorizes States to empower Panchayats to levy, collect and appropriate taxes, duties, tolls and fees.
- **Article243I** mandates the constitution of the **State Finance Commission (SFC)** every five years to recommend distribution of financial resources between the State and Panchayats.
- **Article280** empowers the **Finance Commission of India** to recommend measures for augmenting the Consolidated Fund of States to supplement the resources of Panchayats and Municipalities.

• **Significance for Cooperative Federalism and Rural Development**

- Enhanced devolution strengthens **73rd Constitutional Amendment** objectives by promoting decentralization, participatory governance and inclusive rural development.
- Increased fiscal autonomy enables Panchayats to implement local development priorities more effectively, improve public service delivery and contribute towards achieving the **Sustainable Development Goals (SDGs)** through localized planning.

Conclusion

The Sixteenth Finance Commission recommendations mark a significant step towards deepening fiscal decentralization and empowering Panchayati Raj Institutions. However, their success will depend on timely fund release, stronger Own Source Revenue, robust digital governance, capacity building and effective implementation by States. Financially empowered and accountable Panchayats are essential for realizing the constitutional vision of democratic decentralization and building a resilient, inclusive and self-reliant rural India.

6. India-Israel Bilateral Investment Agreement (BIA)

Why in News?

India and Israel are advancing negotiations on a **Bilateral Investment Agreement (BIA)** to strengthen investment flows, provide legal protection to investors and deepen economic cooperation. The proposed agreement is expected to complement the growing strategic partnership between the two countries.

Key Points for UPSC CSE

• **What is a Bilateral Investment Agreement (BIA)?**

- A **Bilateral Investment Agreement (BIA)**, also known as a **Bilateral Investment Treaty (BIT)**, is an international agreement between two countries that promotes and protects investments made by investors of one country in the territory of the other.
- It provides a stable, transparent and predictable legal framework to encourage cross-border investments while balancing the host country's regulatory powers.
  • **Objectives of the India-Israel BIA**
- Promote bilateral investment by ensuring legal certainty and investor confidence.
- Protect investments against arbitrary or discriminatory treatment.

- Facilitate technology transfer, innovation, manufacturing and high-value sectors such as defence, agriculture, water management, cybersecurity and renewable energy.
- Strengthen long-term economic and strategic cooperation between the two countries.
  • Key Features of India's Model Bilateral Investment Treaty,2016
- Defines the rights and obligations of both investors and host States.
- Requires **exhaustion of local remedies** before initiating international arbitration, generally for a period of five years.
- Preserves the government's **right to regulate** in areas such as public health, environment, labour welfare and national security.
- Provides protection against expropriation without due process and ensures fair treatment under specified conditions.
  • India-Israel Economic Relations
- Diplomatic relations were established in **1992**, and bilateral ties have expanded significantly in trade, defence, agriculture, space, innovation and water technologies.
- Israel is an important partner in **precision agriculture, drip irrigation, cybersecurity, defence manufacturing and start-up innovation**.
- A robust BIA is expected to complement ongoing discussions on a broader **Free Trade Agreement (FTA)**.

Constitutional and Legal Dimensions

- **Article253** empowers Parliament to make laws for implementing international treaties and agreements.
- Under **Article73**, the Union Executive exercises powers relating to international relations and treaty negotiations.
- India follows a **dualist approach**, requiring domestic legislation wherever treaty obligations necessitate changes in municipal law.
  • Importance for India
- Encourages greater Foreign Direct Investment (FDI), particularly in high-technology and strategic sectors.
- Supports the objectives of **Make in India**, **Atmanirbhar Bharat**, **Digital India** and **National Logistics Policy**.
- Enhances investor confidence while safeguarding India's sovereign right to pursue legitimate public policy objectives.

Challenges

- Maintaining a balance between investor protection and the State's regulatory autonomy.
- Preventing frivolous investor-state disputes while ensuring effective dispute resolution.
- Harmonising investment commitments with environmental protection, labour standards and sustainable development goals.

Conclusion

The proposed India-Israel Bilateral Investment Agreement has the potential to strengthen economic and strategic ties by creating a secure and transparent investment environment. If aligned with India's Model BIT,2016, the agreement can promote sustainable investment, technological collaboration and long-term economic growth while preserving the country's regulatory sovereignty.

7. E20 Ethanol-Blended Petrol Programme

Why in News?

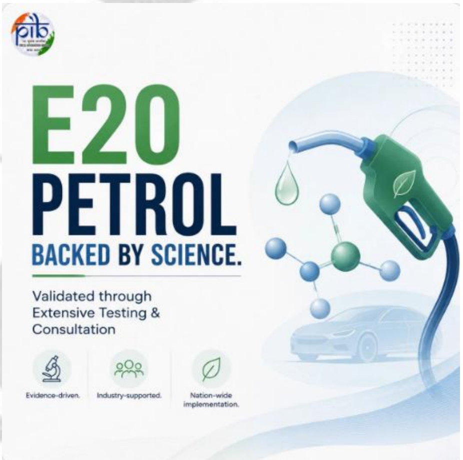
The Ministries of **Petroleum and Natural Gas, Heavy Industries, and Road Transport & Highways** jointly reaffirmed the safety and effectiveness of the **E20 Ethanol-Blended Petrol Programme**. Automobile manufacturers stated that extensive testing found **no significant issues in older vehicles**, strengthening confidence in India's ethanol blending initiative.

• What is E20 Fuel?

- **E20** is petrol blended with **20% ethanol and80% petrol** by volume.
- **Ethanol** is a renewable biofuel produced mainly from **sugarcane, maize, damaged food grains and agricultural biomass**. It is cleaner than conventional fossil fuels and helps reduce carbon emissions and crude oil imports.

Objectives of the E20 Programme

- Reduce dependence on imported crude oil and enhance **energy security**.
- Lower greenhouse gas emissions and urban air pollution.
- Increase farmers' income by creating demand for agricultural feedstock.
- Promote the **biofuel economy** under the **National Policy on Biofuels,2018 (amended2022)**.



• Industry Findings and Performance

- Vehicle manufacturers reported that E20 introduction followed extensive scientific testing and international certification standards.
- **Maruti Suzuki** stated that over **1.5crore older vehicles** serviced showed **no E20-related corrosion or engine damage**.
- E20 offers improved combustion efficiency, better anti-knocking characteristics and lower emissions, although fuel efficiency may reduce marginally because ethanol has a lower calorific value than petrol.

Institutional and Technical Framework

- E20 fuel complies with **Bureau of Indian Standards (BIS)** specifications and **BS-VI emission norms**.
- Testing follows globally accepted standards under the **United Nations Economic Commission for Europe (UNECE)** framework.
- **E85 fuel** (85% ethanol) is intended only for **flex-fuel vehicles**, which are specifically designed to operate on higher ethanol blends.

Significance for India

- Supports the goals of **Atmanirbhar Bharat**, **Make in India** and **Panchamrit climate commitments**.
- Reduces India's import bill for petroleum products and diversifies the energy mix.
- Encourages investment in bio-refineries, rural infrastructure and the circular bioeconomy while generating additional employment opportunities in agriculture and allied sectors.

Historic Perspective

- India launched the **Ethanol Blended Petrol (EBP) Programme** in **2003**, initially with5% blending.
- The target of **20% ethanol blending**, originally planned for2030, was advanced to **2025-26** due to accelerated production capacity and supportive policy measures.
- India has emerged among the world's leading ethanol blending countries through coordinated efforts of the petroleum, agriculture and sugar sectors.

Constitutional and Legal Dimensions

- **Article48A** directs the State to protect and improve the environment.
- **Article51A(g)** makes environmental protection a Fundamental Duty of every citizen.
- Guided by the **National Policy on Biofuels,2018**, **Energy Conservation Act,2001**, and India's commitments under the **Paris Agreement** to promote cleaner and sustainable fuels.

Challenges

- Ensuring sustainable feedstock availability without affecting food security.
- Managing higher water consumption associated with sugarcane cultivation.
- Expanding ethanol production from **2G biofuels** and agricultural residues.
- Strengthening storage, blending and distribution infrastructure across all regions.

Conclusion

The E20 programme represents a major step towards cleaner transportation, enhanced energy security and reduced carbon emissions. Its long-term success will depend on sustainable feedstock diversification, technological innovation and balanced implementation that safeguards both environmental and food security objectives.

8. LokOS: Digital Backbone for Rural Livelihoods

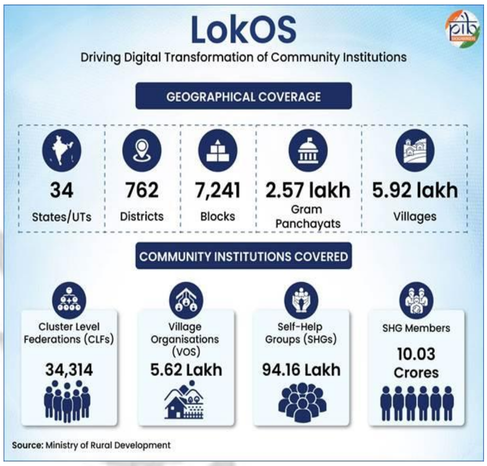
Why in News?

The Government has strengthened digital governance under the **Deendayal Antyodaya Yojana–National Rural Livelihoods Mission (DAY-NRLM)** through **LokOS (Lok Operating System)**, an end-to-end digital platform for Self-Help Groups (SHGs) and Community-Based Organizations (CBOs). Recently, the **SHE-LEAPS** platform was also integrated into LokOS to promote women-led rural enterprises.

Key Points for UPSC CSE

• What is LokOS?

- **LokOS (Lok=People; OS=Operating System)** is a web and mobile-based digital platform developed under **DAY-NRLM** for complete digitization of **Self-Help Groups (SHGs)** and their federations.
- It manages member records, savings, credit, repayments, livelihoods, financial transactions and convergence with government schemes, thereby strengthening transparency and accountability.
  • Major Features of LokOS



- Enables end-to-end digital management of **SHGs, Village Organizations (VOs) and Cluster Level Federations (CLFs)**.
- Generates **Aadhaar- and bank-linked digital IDs** for members.
- Provides real-time dashboards, digital financial records, livelihood profiling, role-based administration and data-driven decision-making.
- Digitally tracks financial transactions of nearly **₹2lakhcrore annually** within the SHG ecosystem.
  • SHE-LEAPS: Promoting Women Entrepreneurship
- **Self-Help Entrepreneur–Livelihoods and Enterprise Application for Prosperity and Sustainability (SHE-LEAPS)** was launched in **June2026** under LokOS.
- It provides a unified digital platform for creating, managing and monitoring **farm and non-farm enterprises**, supporting sustainable rural entrepreneurship and women's economic empowerment.
  • Coverage and Impact
- LokOS covers **34States/UTs,762 districts,7,241 blocks,2.57lakh Gram Panchayats and5.92lakh villages**.
- It digitally connects over **94.16lakh SHGs**, **10.03crore members**, **5.62lakh Village Organizations** and **34,314 Cluster Level Federations**, making it one of the world's largest digital livelihood governance platforms.
  • Financial Inclusion and Rural Empowerment
- Facilitates monitoring of **Revolving Fund (RF)**, **Community Investment Fund (CIF)** and **Community Enterprise Fund (CEF)**.
- Supports the **Lakhpati Didi Initiative** through digital tracking, livelihood planning and maintenance of **Digital Aajeevika Registers (DARs)**, thereby promoting financial inclusion and sustainable income generation.

Historic Perspective

- **DAY-NRLM** was launched in **2011** by restructuring the **Swarnjayanti Gram Swarozgar Yojana (SGSY)** to organize poor rural households into Self-Help Groups and improve sustainable livelihoods.
- Over the years, the mission has evolved from community mobilization to digital governance, enterprise promotion and women-led rural development through platforms like **LokOS** and **SHE-LEAPS**.

Constitutional and Legal Dimensions

- Supports **Article38** (promotion of social and economic justice), **Article39(a)** (adequate means of livelihood), **Article43** (promotion of cottage industries) and **Article46** (protection of weaker sections).

- Contributes to **Digital India**, **Financial Inclusion**, **Aspirational Districts Programme**, and the objectives of **SDG1 (No Poverty), SDG5 (Gender Equality), SDG8 (Decent Work and Economic Growth)** and **SDG10 (Reduced Inequalities)**.

Challenges

- Digital literacy gaps among SHG members in remote areas.
- Uneven internet connectivity and digital infrastructure.
- Data privacy and cybersecurity concerns in handling financial information.
- Need for continuous capacity building, quality data management and convergence with other rural development programmes.

Conclusion

LokOS marks a significant shift towards technology-driven rural governance by integrating financial inclusion, women's empowerment and livelihood promotion on a single digital platform. By strengthening transparency, community institutions and data-driven planning, it is emerging as a key instrument for achieving inclusive rural development and building a self-reliant rural economy.

9. MY Bharat (Mera Yuva Bharat): Where Digital India Meets Young India

Why in News?

MY Bharat (Mera Yuva Bharat) has emerged as India's flagship digital platform for youth engagement, volunteering and leadership development. The platform is being strengthened through **MY Bharat2.0**, leveraging **Artificial Intelligence (AI)** and **Digital Public Infrastructure (DPI)** to empower the **Amrit Peedhi** and advance the vision of **Viksit Bharat@2047**.

Key Points for UPSC CSE

• About MY Bharat

- **MY Bharat (Mera Yuva Bharat)** was launched in **October2023** under the **Ministry of Youth Affairs and Sports** to provide a unified platform for volunteering, experiential learning, leadership development, skill enhancement and civic participation.
- It connects youth with government agencies, educational institutions, industries and civil society organisations through a technology-driven ecosystem.

• Major Features

- Provides **1.52lakh+ volunteer opportunities** in areas such as disaster management, cleanliness, blood donation, sports and community service.
- Offers **24,900+ Experiential Learning Programmes (ELPs)**, internships, apprenticeships, AI-powered resume builder, mentoring support, multilingual quizzes and digital certificates.

- Supports digital volunteer management through online registration, geo-tagging, attendance tracking and impact assessment.
  • Digital Public Infrastructure (DPI) for Youth
- MY Bharat functions as a **Digital Public Infrastructure (DPI)** for youth by integrating digital identity, multilingual access, AI tools and open APIs.
- The mobile application is available in **22 Indian languages**, ensuring greater accessibility, transparency and inclusion.
- The upcoming **MY Bharat2.0** aims to expand digital credentials, AI-enabled services and personalised learning pathways.
  • Nation-Building Initiatives
- Facilitates programmes such as **Viksit Bharat Youth Parliament**, **Nari Shakti Youth Parliament**, **MY Bharat MY Vote**, **Viksit Vibrant Village Programme**, **National Youth Festival**, **Nasha Mukt Bharat Campaign** and participation in the **UN ECOSOC Youth Forum**.
- Strengthens democratic values, constitutional awareness, leadership skills and community participation among youth.
  • Significance
- Promotes **Jan Bhagidari (People's Participation)** and transforms youth from beneficiaries into active partners in governance and development.
- Enhances employability, digital literacy, volunteerism, social responsibility and innovation while supporting India's demographic dividend.

Historic Perspective

- India has consistently promoted youth development through initiatives such as the **National Service Scheme (NSS)(1969)**, **Nehru Yuva Kendra Sangathan (NYKS)(1972)** and the **National Youth Policy,2014**.
- MY Bharat represents the next generation of youth engagement by integrating these objectives with **Digital India**, Artificial Intelligence and Digital Public Infrastructure to create a unified national platform.

Constitutional and Legal Dimensions

- Supports the objectives of the **Preamble** by promoting justice, equality and fraternity through active citizenship.
- Advances **Article38** (promotion of social welfare), **Article41** (right to work, education and public assistance) and **Article51A** (Fundamental Duties), particularly the duty to uphold constitutional values and promote harmony.
- Contributes to **National Education Policy (NEP)2020**, **Digital India Mission**, **Skill India Mission**, **SDG4 (Quality Education), SDG8 (Decent Work and Economic Growth), SDG10 (Reduced Inequalities)** and **SDG16 (Peace, Justice and Strong Institutions)**.

Challenges

- Bridging the digital divide in remote and rural areas.
- Ensuring equitable participation of women, marginalized communities and differently-abled youth.
- Strengthening data privacy, cybersecurity and digital literacy.

- Improving long-term monitoring of volunteer outcomes and integration with employment opportunities.

Conclusion

MY Bharat represents a significant step towards building a digitally empowered and socially responsible youth ecosystem. By combining technology, volunteerism and leadership development, it is transforming India's demographic dividend into a powerful engine for inclusive growth and nation-building, thereby contributing to the vision of **Viksit Bharat@2047**.

10. Performance Grading Index2.0 (PGI-S) and Performance Grading Index for Districts (PGI-D)2025-26

Why in News?

The **Ministry of Education** has released the **Performance Grading Index for States/UTs (PGI-S2.0)** and the **Performance Grading Index for Districts (PGI-D)** for **2025-26** to assess the quality, governance and outcomes of school education across India through a standardized performance evaluation framework.

Key Points for UPSC CSE

• What is PGI?

- **Performance Grading Index (PGI)** is an assessment framework developed by the **Department of School Education and Literacy, Ministry of Education** to evaluate the performance of **States/UTs and Districts** in school education.
- Instead of ranking, it classifies States and districts into **performance grades**, encouraging healthy competition, cooperative federalism and evidence-based policymaking.
  • PGI-S2.0: Framework for States/UTs
- PGI-S carries a total weightage of **1000 points** across **70 indicators**.
- Indicators are grouped under **2 broad categories—Outcomes** and **Governance & Management**—covering **6 domains**:
  - Learning Outcomes and Quality
  - Access
  - Infrastructure and Facilities
  - Equity
  - Governance Processes
  - Teacher Education and Training
- The framework is aligned with **UDISE+, PARAKH Rashtriya Sarvekshan2024, PM POSHAN Portal, PRABANDH Portal and Vidyanjali Portal**.
  • PGI-D: Framework for Districts
- PGI-D evaluates educational performance at the district level with a total weightage of **600 points** across **70 indicators**.
- It covers **6 categories** and **11 domains**, including learning outcomes, teacher availability, digital learning, school safety, governance, infrastructure, attendance monitoring and leadership development.

- It enables district-level planning, targeted interventions and improved accountability.
  • **Importance of PGI**
- Promotes **data-driven governance**, transparency and continuous monitoring of school education.
- Identifies regional disparities, learning gaps and infrastructure deficiencies.
- Facilitates evidence-based allocation of resources and encourages States and districts to improve educational outcomes.
- Strengthens implementation of **National Education Policy (NEP)2020**.

Historic Perspective

- The **Performance Grading Index (PGI)** was introduced by the **Ministry of Education in2019** to objectively evaluate school education performance across States and Union Territories.
- Subsequently, the framework was expanded to the district level through **PGI-D**, enabling decentralized educational assessment and strengthening outcome-based governance.
- The revised **PGI2.0** reflects greater emphasis on **learning outcomes, governance quality, digital education and accountability**, in line with NEP2020 reforms.

Constitutional and Legal Dimensions

- **Article21A** guarantees the **Right to Free and Compulsory Education** for children aged6-14 years.
- **Article45** directs the State to provide early childhood care and education.
- **Article46** promotes educational interests of weaker sections.
- Supports the **Right of Children to Free and Compulsory Education Act,2009 (RTE Act)**, **National Education Policy2020**, **Samagra Shiksha**, and contributes to **SDG4 (Quality Education)**.

Challenges

- Persistent disparities in learning outcomes across States and districts.
- Inadequate teacher availability and uneven infrastructure in rural and remote regions.
- Digital divide affecting equitable access to technology-enabled education.
- Need for timely, reliable educational data and effective utilization of performance findings for policy reforms.

Conclusion

The **Performance Grading Index2.0** represents a significant shift towards outcome-based educational governance in India. By promoting transparency, accountability and evidence-based policymaking, PGI-S and PGI-D can help improve the quality of school education and accelerate the achievement of equitable, inclusive and high-quality learning outcomes envisioned under **NEP2020**.

11. Unified District Information System for Education Plus (UDISE+) Report2025-26

Why in News?

The **Ministry of Education** has released the **UDISE+ Report2025-26**, presenting the latest status of school education in India. The report highlights improvements in teacher availability, enrolment, retention, infrastructure, digital access and gender inclusion, providing a comprehensive database for educational planning and policymaking.

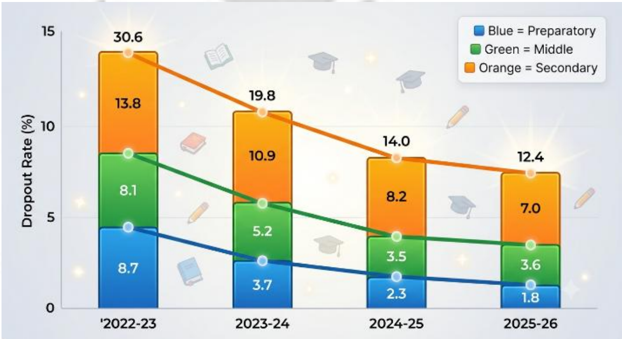
Key Points for UPSC CSE

• About UDISE+

- **Unified District Information System for Education Plus (UDISE+)** is India's largest school education management information system, maintained by the **Department of School Education and Literacy, Ministry of Education**.
- It provides real-time data on schools, teachers, students and educational infrastructure, supporting evidence-based policymaking and implementation of **NEP2020**.

