

THE EDGE

CURRENT AFFAIRS MAGAZINE

JUNE 2026

DECODING CURRENT EVENTS FOR UPSC SUCCESS

PRADHAN MANTRI
SURAKSHA MATRITVA



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UPSC CSE 2027/28 GENERAL STUDIES

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CONSTITUTION, POLITY & GOVERNANCE

1. Right to be Forgotten: Privacy vs Public Interest (Economic Times)

Context:

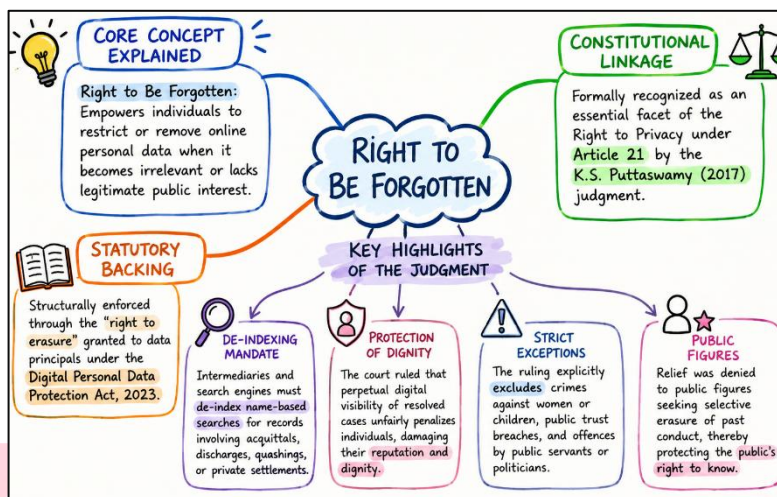
Recently, the Delhi High Court has affirmed the 'Right to be Forgotten' (RTBF) as a core component of the fundamental right to privacy, mandating that search engines de-index judicial records related to cases that have been acquitted or settled.

Significance

- **Digital Rehabilitation:** Enables honourably discharged or acquitted individuals to seamlessly reintegrate into society without permanent digital stigmatization.

- **Balancing**

Fundamental Rights: Carefully harmonizes an individual's right to digital privacy under Article 21 with the public right to information under Article 19.



Challenges / Concerns

- **Transparency Risks:** Over-application of the right threatens to whitewash historical facts and erode judicial transparency or journalistic archives.
- **Technical Hurdles:** Global enforcement remains highly challenging due to cross-border servers, mirror websites, and the unintended viral spread of the Streisand effect.

Way Forward

- **Proportionate Application:** The Data Protection Board must utilize case-by-case balancing tests to protect historical transparency against overarching privacy claims.
- **Clear Operating Thresholds:** The state and judiciary must establish precise guidelines defining public interest to prevent systemic erasure of vital public records.

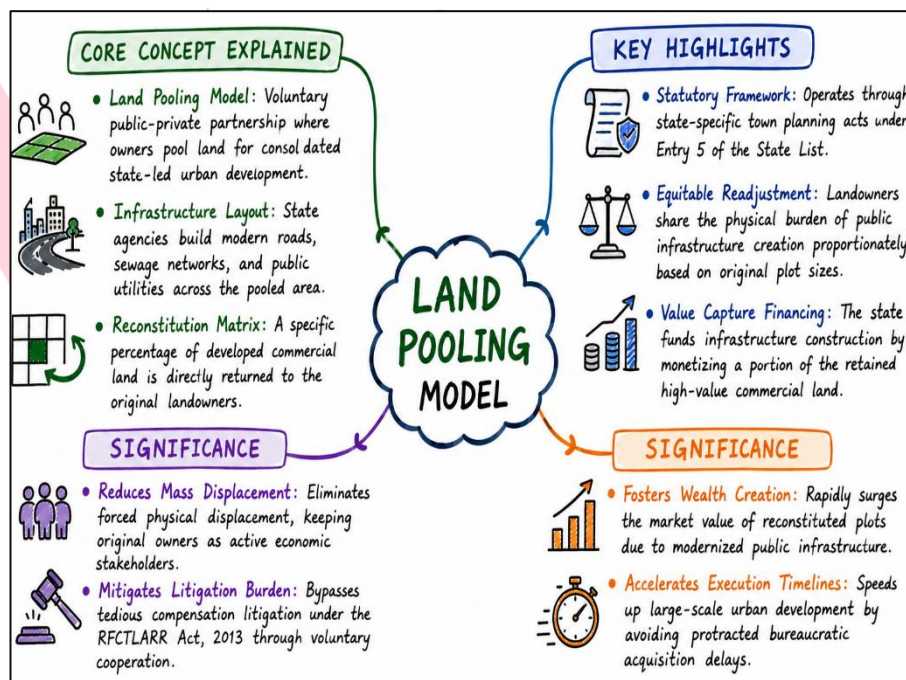
QUICK REVISION BOX		
	UPSC KEYWORDS:	Right to be Forgotten, Digital Rehabilitation, De-indexing, Data Erasure.
	IMPORTANT ARTICLES:	Article 21 (Right to Privacy), Article 19(1)(a) (Right to Information/Freedom of Speech).
	IMPORTANT ACTS:	Digital Personal Data Protection (DPDP) Act, 2023.
	LANDMARK JUDGMENTS:	K.S. Puttaswamy vs. Union of India (2017).

2. Participatory Town Planning: Land Pooling as a Sustainable Alternative (The Hindu)

Context:

Amidst accelerating urbanization, town planning models like land pooling are gaining policy prominence as a sustainable alternative to traditional compulsory land acquisition, which frequently encounters intense legal friction and resettlement challenges.

Challenges / Concerns



- **Asymmetric Negotiations:** Small marginal landowners often lack the institutional bargaining power to secure favorable allotment ratios.
- **Inordinate Delay Risks:** Delays in state infrastructure execution trap landowners in an unproductive phase where they cannot farm or build.
- **Inclusion Deficits:** Informal tenants and landless rural artisans are completely excluded from the direct benefit-sharing framework.

Way Forward

- **Enacting Model Central Frameworks:** Formulate a robust national model law to ensure operational standardization across diverse states.

- **Deploying Smart Digital Mapping:** Utilize advanced GIS mapping to maintain absolute transparency in land title reconstitution.
- **Securing Livelihood Protection:** Embed statutory social security guarantees to shield vulnerable, landless agricultural workers from income loss.

QUICK REVISION BOX	
 UPSC Keywords	Land Pooling, Value Capture Financing, Land Reconstitution.
 Important Acts	RFCTLARR Act, 2013; State Town and Country Planning Acts.
 Important Concepts	Eminent Domain, Voluntary Land Readjustment.
 Related Provisions	Seventh Schedule (State List - Entry 5), Article 300A (Right to Property).

3. MHA Revises Foreigner Registration Timelines for Internal Security (The Indian Express)

Context:

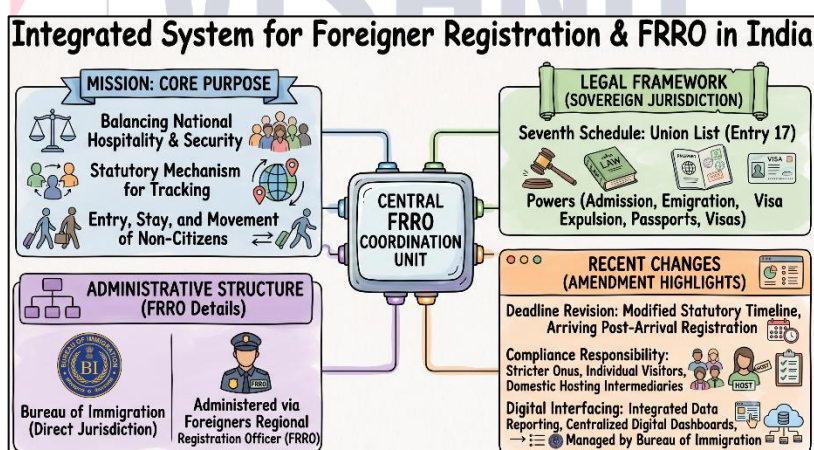
The Ministry of Home Affairs (MHA) has amended the Registration of Foreigners Rules, altering the statutory timelines for mandatory foreigner registration and reporting requirements in India to enhance national internal security tracking.

Significance

- **Strengthens Internal Security:** Mitigates the risks of illegal overstays by establishing tighter, more trackable timelines for external visitors.
- **Streamlines Digital Governance:** Modernizes data collection frameworks, lowering procedural friction for bonafide corporate, medical, and tourist travelers.
- **Enhances Border Management:** Complements real-time intelligence feeds, allowing security agencies to efficiently monitor sensitive border corridors.

Challenges / Concerns

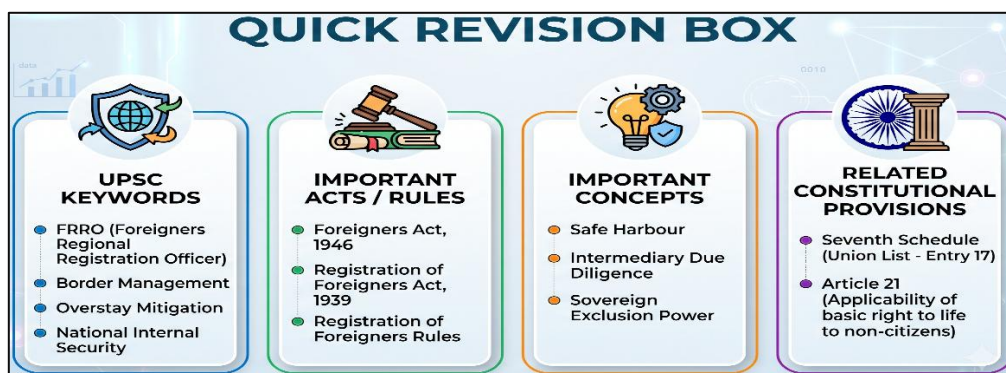
- **Procedural Awareness Deficits:** Lack of awareness regarding revised deadlines can inadvertently lead to financial penalties for unsuspecting travelers.



- **Data Vulnerability Risks:** Centralizing extensive tracking data raises critical institutional privacy concerns under the overarching DPDP Act, 2023 framework.

Way Forward

- **Automating digital prompts:** Enable automated registration alerts via the e-Visa portal to ensure timely compliance before statutory deadlines lapse.
- **Harmonizing privacy safeguards:** Implement strict access-control protocols to safeguard personal data archives against external cybersecurity breaches.



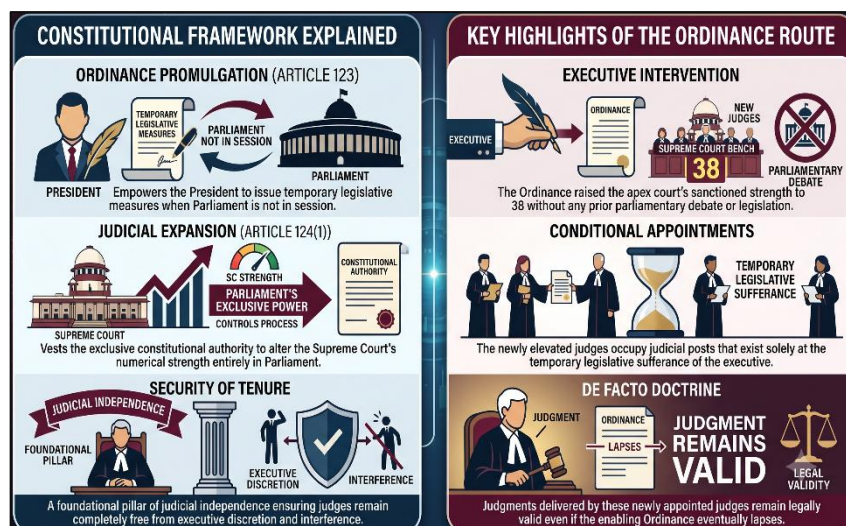
4. Supreme Court Strength Raised by Ordinance – Constitutional Concerns (The Hindu)

Context:

The recent swearing-in of Supreme Court judges against newly created posts via a temporary Presidential Ordinance (increasing the sanctioned strength from 34 to 38) has sparked constitutional debate regarding judicial independence and executive dependence.

Constitutional Implications

- **Threat to Basic Structure:** Relying on temporary executive orders for structural court expansion contradicts the spirit of the NJAC (2015) ruling.



- **Compromised Institutional Autonomy:** Dependencies on the executive for regularizing these seats can create a damaging appearance of compromised judicial detachment.

Challenges & Institutional Concerns

- **Unprecedented Legal Limbo:** If the Ordinance lapses unratified, the court's strength automatically reverts to 34, risking the constitutional status of the new judges.
- **Bypassing the Legislature:** Utilizing Ordinances for non-emergent institutional restructuring violates the Supreme Court's strict warnings in Krishna Kumar Singh (2017).

Way Forward for Legislative Rectification

- **Immediate Statutory Ratification:** Parliament must urgently enact an amendment to the Supreme Court (Number of Judges) Act to permanently secure these posts.
- **Proactive Collegium Prudence:** The Supreme Court Collegium must insist on permanent legislative backing before recommending appointments to newly conceptualized vacancies.

QUICK REVISION BOX			
UPSC Keywords	Important Articles	Landmark Judgments	Important Concepts
• De Facto Doctrine • Executive Promulgation • Institutional Autonomy	• Article 123 (Ordinance Power) • Article 124(1) (Establishment of SC)	• D.C. Wadhwa (1986) • Krishna Kumar Singh (2017) • NJAC Judgment (2015)	• Basic Structure Doctrine • Separation of Powers

5. Right to Dignity vs Media Trial: Calcutta HC's Rebuke (The Indian Express)

Context:

The Calcutta High Court strongly rebuked the practice of publicly parading accused individuals and leaking their photographs to the media, declaring it a flagrant violation of their constitutional right to dignity, privacy, and fair trial.

Rights of the Accused and Judicial Doctrine

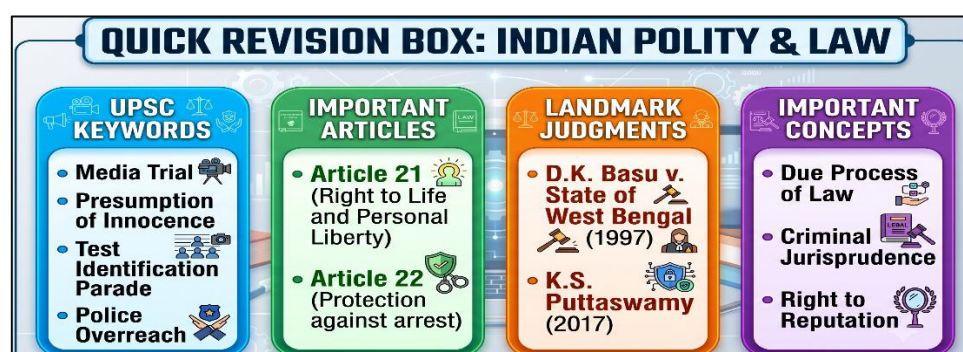
Rights of the Accused & Judicial Doctrine	Key Highlights of the High Court's Ruling	Significance for Criminal Justice
• Article 21 (Right to Life): Encompasses the right to reputation, personal dignity, and privacy, which extends fully to suspects and accused persons. • Presumption of Innocence: A foundational pillar of criminal jurisprudence dictating that an accused is deemed innocent until proven guilty in a court of law. • Doctrine of Due Process: Demands that investigative and police actions strictly adhere to established lawful procedures rather than punitive public shaming.	• Ban on Public Display: Explicitly prohibits law enforcement agencies from parading accused individuals or displaying them before media cameras. • Restrictions on Photo Leaks: Mandates that photographs of suspects in custody must not be shared with external print, digital, or social media networks. • Trial Prejudice Safeguard: Stressed that media trials generated by premature police disclosures severely prejudice judicial proceedings and taint public perception.	• Upholds Human Dignity: Restores constitutional protections against institutional degradation and arbitrary public humiliation by state machinery. • Protects Witness Identification: Safeguards the procedural integrity of Test Identification Parades (TIP) by preventing the pre-trial exposure of suspects.

Challenges in Enforcing Police Accountability

- **Sensationalism and Pressure:** Public and political pressure for immediate results often incentivizes investigative teams to showcase arrests prematurely.
- **Absence of Codified Penalties:** General administrative guidelines lack stringent statutory punitive actions against non-compliant or defaulting police officers.

Way Forward for Police Reforms

- **Strict Internal Standard Operating Procedures:** Formulate binding, clear ministry guidelines that penalize police personnel for unauthorized media disclosures.
- **Sensitization and Training Modules:** Integrate Human Rights and Constitutional Law sensitization programs directly into regular police training curricula.



6. Rajya Sabha Polls: Federal Valve against Majoritarianism (Business Standard)

Context:

The conduct of the Rajya Sabha biennial elections highlights the unique constitutional and structural mechanism designed to maintain continuity and represent state interests within India's federal legislative architecture.

Significance in a Federal Structure

- **Safeguarding State Interests:** Acts as a federal safety valve, preventing the majoritarian impulses of the Lok Sabha from

overriding regional aspirations.

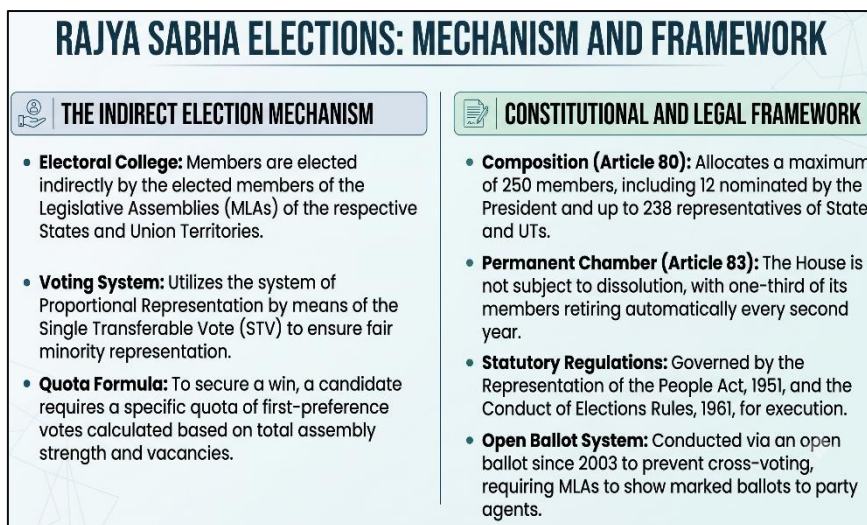
- **Deliberative Check:** Enhances democratic scrutiny by subjecting hasty lower house legislation to deep, non-partisan revision and experts' counsel.

Procedural and Governance Challenges

- **Cross-Voting and Money Power:** Despite the open ballot system, political maneuvering and cross-voting continue to strain electoral integrity during tight contests.
- **Anti-Defection Exemption:** The Supreme Court ruled that voting against party lines in Rajya Sabha polls does not attract disqualification under the Tenth Schedule.
- **Bypassing via Money Bills:** Labeling standard legislations as Money Bills under Article 110 systematically undermines the upper house's constitutional co-equal veto power.

Way Forward for Reform

- **Strengthening Transparency:** Introduce more transparent, digitally monitored voting mechanisms to minimize institutional corruption during indirect polls.
- **Strict Judicial Review:** Apply rigorous judicial review to check the executive practice of misclassifying ordinary legislative bills as Money Bills.

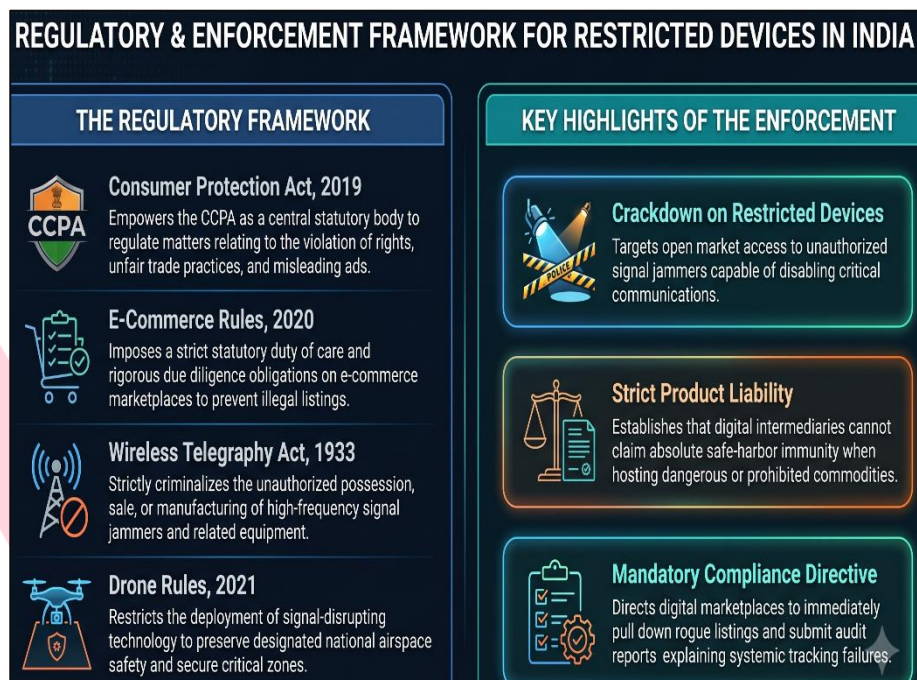


QUICK REVISION BOX: INDIAN POLITY	
UPSC KEYWORDS • Single Transferable Vote • Permanent Chamber • Open Ballot • Federal Valve	IMPORTANT ARTICLES • Article 80 (Composition) • Article 83 (Duration) • Article 110 (Money Bills)
IMPORTANT ACTS / RULES • Representation of the People Act, 1951 • Conduct of Elections Rules, 1961	CONSTITUTIONAL BODIES • Election Commission of India (Article 324)

7. Digital Market Oversight Tightened under Consumer Protection Act, 2019 (News on Air)

Context:

The Central Consumer Protection Authority (CCPA) issued punitive notices to six major e-commerce platforms for facilitating the unauthorized sale of restricted wireless devices, specifically drone and GPS jammers, violating consumer rights and national security protocols.



Significance for Security and Governance

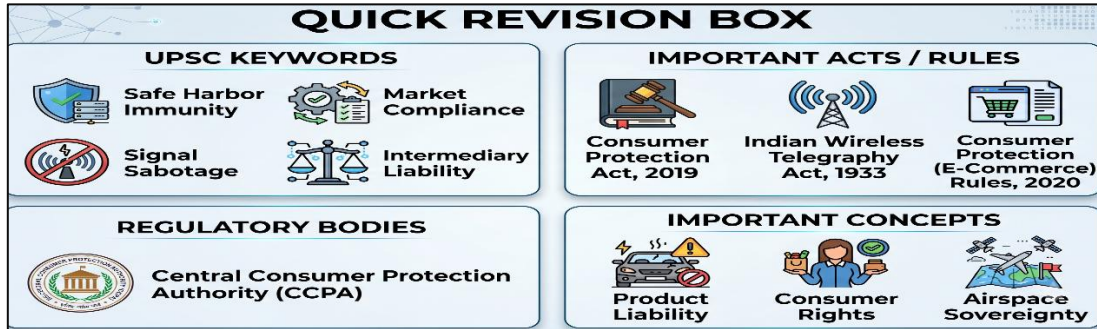
- **Protects Critical Infrastructure:** Prevents asymmetric threats against civil aviation navigation, financial networks, and VIP security convoys using unauthorized jammers.
- **Reinforces Intermediary Liability:** Sharpens platform accountability by transforming passive e-commerce marketplaces into actively monitored, compliant ecosystems.

Challenges in Digital Market Oversight

- **Algorithmic Whack-A-Mole:** Illicit sellers continuously circumvent automated platform keywords by subtly tweaking descriptions or using coded terminology.
- **Enforcement Duplicity:** Regulatory fragmentation across telecom, consumer affairs, and internal security ministries slows down synchronized cross-sectoral policing.

Way Forward

- **Real-Time API Integration:** Mandate e-commerce giants to link product listings with a centralized, government-approved whitelist of certified electronic devices.
- **Enacting Stringent Penal Clauses:** Introduce heavy corporate financial penalties and absolute forfeiture of intermediary exemptions for recurring security breaches.



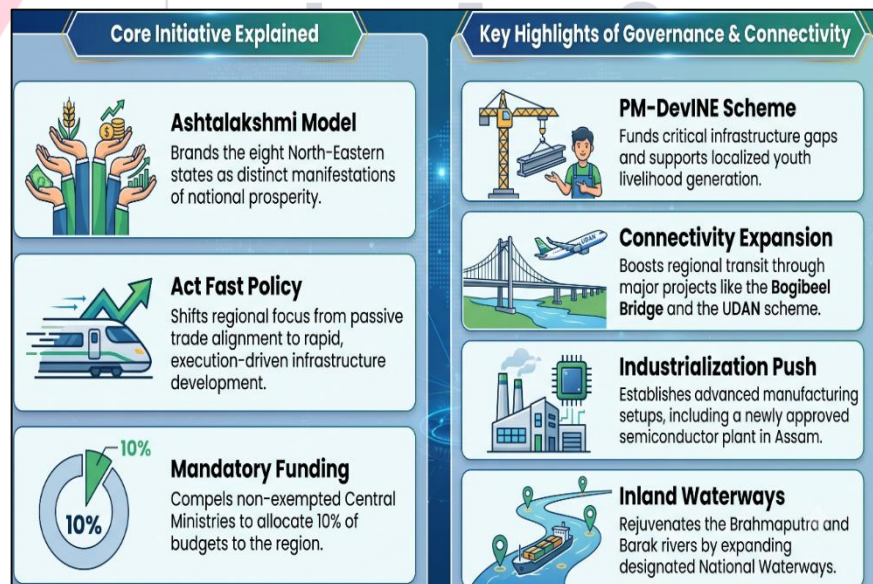
8. Ashtalakshmi Framework: North-East as India's Growth Engine (PIB)

Context:

The Union Government recently highlighted the "Ashtalakshmi" framework, underscoring how sustained policy support, connectivity expansion, and dedicated funding are transforming the eight North-Eastern states into India's strategic growth engine.

Significance for National Integration

- **Gateway to ASEAN:** Positions the region as India's primary land bridge to Southeast Asian markets.
- **Border Security:** Stabilizes frontier zones by anchoring local populations through robust economic growth.



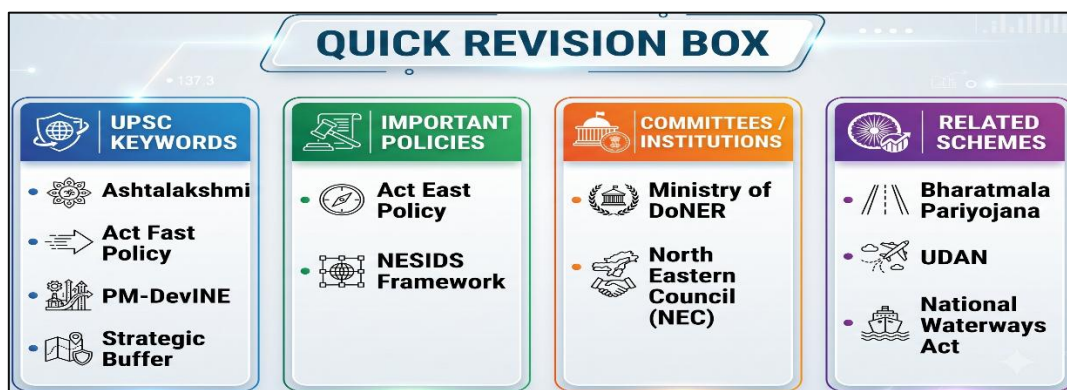
Challenges & Bottlenecks

- **Ecological Friction:** High seismic vulnerability and annual floods severely inflate project costs and timelines.

- **Insurgency Overhang:** Inter-community ethnic conflicts and porous borders occasionally disrupt administrative stability.

Way Forward

- **Cooperative Federalism:** Strengthen MDoNER and NEC coordination with states to ease land acquisition.
- **Ecological Balancing:** Implement rigorous, region-specific environmental impact assessments before sanctioning mega-infrastructure.



9. Anti-Defection Law: Party Mergers and Constitutional Challenges (Indian Express)

Context:

Recent political developments involving the split and merger of a political party have reignited debates on the efficacy of the Anti-Defection Law under the Tenth Schedule.

Constitutional & Legal Framework

- Inserted by the 52nd Constitutional Amendment Act, 1985 to combat political defections.
- Operationalized through Articles 102(2) (Parliament) and 191(2) (State Legislatures).
- The 91st Amendment Act, 2003 omitted the original provision allowing a 'split' by one-third of members.

Key Provisions for Valid Merger

- Governed exclusively by Paragraph 4 of the Tenth Schedule.
- A merger is valid only if at least two-thirds of the legislative party members agree to merge with another party.
- Grants immunity from disqualification to both the merging members and those opting to remain in the original party.
- The Presiding Officer (Speaker/Chairman) acts as the adjudicating authority.

Challenges / Concerns

- Legitimizes 'wholesale defections' while penalizing individual or 'retail' defections.
- Absence of a mandated timeframe allows Speakers to deliberately delay disqualification decisions.
- Partisan conduct of the Speaker undermines the neutrality of the adjudicatory process.

Way Forward

- Establish an independent permanent tribunal to decide defection cases, as suggested by the Supreme Court.
- Fix a mandatory three-month limit for the Speaker to dispose of disqualification petitions.
- Transfer disqualification powers to the President/Governor acting on the Election Commission's advice (NCRWC recommendation).

 QUICK REVISION BOX  		
	IMPORTANT ARTICLES	: 102(2), 191(2), 122, 212
	CONSTITUTIONAL AMENDMENTS	: 52nd CAA (1985), 91st CAA (2003)
	IMPORTANT SCHEDULES	: Tenth Schedule
	LANDMARK JUDGMENTS	: Kihoto Hollohan v. Zachillhu (1992), Keisham Meghachandra Singh v. Speaker (2020), Nabam Rebia v. Deputy Speaker (2016)
	COMMITTEES / COMMISSIONS	: NCRWC, Dinesh Goswami Committee

INTERNATIONAL RELATIONS

10. India-Oman Trade Deal and the Strait of Hormuz Crisis (NDTV World)

Context:

The India-Oman Comprehensive Economic Partnership Agreement (CEPA) has come into effect, opening an alternative trade and energy route to the Gulf beyond the Strait of Hormuz. The ongoing US-Iran conflict has severely disrupted shipping through the Strait of Hormuz, a critical chokepoint handling roughly 20% of global daily oil consumption.