  • Major Findings of UDISE+2025-26
- Number of teachers increased to **1.03crore**, reflecting an **8.3% increase** since2022-23.
- **Pupil-Teacher Ratio (PTR)** improved to **10:1 (Foundational),12:1 (Preparatory),17:1 (Middle) and21:1 (Secondary)**, well within the NEP benchmark.
- Secondary **Gross Enrolment Ratio (GER)** increased to **71.7%**, while dropout rates declined and retention as well as transition rates improved across most stages.

  • Improvement in School Infrastructure
- Schools with **computer access** increased to **69.9%**, while **internet connectivity** reached **67.4%**.
- Basic infrastructure also improved significantly, with **95% schools having electricity**, **99.5% drinking water**, **98.5% girls' toilets**, and **58.2% schools equipped with ramps and handrails**, promoting inclusive education.



  • Gender Inclusion
- **Female teachers** now constitute **54.9%** of the teaching workforce.
- **Girls' enrolment** increased to **48.4%**, reflecting continued progress towards gender equity in school education.

  • Importance of UDISE+
- Facilitates planning under **Samagra Shiksha**, **PM POSHAN**, **NEP2020** and other educational programmes.
- Enables monitoring of educational indicators at national, State and district levels.
- Supports allocation of financial resources, infrastructure planning and identification of learning gaps through reliable educational data.

Historic Perspective

- **UDISE** was introduced in **2012** by integrating the **District Information System for Education (DISE)** and **Secondary Education Management Information System (SEMIS)**.
- It was upgraded to **UDISE+** with online data collection, GIS mapping, Aadhaar-enabled validation and real-time monitoring, making it one of the world's largest school education databases.

Constitutional and Legal Dimensions

- **Article21A** guarantees the **Right to Free and Compulsory Education** for children aged6-14 years.

- **Articles41,45 and46** promote education, early childhood care and protection of weaker sections.
- Supports the **Right of Children to Free and Compulsory Education Act,2009 (RTE Act)**, **National Education Policy2020**, **Samagra Shiksha** and contributes to **SDG4 (Quality Education)**.

Challenges

- Regional disparities in learning outcomes and digital infrastructure.
- Persistent secondary-level dropout in certain socio-economically disadvantaged regions.
- Need for better teacher training, inclusive education and universal internet connectivity.
- Improving educational quality alongside quantitative expansion remains a key priority.

Conclusion

The **UDISE+2025-26 Report** reflects steady progress towards an inclusive, technology-enabled and outcome-oriented school education system. Continued investments in quality teachers, digital infrastructure, equitable access and learning outcomes will be critical for achieving the goals of **NEP2020** and ensuring quality education for every child.

12. Kamarajar Port Becomes India's Second Major Port with18-Metre Draft Capability

Why in News?

Kamarajar Port Limited (KPL) has become India's **second Major Port**, after **Visakhapatnam Port**, to achieve an **18-metre operational draft** following the completion of **Capital Dredging PhaseVI**. The development enables the port to handle fully laden **Capesize vessels** carrying up to **1,70,000DWT**, strengthening India's maritime trade and logistics infrastructure.

Key Points for UPSC CSE

• About the Development

- The **Capital Dredging PhaseVI** project was completed with an investment of **₹440crore**, deepening the navigation channels and harbour basin to make Kamarajar Port **Cape Compliant**.
- The port can now receive large **Capesize bulk carriers**, significantly increasing cargo-handling capacity and operational efficiency.
  • Important Definitions
- **Draft:** The vertical distance between a ship's waterline and its keel, indicating the minimum water depth required for safe navigation.
- **Capesize Vessel:** A large bulk cargo ship that is too large to transit the Panama or Suez Canals and generally sails around the Cape of Good Hope or Cape Horn. These vessels typically transport coal, iron ore and other bulk commodities.
- **DWT (Deadweight Tonnage):** The maximum weight a ship can safely carry, including cargo, fuel, crew and supplies.
  • Economic and Strategic Significance
- Larger vessels reduce transportation costs through **economies of scale**, thereby lowering logistics costs and improving India's global trade competitiveness.

- Strengthens India's **EXIM (Export-Import)** trade by improving bulk cargo movement and port efficiency.
- Enhances ease of doing business and supports industrial growth in southern India.
  • Maritime Infrastructure Development
- Supports the objectives of **Maritime India Vision2030** and **Maritime Amrit Kaal Vision2047**, which aim to modernize ports, improve logistics efficiency and position India as a leading global maritime nation.
- Strengthens multimodal connectivity under the **PM Gati Shakti National Master Plan** and contributes to the development of integrated logistics infrastructure.

Historic Perspective

- **Kamarajar Port**, formerly known as **Ennore Port**, became **India's first corporatized major port** in **2001** and operates under the **Companies Act**.
- Unlike traditional major ports governed through Port Trusts, it functions as a corporate entity under the **Ministry of Ports, Shipping and Waterways**, providing greater operational flexibility and commercial efficiency.
- The latest dredging project marks another milestone in India's transition towards world-class deep-water ports.

Constitutional and Legal Dimensions

- **Entry27 of the Union List (Seventh Schedule)** empowers the Union Government over major ports declared by Parliament.
- Governed by the **Major Port Authorities Act,2021**, which provides greater autonomy to major ports for commercial decision-making and infrastructure development.
- Supports the objectives of the **National Logistics Policy,2022**, **Sagarmala Programme**, **PM Gati Shakti**, **Maritime India Vision2030** and **Blue Economy** initiatives.

Challenges

- High capital and maintenance costs associated with continuous dredging.
- Environmental concerns relating to marine ecosystems, coastal sedimentation and disposal of dredged material.
- Need for improved hinterland connectivity, port digitization and multimodal logistics integration.
- Increasing competition from globally efficient transshipment hubs in the Indo-Pacific region.

Conclusion

The transformation of **Kamarajar Port** into India's second18-metre draft major port represents a significant milestone in strengthening maritime infrastructure. By enabling larger vessels, reducing logistics costs and improving trade efficiency, the project supports India's ambition of becoming a global maritime hub and a key driver of the Blue Economy under **Viksit Bharat2047**.

13. Index of Services Production (ISP) with Base Year2024-25

Why in News?

The **Ministry of Statistics and Programme Implementation (MoSPI)** has released the report of the **Technical Advisory Committee on the Index of Services Production (TAC-ISP)**, recommending the framework for compiling the **Index of Services Production (ISP)** with **Base Year2024-25**. The trial monthly series is proposed to be released from **14July2026**.

Key Points for UPSC CSE

• What is the Index of Services Production (ISP)?

- **Index of Services Production (ISP)** is a proposed **high-frequency monthly indicator** to measure short-term changes in India's **formal services sector**, which contributes nearly **53% of Gross Value Added (GVA)**.
- It will complement the **Index of Industrial Production (IIP)** by providing a comprehensive measure of monthly services sector performance.
  • Methodology and Data Sources
- The **Technical Advisory Committee (TAC-ISP)** has recommended a **Laspeyres Volume Index** with **2024-25 as the base year** and compilation at the **2-digit NIC2025** level using **Gross Value Added (GVA)** weights.
- ISP will primarily use **aggregated GST data**, supplemented by administrative datasets from **Railways, Civil Aviation, Banking, Insurance** and **ASISSE** data for sectors such as health and education.
- The methodology minimizes reporting burden by utilizing existing administrative data.
  • Importance of ISP
- Provides timely assessment of India's largest economic sector, improving macroeconomic monitoring and policymaking.
- Enhances the quality of national income estimation and short-term economic forecasting.
- Assists the Government, RBI, investors and researchers in understanding sectoral trends and business cycles.
  • Sectoral Coverage
- Covers major market-based services such as trade, hospitality, telecommunications, professional services, real estate and administrative services.
- Also incorporates GST-exempt sectors through alternate administrative data sources, ensuring wider coverage of the formal services economy.

Historic Perspective

- India has long published the **Index of Industrial Production (IIP)** as the principal monthly indicator of industrial activity.
- With the services sector emerging as the largest contributor to the economy, the need for a comparable high-frequency services indicator led to the constitution of the **Technical Advisory Committee on ISP** in **2025**.
- The proposed ISP fills a longstanding gap in India's official statistical system by providing monthly measurement of service sector output.

Constitutional and Legal Dimensions

- Supports evidence-based governance under **Article38**, which directs the State to promote social and economic welfare.
- Compiled by **MoSPI** under the **Collection of Statistics Act,2008**, ensuring standardized collection, compilation and dissemination of official statistics.

- Aligns with the **National Statistical System**, **National Accounts Statistics (NAS)** framework and internationally accepted statistical standards of the **UN System of National Accounts (SNA2008)**.

Challenges

- Measuring heterogeneous service activities with varying output characteristics.
- Dependence on multiple administrative databases requiring standardization and timely data sharing.
- Capturing the large informal services sector remains a significant challenge.
- Ensuring regular revision of methodology to reflect structural changes in the economy.

Conclusion

The proposed **Index of Services Production (ISP)** marks a major advancement in India's statistical architecture by providing a robust monthly indicator for the country's largest economic sector. It will strengthen economic policymaking, improve business cycle analysis and enhance the accuracy of national income assessment, thereby supporting evidence-based governance in a rapidly evolving services-driven economy.

14. TribeX: Digital Learning Platform for Tribal Arts, Culture and Traditional Knowledge

Why in News?

The **Ministry of Tribal Affairs** has launched **TribeX**, a first-of-its-kind digital learning platform dedicated to preserving, promoting and disseminating **tribal arts, culture, languages and traditional knowledge**. The platform was launched during the **National Workshop on Strengthening Tribal Research Institutes (TRIs)** in Bhubaneswar, Odisha.

Key Points for UPSC CSE

• About TribeX

- **TribeX** is a comprehensive digital learning ecosystem designed to preserve India's tribal heritage while providing structured learning opportunities through **free certificate courses** and **UGC-recognized Post Graduate Diploma programmes**.
- It serves as a digital repository for tribal languages, oral traditions, performing arts, crafts, textiles and indigenous knowledge systems, making them accessible to learners, researchers and institutions worldwide.
  • Major Features
- Offers **20 free certificate courses**, with a roadmap to expand to **100+ courses**, covering tribal paintings, handicrafts, handloom, artefacts and traditional musical instruments.
- Introduces **five UGC-recognized one-year hybrid PG Diploma programmes** in Santali (Ol Chiki), Sustainable Tribal Culture-Based Livelihood Practices, Museology & Tribal Museum Management, Tribal Arts & Crafts of India and Tribal Textiles.
- Equipped with a **Learning Management System (LMS)** and **Repository Management System (RMS)** for digital learning, progress tracking and knowledge management.
  • Heritage Documentation

- The **Heritage Archive** hosts over **5,000 multimedia resources**, including audio, video and literature documenting tribal festivals, oral traditions and socio-cultural practices, with plans to expand to **10,000 resources**.
- Encourages documentation of endangered tribal languages and indigenous knowledge, contributing to cultural preservation and intergenerational knowledge transfer.
  • Significance
- Bridges geographical barriers through digital technology, enabling tribal knowledge holders, artisans and master craftsmen to connect directly with learners.
- Promotes tribal entrepreneurship, cultural tourism, skill development and livelihood generation while preserving India's intangible cultural heritage.

Historic Perspective

- India is home to over **700 Scheduled Tribes**, each possessing unique languages, art forms and traditional ecological knowledge.
- The **Ministry of Tribal Affairs** was established in **1999** to ensure focused policy intervention for tribal development.
- Tribal Research Institutes (TRIs), established across States, have played a key role in documenting tribal history, culture and socio-economic development. TribeX represents the digital transformation of these conservation efforts.

Constitutional and Legal Dimensions

- **Article46** directs the State to promote the educational and economic interests of Scheduled Tribes.
- **Articles244 and275(1)** provide for administration and financial assistance for Scheduled Areas and tribal welfare.
- **Fifth and Sixth Schedules** safeguard tribal interests through special administrative arrangements.
- Supports the **National Education Policy (NEP)2020**, **National Tribal Policy objectives**, **Digital India Mission**, **PM JANMAN**, and contributes to **SDG4 (Quality Education), SDG10 (Reduced Inequalities)** and **SDG11 (Sustainable Cities and Communities)**.

Challenges

- Risk of losing indigenous languages and oral traditions due to modernization.
- Limited digital connectivity and digital literacy in remote tribal regions.
- Ensuring authenticity, intellectual property protection and benefit-sharing for tribal knowledge holders.
- Need for sustained collaboration among Tribal Research Institutes, universities and local communities.

Conclusion

TribeX marks a significant step towards digitally preserving India's rich tribal heritage while expanding educational and livelihood opportunities for tribal communities. By combining technology with traditional knowledge, the platform strengthens cultural conservation, inclusive development and tribal empowerment, contributing to the vision of an equitable and culturally vibrant **Viksit Bharat**.

15. Strengthening India's Toy Ecosystem: From Local Craftsmanship to Global Markets

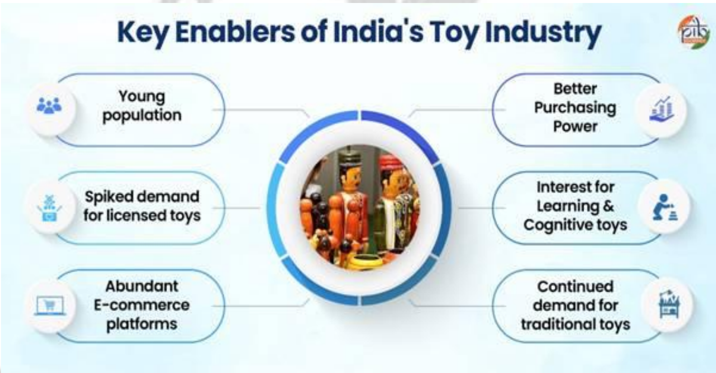
Why in News?

The Government has highlighted the growing transformation of **India's toy industry** through policy support, quality standards, digital market access and export promotion. Driven by initiatives such as the **National Action Plan for Toys (NAPT)**, **ODOP** and **Toy Biz International Exhibition**, India has emerged as a **net exporter of toys** while strengthening indigenous manufacturing and traditional craftsmanship.

Key Points for UPSC CSE

• Growth of India's Toy Industry

- India's toy industry combines **traditional craftsmanship with modern manufacturing and innovation**, supported by strong domestic demand and a young population.
- Toy exports increased from **US$152.7million (2017-18)** to **US$384.7million (2025-26)**, while imports of traditional and educational toys declined significantly, making India a **net exporter** with a trade surplus of **US$152million**.



• Major Government Initiatives

- **National Action Plan for Toys (NAPT),2020** promotes toys based on Indian culture, innovation and quality standards.
- **Quality Control Order (QCO),2020** mandates **Bureau of Indian Standards (BIS)** certification for toys to ensure safety and quality.
- Other initiatives include **Toycathon**, **e-Toys Lab (MeitY)**, **Toy Biz International B2B Exhibition**, **ODOP**, **Districts as Export Hubs (DEH)** and promotion of **GI-tagged toys**.

• Economic Significance

- The sector supports artisans, MSMEs, start-ups and rural enterprises while generating employment and promoting women entrepreneurship.
- Employment in the **Games and Toys sector (NIC324)** more than doubled from **8,685 (2018-19)** to **17,693 (2023-24)**.
- The industry contributes to manufacturing growth, exports, foreign exchange earnings and balanced regional development.

• Cultural and Educational Importance

- India's toy-making tradition dates back nearly **5,000 years**, with archaeological evidence from the **Indus Valley Civilization**.
- Increasing emphasis is being placed on **educational, STEM-based and culturally rooted toys**, integrating traditional knowledge with Artificial Intelligence (AI), Augmented Reality (AR) and Virtual Reality (VR).

Historic Perspective

- India has a rich heritage of handcrafted toys such as **Channapatna Toys (Karnataka), Thanjavur Dolls (Tamil Nadu)** and **Leather Toys of Indore (Madhya Pradesh)**, many of which enjoy **Geographical Indication (GI)** status.
- The industry has evolved from village-based craftsmanship to technology-driven manufacturing, supported by export-oriented policies and digital commerce.

Constitutional and Legal Dimensions

- **Article43** directs the State to promote **cottage industries** in rural areas.
- Supports the objectives of **Atmanirbhar Bharat**, **Make in India**, **Startup India**, **Vocal for Local**, **ODOP** and **Districts as Export Hubs**.
- Governed by the **Bureau of Indian Standards Act,2016**, **Quality Control Order (QCO),2020**, **Geographical Indications of Goods (Registration and Protection) Act,1999**, and aligned with **MSME development** and export promotion policies.

Challenges

- Competition from low-cost imports and counterfeit products.
- Need for greater investment in research, design, branding and intellectual property protection.
- Limited access to advanced manufacturing technologies for MSMEs.
- Strengthening global marketing, export certification and innovation in smart and electronic toys.

Conclusion

India's toy industry represents a unique convergence of cultural heritage, manufacturing and innovation. With strong policy support, quality standards and export promotion, the sector is well positioned to emerge as a global hub for safe, sustainable and culturally rooted toys while generating employment, preserving traditional craftsmanship and advancing the vision of **Atmanirbhar Bharat**.

16. TRAI Clarifies Functioning of1600 and140 Number Series

Why in News?

The **Telecom Regulatory Authority of India (TRAI)** has issued clarifications regarding the functioning of the designated **1600** and **140** number series to prevent misinformation and ensure proper implementation of the **Telecom Commercial Communications Customer Preference Regulations (TCCCPR)**.

Key Points for UPSC CSE

• Purpose of the1600 Series

- The **1600xx series** is exclusively designated for **service and transaction calls** made by:

- Regulated entities of the **Banking, Financial Services and Insurance (BFSI)** sector regulated by **RBI, SEBI, IRDAI and PFRDA**.
- Government departments for **Government-to-Citizen (G2C)** communications.

- The objective is to make important calls **trustworthy, identifiable and secure**, thereby reducing fraud and enhancing consumer confidence.

• Purpose of the140 Series

- The **140xx series** is reserved exclusively for **promotional calls** made by entities across all sectors.
- Businesses must register with their **Telecom Service Provider (TSP)** under the **TCCCPR framework** before using this series.
- Promotional calls from140 numbers are governed by customer preferences registered under the **Do Not Disturb (DND)** mechanism.

• Consumer Protection Measures

- Consumers can register or modify their preferences under the **DND Registry** using the **TRAI DND App** or other approved channels.
- Customers who opt to block promotional calls from selected sectors will not receive140-series promotional calls from those sectors.
- Calls originating from the1600 series **cannot be blocked, tagged or filtered**, ensuring uninterrupted delivery of critical service communications.

• Importance of the Clarification

- Prevents misinterpretation of designated number series and strengthens trust in digital communication.
- Helps distinguish **essential transactional calls** from **commercial promotional calls**, reducing the risk of phishing and telecom fraud.
- Supports India's digital governance, financial inclusion and secure digital payment ecosystem.

Historic Perspective

- The **Telecom Commercial Communications Customer Preference Regulations (TCCCPR),2018** replaced earlier frameworks to strengthen consumer protection against **Unsolicited Commercial Communications (UCC)**.
- Over the years, TRAI has introduced **Distributed Ledger Technology (DLT)**, sender registration, message header verification and designated number series to improve transparency and curb spam and fraudulent communications.

Constitutional and Legal Dimensions

- **TRAI** was established under the **Telecom Regulatory Authority of India Act,1997** to regulate telecommunications and protect consumer interests.

- The framework operates under the **Telecom Act,2023**, **Telecom Commercial Communications Customer Preference Regulations (TCCCPR),2018**, and complements the objectives of the **Digital Personal Data Protection Act,2023** by promoting responsible communication and consumer privacy.

Challenges

- Rising incidents of telecom fraud through spoofed numbers and unauthorized communications.
- Need for greater public awareness regarding the purpose of designated number series.
- Strengthening coordination among telecom operators, financial institutions and regulators for effective enforcement.
- Continuous technological upgrades are required to tackle evolving cyber-enabled frauds.

Conclusion

The designated **1600** and **140** number series represent an important regulatory initiative to improve trust, transparency and consumer protection in India's telecom ecosystem. Effective implementation, coupled with public awareness and robust technological safeguards, will strengthen secure digital communications and support the broader objectives of **Digital India** and a resilient digital economy.

17. Mandatory Use of TReDS for Settlement of MSME Invoices by CPSEs

Why in News?

The **Ministry of MSME** has mandated that **all Central Public Sector Enterprises (CPSEs)** route the settlement of invoices raised by **Micro, Small and Medium Enterprises (MSMEs)** through the **Trade Receivables Discounting System (TReDS)**. The notification, issued on **30June2026**, implements a key announcement made in the **Union Budget2026-27**.

Key Points for UPSC CSE

• What is TReDS?

- **Trade Receivables Discounting System (TReDS)** is an **RBI-regulated electronic platform**, operational since **2017**, that facilitates **invoice financing** for MSMEs by enabling banks and NBFCs to competitively discount invoices raised on corporate buyers, Government Departments and Public Sector Undertakings.
- The platform provides **collateral-free and non-recourse financing**, improving liquidity for MSMEs without waiting for payment due dates.

• Key Features of the New Mandate

- All operating **CPSEs** must settle invoices of MSME suppliers through **RBI-authorized TReDS platforms**.
- CPSEs are required to disclose details of invoices routed through TReDS and obtain a **statutory auditor's certificate** confirming registration and compliance during annual audits.
- The reform is expected to improve payment discipline and establish CPSEs as benchmarks for timely payments.

• Benefits for MSMEs

- Enables faster realization of payments and improves working capital availability.
- Reduces dependence on collateral-based bank loans and lowers financing costs through competitive bidding.

- Enhances cash flow, business continuity, productivity and employment generation.
- Addresses one of the major challenges faced by MSMEs—**delayed payments**.

• Growth of the TReDS Ecosystem

- Five RBI-authorized platforms are operational: **RXIL, M1xchange, Invoicemart, C2treds and DTX**.
- Invoice discounting through TReDS increased from approximately **₹40,000crore in FY2021-22** to about **₹3.47lakhcrore in FY2025-26**, reflecting rapid adoption of digital trade finance.

• Significance

- Strengthens the MSME ecosystem, which comprises over **8.70crore registered enterprises** and provides employment to more than **38crore people**.
- Promotes digital financial inclusion, ease of doing business and formalization of the economy.
- Supports the objectives of **Atmanirbhar Bharat**, **Digital India** and sustainable industrial growth.

Historic Perspective

- The **Micro, Small and Medium Enterprises Development (MSMED) Act,2006** recognized timely payments as a critical requirement for MSME growth.
- To address delayed receivables, **RBI introduced TReDS in2014**, and the first platforms became operational in **2017**.
- The latest mandate marks a major reform by making TReDS compulsory for all CPSE procurement from MSMEs, thereby institutionalizing digital invoice financing.

Constitutional and Legal Dimensions

- **Article38** directs the State to promote social and economic justice.
- **Article39(c)** seeks to prevent concentration of wealth and ensure equitable distribution of economic resources.
- **Article43** promotes cottage and small-scale industries.
- Governed by the **MSMED Act,2006**, **Reserve Bank of India Act,1934**, relevant **RBI guidelines on TReDS**, **Public Procurement Policy for MSEs,2012**, and supports the objectives of **Udyam Registration**, **Digital India**, and the **National Logistics Policy**.

Challenges

- Limited awareness and adoption of TReDS among smaller MSMEs.
- Need for faster invoice acceptance by buyers to maximize financing benefits.
- Digital literacy and technological constraints among micro enterprises.
- Expanding participation of private corporate buyers beyond mandatory entities remains a key challenge.

Conclusion

The mandatory use of **TReDS** by CPSEs is a landmark reform to improve payment discipline and unlock timely, collateral-free working capital for MSMEs. By strengthening digital trade finance and reducing delayed payments, the initiative will enhance the competitiveness, resilience and long-term growth of India's MSME sector while supporting the vision of an **Atmanirbhar Bharat**.

18. SANKALP: Guiding CPWD Towards a Future-Ready Organisation

Why in News?

On the **172nd Annual Day of the Central Public Works Department (CPWD)**, the Union Minister for Housing and Urban Affairs unveiled the **SANKALP** framework—**Speed, Accessibility, Nekneeyat, Kartavyanishtha, Adoption of Technology, Lokhit and Pardarshita**—as the guiding principles for transforming CPWD into a future-ready, transparent and technology-driven organization.

Key Points for UPSC CSE

• What is SANKALP?

- **SANKALP** is a governance framework envisioned for **CPWD** to strengthen efficiency, accountability and public service delivery.
- It emphasizes:
  - **S** – Speed
  - **A** – Accessibility
  - **N** – Nekneeyat (Integrity and Good Intent)
  - **K** – Kartavyanishtha (Commitment to Duty)
  - **A** – Adoption of Technology
  - **L** – Lokhit (Public Welfare)
  - **P** – Pardarshita (Transparency)
- These principles align with the broader vision of **Viksit Bharat2047** and citizen-centric governance.

• About the Central Public Works Department (CPWD)

- **CPWD** is India's premier government construction agency functioning under the **Ministry of Housing and Urban Affairs (MoHUA)**.
- Established in **1854**, it is responsible for the planning, construction and maintenance of Central Government buildings, residential complexes, educational institutions, healthcare facilities, border infrastructure and national landmarks.
- It also provides technical consultancy, project management and engineering services to various government organizations.

• Major Reforms and Digital Initiatives

- CPWD launched **e-NIRMIT ERP Modules** to improve project planning, financial management, procurement and monitoring.
- Greater emphasis has been placed on **Building Information Modelling (BIM)**, digital project management, automation and modern construction technologies.
- The Department is promoting sustainable construction practices, capacity building and institutional reforms to improve efficiency and transparency.

• **Significance**

- Strengthens timely execution of public infrastructure projects.
- Promotes transparent governance, digital transformation and evidence-based project management.
- Supports sustainable urbanization, green buildings and efficient utilization of public resources.
- Reinforces CPWD's role as the Government's principal technical organization for infrastructure development.

• **Proposed Institutional Reforms**

- Proposal to establish a **National Council for Public Works** to promote knowledge sharing, standardization, innovation and collaboration among Central and State agencies, academia and industry.
- Focus on continuous skill development through the **National CPWD Academy** and partnerships with premier technical institutions.

Historic Perspective

- The **Central Public Works Department (CPWD)** was established in **1854** during the British period, making it one of India's oldest engineering organizations.
- Over nearly **172 years**, CPWD has executed several iconic public infrastructure projects and evolved from a conventional construction agency into a technology-driven institution emphasizing digital governance, sustainability and modern engineering practices.

Constitutional and Legal Dimensions

- **Article38** directs the State to promote social welfare through effective governance.
- **Article39(b)** emphasizes equitable distribution of material resources for the common good.
- Supports the objectives of the **National Infrastructure Pipeline (NIP)**, **PM Gati Shakti National Master Plan**, **National Logistics Policy**, **Digital India Mission**, **Energy Conservation Building Code (ECBC)** and **Green Building** initiatives.
- Public procurement and project execution are guided by the **General Financial Rules (GFR),2017**, **Public Procurement policies** and environmental regulations governing sustainable infrastructure development.

Challenges

- Ensuring timely completion of large infrastructure projects while maintaining quality standards.
- Adopting emerging technologies across all project stages.
- Balancing rapid urban infrastructure development with environmental sustainability.
- Strengthening institutional capacity, inter-agency coordination and transparency in project execution.

Conclusion

The **SANKALP** framework provides a comprehensive roadmap for transforming CPWD into a modern, technology-driven and citizen-centric public infrastructure organization. By combining integrity, innovation, sustainability and efficient governance, it can play a pivotal role in building resilient infrastructure and advancing the vision of **Viksit Bharat2047**.

19. Semicon2.0: India's Next-Generation Semiconductor Mission

Why in News?

The **Union Cabinet** has approved **Semicon2.0** with a total outlay of **₹1,27,500crore** to strengthen India's semiconductor design and manufacturing ecosystem. The programme builds upon the progress achieved under **Semicon1.0** and aims to position India as a global semiconductor hub through long-term policy support.

Key Points for UPSC CSE

• What is Semicon2.0?

- **Semicon2.0** is the Government of India's comprehensive semiconductor development programme aimed at building an end-to-end ecosystem covering **chip design, manufacturing, packaging, research, materials and skilled manpower**.
- It seeks to reduce import dependence, strengthen supply chain resilience and enhance India's technological competitiveness in critical sectors.

• Six Pillars of Semicon2.0

- **Design:** Promote indigenous semiconductor Intellectual Property (IP), chip design and System-on-Chip (SoC) development.
- **Machines and Materials:** Encourage domestic manufacturing of semiconductor equipment, specialty chemicals, gases and materials.
- **Fabrication (Fabs):** Support establishment of **silicon fabs, compound semiconductor fabs, discrete semiconductor fabs and display fabs**.
- **ATMP/OSAT Ecosystem:** Expand **Assembly, Testing, Marking and Packaging (ATMP)** and **Outsourced Semiconductor Assembly and Test (OSAT)** facilities using advanced technologies.
- **Research and Development:** Promote advanced semiconductor nodes, emerging technologies and collaboration with global R&D institutions.
- **Talent Development:** Strengthen semiconductor education, clean-room training and industry-oriented skill development through universities and technical institutions.

• Progress under Semicon1.0

- **12 semiconductor manufacturing projects** approved with cumulative investments exceeding **₹1.64lakhcrore**.
- Three companies, including **Micron, Kaynes and CG Semi**, have commenced commercial production.
- **24 semiconductor design projects** have received financial assistance, while **105 startups and MSMEs** have been provided access to advanced **Electronic Design Automation (EDA)** tools.
- More than **68,000 students** have been trained in semiconductor design through **315 universities**.

• Significance

- Strengthens India's strategic autonomy in electronics, telecommunications, defence, space, AI, automobiles and industrial electronics.
- Reduces dependence on imported semiconductors and diversifies global semiconductor supply chains.

- Encourages innovation, high-value manufacturing, employment generation and foreign investment.
- Supports the vision of **Atmanirbhar Bharat**, **Digital India**, **Make in India** and **Viksit Bharat2047**.

• **Key Terms**

- **Semiconductor Fabrication (Fab):** Manufacturing facility where semiconductor chips are produced.
- **ATMP (Assembly, Testing, Marking and Packaging):** Final stage of semiconductor manufacturing involving packaging and quality testing.
- **OSAT (Outsourced Semiconductor Assembly and Test):** Specialized facilities providing chip packaging and testing services for semiconductor companies.

Historic Perspective

- India's semiconductor policy gained momentum with the launch of the **India Semiconductor Mission (ISM)** in **2021**.
- **Semicon India Programme (Semicon1.0)** laid the foundation for semiconductor manufacturing by providing incentives for fabs, packaging units and chip design.
- **Semicon2.0** marks the transition from establishing manufacturing capacity to developing a complete semiconductor value chain, including indigenous technology, research and advanced manufacturing.

Constitutional and Legal Dimensions

- **Article39(b)** directs the State to ensure equitable distribution of material resources for the common good.
- **Article19(1)(g)** promotes entrepreneurship and industrial innovation.
- The initiative complements the **India Semiconductor Mission (ISM)**, **National Policy on Electronics,2019**, **Production Linked Incentive (PLI) Schemes**, **Digital India Programme**, **Make in India**, **National Policy on Research, Development and Innovation**, and the **National Logistics Policy**.

Challenges

- High capital investment and long gestation periods for semiconductor fabs.
- Dependence on imported semiconductor-grade materials, equipment and advanced manufacturing technologies.
- Need for reliable power, ultra-pure water and world-class infrastructure.
- Intense global competition for technology, skilled manpower and supply chain integration.

Conclusion

Semicon2.0 represents a decisive step towards building a globally competitive semiconductor ecosystem in India. By integrating design, fabrication, packaging, research and talent development, the programme has the potential to strengthen technological sovereignty, enhance economic resilience and establish India as a major player in the global semiconductor value chain.

20. Coal Exchanges in India: Towards a Transparent and Competitive Coal Market

Why in News?

The **Ministry of Coal** has launched the **Online Application Portal for Registration of Coal Exchanges**, marking the operational rollout of the **Coal Exchange Rules,2026**. The initiative aims to establish a transparent, technology-driven and market-based coal trading ecosystem under the regulatory oversight of the **Coal Controller Organisation (CCO)**.

• What is a Coal Exchange?

- A **Coal Exchange** is a regulated electronic trading platform where buyers and sellers can trade **coal and processed coal products** through delivery-based contracts approved by the regulatory authority.
- It enables **transparent price discovery, quality assurance, secured settlement, market surveillance and grievance redressal**, thereby modernizing India's coal trading system.

• Key Features of Coal Exchanges

- Facilitates **market-based price discovery** through competitive bidding.
- Coal quality will be certified by **Authority-approved sampling agencies**.
- Provides secure clearing and settlement backed by a **Settlement Fund**.
- Ensures transparency through digital trading, real-time monitoring and an institutional grievance redressal mechanism.
- Registrations of Coal Exchanges will remain valid for **25 years**.

• Regulatory Framework

- The concept of **Mineral Exchanges**, including Coal Exchanges, was introduced through the **Mines and Minerals (Development and Regulation) Amendment Act,2025**.
- The **Coal Exchange Rules,2026** provide the legal and operational framework for establishment and functioning of Coal Exchanges.
- The **Coal Controller Organisation (CCO)** has been designated as the regulatory authority responsible for registration, regulation and oversight of Coal Exchanges.

• Online Registration Portal

- The newly launched portal enables **end-to-end digital registration**, including application submission, document upload, online fee payment through **BharatKosh**, and real-time application tracking.
- The digital platform promotes ease of doing business, transparency and faster regulatory approvals.

• Significance

- Improves efficiency and competitiveness in the coal sector through transparent trading.

- Strengthens supply chain resilience and reduces information asymmetry in coal markets.
- Encourages private sector participation and enhances investor confidence.
- Supports India's goals of **energy security, commercial coal mining, ease of doing business and Atmanirbhar Bharat**.

Historic Perspective

- India's coal sector was historically dominated by administrative allocation and long-term supply arrangements.
- Reforms such as **commercial coal mining (2020)** and the **MMDR Amendment Act,2025** have progressively introduced market-oriented mechanisms.
- The launch of Coal Exchanges represents the next phase of reform by enabling transparent and competitive digital coal trading similar to commodity exchanges.

Constitutional and Legal Dimensions

- **Article39(b)** directs the State to ensure that material resources are distributed to subserve the common good.
- **Article19(1)(g)** supports lawful trade and business activities.
- Governed by the **Mines and Minerals (Development and Regulation) Act,1957**, **MMDR Amendment Act,2025**, **Coal Exchange Rules,2026**, **Coal Mines (Special Provisions) Act,2015**, and aligned with the objectives of the **National Mineral Policy,2019**, **Commercial Coal Mining Policy** and the vision of **Viksit Bharat2047**.

Challenges

- Ensuring sufficient market liquidity and broad participation by buyers and sellers.
- Maintaining transparency while preventing market manipulation.
- Standardizing coal quality assessment across regions.
- Integrating digital trading with existing logistics and coal supply infrastructure.

Conclusion

The introduction of **Coal Exchanges** marks a significant reform in India's coal sector by replacing conventional trading mechanisms with a transparent, technology-enabled and competitive marketplace. If effectively implemented, the initiative can improve market efficiency, strengthen energy security and contribute to building a modern and resilient coal ecosystem in line with India's long-term economic and industrial aspirations.

21. India–UK Comprehensive Economic and Trade Agreement (CETA) Enters into Force

Why in News?

The **India–United Kingdom Comprehensive Economic and Trade Agreement (CETA)** and the **Agreement on Social Security (Double Contribution Convention-DCC)** have formally entered into force. On the first day, **over50 export consignments worth more than USD140million** were dispatched under the preferential tariff regime from ports, airports, ICDs and SEZs across India.

• What is India–UK CETA?

- The **Comprehensive Economic and Trade Agreement (CETA)** is a comprehensive Free Trade Agreement (FTA) covering **trade in goods and services, investment, customs cooperation, digital trade, intellectual property, professional services and regulatory cooperation**.
- It aims to deepen economic integration between two complementary economies by improving market access and reducing trade barriers.

• Major Features of the Agreement

- Provides **zero-duty market access for nearly99% of India's exports**, covering almost **100% of trade value**.
- Expands opportunities for sectors such as **textiles, leather, gems and jewellery, engineering goods, marine products, chemicals, processed foods, IT, financial and professional services**.
- The **Double Contribution Convention (DCC)** exempts Indian professionals on temporary assignments in the UK from paying double social security contributions for up to **five years**.

• Trade Facilitation Measures

- The first **Certificates of Origin** under CETA have been issued through the **eCoO2.0 platform** on a **self-certification basis**.
- Digital certification reduces compliance costs, simplifies procedures and particularly benefits **MSMEs**.
- Necessary arrangements relating to **Rules of Origin** and customs preparedness have been completed for smooth implementation.

• Significance

- Strengthens bilateral trade, investment and supply-chain resilience.
- Enhances competitiveness of Indian exports in one of the world's largest developed markets.
- Supports employment generation in labour-intensive sectors while benefiting **MSMEs, farmers, women entrepreneurs and service professionals**.
- Expected to substantially expand long-term bilateral trade and investment flows.

• About Comprehensive Economic Partnership Agreements

- A **Comprehensive Economic and Trade Agreement (CETA)** is an advanced form of Free Trade Agreement that covers not only tariff reduction but also **services, investment, intellectual property, digital trade, government procurement and regulatory cooperation**, ensuring deeper economic integration.

Historic Perspective

- India and the UK have maintained strong trade ties since independence, but negotiations for a comprehensive trade agreement accelerated in recent years.
- The CETA was finalized after **over800 technical sessions across14 formal negotiation rounds**, making it one of India's most comprehensive trade agreements.

Constitutional and Legal Dimensions

- **Article253** empowers Parliament to enact laws for implementing international agreements and treaties.
- **Article246** read with the **Union List (Entry41)** gives the Union exclusive jurisdiction over foreign trade and commerce.
- The Agreement operates within the framework of the **Foreign Trade (Development and Regulation) Act,1992**, **Customs Act,1962**, **Patents Act,1970**, relevant **Intellectual Property laws**, and is consistent with **WTO** principles governing international trade.

Challenges

- Ensuring effective utilization of tariff preferences by exporters.
- Meeting stringent UK quality, sanitary and technical standards.
- Enhancing awareness among MSMEs regarding Rules of Origin and certification procedures.
- Addressing future non-tariff barriers and ensuring smooth implementation across sectors.

Conclusion

The entry into force of the **India–UK CETA** marks a landmark milestone in India's trade diplomacy. By expanding market access, facilitating digital trade and services, and improving mobility for professionals, the Agreement is expected to strengthen India's export competitiveness, generate employment and deepen the strategic economic partnership between India and the United Kingdom while contributing to the vision of **Viksit Bharat**.

22. Core Sectors Growth: Updated Index of Core Industries (ICI) Series

Why in News?

The **Ministry of Commerce and Industry** has released the **updated Index of Core Industries (ICI)** with the **base year revised from2011-12 to2022-23**. The revised series expands the index to **nine core sectors** by including **Iron Ore**, while India's core industries registered **5% growth in June2026**, the highest in the last five months.

• What is the Index of Core Industries (ICI)?

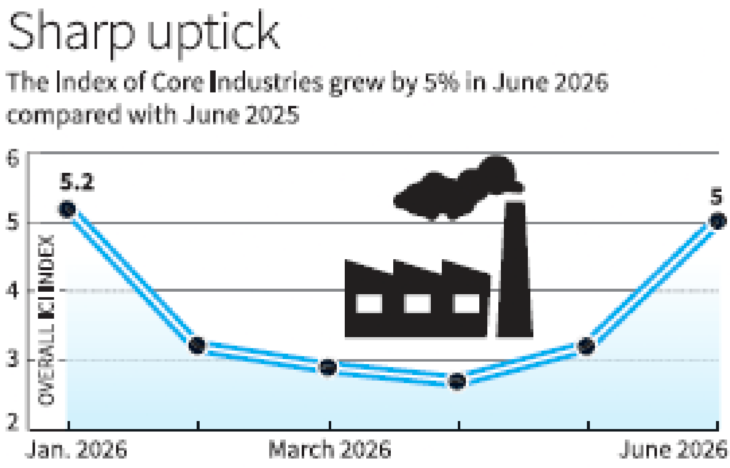
- The **Index of Core Industries (ICI)** is a **monthly production index** compiled by the **Office of the Economic Adviser (OEA), Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry**.
- It measures the performance of **core infrastructure sectors**, which collectively have a significant weight in the **Index of Industrial Production (IIP)** and serve as leading indicators of industrial activity.

• Salient Features of the Updated ICI Series

- **Base Year revised:** From **2011-12** to **2022-23** to better reflect the present industrial structure.
- **Nine Core Sectors:** Coal, Crude Oil, Natural Gas, Refinery Products, Fertilizers, Steel, Cement, Electricity and **Iron Ore** (newly added).
- Methodological improvements include the use of **gross steel production data** and exclusion of double counting in coal statistics.
- The revised index better captures structural changes in India's industrial economy.

• **Growth Performance**

- Core sectors recorded **5% growth in June2026**, the highest in five months.
- **Iron Ore** registered the fastest growth (**43.9%**), supported partly by a favourable base effect.
- Strong performance was also recorded by **Electricity**, **Cement**, **Steel** and **Coal**, while certain hydrocarbon sectors witnessed contraction.



• **Key Definitions**

- **Base Effect:** Statistical phenomenon where growth rates appear higher or lower because of an unusually high or low comparison base in the previous period.
- **Index of Industrial Production (IIP):** A monthly indicator measuring changes in industrial output across the mining, manufacturing and electricity sectors.

Historic Perspective

- The **Index of Core Industries** has undergone periodic revisions to ensure that the index reflects evolving production patterns and structural changes in the economy.
- Revision of the **base year** is a standard statistical practice to improve the relevance, comparability and reliability of macroeconomic indicators.
- The inclusion of **Iron Ore** reflects its growing importance in India's manufacturing, steel production and infrastructure development.

Constitutional and Legal Dimensions

- The **Department for Promotion of Industry and Internal Trade (DPIIT)** is the nodal authority responsible for compilation and dissemination of the ICI.
- The **Collection of Statistics Act,2008** provides the legal framework for collection of official economic and industrial statistics.
- **Entry52** (Industries under Union control) and **Entry54** (Regulation of mines and mineral development) of the **Union List (Seventh Schedule)** empower Parliament to regulate key industrial sectors.
- **Article39(b)** directs the State to ensure that material resources are distributed to serve the common good.