Key Highlights

- **Tariff Elimination:** Oman offers zero-duty access on 98% of its tariff lines, covering over 99% of India's exports (e.g., gems, textiles, pharmaceuticals).
- **India's Concessions:** India reduces tariffs on 78% of its tariff lines, benefiting Omani energy, fertilizers, and industrial raw materials.
- **Trade Surge:** Despite the Gulf crisis, India's imports from Oman (crude oil, urea) surged by over 246% in April 2026.



Strategic Significance

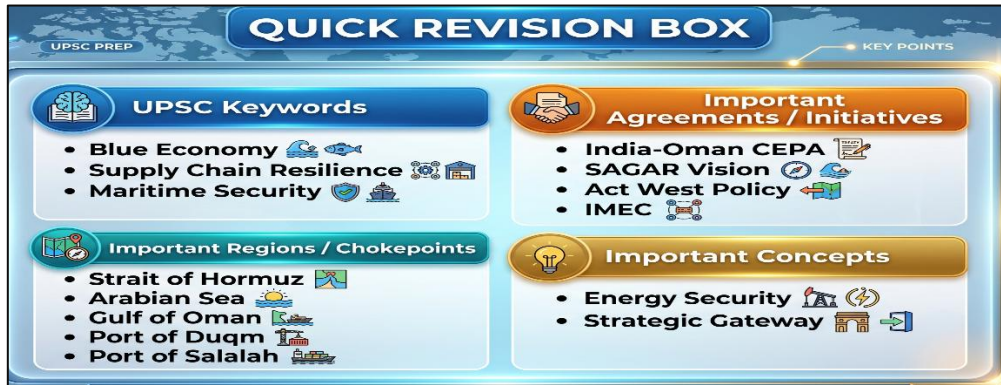
- **Bypassing Hormuz Chokepoint:** Oman's major ports (Salalah and Duqm) lie outside the Strait of Hormuz, directly on the Arabian Sea, ensuring uninterrupted access.
- **Energy & Fertilizer Security:** Ensures reliable supplies of crude oil, LNG, and critical industrial inputs like ammonia and urea during regional conflicts.
- **Gateway to Global Markets:** Oman acts as a strategic fallback hub and a springboard for Indian exports to Africa and Europe.
- **Geopolitical Resilience:** Aligns with India's 'Act West' policy and SAGAR vision, mitigating risks associated with supply chain disruptions in West Asia.

Challenges / Concerns

- **Modest Market Size:** With Oman's population around 5.5 million and GDP of \$110 billion, direct economic gains remain relatively modest.
- **Geopolitical Spillover:** Broader regional instability could still impact maritime security in the Arabian Sea and the Gulf of Oman.

Way Forward

- **Deepening Integration:** Expedite the integration of Omani ports with India's broader connectivity projects like the India-Middle East-Europe Economic Corridor (IMEC).
- **Diversifying Supply Chains:** Leverage Oman's free zones to enhance value-added manufacturing and strengthen blue economy partnerships in the Indian Ocean Region.



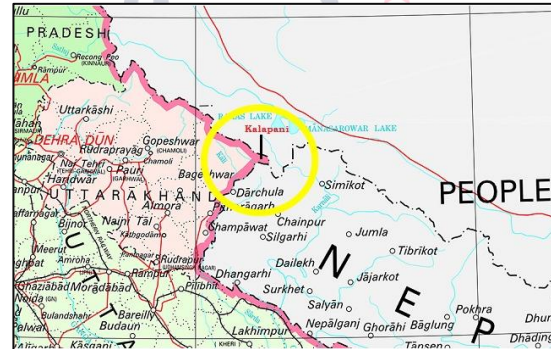
11. India-Nepal Border Dispute (NDTV World)

Context:

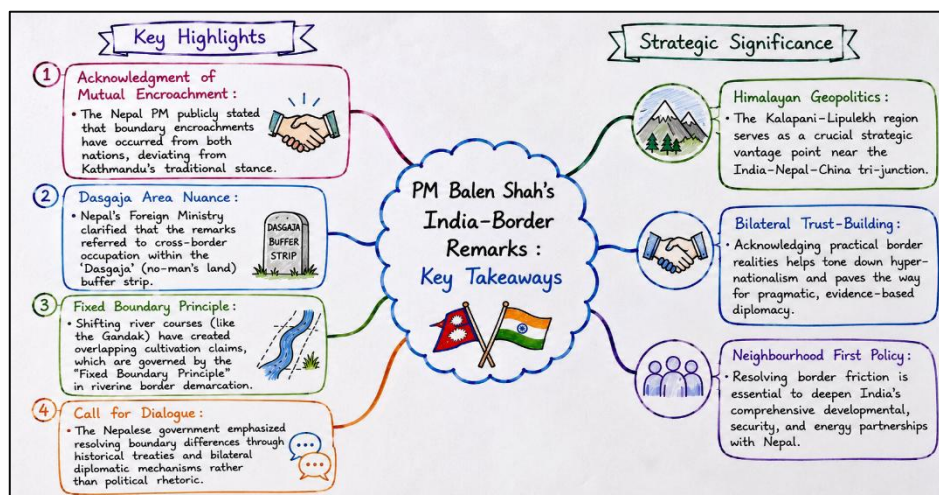
Nepal Prime Minister Balendra Shah's recent statement acknowledging cross-border land occupation by both Nepal and India has reignited domestic and bilateral debates over the unresolved India-Nepal boundary disputes.

Background:

- The 1816 Treaty of Sugauli delineated the India-Nepal boundary, using the Mahakali River (west) and Gandak River (south) as natural frontiers.
- Major unresolved territorial disputes exist in the Kalapani-Lipulekh-Limpiyadhura region (Uttarakhand) and the Susta region (Bihar).



Challenges / Concerns



- **Politicization of Borders:** Boundary issues are often leveraged in Nepal for domestic political mileage, complicating objective negotiations.
- **Cartographic Aggression:** Nepal's 2020 constitutional amendment incorporating Indian territories into its official map remains a significant diplomatic hurdle.
- **Open Border Vulnerabilities:** The porous 1,750 km boundary facilitates cross-border crime, smuggling, and unregulated demographic movements.

Way Forward

- **Reactivate Boundary Mechanisms:** Expedite the fieldwork of the India-Nepal Boundary Working Group to restore missing border pillars and resolve local disputes.
- **Quiet Diplomacy:** Prioritize sustained, closed-door bilateral talks over public posturing to resolve sensitive territorial issues amicably.
- **Leverage Economic Integration:** Focus on BBIN connectivity and cross-border hydropower projects to foster mutual interdependence that overshadows territorial friction.

★ QUICK REVISION BOX ★	
UPSC KEYWORDS	• Cross-border Occupation, Fixed Boundary Principle, Cartographic Aggression, Dasgaja Area.
IMPORTANT TREATIES / AGREEMENTS	• 1816 Treaty of Sugauli, 1950 India-Nepal Treaty of Peace and Friendship.
IMPORTANT BORDER AREAS	• Kalapani, Lipulekh, Limpiyadhura, Susta.
REGIONAL ORGANIZATIONS	• BBIN Initiative, BIMSTEC, SAARC.
IMPORTANT CONCEPTS	• Neighbourhood First Policy, Open Border Management.
RELATED CONNECTIVITY PROJECTS	• Kailash Mansarovar Yatra Link Road (Lipulekh Pass).

12. India's Blue Helmets Honoured in South Sudan (Times of India)

Context:

Over 550 Indian peacekeepers, including 53 women, deployed with the United Nations Mission in South Sudan (UNMISS) were recently awarded the prestigious UN Medal of Honour for their exceptional service.

KEY HIGHLIGHTS	SIGNIFICANCE FOR INDIA
 Multifaceted Operations: The 565 Indian 'Blue Helmets' were recognized for protecting civilians, conducting tactical patrols, and ensuring humanitarian access in conflict zones.	 Global Security Provider: As the second-largest troop contributor (over 4,200 personnel), India cements its role as a responsible stakeholder in maintaining international peace.
 Grassroots Engagement: Peacekeepers successfully organized community-centric initiatives like veterinary camps, women's self-defence training, and anti-gender-violence campaigns.	 Defence Diplomacy: Grassroots civil-military action enhances India's soft power and deepens strategic ties with African nations.
 Gender Parity in Peacekeeping: The inclusion of 53 female personnel highlights India's ongoing commitment to the UN's Women, Peace, and Security (WPS) agenda.	 UNSC Aspirations: Consistent and substantive contributions to UNPKOs validate India's legitimate claim for a permanent seat in a reformed UN Security Council.
 Supreme Sacrifice: Reinforcing India's legacy, two Indian peacekeepers recently received the posthumous Dag Hammarskjöld Medal, the highest UN honour for sacrifice in the line of duty.	 Global South Leadership: Demonstrates India's proactive approach to conflict resolution, stability, and post-conflict nation-building in the developing world.

Challenges:

- **Asymmetric Threats:** Peacekeepers increasingly face targeted attacks from non-state actors and armed militias in volatile regions.
- **Resource Deficit:** Many missions operate with underfunded budgets, inadequate technological resources, and ambiguous mandates.
- **Exclusion from Decision-Making:** Major Troop Contributing Countries (TCCs) like India lack adequate representation in the UNSC when peacekeeping mandates are drafted.

Way Forward

- **Mandate Clarity:** Implement the recommendations of the Brahimi Report to ensure that peacekeeping mandates are realistic, clear, and adequately resourced.
- **Institutional Reforms:** Democratize the UNSC to give TCCs a decisive voice in the planning and transition of peacekeeping operations.
- **Technological Upgradation:** Equip Blue Helmets with advanced intelligence-gathering, early-warning systems, and modern protective gear to counter emerging threats.

QUICK REVISION BOX	
 UPSC KEYWORDS	• Blue Helmets, Responsibility to Protect (R2P), Defence Diplomacy, Vasudhaiva Kutumbakam.
 IMPORTANT UN MISSIONS	• UNMISS (South Sudan), MONUSCO (DR Congo), UNIFIL (Lebanon).
 UN ORGANS / INSTITUTIONS	• UN Security Council, UN Peacekeeping Forces.
 IMPORTANT AWARDS	• UN Medal of Honour, Dag Hammarskjöld Medal, Military Gender Advocate of the Year Award.
 IMPORTANT CONCEPTS	• Women, Peace, and Security (WPS) agenda.

13. India-UK Critical Minerals Observatory: Securing Supply Chain Resilience (PIB)

Context:

India and the UK recently launched the Critical Minerals Global Supply Chain Observatory to enhance bilateral cooperation in resource security and technological innovation.

Background

- Aligned with the India-UK Comprehensive Strategic Partnership and the broader Roadmap 2030 framework.
- Aims to mitigate global vulnerabilities stemming from China's dominant control over critical mineral processing and refining.

Key Highlights

- Acts as a joint bilateral platform to monitor, analyze, and forecast global supply chain trends for critical minerals.
- Facilitates real-time data exchange regarding market demands, geopolitical risks, and raw material bottlenecks.
- Promotes collaborative research in deep-tech extraction, sustainable refining, and recycling of Rare Earth Elements (REEs).

STRATEGIC SIGNIFICANCE FOR INDIA	
	Supply Chain Resilience: Diversifies mineral sourcing beyond concentrated markets, safeguarding India's economic security.
	Clean Energy Transition: Secures vital inputs (like Lithium and Cobalt) needed for electric mobility and battery manufacturing.
	Technological Advancement: Ensures uninterrupted raw material supply for India's growing semiconductor ecosystem, aerospace, and defence sectors.
	Geopolitical Synergy: Complements India's strategic objectives within the US-led Mineral Security Partnership (MSP).
	Self-Reliance: Strengthens the Atmanirbhar Bharat and Make in India visions by securing the foundation of advanced manufacturing.

Challenges / Concerns

- High capital requirements and long gestation periods for establishing domestic deep-tech mineral processing infrastructure.
- Geopolitical weaponization of critical minerals through sudden export controls by dominant nations.
- Ecological and social challenges associated with scaling up domestic mining and extraction activities.

Way Forward

- Fast-track the implementation of India's National Critical Mineral Mission to build indigenous processing capabilities.

- Incentivize private sector participation in urban mining and circular economy models for efficient e-waste recycling.
- Leverage the ongoing India–UK Free Trade Agreement (FTA) negotiations to secure preferential trade terms for critical minerals.

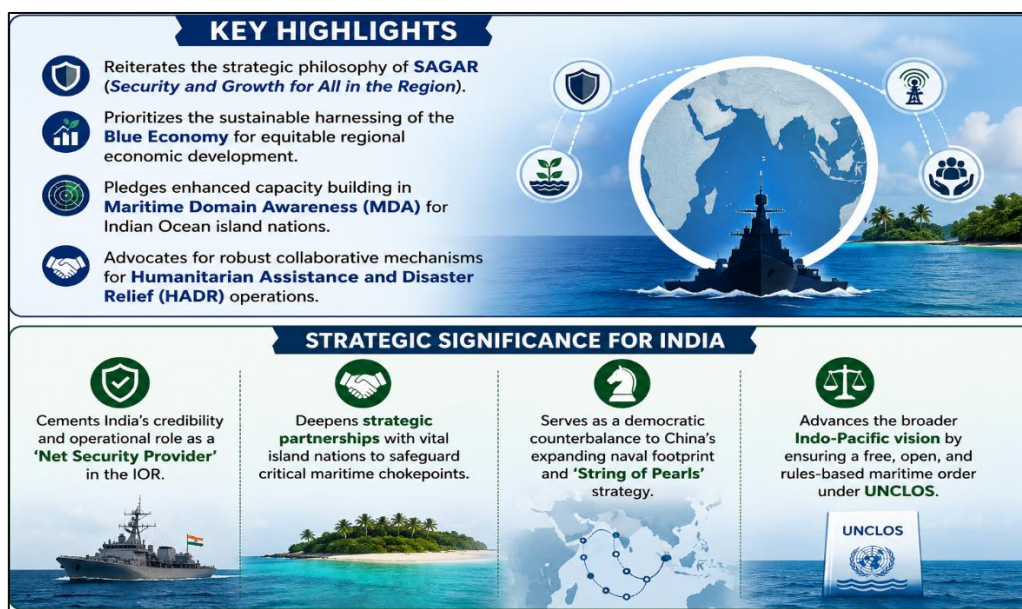
QUICK REVISION BOX		
	UPSC Keywords:	Strategic Autonomy, Supply Chain Resilience, Urban Mining, Circular Economy.
	Important Bilateral Initiatives:	Roadmap 2030, India–UK Comprehensive Strategic Partnership.
	International Partnerships:	Mineral Security Partnership (MSP).
	Important Minerals:	Lithium, Cobalt, Nickel, Rare Earth Elements (REEs).
	Important Concepts:	Clean Energy Transition, Weaponization of Supply Chains.
	Related Government Missions:	National Critical Mineral Mission, Make in India.

14. Ocean of Opportunity: India's SAGAR Vision in the Indian Ocean Region (The Hindu)

Context:

During a recent visit to Seychelles, the Prime Minister articulated India's vision to transform the Indian Ocean Region (IOR) into an "Ocean of Opportunity", reaffirming a commitment to shared prosperity and maritime security.

- **Background:** The IOR hosts critical Sea Lines of Communication (SLOCs) that facilitate over two-thirds of global oil shipments and one-third of bulk cargo.



Challenges

- Escalating militarization and geopolitical competition by extra-regional powers in the Indian Ocean.

- Proliferation of non-traditional threats including piracy, drug trafficking, and Illegal, Unreported, and Unregulated (IUU) fishing.
- Severe climate change vulnerabilities and rising sea levels threatening the Exclusive Economic Zones (EEZ) of island states.

Way Forward

- Actively operationalize the MAHASAGAR initiative to streamline regional maritime security cooperation.
- Expand real-time intelligence and data sharing through the Information Fusion Centre for Indian Ocean Region (IFC-IOR).
- Empower regional institutional frameworks like the Indian Ocean Rim Association (IORA) and the Colombo Security Conclave.

QUICK REVISION BOX	
 UPSC Keywords	Net Security Provider, Blue Economy, SLOCs, String of Pearls.
 Important Maritime Initiatives	SAGAR, MAHASAGAR, IFC-IOR.
 International Organizations / Groupings	IORA, IONS, Colombo Security Conclave.
 Important Maritime Concepts	Maritime Domain Awareness (MDA), HADR, UNCLOS, EEZ.
 Important Places in News	Seychelles (Assumption Island).

15. India's First Responder Role: Operation Amistad (News on Air)

Context:

India successfully concluded 'Operation Amistad,' a Humanitarian Assistance and Disaster Relief (HADR) mission, to support Venezuela following devastating twin earthquakes.

KEY HIGHLIGHTS	
	Mission Amistad: Named after the Spanish word for “Friendship,” the operation delivered over 35 tonnes of emergency humanitarian relief and medical supplies.
	Rapid Deployment: The Indian Air Force deployed C-17 Globemaster aircraft carrying a specialized medical contingent from the Indian Army’s 60 Para Field Hospital.
	Technological Integration: Deployed BHISHM (Bharat Health Initiative for Sahyog, Hita, and Maitri) Cubes—indigenous, rapidly deployable portable hospitals capable of treating up to 200 casualties.
	Comprehensive Care: The self-reliant task force provided critical trauma management and life-saving surgical support within the crucial ‘golden hour’.
STRATEGIC SIGNIFICANCE FOR INDIA	
	Vishwa Bandhu Approach: Reinforces India’s foreign policy paradigm of ‘Vasudhaiva Kutumbakam’ and its emerging role as a global ‘First Responder’ in crises.
	Disaster Diplomacy: Translates HADR capabilities into an effective tool of soft power, bolstering diplomatic goodwill in the resource-rich Latin American region.
	South-South Cooperation: Demonstrates India’s commitment to supporting the Global South, offering a sustainable alternative to traditional Western-led humanitarian aid.
	Showcasing Indigenous Innovation: The successful international deployment of the BHISHM Cubes highlights India’s self-reliance (Atmanirbhar Bharat) in disaster-response technology.

Challenges

- **Logistical Constraints:** The lack of robust air-to-air refuelling capabilities for ultra-long-haul strategic airlifts across continents.
- **Complex Operating Environments:** Navigating severe infrastructure damage, complex airspace regulations, and local administrative bottlenecks during rapid deployments.

Way Forward

- **Capacity Building:** Upgrade long-range strategic airlift and mid-air refuelling capabilities to ensure faster, seamless global response times.
- **Framework Integration:** Align bilateral HADR operations with multilateral frameworks like the Sendai Framework and INSARAG to standardize protocols and enhance global interoperability.

QUICK REVISION BOX		
	UPSC KEYWORDS	Disaster Diplomacy, Vishwa Bandhu, South-South Cooperation, Golden Hour.
	IMPORTANT DISASTER RELIEF OPERATIONS	Operation Amistad (Venezuela), Operation Dost (Turkey-Syria), Operation Maitri (Nepal), Operation Karuna (Myanmar).
	INTERNATIONAL FRAMEWORKS	Sendai Framework, INSARAG.
	IMPORTANT CONCEPTS	HADR, Vasudhaiva Kutumbakam.
	RELATED GOVERNMENT INSTITUTIONS	Indian Armed Forces, NDRF.

16. India–Iran Ties: Strategic Partnership & Connectivity Imperatives (Indian Express)

Context:

Recent diplomatic engagements and changing West Asian geopolitics have renewed focus on India–Iran bilateral ties. Relationship is anchored by the 2001 Tehran Declaration and the 2003 New Delhi Declaration.

KEY HIGHLIGHTS	STRATEGIC SIGNIFICANCE FOR INDIA
 Transit Access: Iran provides India land access to Central Asia and Russia, bypassing Pakistan.	 Strategic Autonomy: Helps India balance relations between the US, Israel, and Arab Gulf states.
 Chabahar Port: India is developing the strategic Shahid Beheshti Terminal at Chabahar Port.	 Act West Policy: Forms a critical pillar for India's extended neighborhood outreach.
 Connectivity Hub: Chabahar integrates into the multi-modal International North-South Transport Corridor (INSTC).	 Maritime Security: Secures vital Sea Lines of Communication (SLOCs) around the Strait of Hormuz.
 Multilateralism: Both nations coordinate through expanded frameworks like the SCO and BRICS.	 Energy Security: Offers a long-term, geographically proximate source for India's hydrocarbon imports.

Challenges / Concerns

- **Sanctions Impact:** Western sanctions delay project execution and block formal banking channels.
- **Regional Conflicts:** Geopolitical volatility in West Asia threatens commercial shipping and regional stability.
- **China Factor:** Growing Beijing-Tehran strategic convergence poses competition to Indian interests.
- **Competing Corridors:** Managing trade balancing between the INSTC and the proposed IMEC project.

Way Forward

- **Alternative Payments:** Strengthen rupee-rial mechanisms to insulate trade from Western sanctions.
- **Infrastructure Push:** Fast-track the operationalization of the INSTC and custom harmonization.
- **Pragmatic Diplomacy:** Maintain de-hyphenated engagement independent of extra-regional geopolitical equations.

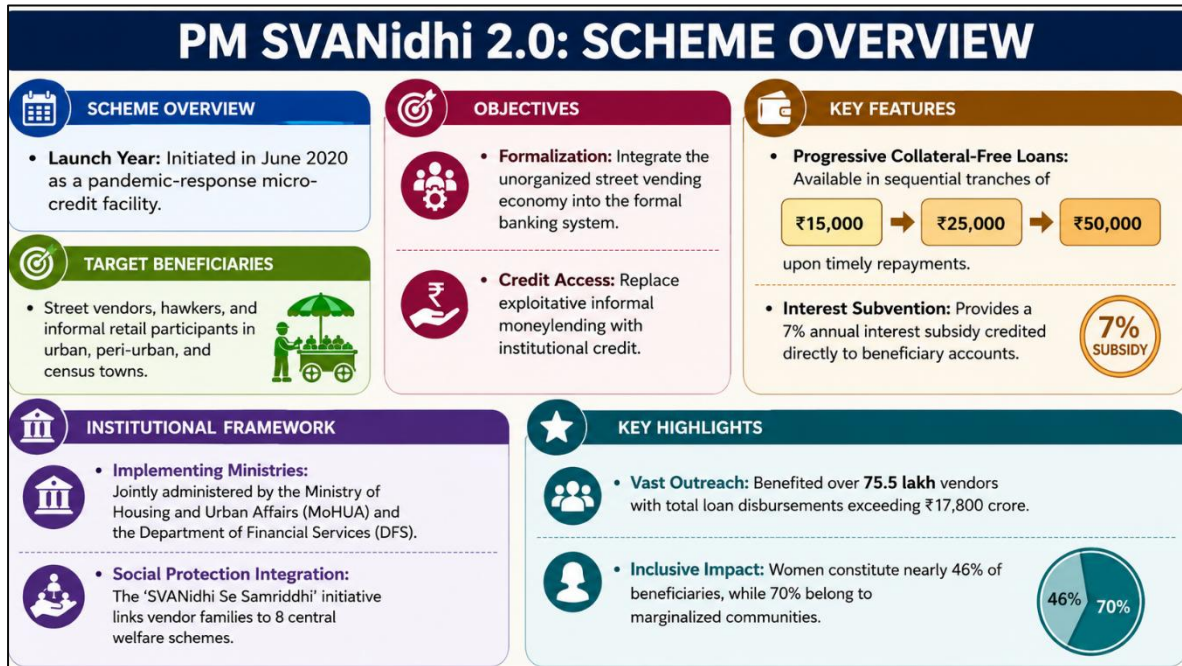
QUICK REVISION BOX		
	UPSC KEYWORDS	• Strategic Autonomy • De-hyphenated Diplomacy • Extended Neighborhood
	IMPORTANT BILATERAL PROJECTS	• Chabahar Port Development • Tehran Declaration (2001)
	IMPORTANT CORRIDORS / CHOKEPOINTS	• INSTC • IMEC • Strait of Hormuz
	INTERNATIONAL GROUPINGS	• BRICS • Shanghai Cooperation Organisation (SCO)
	IMPORTANT CONCEPTS	• Energy Security • Sea Lines of Communication (SLOCs)

ECONOMY

17. PM SVANidhi 2.0: Extending Credit, Securing Livelihoods (PIB)

Context:

The Union Cabinet recently approved the restructuring of the PM SVANidhi Scheme, extending its lending period to March 31, 2030, and enhancing micro-credit limits to strengthen urban livelihood security.



Economic Significance

- **Financial Inclusion:** Establishes formal credit histories for previously unbanked populations.
- **Digital Financial Ecosystem:** Drives the JAM Trinity by habituating vendors to UPI-based retail transactions.
- **Urban Poverty Alleviation:** Acts as a vital safety net, increasing vendor incomes by an average of 20% annually.
- **Inclusive Growth:** Directly aligns with SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth).

Challenges

- **Digital Literacy Gap:** Cashless incentives remain underutilized due to digital divides among older vendors.
- **Administrative Delays:** Slow issuance of Certificates of Vending (CoV) by Urban Local Bodies (ULBs) hinders quick loan disbursement.

Way Forward

- Targeted Capacity Building: Expand digital and financial literacy camps at the ULB level.
- Enterprise Graduation: Seamlessly converge successful PM SVANidhi borrowers with the Mudra Yojana for larger capital needs.’=

QUICK REVISION BOX		
	UPSC Keywords	: Microfinance, Formalization of Informal Sector, Priority Sector Lending, JAM Trinity.
	Launch Year	: 2020.
	Ministry	: MoHUA and DFS.
	Target Beneficiaries	: Urban and peri-urban street vendors.
	Loan Structure	: ₹15k, ₹25k, and ₹50k sequential tranches.
	Interest Subsidy	: 7% per annum.
	Related Schemes	: DAY-NULM, PM Mudra Yojana, Digital India.
	Important Concepts	: Collateral-free lending, Credit history creation, Interest subvention.

18. Navachar Mantra: Grassroots Innovation for Atmanirbhar Bharat (PIB)

Context:

The Ministry of Skill Development and Entrepreneurship (MSDE) recently launched the 'Navachar Mantra' initiative to empower grassroots innovators and strengthen India's early-stage entrepreneurial ecosystem.

	INITIATIVE OVERVIEW & OBJECTIVES • Vision: To identify, nurture, and scale high-potential grassroots innovations into sustainable enterprises. • Democratizing Innovation: Shifts the startup ecosystem's focus from metropolitan hubs to Tier-2/Tier-3 cities, rural areas, and aspirational districts.
	INSTITUTIONAL FRAMEWORK • Nodal Ministry: Ministry of Skill Development and Entrepreneurship (MSDE). • Implementing Agencies: National Institute for Entrepreneurship and Small Business Development (NIESBUD) alongside FITT, IIT Delhi as the Technical Knowledge Partner.
	KEY FEATURES & TARGET BENEFICIARIES • Inclusive Eligibility: Open to Indian citizens (18-55 years); allows unregistered entities and early-stage ideas (concept, prototype, or early revenue). • Priority Sectors: AgriTech, HealthTech, EdTech, Climate Sustainability, Rural Commerce, and MSME Enablement. • Support Mechanism: Offers a structured 12-month program providing expert mentorship, IP guidance, regulatory compliance support, and market linkage.
	KEY HIGHLIGHTS • Ecosystem Integration: Connects innovators directly with policymakers, venture capitalists, incubators, and industry leaders. • Financial Access: Facilitates fundraising avenues through structural linkage to institutional credit and venture frameworks.

Economic Significance

- **Inclusive Economic Development:** Bridges the urban-rural divide by driving localized innovation-led growth and productivity enhancement.
- **Employment Generation:** Catalyzes the shift from job seekers to job creators, complementing Startup India and Stand-Up India.

- **Atmanirbhar Bharat:** Cultivates indigenous intellectual property (IPR) and grassroots technology to solve local challenges.

Challenges

- **Information Asymmetry:** Limited awareness regarding IPR and regulatory compliance among rural innovators.
- **Funding Bottlenecks:** Reluctance of formal venture capital to invest in highly localized, early-stage unproven ideas.

Way Forward

- **Convergence:** Synergizing with the Atal Innovation Mission (AIM) and National Innovation Foundation for a continuous innovation pipeline.
- **Decentralized Incubation:** Expanding localized capacity-building hubs to ensure last-mile mentorship and ecosystem support.

QUICK REVISION BOX	
	UPSC KEYWORDS : Grassroots Innovation, Entrepreneurial Ecosystem, Inclusive Growth.
	IMPLEMENTING MINISTRY / AGENCY : MSDE, NIESBUD, FITT-IIT Delhi.
	TARGET BENEFICIARIES : Early-stage innovators (18-55 years), Tier-2/3 cities.
	KEY FEATURES : 12-month mentorship, IP guidance, market linkages.
	RELATED GOVERNMENT INITIATIVES : Startup India, Atal Innovation Mission.
	IMPORTANT CONCEPTS : Intellectual Property Rights (IPR), Atmanirbhar Bharat.

19. India Revises WPI Base Year, Introduces PPI (PIB)

Context:

The Office of the Economic Adviser, DPIIT has recently updated the base year for the Wholesale Price Index (WPI) from 2011–12 to 2022–23 and has launched the inaugural Producer Price Indices (PPI), with a strategy to gradually phase out the WPI over a period of five years.

CORE CONCEPTS		WPI vs CPI vs PPI	
WHOLESALE PRICE INDEX (WPI)		CPI	Tracks retail prices of goods and services from a consumer's perspective and is used by the RBI for inflation targeting.
• Definition: A macroeconomic indicator measuring the average change in prices of goods traded in bulk at the wholesale level. • Institutional Framework: Compiled and released monthly by the Office of the Economic Adviser (OEA) under the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce & Industry. • Components: WPI is a goods-based index divided into Primary Articles, Fuel & Power, and Manufactured Products.	WPI	Captures wholesale transaction prices including indirect taxes and imports.	
	PPI	Captures factory-gate basic prices (excluding indirect taxes) and strictly measures domestic production.	
PRODUCER PRICE INDEX (PPI)		KEY HIGHLIGHTS	
• Definition: An internationally accepted index that tracks the average change over time in the selling prices received by domestic producers for their output. • Framework: The new PPI system introduces an Output PPI, an experimental Input PPI, and a Service PPI.	• Expanded Coverage: The WPI basket has increased from 697 to 957 items. • Methodological Shift: Weights are now derived using Gross Value of Output (GVO) instead of Net Traded Value, better reflecting domestic production scale. • Renewable Energy Integration: Solar, wind, and nuclear electricity have been added to the 'Electricity' group to reflect India's changing energy mix. • Service Sector Representation: A quarterly Service PPI covering seven sectors (e.g., banking, telecom, railways) has been launched for the first time.		
BASE YEAR REVISION			
• Rationale: Periodic revisions capture structural economic shifts, changing consumption patterns, and the emergence of new commodities, ensuring accurate economic planning.			

Economic Significance

- **Removing Tax Illusion:** PPI tracks the "Basic Price," ensuring that hikes in indirect taxes do not create artificial inflation spikes.
- **Global Alignment:** Replacing WPI with PPI aligns India's statistical system with IMF standards and the practices of advanced economies.
- **Better Policy Formulation:** Eliminating the imported inflation bias allows the RBI and the government to accurately gauge the health of domestic manufacturing.
- **Smooth Transition:** Running WPI and PPI parallel for five years will give businesses sufficient time to modify price escalation clauses in infrastructure and PPP contracts.

Challenges / Limitations

- **Data Bottlenecks for Services:** Relying on administrative sources limits the initial Service PPI rollout to only seven sectors, leaving major areas like IT and real estate excluded.
- **Transitional Friction:** Shifting long-term commercial contracts from a WPI-linked escalation model to a PPI-linked one may require complex renegotiations.

Way Forward

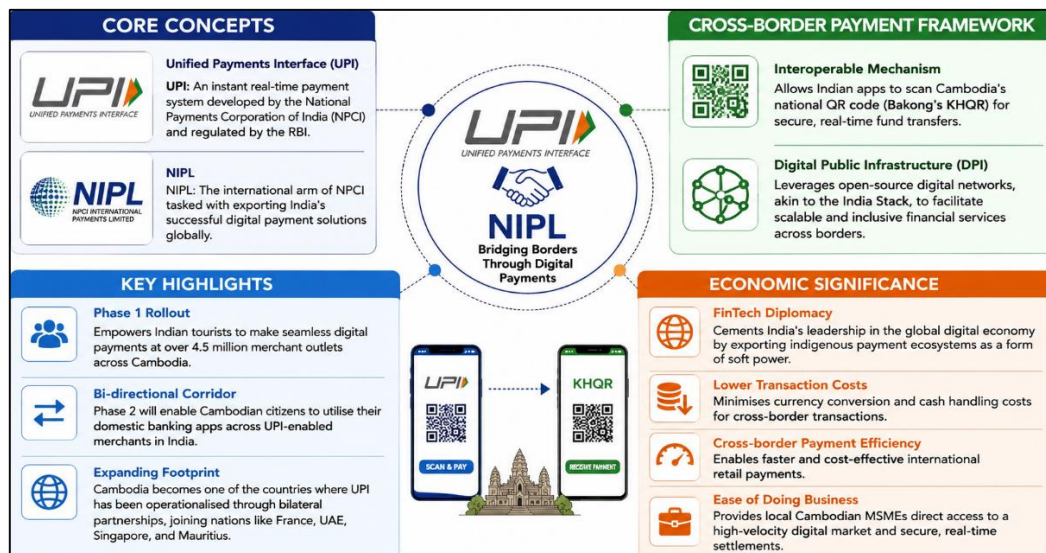
- **Expanding the Service Basket:** Progressively integrate more tertiary sectors into the Service PPI to accurately reflect its ~55% contribution to India's GDP.
- **Stakeholder Sensitization:** Launch targeted awareness campaigns and provide clear regulatory guidelines to help MSMEs transition seamlessly to the PPI framework.

QUICK REVISION BOX	
UPSC Keywords:	Tax Illusion, Gross Value of Output (GVO), Structural Economic Shift.
Base Year:	2022–23.
Releasing Authority:	Office of the Economic Adviser, DPIIT.
Components of WPI:	Primary Articles, Fuel & Power, Manufactured Products.
Important Concepts:	Output PPI, Input PPI, Target Mean Imputation.
Related Economic Indicators:	CPI, GDP Deflator, Index of Industrial Production (IIP).

20. UPI Goes Global: India–Cambodia Digital Payments Link (News on Air)

Context:

The NPCI International Payments Limited (NIPL) has partnered with ACLEDA Bank to launch Unified Payments Interface (UPI) acceptance in Cambodia, further globalising India's Digital Public Infrastructure (DPI).



Challenges

- **Regulatory Divergence:** Harmonising data localisation mandates and cybersecurity protocols across differing sovereign jurisdictions.
- **Currency Settlement Risks:** Managing real-time currency conversion rates and clearing latency in bilateral cross-border transactions.

Way Forward

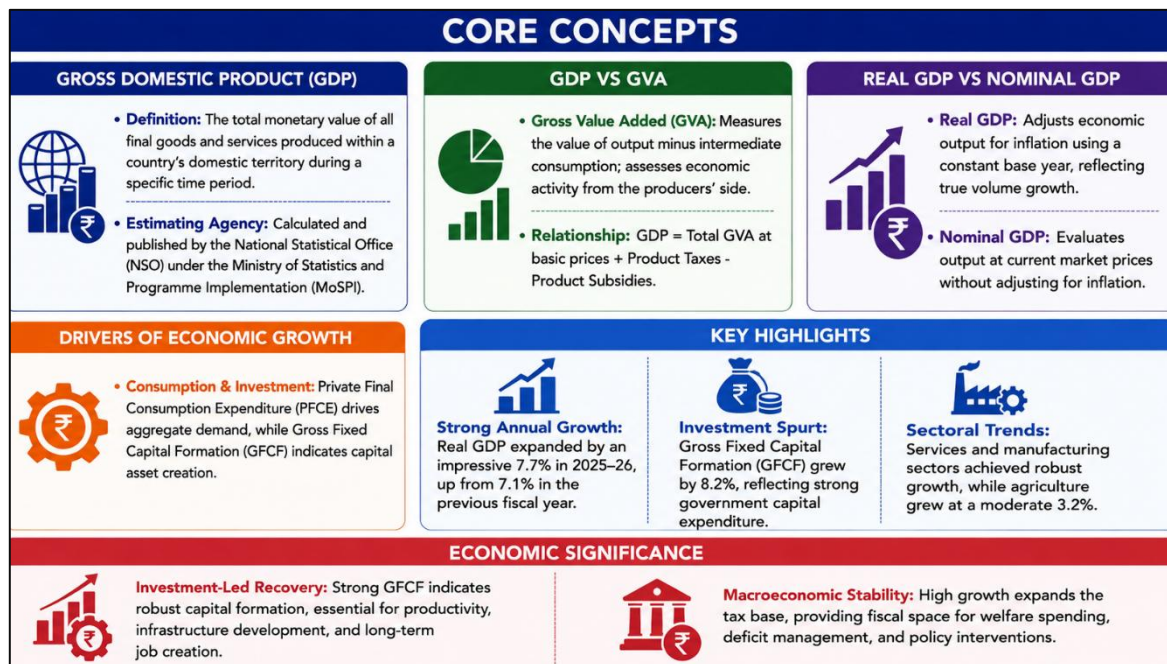
- **Interoperable Standards:** Strengthen bilateral payment connectivity through interoperable digital payment standards.
- **Synergistic Expansion:** Integrating the RuPay credit network alongside UPI linkages to comprehensively broaden cross-border financial inclusion.

QUICK REVISION BOX	
	UPSC Keywords: Digital Public Infrastructure (DPI), FinTech Diplomacy, Cross-border Interoperability.
	Implementing Institutions: NIPL and ACLEDA Bank.
	Partner Country / Platform: Cambodia / Bakong's KHQR.
	Related Initiatives: India Stack, RuPay Global.
	Important Concepts: Real-Time Payments, Foreign Exchange Volatility.

21. India's GDP Growth Pegged at 7.7% in 2025-26 (The Hindu)

Context:

The Government of India recently released the Provisional Estimates of Annual GDP, estimating real GDP growth at 7.7% for the financial year 2025-26, highlighting sustained economic resilience amidst global uncertainties.



Challenges / Risks

- Geopolitical Headwinds:** Supply chain disruptions and volatile crude oil prices risk imported inflation and a widened Current Account Deficit.
- Agricultural Vulnerability:** Dependency on unpredictable monsoons impacts rural incomes and suppresses rural consumption demand.

Way Forward

- Boosting Private Investment:** Easing regulatory compliance to ensure the private sector crowds in alongside government expenditure.
- Agricultural Modernization:** Promoting climate-resilient farming and advanced irrigation networks to minimize primary sector volatility.

QUICK REVISION BOX	
	UPSC Keywords: Capital Formation, GVA at Basic Prices, Real vs Nominal GDP.
	Estimating Agency: MoSPI (NSO).
	Important Economic Indicators: GFCF, PFCE, GDP Deflator.
	Important Concepts: Capital Expenditure, Macroeconomic Stability, Business Cycle.

22. Deepening G-Sec Market, Liberalising FPI Access (PIB)

Context:

The Government of India has introduced major reforms to deepen the Government Securities (G-Sec) market and boost Foreign Portfolio Investment (FPI) in equities, aiming to integrate India into global financial markets.

CORE CONCEPTS		KEY HIGHLIGHTS	
 Government Securities (G-Secs) & G-Sec Market G-Secs: Tradable instruments issued by the Central or State Governments acknowledging debt obligations, carrying zero default risk. G-Sec Market Framework: Managed by the RBI to finance the fiscal deficit, acting as a benchmark for pricing corporate bonds.	 Foreign Portfolio Investment (FPI) & FDI/FPI Passive investment by non-residents in Indian securities seeking short-term capital gains without management control.	 Tax Exemptions: Complete income tax exemption on interest and capital gains from G-Secs for FPIs, effective April 1, 2026.	
		 Equity Market Access: Individual Persons Resident Outside India (PROI) can now invest in listed equities through the Portfolio Investment Scheme.	
		 FAR Expansion: Inclusion of 15, 30, and 40-year G-Secs and Sovereign Green Bonds (SGrBs) under the Fully Accessible Route (FAR).	
 FPI vs FDI FDI involves long-term direct control and technology transfer, whereas FPI is highly liquid financial capital.		 Easing Restrictions: Removal of short-term, concentration, and security-wise investment limits for FPIs under the General Route.	
ECONOMIC SIGNIFICANCE			
 Yield Curve Development: Access to long-tenor G-Secs builds a smoother sovereign yield curve, aiding effective corporate bond pricing.	 Capital Market Deepening: Simplifies market access, boosting liquidity and stabilizing the Government Borrowing Programme.	 External Sector Stability: Attracts patient, long-term capital from pension and sovereign wealth funds, strengthening the capital account.	

Challenges / Concerns

- **Currency Volatility:** Sudden outflows of volatile FPI capital can trigger currency depreciation and disrupt domestic financial markets.
- **Macroeconomic Vulnerability:** Increased foreign exposure links domestic bond yields directly to global interest rate fluctuations.

Way Forward

- **Macro-Prudential Buffers:** Maintaining robust foreign exchange reserves to cushion the economy against abrupt capital flight.
- **Corporate Bond Synergy:** Translating the enhanced liquidity of the sovereign debt market into a vibrant corporate bond market for private capital formation.

QUICK REVISION BOX	
	UPSC Keywords: Yield Curve, Hot Money, Sovereign Borrowing, Capital Account.
	Regulatory Institutions: RBI, SEBI, Ministry of Finance (DEA).
	Important Financial Instruments: G-Secs, Sovereign Green Bonds (SGrBs).
	Related Reforms: Fully Accessible Route (FAR), JP Morgan Global Bond Index inclusion.
	Important Concepts: FPI vs FDI, Fiscal Deficit Financing.

23. Ease of Doing Business: From Compliance to Trust (PIB)

Context:

The Government recently released a comprehensive review of India's Ease of Doing Business (EoDB) reforms, highlighting the structural transition from a compliance-heavy regulatory regime to a trust-based, digital-first facilitation ecosystem.



Challenges

- **Implementation Asymmetry:** Uneven adoption of the District Business Reform Action Plan (D-BRAP) across states creates fragmented regulatory experiences at the local level.
- **Judicial Bottlenecks:** Prolonged commercial dispute resolution and weak contract enforcement continue to deter long-term foreign institutional investment.

Way Forward

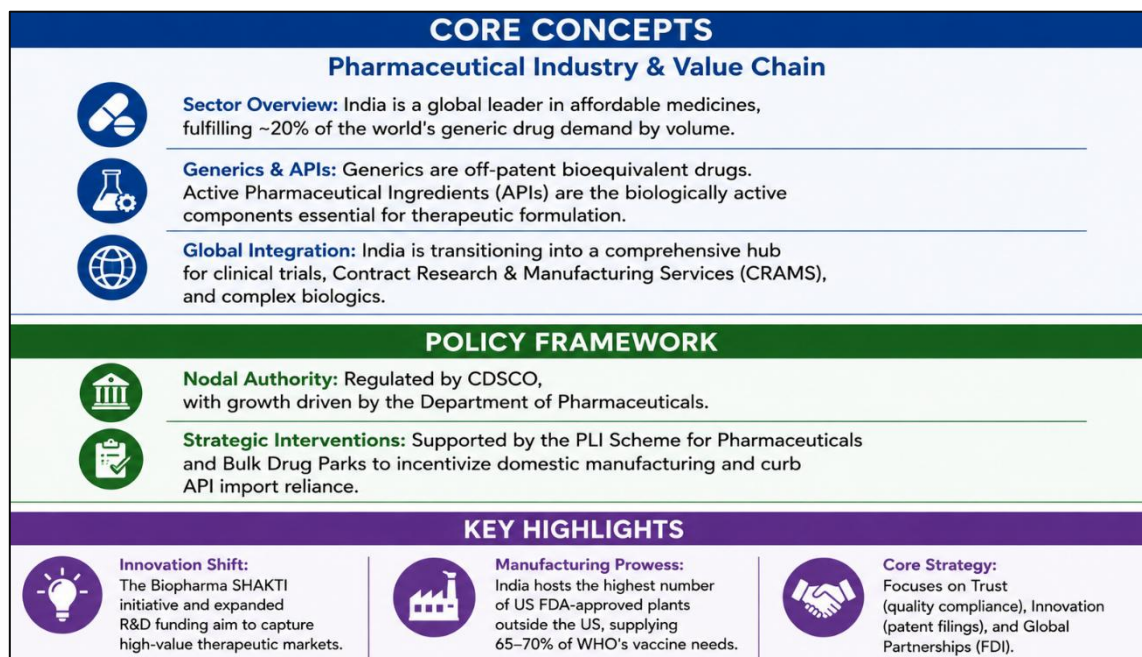
- **Grassroots Standardisation:** Expanding localized single-window clearance desks at the municipal and collectorate levels.
- **Judicial Reforms:** Strengthening commercial courts and alternative dispute resolution mechanisms to guarantee swift contract enforcement.

QUICK REVISION BOX		
	UPSC Keywords:	Trust-based Governance, Inspector Raj, Single Window System, Compliance Burden.
	Important Institutions:	DPIIT, Ministry of Corporate Affairs (MCA).
	Important Government Initiatives:	PM Gati Shakti, Startup India, Make in India, PLI Scheme.
	Related Acts / Reforms:	Jan Vishwas Act, Business Reforms Action Plan (BRAP).
	Related Reports:	World Bank GovTech Maturity Index, IMD World Competitiveness Ranking.

24. India's Pharma Shift: From Generics to Biopharma Innovation (PIB)

Context:

The Government aims to double India's \$60 billion pharmaceutical industry over the next five years, pivoting from volume-driven generic medicine dominance to an innovation-led global biopharma ecosystem.



Economic Significance

- **Export Competitiveness:** Advancing beyond low-margin generics to patented drugs maximizes value realization and strengthens export revenues.
- **Healthcare Security:** Securing domestic API production advances Atmanirbhar Bharat, shielding the healthcare sector from global supply chain shocks.

Challenges

- **Import Vulnerability:** Heavy reliance on China for critical Key Starting Materials (KSMs) and bulk APIs threatens supply chain resilience.
- **Regulatory Scrutiny:** Frequent compliance flags from international regulators like the US FDA impact global market access and brand equity.

Way Forward

- **R&D Ecosystem:** Strengthening Intellectual Property Rights (IPR) and industry-academia linkages to transition from 'Make in India' to 'Discover in India'.
- **Quality Standardisation:** Upgrading Good Manufacturing Practices (GMP) and aligning Schedule M with stringent global regulatory benchmarks.

QUICK REVISION BOX		
	UPSC Keywords	: CRAMS, Biologics, Value Chain Upgradation, Key Starting Materials (KSMs).
	Nodal Ministry	: Ministry of Chemicals and Fertilizers.
	Related Schemes / Policies	: PLI Scheme, Bulk Drug Parks, Biopharma SHAKTI, Pradhan Mantri Bhartiya Janaushadhi Pariyojana.
	Important Institutions	: CDSCO, NIPER.
	Important Concepts	: Active Pharmaceutical Ingredients (APIs), Biosimilars vs Generics.

25. India–Korea Maritime Partnership: Boosting Shipbuilding (The Hindu)

Context:

India and South Korea have recently upgraded their bilateral maritime partnership to accelerate domestic warship and commercial vessel

CORE CONCEPTS	
SHIPBUILDING DYNAMICS  Macroeconomic Multiplier: Acts as a heavy engineering industry with a 1:11 employment multiplier and deep forward-backward linkages.  Strategic Assets: Public shipyards focus primarily on strategic naval defense, while private players handle commercial vessels.	MARITIME VALUE CHAIN  Upstream-Downstream Integration: Encompasses steel manufacturing, advanced marine engineering, automation software, and port logistics.  Fleet Strategic Value: Owning a robust domestic merchant fleet ensures supply chain security during global geopolitical crises.
POLICY & FISCAL FRAMEWORK	
 Financial Leverage: The Shipbuilding Financial Assistance Policy (SBFAP) provides targeted institutional subsidies to domestic shipyards.	 Long-Term Roadmap: Empowered by the policy targets of Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047.
KEY HIGHLIGHTS  Technology Induction: Korean collaboration introduces automated smart yard workflows and advanced digital twin designing.  Infrastructure Clustering: Co-developing localized maritime clusters to cut high domestic ancillary supply costs.	ECONOMIC SIGNIFICANCE  Logistics Optimization: Boosting domestic vessel ownership curtails massive foreign exchange outgo on overseas freight shipping.  Blue Economy Expansion: Advances coastal economic zones, generates skilled industrial employment, and scales up Make in India exports.  Green Shipping Transition: Collaborating on alternative clean fuels (ammonia, hydrogen) to meet global decarbonisation norms.

manufacturing under the Amrit Kaal vision.

Challenges

- **High Financing Costs:** Indian shipbuilders face steep capital procurement costs compared to globally subsidized competitors.
- **Component Import Reliance:** Structural dependence on imported marine-grade steel and critical propulsion machinery delays project lifecycles.

Way Forward

- **Infrastructure Status:** Granting comprehensive infrastructure status to the entire ship-repair value chain to secure low-cost financing.
- **Joint Ventures:** Executing dedicated technology-transfer partnerships with Korean yards to localize advanced propulsion manufacturing.

QUICK REVISION BOX		
	UPSC Keywords	: Employment Multiplier, Ancillary Clustering, Decarbonisation.
	Nodal Ministries	: Ministry of Ports, Shipping and Waterways.
	Related Policies / Programmes	: SBFAP, Sagarmala Programme, PM Gati Shakti.
	Important Concepts	: Digital Shipbuilding, Maritime Value Chain, Blue Economy.

26. Green Ship Recycling: India Tops Global Market (DD News)

Context:

India has emerged as the world's top ship recycling nation in 2025, capturing a 35.4% global market share and achieving its Maritime India Vision (MIV) 2030 target five years ahead of schedule.

CORE CONCEPTS	
SHIP RECYCLING ECOSYSTEM	
	Industry Dynamics: The organized dismantling of end-of-life vessels to recover valuable materials, heavily concentrated at the Alang-Sosiya yard in Gujarat.
	Circular Economy: Promotes resource optimization by reusing marine-grade steel and extracting machinery, reducing reliance on virgin iron ore.
GREEN RECYCLING FRAMEWORK	
	Hong Kong Convention (HKC): A global treaty ensuring that ship recycling does not pose unnecessary risks to human health or the environment.
	Regulatory Backbone: The Recycling of Ships Act, 2019 enforces HKC standards, driving the modernization of over 115 domestic recycling yards.
KEY HIGHLIGHTS	
	Global Leadership: India processed 2.99 million gross tons in 2025, surpassing competitors due to rapid, eco-friendly infrastructure modernization.
	Innovative Incentives: The Ship-breaking Credit Note Scheme links recycling scrap value to discounts on new domestic shipbuilding.
ECONOMIC SIGNIFICANCE	
	Resource Security: Supplies affordable secondary steel to the domestic market, boosting MSME manufacturing and real estate.
	Blue Economy Growth: Anchors coastal industrial clusters, creating substantial direct employment and fostering robust maritime supply chains.
	Import Substitution: Reduces national dependence on imported scrap steel, thereby mitigating foreign exchange outflows.

Challenges

- **Hazardous Waste:** Handling asbestos, heavy metals, and residual oil requires expensive, specialized environmental monitoring infrastructure.
- **Fierce Competition:** Cost-based competition from neighbouring nations lacking stringent environmental compliance can undercut market pricing.

Way Forward

- **EU Compliance:** Securing recognition under the European Union Ship Recycling Regulation (EUSRR) to attract high-value European fleets.

- **Capacity Expansion:** Upgrading Alang to handle 9 million Light Displacement Tons (LDT) through automated dismantling technologies.

QUICK REVISION BOX		
	UPSC Keywords	: Circular Economy, Secondary Steel Recovery, Green Ship Recycling.
	Nodal Ministry	: Ministry of Ports, Shipping and Waterways.
	Important Acts / Conventions	: Recycling of Ships Act 2019, Hong Kong Convention.
	Related Maritime Initiatives	: MIV 2030, Maritime Amrit Kaal Vision 2047, Sagarmala.
	Important Places	: Alang-Sosiya Yard (Gujarat).



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SOCIAL ISSUES & SOCIAL JUSTICE

27. Ayushman Bharat Digital Mission: Towards Unified Health Infrastructure (PIB)

Context:

The Ayushman Bharat Digital Mission (ABDM) has recently achieved a monumental milestone by linking over 100 crore health records to more than 93 crore Ayushman Bharat Health Accounts (ABHA), cementing India's position as a global leader in digital healthcare infrastructure.

CORE CONCEPTS		
ABDM FRAMEWORK 	 Mission Goal:	Building a unified, citizen-centric digital health infrastructure across India.
	 Unique Identifier:	ABHA assigns a 14-digit health ID to securely link longitudinal health histories.
	 Unified Registries:	Health Facility (HFR) and Healthcare Professionals (HPR) registries ensure verified systemic data.
DIGITAL INFRASTRUCTURE 	 Consent Framework:	Enables secure, user-approved data exchange via Digital Public Infrastructure (DPI).
	 Queue Mitigation:	"Scan and Share" OPD tokens reduce hospital line wait times drastically.
SOCIAL SIGNIFICANCE 	 Universal Health Coverage:	Accelerates SDG 3 by ensuring equitable, affordable healthcare access.
	 Continuum of Care:	Eliminates duplicate clinical testing through instantly accessible medical histories.
	 Data-Driven Policy:	Anonymized aggregates empower real-time disease surveillance and resource deployment.
	 Empowered Governance:	Shifts health data sovereignty directly to citizens via revocable consent controls.

Challenges

- **Digital Divide:** Rural smartphone deficits restrict grassroots adoption of digital health tools.
- **Cybersecurity Risks:** Centralized records remain vulnerable to sophisticated institutional data breaches.

Way Forward

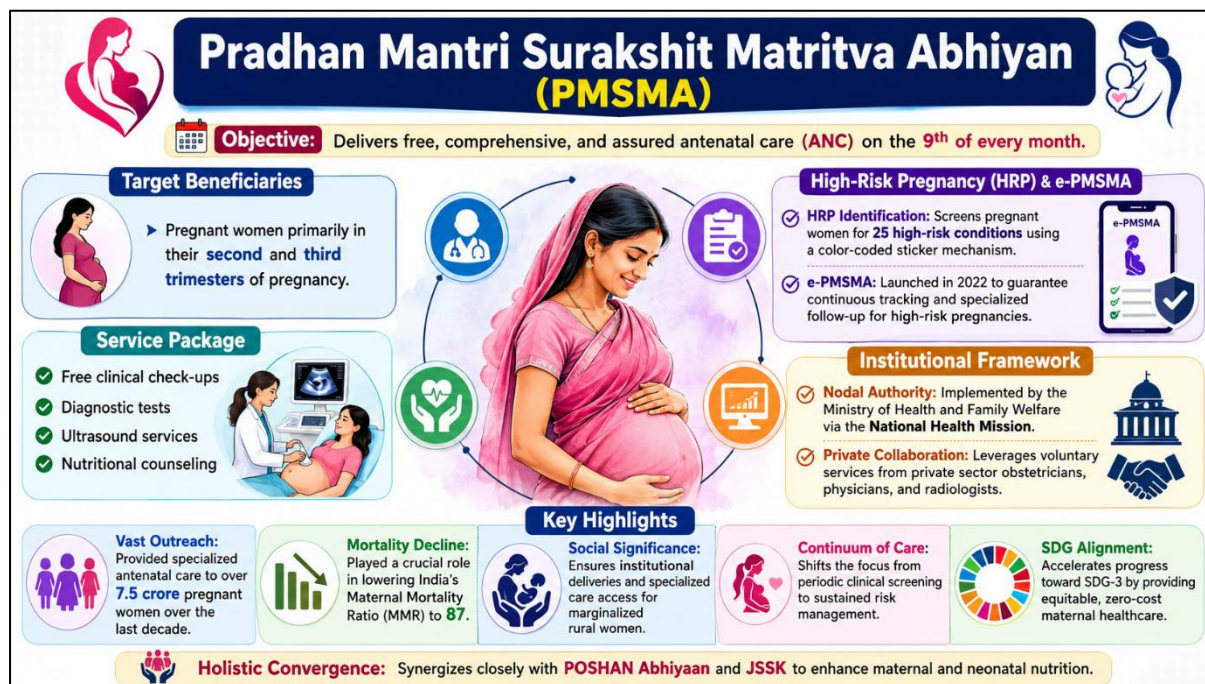
- **Data Safeguards:** Hardening compliance parameters in strict alignment with the DPDP Act.
- **Grassroots Outreach:** Deploying ASHA workers to drive inclusive digital enrollment in rural zones.

QUICK REVISION BOX		
	UPSC Keywords	Digital Public Infrastructure, Interoperability, Revocable Consent.
	Launch Year	2021.
	Implementing Agency	National Health Authority (NHA).
	Digital Components	ABHA, HPR, HFR, PHR.
	Related Initiatives	Ayushman Bharat PM-JAY.

28. Pradhan Mantri Surakshit Matritva Abhiyan: 10 Years of ANC Care (News on Air)

Context:

The Ministry of Health and Family Welfare recently launched nationwide celebrations to mark the 10th anniversary of the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), highlighting a decade of improved maternal healthcare.



Challenges

- **Specialist Shortages:** A severe lack of rural obstetricians and radiologists delays critical high-risk diagnoses.
- **Referral Bottlenecks:** Weak transport infrastructure hampers the swift transfer of high-risk cases to referral units.

Way Forward

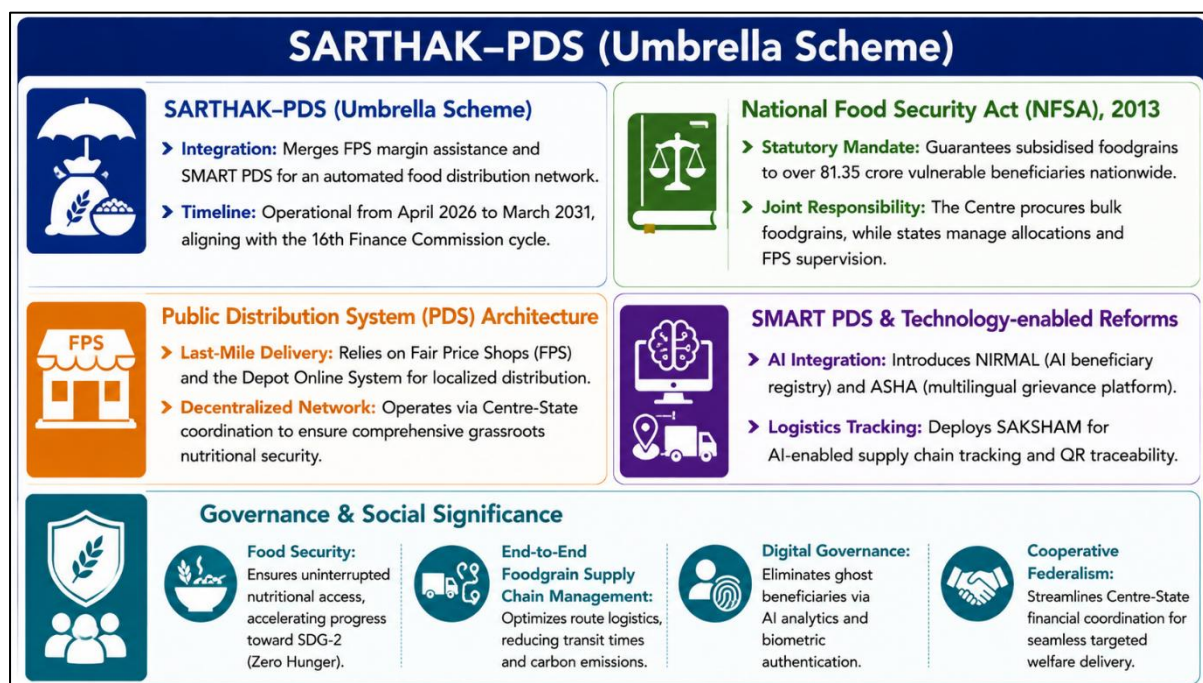
- **Digital Synergy:** Seamlessly integrating e-PMSMA's high-risk tracking network with the Ayushman Bharat Digital Mission.
- **Infrastructure Upgrades:** Equipping rural Primary Health Centres (PHCs) with mandatory ultrasound machines and permanent specialists.