Challenges

- Volatility in global commodity and energy prices.
- Supply-chain disruptions affecting industrial production.
- Need for reliable, high-frequency industrial data.

- Ensuring sustainable growth while reducing energy intensity and carbon emissions.

Conclusion

The **updated Index of Core Industries (ICI)** with the **2022-23 base year** provides a more accurate measure of India's evolving industrial landscape. By incorporating **Iron Ore** and improving statistical methodology, the revised index strengthens economic monitoring and policymaking, while sustained growth in core sectors will remain crucial for achieving higher manufacturing output, infrastructure expansion and long-term economic development.

GEOGRAPHY & ENVIRONMENT

1. India Advances Global Green Hydrogen Leadership under National Green Hydrogen Mission

Key Highlights & Summary

- ACME Group secured landmark long-term offtake agreements with Japanese firms IHI Corporation for Green Ammonia and Mitsubishi Gas Chemical Company for Green Methanol.
- The agreements stem from ACME's awarded capacity of 3,70,000 tonnes per annum under the SIGHT Programme of the National Green Hydrogen Mission.
- The pact includes supplying 4,05,000 tonnes per annum of green ammonia backed by Japan's Contract for Difference scheme administered by METI.
- A 10-year agreement with Mitsubishi covers 1,00,000 tonnes per annum of green methanol from the Paradip facility meeting International Maritime Organization standards.
- These strategic deals mark India's emergence as a trusted global exporter of clean fuels while cementing bilateral clean energy cooperation with Japan.

Essential Definitions

- National Green Hydrogen Mission: Launched in January 2023 with an outlay of ₹19,744 crore to establish India as a global hub for green hydrogen production, utilization, and export.
- SIGHT Programme: Strategic Interventions for Green Hydrogen Transition, a major financial incentive component under the national mission supporting domestic electrolyser and green hydrogen manufacturing.
- Green Ammonia: Ammonia produced using hydrogen obtained via water electrolysis powered by renewable energy sources, serving as a clean energy carrier and shipping fuel.
- Contract for Difference: A financial support mechanism covering price gaps between conventional and low-carbon fuels to ensure commercial viability for buyers.

Legal and Constitutional Framework

- National Framework: Operates under overarching climate policies aligned with India's Nationally Determined Contributions (NDCs) under the Paris Agreement.
- Article 48A: Directs the State to protect and improve the environment and to safeguard the forests and wildlife of the country under the Directive Principles of State Policy.

- Article 51A(g): Imposes a fundamental duty on every Indian citizen to protect and improve the natural environment including forests, lakes, rivers, and wildlife.
- Seventh Schedule: Energy, electricity, and environmental planning span concurrent and central legislative domains, enabling coordinated federal and state policy actions.

Conclusion

The landmark offtake agreements between Indian clean energy developers and Japanese corporations validate the commercial viability and global competitiveness of India's green hydrogen infrastructure. By successfully integrating domestic production incentives with international market demands, the National Green Hydrogen Mission is driving forward India's net-zero transition and clean energy diplomacy.

UPSC Relevance

Highly relevant for General Studies Paper III under Infrastructure (Energy) and Environment, Conservation, and Climate Change, as well as General Studies Paper II under International Relations and Bilateral Groupings involving India and Japan.

2. Pashujanya Yudh Abhyas (PYA) for Animal Health Emergencies

Key Highlights & Summary

- The Department of Animal Husbandry and Dairying conducted Pashujanya Yudh Abhyas (PYA), the third national-level mock drill under the National One Health Mission, in Vidisha District, Madhya Pradesh.
- The 5-day exercise simulated an Influenza A (H1N1) outbreak in animals with potential spillover risks to humans and wildlife to test emergency response mechanisms.
- It brought together multi-sectoral stakeholders including DAHD, ICAR, NCDC, ICMR, BSL-3 network laboratories, and the National Joint Outbreak Response Team.
- The drill evaluated the complete operational chain spanning early warning surveillance, sample collection, BSL-3 laboratory diagnostics, containment operations, and public communication.
- The exercise reinforced India's institutional preparedness and inter-sectoral coordination capabilities under the unified One Health framework.

Essential Definitions

- Pashujanya Yudh Abhyas: A national-level simulated mock drill designed to assess, test, and validate multi-sectoral preparedness for managing animal health emergencies and zoonotic outbreaks.
- One Health Approach: An integrated, unifying framework aiming to sustainably balance and optimize the health of people, animals, and ecosystems by recognizing their interconnectedness.
- Zoonotic Diseases: Infectious diseases that can be naturally transmitted between vertebrate animals and humans, posing significant public health and biosecurity challenges.

Legal and Constitutional Framework

- National One Health Mission: The apex institutional framework guiding coordinated scientific responses across human, animal, and environmental health sectors in India.
- Epidemic Diseases Act, 1897: Provides regulatory and emergency powers for the containment and prevention of dangerous epidemic diseases.

- Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009: Empowers authorities to prevent, control, and eradicate scheduled animal diseases across states.
- Seventh Schedule (State List - Entry 6: Public health, Entry 15: Preservation of stock): Places primary responsibility on state governments while enabling central coordination for national health security.

Conclusion

Pashujanya Yudh Abhyas serves as a critical operational milestone in strengthening India's biological security and public health preparedness. By testing multi-agency coordination in real time, the exercise bridges structural gaps between animal husbandry and human health sectors, ensuring robust defenses against emerging zoonotic threats.

3. Indiahandmade: Digital Marketplace for India's Handloom and Handicraft Heritage

Why in News?

Indiahandmade, a dedicated digital marketplace developed under the **Ministry of Textiles**, is expanding market access for artisans and weavers by connecting them directly with buyers. The platform promotes **GI-tagged** and **One District One Product (ODOP)** products while strengthening digital commerce, cultural preservation and rural livelihoods.

Key Points for UPSC CSE

• About Indiahandmade

- **Indiahandmade** was launched in **2023** by the **Digital India Corporation (DIC)** under the **Ministry of Textiles**.
- It is a dedicated e-commerce platform that enables **handloom weavers, handicraft artisans, Self-Help Groups (SHGs), producer organisations and cooperatives** to sell their products directly to consumers.

- The platform aims to reduce intermediaries, improve income and preserve India's rich craft traditions.
  • Key Features
- Provides a specialised online marketplace for handloom and handicraft products.
- Offers secure digital payments, buyer protection, free shipping and simplified seller onboarding.
- Allows small artisans without **GST registration** to register using an **Enrolment ID** for intra-state sales, promoting greater inclusion in digital commerce.
- Showcases **GI-tagged** and **ODOP** products to strengthen regional identity and market visibility.
  • Importance for Rural Economy
- India has around **64.66lakh handloom and handicraft artisans**, with women constituting nearly **71% of handloom weavers**.
- The platform promotes financial inclusion, women empowerment, entrepreneurship and sustainable livelihoods while supporting rural and traditional industries.

- It contributes to preserving indigenous knowledge systems and traditional craftsmanship.
  • GI Tags and ODOP Initiative
- **Geographical Indication (GI)** is an intellectual property right that identifies products originating from a specific geographical region possessing unique qualities or reputation.
- **One District One Product (ODOP)** promotes district-specific products to enhance local manufacturing, exports and balanced regional development.
- Indiahandmade provides national visibility to products such as **Banarasi Silk, Chanderi Silk, Dokra Art, Pashmina, Ikat, Terracotta and Aipan Art**.

Historic Perspective

- India's handloom and handicraft traditions date back to the **Indus Valley Civilization**, making them among the oldest living craft traditions in the world.
- Post-Independence, institutions such as the **Khadi and Village Industries Commission (KVIC)**, **Handloom Reservation Act,1985**, and various handicraft development programmes have promoted artisan welfare.
- Indiahandmade represents the digital evolution of these efforts by integrating traditional craftsmanship with the digital economy.

Constitutional and Legal Dimensions

- **Article43** directs the State to promote **cottage industries** in rural areas.
- **Article38** promotes social and economic justice, while **Article46** encourages protection of weaker sections.
- Supported by the **Geographical Indications of Goods (Registration and Protection) Act,1999**, **Digital India Mission**, **National Handloom Development Programme (NHDP)**, **ODOP Initiative**, **Atmanirbhar Bharat**, and contributes to **SDG1 (No Poverty), SDG5 (Gender Equality), SDG8 (Decent Work and Economic Growth), SDG9 (Industry, Innovation and Infrastructure)** and **SDG12 (Responsible Consumption and Production)**.

Challenges

- Limited digital literacy and internet access among artisans.
- Competition from machine-made and counterfeit products.
- Inadequate branding, logistics and export market access for rural producers.
- Need for stronger intellectual property protection and quality certification of traditional crafts.

Conclusion

Indiahandmade is a significant step towards integrating India's traditional artisans into the digital economy. By combining technology with cultural preservation, the platform strengthens rural livelihoods, empowers women entrepreneurs and enhances the global visibility of India's rich handloom and handicraft heritage, thereby supporting the vision of **Atmanirbhar Bharat** and **Viksit Bharat2047**.

4. Natural History Museum, Mizoram Notified as India's 21st Designated Repository under the Biological Diversity Act,2002

Why in News?

The **Ministry of Environment, Forest and Climate Change (MoEFCC)** has notified the **Natural History Museum (NHM), Mizoram University** as India's **21st Designated Repository** under **Section39 of the Biological Diversity Act,2002**. The designation strengthens biodiversity conservation and scientific documentation in the **Indo-Burma Biodiversity Hotspot**.

Key Points for UPSC CSE

• What is a Designated Repository?

- A **Designated Repository** is an institution notified by the Central Government under **Section39 of the Biological Diversity Act,2002** for the safe preservation of authenticated biological specimens collected under the Act.
- It maintains **voucher specimens** and **type specimens**, ensuring scientific identification, traceability, research and long-term conservation of India's biological resources.
  • Significance of NHM, Mizoram
- Established in **2022** under **Mizoram University**, the repository is strategically located in the **Indo-Burma Biodiversity Hotspot**, one of the world's richest biodiversity regions.
- It specializes in **pteridophytes, macrofungi, reptiles, amphibians, fishes, moths, beetles and butterflies**, strengthening scientific documentation of Northeast India's lesser-studied biodiversity.
- The repository will also preserve **type specimens** of newly discovered species, including the recently identified **Leptobrachella tamdil** amphibian.
  • Importance for Biodiversity Conservation
- Supports **ex situ conservation** by preserving biological specimens outside their natural habitats for research, education and restoration.
- Enhances species identification, taxonomic research, ecological monitoring and genetic resource conservation.
- Facilitates habitat restoration and species recovery following habitat degradation or natural disasters.
  • Strategic Significance
- Strengthens collaboration with the **National Biodiversity Authority (NBA)**, **Mizoram State Biodiversity Board**, **Botanical Survey of India (BSI)** and **Zoological Survey of India (ZSI)**.
- Improves regional scientific infrastructure by preserving biodiversity closer to its natural source, reducing logistical challenges and promoting research in Northeast India.

Historic Perspective

- The **Biological Diversity Act,2002** was enacted to implement India's commitments under the **Convention on Biological Diversity (CBD),1992**.
- The **National Biodiversity Authority (NBA)** was established in **2003** to regulate access to biological resources and ensure fair and equitable sharing of benefits.
- The notification of NHM as the **21st Designated Repository** reflects the gradual expansion of India's biodiversity conservation infrastructure, particularly in ecologically sensitive regions.

Constitutional and Legal Dimensions

- **Article48A** directs the State to protect and improve the environment and safeguard forests and wildlife.
- **Article51A(g)** makes environmental protection a Fundamental Duty of every citizen.
- Governed by the **Biological Diversity Act,2002**, the **Biological Diversity Rules,2004**, and aligned with the **National Biodiversity Strategy and Action Plan (NBSAP)2024-30** and **Target4 of the Kunming-Montreal Global Biodiversity Framework**, which emphasizes conservation of genetic diversity and **ex situ conservation**.

Challenges

- Taxonomic expertise remains limited for several lesser-known species.
- Climate change, habitat fragmentation and invasive alien species continue to threaten biodiversity in the Northeast.
- Need for greater digitization of biological collections and stronger coordination among biodiversity institutions.
- Ensuring adequate funding, skilled manpower and long-term maintenance of repositories remains essential.

Conclusion

The designation of the **Natural History Museum, Mizoram** as India's 21st Designated Repository marks a significant step in strengthening biodiversity governance and scientific research. By preserving invaluable biological specimens in one of the world's richest biodiversity hotspots, it reinforces India's commitment to conserving its natural heritage while advancing national and global biodiversity conservation goals.

5. Governing Body of National CAMPA

Why in News?

The **Central Government** has constituted the **Governing Body of the National Compensatory Afforestation Fund Management and Planning Authority (National CAMPA)** to strengthen oversight, transparency and effective utilization of funds collected for **Compensatory Afforestation** under India's forest conservation framework.

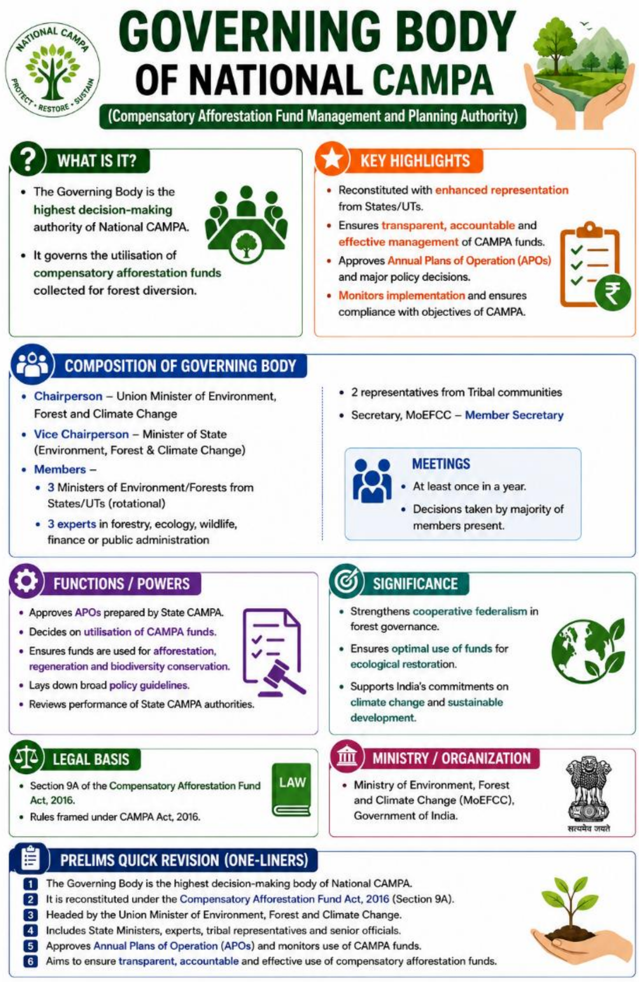
Key Points for UPSC CSE

• What is National CAMPA?

- **National Compensatory Afforestation Fund Management and Planning Authority (National CAMPA)** is a statutory authority established under the **Compensatory Afforestation Fund Act,2016 (CAF Act)**.
- It manages funds collected from user agencies that divert forest land for non-forest purposes and ensures their utilization for afforestation, ecological restoration and forest conservation.
- It functions as the apex institution for planning, monitoring and coordinating compensatory afforestation activities across the country.

• Governing Body of National CAMPA

- The **Governing Body** is the apex policy-making and supervisory body of National CAMPA.
- It is chaired by the **Union Minister for Environment, Forest and Climate Change** and comprises senior officials of the Ministry, representatives of concerned Ministries and domain experts.



- It provides policy direction, approves major decisions, oversees fund utilization and ensures coordination with **State CAMPA Authorities** for effective implementation.

• Functions of National CAMPA

- Approves Annual Plans of Operation (APOs) submitted by States and monitors their implementation.
- Manages and allocates Compensatory Afforestation Funds in accordance with the CAF Act.
- Supports activities such as **compensatory afforestation, assisted natural regeneration, forest fire prevention, wildlife protection, soil and moisture conservation, catchment area treatment, forest infrastructure development and biodiversity conservation**.
- Promotes transparency through digital monitoring, periodic audits and outcome-based evaluation of projects.

• What is Compensatory Afforestation?

- **Compensatory Afforestation (CA)** refers to raising forests or regenerating degraded forests to compensate for the diversion of forest land for non-forest purposes.
- Under the CAF framework, user agencies are required to bear the cost of afforestation, **Net Present Value (NPV)** and other ecological restoration measures before diversion of forest land is permitted.
- It aims to maintain ecological balance and compensate for the loss of forest ecosystem services.

• Significance

- Strengthens India's forest conservation efforts and ecological restoration.
- Supports carbon sequestration, biodiversity conservation and climate resilience.
- Contributes to achieving the **National Forest Policy** objective of increasing forest and tree cover while balancing developmental needs.

Historic Perspective

- The concept of CAMPA emerged from the **Supreme Court's judgement in *T.N.Godavarman Thirumulpad v. Union of India (2002)***, which directed the creation of a dedicated mechanism to manage compensatory afforestation funds.
- An **Ad hoc CAMPA** was established in **2004**, followed by the enactment of the **Compensatory Afforestation Fund Act,2016**, which gave statutory status to **National CAMPA** and **State CAMPA Authorities**.

Constitutional and Legal Dimensions

- **Article48A** – Protection and improvement of the environment and safeguarding forests and wildlife.
- **Article51A(g)** – Fundamental Duty to protect and improve the natural environment.
- Governed by the **Compensatory Afforestation Fund Act,2016**, **CAF Rules,2018**, **Van (Sanrakshan Evam Samvardhan) Adhiniyam,1980** (formerly Forest (Conservation) Act,1980), and aligned with the **National Forest Policy,1988**, **National Biodiversity Action Plan**, **Green India Mission** and India's **Nationally Determined Contributions (NDCs)**.

Challenges

- Delays in utilization of CAMPA funds by States.
- Preference for monoculture plantations instead of restoration of native ecosystems.
- Limited availability of suitable land for compensatory afforestation.
- Need for stronger community participation, scientific monitoring and outcome-based evaluation of ecological restoration projects.

Conclusion

National CAMPA has become a key institutional mechanism for balancing environmental conservation with developmental requirements. Effective governance, scientific afforestation, transparent fund utilization and restoration of native ecosystems will be essential for strengthening India's forest resources, biodiversity conservation and climate commitments.

6. National Human-Wildlife Conflict Portal

Why in News?

The Government has launched the **National Human-Wildlife Conflict Portal** to establish a centralized digital platform for reporting, monitoring and managing **Human-Wildlife Conflict (HWC)** cases across the country. The portal aims to strengthen scientific decision-making, improve coordination among States and support timely mitigation measures.

• What is the National Human-Wildlife Conflict Portal?

- The **National Human-Wildlife Conflict Portal** is a centralized digital platform developed by the **Ministry of Environment, Forest and Climate Change (MoEFCC)** for systematic recording, monitoring and analysis of human-wildlife conflict incidents.
- It enables real-time data collection, geo-referenced reporting and evidence-based planning to reduce conflicts between humans and wildlife.
- The portal supports coordination among Forest Departments, wildlife managers, researchers and policymakers for effective conflict mitigation.

• Objectives of the Portal

- Establish a national database on human-wildlife conflict incidents.
- Facilitate timely reporting, monitoring and analysis of conflict hotspots.
- Improve policy formulation and scientific management through data-driven interventions.

- Support faster compensation processing, wildlife rescue operations and preventive measures.
- Promote coordination among States for addressing transboundary wildlife movement.

• **What is Human-Wildlife Conflict (HWC)?**

- **Human-Wildlife Conflict** refers to interactions between humans and wild animals that result in loss of life, injury, crop damage, livestock depredation or property destruction, adversely affecting both human livelihoods and wildlife conservation.
- Common conflict species in India include **elephants, tigers, leopards, bears, crocodiles, wild boars, monkeys and nilgai**.

• **Significance of the Portal**

- Enables identification of conflict-prone landscapes through GIS-based mapping and real-time analytics.
- Supports scientific wildlife management, habitat restoration and corridor conservation.
- Strengthens conservation planning while minimizing socio-economic losses to local communities.
- Contributes to balancing biodiversity conservation with sustainable development objectives.

• **Causes of Human-Wildlife Conflict**

- Habitat loss and fragmentation due to urbanization, mining and infrastructure development.
- Encroachment into forest areas and obstruction of wildlife corridors.
- Climate change, declining prey base and changing land-use patterns.
- Expansion of agriculture near protected areas and increasing human dependence on forest resources.

Historic Perspective

- Human-wildlife conflict has intensified over the past few decades due to rapid developmental activities and fragmentation of natural habitats.
- India has implemented several mitigation measures, including **Project Tiger (1973)**, **Project Elephant (1992)**, eco-sensitive zones, wildlife corridors and early warning systems.
- The National Human-Wildlife Conflict Portal represents the next step towards integrating digital technology into wildlife conservation and conflict management.

Constitutional and Legal Dimensions

- **Article48A** directs the State to protect and improve the environment and safeguard forests and wildlife.
- **Article51A(g)** makes environmental protection a Fundamental Duty of every citizen.
- Governed by the **Wild Life (Protection) Act,1972**, **Biological Diversity Act,2002**, **Forest Rights Act,2006**, and aligned with the **National Wildlife Action Plan (2017-2031)**, **Project Tiger**, **Project Elephant**, and India's commitments under the **Convention on Biological Diversity (CBD)**.