QUICK REVISION BOX		
	UPSC Keywords	Antenatal Care, High-Risk Pregnancy, Universal Health Coverage, Continuum of Care.
	Launch Year	2016 (e-PMSMA in 2022).
	Nodal Ministry	Ministry of Health and Family Welfare.
	Target Beneficiaries	Pregnant women in 2nd/3rd trimesters.
	Related Schemes	JSY, JSSK, PMMVY, POSHAN Abhiyaan.
	Important Concepts	Color-coded HRP stickers, Public-Private Partnership in healthcare.

29. SARTHAK-PDS: Integrating NFSA Support with SMART Reforms (PIB)

Context:

The Union Cabinet recently approved the ₹25,530 crore SARTHAK-PDS umbrella scheme to integrate intra-state logistics support and modernise the public distribution system.



Challenges

- **Authentication Failures:** Poor rural internet connectivity causes unintended biometric exclusion errors.
- **Portability Issues:** Operational hurdles persist in seamless inter-state ONORC implementation.
- **Database Syncing:** Constant beneficiary identification and updation create continuous administrative bottlenecks.

Way Forward

- **Offline Biometrics:** Integrate offline ePoS functionalities to prevent denial of rations during network outages.

- **Blockchain Integration:** Deploy blockchain ledgers to ensure tamper-proof, real-time inventory tracking across state borders.

QUICK REVISION BOX		
	UPSC Keywords	Ghost Beneficiaries, AI-driven Supply Chain, Cooperative Federalism.
	Nodal Ministry	Ministry of Consumer Affairs, Food and Public Distribution.
	Important Acts	National Food Security Act (NFSA), 2013.
	Related Schemes / Digital Initiatives	ONORC, Mera Ration App, SMART PDS.
	Important Institutions	Food Corporation of India (FCI), Fair Price Shops (FPS).
	Important Concepts	Buffer Stock, Targeted PDS, End-to-End Computerisation.

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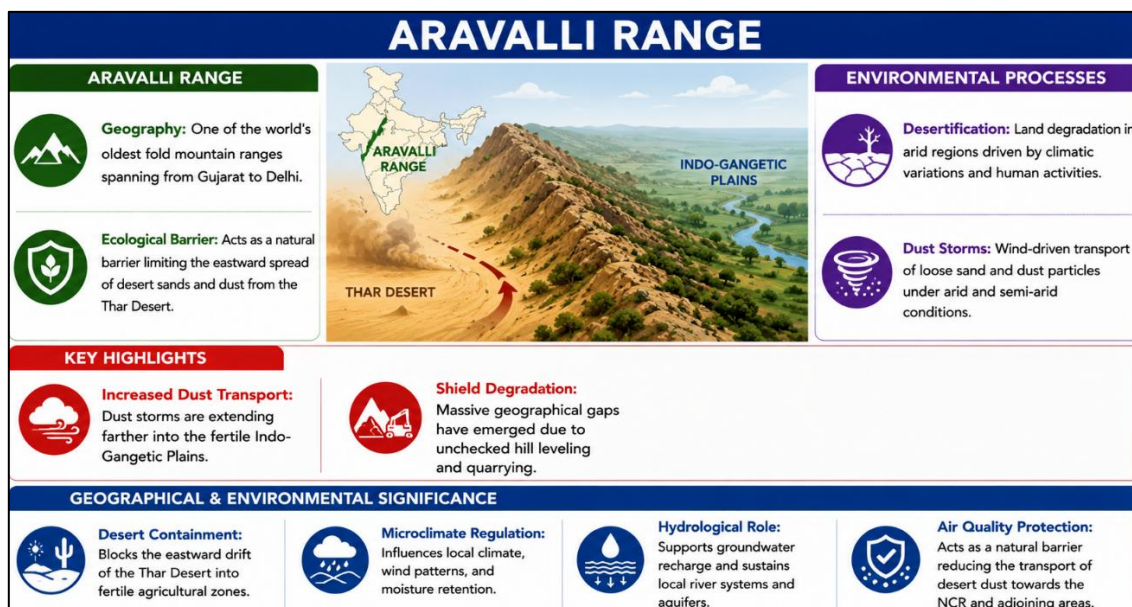
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GEOGRAPHY, DISASTER MANAGEMENT & ENVIRONMENT

30. Aravalli Shield Weakening: Desertification Threat to Indo-Gangetic Plains (Indian Express)

Context:

Recent dust storms in Churu, Rajasthan, have renewed attention to the weakening ecological barrier of the Aravalli Range, raising concerns over desertification, dust transport, and environmental degradation.



Challenges / Threats

- **Illegal Mining:** Unregulated stone quarrying causes severe geographical gaps and landscape degradation.
- **Habitat Fragmentation:** Expanding linear infrastructure severely disrupts regional ecological connectivity.
- **Deforestation:** Rapid urbanization and encroachment strip vital vegetative cover.

Way Forward

- **Aravalli Green Wall Project:** Expediting the proposed 1,400-km ecological afforestation corridor.
- **Sustainable Management:** Strengthen regulation of mining and land-use while restoring degraded landscapes.

QUICK REVISION BOX		
	UPSC Keywords	Aeolian Processes, Land Degradation Neutrality (LDN).
	Important Mountain Range	Aravalli Range.
	Related Initiatives / Programmes	Aravalli Green Wall Project, National Action Programme to Combat Desertification (NAPCD).
	Important Conventions	UN Convention to Combat Desertification (UNCCD).
	Important Places	Churu (Rajasthan), Thar Desert, Indo-Gangetic Plains.

31. Lunar Phenomena: Supermoon, Blood Moon & Phases (Indian Express)

Context:

A Blue Micromoon, a rare coincidence of a Blue Moon and a Micromoon, was recently observed, drawing attention to lunar orbital dynamics and astronomical phenomena.



BLUE MICROMOON

A rare celestial coincidence occurring when a full moon simultaneously qualifies as both a **Blue Moon** and a **Micromoon**.



VISUAL CHARACTERISTICS:

Appears slightly smaller and dimmer in the night sky compared to an average full moon.

BLUE MOON

- Calendrical Definition:** The second full moon occurring within a single calendar month.
- Seasonal Definition:** Less commonly, the third full moon in an astronomical season that contains four full moons instead of the usual three.
- Optical Clarification:** The term is strictly a calendrical designation and does not imply any actual change in the Moon's physical colour, barring rare atmospheric anomalies.

LUNAR ORBIT

- Elliptical Geometry:** The Moon revolves around Earth along an eccentric, non-circular path over an approximate 27.3-day period.
- Apogee and Perigee:** Apogee represents the orbital peak distance, while perigee denotes the closest approach.



MICROMOON

- Orbital Conjunction:** Transpires when a full moon phase coincides precisely with apogee (the Moon's farthest point from Earth).
- Apparent Size:** The increased physical distance reduces its apparent angular diameter and overall luminosity as observed from Earth.

RELATED LUNAR PHENOMENA

- Supermoon:** Occurs when a full moon aligns closely with perigee, appearing significantly larger and brighter.
- Blood Moon:** The distinct deep red coloration caused by Rayleigh scattering of sunlight during a total lunar eclipse.
- Lunar Phases:** Essential terms like New Moon, Waxing (growing illumination), and Waning (decreasing illumination) track the synodic month.



KEY TAKEAWAYS

- Blue Micromoon is a rare alignment of lunar cycle (calendar & orbit).
- It appears smaller and dimmer due to the Moon's farthest position (apogee).
- Blue Moon is about timing; Micromoon is about distance.
- Understanding lunar events helps in appreciating astronomical cycles and Earth-Moon dynamics.

SIGNIFICANCE:

- Helps in understanding celestial mechanics.
- Important for astronomical observation & research.
- Enhances awareness of natural phenomena and space science.
- Promotes scientific temper and curiosity.

Scientific Significance

- Earth-Moon Dynamics:** Enhances understanding of orbital mechanics and the physical variables that dictate celestial movements.
- Tidal Variations:** The maximum distance at apogee weakens the gravitational pull, resulting in lower-amplitude apogean tides.
- Scientific Temper:** Cultivates empirical thinking by replacing historical celestial myths with verifiable physics and mathematical predictability.

Way Forward

- Scientific Awareness:** Promote astronomy outreach through planetariums and citizen science initiatives to engage the public.

- **Scientific Temper:** Encourage evidence-based understanding of celestial events in line with Article 51A(h) of the Indian Constitution, fostering a spirit of inquiry and reform.

QUICK REVISION BOX		
	UPSC Keywords	Apogean Tides, Rayleigh Scattering, Synodic Month.
	Important Astronomical Terms	Apogee, Perigee, Waxing, Waning.
	Related Celestial Phenomena	Supermoon, Blood Moon, Lunar Eclipse.
	Important Concepts	Orbital Mechanics, Apparent Angular Diameter.

32. Mission Senehjori: Branding Assam's Golden Muga Silk (PIB)

Context:

The Union Government recently launched Mission 'Senehjori' to transform Assam's unique Golden Muga silk into a globally competitive, traceable luxury brand.



Challenges

- **Habitat Degradation:** Rapid depletion of Som and Soalu tree covers limits natural rearing grounds.
- **Climate Variability:** Unpredictable rainfall and temperature fluctuations disrupt the fragile silkworm lifecycle.

Way Forward

- **Ecological Restoration:** Expanding indigenous host plant plantations to safeguard the traditional sericulture ecosystem.

- **Climate-Smart Rearing:** Adopting weather-resilient silkworm rearing practices and advanced pest-management techniques.

QUICK REVISION BOX		
	UPSC Keywords	Endemic Species, Sericulture, Sustainable Value Chains.
	Nodal Ministry	MDoNER in convergence with the Ministry of Textiles.
	Important Species	<i>Antheraea assamensis</i> , Som, Soalu.
	Related Initiatives	Silk Samagra, National Sericulture Development Programme.
	Important Places	Brahmaputra Valley, Sualkuchi.

33. Potato Patch Coral: Lakshadweep's Ancient Marine Giant (Down To Earth)

Context:

Researchers recently documented the 'Potato Patch,' a massive Pavona clavus coral colony near Kadmat Island in Lakshadweep, potentially making it one of the world's largest and oldest living coral structures.

CORAL REEFS & ATOLL ECOSYSTEM



CORAL REEFS:
Underwater ecosystems built by marine polyps that secrete calcium carbonate to form hard exoskeletons.



SYMBIOTIC RELATIONSHIP:
Polyps host microscopic zooxanthellae algae, which provide essential nutrients and vibrant colours through photosynthesis.



ATOLL ECOSYSTEM:
Ring-shaped coral reefs enclosing a central lagoon, characteristic of the Lakshadweep archipelago, India's only coral atoll chain.

CORAL COLONIES & CONSERVATION



CORAL COLONIES:
Continuous formations created by centuries of uninterrupted calcium carbonate deposition by polyp clusters.



RESILIENCE & ADAPTATION:
Structurally robust colonies, like the columnar Pavona clavus, demonstrate high hydrodynamic resilience to oceanic currents and cyclones.



INSTITUTIONAL FRAMEWORK:
Protected under the Biological Diversity Act, Coastal Regulation Zone (CRZ) norms, and the National Coral Reef Conservation Programme.

KEY HIGHLIGHTS



MASSIVE SCALE:
The colony spans approximately 4,250 square metres and is estimated to be between 700 and 1,800 years old.



CLIMATE RESILIENCE:
Despite repeated marine heatwaves and bleaching events, nearly **60%** of its tissue remains alive, offering a unique natural laboratory for climate adaptation.

ECOLOGICAL & GEOGRAPHICAL SIGNIFICANCE



MARINE BIODIVERSITY:
Acts as a vital breeding and foraging habitat for diverse marine species, anchoring the regional Blue Economy.



COASTAL PROTECTION:
Functions as a natural seawall, dissipating wave energy, preventing coastal erosion, and guarding freshwater aquifers from saltwater intrusion.



FISHERIES & LIVELIHOODS:
Healthy reefs are indispensable to the local economy, directly sustaining the artisanal fishing communities of Lakshadweep.



CLIMATE REGULATION:
Plays a crucial role in marine carbon cycling and achieving SDG-14 (Life Below Water) objectives.

Threats

- **Climate Change:** Rising sea surface temperatures trigger mass coral bleaching, causing polyps to expel their vital zooxanthellae.
- **Ocean Acidification:** Increased oceanic carbon dioxide absorption impairs the ability of corals to calcify and build their skeletons.
- **Anthropogenic Pressures:** Unsustainable marine tourism, coastal development, and pollution severely degrade fragile atoll ecosystems.

Way Forward

- **Scientific Monitoring:** Utilising sclerochronology and radiometric dating to map historical climate data and enhance predictive conservation modelling.
- **Marine Protected Areas (MPAs):** Expanding strict conservation zones to shield resilient reef networks from localised anthropogenic stress.

QUICK REVISION BOX		
	UPSC KEYWORDS:	Sclerochronology, Coral Bleaching, Atoll Ecosystem, Hydrodynamic Resilience.
	IMPORTANT SPECIES:	<i>Pavona clavus</i> (Potato Coral), Zooxanthellae.
	RELATED INITIATIVES:	National Coral Reef Conservation Programme, ICRI.
	IMPORTANT CONCEPTS:	Symbiotic Relationship, Ocean Acidification, Blue Economy.
	IMPORTANT PLACES:	Kadmat Island (Lakshadweep).

34. Urban Fire Safety: Governance Gaps and Disaster Risks (The Hindu)

Context:

The recent Delhi hotel fire serves as a tragic reminder of growing urban fire vulnerabilities, underscoring the urgent need to overhaul fire safety governance and disaster preparedness.



Challenges

- **Weak Enforcement:** Inadequate enforcement of building bye-laws and periodic fire safety audits.
- **Infrastructure Deficits:** State Fire Services face severe shortages of modern firefighting equipment and trained personnel.

- **Public Apathy:** Low civic awareness regarding evacuation drills and basic fire extinguisher usage.

Way Forward

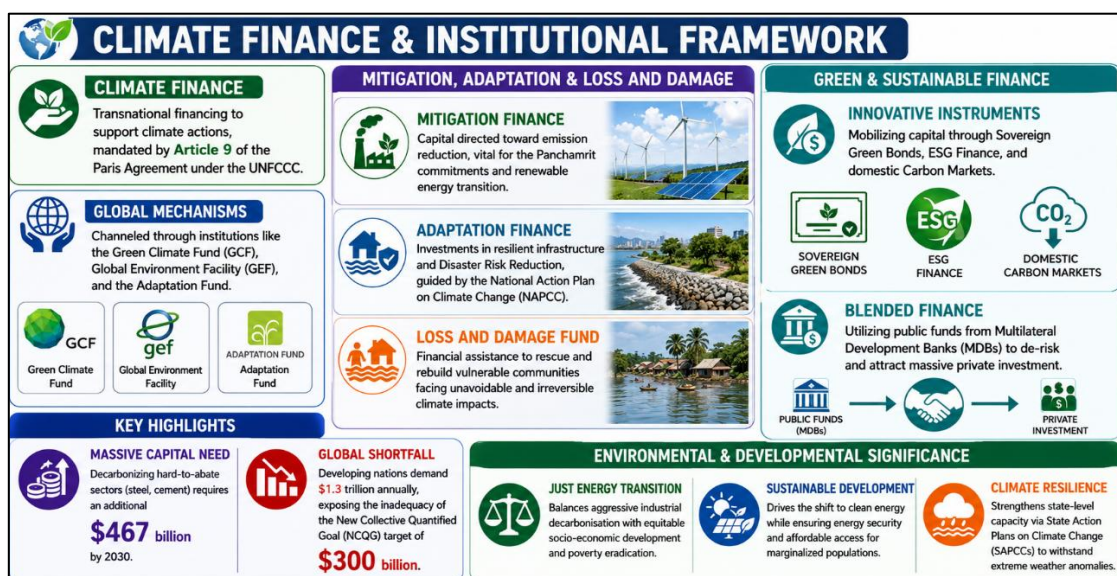
- **Strict NBC Compliance:** Making NBC 2016 safety guidelines legally binding across all local municipal jurisdictions.
- **Technological Integration:** Embedding automated fire-monitoring systems and GIS-based emergency response systems within the Smart Cities Mission framework.
- **Capacity Building:** Strengthen Fire Services through modern equipment, trained manpower, regular mock drills, and the Incident Response System (IRS).

QUICK REVISION BOX		
	UPSC KEYWORDS:	Compartmentalization, Ex-ante Mitigation, Spatial Vulnerability.
	IMPORTANT ACTS / CODES:	Disaster Management Act 2005, NBC 2016.
	IMPORTANT INSTITUTIONS:	National Disaster Management Authority (NDMA), State Fire Services, Municipal Authorities.
	RELATED FRAMEWORKS:	Sendai Framework (2015–2030), Incident Response System (IRS).
	IMPORTANT CONCEPTS:	Disaster Risk Reduction (DRR), Urban Resilience.
	RELATED GOVERNMENT INITIATIVES:	Smart Cities Mission, Model Building Bye-Laws 2016.

35. India's Climate Finance Challenge: Trillions for Net-Zero (The Hindu)

Context:

Estimates suggest India requires nearly \$2.5 trillion by 2030 for its Nationally Determined Contributions (NDCs) and \$10.1 trillion by 2070 for net-zero, bringing the climate finance challenge to the forefront of its developmental agenda.



Challenges

- **Climate Justice:** Developed nations continually fail to meet historical financial and critical technology transfer obligations.

- **High Cost of Capital:** Green projects in developing economies face prohibitive interest rates and heavily restricted access to concessional finance.
- **Institutional Bottlenecks:** A fragmented domestic financial architecture struggles to absorb, track, and deploy large-scale multilateral funds efficiently.

Way Forward

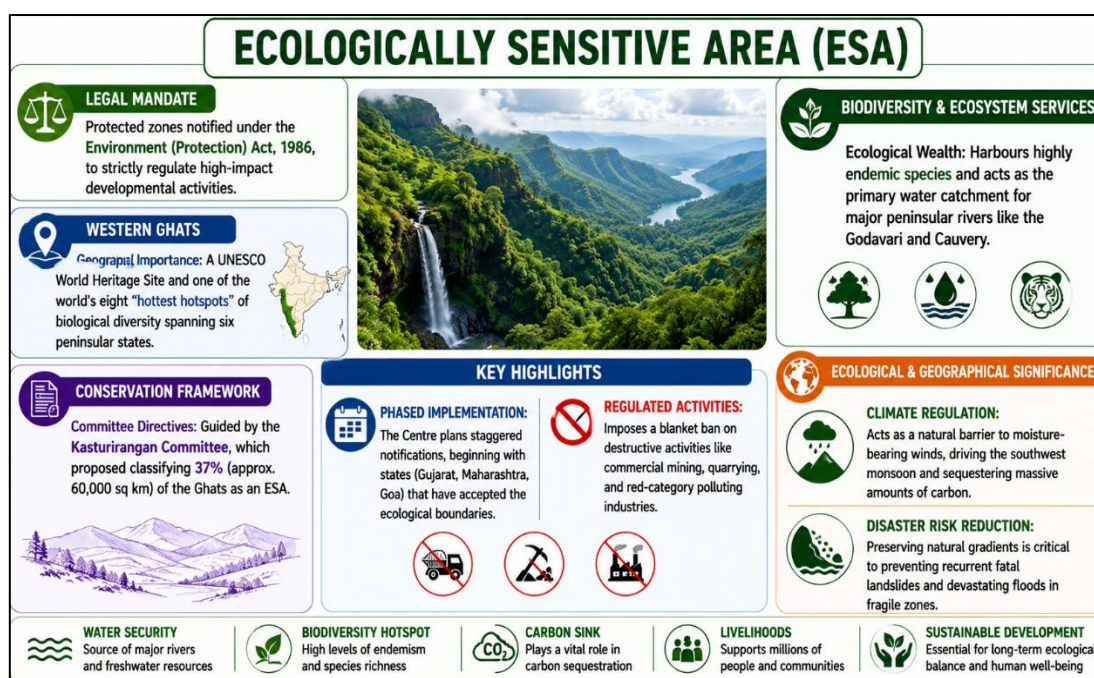
- **Regulatory Deepening:** Finalizing a robust national Climate Finance Taxonomy to streamline priority sector lending and completely prevent greenwashing.
- **Scaling Alternative Mechanisms:** Deepening domestic green bond markets and strategically leveraging international carbon trading frameworks.

QUICK REVISION BOX		
	UPSC KEYWORDS:	Blended Finance, Concessional Finance, Climate Justice, Just Energy Transition.
	IMPORTANT INTERNATIONAL FUNDS:	GCF, GEF, Adaptation Fund, Loss and Damage Fund.
	IMPORTANT AGREEMENTS:	Paris Agreement (Article 9), NCQG.
	RELATED NATIONAL INITIATIVES:	NAPCC, SAPCCs, Sovereign Green Bonds, Panchamrit.
	IMPORTANT CONCEPTS:	Mitigation vs Adaptation Finance, Carbon Markets, ESG Finance.

36. Western Ghats ESA: Balancing Conservation and Development (Indian Express)

Context:

The Union Government is preparing to finalize a phased notification of the Ecologically Sensitive Area (ESA) across the Western Ghats to combat extreme environmental degradation.



Concerns / Challenges

- **Federal Friction:** States like Kerala strongly oppose blanket classifications, demanding the complete exclusion of human settlements and agricultural lands.
- **Livelihood Insecurity:** Local communities fear severe restrictive impacts on traditional agriculture, plantation expansions, and regional economic activities.

Way Forward

- **Landscape Approach:** Accurately demarcating cultural landscapes from natural ecosystems using satellite imagery and rigorous ground-truthing.
- **Payment for Ecosystem Services:** Financially incentivizing local communities for sustaining ecological services like watershed protection and biodiversity conservation.

QUICK REVISION BOX		
	UPSC KEYWORDS:	Payment for Ecosystem Services, Landscape Approach, Hottest Hotspots.
	IMPORTANT COMMITTEES:	Gadgil Committee (WGEEP), Kasturirangan Committee (HLWG).
	IMPORTANT ACT:	Environment (Protection) Act, 1986.
	RELATED CONSERVATION INITIATIVES:	Nilgiri Biosphere Reserve, Wildlife Corridors.
	IMPORTANT CONCEPTS:	Ecologically Sensitive Area (ESA), Ecosystem-based Disaster Risk Reduction.
	IMPORTANT PLACES IN NEWS:	Palakkad Gap, Wayanad.

37. India in UN SDG Index 2026: Progress and Persistent Gaps (Down To Earth)

Context:

India achieved its highest-ever rank of 94th in the 2026 UN SDG Index released at the Hamburg Sustainability Conference, though persistent malnutrition underscores the urgent need to address systemic hunger.



Challenges

- **Persistent Malnutrition:** Stagnating undernourishment (12%) and a critical prevalence of child wasting (19%) expose severe regional dietary disparities.
- **Climate Vulnerability:** Rising per-capita emissions and escalating fossil fuel dependency fundamentally threaten India's environmental governance targets.

Way Forward

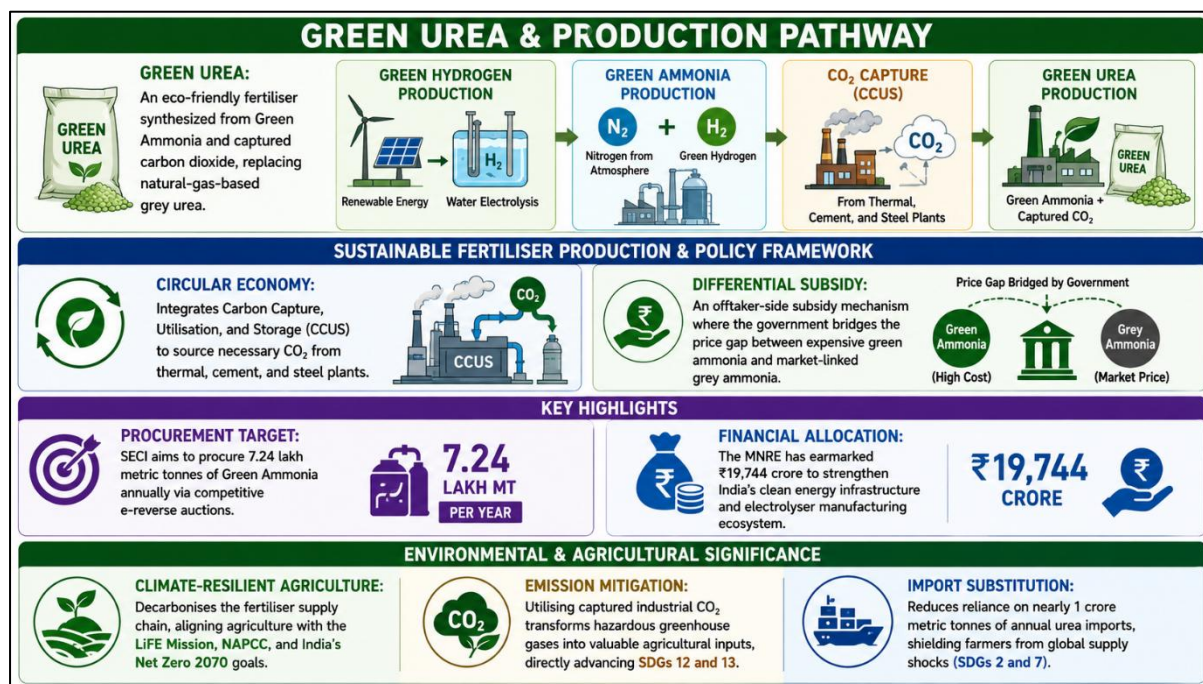
- **Nutrition-Centric Interventions:** Shifting from mere caloric food security to comprehensive nutritional security through climate-resilient millet cultivation.
- **Ecosystem-Based Planning:** Mainstreaming biodiversity conservation into infrastructure development to harmonize ecological stability with inclusive growth.

QUICK REVISION BOX	
	UPSC KEYWORDS: SDG Localisation, Intergenerational Equity, Land Degradation Neutrality, Circular Economy.
	IMPORTANT REPORTS: 2026 UN SDG Index, Voluntary National Reviews (VNRs).
	IMPORTANT INSTITUTIONS: UN SDSN, NITI Aayog.
	RELATED INITIATIVES: LIFE Mission, National Action Plan on Climate Change (NAPCC).
	RELEVANT SDGs: 2, 6, 7, 9, 11, 13, 14, 15

38. Green Urea: Decarbonising Fertiliser Production (PIB)

Context:

The Department of Fertilizers recently unveiled a comprehensive roadmap to establish Green Urea production in India, backed by large-scale Green Ammonia procurement under the National Green Hydrogen Mission.



Challenges

- **High Production Costs:** The synthesis of Green Ammonia currently demands significantly higher capital than conventional fossil-fuel-based manufacturing.
- **Logistical Bottlenecks:** Transporting millions of tonnes of captured CO₂ from scattered industrial plants to fertiliser hubs requires complex pipeline networks.

Way Forward

- **Infrastructure Synergy:** Establishing localized industrial carbon capture hubs adjacent to high-voltage green energy corridors.
- **Policy Continuity:** Sustaining long-term producer-side incentives to ensure Integrated Nutrient Management (INM) without burdening the national fertiliser subsidy.

QUICK REVISION BOX			
	UPSC KEYWORDS:	Carbon Capture and Utilisation (CCUS), Offtaker-side Subsidy, Water Electrolysis.	
	NODAL MINISTRY / INSTITUTIONS:	Department of Fertilizers, MNRE, SECI.	
	RELATED MISSIONS:	National Green Hydrogen Mission (NGHM).	
	IMPORTANT CONCEPTS:	Green vs. Grey Ammonia, Circular Economy.	
	RELEVANT SDGs:	2 ZERO HUNGER	7 AFFORDABLE AND CLEAN ENERGY
		12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION

DEFENSE & INTERNAL SECURITY

39. Operation Sheruwali & India's Counter-Terror Strategy (The Hindu)

Context:

Operation Sheruwali, a massive joint anti-terror mission in the Rajouri district of Jammu & Kashmir, underscores India's intensifying multi-agency efforts to neutralize cross-border militant networks.

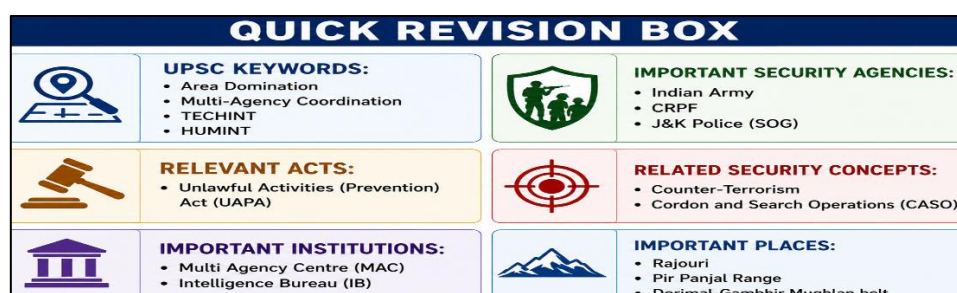


Challenges

- **Difficult Terrain:** Dense vegetation, steep slopes, and rocky hills provide natural camouflage, severely hampering troop movement.
- **Evolving Tactics:** Terrorists increasingly utilize encrypted communication and highly localized sleeper networks to evade detection.

Way Forward

- **Technological Force Multipliers:** Mainstreaming foliage-penetrating radars and thermal imaging to counter geographical disadvantages.
- **Community Intelligence:** Strengthening grassroots policing and civil-military relations to bridge crucial HUMINT gaps in border villages.



40. India-Indonesia Defence Ties: BrahMos Export Milestone (NDTV World)

Context:

Indonesia has officially signed a major defence agreement to procure the BrahMos supersonic cruise missile and Astra air-to-air missiles from India, marking a significant milestone in India's defence export trajectory and its strategic footprint in Southeast Asia.



Challenges

- **Geopolitical Sensitivities:** Exporting lethal offensive weapons requires careful diplomatic balancing to avoid escalating regional arms races.
- **Maintenance & Life-Cycle Support:** Establishing robust international supply chains for spare parts and maintenance remains a significant logistical hurdle for Indian manufacturers.

Way Forward

- **Comprehensive Support:** Coupling weapon exports with extensive capacity building, joint military exercises, and long-term technical maintenance agreements.
- **Targeted Indigenisation:** Accelerating the development of indigenous propulsion systems to reduce technology transfer dependencies on foreign joint-venture partners.

QUICK REVISION BOX			
UPSC KEYWORDS - Defence Diplomacy - A2/AD Capabilities - Atmanirbhar Bharat - Sea Lines of Communication (SLOCs)	DEVELOPING INSTITUTIONS - DRDO - BrahMos Aerospace	IMPORTANT POLICIES - Defence Production & Export Promotion Policy (DPEPP) - Act East Policy	RELATED STRATEGIC INITIATIVES - SAGAR: Security and Growth for All in the Region - Indo-Pacific Oceans Initiative (IPOI)
IMPORTANT CONCEPTS CRUISE MISSILES: Fly at low altitudes, parallel to the ground, making them difficult for radar to detect. BALLISTIC MISSILES: Follow a parabolic trajectory before reaching the target. SUPERSONIC TECHNOLOGY: BrahMos operates at Mach 2.8 to 3.0, delivering high speed, precision and kinetic energy.	IMPORTANT PLACES IN NEWS STRAIT OF MALACCA: A vital maritime chokepoint and Sea Line of Communication (SLOC). SOUTH CHINA SEA: A strategically important maritime region in the Indo-Pacific.	ADDITIONAL QUICK POINTERS - Enhances anti-access/area denial (A2/AD) capabilities. - Strengthens maritime partnerships in the Indo-Pacific. - Supports secure Sea Lines of Communication (SLOCs). - Boosts indigenous defence manufacturing under Atmanirbhar Bharat.	

41. Project UDAYAK: BRO's Strategic Roads in Northeast India (PIB)

Context:

The Border Roads Organisation (BRO) recently celebrated the 37th Raising Day of Project UDAYAK, highlighting its pivotal role in developing critical strategic infrastructure across Northeast India.

PROJECT UDAYAK			
GEOGRAPHICAL MANDATE A specialized BRO initiative headquartered in Doomdooma, Assam, managing infrastructure in the easternmost regions of Arunachal Pradesh and Assam.			BORDER ROADS ORGANISATION (BRO) India's premier border infrastructure agency functioning fully under the Ministry of Defence to secure frontier connectivity.
AOR (AREA OF RESPONSIBILITY) Covers strategically vital districts including Anjaw, Lohit, Dibang Valley, Longding, Tirap, and Changlang.			STRATEGIC BORDER INFRASTRUCTURE Focuses on the swift construction of all-weather roads, bridges, and helipads along the Line of Actual Control (LAC) and the Indo-Myanmar border.
DUAL-USE INFRASTRUCTURE Civil-Military Integration: Building infrastructure that simultaneously facilitates rapid military logistics and integrates remote border villages with mainstream markets.	EXTENSIVE NETWORK: Currently maintains over 1,457 km of critical road networks in geographically harsh and remote terrains.	BORDER FENCING: Actively executing major fencing projects along the highly porous Indo-Myanmar border to bolster national security.	
STRATEGIC & NATIONAL SECURITY SIGNIFICANCE			
OPERATIONAL PREPAREDNESS: Ensures seamless military mobility and rapid troop deployment to forward posts along the LAC.	BORDER MANAGEMENT: Strengthens anti-insurgency grids and restricts illegal cross-border infiltration from Myanmar.	SOCIO-ECONOMIC DEVELOPMENT: Aligns with the Vibrant Villages Programme (VVP) to provide last-mile connectivity, checking out-migration from border hamlets.	DISASTER RESPONSE: Facilitates swift humanitarian assistance and the restoration of communication lines during frequent Himalayan landslides and flash floods.

Challenges

- **Topographical Hurdles:** Executing engineering projects amidst steep gradients, high altitudes, and prolonged heavy rainfall.
- **Ecological Sensitivity:** Balancing extensive infrastructure expansion with the fragile biodiversity and forest clearances required in the Eastern Himalayas.

Way Forward

- **Technological Upgradation:** Deploying advanced tunneling techniques and modular bailey bridges to accelerate construction in harsh topographies.
- **Integrated Border Development:** Synergizing BRO's infrastructure projects with the PM Gati Shakti master plan for multimodal regional connectivity.

QUICK REVISION BOX		
UPSC KEYWORDS - Dual-use Infrastructure - Anti-insurgency Grid - Last-mile Connectivity	NODAL ORGANISATION  Border Roads Organisation (Ministry of Defence)	RELATED POLICIES / PROGRAMMES - Vibrant Villages Programme (VVP) - PM Gati Shakti - Bharatmala Pariyojana - Act East Policy
IMPORTANT STRATEGIC CONCEPTS Military Logistics Efficient movement of troops, supplies and equipment to forward areas. Operational Preparedness Ensures readiness for rapid deployment and response in border areas.	IMPORTANT PLACES IN NEWS Doomdooma Headquarters of Project UDAYAK, Assam. Anjaw District in Arunachal Pradesh under Project UDAYAK's AOR. Lohit District in Arunachal Pradesh under Project UDAYAK's AOR. Dibang Valley District in Arunachal Pradesh under Project UDAYAK's AOR.	

42. RudraM-II: Indigenous Precision Strike Missile (Times of India)

Context:

The Defence Research and Development Organisation (DRDO) and the Indian Air Force (IAF) successfully flight-tested the indigenous RudraM-II air-to-surface missile, marking a critical milestone in India's precision-strike capabilities and self-reliance in advanced weaponry.

RUDRAM-II MISSILE

ANTI-RADIATION MUNITION



An indigenous solid-propelled anti-radiation missile (ARM) primarily designed to suppress enemy air defences (SEAD).

AIR-TO-SURFACE SYSTEM



A munition launched from airborne platforms to neutralize ground targets, distinguishing it from air-to-air or surface-to-air classifications.

STAND-OFF STRIKE CAPABILITY



Enables fighter jets to launch precision attacks from safe distances (up to 300 km), keeping pilots outside the range of hostile air-defence networks.

INSTITUTIONAL FRAMEWORK



Collaborative development spearheaded by DRDO's Research Centre Imarat (RCI) in collaboration with Hindustan Aeronautics Limited (HAL) and private industry partners.

KEY HIGHLIGHTS

PIN-POINT ACCURACY



Successfully validated its hybrid navigation (INS/GPS) and passive homing head against a predefined target under extreme release conditions from a Su-30MKI.

STRATEGIC REPLACEMENT



Solidifies India's transition to indigenous platforms, eventually replacing older Russian-origin Kh-31 anti-radiation missiles.

STRATEGIC & DEFENCE SIGNIFICANCE

SEAD OPERATIONS



Designed to detect, track, and destroy enemy radars and communication nodes, blinding hostile forces during early conflict phases.

AIR POWER MODERNISATION



Acts as a formidable force multiplier in network-centric warfare, significantly enhancing IAF offensive firepower and survivability.

INDIGENOUS MANUFACTURING



Reduces critical import dependency, building a robust domestic military-industrial base for precision-guided munitions.

Challenges

- **Platform Integration:** Ensuring seamless structural and electronic compatibility across the IAF's diverse fleet of fighter aircraft.
- **Electronic Countermeasures:** Continuously upgrading anti-jamming capabilities to defeat rapidly evolving adversarial electronic warfare (EW) tactics.

Way Forward

- **Rapid Induction:** Accelerating mass production via Defence Public Sector Undertakings (DPSUs) to quickly equip frontline fighter squadrons.

- **Next-Gen Seekers:** Sustained investment in AI-driven seeker technologies for future variants to outpace adversary air-defence upgrades.

QUICK REVISION BOX	
 UPSC Keywords:	SEAD Operations, Anti-Radiation Missile, Stand-off Weapons, Network-Centric Warfare.
 Developing Organisations:	DRDO, IAF.
 Important Defence Concepts:	Air-to-Surface Missiles, Precision-Guided Munitions.
 Related Policies:	Atmanirbhar Bharat in Defence.
 Important Missile Systems:	RudraM Series, BrahMos, Astra.

43. Project Hawk Eye: Tech-Driven Security for Amarnath Yatra (DD News)

Context:

The Jammu and Kashmir Police recently launched 'Project Hawk Eye,' an advanced technology-driven surveillance framework, to ensure foolproof security and seamless management of the annual Amarnath Yatra.

 Project Hawk Eye	Integrated Framework: A comprehensive multi-layered security grid combining aerial and ground-based surveillance to secure vulnerable Himalayan pilgrimage routes.
 Technology-enabled Security	Leverages AI-driven Facial Recognition Systems (FRS), high-resolution CCTV networks, and drones for predictive policing.
 Surveillance & Intelligence	Integrated Surveillance: Synchronizes real-time feeds from tactical vantage posts (Machan Morchas) to centralized command-and-control centres for swift decision-making. Intelligence-led Security: Employs biometric cross-referencing and AI analytics to autonomously detect and flag suspicious movements in real-time.
 Institutional Framework	Inter-agency Coordination: Coordinated by the J&K Police in synergy with Central Armed Police Forces (CAPFs) and intelligence agencies via the Multi Agency Centre (MAC).
 Key Highlights	Aerial Dominance: Deploys specialized drones to eliminate geographical blind spots and maintain continuous situational awareness. Preventive Posture: Integrates specially trained sniper teams at high-altitude points to preemptively neutralize potential terror threats.
 Strategic & Internal Security Significance	Counter-Terrorism Preparedness: Shifts internal security strategies from reactive deployments to proactive, intelligence-led threat neutralization. Pilgrim Safety: Ensures effective crowd management and rapid emergency evacuation capabilities during stampedes or natural disasters. Critical Infrastructure Protection: Fortifies high-risk, high-footfall religious tourism corridors against cross-border sabotage. Public Confidence: Demonstrates the state's capacity to seamlessly blend emerging technologies with conventional policing in hostile terrains.

Challenges

- **Topographical & Climatic:** Steep Himalayan gradients and unpredictable weather severely restrict drone operability and satellite communication networks.
- **Privacy & Cyber Vulnerabilities:** Mass deployment of FRS raises critical concerns regarding data privacy, biometric protection, and potential cyber-attacks.

Way Forward

- **Data Governance:** Establishing robust, transparent Standard Operating Procedures (SOPs) and conducting regular audits for AI-based biometric surveillance.
- **Integrated Disaster Response:** Fusing real-time surveillance inputs with the National Disaster Management Authority (NDMA) grid for proactive disaster mitigation.

QUICK REVISION BOX	
 UPSC Keywords:	Predictive Policing, Facial Recognition System (FRS), Area Domination, Multi-layered Security Grid.
 Important Security Agencies:	J&K Police, CAPFs (CRPF, BSF), Multi Agency Centre (MAC), NDMA.
 Related Technologies:	UAVs, AI-enabled CCTV analytics, GIS Mapping.
 Important Security Concepts:	Intelligence-led Security, Critical Infrastructure Protection.
 Important Places:	Anantnag, Pahalgam, Baltal, Pir Panjal.

44. INS Dunagiri, Sanshodhak & Agray: Strengthening Maritime Security (Indian Express)

Context:

The Indian Navy recently achieved a historic milestone with the tri-commissioning of INS Dunagiri, INS Sanshodhak, and INS Agray, significantly augmenting its layered maritime security and blue-water capabilities.

INS Dunagiri (Stealth Frigate)		INS Sanshodhak (Survey Vessel)		INS Agray (Anti-Submarine Warfare)	
					
• Project 17A Frigate: An advanced guided-missile stealth frigate engineered with radar-evading structural geometry. • Combat Profile: Armed with supersonic BrahMos surface-to-surface missiles and Medium-Range Surface-to-Air Missiles (MRSAM) for distant blue-water operations and sea control.		• Deep-Water Surveyor: A Sandhayak-class Survey Vessel (Large) tasked with comprehensive coastal and deep-water hydrographic data collection. • Maritime Domain Awareness: Deploys Autonomous Underwater Vehicles (AUVs) and remotely operated vehicles to map seabed features, ensuring safe navigation for both civilian shipping and strategic naval submarines.		• Arnala-class ASW SWC: An Anti-Submarine Warfare Shallow Water Craft designed specifically to detect, track, and neutralise hostile underwater threats in littoral (shallow) waters. • Coastal Defence: Densely packed with indigenous rocket launchers, lightweight torpedoes, and advanced hull-mounted sonars to protect vital coastal choke points.	
	Naval Platform Classification	• Multi-Role Fleet Design: Modern maritime power requires a balanced fleet—heavy combatants (frigates) for offensive strikes, survey vessels for operational intelligence, and shallow-water hunters for asymmetric coastal defence.			
	Institutional Framework	• Indigenous Shipbuilding: All three platforms were designed by the Indian Navy's Warship Design Bureau and constructed by Garden Reach Shipbuilders & Engineers (GRSE), Kolkata. • Atmanirbhar Bharat: Boasting over 75% indigenous content, these platforms reflect the maturity of India's defence industrial base and the MSME ecosystem.			
	Key Highlights	• Historic Tri-Commissioning: Reflects an unprecedented compression in shipbuilding timeframes, showcasing enhanced domestic manufacturing capacity and self-reliance. • Strategic Coincidence: The commissioning of INS Sanshodhak uniquely coincided with World Hydrography Day, emphasising India's commitment to maritime safety and underwater research.			
	Strategic & Maritime Security Significance	 Fleet Readiness A multi-layered force structure allows the Navy to project power across distant oceanic corridors while simultaneously securing immediate coastal borders.		 Protection of SLOCs Stealth frigates like INS Dunagiri play a critical role in securing vital Sea Lines of Communication in the increasingly contested Indo-Pacific region.	
				 Blue Water Aspirations Comprehensive seabed mapping by survey vessels ensures safe submerged navigation, a prerequisite for sustained deep-sea submarine operations and humanitarian assistance.	
				 Strategic Deterrence Shallow water anti-submarine craft deny adversaries the ability to conduct stealth reconnaissance or mine-laying operations near commercial ports and strategic naval bases.	

Challenges

- **Technological Integration:** Ensuring seamless network-centric interoperability between varied new platforms and complex legacy systems remains an operational challenge.
- **Evolving Asymmetric Threats:** The rapid regional proliferation of hostile autonomous underwater drones and advanced stealth submarines complicates shallow-water acoustic surveillance.

Way Forward

- **Capacity Expansion:** Accelerating the modernisation of shipyard infrastructure and promoting public-private partnerships to sustain rapid warship induction.
- **Advanced Sensors:** Investing in AI-driven acoustic signature processing and next-generation variable depth sonars to maintain a decisive edge in underwater domain awareness.

• QUICK REVISION BOX •	
 UPSC Keywords:	Blue Water Navy, Sea Lines of Communication (SLOCs), Network-centric Warfare, Autonomous Underwater Vehicles (AUVs).
 Operating Organisation:	Indian Navy.
 Shipbuilding Organisations:	Warship Design Bureau, Garden Reach Shipbuilders & Engineers (GRSE).
 Related Defence Initiatives:	Atmanirbhar Bharat, Project 17A.
 Important Maritime Concepts:	Anti-Submarine Warfare, Hydrographic Survey, Maritime Domain Awareness.
 Important Naval Platforms:	INS Dunagiri, INS Sanshodhak, INS Agray.

SCIENCE & TECHNOLOGY

45. MAHA Water Mission: Tech-Driven Solutions for Water Security (DD News)

Context:

The Union Government recently launched the ₹200-crore MAHA Water Mission, a joint initiative by the Anusandhan National Research Foundation (ANRF) and the Ministry of Jal Shakti to accelerate deep-tech startup innovation and R&D in the water sector.

MAHA Water Mission	Water Technology (WaterTech)	Innovation Ecosystem	Technology-driven Water Management	Key Highlights
 Part of the 'Missions for Advancement in High-impact Areas' (MAHA) to bridge the gap between fundamental laboratory research and real-world field deployment.	 Application of emerging technologies like AI, IoT, and Big Data Analytics to optimise water resource monitoring, treatment, and equitable distribution.	 Creation of multidisciplinary consortia that integrate universities, R&D laboratories, deep-tech startups, MSMEs, and industry partners.	 Leveraging ISRO's satellite data and geospatial mapping for precision irrigation, predictive climate modelling, and scientific groundwater assessment.	 • Consortium Funding: Provides up to ₹20 crore in grants per selected multidisciplinary project to support technology validation and commercialisation. • Thematic Focus: Prioritises water resource assessment, drinking water access, ecological health, circular economy (water-use efficiency), and climate resilience.
Scientific & Technological Significance				
 Startup-led Innovation: Democratises research funding, empowering deep-tech startups to drive indigenous technological breakthroughs under Atmanirbhar Bharat.	 Technology Commercialisation: Accelerates the Technology Readiness Level (TRL) of critical innovations such as smart sensors, desalination, and membrane filtration.		 Sustainable Water Management: Promotes a circular economy in wastewater recycling, directly advancing Sustainable Development Goal (SDG) 6.	

Challenges

- **Commercial Scaling:** Startups often face the "valley of death" due to high capital requirements and a lack of sustained venture capital in core water infrastructure.
- **Adoption Bottlenecks:** Technical complexities, high deployment costs, and rigid regulatory frameworks limit the grassroots adoption of WaterTech by local municipal bodies.

Way Forward

- **Public-Private Partnerships:** Strengthening industry-academia synergies to co-create scalable, cost-effective technologies tailored to specific Indian agro-climatic zones.
- **Sandbox Environments:** Creating real-world testing grounds within municipal systems to accelerate the regulatory approval and deployment of startup innovations.

QUICK REVISION BOX	
 UPSC Keywords:	Deep-Tech, Circular Economy, Technology Readiness Level (TRL), WaterTech, Atmanirbhar Bharat.
 Nodal Organisations:	ANRF (DST), Ministry of Jal Shakti, ISRO.
 Related Initiatives:	National Water Mission, Jal Jeevan Mission, Atal Innovation Mission (AIM).
 Important Technologies:	AI-enabled Smart Sensors, GIS Mapping, Remote Sensing, Desalination.
 Relevant SDGs:	SDG 6 (Clean Water and Sanitation), SDG 9 (Industry, Innovation and Infrastructure).

46. Prime Minister Research Chair: Brain Gain for Innovation (News on Air)

Context:

The Ministry of Education recently launched the Prime Minister Research Chair (PMRC) Scheme 2026 to attract distinguished global Indian-origin researchers and strengthen India's research and innovation ecosystem.

Prime Minister Research Chair (PMRC) Scheme	Research Chairs	India's R&D Ecosystem	Innovation-driven Knowledge Economy	Key Highlights
 Global Talent Integration: Embeds world-class Indian-origin scientists from abroad into premier Indian institutions for high-impact frontier research.	 Academic Leadership: Prestigious positions awarded to eminent researchers to lead niche technological development and mentorship.	 Institutional Synergy: Fosters collaboration among top-ranked HEIs (IITs, IISc) and premier national laboratories (CSIR, DST, DBT, ICMR).	 Translational Research: Shifts focus from basic research to the indigenous creation and commercialisation of critical technologies.	 Strategic Thematic Areas: Focuses on 13 national priorities, including Artificial Intelligence (AI), Semiconductors, Quantum Computing, and Space. Reversing Brain Drain: Recruits global talent across three tiers: Young Research Fellows, Senior Fellows, and Research Chairs.
Scientific & Technological Significance				
 Indigenous Technology Development: Accelerates the "lab to market" transition, bolstering technological self-reliance under Atmanirbhar Bharat.	 Global Competitiveness: Elevates domestic research quality, pushing Indian institutions higher in global scientific rankings.	 Academia-Industry Collaboration: Facilitates intellectual property (IP) creation, patent commercialisation, and industry-aligned deep-tech innovation.		

Challenges

- **Low R&D Expenditure:** India's Gross Expenditure on R&D (GERD) remains stagnant at ~0.65% of GDP, limiting large-scale infrastructure upgrades.
- **Fragmented Ecosystem:** Siloed functioning between university researchers and private industries severely hinders effective technology commercialisation.

Way Forward

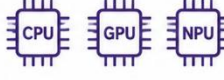
- **Institutional Strengthening:** Leveraging the Anusandhan National Research Foundation (ANRF) to bridge the gap between basic research and real-world deployment.
- **Private Sector Participation:** Incentivising corporate R&D investments to match public funding, driving sustained economic growth.

QUICK REVISION BOX	
 UPSC Keywords:	Brain Gain, Translational Research, Lab to Market, Deep-Tech.
 Nodal Organisation:	Department of Higher Education (Ministry of Education), Principal Scientific Advisor (PSA).
 Related National Missions:	ANRF, National Quantum Mission, Startup India.
 Important Research Institutions:	CSIR, DST, DBT, ICMR, IITs, IISc.
 Emerging Technologies:	Semiconductors, AI, Quantum Computing, Advanced Materials.
 Related Policies:	National Education Policy (NEP) 2020.

47. Nvidia's AI Chips: Powering the Future of PCs (Indian Express)

Context:

Nvidia recently unveiled advanced AI chips for personal computers, directly challenging traditional leaders like Apple and Intel and marking a critical shift towards on-device artificial intelligence processing.

AI Chips & Hardware Acceleration	AI PCs & Edge AI	CPU, GPU, and NPU	Semiconductor Ecosystem	Key Highlights
 AI Chips: Specialized microprocessors designed to handle the massive parallel computing required for Machine Learning, Deep Learning, and Generative AI. Hardware Acceleration: Using dedicated hardware to speed up complex mathematical computations required for running Large Language Models (LLMs).	 AI-enabled Personal Computers: Devices embedded with dedicated AI processors capable of running complex tasks locally. Edge AI (On-device AI): Processes data directly on the device rather than relying on remote Cloud AI servers, significantly reducing latency and bandwidth requirements.	 Central Processing Unit (CPU): The general-purpose processor managing sequential tasks and system operations. Graphics Processing Unit (GPU): Excels at parallel computing, vital for training large AI models and rendering complex graphics. Neural Processing Unit (NPU): A dedicated accelerator handling AI inference (e.g., voice recognition) with extreme energy efficiency.	 Value Chain: Spans from chip design to advanced packaging and fabrication, increasingly utilizing modular architectures like chiplets.	 Integrated Architecture: New AI PC chips combine powerful CPUs, GPUs, and high-speed memory into a single "superchip" architecture. Agentic AI: Shifts the computing paradigm from launching applications to running autonomous AI agents that execute complex multi-step tasks.
Scientific & Technological Significance				
 Data Privacy: On-device processing ensures that sensitive personal data is not transmitted to external cloud servers, strengthening cybersecurity.	 High-Performance Computing (HPC): Brings data center-level computing capabilities to personal desktops for complex scientific research and simulations.	 Digital Ecosystem: Supports the IndiaAI Mission and Digital India by enabling localized deployment of AI tools tailored for Indian languages.		

Challenges

- **Supply Chain Vulnerabilities:** The global semiconductor value chain is highly concentrated, making it susceptible to geopolitical friction and export controls.
- **High Capital Costs:** Transitioning to advanced semiconductor fabrication nodes requires massive upfront capital expenditure.
- **Technological Dependence:** India currently relies heavily on foreign intellectual property for advanced chip design.

Way Forward

- **Strategic Self-Reliance:** Accelerating the India Semiconductor Mission (ISM) and Semicon India Programme to establish domestic trusted electronics fabrication capabilities.

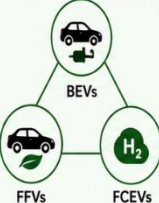
- **Incentivizing Design:** Leveraging the Design Linked Incentive (DLI) Scheme and PLI Scheme for Semiconductors to build an indigenous talent pool, advancing the vision of Atmanirbhar Bharat.

QUICK REVISION BOX	
 UPSC Keywords:	Edge AI, Parallel Computing, Chiplets, On-device Processing.
 Important Organisations:	India Semiconductor Mission (ISM).
 Related Government Initiatives:	Semicon India, DLI, PLI Scheme for Semiconductors, IndiaAI Mission, National Supercomputing Mission (NSM).
 Emerging Technologies:	NPUs, Generative AI, LLMs, Advanced Packaging.
 Important Concepts:	CPU vs GPU vs NPU, Hardware Acceleration.

48. India's First Flex-Fuel Passenger Vehicle: Towards Sustainable Mobility (News on Air)

Context:

The Union Government recently unveiled India's first flex-fuel passenger vehicle, marking a significant technological milestone in advancing indigenous clean mobility and accelerating the nation's energy transition.

Flex-Fuel Vehicles (FFVs) & Engine Technology	Ethanol Blending & Alternative Fuels	Key Highlights
 • Flex-Fuel Vehicles: Automobiles engineered with modified internal combustion engines (ICE) capable of operating on flexible blends of petrol and ethanol (ranging from E20 to E100).  • Engine Adaptation: Integrates advanced fuel-composition sensors, recalibrated engine control modules, and anti-corrosive fuel lines to dynamically adjust combustion timing based on the ethanol ratio.	 • Ethanol Blending: Blending agriculturally derived biofuel with fossil fuels, leveraging ethanol's higher octane rating for cleaner, more efficient combustion.  • Technological Complementarity: FFVs offer a practical, immediate decarbonisation pathway utilizing existing ICE infrastructure, complementing Battery Electric Vehicles (BEVs) and Hydrogen Fuel Cell Vehicles (FCEVs).	 • Indigenous Calibration: Showcases advanced flex-fuel engine calibration specifically adapted to Indian climatic variables and driving conditions.  • Policy Alignment: Directly accelerates the Ethanol Blended Petrol (EBP) Programme's mandate to achieve 20% ethanol blending (E20) nationwide.
Scientific & Technological Significance		
 Energy Security: Drastically reduces crude oil import dependence while lowering tailpipe emissions, advancing the Net Zero 2070 climate target.	 Rural Bioeconomy: Transforms agricultural waste into lucrative biofuel feedstocks, fostering a circular economy governed by the National Policy on Biofuels.	 Automotive Innovation: Drives indigenous R&D in clean engine technologies, heavily incentivized by the PLI Scheme for Automobile & Auto Components.

Challenges

- **Food vs. Fuel Conflict:** Over-reliance on water-intensive 1G feedstocks (sugarcane, broken rice) risks stressing groundwater tables and national food security.
- **Infrastructure Deficit:** The nationwide lack of high-blend (E85/E100) ethanol dispensing stations restricts mass consumer adoption.

Way Forward

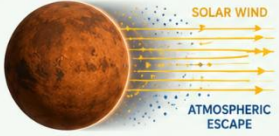
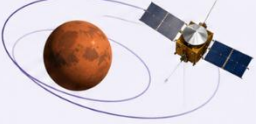
- **Advanced Feedstocks:** Scaling up commercial 2G (lignocellulosic biomass) ethanol production through dedicated funding under the PM JI-VAN Yojana.
- **Ecosystem Synergy:** Synchronising FFV manufacturing with biofuel supply-chain expansion under the SATAT initiative for a holistic energy transition.

QUICK REVISION BOX	
 UPSC Keywords:	Internal Combustion Engine (ICE), Octane Rating, 1G & 2G Ethanol, Circular Bioeconomy.
 Nodal Ministry:	Ministry of Petroleum and Natural Gas, Ministry of Road Transport and Highways.
 Related Initiatives:	EBP Programme, PM JI-VAN Yojana, SATAT.
 Emerging Technologies:	FFVs, BEVs, FCEVs.
 Important Policies:	National Policy on Biofuels (2018).

49. MAVEN Mission: Unlocking Mars' Atmospheric Secrets (NASA)

Context:

NASA recently declared the conclusion of its historic Mars Atmosphere and Volatile Evolution (MAVEN) mission after over a decade in orbit, following an unrecoverable loss of communication in late 2025.

MAVEN Mission	Mars' Atmosphere & Atmospheric Escape	Planetary Exploration & Comparative Planetology	Key Highlights
 Mission Profile: Launched in 2013, MAVEN was the first spacecraft dedicated exclusively to exploring the Martian upper atmosphere, ionosphere, and interactions with the solar wind. Data Relay Role: Beyond scientific observation, it acted as a critical telecommunications relay for Martian surface rovers like Curiosity and Perseverance.	 Atmospheric Erosion: The gradual stripping of Mars' ancient, dense atmosphere by the continuous stream of charged particles known as the solar wind. Atmospheric Sputtering: A process where high-energy ions collide with atmospheric gases, ejecting them into space—first directly observed by MAVEN.	 Orbital Observation: Utilising orbiters equipped with ultraviolet spectrometers to analyse planetary evolution over geological timescales. Comparative Planetology: Studying Martian climate history to understand how planetary bodies (including Earth) respond to extreme solar activity and magnetic field depletion.	Discoveries: MAVEN revealed new types of proton auroras and demonstrated how global dust storms accelerate the loss of Martian water into deep space. Mission End: The spacecraft suffered an unrecoverable power and communication failure due to an anomalous high-rate rotation, officially ending its 11-year scientific tenure.
Scientific & Technological Significance			
 Planetary Climate Evolution: Provided definitive evidence explaining Mars' transition from a potentially habitable, warm, and wet world to today's cold, arid landscape.	 Future Human Missions: Insights into the Martian radiation environment and atmospheric dynamics are crucial for designing safe trajectories and landing systems for future crewed missions.	 Indigenous Parallels: Complements data from ISRO's Mars Orbiter Mission (Mangalyaan), reinforcing the importance of global scientific data sharing in advancing our understanding of planetary evolution.	

Challenges

- **Deep-Space Communication:** The vast distance causes significant signal latency, complicating real-time recovery efforts during spacecraft anomalies.
- **Technological Complexity:** Designing instrumentation that can withstand extreme space weather, radiation exposure, and planetary orbital degradation over decades.