Challenges

- Delays in reporting and compensation for affected communities.
- Lack of real-time monitoring infrastructure in remote forest areas.
- Increasing habitat fragmentation and loss of wildlife corridors.
- Need for greater community participation, use of advanced technologies and inter-State coordination for conflict mitigation.

Conclusion

The **National Human-Wildlife Conflict Portal** is a significant step towards technology-enabled wildlife governance in India. By integrating real-time data, scientific planning and coordinated response mechanisms, the portal can help reduce human-wildlife conflict, protect biodiversity and promote harmonious coexistence between people and wildlife.

7. BS-III Vehicles May Need Minor Modifications for E20 Fuel: Centre

Key Highlights & Summary

- **Parliamentary Disclosure:** The Union Government informed Parliament that certain BS-III vehicles manufactured between 2005 and 2016 may require replacement of select rubber components and gaskets when using E20 fuel.
- **No Major Engine Overhaul:** A multi-institutional study confirmed that engine modifications are unnecessary for existing two-wheelers and four-wheelers to run on E20 petrol.

- **Servicing Integration:** Replacement of susceptible rubber and gasket parts in legacy vehicles can be seamlessly managed during regular servicing routines.
- **Research Consortium:** The technical evaluation was jointly conducted by IOCL, Indian Institute of Petroleum (IIP) Dehradun, SIAM, and ARAI.
- **Consumer Concerns:** The statement addresses growing public queries regarding engine misfiring, reduced fuel efficiency, and long-term vehicle durability linked to higher ethanol blends.
- **Broader E20 Rollout:** The government maintains that E20 adoption aligns with India's phased bio-fuel roadmap without compromising broader vehicular performance.

Essential Definitions

- **E20 Fuel:** A blended fuel mixture consisting of 20% ethanol derived from biomass and 80% conventional petrol.
- **Bharat Stage (BS) Norms:** Nationally mandated emission standards regulated by the government to control air pollutant outputs from internal combustion engines.
- **Corrosivity of Ethanol:** The chemical property of ethanol to absorb water and degrade certain elastomers, plastics, and non-ferrous metals in older fuel delivery systems.

Legal and Constitutional Framework

- **Motor Vehicles Act, 1988:** Provides the statutory backbone for establishing vehicular safety standards, emission norms, and technical compliance across India.
- **Environment (Protection) Act, 1986:** Empowers the Central Government to formulate fuel quality standards and mandates to mitigate environmental degradation.
- **National Policy on Biofuels:** Sets strategic targets for ethanol blending in petrol to advance energy security and decarbonization goals.

Conclusion

While E20 fuel implementation marks a critical milestone in reducing crude oil imports and carbon emissions, addressing material compatibility in legacy BS-III vehicles through consumer guidance and routine maintenance remains essential for ensuring a seamless green energy transition.

8. Cauvery Water Distress-Sharing Mechanism

Why in News?

The **Cauvery Water Regulation Committee (CWRC)** has urged **Karnataka and Tamil Nadu** to jointly develop a **scientific and permanent distress-sharing formula** for equitable distribution of Cauvery waters during drought or deficit rainfall years. Simultaneously, the CWRC directed Karnataka to release **3,500cusecs** of water daily to Tamil Nadu for **15 days**, a decision challenged by Karnataka before the **Cauvery Water Management Authority (CWMA)**.

• What is the Distress-Sharing Formula?

- A **Distress-Sharing Formula** is an institutional mechanism for **proportionally distributing reduced river flows among riparian States** during years of deficient rainfall or drought.
- It seeks to ensure equitable water allocation based on available water, reservoir storage, rainfall and hydrological conditions, thereby reducing conflicts.

• Role of CWRC and CWMA

- The **Cauvery Water Regulation Committee (CWRC)** monitors reservoir levels, rainfall, inflows and compliance with water release schedules.
- The **Cauvery Water Management Authority (CWMA)** is the apex executive body responsible for implementing the **Cauvery Water Disputes Tribunal (CWDT) Award** and the **Supreme Court's2018 judgment**.
- CWRC functions under the supervision of CWMA.

• Current Water Release Direction

- CWRC directed Karnataka to release **3,500cusecs** of water daily for **15days** to Tamil Nadu.
- Due to the **dry intermediate catchment** between reservoirs and the **Biligundlu gauging station**, Karnataka would need to release approximately **6,000-6,500cusecs** to ensure the prescribed flow reaches Tamil Nadu.
- Karnataka has decided to appeal against the direction before the **CWMA**.

• Key Terms

- **Riparian State:** A State located along the course of a river. It may be an **upper riparian** or **lower riparian** State depending on the river's flow.
- **Cusec:** A unit of water discharge equal to **one cubic foot per second (28.317litres per second)**.

• Significance

- A permanent distress-sharing framework would reduce recurring disputes during drought years.
- Promotes scientific, transparent and predictable water management.
- Strengthens cooperative federalism by encouraging consensus-based decision-making.
- Supports sustainable management of interstate river basins under changing climatic conditions.

Historic Perspective

- The **Cauvery River dispute** has existed for more than a century, beginning with agreements between the **Madras Presidency and the Princely State of Mysore** in **1892** and **1924**.
- The **Cauvery Water Disputes Tribunal (CWDT)** delivered its final award in **2007**, which was modified by the **Supreme Court in2018**, leading to the establishment of the **CWMA** and **CWRC** for implementation and regulation.

Constitutional and Legal Dimensions

- **Article262** empowers Parliament to provide for adjudication of disputes relating to inter-State river waters.
- **Entry17, State List (ListII)** places water under the jurisdiction of States, subject to **Entry56, Union List (ListI)** relating to regulation and development of inter-State rivers.
- Governed by the **Inter-State River Water Disputes Act,1956**, the **Cauvery Water Disputes Tribunal Award (2007)**, and the **Supreme Court judgment (2018)** establishing the **CWMA** and **CWRC**.

Challenges

- Absence of a mutually agreed permanent distress-sharing formula.
- Increasing rainfall variability and climate change affecting river flows.

- Competing agricultural, drinking water and ecological demands.
- Balancing State interests while ensuring compliance with tribunal awards and judicial directions.

Conclusion

The recurring Cauvery dispute highlights the need for a **scientific, transparent and consensus-based distress-sharing mechanism**. Institutionalizing such a framework under the **CWMA** would reduce litigation, improve interstate water governance and strengthen the spirit of **cooperative federalism** while ensuring equitable and sustainable utilization of Cauvery waters.

9. CAFE 3 Norms: India's Push for Automotive Decarbonisation

Why in News?

The **Ministry of Power** has released the **draft Corporate Average Fuel Efficiency (CAFE) Phase III Norms**, proposed to be implemented from **1April2027 to2032**. The norms aim to reduce the average **CO_2 emissions** of vehicle manufacturers' fleets, accelerate low-carbon mobility and support India's climate commitments.

• What are CAFE Norms?

- **Corporate Average Fuel Efficiency (CAFE)** norms prescribe the **maximum permissible average CO_2 emissions** for the entire fleet of passenger vehicles sold by an automobile manufacturer during a financial year.
- Unlike **BS-VI emission norms**, which regulate emissions from individual vehicles, CAFE focuses on the **overall fleet efficiency** of manufacturers.

• Salient Features of Draft CAFE 3

What's new in the draft CAFE-III norms? | Explained

The latest draft leaves most of the April proposal unchanged, suggesting the government has broadly stuck to the compromise it arrived at after months of intense negotiations between manufacturers of small cars and larger SUVs.

- Proposed implementation period: **1April2027 to2032**.
- Introduces progressively stricter fleet-average CO_2 emission targets.
- Encourages adoption of **Electric Vehicles (EVs), Hybrid Vehicles, CNG and other cleaner technologies**.
- Proposes flexibility through **Super Credits** and a possible **credit-trading mechanism** among manufacturers.
- Plans to gradually expand similar fuel-efficiency standards to **two-wheelers**.

• Key Definitions

- **Super Credits:** Regulatory incentives under which low or zero-emission vehicles receive additional weighting while calculating fleet-average emissions, helping manufacturers meet compliance targets.
- **Powertrain:** The complete system that generates and transmits power to the wheels, including the engine, motor, transmission and associated components.
- **Fleet Average Emissions:** Weighted average carbon dioxide emissions of all vehicles sold by a manufacturer during a specified period.

• Significance

- Supports India's transition towards **low-carbon transportation**.

- Reduces dependence on fossil fuels and improves fuel efficiency.
- Encourages innovation in clean automotive technologies and indigenous manufacturing.
- Contributes to improved urban air quality and achievement of India's climate goals.
- Enhances the competitiveness of India's automobile industry in the global clean mobility market.

Historic Perspective

- India introduced **CAFE Phase I** standards in **2017**, followed by **CAFE Phase II** to progressively improve fuel efficiency in passenger vehicles.
- The transition from **BS-IV to BS-VI** significantly reduced local air pollutants, while CAFE norms focus specifically on reducing **greenhouse gas emissions** from the transport sector.
- Draft **CAFE Phase III** represents the next stage in India's long-term vehicle decarbonisation strategy.

Constitutional and Legal Dimensions

- **Energy Conservation Act,2001** empowers the Government, through the **Bureau of Energy Efficiency (BEE)**, to prescribe fuel consumption standards.
- **Motor Vehicles Act,1988** provides the regulatory framework for vehicle standards and compliance.
- **Article21** has been judicially interpreted to include the **right to a clean and healthy environment**.
- **Article48A** directs the State to protect and improve the environment.
- **Article51A(g)** makes environmental protection a Fundamental Duty of every citizen.
- The norms support India's commitments under the **Paris Agreement**, **Nationally Determined Contributions (NDCs)** and the objective of achieving **Net Zero emissions by2070**.

Challenges

- Higher compliance costs for automobile manufacturers.
- Need for expanded EV charging and alternative fuel infrastructure.
- Dependence on battery imports and critical minerals.
- Balancing environmental objectives with affordability for consumers.

Conclusion

The **Draft CAFE 3 Norms** mark a significant step in India's shift towards **fleet-wide automotive decarbonisation** by promoting cleaner technologies and improved fuel efficiency. Successful implementation will require supportive infrastructure, technological innovation, robust domestic manufacturing and policy stability to achieve sustainable mobility while maintaining the competitiveness of India's automobile sector.

INTERNATIONAL RELATIONS

1. China's Open-Weight AI Strategy: Geopolitics and Compute Constraints

Why in News?

At the **Ninth World AI Conference (WAIC), Shanghai**, China promoted its **open-weight Artificial Intelligence (AI) models** as a global public good, contrasting them with proprietary AI systems developed by US firms. The strategy reflects both China's geopolitical outreach and its response to semiconductor export restrictions affecting advanced AI infrastructure.

Key Points for UPSC CSE

• What is an Open-Weight AI Model?

- An **Open-Weight AI Model** is an AI system whose **trained model parameters (weights)** are publicly available, enabling developers to download, modify, fine-tune and deploy the model on their own computing infrastructure.
- Unlike **API-based proprietary models**, users retain greater control over data, customization and deployment.

• Why is China Promoting Open-Weight AI?

- China presents open-weight AI as a means to enhance **technology accessibility**, particularly for developing countries.
- Open deployment allows countries to process sensitive data on domestic servers, supporting **data sovereignty** and reducing dependence on foreign cloud-based AI services.
- The strategy also expands China's technological influence and AI ecosystem globally.

• Compute Constraints Behind the Strategy

- US export controls on advanced AI chips and semiconductor manufacturing technologies have constrained China's access to cutting-edge computing infrastructure.
- While China possesses adequate computing capacity for **training** several AI models, scaling **inference** services for millions of global users requires significantly larger GPU infrastructure.
- By releasing open-weight models, inference costs are shifted to end-users who deploy the models locally.

• Key Definitions

- **API (Application Programming Interface):** A software interface through which users access AI models hosted on remote cloud servers without obtaining the underlying model.
- **Training:** One-time computational process of developing an AI model using massive datasets.
- **Inference:** Continuous process of generating outputs when users interact with a trained AI model.

• Significance

- Expands AI accessibility for countries lacking large cloud infrastructure.

- Promotes greater technological competition in the global AI ecosystem.
- Raises important debates regarding data governance, AI security, technology dependence and digital sovereignty.
- Highlights the strategic importance of semiconductor manufacturing in AI leadership.

Historic Perspective

- The global AI race has increasingly shifted from algorithm development to **compute capability**, advanced semiconductor manufacturing and cloud infrastructure.
- Recent export controls on advanced AI chips and semiconductor manufacturing equipment have accelerated efforts by major powers to pursue **technological self-reliance** and alternative AI development strategies.
- Open-weight AI has consequently emerged as an important model for expanding AI adoption while reducing dependence on proprietary cloud platforms.

Constitutional and Legal Dimensions

- **Article51** encourages India to promote international cooperation in emerging technologies and scientific advancement.
- **Digital Personal Data Protection (DPDP) Act,2023** provides the legal framework for protection and processing of personal data, with implications for AI deployment and cross-border data flows.
- **Information Technology Act,2000** and associated rules govern digital platforms, cybersecurity and intermediary responsibilities relevant to AI applications.
- Internationally, semiconductor export controls are influenced by multilateral technology control arrangements governing dual-use technologies.

Challenges

- Dependence on imported semiconductor technology and advanced computing hardware.
- Balancing openness with AI safety, cybersecurity and misuse prevention.
- Ensuring responsible AI governance while encouraging innovation.
- Bridging the digital divide and building indigenous AI infrastructure in developing countries.

Conclusion

China's open-weight AI strategy reflects the intersection of **geopolitics, semiconductor supply chains and digital sovereignty**. For India, the development underscores the importance of strengthening indigenous semiconductor manufacturing, AI research, trusted digital infrastructure and robust governance frameworks to achieve technological self-reliance while responsibly leveraging emerging AI opportunities.

2. India-Pakistan Relations: Historical Circumspection, Fragile Bridges and Prospects for Cooperation

Why in News?

Recent discussions on **India-Pakistan relations** have highlighted that despite persistent hostility, cross-border terrorism and military tensions, both countries have maintained certain **institutional confidence-building mechanisms (CBMs)** and limited functional cooperation. The debate has also focused on the future prospects of engagement in areas such as environmental security, disaster management and transnational crime.

• Historical Evolution of Bilateral Relations

- India-Pakistan relations have been shaped by **partition (1947)**, territorial disputes, cross-border terrorism and repeated military confrontations.
- Despite wars in **1947-48,1965,1971** and the **Kargil conflict (1999)**, both countries have periodically pursued diplomatic engagement through bilateral agreements and confidence-building measures.
- During conventional wars, military operations largely remained focused on strategic targets rather than deliberate large-scale attacks on major civilian centres.

• Confidence-Building Measures (CBMs)

- **Confidence-Building Measures (CBMs)** are institutional arrangements aimed at reducing mistrust, preventing accidental escalation and enhancing military transparency between adversarial States.
- Existing CBMs include advance notification of ballistic missile tests, exchange of nuclear installation lists and communication through military hotlines.
- These mechanisms have contributed to reducing the risk of unintended escalation between two nuclear-armed neighbours.

• Areas of Potential Cooperation

- Shared challenges such as **climate change, glacier retreat, air pollution, disaster management, water resource management and cross-border narcotics trafficking** provide opportunities for limited functional cooperation.
- Geo-economic connectivity and regional trade could contribute to long-term regional stability, subject to favourable security conditions.

• Key Definitions

- **Area Bombing:** Indiscriminate aerial bombing over large geographical areas targeting infrastructure and civilian settlements.
- **Geo-economics:** The use of economic instruments and connectivity to advance strategic and geopolitical objectives.

Historic Perspective

- Bilateral relations have evolved through periods of conflict and dialogue, marked by agreements such as the **Tashkent Declaration (1966)**, **Simla Agreement (1972)** and **Lahore Declaration (1999)**.
- While peace initiatives have periodically emerged, several have been disrupted by incidents of cross-border terrorism and security crises.
- Nevertheless, institutional arrangements such as the **Indus Waters Treaty** and nuclear CBMs have continued to function despite broader political tensions.

Constitutional and Legal Dimensions

- **Article51** of the Constitution directs the State to promote international peace, maintain just and honourable relations among nations and encourage settlement of international disputes through peaceful means.

- The **Indus Waters Treaty,1960**, brokered by the World Bank, remains one of the most enduring bilateral agreements governing water sharing.
- The **Simla Agreement (1972)** commits both countries to resolve disputes through **bilateral negotiations**.
- The **Lahore Declaration (1999)** emphasizes confidence-building measures, nuclear risk reduction and peaceful engagement.

Challenges

- Persistent cross-border terrorism and security concerns.
- Political mistrust and recurring ceasefire violations.
- Limited economic engagement and restricted people-to-people exchanges.
- Emerging challenges from cyber threats, misinformation and climate-induced security risks.

Conclusion

India-Pakistan relations continue to be influenced by complex security, political and historical factors. While sustainable normalization depends upon addressing core security concerns and eliminating cross-border terrorism, strengthening existing confidence-building measures and expanding cooperation in non-traditional areas such as climate resilience, disaster management and transnational crime can contribute to greater regional stability and reinforce the objective of peaceful coexistence in South Asia.

SOCIAL

1. MANAS: A Digital Shield Against Drugs for a Nasha Mukt Bharat

Key Highlights & Summary

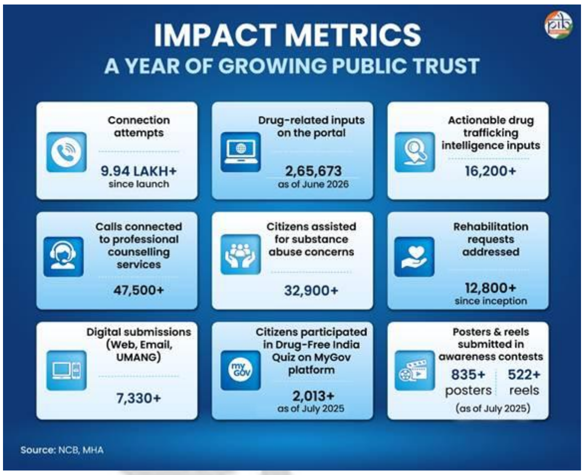
- MANAS (Madak Padarth Nishedh Asoochna Kendra) was launched on 18th July 2024 by the Narcotics Control Bureau (NCB) and Digital India Corporation to tackle substance abuse.
- It operates as a secure, technology-driven platform accessible via helpline 1933, web portal, email, and the UMANG app for anonymous reporting and counselling.
- The platform streamlines enforcement by directly linking public inputs with 30 NCB Zonal Units and 36 State and Union Territory Anti-Narcotics Task Forces (ANTFs).
- It integrates rehabilitation support by routing addiction queries to the Ministry of Social Justice and Empowerment helpline 14446.
- MANAS leverages Digital Public Infrastructure (DPI) to convert public alertness into actionable intelligence, advancing the vision of a drug-free India.

Essential Definitions

- Madak Padarth Nishedh Asoochna Kendra (MANAS): A centralized national narcotics helpline and digital architecture designed to enable confidential reporting, intelligence sharing, and support services.
- Digital Public Infrastructure (DPI): Shared digital systems built and leveraged to deliver essential public services securely, transparently, and at scale across society.

- Substance Abuse: The harmful or hazardous use of psychoactive substances, including alcohol, illicit drugs, and prescription medications, leading to dependence and social harm.

Legal and Constitutional Framework



- Article 47: Directs the State to bring about prohibition of the consumption except for medicinal purposes of intoxicating drinks and of drugs which are injurious to health under Directive Principles of State Policy.
- Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985: The primary legislative enactment prohibiting the production, manufacture, possession, sale, purchase, and transport of narcotic drugs and psychotropic substances in India.
- Article 21: Protects the right to life and personal liberty, interpreted to encompass healthcare access, rehabilitation, and living free from the menace of substance abuse.
- Seventh Schedule: Public health, sanitation, and law enforcement fall primarily under State List domains, while central agencies like the NCB coordinate nationwide counter-narcotics efforts.

Conclusion

MANAS represents a vital paradigm shift in India's war against drugs by blending advanced digital governance with citizen participation. By ensuring complete anonymity, seamless inter-agency coordination, and accessible rehabilitation linkages, the platform transforms ordinary citizens into active stakeholders in realizing the national vision of a Nasha Mukt Bharat.

UPSC Relevance

Highly relevant for General Studies Paper II (Welfare Schemes for Vulnerable Sections, Governance, and Public Health Delivery) and General Studies Paper III (Internal Security - Challenges to Internal Security through Communication Networks, Border Area Security, and Drug Trafficking).

2. Atal Vayo Abhyudaya Yojana (AVYAY)

Why in News?

The **Atal Vayo Abhyudaya Yojana (AVYAY)** continues to be the flagship umbrella scheme of the Ministry of Social Justice and Empowerment for ensuring the welfare, dignity and active participation of **Senior Citizens (60 years and above)** through integrated health, care, protection and livelihood support.

• About AVYAY

- **Atal Vayo Abhyudaya Yojana (AVYAY)** is a **Central Sector Scheme** launched by the **Ministry of Social Justice and Empowerment** to provide comprehensive support for senior citizens.
- It consolidates various welfare programmes under a single umbrella to promote **healthy, active, productive and dignified ageing**, in line with the concept of an inclusive welfare state.

Objectives of the Scheme

- Promote financial, physical and emotional well-being of elderly persons.

- Strengthen institutional and community-based care services.
- Encourage active ageing through social participation, lifelong learning and digital inclusion.
- Provide healthcare support, protection against neglect and opportunities for independent living.