Way Forward

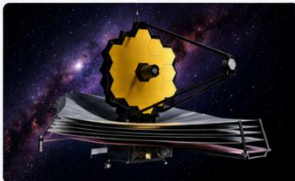
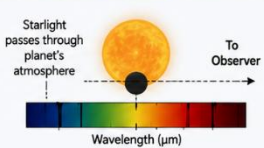
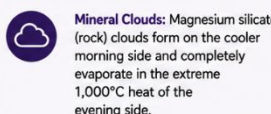
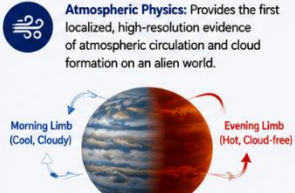
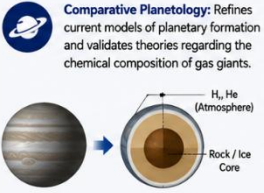
- **Global Collaboration:** Bridging planetary communication gaps through international constellations, integrating efforts from NASA, ESA, and ISRO's future Mars missions.
- **Archival Science:** Leveraging MAVEN's decade-long dataset to refine predictive climate models and guide the next generation of sample-return missions.

QUICK REVISION BOX	
 UPSC Keywords:	Atmospheric Sputtering, Solar Wind, Atmospheric Escape, Comparative Planetology.
 Space Agencies:	NASA, ESA, ISRO (Mars Orbiter Mission/Mangalyaan).
 Related Space Missions:	Curiosity, Perseverance, Mangalyaan.
 Important Scientific Concepts:	Magnetosphere, Ionosphere, Solar Flares.
 Important Instruments:	Orbiters, Ultraviolet Spectrometers.

50. JWST Discovery: Daily Cloud Cycle on Exoplanet WASP-94A b (Economic Times)

Context:

The James Webb Space Telescope (JWST) recently discovered a repeating daily cloud cycle of vaporised rock on the exoplanet WASP-94A b, marking a major breakthrough in understanding extraterrestrial weather systems and atmospheric dynamics.

James Webb Space Telescope (JWST)	Exoplanets & Hot Jupiters	Space-based Spectroscopy & Atmospheric Dynamics	Key Highlights
 Infrared Observatory: A premier space telescope jointly developed by NASA, ESA, and CSA, designed to observe the universe in high-resolution infrared wavelengths.	 WASP-94A b: A tidally locked gas giant located nearly 700 light-years away in the constellation Microscopium, orbiting extremely close to its host star. Hot Jupiters: Massive exoplanets characterised by extreme temperatures, intense stellar radiation, and short orbital periods.	 Starlight passes through planet's atmosphere To Observer Wavelength (μm) Transit Method: Analysing the spectrum of starlight filtering through a planet's atmosphere as it passes directly in front of its host star. Limb Asymmetry: JWST uniquely isolated the leading edge (morning limb) from the trailing edge (evening limb) to create a three-dimensional atmospheric profile.	 Mineral Clouds: Magnesium silicate (rock) clouds form on the cooler morning side and completely evaporate in the extreme 1,000°C heat of the evening side. MORNING SIDE (Cooler) EVENING SIDE (~1,000°C) Chemical Clarity: The cloud-free evening sky allowed JWST to correct previous Hubble data, revealing that the planet's carbon and oxygen levels are surprisingly similar to our Jupiter.
Scientific & Technological Significance			
 Atmospheric Physics: Provides the first localized, high-resolution evidence of atmospheric circulation and cloud formation on an alien world. Morning Limb (Cool, Cloudy) Evening Limb (Hot, Cloud-free)	 Comparative Planetology: Refines current models of planetary formation and validates theories regarding the chemical composition of gas giants. H₂, He (Atmosphere) Rock / Ice Core	 Technological Leap: Demonstrates the superiority of space-based infrared observation over ground-based telescopes in mapping complex 3D planetary climates. GROUND-BASED TELESCOPE VS JWST (SPACE-BASED)	 Search for Habitability: Perfecting cloud-detection methods on Hot Jupiters paves the way for characterizing the atmospheres of smaller, potentially habitable Earth-like planets.

Challenges

- **Extreme Distances:** Faint signals from exoplanets hundreds of light-years away make spectral data extraction highly complex and prone to noise.
- **Instrument Limitations:** Differentiating atmospheric aerosols (clouds/hazes) from actual chemical gas signatures requires immense resolution and prolonged space observation.

Way Forward

- **Advanced Modelling:** Combining JWST's high-resolution spectral data with 3D numerical simulations to accurately decode atmospheric dynamics.
- **Global Collaboration:** Enhancing synergies between international space agencies and Indian initiatives like IN-SPACe to democratise access to next-generation astronomical data.

QUICK REVISION BOX		
	UPSC Keywords:	Transit Spectroscopy, Limb Asymmetry, Hot Jupiter, Tidal Locking.
	Space Agencies:	NASA, ESA, CSA, ISRO.
	Related Space Missions:	JWST, Hubble Space Telescope, AstroSat.
	Important Scientific Concepts:	Infrared Astronomy, Magnesium Silicate Clouds, Planetary Circulation.
	Observation Techniques:	Transit Method, Transmission Spectroscopy.

51. E85 Fuel & Flex-Fuel Technology: India's Biofuel Transition (The Indian Express)

Context:

With the Bureau of Indian Standards (BIS) notifying standards for higher ethanol blends, the compatibility of E85 fuel with conventional and Flex-Fuel Vehicles (FFVs) has become central to India's energy transition.


WHY IN NEWS

With the Bureau of Indian Standards (BIS) notifying standards for higher ethanol blends, the compatibility of E85 fuel with conventional and Flex-Fuel Vehicles (FFVs) has become central to India's energy transition.

CORE CONCEPTS



E85 Fuel & Ethanol Blending

- **E85 Fuel:** A high-octane biofuel blend comprising 85% ethanol and 15% petrol, possessing a lower calorific value than pure petrol.
- **Ethanol Blending (E20–E100):** The strategic mixing of bioethanol with fossil fuels to reduce well-to-wheel greenhouse gas emissions and crude oil dependence.



Flex-Fuel Vehicles (FFVs) & Engine Technology

- **Flex-Fuel Vehicles:** Automobiles engineered with modified internal combustion engines (ICE) to seamlessly operate on any petrol-ethanol blend up to E85 or E100.
- **Engine Calibration:** FFVs utilize advanced sensors, reprogrammed electronic control units (ECUs), and corrosion-resistant fuel lines to continuously optimize ethanol combustion.



Bioethanol & Alternative Fuels

- **Bioethanol Production:** Deriving ethyl alcohol from 1G (sugarcane, broken rice) and 2G (lignocellulosic biomass) feedstocks to fuel sustainable mobility.

KEY HIGHLIGHTS



Strict Compatibility: E85 is exclusively meant for FFVs; its use in conventional ICE vehicles degrades rubber/plastic components and causes severe engine misfires.



Standardisation: Formal BIS recognition for E85 paves the way for specialized dispensing infrastructure and mass FFV adoption.



FLEX-FUEL VEHICLE (FFV)
 Engine calibrated for high ethanol blends

SCIENTIFIC & TECHNOLOGICAL SIGNIFICANCE



Energy Security:

Diversifying the fuel matrix drastically reduces crude oil imports, safeguarding the economy against geopolitical supply disruptions.



Clean Transportation:

Significantly lowers tailpipe carbon emissions, advancing India's Net Zero 2070 climate commitments.



Technological Synergy:

FFVs complement Battery Electric Vehicles (BEVs), CNG, and Hydrogen FCEVs by proactively decarbonizing legacy ICE technologies.



Biofuel-based Circular Economy:

Transforms agricultural surplus into rural wealth, strongly aligning with the National Policy on Biofuels.

Challenges

- **Food-versus-Fuel:** Heavy reliance on water-intensive 1G crops strains groundwater tables and poses long-term risks to national food security.

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- **Lower Energy Density:** E85's reduced calorific value inherently results in a noticeable drop in vehicle mileage compared to conventional petrol.
- **Infrastructure Deficit:** Establishing dedicated E85 dispensing networks across the country remains a capital-intensive and logistical hurdle.

Way Forward

- **Advancing 2G Ethanol:** Accelerating commercial-scale 2G biofuel production through the PM JI-VAN Yojana to bypass agricultural conflicts.
- **Indigenous Innovation:** Utilizing the PLI Scheme for Auto Components to deeply localize FFV manufacturing and advanced fuel-injection systems.

QUICK REVISION BOX		
	UPSC Keywords:	Well-to-Wheel Emissions, Calorific Value, Circular Bioeconomy.
	Nodal Ministry:	Ministry of Petroleum and Natural Gas.
	Related Initiatives:	EBP Programme, PM JI-VAN Yojana, SATAT.
	Important Fuel Standards:	E20, E85, E100, BIS Specifications.
	Important Concepts:	Octane Rating, 1G & 2G Ethanol.

52. Ban on Irrational FDCs: Safeguarding Public Health (The Hindu)

Context:

The Union Ministry of Health and Family Welfare has banned 16 fixed-dose combination (FDC) drugs, including antibiotics and painkillers, citing safety risks, unproven therapeutic effects, and the potential to exacerbate antimicrobial resistance.

Fixed Dose Combination (FDC) Drugs			
 DEFINITION Formulations containing two or more active pharmaceutical ingredients combined in a fixed ratio within a single dosage form.	RATIONAL VS IRRATIONAL COMBINATIONS  RATIONAL FDCs Improve patient compliance and therapeutic efficacy.  IRRATIONAL FDCs Lack scientific justification and pose severe health risks.		RATIONAL DRUG THERAPY & EVIDENCE-BASED MEDICINE Therapeutic Efficacy: Ensuring that combined active ingredients exhibit synergistic or additive effects without adverse pharmacokinetic drug interactions. Antimicrobial Stewardship: Prescribing antibiotics only when clinically justified to preserve their efficacy and prevent pathogen mutation.
DRUG REGULATION IN INDIA Regulatory Framework: Governed by the Drugs and Cosmetics Act, 1940, and the Drugs and Cosmetics Rules, 1945, ensuring post-marketing surveillance and drug safety. Institutional Oversight: The Central Drugs Standard Control Organisation (CDSCO), led by the Drug Controller General of India (DCGI), acts as the apex regulatory authority.	ANTIMICROBIAL RESISTANCE (AMR) Mechanism: The evolutionary process where microorganisms survive exposure to antimicrobial drugs, rendering standard treatments ineffective. Public Health Threat: Accelerated by the irrational combination and over-the-counter misuse of antibiotic-based formulations.		KEY HIGHLIGHTS Statutory Action: The ban was enforced under Section 26A of the Drugs and Cosmetics Act, prohibiting the manufacture, sale, and distribution of these specific drugs. Identified Categories: The prohibited medications primarily include unwarranted dermatological preparations, analgesics, antispasmodics, and antibiotic cocktails.
SCIENTIFIC & TECHNOLOGICAL SIGNIFICANCE			
 Drug Safety: Eliminates hazardous pharmaceutical cocktails that cause unpredictable adverse drug reactions (ADRs) or organ toxicity.	 AMR Prevention: Strongly curbs the indiscriminate consumption of broad-spectrum antibiotics, aligning with the National Action Plan on Antimicrobial Resistance (NAP-AMR).	 Evidence-based Healthcare: Promotes monotherapy and rational prescribing practices, safeguarding patient safety and strengthening India's pharmaceutical regulatory system.	

Challenges

- **Regulatory Enforcement:** Weak implementation at the state level often allows banned formulations to circulate under different generic or brand names.
- **Over-the-Counter Misuse:** Lack of stringent dispensing laws facilitates unchecked self-medication and the procurement of prescription drugs by the public.
- **Pharmacovigilance Deficits:** Inadequate reporting of adverse drug reactions hampers the timely detection of dangerous irrational drug combinations.

Way Forward

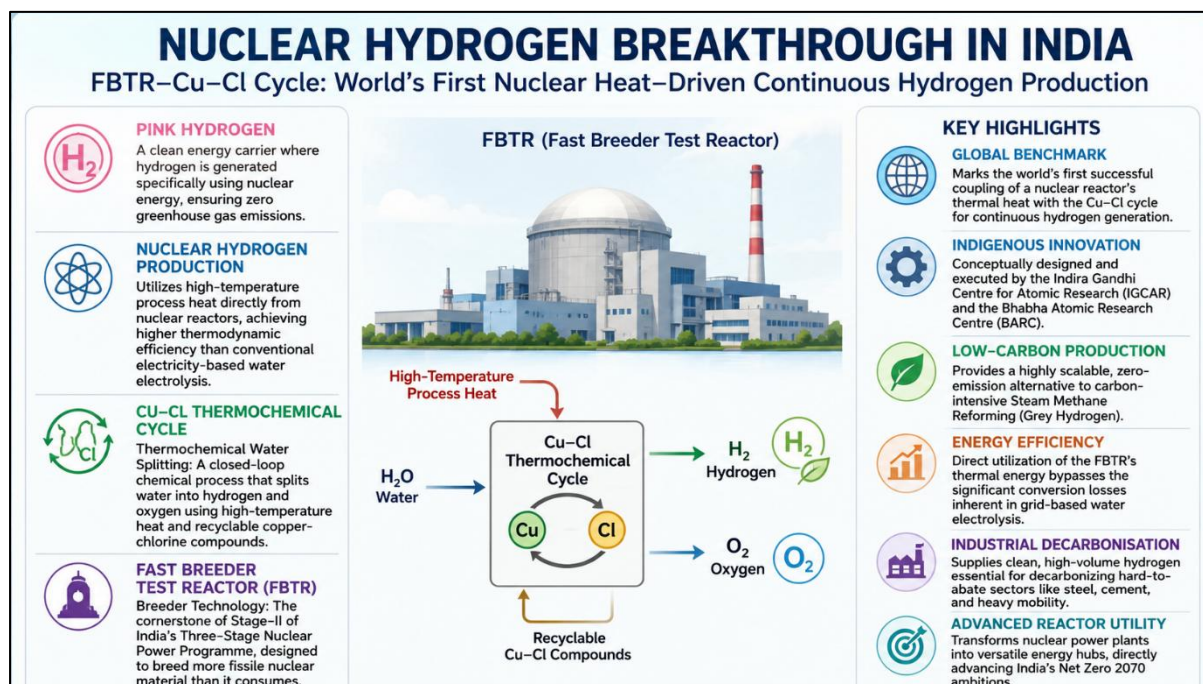
- **Enhanced Surveillance:** Strengthening the Pharmacovigilance Programme of India (PvPI) to actively monitor and report drug toxicity and interactions.
- **Stringent Compliance:** Empowering State Drug Controllers to conduct aggressive market crackdowns and enforce strict adherence to the National List of Essential Medicines (NLEM).

QUICK REVISION BOX		
	UPSC Keywords:	Antimicrobial Stewardship, Pharmacokinetics, Adverse Drug Reactions (ADRs).
	Nodal Regulatory Authorities:	Central Drugs Standard Control Organisation (CDSCO), Drug Controller General of India (DCGI).
	Related Acts & Rules:	Drugs and Cosmetics Act, 1940; Drugs and Cosmetics Rules, 1945 (Section 26A).
	National Health Programmes:	Pharmacovigilance Programme of India (PvPI), Ayushman Bharat.
	Important Scientific Concepts:	Fixed Dose Combinations (FDCs), Monotherapy, Antimicrobial Resistance.
	Related Public Health Initiatives:	National Action Plan on Antimicrobial Resistance (NAP-AMR), National List of Essential Medicines (NLEM).

53. Cu-Cl Nuclear Hydrogen Facility: India's Clean Energy Milestone (PIB)

Context:

The Department of Atomic Energy (DAE) inaugurated the world's first hydrogen production facility based on the Copper-Chlorine (Cu-Cl) thermochemical cycle, utilizing nuclear heat from the Fast Breeder Test Reactor (FBTR).



Challenges

- **Material Degradation:** Managing the highly corrosive nature of hot chlorine and hydrochloric acid demands expensive, advanced material engineering.
- **Nuclear Safety Synergy:** Safely operating volatile hydrogen production units in close proximity to sensitive nuclear reactor zones requires stringent regulatory frameworks.

Way Forward

- **Commercial Scaling:** Upgrading this pilot-scale technology for integration with the upcoming 500 MWe Prototype Fast Breeder Reactor (PFBR).
- **Policy Integration:** Synergizing nuclear hydrogen capabilities with the National Green Hydrogen Mission to optimize storage, transport, and industrial off-take.

QUICK REVISION BOX		
	UPSC Keywords:	Pink Hydrogen, Thermochemical Water Splitting, Hard-to-Abate Sectors, Fuel Breeding.
	Nodal Organisations:	DAE, BARC, IGCAR.
	Related National Missions:	National Green Hydrogen Mission.
	Nuclear Facilities:	FBTR, PFBR (Kalpakam).
	Important Scientific Concepts:	Cu–Cl Cycle, Fast Breeder Reactor (FBR) Technology, Three-Stage Nuclear Power Programme.

54. Indigenous Netra Cleared for Frontline Duty (PIB)

Context:

The Defence Research and Development Organisation (DRDO) recently handed over the Final Operational Clearance (FOC) certificate for the indigenous 'Netra' Airborne Early Warning and Control (AEW&C) system to the Indian Air Force (IAF).

IAF GETS FINAL OPERATIONAL CLEARANCE OF INDIGENOUS AEW&C SYSTEM 'NETRA'

AIRBORNE EARLY WARNING & CONTROL (AEW&C)
Eye in the Sky: A sophisticated airborne platform combining radar, intelligence sensors, and command systems to detect incoming threats beyond the ground radar horizon.

NETRA AEW&C SYSTEM
Indigenous Platform: Developed by DRDO's Centre for Airborne Systems (CABS) and mounted on an Embraer aircraft, featuring an Active Electronically Scanned Array (AESA) radar.

AIRBORNE SURVEILLANCE TECHNOLOGIES
Sensor Suite: Incorporates Identification Friend or Foe (IFF) and Electronic Support Measures (ESM) to track aircraft, drones, and cruise missiles.

C4ISR & NETWORK-CENTRIC WARFARE
Battle Management: Employs C4ISR capabilities for real-time sensor fusion, directing friendly fighter jets during beyond-visual-range (BVR) combat.



SCIENTIFIC & TECHNOLOGICAL SIGNIFICANCE

AIR DEFENCE NETWORK:
Overcomes ground radar line-of-sight limitations, extending airspace surveillance deep into hostile territory.

FORCE MULTIPLICATION:
Enhances situational awareness and coordinates complex aerial engagements, acting as a crucial force multiplier.

STRATEGIC AUTONOMY:
Marks a landmark achievement in indigenous aerospace engineering, reducing reliance on foreign AWACS platforms.

KEY HIGHLIGHTS

COMBAT READY: The FOC certifies that Netra has met stringent operational benchmarks and is cleared for unrestricted frontline combat deployment.

PROVEN CAPABILITY: The system demonstrated tactical reliability during the Balakot strikes and Operation Sindoor.

AESA RADAR
High-performance radar for 360° surveillance and threat detection.

IFF
Ensures accurate identification of airborne assets.

ELECTRONIC SUPPORT MEASURES (ESM)
Detects and analyzes electromagnetic emissions from hostile sources.

C4ISR CAPABILITIES
Command, Control, Communications, Computers, Intelligence, Surveillance & Reconnaissance.

BEYOND-VISUAL-RANGE (BVR) COMBAT
Enables fighters to engage targets beyond visual range with coordinated support.

Challenges

- **Electronic Warfare:** Sustaining operations in dense electromagnetic environments requires continuous upgrades against jamming.
- **Technological Complexity:** Seamlessly integrating classified avionics with legacy multi-domain defence networks presents interoperability hurdles.

Way Forward

- **Next-Gen Development:** Advancing Netra Mk-1A and larger AWACS to secure 360-degree radar coverage.
- **AI Integration:** Leveraging artificial intelligence to automate threat categorization and streamline real-time sensor fusion.

QUICK REVISION BOX		
	UPSC Keywords:	Force Multiplier, AESA Radar, Network-Centric Warfare, Radar Horizon.
	Nodal Organisations:	DRDO, CABS, IAF.
	Related Defence Programmes:	Netra AEW&C, AWACS-India.
	Important Technologies:	ESM, C4ISR, IFF.
	Related Policies:	Atmanirbhar Bharat, DAP 2020.

HISTORY & CULTURE

55. Mountbatten Plan (June 3, 1947 Declaration) (Indian Express)

Context:

India recently marked the 79th anniversary of the Mountbatten Plan (June 3 Declaration, 1947), the definitive framework for the partition of British India and the subsequent transfer of sovereign power.

MOUNTBATTEN PLAN (JUNE 3 PLAN), 1947		
HISTORICAL BACKGROUND	MAJOR PROVISIONS	KEY HIGHLIGHTS
 Political Deadlock: The failure of the Cabinet Mission Plan to reconcile differences between the Indian National Congress and the Muslim League necessitated a new constitutional arrangement.	 Partition of India: The plan formally proposed the division of British India into two independent dominions—India and Pakistan.	 Political Consensus: Marked the formal acceptance of partition as the basis for the transfer of power by the Congress, Muslim League, and Sikh leadership.
 Mountbatten's Mandate: Lord Mountbatten arrived as Viceroy in March 1947 with instructions to transfer power by June 1948, a timeline he accelerated due to escalating communal unrest.	 Provincial Partition: The legislative assemblies of Bengal and Punjab were empowered to vote on partitioning their provinces based on religious demographic majorities.	 Boundary Demarcation: Mandated the establishment of Boundary Commissions to draw the exact borders in Punjab and Bengal.
	 Referendums: Plebiscites were mandated to determine the accession of the North-West Frontier Province (NWFP) and the Sylhet district of Assam.	 Accelerated Timeline: Advanced the date for the transfer of power from June 1948 to August 15, 1947.
	 Princely States: British paramountcy was to lapse, leaving the states free to accede to either dominion, though Mountbatten strongly advised accession based on geographical contiguity.	
HISTORICAL & CONSTITUTIONAL SIGNIFICANCE		
 Constitutional Transfer of Sovereignty: Facilitated a legal transition of power, enabling the Constituent Assembly to function as a fully sovereign legislative body.	 End of British Supremacy: Paved the way for the Indian Independence Act, 1947, effectively terminating British parliamentary control over Indian affairs.	 Dominion Governance: Established the framework for interim governance under the Government of India Act, 1935, until the new Constitution was framed.
		 Federal Integration: Accelerated the critical political and administrative integration of over 500 Princely States into the Indian Union.

Immediate Consequences

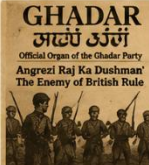
- **Administrative Partition:** Necessitated the complex and rapid division of civil services, financial assets, railways, and military personnel.
- **Refugee Rehabilitation:** Triggered unprecedented cross-border migration, resulting in a massive humanitarian and rehabilitation crisis.
- **Geopolitical Conflicts:** Left unresolved border anomalies and set the immediate stage for the conflict over the accession of Kashmir.

QUICK REVISION BOX		
	UPSC Keywords:	Dominion Status, Lapse of Paramountcy, Two-Nation Theory, Boundary Commission.
	Important Personalities:	Lord Mountbatten, Sardar Vallabhbhai Patel, Cyril Radcliffe.
	Important Acts:	Indian Independence Act, 1947; Government of India Act, 1935.
	Timeline:	June 3, 1947 (Plan announced); August 15, 1947 (Transfer of Power).
	Important Committees:	Radcliffe Commission (Boundary Commission), Cabinet Mission.

56. Maulana Barkatullah & the Provisional Government of India (1915) (Indian Express)

Context:

A proposal to rename Bhopal's Barkatullah University has brought renewed attention to Maulana Barkatullah (1854–1927), a prominent overseas revolutionary and Prime Minister of the Provisional Government of India established at Kabul in 1915.

PROVISIONAL GOVERNMENT OF INDIA (KABUL, 1915)	MAULANA BARKATULLAH (OVERSEAS REVOLUTIONARY)	OVERSEAS REVOLUTIONARY MOVEMENT
Established in Afghanistan to challenge British legitimacy.  Raja Mahendra Pratap President  Maulana Barkatullah Prime Minister  Maulana Ubaidullah Sindhi Home Minister	 <i>"Freedom is not the gift of any nation. It is the inalienable right of all mankind."</i> — Maulana Barkatullah A Bhopal-born nationalist who organised anti-colonial activities from abroad and built international support for India's independence during the First World War (1914–1918).	A militant phase of the freedom struggle where leaders operated from foreign soil (e.g., Ghadar Party, Berlin Committee) to mobilize arms, incite mutinies, and secure diplomatic backing.
KEY HIGHLIGHTS		
GHADAR PARTY  Associated with the Ghadar Movement and used revolutionary journalism to mobilise overseas Indians against British rule.	ANTI-COLONIAL DIPLOMACY  Engaged with revolutionary leaders, including Vladimir Lenin, in pursuit of international support for India's independence.	COMPOSITE NATIONALISM  Vehemently championed Hindu-Muslim solidarity, viewing communal unity as the fundamental prerequisite for defeating British imperialism.

Historical Significance

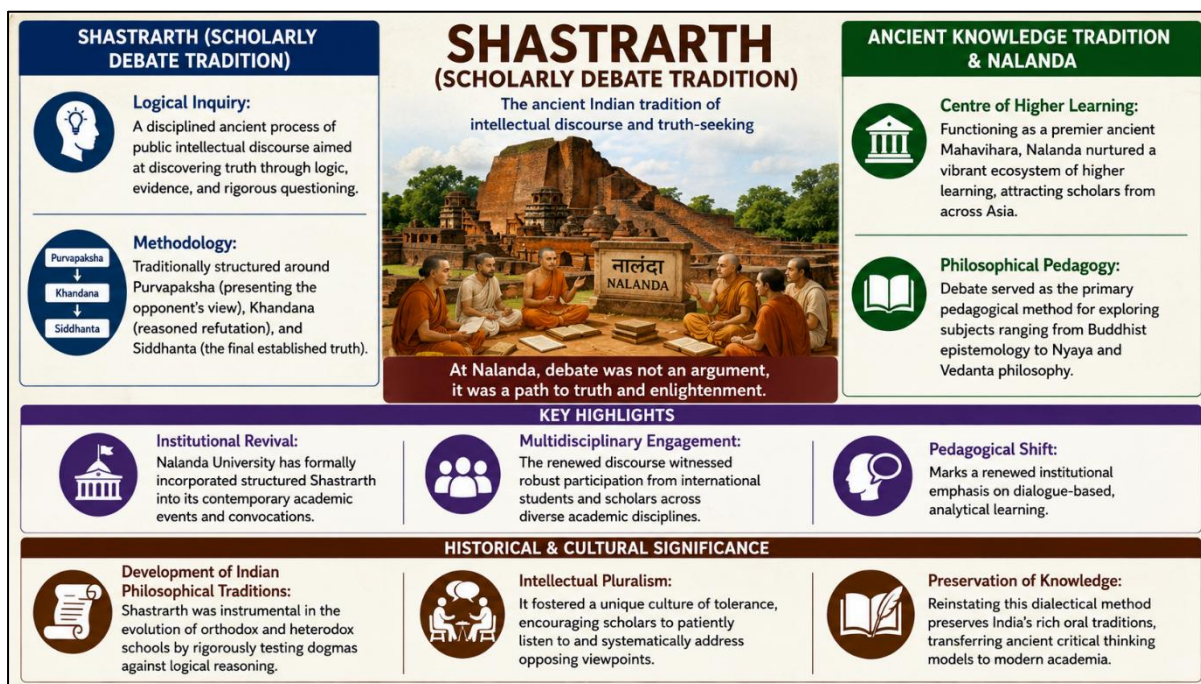
- **Internationalisation of the Struggle:** Successfully elevated India's domestic fight to the global stage, negotiating alliances during the Hindu-German Conspiracy.
- **Broadening the Freedom Movement:** Demonstrated that India's struggle for independence extended beyond constitutional politics by combining revolutionary activism, diplomacy, and international networking.
- **Pioneer of Overseas Resistance:** Contributed to the evolution of overseas revolutionary networks that later influenced India's armed struggle, including the movement associated with the Indian National Army.

QUICK REVISION BOX		
	UPSC Keywords:	Composite Nationalism, Anti-colonial Diplomacy, Pan-Islamism.
	Important Personalities:	Raja Mahendra Pratap, Maulana Ubaidullah Sindhi, Lala Hardayal, Vladimir Lenin.
	Important Organisations/Events:	Provisional Government of India (Kabul, 1915), Ghadar Party, Berlin Committee (Indian Independence Committee), First World War.
	Important Places:	Kabul, San Francisco, Bhopal.

57. Revival of Shastrarth Tradition at Nalanda (DD News)

Context:

The Prime Minister recently praised Nalanda University for reviving the ancient Indian tradition of Shastrarth (scholarly debate), highlighting its role in preserving India's intellectual heritage within contemporary higher education.



Contemporary Relevance

- **Knowledge Heritage:** Revives India's civilisational tradition of inquiry, intellectual freedom, and evidence-based learning.
- **Academic Excellence:** Promotes critical thinking, open dialogue, and interdisciplinary learning among modern scholars.
- **Policy Alignment:** Supports the broader educational goal of integrating Indian Knowledge Systems (IKS) into higher education.
- **Cultural Diplomacy:** Strengthens India's soft power by projecting its historical legacy as a global hub of intellectual discourse.

QUICK REVISION BOX		
	UPSC Keywords:	Purvapaksha, Khandana, Siddhanta, Mahavihara, Indian Knowledge Systems (IKS).
	Important Ancient Universities:	Nalanda, Vikramashila, Takshashila.
	Important Philosophical Schools:	Nyaya, Vedanta, Buddhism, Jainism.
	Important Concepts:	Shastrarth (Scholarly Discourse), Dialectical Method, Oral Traditions.
	Related Institutions:	Nalanda University.

58. Cultural Nationalism in Literature: Bankim Chandra & Vande Mataram (PIB)

Context:

Prime Minister Narendra Modi recently paid homage to Bankim Chandra Chattopadhyay on his birth anniversary, which also coincides with the 150th anniversary of the composition of Vande Mataram, India's National Song.

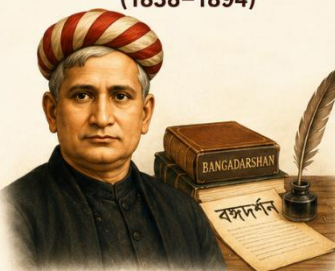
BANKIM CHANDRA CHATTOPADHYAY

He played a pioneering role in the growth of modern Bengali literature and used literature as a medium to awaken patriotic consciousness during British rule.

Through his literary works and journal *Bangadarshan*, he contributed to the intellectual foundations of the Indian national movement.

BANKIM CHANDRA CHATTOPADHYAY

(1838–1894)



A distinguished novelist, poet, journalist, and one of the earliest architects of cultural nationalism in modern India.

VANDE MATARAM

Composed in 1875 and later incorporated into *Anandamath* (1882), Vande Mataram personified India as the Motherland (Bharat Mata).

It became a powerful symbol of national unity and anti-colonial resistance, particularly during the Swadeshi Movement (1905).

In 1950, the Constituent Assembly accorded Vande Mataram the status of the National Song, while Jana Gana Mana became the National Anthem.

ANANDAMATH

Published in 1882, *Anandamath* is set against the backdrop of the Sannyasi Rebellion of the late eighteenth century.

The novel popularised Vande Mataram and reflected themes of patriotism, sacrifice, and resistance against oppression.

It became one of the most influential literary works in shaping nationalist imagination.

BENGAL RENAISSANCE AND LITERARY NATIONALISM

The Bengal Renaissance promoted social reform, intellectual awakening, vernacular literature, and cultural self-confidence.

Writers and intellectuals used literature and journalism to foster national consciousness and preserve India's cultural identity under colonial rule.

KEY HIGHLIGHTS

Vande Mataram emerged as one of the most influential slogans of the Swadeshi Movement (1905) following the Partition of Bengal.

Bankim Chandra demonstrated how literature could serve as a powerful instrument of national awakening and political consciousness.

His writings inspired several nationalist leaders and revolutionaries, including Sri Aurobindo, Bipin Chandra Pal, and numerous participants in the freedom movement.

Historical & Cultural Significance

- **Strengthening Cultural Nationalism:** Bankim Chandra's writings fostered pride in India's civilisational heritage and strengthened the cultural foundations of the emerging nationalist movement.
- **National Awakening through Literature:** By promoting vernacular literature and journalism, he transformed literary expression into a vehicle for political awareness and public mobilisation.
- **Contribution to the Freedom Movement:** Vande Mataram became an enduring symbol of resistance against colonial rule and inspired generations of freedom fighters.
- **Growth of Modern Indian Literature:** His literary works significantly shaped modern Bengali prose and influenced the development of Indian literature across regional languages.

QUICK REVISION BOX		
	UPSC Keywords:	Cultural Nationalism, Literary Nationalism, Bengal Renaissance.
	Important Literary Works:	<i>Anandamath</i> , Vande Mataram, <i>Bangadarshan</i> (journal).
	Important Personalities:	Bankim Chandra Chattopadhyay, Rabindranath Tagore (who set Vande Mataram to music).
	Important Concepts:	Personification of the Nation (Bharat Mata), Cultural vs Political Nationalism.
	Related Events:	Sannyasi Rebellion, Swadeshi Movement (1905).

59. Sufiyana Mousiqi: Kashmir's Intangible Heritage (The Hindu)

Context:

The Jammu and Kashmir government has formally proposed the inclusion of Kashmir's indigenous Sufiyana Mousiqi (Sufiyana Music) in the UNESCO Intangible Cultural Heritage (ICH) list to ensure the preservation and global recognition of this vanishing classical art form.

SUFIYANA MUSIC

Classical Tradition:
A highly structured, classical choral ensemble exclusive to the Kashmir Valley, combining devotional poetry, melody, and rhythm.

Musical Framework:
Rooted in the Persian maqam system (akin to Indian ragas), passed down orally through specialised musical lineages (gharanas).

Unique Ensemble:
Features vocalists who simultaneously play traditional acoustic instruments, most notably the 100-string Kashmiri Santoor, Rabab, and Saz-e-Kashmir.

SUFIYANA MUSIC

DEVOTION • MELODY • HARMONY



A classical Sufi devotional music tradition of Kashmir that blends Persian maqam, indigenous melodies, and spiritual poetry.

SUFI TRADITION IN KASHMIR

Cross-Cultural Synthesis:
Emerged during the 14th–15th centuries as Sufi saints from Central Asia introduced musical ideas that seamlessly blended with indigenous pre-Islamic practices.

Composite Culture:
Represents a rare civilisational dialogue and spiritual synthesis of Islamic, Persian, and Shaivite philosophical thought, deeply reflecting the ethos of Kashmiriyat.

KEY HIGHLIGHTS

Devotional Repertoire:
Performances feature mystical couplets exploring divine love and spiritual longing, historically sung in Kashmiri and Persian.

Nomination Effort:
Drafted by INTACH, the proposal highlights the art form's role in promoting harmony, inclusiveness, and cultural dialogue.

HISTORICAL & CULTURAL SIGNIFICANCE

Cultural Identity:
Functions as a vibrant repository of Kashmir's syncretic heritage shaped by centuries of Silk Road exchanges.

Intangible Preservation:
Protects an intricate oral tradition that relies heavily on master-to-disciple (ustad-shagird) transmission rather than codified texts.

UNESCO INTANGIBLE CULTURAL HERITAGE

Living Heritage:
Established under the 2003 Convention to safeguard oral expressions, performing arts, and traditional craftsmanship from extinction.

Challenges

- **Declining Repertoire:** Of the original 54 traditional maqams, only about 20 remain in active practice today due to a lack of documentation.
- **Dwindling Practitioners:** The art form faces the threat of extinction, sustained by a handful of surviving master musicians amidst shifting cultural tastes and commercialisation.

Way Forward

- **Institutional Safeguarding:** Establishing dedicated cultural academies to financially support traditional gharanas and ensure intergenerational transmission.
- **Global Recognition:** Securing UNESCO inscription to provide international visibility, funding access, and structured frameworks for long-term heritage conservation.

QUICK REVISION BOX		
	UPSC Keywords:	Kashmiriyat, Maqam System, Oral Tradition, Composite Culture.
	UNESCO Convention/Organisation:	2003 Convention for the Safeguarding of the Intangible Cultural Heritage, INTACH.
	Important Traditional Musical Instruments:	100-string Kashmiri Santoor, Rabab, Saz-e-Kashmir.
	Important Concepts:	Sufiyana Mousiqi, Ustad-Shagird Parampara.
	Related UNESCO ICH Elements of India:	Vedic Chanting, Ramlila, Sankirtana.

60. Thewa Art of Rajasthan: Gold Craft on Glass (DD News)

Context:

The 400-year-old Thewa art of Rajasthan recently gained international recognition after handcrafted Thewa motif cufflinks were presented as a diplomatic gift to the President of Slovakia.

THEWA ART	
UNIQUE CRAFTSMANSHIP  A centuries-old, intricate decorative art form that involves fusing hand-carved, 23-carat gold filigree sheets onto vibrant, molten multicoloured glass.  Exclusively practised and preserved by artisan families in the Pratapgarh district of Rajasthan since its origin during the Mughal era in the 17th century.  Designs predominantly depict scenes from royal life, hunting expeditions, flora and fauna, and mythological narratives.	TRADITIONAL CRAFTSMANSHIP  The core uniqueness lies in its traditional thermal bonding process, where the gold sheet (Thewa Ki Patti) is permanently fused to the glass without using any synthetic glue or solder.  Passed down orally and through rigorous apprenticeship within specific goldsmith families, safeguarding the intricate skills across generations.
KEY HIGHLIGHTS  Global Spotlight: The presentation of Thewa artefacts on an international platform highlighted India's rich artisanal heritage and the potential of cultural diplomacy.  One District One Product (ODOP): Thewa art is prominently featured under the ODOP initiative, aiming to boost local employment and promote regional crafts on a broader scale.	GEOGRAPHICAL INDICATION (GI) TAG  Thewa art received Geographical Indication (GI) status in 2014, protecting its authenticity and preventing unauthorized imitation by linking the craft strictly to its geographical origin in Pratapgarh.
HISTORICAL & CULTURAL SIGNIFICANCE  Preservation of Cultural Heritage: Represents a seamless blend of indigenous metallurgy and glasswork, symbolising the rich artistic legacy of Rajasthan.  Soft Power Diplomacy: Showcases India's traditional handicrafts as a potent tool for cultural diplomacy and international outreach.  Rural Livelihoods: Sustains the rural economy and provides critical livelihood opportunities for traditional artisan communities who have preserved the craft for over four centuries.	

Challenges

- **Declining Artisan Base:** The highly labour-intensive nature of the work and the secrecy maintained by traditional families restrict the number of practicing artisans.
- **Market Competition:** Faces stiff competition from cheaper, machine-made imitation jewellery and modern consumer preferences.
- **Limited Access:** Artisans often struggle with limited access to modern marketing channels, e-commerce platforms, and international export markets.

Way Forward

- **Institutional Support:** Strengthening the ODOP initiative and providing targeted financial assistance to artisans to scale up production while maintaining quality.
- **Design Intervention:** Facilitating collaborations between traditional craftsmen and modern designers to create contemporary products that appeal to global markets.
- **Skill Transmission:** Establishing formal training centres to institutionalize the skill transfer process and ensure the intergenerational survival of the craft.

QUICK REVISION BOX		
	UPSC Keywords:	Geographical Indication (GI) Tag, Cultural Diplomacy, Soft Power, ODOP.
	State & Traditional Centre:	Rajasthan, Pratapgarh District.
	GI Tag:	Awarded in 2014.
	Traditional Materials:	23-carat gold foil (Thewa Ki Patti), coloured molten glass.
	Related Traditional Crafts of Rajasthan:	Meenakari, Kundan, Blue Pottery, Pichwai Paintings.

61. Subhas Chandra Bose & the Forward Bloc (1939) (Indian Express)

Context:

Recent historical analyses have revisited Subhas Chandra Bose's decisive break with the Indian National Congress in 1939, highlighting the ideological friction that led to the formation of the Forward Bloc.

TRIPURI SESSION (1939)  Contested Election: Bose was re-elected Congress President at Tripuri (1939) following his Haripura tenure (1938), defeating Mahatma Gandhi's chosen candidate, Pattabhi Sitaramayya.  Pant Resolution: A resolution moved by Govind Ballabh Pant compelled Bose to nominate his Working Committee as per Gandhi's wishes, severely undermining his executive authority.  Resignation: Isolated by the Gandhian leadership and lacking united support from fragmented Leftist factions, Bose resigned from the presidency in April 1939.	SUBHAS CHANDRA BOSE   RADICAL NATIONALIST: A prominent leader of the national movement who advocated uncompromising, militant mass resistance against British imperialism.	IDEOLOGICAL DIFFERENCES WITHIN THE CONGRESS  Strategic Divergence: Bose proposed an immediate six-month ultimatum to the British, capitalising on the impending Second World War.  Gandhian Approach: Gandhi maintained that the masses and the Congress organisation were unprepared for an immediate non-violent confrontation. FORWARD BLOC  Formation (May 1939): Established as a radical left-wing faction within the Congress to consolidate socialist and anti-imperialist forces.  Objectives: Aimed at achieving immediate independence, establishing a modern socialist state, and aggressively mobilising youth, workers, and peasants.
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Key Highlights

- **All India Conference (1940):** The Bloc passed the 'All Power to the Indian People' resolution in Nagpur, urging militant action against British rule.
- **Anti-Compromise Conference (1940):** Organised alongside the Kisan Sabha at Ramgarh to vehemently oppose India's participation in the imperial war effort.

Historical Significance

- **Alternative Pathway:** Legitimised a radical socialist alternative to the moderate Gandhian strategy of negotiations and phased struggle.
- **Mass Mobilisation:** Galvanised youth and radical elements who were increasingly disillusioned with the constitutional politics of the Congress.

QUICK REVISION BOX		
	UPSC Keywords:	Radical Nationalism, Pant Resolution, Anti-Compromise Conference.
	Important Personalities:	Subhas Chandra Bose, Mahatma Gandhi, Pattabhi Sitaramayya.
	Important Sessions:	Haripura (1938), Tripuri (1939), Ramgarh (1940).
	Important Organisations:	Forward Bloc, Congress Socialist Party (CSP).

62. Rakhigarhi Skeletal Remains: Insights into Harappan Society (PIB)

Context:

The Archaeological Survey of India (ASI) recently transferred human skeletal remains excavated from Rakhigarhi to the Anthropological Survey of India (AnSI) for multidisciplinary scientific research aimed at understanding the Harappan civilisation and its people.

RAKHIGARHI

Harappan Metropolis:
Located in Haryana, it is the largest known Indus Valley settlement, reflecting continuous urban evolution from the Early to Mature Harappan phases.



HUMAN SKELETAL REMAINS

Archaeological Evidence:
Provide valuable evidence on the health, diet, burial practices, lifestyle, and biological characteristics of ancient populations.



ANTHROPOLOGICAL SURVEY OF INDIA (AnSI)

Nodal Research Institution:
An apex institute under the Ministry of Culture dedicated to physical, biological, and cultural anthropological studies, including palaeoanthropology.



RAKHIGARHI



KEY HIGHLIGHTS

Recent Excavations:
Multiple burials containing complete skeletons and fragments were uncovered at Rakhigarhi's Mound No. 7 during recent excavation seasons.

Institutional Collaboration:
Combines field archaeology with laboratory analysis, involving apex organisations like AnSI and the Birbal Sahni Institute of Palaeosciences (BSIP).

Civilisational Insights:
Rakhigarhi continues to provide crucial evidence for understanding the urban planning, social organisation, and burial practices of the Harappan Civilisation.

SCIENTIFIC METHODS

Bioarchaeological Investigation:
Utilises advanced interdisciplinary tools such as ancient DNA (aDNA) sequencing, osteological analysis, and stable isotope analysis to study ancient human remains.

 Ancient DNA (aDNA) Sequencing
 Osteological Analysis
 Stable Isotope Analysis

HISTORICAL & CIVILISATIONAL SIGNIFICANCE



 One of the largest Indus Valley settlements
 Provides insights into Harappan urbanisation and social organisation
 Enhances understanding of burial practices, health, diet, and lifestyle of ancient populations

Scientific Significance

- **Scientific Validation:** Modern scientific techniques complement conventional archaeological findings and significantly improve the precision of historical reconstruction.
- **Interdisciplinary Research:** Successfully integrates archaeology, anthropology, genetics, and earth sciences to examine population history and environmental adaptations.

Way Forward

- **Conservation of Archaeological Heritage:** Strengthen systematic excavation standards, long-term preservation practices, and comprehensive scientific documentation of unearthed antiquities.
- **Interdisciplinary Collaboration:** Institutionalise closer cooperation between field archaeologists, physical anthropologists, and scientific laboratories to build robust domestic research capacity.

QUICK REVISION BOX		
	UPSC Keywords:	Bioarchaeological Investigation, Harappan Metropolis, Mortuary Practices, Cultural Heritage.
	Important Harappan Sites:	Rakhigarhi, Dholavira, Kalibangan, Lothal, Harappa.
	Important Organisations:	Archaeological Survey of India (ASI), Anthropological Survey of India (AnSI), BSIP.
	Scientific Techniques:	Ancient DNA (aDNA) Analysis, Osteology, Stable Isotope Analysis.

PLACES IN NEWS

63. Sea of Azov: Strategic Maritime Link (Times of India)

Context:

The Sea of Azov was recently in the news after reports of drone strikes on cargo vessels, bringing renewed attention to this strategically important inland sea.

Location & Geographical Profile

- **Location:** An inland sea in Eastern Europe, located north of the Black Sea.
- **Type:** Inland sea of the Atlantic Ocean basin.
- **Borders:** Ukraine (northwest) and Russia (east and south).
- **Connectivity:** Linked to the Black Sea via the Kerch Strait.

Key Geographical Features

- **World's Shallowest Sea:** The shallowest sea globally, with a maximum depth of just 14 metres.
- **River Inflow:** Fed primarily by the Don and Kuban rivers, resulting in relatively low salinity.
- **Coastal Landforms:** Features long sand spits (such as the Arabat Spit) and highly saline lagoons (like the Syvash).



Strategic Significance

- **Maritime Connectivity:** Provides access between the Caspian Sea (through the Volga–Don Canal) and the Black Sea, facilitating inland navigation and trade.
- **Geopolitical Chokepoint:** The Kerch Strait serves as a critical navigational and military gateway.

QUICK REVISION BOX		
	Connected Water Body:	Black Sea.
	Important Strait:	Kerch Strait.
	Major Rivers:	Don, Kuban.
	UPSC Keywords:	World's Shallowest Sea, Arabat Spit.

64. Philippines: Earthquake in the Pacific Ring of Fire (NDTV)

Context:

The Philippines was recently in the news following a powerful 7.8 magnitude earthquake off the coast of Mindanao.

Location & Geographical Profile

- **Location:** An archipelagic nation in Southeast Asia, located between the Philippine Sea and the South China Sea in the western Pacific Ocean.
- **Surrounding Seas:** Bounded by the Philippine Sea (east), South China Sea (west), and Celebes Sea (south).
- **Major Islands:** Broadly divided into three main divisions: Luzon, Visayas, and Mindanao.



Key Geographical Features

- **Archipelagic Geography:** Comprises over 7,600 islands featuring extensive coastlines and mountainous, volcanic terrain.
- **Tectonic Setting:** Lies along the Pacific Ring of Fire, where several major tectonic plates converge, resulting in high seismic and volcanic activity.

Geographical Significance

Disaster Vulnerability: Its tectonic position makes the archipelago highly susceptible to earthquakes, tsunamis, and volcanic eruptions.

Strategic Maritime Location: Occupies an important position along sea lanes linking the South China Sea, the Pacific Ocean, and the wider Indo-Pacific.

QUICK REVISION BOX		
	Region:	Southeast Asia.
	Capital:	Manila.
	Surrounding Seas:	Philippine Sea, South China Sea, Celebes Sea.
	UPSC Keywords:	Pacific Ring of Fire, Archipelago.

65. Katchatheevu Island (Indian Express)

Context:

Katchatheevu Island was recently in the news following renewed discussions during the visit of a Sri Lankan parliamentarian to Chennai.

Location & Geographical Profile

- A small, uninhabited island located in the Palk Strait between Rameswaram (Tamil Nadu, India) and the Jaffna Peninsula (Sri Lanka).
- Presently administered by Sri Lanka.
- Situated between the Bay of Bengal and the Gulf of Mannar, forming part of an important maritime region in South Asia.



Key Geographical Features

- Covers about 285 acres (1.15 sq. km).
- Composed mainly of coral and limestone formations.
- Has no permanent freshwater source or human habitation.
- Supports sparse vegetation due to its dry, rocky terrain.
- Houses the historic St. Antony's Shrine, visited annually by pilgrims from both India and Sri Lanka.

Geographical & Strategic Significance

- Located close to traditional fishing grounds used by fishermen from both countries.
- Lies in a strategically important maritime zone connecting the Palk Strait and the Gulf of Mannar.
- Associated with the India–Sri Lanka Maritime Boundary Agreements (1974 & 1976) that delineated maritime boundaries.
- Important for maritime navigation, fisheries management, coastal security, and India–Sri Lanka maritime cooperation.

QUICK REVISION BOX		
	Particular	Details
	Region	Palk Strait
	Water Body	Between the Bay of Bengal and Gulf of Mannar
	Nearest Countries	India, Sri Lanka
	Important Agreements	India–Sri Lanka Maritime Boundary Agreements (1974 & 1976)
	Important Landmark	St. Antony's Shrine
	UPSC Keywords	Palk Strait, Gulf of Mannar, Maritime Boundary, Coral Island, Traditional Fishing Grounds

66. Padma River & Proposed Padma Barrage (Bangladesh) (The Hindu)

Context:

The proposed Padma Barrage was recently in the news due to discussions on its potential role in water regulation and river management in Bangladesh.

Location & Geographical Profile

- The Padma River is the principal distributary of the Ganga River in Bangladesh after the Ganga enters the country from India.
- It flows southeast across central Bangladesh before joining the Jamuna (Brahmaputra) River near Goalundo.
- The combined stream subsequently joins the Meghna River before emptying into the Bay of Bengal through the Ganga–Brahmaputra Delta.



Key Geographical Features

- Forms an integral part of the Ganga–Brahmaputra–Meghna (GBM) River System.
- Carries a large volume of water and sediment, contributing significantly to delta formation.
- Supports fertile alluvial plains, rich fisheries, and extensive inland waterways.

- The proposed Padma Barrage aims to regulate river flow, improve irrigation, facilitate navigation, and assist in flood management.

Geographical Significance

- Plays a vital role in sustaining agriculture, fisheries, and inland transport in Bangladesh.
- Contributes to the formation and maintenance of the world's largest delta.
- Serves as a major transboundary river system with significant hydrological and ecological importance in South Asia.

QUICK REVISION BOX		
Particular	Details	
 Country	Bangladesh	
 Parent River	Ganga River	
 Major Confluences	Jamuna (Brahmaputra) and Meghna Rivers	
 River System	Ganga–Brahmaputra–Meghna (GBM)	
 Delta	Ganga–Brahmaputra (Sundarbans) Delta	
 UPSC Keywords	Padma River, GBM Basin, Delta Formation, Transboundary River, Inland Navigation	

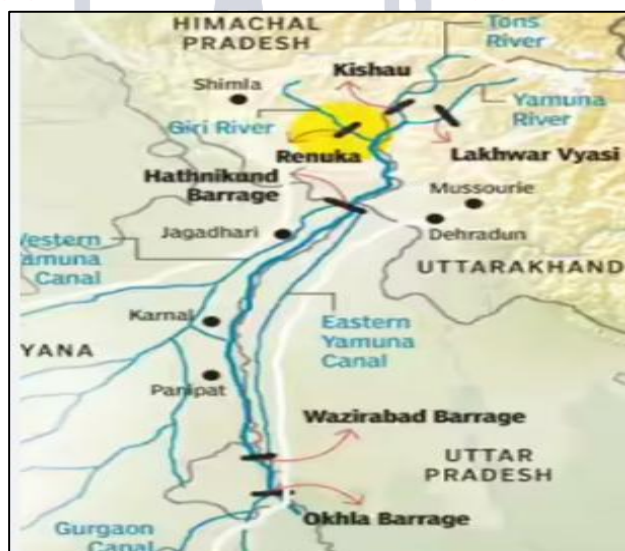
67. Kishau Multi-Purpose Dam Project & Tons River (News on Air)

Context:

The Kishau Multi-Purpose Dam Project was recently in the news following discussions on its implementation in the Upper Yamuna basin.

Location & Geographical Profile

- The proposed Kishau Dam is located on the Tons River along the border of Uttarakhand and Himachal Pradesh in the Western Himalayas.
- The Tons River originates in the Bandarpunch massif near the Ruinsara Range in Uttarakhand.
- It is the largest tributary of the Yamuna River, joining it near Kalsi in Dehradun district.



Key Geographical Features

- The project lies within the Upper Yamuna River Basin, a major Himalayan river catchment.
- The Tons is a perennial, snow-fed river with steep gradients and high hydropower potential.

- The dam is designed for water storage, irrigation, hydropower generation, and flood moderation.
- The basin receives substantial runoff from snowmelt and monsoon rainfall.

Geographical Significance

- Strengthens water resource management in the Upper Yamuna basin.
- Supports irrigation and water availability in downstream regions.
- Demonstrates the significance of Himalayan rivers in sustaining northern India's water security.
- Highlights the multipurpose use of river valley projects in mountainous regions.

QUICK REVISION BOX		
Particular	Details	
 States	Uttarakhand, Himachal Pradesh	
 River	Tons River	
 Parent River	Yamuna River	
 River Basin	Upper Yamuna Basin	
 Himalayan Region	Western Himalayas	
 UPSC Keywords	Tons River, Yamuna Basin, Multipurpose Dam, Snow-fed River, Western Himalayas	

68. Seychelles (PIB)

Context:

Seychelles was recently in the news following a high-level bilateral visit, bringing attention to the strategically located island nation in the Indian Ocean.

Location & Geographical Profile

- Seychelles is an archipelagic island nation in the western Indian Ocean, northeast of Madagascar and east of the African mainland.
- It comprises 115 islands, broadly classified into granitic islands and coral islands.
- The capital city is Victoria, located on Mahé Island, the largest island of the archipelago.
- The islands are situated near the Mascarene Plateau in the South-West Indian Ocean.



Key Geographical Features

- Possesses an extensive Exclusive Economic Zone (EEZ) that is much larger than its land area.
- Home to the Aldabra Atoll, one of the world's largest raised coral atolls and a UNESCO World Heritage Site.
- Characterised by tropical marine ecosystems, coral reefs, and exceptional marine biodiversity.
- The archipelago includes both ancient granitic formations and low-lying coral islands.

Geographical Significance

- Occupies a strategic position along major Indian Ocean Sea Lines of Communication (SLOCs).
- Serves as an important maritime location in the South-West Indian Ocean.
- Rich marine resources support fisheries, biodiversity conservation, and the Blue Economy.
- Its vast EEZ enhances its significance in ocean governance and sustainable resource management.

QUICK REVISION BOX	
Particular	Details
 Region	Western Indian Ocean
 Capital	Victoria
 Ocean	Indian Ocean
 Important Islands/Atolls	Mahé, Praslin, La Digue, Aldabra Atoll
 UNESCO Site	Aldabra Atoll
 UPSC Keywords	Archipelago, EEZ, Aldabra Atoll, Mascarene Plateau, SLOCs, Blue Economy

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SPECIES IN NEWS

69. Tylosaurus proriger (Mosasaur) (The Hindu)

Context:

Tylosaurus proriger was recently in the news following a scientific study that provided fresh insights into the biology of this extinct marine reptile.

Taxonomy & Geological Distribution

- Scientific Name: Tylosaurus proriger.
- Belonged to the Mosasaurs, an extinct group of large marine reptiles closely related to modern lizards and snakes, not dinosaurs.
- Lived during the Late Cretaceous Period (about 86–66 million years ago).
- Fossil remains have been discovered mainly in North America, particularly in deposits of the ancient Western Interior Seaway.



Key Characteristics

- One of the largest mosasaurs, reaching lengths of up to 14–15 metres.
- Streamlined body, powerful tail, paddle-like limbs, and strong jaws with sharp conical teeth adapted for marine hunting.
- An apex predator that fed on fish, ammonites, seabirds, turtles, and smaller marine reptiles.
- Fully adapted to life in marine environments with efficient swimming capabilities.

Palaeontological Significance

- Represents the ecological dominance of marine reptiles during the Late Cretaceous.
- Provides evidence of marine biodiversity and predator-prey interactions in prehistoric oceans.
- Highlights that marine reptiles evolved independently from dinosaurs despite living during the same geological era.
- Became extinct during the Cretaceous–Paleogene (K–Pg) mass extinction event around 66 million years ago.

QUICK REVISION BOX		
Particular	Details	
 Scientific Name	<i>Tylosaurus proriger</i>	
 Taxonomic Group	Extinct Marine Reptile (Mosasaur)	
 Geological Period	Late Cretaceous	
 Habitat	Ancient Marine Environments (Western Interior Seaway)	
 Diet	Carnivorous (Apex Marine Predator)	
 Extinction Event	Cretaceous–Paleogene (K–Pg) Mass Extinction	
 UPSC Keywords	Mosasaur, Marine Reptile, Late Cretaceous, Western Interior Seaway, Mass Extinction	

70. Aldabra Giant Tortoise (*Aldabrachelys gigantea*) (Times of India)

Context:

The Aldabra Giant Tortoise was recently in the news after renewed attention on Jonathan, an individual belonging to this species.

Taxonomy & Distribution

- Scientific Name: *Aldabrachelys gigantea*.
- Belongs to the class Reptilia and family Testudinidae (tortoises).
- Endemic to the Aldabra Atoll in Seychelles, a UNESCO World Heritage Site in the western Indian Ocean.
- Inhabits coastal scrublands, grasslands, mangrove fringes, and other terrestrial island ecosystems.



Key Characteristics

- One of the largest surviving tortoise species in the world.
- Herbivorous, feeding mainly on grasses, leaves, fruits, and shrubs.
- Characterised by a massive domed shell, sturdy limbs, and exceptional longevity.
- Well adapted to island environments with slow metabolism and efficient water conservation.

Conservation Status

- IUCN Red List: Vulnerable (VU).
- CITES: Appendix II.
- Major threats include habitat alteration, invasive species, and climate-related impacts on island ecosystems.
- Conservation focuses on strict habitat protection, population monitoring, and safeguarding the Aldabra Atoll ecosystem.

Ecological Significance

- Plays a vital role in seed dispersal and maintaining vegetation dynamics.
- Functions as an ecosystem engineer, supporting nutrient cycling and habitat health.
- Represents the unique biodiversity and evolutionary significance of isolated island ecosystems.

QUICK REVISION BOX		
Particular	Details	
 Scientific Name	<i>Aldabrachelys gigantea</i>	
 Taxonomic Group	Reptile (Tortoise)	
 Habitat	Coastal scrublands, grasslands, terrestrial island ecosystems	
 Native Distribution	Aldabra Atoll, Seychelles	
 IUCN Status	Vulnerable (VU)	
 CITES	Appendix II	
 UNESCO Site	Aldabra Atoll	
 UPSC Keywords	Endemic Species, Island Biodiversity, Seed Dispersal, Aldabra Atoll, Seychelles	

71. Greater Flamingo (*Phoenicopterus roseus*) (DD News)

Context:

The Greater Flamingo was recently in the news following its sighting in a coastal wetland, highlighting the ecological importance of migratory bird habitats.

Taxonomy & Distribution

- Scientific Name: *Phoenicopterus roseus*.
- Belongs to the class Aves and family Phoenicopteridae.
- Widely distributed across Southern Europe, Africa, West and South Asia, including India.
- In India, it occurs in wetlands such as the Rann of Kutch, Pulicat Lake, Chilika Lake, Sambhar Lake, and other coastal lagoons, estuaries, and salt pans.
- Prefers shallow saline, brackish, and alkaline wetlands.



Key Characteristics

- Largest living flamingo species, recognised by its pale pink plumage, long neck, and elongated legs.
- Possesses a specialised downward-curved bill adapted for filter-feeding on algae, crustaceans, molluscs, and plankton.
- A migratory species associated with the Central Asian Flyway, using Indian wetlands as important wintering and feeding grounds.