Major Components of AVYAY

- **Integrated Programme for Senior Citizens (IPSrC):** Financial assistance for old-age homes, continuous care homes, mobile medicare units, physiotherapy centres and regional resource centres.
- **Rashtriya Vayoshri Yojana (RVY):** Free assisted-living devices such as walking sticks, wheelchairs, hearing aids and spectacles for eligible senior citizens.
- **Seniorcare Ageing Growth Engine (SAGE):** Supports innovative start-ups developing technology-based products and services for elderly care.
- **National Helpline for Senior Citizens (Elder Line-14567):** Provides information, guidance, emotional support and assistance in cases of abuse or neglect.

Constitutional and Legal Provisions

- **Article41 (Directive Principles of State Policy):** Directs the State to provide public assistance in cases of old age, sickness and disablement within its economic capacity.
- **Article46:** Promotes protection of weaker sections of society.
- **Maintenance and Welfare of Parents and Senior Citizens Act,2007** (amended as applicable): Mandates maintenance of parents and senior citizens by children or legal heirs and provides for old-age homes and welfare measures.

Demographic Significance

- India is witnessing rapid population ageing due to increasing life expectancy and declining fertility.
- According to the **2021 Census projections**, senior citizens constitute an increasing share of the population, making elderly welfare a key governance priority.
- The scheme contributes to achieving **SDG3 (Good Health and Well-being)**, **SDG10 (Reduced Inequalities)** and **SDG11 (Sustainable Communities)**.

Challenges in Elderly Welfare

- Rising incidence of loneliness, chronic diseases, elder abuse and financial insecurity.
- Inadequate geriatric healthcare, especially in rural areas.
- Limited pension coverage, shortage of trained caregivers and weak awareness regarding welfare schemes.

Significance of AVYAY

- Strengthens social security through an integrated approach combining healthcare, assistive technology, institutional care and community support.
- Encourages **"Ageing with Dignity"**, promotes independent living and improves the quality of life of senior citizens through convergence of welfare services and digital outreach.

Conclusion

With India's elderly population expected to grow substantially in the coming decades, AVYAY represents an important step towards building an age-friendly society. Strengthening geriatric healthcare, expanding community-based care, improving social security and enhancing awareness will be essential to ensure that senior citizens live with dignity, security and active participation in national development.

3. PM SVANidhi Street Food Hub Initiative: Lakhanpur among the First Approved Towns

Why in News?

Lakhanpur (Kathua district, Jammu & Kashmir) has been selected among the **first towns** for the establishment of a **Street Food Hub** under the **PM SVANidhi** initiative. The project aims to promote organized street vending, enhance tourism infrastructure and create sustainable livelihood opportunities for street vendors.

• What is the Street Food Hub Initiative?

- The **Street Food Hub Initiative**, implemented under **PM SVANidhi** by the **Ministry of Housing and Urban Affairs (MoHUA)**, aims to develop **organized, hygienic and world-class street food destinations** across India.
- It seeks to preserve regional culinary traditions while improving the livelihoods of street vendors through better infrastructure and tourism integration.

• Key Features of the Initiative

- The Government plans to establish **up to50 Street Food Hubs** across the country.
- Priority is given to cities and towns with **high tourism potential, heritage value, unique local cuisine**, and convergence with initiatives such as **Swadesh Darshan, PRASHAD, UNESCO World Heritage Sites and UNESCO Creative Cities**.
- Each approved project will receive **₹4crore** in financial assistance, along with an additional **₹25lakh incentive** for cities that have notified their **Street Vending Plan**.

• Lakhanpur Street Food Hub

- Lakhanpur, the gateway to **Jammu & Kashmir** from Punjab, has been selected in the first batch of approvals.
- The hub will be developed in **two clusters** covering about **1,754sq.m**, promoting **Dogra cuisine** and other regional food traditions.
- The project is expected to benefit **pilgrims visiting Shri Amarnath Ji and Shri Mata Vaishno Devi**, tourists and local entrepreneurs by transforming Lakhanpur into a major culinary destination.

• Significance

- Enhances livelihoods of street vendors through better infrastructure, formalization and market access.

- Promotes food tourism, local entrepreneurship and regional cultural heritage.
- Encourages hygienic food practices and improves the overall visitor experience.
- Supports urban economic development through convergence of tourism, food safety and urban planning.

• About PM SVANidhi

- **PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi)** was launched in **2020** to provide **collateral-free working capital loans** to street vendors affected by the COVID-19 pandemic.
- The scheme also promotes **digital payments**, financial inclusion and credit history creation through incentives and cashback benefits.

Historic Perspective

- Street vending has historically formed an integral part of India's urban informal economy, providing affordable goods, employment and local food culture.
- To protect vendors' rights, Parliament enacted the **Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act,2014**.
- Building upon this legal framework, **PM SVANidhi (2020)** introduced institutional credit support, while the **Street Food Hub Initiative** expands the focus towards tourism, urban planning and sustainable livelihoods.

Constitutional and Legal Dimensions

- **Article19(1)(g)** guarantees the freedom to practice any profession or carry on any occupation, trade or business, subject to reasonable restrictions.
- **Article38** promotes social and economic justice, while **Article39(a)** seeks adequate means of livelihood for all citizens.
- Governed by the **Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act,2014**, **PM SVANidhi Scheme**, **Food Safety and Standards Act,2006**, and aligned with **Swadesh Darshan**, **PRASHAD**, **AMRUT**, **Smart Cities Mission** and **SDG8 (Decent Work and Economic Growth)**.

Challenges

- Ensuring proper implementation of Street Vending Plans by Urban Local Bodies.
- Maintaining hygiene, food safety and waste management standards.
- Balancing urban planning requirements with livelihood protection.
- Strengthening digital literacy and financial inclusion among street vendors.

Conclusion

The **Street Food Hub Initiative** under **PM SVANidhi** represents an innovative convergence of urban development, tourism and livelihood promotion. By formalizing street vending while preserving regional culinary heritage, the initiative can generate sustainable employment, improve urban infrastructure and strengthen India's vibrant local economy.

SECURITY & DEFENCE

1. INS Mahendragiri (F38): Sixth Project17A Indigenous Stealth Frigate Commissioned

Why in News?

The **Indian Navy** is set to commission **INS Mahendragiri (F38)**, the **sixth Project17A indigenous stealth frigate**, at **Visakhapatnam**. Designed by the Navy's **Warship Design Bureau (WDB)** and built by **Mazagon Dock Shipbuilders Limited (MDL)**, it marks another milestone in India's indigenous naval modernization under **Aatmanirbhar Bharat**.

Key Points for UPSC CSE

• About INS Mahendragiri

- **INS Mahendragiri** is named after the **Mahendragiri Hills** of the **Eastern Ghats** and is the first Indian Naval warship to bear this name.
- It belongs to the **Project17A (P17A)** class of advanced stealth guided-missile frigates, developed as the successor to the **Project17 Shivalik-class frigates**.
- The warship incorporates over **75% indigenous content**, reflecting India's growing self-reliance in defence manufacturing.
  • Major Features
- Equipped with advanced **stealth technology**, reduced radar signature, enhanced survivability and a high degree of automation.
- Powered by the **Combined Diesel or Gas (CODOG)** propulsion system, enabling high-speed operations with long endurance.
- Carries advanced **surface-to-surface missiles, surface-to-air missiles, anti-submarine warfare (ASW) systems, electronic warfare suites** and an **Integrated Combat Management System (CMS)**.
  • Operational Role
- Designed for **anti-air, anti-surface and anti-submarine warfare** operations.
- Capable of undertaking **Maritime Security Operations, Humanitarian Assistance and Disaster Relief (HADR), Search and Rescue (SAR), surveillance, power projection and sustained deployment** across the **Indian Ocean Region (IOR)** and Indo-Pacific.
  • Strategic Significance
- Strengthens India's maritime deterrence and blue-water naval capability.
- Enhances India's role as the **Preferred Security Partner** and **First Responder** in the Indian Ocean Region.
- Supports the strategic vision of **SAGAR (Security and Growth for All in the Region)** and reinforces a **free, open, inclusive and rules-based Indo-Pacific**.

Historic Perspective

- **Project17A** was approved to build **seven next-generation stealth frigates**, improving upon the Shivalik-class with advanced automation and stealth technologies.

- India has progressively expanded indigenous warship construction through projects such as **Nilgiri-class, Shivalik-class, Kolkata-class destroyers, Visakhapatnam-class destroyers and Project15B**, making naval self-reliance a key pillar of defence modernization.

Constitutional and Legal Dimensions

- **Article53** vests the supreme command of the Defence Forces in the President of India.
- **Article246 read with Entry1 of the Union List (Seventh Schedule)** empowers Parliament over defence and armed forces.
- Supports the objectives of **Aatmanirbhar Bharat**, **Make in India (Defence)**, **Defence Acquisition Procedure (DAP)2020**, **Defence Production and Export Promotion Policy (DPEPP)2020**, and aligns with the **Maritime Security Strategy** and **Maritime India Vision2030**.

Challenges

- Sustaining indigenous production of advanced propulsion systems, sensors and weapon technologies.
- Reducing dependence on imported critical defence components.
- Addressing evolving maritime threats, including cyber warfare, unmanned platforms and submarine proliferation in the Indo-Pacific.
- Ensuring timely execution of indigenous shipbuilding projects while strengthening the domestic defence industrial ecosystem.

Conclusion

The commissioning of **INS Mahendragiri** marks another significant step in India's journey towards self-reliance in naval defence. By combining indigenous technology with advanced combat capabilities, the warship enhances India's maritime security architecture, strengthens deterrence in the Indo-Pacific and reinforces the nation's emergence as a leading maritime power.

2. Capitalizing on Indigenisation: Defence Sector Outperformance and Market Challenges

Why in News?

India's defence sector has emerged as one of the best-performing segments in 2026, supported by higher indigenous procurement, rising defence exports, expanding order books of defence companies and sustained policy reforms under the **Aatmanirbhar Bharat** initiative.

Key Points for UPSC CSE

• Defence Sector Performance

- The **Nifty Defence Index** has significantly outperformed broader market indices in 2026, reflecting growing investor confidence in India's defence manufacturing ecosystem.
- The **Defence Acquisition Council (DAC)** approved procurement proposals worth nearly **₹16.6 lakh crore** between FY24-FY26, with emphasis on **Buy Indian-IDDM** and **Buy & Make (Indian)** categories.
- India's defence exports reached approximately **₹38,400 crore in FY26**, with the Government targeting **₹50,000 crore by FY29**.

• What is Defence Acquisition Council (DAC)?

- The **DAC**, chaired by the **Defence Minister**, is the highest decision-making body for capital acquisitions in the Ministry of Defence.
- It approves procurement proposals, promotes indigenous defence production and implements the **Defence Acquisition Procedure (DAP),2020**.

• What is Buy Indian-IDDM?

- **Buy Indian-Indigenously Designed, Developed and Manufactured (IDDM)** is the highest priority procurement category under **DAP,2020**.
- It gives preference to defence equipment designed and manufactured in India with prescribed indigenous content, thereby strengthening self-reliance.

Historic Perspective

- India remained one of the world's largest arms importers for several decades after Independence.
- Since the launch of the **Aatmanirbhar Bharat** initiative in 2020, defence reforms have focused on indigenous manufacturing, private sector participation, Defence Industrial Corridors, Innovations for Defence Excellence (iDEX), Positive Indigenisation Lists and export promotion.
- The policy shift aims to transform India from a major importer into a global defence manufacturing and export hub.

Constitutional and Legal Dimensions

- **Union List Entries1,2 and2A (Seventh Schedule)** empower Parliament to legislate on defence, armed forces and national security.
- **Defence Acquisition Procedure (DAP),2020** provides the regulatory framework for defence procurement with priority to indigenous manufacturing.
- **Positive Indigenisation Lists** prohibit the import of specified defence equipment to encourage domestic production.
- Defence production is supported under the **Make in India** and **Aatmanirbhar Bharat** initiatives.

Challenges

- Delays in execution of defence contracts and supply-chain bottlenecks.
- Dependence on imported critical technologies, semiconductor components and aero-engines.
- Limited private-sector participation in high-end defence platforms.
- Need for greater investment in indigenous R&D and advanced defence technologies.

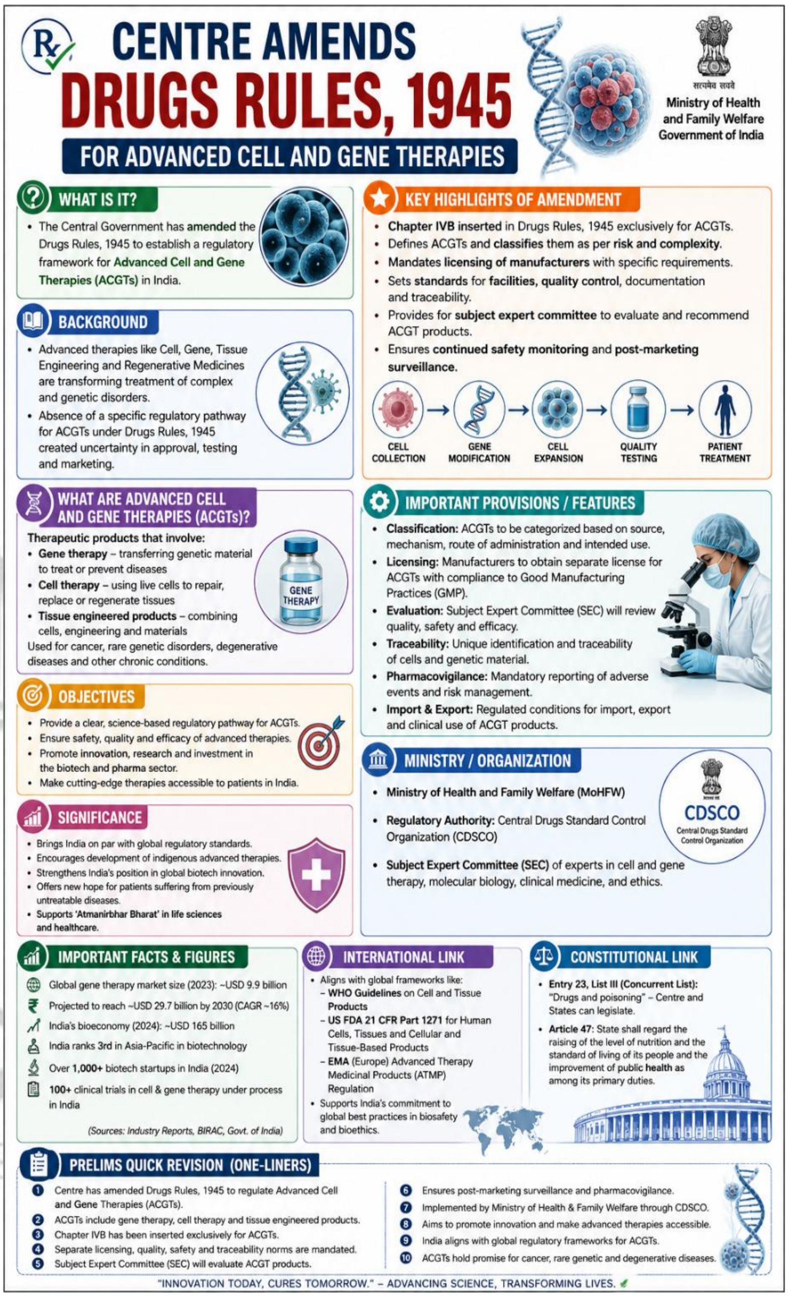
Conclusion

India's defence sector is witnessing a structural transformation driven by indigenisation, rising exports and policy support. Sustaining this momentum will require timely project execution, technological innovation, enhanced private sector participation and continued investment in indigenous research to strengthen national security while positioning India as a global defence manufacturing hub.

SCIENCE & TECHNOLOGY

1. Centre Amends Drugs Rules, 1945 for Advanced Cell and Gene Therapies

Key Highlights & Summary



- The Union Ministry of Health and Family Welfare amended the Drugs Rules, 1945 to bring advanced medical technologies under strict supervision.
- The amendment expands the Centrally License Approving Authority (CLAA) framework to include cell and stem cell-derived products, gene therapeutics, and xenografts.
- Previously, the CLAA framework jointly regulated critical biological products like vaccines, large-volume parenterals (>100ml), and recombinant DNA (r-DNA) based medicines.
- The regulatory change establishes a system of joint oversight by Central and State Licensing Authorities to enforce uniform standards nationwide.
- It aims to mitigate risks associated with living-cell interventions and complex genetic modifications while aligning Indian regulations with global best practices.

Essential Definitions

- Cell or Stem Cell-derived Products: Advanced medical treatments using undifferentiated cells or their derivatives, such as CAR-T cell therapies used for blood cancers.
- Gene Therapeutic Products: Novel interventions that involve gene replacement, gene editing, or modification of human genetic material to target inherited disorders and malignancies.
- Xenografts: Medical products derived from animal tissues, such as specialized heart valves, transplanted into humans for cardiology and orthopedic applications.
- Centrally License Approving Authority (CLAA): A joint regulatory arrangement ensuring central coordination alongside state bodies for licensing critical and sensitive medical products.

Legal and Constitutional Framework

- Drugs and Cosmetics Act, 1940: The parent legislative enactment governing the import, manufacture, distribution, and sale of drugs and cosmetics across India.
- Drugs Rules, 1945: Framed under the 1940 Act, providing specific procedural norms for licensing, clinical testing, manufacturing standards, and labeling of medical products.
- Article 21: The Right to Life implicitly guarantees access to safe healthcare, medical standards, and protection against substandard therapeutic interventions.
- Seventh Schedule (Union List - Entry 19 & Concurrent List - Entry 26): Empowers Parliament and State Legislatures to legislate on drugs, poisons, and medical safety standards.

Conclusion

The latest expansion of the CLAA framework marks a progressive regulatory milestone for India's biotechnology landscape. By closing previous regulatory gaps regarding living cells and gene-editing products, the government balances patient safety and ethical oversight with the rapid adoption of precision medicine.

UPSC Relevance

Highly relevant for General Studies Paper II (Government Policies and Interventions for Development in Health Sector) and General Studies Paper III (Science and Technology - Awareness in Biotechnology, Intellectual Property, and Health Issues).

2. Breakthrough in Superalloy Bi-Metallic Structures through Additive Manufacturing

Key Highlights & Summary

- Researchers at ARCI developed a crack-free bi-metallic structure joining stainless steel (SS316L) and a nickel-based superalloy (IN718) using laser-based powder bed fusion additive manufacturing.
- The innovation overcomes traditional welding challenges like solidification cracking and brittle intermetallic formation caused by mismatched thermal expansion and chemical compositions.
- The fabricated structure demonstrated a peak micro-hardness of roughly 310HV at the interface and an ultimate tensile strength of 550±30MPa.
- The breakthrough reduces import dependency on expensive superalloys by strategically placing high-cost materials only in extreme thermal zones while using steel for load-bearing sections.
- Key applications span advanced aerospace components, nuclear reactors, thermal power plant boiler tubes, and heat exchangers operating under extreme gradients.

Essential Definitions

- Bi-Metallic Structure: A composite engineering component combining two distinct metallic materials to leverage complementary mechanical, thermal, and chemical properties.
- Laser-Based Powder Bed Fusion: An additive manufacturing technique that uses a high-energy laser beam to selectively fuse metal powder layers into complex 3D geometries.
- Superalloys: High-performance alloys exhibiting excellent mechanical strength, surface stability, and creep resistance at high temperatures.

Legal and Constitutional Framework

- National Science, Technology, and Innovation Policy: Guides public-funded research institutions like ARCI under DST toward indigenous technological self-reliance and import substitution.
- Article 51A(h): Enjoins citizens and state-supported institutions to develop a scientific temper, humanism, and the spirit of inquiry and reform.
- Seventh Schedule: Scientific research, technical education, and industrial development fall under Central and Concurrent legislative oversight.

Conclusion

This breakthrough in additive manufacturing for bi-metallic structures represents a major leap toward self-reliance in advanced materials engineering. By efficiently minimizing reliance on costly imported superalloys while maximizing component performance, the technology strengthens India's manufacturing capabilities in critical sectors like aerospace and nuclear energy.

UPSC Relevance

Highly relevant for General Studies Paper III under Science and Technology (Awareness in fields of IT, Space, Computers, Robotics, Nanotechnology, and Bio-Technology) and Industrial Growth/Import Substitution.

3. High-Resolution Radio Study Uncovers Hidden Supermassive Black Hole Activity in Nearby Galaxies

Why in News?

An international team of astronomers, including researchers from the **Indian Institute of Astrophysics (IIA)**, has discovered a hidden population of **weakly active supermassive black holes** in nearby galaxies using the **e-MERLIN radio telescope array** and **NASA's Chandra X-ray Observatory**. The findings have been published in the **Monthly Notices of the Royal Astronomical Society (MNRAS)**.

Key Points for UPSC CSE

• Major Findings of the Study

- High-resolution radio observations of **280 nearby galaxies** revealed that nearly **one-fourth** contain previously undetected **weakly accreting supermassive black holes**.
- These black holes were difficult to detect through conventional optical observations because of their extremely faint activity.
- The study suggests that **low-level accretion** may be the dominant mode of black hole growth in the present-day Universe.

  • What is a Supermassive Black Hole?
- A **supermassive black hole (SMBH)** is an extremely dense astronomical object with a mass ranging from **millions to billions of times the mass of the Sun**, usually located at the centre of galaxies.
- When matter falls into a black hole, the process is called **accretion**, releasing enormous amounts of energy through radiation, jets and outflows.
- Such active black holes are known as **Active Galactic Nuclei (AGN)**.

  • Scientific Significance

- The study used the **e-MERLIN (Enhanced Multi-Element Radio Linked Interferometer Network)**, a network of radio telescopes functioning as an interferometer to achieve extremely high spatial resolution.
- The observations were validated using **NASA's Chandra X-ray Observatory**, confirming that the emissions originated from accreting black holes rather than star formation or supernova remnants.
- The research demonstrates the importance of combining **radio astronomy and X-ray astronomy** for studying the evolution of galaxies.
  • Importance for Galaxy Evolution
- Supermassive black holes regulate galaxy evolution through **jets and outflows**, influencing star formation, gas distribution and the long-term growth of galaxies.
- Understanding faint black hole activity improves models of **galaxy formation, cosmic evolution and feedback mechanisms** in the Universe.

Historic Perspective

- The concept of black holes emerged from **Albert Einstein's General Theory of Relativity (1915)** and was mathematically developed by **Karl Schwarzschild**.
- The first image of a black hole was released by the **Event Horizon Telescope (EHT)** in **2019**, followed by the image of the Milky Way's central black hole **SagittariusA*** in **2022**.
- Modern astronomy increasingly relies on multi-wavelength observations, combining radio, optical, infrared and X-ray telescopes to study black holes.

Institutional Dimensions

- The study involved the **Indian Institute of Astrophysics (IIA)**, an autonomous institute under the **Department of Science and Technology (DST)**.
- It highlights India's growing contribution to global astrophysical research and complements national initiatives such as **ASTROSAT**, India's first dedicated multi-wavelength space observatory.

Challenges

- Detecting extremely faint black holes requires highly sensitive radio interferometers and long-duration observations.
- Limited availability of advanced astronomical infrastructure and the complexity of separating black hole signals from stellar activity remain major scientific challenges.
- Understanding the role of weakly active black holes in galaxy evolution requires continuous multi-wavelength observations and international collaboration.

Conclusion

The discovery of widespread faint supermassive black hole activity provides new insights into the evolution of galaxies and the growth of black holes in the local Universe. It also highlights the importance of advanced radio astronomy and international scientific collaboration in expanding humanity's understanding of the cosmos.

4. NIDAR2.0: National Innovation Challenge for Drone Application and Research

Why in News?

The **Ministry of Electronics and Information Technology (MeitY)**, in collaboration with the **Drone Federation India (DFI)**, has launched **NIDAR2.0 (2026-27)** under the **SwaYaan Initiative**. The challenge encourages students to develop **autonomous drones and indigenous drone components** powered by the **VEGA processor**, promoting self-reliance in drone and semiconductor technologies.

• **What is NIDAR2.0?**

- **National Innovation Challenge for Drone Application and Research (NIDAR2.0)** is MeitY's flagship innovation challenge under the **SwaYaan Initiative** to promote research, innovation and skill development in **Unmanned Aircraft Systems (UAS)**.
- It aims to encourage students to develop **next-generation autonomous drones** and **indigenous flight control systems** using Indian technologies.

• **Key Features of NIDAR2.0**

- Conducted through **two innovation tracks**:
    - **Drone Innovation:** Development of autonomous swarm drones for disaster response, medical supply delivery and GPS-denied indoor navigation.
    - **Component Innovation:** Design of indigenous **flight controllers and autopilot systems** using the **VEGA processor** and Indian electronic components.
- The challenge offers a **prize pool exceeding ₹65lakh**, along with startup incubation, cloud credits, software support and corporate internships.

• **What is the VEGA Processor?**

- **VEGA** is a family of indigenous microprocessors developed by **C-DAC** under MeitY's **Digital India RISC-V (DIR-V) Programme**.
- Based on the **open-standard RISC-V architecture**, it aims to reduce India's dependence on foreign chip designs and licensing while strengthening the domestic semiconductor ecosystem.

• **What is the SwaYaan Initiative?**

- **SwaYaan (Capacity Building for Human Resource Development in Unmanned Aircraft Systems)** was approved by **MeitY in2022** with an outlay of about **₹89.87crore** for five years.

- Implemented through a **Hub-and-Spoke model** involving **30 premier institutions**, including **IISc, IITs, IIITs, NITs, C-DAC and NIELIT**.
- It focuses on **Aeromechanics, Drone Electronics, Guidance, Navigation and Control (GNC), Drone Applications** and **Allied UAS Technologies**, and has already trained over **51,000 individuals**.

• Significance

- Promotes indigenous innovation in **drones, avionics, embedded systems and semiconductor design**.
- Supports applications in **disaster management, agriculture, industrial inspection, logistics, defence and homeland security**.
- Strengthens the objectives of **Atmanirbhar Bharat**, **Digital India**, **Make in India** and **Viksit Bharat2047** by developing a skilled workforce and reducing import dependence.

Historic Perspective

- India liberalized the drone sector through the **Drone Rules,2021**, replacing restrictive regulations with a simplified framework.
- The **Production Linked Incentive (PLI) Scheme for Drones and Drone Components (2021)** accelerated indigenous manufacturing.
- The launch of **SwaYaan (2022)** and **NIDAR** reflects India's transition from drone adoption to indigenous design, innovation and core technology development.

Constitutional and Legal Dimensions

- **Article19(1)(g)** supports innovation and entrepreneurship by guaranteeing the freedom to practice any profession or business.
- The initiative complements the **Drone Rules,2021**, **National Geospatial Policy,2022**, **Digital India Programme**, **India Semiconductor Mission (ISM)**, **Production Linked Incentive (PLI) Scheme for Drones**, and the **National Policy on Electronics,2019**.

Challenges

- Limited domestic manufacturing of advanced drone components and sensors.
- Dependence on imported semiconductors and precision electronics.
- Need for stronger cybersecurity, airspace management and drone traffic regulation.
- Bridging the gap between academic innovation and large-scale commercialization.

Conclusion

NIDAR2.0 represents a significant step towards building an indigenous drone and semiconductor ecosystem in India. By combining innovation, skill development and indigenous chip design, the initiative will strengthen India's technological sovereignty, enhance strategic capabilities and accelerate the vision of a self-reliant and globally competitive drone industry.

HISTORY & CULTURE

1. Kala Sanskriti Vikas Yojana (KSVY) 2026-27

Key Highlights & Summary

- Umbrella Central Sector Scheme implemented by the Ministry of Culture to preserve, promote, and develop India's rich tangible and intangible cultural heritage.
- Provides financial assistance to individual artists, cultural organizations, NGOs, and educational institutions engaged in performing arts, folk traditions, and tribal art forms.
- Focuses on safeguarding traditional knowledge through structured components like the Guru-Shishya Parampara, Repertory Grants, and Cultural Function and Production Grant Scheme (CFPGS).
- Emphasizes the creation and modernization of robust cultural infrastructure including auditoriums, studio theatres, rehearsal halls, and Tagore Cultural Complexes (TCC) nationwide.
- Extends targeted support to specialized regional domains, encompassing Himalayan cultural heritage promotion and the preservation of Buddhist and Tibetan traditions.
- Focuses on inclusive outreach to ensure participation from rural, tribal, and economically backward regions via a seamless, paperless online application portal.

Essential Definitions

- Guru-Shishya Parampara: A traditional system of learning where knowledge is imparted continuously by a master mentor (Guru) to dedicated disciples (Shishyas) in performing arts.
- Repertory Grant: Financial assistance provided to active theatre groups, dance academies, and music ensembles to sustain their operational continuity and artistic training.
- Tangible and Intangible Heritage: Physical artifacts, monuments, and infrastructure contrasted with oral traditions, performing arts, social practices, and traditional craftsmanship.

Legal and Constitutional Framework

- Article 29: Protects the cultural and educational rights of citizens, ensuring sections of citizens having a distinct culture can conserve the same.
- Article 49: Directs the State to protect monuments and places and objects of historic or artistic interest, forming part of Directive Principles of State Policy.
- Article 51A(f): Imposes a fundamental duty on every Indian citizen to value and preserve the rich heritage of our composite culture.
- Seventh Schedule: Culture falls predominantly under the Concurrent List and State List responsibilities, allowing collaborative central intervention through schemes like KSVY.

Conclusion

Kala Sanskriti Vikas Yojana serves as a vital instrument for safeguarding India's diverse artistic heritage against the pressures of modernization and globalization. By combining direct financial security for artists with infrastructure development, the scheme ensures the intergenerational transfer of indigenous knowledge systems while fostering inclusive cultural growth across all segments of society.

UPSC Relevance

Highly relevant for General Studies Paper I under Indian Heritage and Culture (salient aspects of art forms, literature, and architecture) and General Studies Paper II under Government Policies and Interventions for development in social sectors.

2. Oldest Scientifically Dated Banyan Tree Discovered in Munger, Bihar

Why in News?

Researchers from the **Birbal Sahni Institute of Palaeosciences (BSIP), Lucknow**, have scientifically established that a **Banyan tree (Ficus benghalensis)** in Munger, Bihar is around **700 years old**, making it the **oldest accurately dated Banyan tree** using **Radiocarbon Dating (Accelerator Mass Spectrometry-AMS)**.

• Scientific Breakthrough in Dating Tropical Trees

- The Munger Banyan has been dated through **Radiocarbon (Carbon-14) Dating**, replacing age estimates based on folklore, inscriptions or historical records.
- Unlike temperate trees, most tropical broadleaf trees do not develop distinct annual growth rings, making conventional **dendrochronology** unsuitable.
- The study establishes a standardized scientific protocol for dating heritage trees in tropical regions.

Radiocarbon Dating: Key Concept

- **Radiocarbon Dating (Carbon-14 Dating)** is a scientific technique used to estimate the age of organic materials by measuring the decay of the radioactive isotope **Carbon-14 (^{14}C)**.
- Researchers extracted **alpha-cellulose**, the most stable component of plant cell walls, from the tree's oldest wood and dated it using **Accelerator Mass Spectrometry (AMS)**, calibrated through **IntCal20** and **OxCal** software for high accuracy.

Historical Significance of the Discovery

- The study disproves the earlier belief that the Banyan was planted during the late Mughal-Early British period near the historic **Burra Bunglow**.
- Instead, the tree predates the structure by several centuries and is considered a surviving remnant of an ancient natural forest, thereby redefining the historical sequence of settlement in the region.

Ecological Importance of Banyan Tree

- **Ficus benghalensis**, the National Tree of India, is a **keystone species** supporting birds, bats, insects and numerous epiphytes by providing food and habitat throughout the year.
- Its extensive canopy and aerial root system contribute to biodiversity conservation, carbon sequestration, microclimate regulation and soil conservation.
  • Conservation and Heritage Management
- The new methodology enables governments and forest departments to scientifically identify and protect **heritage trees** of ecological, historical and cultural significance.
- It strengthens evidence-based conservation planning, biodiversity management, climate research and environmental education across tropical regions.

Constitutional, Legal and Policy Linkages

- **Article48A** directs the State to protect and improve the environment and safeguard forests and wildlife.
- **Article51A(g)** makes it a Fundamental Duty of every citizen to protect and improve the natural environment.
- The **Biological Diversity Act,2002**, the **Forest (Conservation) Act,1980** (as amended) and the **National Biodiversity Action Plan (NBAP)** support conservation of ecologically significant flora and habitats.
  • Institutions and Scientific Importance
- The research was conducted by the **Birbal Sahni Institute of Palaeosciences (BSIP)**, an autonomous institute under the **Department of Science and Technology (DST)**.
- Published in the journal **Quaternary Research**, the methodology has global relevance for dating ancient tropical trees and reconstructing past landscapes, biodiversity history and climate records.

Conclusion

The scientific dating of the Munger Banyan marks a major advance in tropical palaeoecology and heritage conservation. By replacing assumptions with scientific evidence, it strengthens conservation planning, enriches India's environmental history and provides a reliable framework for protecting culturally and ecologically significant heritage trees across the world.

3. India-Australia Agreement on Access to CSIR-Traditional Knowledge Digital Library (TKDL)

Why in News?

India and Australia have signed an agreement allowing **IP Australia** to access the **CSIR-Traditional Knowledge Digital Library (TKDL)** during the **3rd India-Australia Annual Summit (2026)**. The agreement aims to strengthen the protection of traditional knowledge by preventing the wrongful grant of patents based on India's documented indigenous knowledge.

Key Points for UPSC CSE

• What is the Traditional Knowledge Digital Library (TKDL)?

- **Traditional Knowledge Digital Library (TKDL)** is the world's first **prior art database**, established in **2001** through a collaborative initiative of the **Council of Scientific and Industrial Research (CSIR)** and the **Ministry of AYUSH**.
- It documents over **5.2lakh formulations and traditional practices** from **Ayurveda, Siddha, Unani, Sowa Rigpa and Yoga**, translated into **English, German, French, Japanese and Spanish** to assist patent examiners worldwide.

• Key Features of the India-Australia Agreement

- The agreement grants **IP Australia** access to the TKDL database under a **Non-Disclosure Agreement (NDA)**.
- It enables Australian patent examiners to identify **prior art** while examining patent applications, thereby preventing the grant of patents on already existing traditional knowledge.
- With this agreement, **18 international patent offices** now have access to the TKDL database.

• **What is Prior Art?**

- **Prior Art** refers to any publicly available knowledge, document or evidence that establishes an invention or practice already exists before a patent application is filed.
- Patent offices use prior art to assess the **novelty and inventiveness** of an invention before granting patent protection.

• **Significance of TKDL**

- Protects India's traditional knowledge from **biopiracy** and misappropriation.
- Has contributed to the **revocation, rejection, amendment or withdrawal of over375 patent applications** globally.
- Strengthens India's intellectual property ecosystem while promoting international recognition of indigenous knowledge systems.
- Encourages ethical use and preservation of traditional medicinal knowledge.

• **India-Australia Cooperation**

- Reflects the shared commitment of both countries to protecting indigenous knowledge, strengthening intellectual property rights and enhancing scientific collaboration.
- Expands bilateral cooperation in **science and technology, innovation, traditional medicine and cultural heritage protection**.

Historic Perspective

- The concept of **TKDL** emerged following international patent disputes involving **Turmeric, Neem and Basmati**, where traditional Indian knowledge was wrongly patented abroad.
- To prevent such instances of **biopiracy**, the Government established **TKDL in2001**, creating a globally recognized digital repository of India's traditional medicinal knowledge.
- Since then, TKDL has become an internationally acclaimed model for the **defensive protection of traditional knowledge**.

Constitutional and Legal Dimensions

- **Article49** directs the State to protect monuments and objects of national importance, reflecting the broader constitutional commitment to preserving India's heritage.
- **Article51A(f)** makes it a Fundamental Duty to value and preserve the rich heritage of India's composite culture.
- Governed by the **Patents Act,1970**, **Biological Diversity Act,2002**, **National IPR Policy,2016**, and aligned with the **Convention on Biological Diversity (CBD),1992**, the **Nagoya Protocol** on Access and Benefit Sharing, and the **World Intellectual Property Organization (WIPO)** initiatives on traditional knowledge.

Challenges

- Protecting undocumented traditional knowledge held by indigenous communities.
- Addressing cross-border biopiracy and unauthorized commercialization of biological resources.
- Balancing knowledge protection with legitimate scientific research and innovation.

- Ensuring equitable benefit-sharing with indigenous and local communities.

Conclusion

The India-Australia agreement on **CSIR-TKDL** marks an important milestone in strengthening the global protection of traditional knowledge. By integrating documented indigenous knowledge into international patent examination systems, the agreement safeguards India's intellectual heritage, promotes ethical innovation and reinforces international cooperation against biopiracy.

4. Ancient Kewra (Kevda) Plant Fossils from Assam

Why in News?

Scientists from the **Birbal Sahni Institute of Palaeosciences (BSIP)** have discovered **24-million-year-old fossil leaves** of the **Kewra (Kevda) plant** (*Pandanus*, family **Pandanaceae**) from the **Makum Coalfield (Tikak Parbat Formation), Assam**. The discovery establishes that the Kewra lineage has existed in the Indian subcontinent for at least **24million years**, predating the appearance of humans and surviving major geological and climatic changes.

What is the Discovery?

- Four well-preserved fossil leaves recovered from the **Makum Coalfield, Assam**, closely resemble the modern **Kewra (Pandanus)** plant.
- Detailed morphological and microscopic analyses confirmed their affinity with the **Pandanaceae** family.
- The study, published in the journal **Geobios**, fills an important gap in the evolutionary history of this ancient tropical plant lineage.

• About the Kewra (Kevda) Plant

- **Kewra (Pandanus)** is a tropical plant renowned for its **fragrant flowers**, from which **kewra essence** is extracted.
- It is widely used in **traditional sweets, perfumes, medicines, religious rituals and the flavouring industry**.
- Today, the genus is mainly distributed across **tropical and subtropical regions** of Asia, Africa and Oceania.

• Evolutionary Significance

- Fossil evidence indicates that ancestors of **Pandanus** were widely distributed across the **Northern Hemisphere about85-66million years ago**.
- Global cooling after approximately **34million years ago** caused the disappearance of the plant from many temperate regions.
- The Assam fossils indicate that **India acted as a climatic refuge**, enabling the survival of this ancient lineage.

• Scientific Importance

- Provides valuable evidence regarding the **evolution of tropical biodiversity**.
- Enhances understanding of plant responses to **past climate change** and ecosystem evolution.

- Demonstrates the importance of fossil studies in reconstructing India's palaeoenvironmental history and biodiversity evolution.

• Significance for Conservation

- Highlights the ecological importance of India's tropical forests as reservoirs of ancient biodiversity.
- Reinforces the need for conserving biodiversity hotspots and fossil heritage sites.
- Supports research on long-term ecosystem resilience under changing climatic conditions.

Historic Perspective

- India possesses one of the richest fossil floras in Asia, particularly in the **Northeast**, which preserves evidence of ancient tropical ecosystems.
- The **Makum Coalfield** has yielded numerous fossil discoveries that have improved understanding of the evolution of flowering plants following India's northward drift and climatic transitions.
- This discovery further establishes India as an important refuge for ancient tropical plant lineages during global environmental change.

Constitutional and Legal Dimensions

- **Article48A** directs the State to protect and improve the environment and safeguard forests and wildlife.
- **Article51A(g)** makes environmental protection a Fundamental Duty of every citizen.
- The findings support the objectives of the **Biological Diversity Act,2002**, **National Biodiversity Strategy and Action Plan (2024-2030)**, **National Mission for Sustaining the Himalayan Ecosystem (NMSHE)** and India's commitments under the **Convention on Biological Diversity (CBD)**.

Challenges

- Habitat degradation and climate change threaten several ancient tropical plant species.
- Limited documentation and conservation of fossil heritage sites.
- Need for greater investment in palaeobotanical research and biodiversity monitoring.
- Strengthening public awareness regarding the ecological and scientific value of ancient plant lineages.

Conclusion

The discovery of **24-million-year-old Kewra fossils** from Assam highlights India's role as a long-term refuge for ancient tropical biodiversity. Besides enriching our understanding of plant evolution and past climate change, it underscores the importance of conserving both living biodiversity and fossil heritage for advancing scientific research and ensuring ecological sustainability.

EDITORIALS & OPINION

1. Saushrutam2026: Advancing Evidence-Based Ayurvedic Surgical Sciences

Why in News?

The **President of India** inaugurated **Saushrutam2026**, a three-day international seminar on **Ayurvedic Surgery** at the **All India Institute of Ayurveda (AIIA), New Delhi**, emphasizing the integration of **traditional Ayurvedic knowledge with modern science** to strengthen evidence-based Ayurveda. The event also witnessed the inauguration of an **AI-enabled 3Tesla MRI facility** and the release of an **NCISM study on women Ayurveda graduates**.

• What is Saushrutam2026?

- **Saushrutam2026** is an international conference organized by the **All India Institute of Ayurveda (AIIA)** under the **Ministry of AYUSH** on the occasion of **Sushruta Jayanti**.
- It brings together experts from **India and eight other countries** to promote scientific dialogue, research collaboration and innovation in **Ayurvedic surgical sciences**.

• About Acharya Sushruta

- **Acharya Sushruta**, regarded as the **Father of Surgery**, authored the **Sushruta Samhita**, one of the earliest treatises on surgery and medicine.
- His contributions include descriptions of **plastic surgery, cataract surgery, fracture management, surgical instruments, wound care and anatomical studies**, making him one of the pioneers of scientific surgery.

• Major Highlights of Saushrutam2026

- Inauguration of an **AI-enabled 3Tesla High-Field MRI facility** at AIIA to strengthen integrative diagnostics and research.
- Release of the **National Commission for Indian System of Medicine (NCISM)** study on the professional careers of women Ayurveda graduates.
- Scientific sessions covering **Shalya Tantra, Kshara Sutra, Agnikarma, reconstructive surgery, integrative oncology** and other emerging areas.

• Significance

- Promotes **evidence-based Ayurveda** through scientific validation, modern diagnostics and advanced research.
- Encourages integration of traditional medicine with contemporary healthcare systems.
- Strengthens biodiversity conservation by emphasizing sustainable availability of medicinal plants.
- Highlights the need to improve participation and leadership opportunities for women professionals in Ayurveda.

• About AIIA and NCISM

- **All India Institute of Ayurveda (AIIA)** is an autonomous institute under the **Ministry of AYUSH**, established to promote quality education, research and patient care in Ayurveda.

- **National Commission for Indian System of Medicine (NCISM)** is the statutory regulatory body established under the **National Commission for Indian System of Medicine Act,2020** to regulate education and professional standards in Indian Systems of Medicine.

Historic Perspective

- Ayurveda, one of the world's oldest medical systems, has evolved over more than **3,000 years** through classical texts such as the **Charaka Samhita** and **Sushruta Samhita**.
- In recent years, India has undertaken significant initiatives including the establishment of the **Ministry of AYUSH (2014)**, creation of **AIIA**, expansion of global Ayurveda collaborations and promotion of scientific research to enhance international acceptance of traditional medicine.

Constitutional and Legal Dimensions

- **Article21** has been interpreted to include the **Right to Health** as part of the Right to Life.
- **Article47** directs the State to improve public health and nutrition.
- **Article48A** promotes environmental protection, supporting conservation of medicinal biodiversity.
- Governed by the **National Commission for Indian System of Medicine Act,2020**, **Biological Diversity Act,2002**, **National Medicinal Plants Board (NMPB)** initiatives, **National AYUSH Mission (NAM)** and aligned with the **WHO Global Traditional Medicine Strategy**.

Challenges

- Need for stronger scientific evidence and high-quality clinical research.
- Conservation of medicinal plant diversity amid habitat degradation.
- Standardization of Ayurvedic medicines and treatment protocols.
- Enhancing research funding, international collaborations and career opportunities, particularly for women professionals.

Conclusion

Saushrutam2026 reflects India's commitment to combining its rich medical heritage with modern scientific advancements. By promoting evidence-based research, biodiversity conservation and global collaboration, the initiative can strengthen the credibility of Ayurveda and position it as an important component of integrated healthcare in the 21st century.

ETHICS

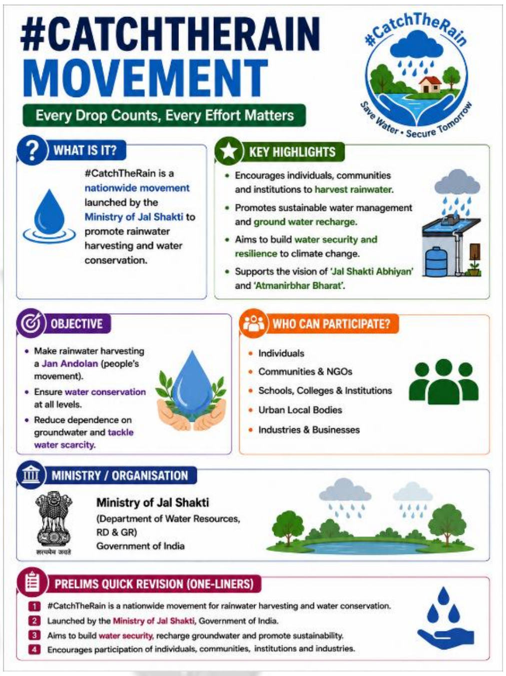
1. #CatchTheRain Movement

Why in News?

The **#CatchTheRain Movement**, launched by the **Ministry of Jal Shakti**, continues to be a flagship nationwide water conservation campaign promoting **rainwater harvesting**, groundwater recharge and community participation under the vision of **"Catch the Rain, Where it Falls, When it Falls."**

• **What is the #CatchTheRain Movement?**

- **#CatchTheRain** is a nationwide water conservation campaign launched by the **Ministry of Jal Shakti** under the **National Water Mission** to promote rainwater harvesting before the onset of the monsoon.
- It aims to encourage individuals, communities, local bodies and institutions to create and restore water harvesting structures for sustainable water management.



• **Objectives of the Movement**

- Promote **rainwater harvesting** and **groundwater recharge**.
- Restore and rejuvenate traditional water bodies, ponds, tanks, lakes and stepwells.
- Strengthen community participation (**Jan Bhagidari**) in water conservation.
- Improve water security in both rural and urban areas while reducing dependence on groundwater extraction.

• **Major Components**

- Construction and renovation of **rainwater harvesting structures**.
- Geo-tagging and mapping of water conservation assets.
- Desilting and restoration of ponds, lakes, check dams and traditional water bodies.
- Awareness campaigns through schools, Gram Panchayats, Urban Local Bodies, NGOs and civil society organizations.
- Convergence with schemes such as **Jal Jeevan Mission**, **MGNREGA**, **Amrit Sarovar Mission** and **Atal Bhujal Yojana**.

• **Significance**

- Enhances groundwater recharge and improves water availability during dry seasons.
- Reduces flood runoff, soil erosion and urban waterlogging.
- Strengthens climate resilience by improving drought preparedness.
- Supports sustainable agriculture, drinking water security and ecosystem restoration.

• **Rainwater Harvesting: Definition**

- **Rainwater Harvesting** is the process of collecting, storing and recharging rainwater for future use through structures such as rooftop systems, recharge pits, percolation tanks, check dams and farm ponds.
- It is considered one of the most cost-effective methods for sustainable water resource management.

Historic Perspective

- India has a rich tradition of community-based water conservation through **Johads (Rajasthan), Baolis (North India), Ahar-Pyne (Bihar), Kuls (Himachal Pradesh), Surangams (Kerala)** and **Eris (Tamil Nadu)**.

- The **#CatchTheRain Campaign** was launched in **2021** as a nationwide movement to revive these traditional practices using modern technology and community participation.
- The campaign has evolved into an annual pre-monsoon initiative supporting integrated water resource management.

Constitutional and Legal Dimensions

- **Article21** has been judicially interpreted to include the **Right to Safe Water** as part of the Right to Life.
- **Article48A** directs the State to protect and improve the environment.
- **Article51A(g)** makes environmental protection a Fundamental Duty.
- Supports the objectives of the **National Water Policy,2012**, **National Water Mission**, **Jal Shakti Abhiyan**, **Jal Jeevan Mission**, **Atal Bhujal Yojana**, **MGNREGA**, and contributes to **SDG6 (Clean Water and Sanitation)** and **SDG13 (Climate Action)**.

Challenges

- Declining groundwater levels due to excessive extraction.
- Poor maintenance of traditional water harvesting structures.
- Rapid urbanization reducing natural groundwater recharge.
- Limited public awareness and weak convergence among implementing agencies.
- Climate change leading to erratic rainfall patterns and increasing water stress.

Conclusion

The **#CatchTheRain Movement** represents a people-centric approach to water conservation by combining traditional wisdom with modern technology and community participation. Strengthening rainwater harvesting, restoring local water bodies and promoting sustainable water governance will be critical for ensuring long-term water security and achieving India's climate resilience and sustainable development goals.

2. Kudankulam Nuclear Power Plant Data Breach and Cybersecurity in Critical Infrastructure

Why in News?

The **Union Ministry of State for Atomic Energy** informed Parliament that the recent **data breach related to the Kudankulam Nuclear Power Plant (KKNPP), Tamil Nadu**, did **not compromise nuclear operations, reactor safety or core security systems**. The breach was limited to **Balance of Plant (BoP)** data held by a private contractor and did not affect NPCIL's secure operational network.

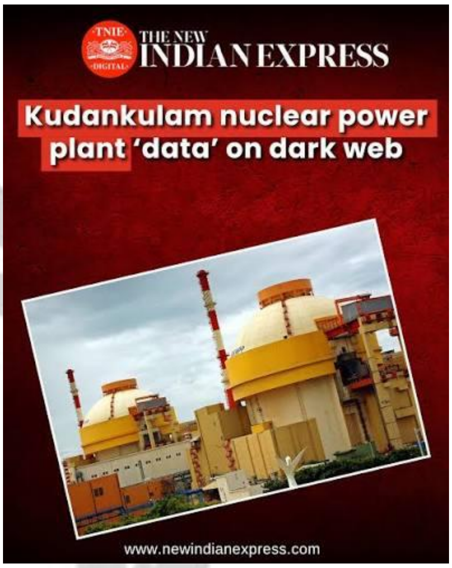
• What is the Kudankulam Data Breach?

- The cyber incident involved **electronic files related to the Balance of Plant (BoP)**, which comprise auxiliary infrastructure supporting plant operations rather than the nuclear reactor itself.
- The compromised information belonged to a **private contractor's database**, and **Nuclear Power Corporation of India Limited (NPCIL)** clarified that its core operational systems remained unaffected.
- Authorities confirmed that no safety-critical systems or nuclear security infrastructure were compromised.

• **What is Balance of Plant (BoP)?**

- **Balance of Plant (BoP)** refers to the **supporting systems and auxiliary equipment** of a power plant, excluding the main power-generating unit.
- It includes systems such as cooling, electrical distribution, water treatment, turbines, control utilities and other operational infrastructure necessary for power generation.

• **What is Critical Information Infrastructure (CII)?**



- **Critical Information Infrastructure (CII)** refers to computer resources whose incapacitation or destruction would have a debilitating impact on **national security, economy, public health or public safety**.
- Nuclear power plants, power grids, financial systems, telecommunications and transportation networks constitute major components of India's CII.

• **Significance**

- Highlights the growing cybersecurity risks arising from **third-party vendors and contractor networks**.
- Demonstrates the need for comprehensive cyber resilience extending beyond core operational systems.
- Reinforces the importance of supply-chain security, regular cybersecurity audits and incident response mechanisms for critical infrastructure.

Historic Perspective

- Cyberattacks targeting critical infrastructure have become a major global security concern due to increasing digitalization of strategic sectors.
- India has progressively strengthened its cyber governance architecture through specialized institutions such as **CERT-In**, **NCIIPC** and sector-specific cybersecurity frameworks.
- The Kudankulam incident underscores that vulnerabilities increasingly arise through interconnected vendor ecosystems rather than direct attacks on secured operational networks.

Constitutional and Legal Dimensions

- **Atomic Energy Act,1962** regulates the development, control and security of nuclear installations in India.
- **Information Technology Act,2000** provides the legal framework for cybersecurity, cyber offences and protection of critical information infrastructure.
- **Section70** of the IT Act empowers the Government to designate **Critical Information Infrastructure (CII)**.
- **Section70A** establishes the **National Critical Information Infrastructure Protection Centre (NCIIPC)** as the nodal agency for protecting India's critical information infrastructure.
- The incident also highlights the importance of compliance with national cybersecurity guidelines issued by **CERT-In** and relevant sectoral authorities.

Challenges

- Strengthening cybersecurity across third-party contractors and supply chains.
- Regular vulnerability assessment and security audits of non-core digital systems.
- Balancing digital transformation with robust cyber resilience.
- Developing skilled cybersecurity professionals for strategic infrastructure protection.

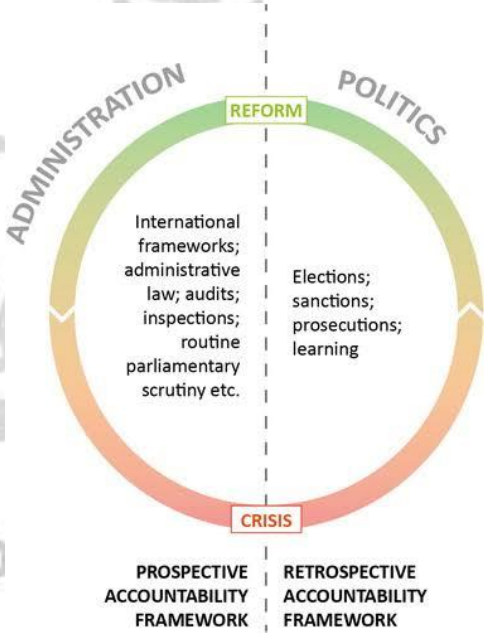
Conclusion

Although the **Kudankulam data breach** did not affect reactor safety or nuclear operations, it demonstrates that **contractor ecosystems can become potential cyber entry points**. Strengthening cybersecurity governance across the entire supply chain, coupled with continuous monitoring, vendor compliance and institutional coordination, is essential to safeguard India's critical infrastructure against evolving cyber threats.

3. Crisis of Institutional Accountability and Passive Governance

Why in News?

The growing debate on **institutional accountability** has highlighted concerns over **administrative opacity, weak responsibility mechanisms and passive governance**, where policy failures are often attributed to vague systemic factors instead of identifiable institutional actors. The issue has renewed focus on strengthening accountability, transparency and good governance in India's democratic framework.



• What is Institutional Accountability?

- **Institutional Accountability** refers to the obligation of public institutions and officials to **justify their decisions, accept responsibility for their actions and remain answerable to constitutional, legal and democratic oversight mechanisms**.
- It forms the foundation of **good governance**, ensuring transparency, responsiveness and public trust in government institutions.

• What is Passive Governance?

- **Passive Governance** describes a situation where governance failures are viewed as inevitable systemic outcomes rather than the consequence of identifiable administrative decisions or omissions.
- Such an approach weakens responsibility, delays corrective action and reduces public confidence in institutions.

• Key Governance Concerns

- Increasing tendency to attribute failures to broad entities such as **"the system"** rather than individual or institutional accountability.
- Weak enforcement of administrative responsibility may reduce transparency and institutional credibility.
- Excessive centralisation of political narratives may divert attention from the accountability of implementing agencies and public officials.

- Strengthening institutional responsibility is essential for improving policy implementation and public service delivery.

• Key Definitions

- **Accountability:** Obligation of public authorities to explain and justify their decisions while being subject to review and corrective action.
- **Malfeasance:** Wrongful or unlawful conduct by a public official in the discharge of official duties.
- **Rule of Law:** Constitutional principle that all individuals and institutions, including the government, are equally subject to the law.

Constitutional and Legal Dimensions

- **Article14:** Ensures equality before law and prohibits arbitrary state action, forming the basis of administrative accountability.
- **Article75(3)** and **Article164(2):** Establish the principle of **collective responsibility** of the Council of Ministers to Parliament and State Legislatures respectively.
- **Articles32** and **226:** Empower the Supreme Court and High Courts to enforce constitutional rights through judicial review.
- The **Right to Information Act,2005**, **Prevention of Corruption Act,1988**, **Lokpal and Lokayuktas Act,2013**, and audit by the **CAG (Article148)** collectively strengthen transparency and accountability in public administration.

Challenges

- Delayed administrative action and weak enforcement of responsibility.
- Overlapping institutional jurisdictions and coordination gaps.
- Limited protection for whistle-blowers and accountability mechanisms.
- Balancing administrative discretion with transparency and efficiency.

Conclusion

Institutional accountability remains a cornerstone of constitutional democracy and good governance. Strengthening transparency, clearly defining administrative responsibility and reinforcing independent oversight institutions are essential for improving governance outcomes, enhancing public trust and ensuring that democratic institutions remain responsive, accountable and citizen-centric.

YOJANA & KURUKSHETRA

1. India's First Hydrogen-Powered Train and Green Infrastructure Initiatives

Why in News?

The Prime Minister is set to flag off **India's first indigenously developed hydrogen-powered passenger train**, the **"NaMo Green Rail"**, from **Jind, Haryana**. Alongside, several infrastructure and healthcare projects worth over **₹25,000crore** are being launched across Haryana, Chandigarh and Punjab, reinforcing India's commitment to green mobility and sustainable development.

• What is India's First Hydrogen-Powered Train?

- The **NaMo Green Rail** is India's **first hydrogen fuel cell-powered passenger train**, operating on the **Jind-Sonipat** route.

- It comprises **10 coaches** and is powered by a **3,200horsepower hydrogen fuel cell propulsion system**, making it one of the world's longest and most powerful hydrogen-powered passenger trainsets.

- Electricity is generated onboard through an electrochemical reaction between **hydrogen and oxygen**, producing **only water vapour and heat** as by-products, making it a zero tailpipe-emission transport system.

• What is Hydrogen Fuel Cell Technology?

- A **Hydrogen Fuel Cell** converts the chemical energy of hydrogen into electricity through an electrochemical process without combustion.

- It offers **high energy efficiency**, low noise and zero carbon emissions at the point of use, making it a promising clean transportation technology.

• Green Infrastructure Initiatives

- The programme includes major highway projects such as the **Delhi-Amritsar-Katra Expressway** and the **Jind-Gohana Greenfield Highway**, improving regional connectivity and logistics.

- Healthcare initiatives include an advanced neurosciences centre, a Mother and Child Centre at **PGIMER Chandigarh**, and a **PM-ABHIM Critical Care Block**, strengthening public health infrastructure.

• Key Definitions

- **Greenfield Project:** Infrastructure developed on previously undeveloped land without modification of existing facilities.

- **Access-Controlled Expressway:** A high-speed highway with regulated entry and exit points to facilitate uninterrupted vehicular movement.

• Significance

- Promotes decarbonisation of the transport sector and reduces dependence on fossil fuels.

- Supports indigenous innovation under **Atmanirbhar Bharat**.
- Advances India's commitments towards **Net Zero emissions by2070** and sustainable mobility.
- Strengthens regional connectivity, healthcare access and economic development.

Historic Perspective

- Hydrogen has emerged globally as a strategic clean energy carrier for achieving deep decarbonisation in hard-to-abate sectors such as transport and industry.
- India launched the **National Green Hydrogen Mission** in **2023** to position itself as a global hub for the production, utilisation and export of green hydrogen.
- The introduction of a hydrogen-powered passenger train marks a significant milestone in India's transition towards low-carbon transportation.

Constitutional and Legal Dimensions

- **Article39(b)** directs the State to ensure that material resources are distributed to serve the common good.
- **Article48A** mandates the State to protect and improve the environment.
- **Article51A(g)** makes environmental protection a Fundamental Duty of every citizen.
- The initiative aligns with the **National Green Hydrogen Mission**, **National Action Plan on Climate Change (NAPCC)**, India's **Nationally Determined Contributions (NDCs)** under the Paris Agreement and the vision of **Net Zero2070**.

Challenges

- High production and storage costs of green hydrogen.
- Limited hydrogen refuelling infrastructure.
- Need for indigenous manufacturing of fuel cells and hydrogen storage systems.
- Scaling renewable energy capacity for cost-effective green hydrogen production.

Conclusion

The launch of **India's first hydrogen-powered passenger train** marks a major step towards sustainable and clean transportation. Combined with investments in green infrastructure and healthcare, it reflects India's integrated approach to economic growth, technological self-reliance and climate action, while accelerating the transition towards a low-carbon and resilient future.

PIB & PARLIAMENTARY RESEARCH STUDIES (PRS)

1. Regulatory Milestone: DCGI Approval for India's First Dengue Vaccine (QDENGA)

Why in News?

The **Drug Controller General of India (DCGI)** has granted market authorization to **QDENGA (TAK-003)**, developed by Takeda Biopharmaceuticals, making it the **first approved dengue vaccine in India**. The approval marks a significant step towards strengthening India's strategy against dengue, one of the country's major vector-borne diseases.

• **What is QDENGA (TAK-003)?**

- **QDENGA** is a **live-attenuated tetravalent dengue vaccine** that provides protection against all **four dengue virus serotypes (DENV-1,DENV-2,DENV-3 and DENV-4)**.
- It is approved for individuals aged **4-60 years** and is administered in a **two-dose schedule**, with doses given **three months apart**, without requiring pre-vaccination screening.

• **Salient Features of the Approval**

- The vaccine received approval under **Form CT-20** of the **New Drugs and Clinical Trials (NDCT) Rules,2019**, framed under the **Drugs and Cosmetics Act,1940**.
- It represents a shift from exclusive dependence on mosquito control and supportive treatment towards preventive immunization.
- India continues to witness a high dengue burden due to rapid urbanization, climate variability and expanding mosquito habitats.

• **Key Definitions**

- **Live-Attenuated Vaccine:** A vaccine prepared from weakened forms of the pathogen that stimulate immunity without causing severe disease in healthy individuals.
- **Tetravalent Vaccine:** A vaccine designed to protect simultaneously against four different strains or serotypes of the same pathogen.
- **Vector-Borne Disease:** A disease transmitted through vectors such as mosquitoes, ticks or fleas.

Historic Perspective

- Dengue has emerged as one of the fastest-growing mosquito-borne diseases globally over the past few decades.
- India has largely relied on **vector control measures**, public awareness campaigns and supportive clinical management, as no approved dengue vaccine was previously available.
- Alongside QDENGA, several indigenous vaccine candidates developed by **Bharat Biotech, Panacea Biotec, Serum Institute of India and Indian Immunologicals** are undergoing advanced stages of clinical development.

Constitutional and Legal Dimensions

- The **Drugs and Cosmetics Act,1940** and **NDCT Rules,2019** regulate the approval, manufacture and marketing of new drugs and vaccines in India through the **Central Drugs Standard Control Organisation (CDSCO)**.
- **Article21** has been judicially interpreted to include the **Right to Health** as part of the Right to Life.
- **Article47** directs the State to improve public health and raise the standard of living of citizens.

- The **National Vector Borne Disease Control Programme (NVBDCP)** remains the principal public health programme for prevention and control of dengue and other vector-borne diseases.

Challenges

- Ensuring affordable and equitable vaccine access across urban and rural areas.
- Integrating vaccination with existing mosquito control and surveillance programmes.
- Addressing vaccine hesitancy through scientific awareness.
- Strengthening indigenous vaccine manufacturing and cold-chain infrastructure.

Conclusion

The approval of **QDENGA** marks a major milestone in India's public health landscape by introducing the country's first licensed dengue vaccine. However, long-term success will depend on integrating vaccination with vector control, disease surveillance, public awareness and robust healthcare infrastructure to reduce the burden of dengue sustainably.