Conservation Status

- IUCN Red List: Least Concern (LC).
- CITES: Appendix II.
- Wildlife (Protection) Act, 1972 (as amended in 2022): Schedule II.
- Major threats include wetland degradation, coastal habitat alteration, pollution, and disturbance from human activities.
- Conservation focuses on protecting Ramsar wetlands, coastal ecosystems, and migratory bird habitats.

Ecological Significance

- Acts as an important indicator species reflecting the ecological health of wetlands.
- Helps maintain aquatic food-web dynamics through filter-feeding.
- Highlights the importance of conserving wetlands along international migratory flyways.

QUICK REVISION BOX		
Particular	Details	
 Scientific Name	<i>Phoenicopterus roseus</i>	
 Taxonomic Group	Bird (Family: Phoenicopteridae)	
 Habitat	Coastal wetlands, lagoons, estuaries, salt pans, saline lakes	
 Distribution	Europe, Africa, West & South Asia, including India	
 IUCN Status	Least Concern (LC)	
 CITES	Appendix II	
 WPA Schedule	Schedule II	
 Migratory Flyway	Central Asian Flyway	
 UPSC Keywords	Greater Flamingo, Ramsar Wetlands, Coastal Wetlands, Filter-feeding, Central Asian Flyway	

72. Great Indian Bustard (*Ardeotis nigriceps*) (Times of India)

Context:

The Great Indian Bustard was recently in the news following a conservation milestone that highlighted ongoing efforts to recover its dwindling population.

Taxonomy & Distribution

- Scientific Name: *Ardeotis nigriceps*.
- Belongs to the class Aves and family Otididae.
- Endemic to the Indian subcontinent, with its largest surviving population in Rajasthan, and smaller populations in Gujarat, Maharashtra, Karnataka, and Andhra Pradesh.
- Inhabits arid and semi-arid grasslands, open scrublands, and dry plains, particularly in the Thar Desert.



Key Characteristics

- One of the world's heaviest flying birds.
- A ground-nesting species with low reproductive rates, making it highly vulnerable to population decline.
- Omnivorous, feeding on insects, seeds, grasses, small reptiles, and rodents.
- Serves as a flagship species and a key indicator of healthy grassland ecosystems.

Conservation Status

- IUCN Red List: Critically Endangered (CR).
- CITES: Appendix I.
- Wildlife (Protection) Act, 1972 (as amended in 2022): Schedule I.
- Major threats include habitat loss, grassland fragmentation, collisions with overhead power transmission lines, and infrastructure development.
- Key conservation measures include Project Great Indian Bustard, the Conservation Breeding Programme, and integrated in-situ and ex-situ conservation efforts.

Ecological Significance

- Plays a vital role in maintaining the ecological balance of arid grassland ecosystems.
- Acts as an umbrella species, promoting conservation of associated flora and fauna.
- Highlights the ecological importance of Desert National Park (Rajasthan) and India's threatened grassland habitats.

QUICK REVISION BOX	
Particular	Details
 Scientific Name	<i>Ardeotis nigriceps</i>
 Taxonomic Group	Bird (Family: Otididae)
 Habitat	Arid and semi-arid grasslands, scrublands
 Distribution	Rajasthan, Gujarat, Maharashtra, Karnataka, Andhra Pradesh
 IUCN Status	Critically Endangered (CR)
 CITES	Appendix I
 WPA Schedule	Schedule I
 Important Conservation Initiative	Project Great Indian Bustard; Conservation Breeding Programme
 UPSC Keywords	Desert National Park, Thar Desert, Grassland Ecosystem, Flagship Species, Power Line Collision

73. White-rumped Vulture – *Gyps bengalensis* (The Hindu)

Context:

The White-rumped Vulture was recently in the news following concerns over the safety of an individual bird, drawing attention to the conservation of this critically endangered scavenger.

Taxonomy & Distribution

- Scientific Name: *Gyps bengalensis*.
- Belongs to the class Aves and family Accipitridae.
- Distributed across the Indian subcontinent, including India, Nepal, Bhutan, Bangladesh, Pakistan, and Myanmar.
- Inhabits open forests, grasslands, agricultural landscapes, and areas near human settlements where livestock carcasses are available.



Key Characteristics

- A medium-sized vulture distinguished by its white rump, broad wings, and featherless head adapted for scavenging.
- Primarily feeds on animal carcasses, making it an obligate scavenger.
- Highly social, nesting and roosting in colonies on tall trees.
- Provides vital ecosystem services through rapid carcass disposal.

Conservation Status

- IUCN Red List: Critically Endangered (CR).
- CITES: Appendix II.
- Wildlife (Protection) Act, 1972 (as amended in 2022): Schedule I.
- Major threats include diclofenac poisoning, electrocution from power infrastructure, habitat degradation, and declining food availability.
- Key conservation measures include the Vulture Conservation Breeding Programme, ban on veterinary diclofenac, Vulture Safe Zones, and the Action Plan for Vulture Conservation (2020–2025).

Ecological Significance

- Plays a crucial role in the scavenger guild by removing animal carcasses.
- Helps prevent the spread of diseases such as anthrax and rabies by reducing carrion accumulation.
- Serves as an indicator of ecosystem health and the effectiveness of wildlife conservation measures.

QUICK REVISION BOX		
Particular	Details	
Scientific Name	<i>Gyps bengalensis</i>	
Taxonomic Group	Bird (Vulture)	
Habitat	Open forests, grasslands, agricultural landscapes	
Distribution	Indian subcontinent	
IUCN Status	Critically Endangered (CR)	
CITES	Appendix II	
WPA Schedule	Schedule I	
Key Conservation Initiative	Vulture Conservation Breeding Programme; Vulture Safe Zones; Action Plan for Vulture Conservation (2020–2025)	
UPSC Keywords	Diclofenac, Scavenger Guild, Ecosystem Services, Vulture Safe Zones, Carrion Disposal	



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Andhra Pradesh Regional Current Affairs

74. Andhra Pradesh Community Managed Natural Farming (APCNF) Wins 2026 Food Planet Prize (Down To Earth)

Context:

Andhra Pradesh Community Managed Natural Farming (APCNF) won the 2026 Food Planet Prize, awarded by Sweden's Curt Bergfors Foundation, for promoting sustainable, climate-resilient and community-led agricultural practices.

About APCNF

- Launched in 2016 by Rythu Sadhikara Samstha (RySS) under the Department of Agriculture, Government of Andhra Pradesh.
- It is one of the world's largest community-managed natural farming initiatives, covering around 1.8 million farming families through 340,000 Women's Self-Help Groups (SHGs).
- The programme promotes chemical-free farming, local bio-inputs, crop diversification, soil regeneration and farmer-to-farmer knowledge sharing.

Significance

- Reduces dependence on synthetic fertilisers and pesticides, thereby lowering cultivation costs.
- Improves soil health, biodiversity, water conservation and carbon sequestration, contributing to climate-resilient agriculture.
- Enhances farmers' net incomes through reduced input costs and sustainable production.
- Strengthens women's participation, with SHGs playing a pivotal role in extension services and capacity building.
- Serves as a scalable model for sustainable agriculture, now being adopted across 22 Indian States and countries such as Sri Lanka and Zambia.

Challenges

- Ensuring scientific validation and long-term productivity across diverse agro-climatic regions.
- Scaling up training, market access and certification for natural produce.
- Addressing farmers' transition risks and initial yield uncertainties.

Way Forward

- Integrate natural farming with climate adaptation, watershed development and sustainable value chains.
- Strengthen research, digital extension services and market linkages for natural produce.

- Promote convergence with flagship schemes such as National Mission on Natural Farming (NMNF), Paramparagat Krishi Vikas Yojana (PKVY) and DAY-NRLM to accelerate nationwide adoption.

75. 16th-Century Vijayanagara Inscriptions Unearthed in Seshachalam Forest (The Hindu)

Context:

The Archaeological Survey of India (ASI) discovered three 16th-century inscriptions from the reign of Vijayanagara King Sadasiva Deva Raya at Sadasivakona in the Seshachalam Hills, Tirupati district (Andhra Pradesh).



Key Findings

- The inscriptions, dated 31 July 1554 CE, are engraved in Telugu, Tamil and Kannada, reflecting the multilingual nature of the Vijayanagara Empire.
- They record the construction of a Shiva temple and a monastery (Mutt) at Sadasivakona during the King's pilgrimage.
- The inscriptions mention grants of temple lands (Kaanika) and tax revenues from the Gudimallam Parasurameswara Temple to support daily worship, food offerings and temple administration.
- They also highlight the role of temple officials and accountants in managing religious endowments.

About Vijayanagara King Sadasiva Deva Raya

- Ruled the Vijayanagara Empire from 1542 to 1570 CE and was the last nominal ruler of the Tuluva dynasty.
- Actual administration was largely exercised by Aliya Rama Raya, who served as the empire's de facto ruler.
- His reign witnessed continued patronage of temples, monasteries and religious endowments, as evidenced by inscriptions across South India.
- The period culminated in the Battle of Talikota (1565), after which the Vijayanagara capital, Hampi, was devastated, marking the beginning of the empire's decline.

Historical Significance

- Demonstrates the Vijayanagara Empire's patronage of temples, pilgrimage centres and religious institutions.

- Provides valuable evidence of the temple economy, land grants and revenue administration during the 16th century.
- Highlights the cultural integration of different linguistic communities under Vijayanagara rule.
- Reinforces the historical importance of the Gudimallam Parasurameswara Temple, one of India's oldest surviving Shiva temples (2nd century BCE).

Conservation Significance

- The discovery enriches India's epigraphic and archaeological records, aiding reconstruction of regional history.
- It underscores the importance of preserving archaeological heritage in ecologically sensitive landscapes such as the Seshachalam Biosphere Reserve.

Way Forward

- Digitise and scientifically document inscriptions using advanced imaging technologies.
- Promote interdisciplinary research combining archaeology, epigraphy and history.
- Strengthen conservation and responsible heritage tourism while protecting fragile forest ecosystems.

76. 11th-Century Chalukya Inscription Unearthed in Nallamala Forest (Indian Express)

Context:

- The Archaeological Survey of India (ASI) discovered an 11th-century Telugu inscription near Sathakodu village in the Nallamala Reserve Forest (Andhra Pradesh) during an epigraphical survey.
- The inscription belongs to the Chalukyas of Kalyani (Western Chalukyas) and is dated to 1121 CE (Chalukya Vikrama Year 42; Saka 1043).

About the Chalukyas of Kalyani (Western Chalukyas)

- Ruled large parts of the Deccan from 973 to 1189 CE, with Kalyani (Basavakalyan, Karnataka) as their capital.
- Founded by Tailapa II after overthrowing the Rashtrakutas.
- Renowned for temple architecture, administrative efficiency and patronage of Kannada, Sanskrit and Telugu literature.



- Developed the distinctive Western Chalukya architectural style, which served as a transition between the Early Chalukya and Hoysala styles.

About the Chalukya Vikrama Era

- Chalukya Vikrama Year was an era introduced by King Vikramaditya VI of the Western Chalukyas after his accession in 1076 CE.
- It was widely used in inscriptions issued during the Western Chalukya period to record grants, donations and administrative orders.
- The newly discovered inscription is dated to Vikrama Year 42, corresponding to 1121 CE.

Key Findings

- Records the donation of four mattars of wetland and ten matlu of Vaalipolam land under the Pullalacheruvu tank.
- The grant was made by Bhimisetty to support worship at the Sathakodu Devara Temple.
- Written in Telugu script, it reflects the prevalence of Telugu in regional administration.

Historical Significance

- Highlights the importance of the temple economy, where land grants supported religious institutions and local administration.
- Demonstrates the role of irrigation tanks in medieval agrarian and revenue systems.
- Provides evidence of medieval land measurement units, agrarian practices and donor traditions.
- Enriches the epigraphic record of the Nallamala region, offering valuable insights into the socio-economic and cultural history of the Deccan.

77. Right to Privacy Cannot Be Used to Evade Law: Andhra Pradesh High Court (Indian Express)

Context:

- The Andhra Pradesh High Court ruled that the right to privacy cannot be invoked as a shield to evade the law in cases involving alleged forgery and fraud.
- The Court directed the Unique Identification Authority of India (UIDAI) to share Aadhaar and biometric information with the investigating agency under judicial supervision in a land fraud case.

Constitutional & Legal Framework

- **Article 21:** The Right to Privacy is a fundamental right, recognised by the Supreme Court in Justice K.S. Puttaswamy v. Union of India (2017).

- **Article 300A:** Guarantees that no person shall be deprived of property except by authority of law.
- **Section 33(1) of the Aadhaar Act, 2016:** Permits disclosure of Aadhaar-related information pursuant to an order of a court not inferior to that of a High Court, subject to prescribed safeguards.
- **Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016:** Regulates the collection, storage and use of Aadhaar data while safeguarding individual privacy.

Key Observations of the Court

- The right to privacy is not absolute and may be subject to reasonable restrictions in accordance with law.
- Section 33(1) does not impose a blanket prohibition on disclosure of Aadhaar-related information.
- Courts may direct disclosure where it is necessary for a fair investigation, while ensuring adequate safeguards against misuse.
- Privacy protections should not obstruct the investigation and prosecution of offences such as forgery, impersonation and fraud.

Significance

- Reinforces the principle that privacy and the administration of justice must be balanced.
- Clarifies the legal scope of disclosure of Aadhaar information in criminal investigations.
- Strengthens the fight against identity theft, document forgery and property fraud while preserving judicial oversight.

Challenges

- Balancing the Right to Privacy with the need for effective criminal investigation.
- Preventing misuse or unauthorised disclosure of sensitive Aadhaar and biometric data.
- Strengthening cybersecurity to protect personal data from breaches and identity theft.
- Ensuring uniform judicial standards for permitting disclosure under exceptional circumstances.
- Addressing delays in investigation where access to digital identity records is essential.

Way Forward

- Ensure disclosure of Aadhaar-related information only through judicial oversight and in accordance with the principle of proportionality laid down in the Puttaswamy judgment.

- Strengthen data protection, encryption and accountability mechanisms under the Digital Personal Data Protection Act, 2023 and the Aadhaar Act, 2016.
- Develop clear Standard Operating Procedures (SOPs) for law enforcement agencies to access biometric information in exceptional cases.
- Enhance coordination among UIDAI, investigating agencies and the judiciary to facilitate lawful investigations while protecting individual rights.
- Promote public awareness on safeguarding Aadhaar credentials and reporting identity theft promptly.

78. Commercial Tax Collections in Andhra Pradesh Register Strong Growth (Indian Express)

Context:

- Andhra Pradesh recorded a 19% year-on-year growth in Commercial Tax collections in May 2026, with total collections reaching ₹4,950 crore.
- The State also reported 16% growth in net GST collections, outperforming the national average and most southern States.

About Commercial Taxes

- Commercial Taxes constitute a major source of a State's Own Tax Revenue (SOTR).
- They primarily include State GST (SGST), Value Added Tax (VAT) on petroleum products and alcoholic liquor for human consumption, profession tax and other taxes administered by the State.
- The Commercial Taxes Department is responsible for tax administration, compliance enforcement and revenue mobilisation.

Key Highlights

- Higher collections were driven by improved GST compliance, enhanced tax administration and increased economic activity.
- Growth was supported by sectors such as petroleum, real estate, construction, electrical machinery and bullion & jewellery.
- The State also received a higher Integrated GST (IGST) settlement from the Union Government, strengthening its revenue position.

Significance

- Improves the State's fiscal capacity to finance infrastructure, welfare schemes and public services.
- Reflects better tax compliance and efficient revenue administration.
- Enhances fiscal stability by strengthening State Own Tax Revenue (SOTR).
- Supports sustainable economic growth through improved public expenditure.

Challenges

- Dependence on economic activity makes tax collections vulnerable to business cycles.
- GST rate rationalisation and compensation-related issues may affect State revenues.
- Tax evasion, compliance gaps and fluctuations in petroleum consumption remain concerns.

Way Forward

- Strengthen digital tax administration, data analytics and e-governance for better compliance.
- Broaden the tax base while reducing tax evasion.
- Enhance Centre-State coordination for timely IGST settlements.
- Promote formalisation of the economy and sustained economic growth to ensure stable revenue mobilisation.

79. Strengthening Andhra Pradesh's Maritime and Multimodal Infrastructure (Indian Express)

Context:

The Andhra Pradesh Government has accelerated the development of greenfield ports, fishing harbours, airports, logistics parks and road infrastructure under the AP Maritime Policy 2024–29 and the Aerospace & Defence Policy, 2025, aiming to position the State as a major logistics and industrial hub.

Key Initiatives

- Development of greenfield ports at Ramayapatnam, Machilipatnam, Mulapeta and Kakinada Gateway to strengthen cargo handling and maritime trade.
- Construction of modern fishing harbours to improve fisheries infrastructure, enhance value chains and support coastal livelihoods.
- Establishment of the Duggarajapatnam Mega Shipbuilding Cluster and AP LINK Logistics Corporation to promote shipbuilding, logistics and industrial growth.
- Operationalisation of Bhogapuram International Airport and development of new greenfield airports and water aerodromes to improve regional connectivity.

Significance

- Supports port-led development and the Blue Economy by leveraging Andhra Pradesh's 1,053-km coastline.
- Reduces logistics costs and improves export competitiveness through multimodal connectivity.
- Attracts investments, generates employment and strengthens manufacturing, shipbuilding and allied industries.

- Enhances fisheries, tourism and regional economic development while improving national and international connectivity.

Challenges

- Timely land acquisition and environmental clearances for large infrastructure projects.
- Ensuring sustainable coastal development without affecting fragile marine ecosystems.
- Mobilising long-term investments and ensuring timely project execution.
- Integrating ports, roads, railways and airports for seamless multimodal logistics.

Way Forward

- Promote integrated infrastructure planning under the PM Gati Shakti National Master Plan.
- Adopt sustainable port development practices aligned with the Blue Economy framework.
- Strengthen public-private partnerships (PPP), digital logistics and last-mile connectivity.
- Enhance skill development and coastal community participation to maximise employment and inclusive growth.

80. Proposal to Reclassify Andhra's Madhurawada-Bheemunipatnam Coast as CRZ-II (Indian Express)

Context:

The Andhra Pradesh Government has proposed the reclassification of the Madhurawada-Bheemunipatnam coastal stretch from Coastal Regulation Zone (CRZ)-III to CRZ-II to facilitate planned urban development and infrastructure expansion.

About Coastal Regulation Zone (CRZ)

- The Coastal Regulation Zone (CRZ) is governed under the Environment (Protection) Act, 1986 through the CRZ Notification, 2019 issued by the Ministry of Environment, Forest and Climate Change (MoEF&CC).
- CRZ-II comprises substantially built-up urban coastal areas within municipal limits, where regulated development is permitted.
- CRZ-III covers relatively undisturbed rural and natural coastal areas, where stricter development controls, including No Development Zones (NDZs), are applicable.

Why is Reclassification Proposed?

- Rapid urbanisation and expansion of civic infrastructure along the corridor have transformed the area into a predominantly urban landscape.

- The proposal seeks to support major infrastructure projects, including the Beach Corridor, Vizag Bay City, Metro Rail, and enhanced connectivity to Bhogapuram International Airport.

Significance

- Facilitates planned urban expansion and improves infrastructure connectivity.
- Attracts investments in tourism, real estate and logistics, contributing to regional economic growth.
- Supports integrated coastal and urban planning in one of Andhra Pradesh's fastest-growing regions.

Challenges

- Increased development pressure may threaten coastal ecosystems, biodiversity and natural habitats.
- Higher vulnerability to coastal erosion, flooding and climate change-induced sea-level rise.
- Balancing infrastructure development with ecological conservation and the livelihoods of coastal communities remains a key challenge.

Way Forward

- Ensure that any reclassification is based on scientific assessment by the National Centre for Sustainable Coastal Management (NCSCM) and complies with the CRZ Notification, 2019.
- Strengthen Coastal Zone Management Plans (CZMPs), Environmental Impact Assessments (EIAs) and public consultations.
- Promote climate-resilient infrastructure, coastal ecosystem restoration and sustainable urban planning.

81. Aqua Corridor to Strengthen Andhra Pradesh's Blue Economy and Seafood Exports (Indian Express)

Context:

The Andhra Pradesh Government has proposed an Aqua Corridor connecting Amaravati, Bhimavaram, Kakinada, Visakhapatnam, Krishnapatnam and Nellore to strengthen the State's aquaculture ecosystem, enhance seafood exports and promote value-added fisheries.

About the Aqua Corridor

- The proposed corridor aims to integrate aquaculture production, processing, research, logistics, innovation and exports through a coordinated infrastructure network.

- It will serve as a hub for research institutions, seafood processing units, startups, innovation centres and cold-chain infrastructure, improving the efficiency of the fisheries value chain.
- The initiative aligns with the vision of "Pond to Port", "Farmer to Global Consumer" and the Blue Economy.

Significance

- Enhances Andhra Pradesh's position as India's leading producer of fish and shrimp while boosting export competitiveness.
- Promotes value addition, branding and seafood processing, enabling higher income for fishers and aquaculture farmers.
- Strengthens logistics through better integration of ports, airports and cold-chain facilities.
- Generates employment across fisheries, food processing, logistics, packaging and allied industries.
- Contributes to Viksit Bharat by fostering sustainable coastal and marine economic development.

Challenges

- Strengthening disease surveillance, biosecurity and quality standards in aquaculture.
- Addressing environmental concerns such as water pollution, salinity and coastal ecosystem degradation.
- Expanding cold-chain infrastructure and export logistics.
- Ensuring sustainable aquaculture practices and compliance with international food safety standards.

Way Forward

- Promote sustainable aquaculture under the Blue Economy framework with climate-resilient practices.
- Strengthen value addition through Mega Seafood Processing Parks, modern processing units and export-oriented infrastructure.
- Improve research, innovation, digital traceability and market intelligence.
- Leverage schemes such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY) and Fisheries and Aquaculture Infrastructure Development Fund (FIDF) to modernise the sector.

82. Climate Vulnerability and Resilience in Andhra Pradesh (Indian Express)

Context:

The State of India's Environment 2026 report, published by Down To Earth, identified Andhra Pradesh as the State recording the highest climate-induced internal

displacement in 2025 due to cyclones and severe storms, highlighting its increasing vulnerability to extreme weather events.

Key Findings

- The State witnessed a rise in cyclones, heavy rainfall, heatwaves and other extreme weather events, leading to large-scale displacement and disruption of livelihoods.
- Rising temperatures, increasing heat stress and changing rainfall patterns have adversely affected agriculture, water resources and public health.
- The report also highlights concerns related to air pollution, forest diversion, human-wildlife conflict, and climate-sensitive sectors such as fisheries and agriculture.

Significance

- Andhra Pradesh's 1,053-km coastline makes it highly vulnerable to cyclones, storm surges and sea-level rise.
- Climate-induced disasters threaten food security, infrastructure, biodiversity and coastal livelihoods.
- The findings underscore the need for integrating climate resilience into infrastructure planning, agriculture, disaster management and urban development.
- Strengthening adaptive capacity is essential for achieving sustainable development and protecting vulnerable communities.

Government Initiatives

- Andhra Pradesh State Action Plan on Climate Change (SAPCC).
- Andhra Pradesh State Disaster Management Authority (APSDMA) for disaster preparedness and early warning.
- Expansion of Automatic Weather Stations (AWSs) and Doppler Weather Radars (DWRs) for weather forecasting.
- Promotion of climate-resilient agriculture through Natural Farming and disaster-resilient infrastructure.

Challenges

- Frequent cyclones, coastal erosion and extreme weather events.
- Climate stress on agriculture, fisheries and water resources.
- Rising urbanisation in coastal zones and environmental degradation.
- Limited adaptive capacity of vulnerable communities and local institutions.

Way Forward

- Strengthen early warning systems, climate-resilient infrastructure and disaster preparedness.

- Promote climate-smart agriculture, sustainable coastal zone management and ecosystem restoration.
- Enhance climate risk assessments in development planning and improve inter-departmental coordination.
- Increase investments in renewable energy, resilient livelihoods and community-based climate adaptation.

83. Water Hyacinth Invasion and Urban Water Ecosystem Management (Indian Express)

Context:

The rapid spread of water hyacinth in the Godavari–Eluru Canal has obstructed water flow, degraded water quality and raised concerns over ecological damage and vector-borne diseases, underscoring the need for sustainable waterbody management.

About Water Hyacinth

- Water Hyacinth (*Eichhornia crassipes*) is a highly invasive aquatic plant native to the Amazon Basin of South America.
- It is recognised among the world's most invasive alien species due to its rapid vegetative reproduction and ability to form dense floating mats over freshwater bodies.

Environmental and Socio-economic Impacts

- Restricts sunlight penetration and reduces dissolved oxygen, threatening fish and other aquatic organisms.
- Accelerates eutrophication by flourishing in nutrient-rich waters contaminated with untreated sewage and agricultural runoff.
- Obstructs irrigation canals, drainage systems and inland navigation, increasing the risk of flooding and reducing water-use efficiency.
- Creates breeding grounds for mosquitoes, increasing the incidence of vector-borne diseases such as dengue and malaria.
- Affects fisheries, irrigation, biodiversity and recreational use of water bodies, causing economic losses to local communities.

Challenges

- Continuous discharge of untreated sewage and solid waste promotes recurring infestations.
- Mechanical removal alone provides temporary relief due to rapid regeneration.
- Weak coordination among irrigation, urban local bodies and pollution control agencies limits effective management.
- Limited public awareness regarding pollution prevention and invasive species control.

Way Forward

- Adopt an Integrated Aquatic Weed Management approach combining mechanical, biological and eco-friendly control methods.
- Prevent nutrient enrichment through effective sewage treatment, solid waste management and strict pollution control.
- Promote regular monitoring, desilting and installation of trash barriers in canals.
- Encourage utilisation of harvested water hyacinth for compost, biogas, biofertilisers and handicrafts, converting waste into a valuable resource.
- Strengthen inter-agency coordination and community participation to ensure long-term restoration of urban water ecosystems.

84. Andhra Pradesh's Renewable Energy Transition and Green Industrial Growth (Indian Express)

Context:

Andhra Pradesh reiterated its commitment to becoming a Green Energy Hub by promoting renewable energy investments, manufacturing and innovation at the Green India Conference 2026, highlighting the State's long-term clean energy vision.

Renewable Energy Vision of Andhra Pradesh

- The State's Integrated Clean Energy (ICE) Policy, 2024 aims to position Andhra Pradesh as a national leader in renewable energy by promoting solar, wind, pumped storage, green hydrogen and green ammonia projects.
- Leveraging its long coastline, abundant solar radiation and favourable wind corridors, the State seeks to strengthen energy security while accelerating sustainable industrialisation.

Significance

- Expands renewable energy capacity, contributing to India's Net Zero by 2070 target and energy transition goals.
- Promotes green manufacturing, including solar modules, battery storage systems and clean energy equipment, boosting industrial competitiveness.
- Generates large-scale employment through investments in manufacturing, logistics, research and allied services.
- Strengthens energy security by reducing dependence on fossil fuels and encouraging indigenous clean energy technologies.
- Supports the growth of MSMEs, innovation, skill development and export-oriented industries, enhancing Andhra Pradesh's role in the Green Economy.

Challenges

- High capital requirements and financing constraints for renewable energy projects.

- Need for robust transmission infrastructure, grid integration and energy storage systems.
- Land acquisition, environmental clearances and balancing ecological concerns with industrial expansion.
- Bridging the skill gap in emerging clean energy technologies.

Way Forward

- Accelerate implementation of the Integrated Clean Energy (ICE) Policy, 2024 through transparent and investor-friendly mechanisms.
- Strengthen Renewable Energy Parks, transmission networks and battery energy storage infrastructure.
- Promote research, innovation and industry-academia partnerships in green technologies.
- Encourage public-private partnerships (PPPs), MSME participation and local manufacturing to build a resilient renewable energy ecosystem.

85. Archaeological Discoveries in Nallamala: Insights into Andhra Pradesh's Early History (Indian Express)

Context:

A survey by the Epigraphy Branch of the Archaeological Survey of India (ASI) in the Nallamala–Nagarjunasagar–Srisaïlam Tiger Reserve (NSTR) uncovered prehistoric rock paintings, geometric motifs and inscriptions dating from the Megalithic period to the 16th century CE, highlighting the region's rich cultural heritage.

Key Discoveries

- Rock paintings and geometric designs discovered in caves near the Krishna River are preliminarily dated to the Megalithic and Early Historic periods (around 1500 BCE), indicating early human habitation.
- Inscriptions spanning nearly 1,400 years were documented, including Satavahana-period inscriptions in Prakrit language using Brahmi script, along with later inscriptions in Telugu and Kannada, reflecting the linguistic and cultural evolution of the region.



		Rock Art comprises prehistoric paintings and engravings depicting hunting, rituals, animals and daily life, serving as valuable evidence of early human societies.
		Megalithic Culture (c. 1500 BCE–300 BCE) is characterised by large stone burial monuments, iron tools, Black-and-Red Ware pottery and the emergence of settled communities.
		Epigraphy is the study of inscriptions engraved on durable materials such as stone, metal and caves, providing authentic evidence for reconstructing political, social, economic and cultural history.
		The Satavahanas (c. 1st Century BCE–3rd Century CE) were among the earliest major Deccan dynasties, promoting trade, Prakrit literature and Buddhist institutions.

Historical Significance

- The discoveries provide valuable evidence of prehistoric life, settlement patterns, religious practices and artistic traditions in Andhra Pradesh.
- Satavahana inscriptions strengthen understanding of one of the earliest historical dynasties that promoted trade, urbanisation and Buddhist culture in the Deccan.
- The evolution from Brahmi to later regional scripts illustrates the development of language, administration and socio-political institutions over centuries.
- The findings reinforce the importance of the Nallamala region as a continuous centre of human habitation and cultural interaction.

Need for Conservation

- Scientific documentation, digital archiving and advanced dating techniques are essential to preserve these invaluable archaeological assets.
- Strengthening heritage conservation through community participation, eco-sensitive tourism and protection from vandalism and natural degradation is crucial.
- Collaboration between the ASI, Forest Department and academic institutions can promote research while ensuring sustainable management of heritage sites.

86. National Museum of Epigraphy in Tirupati: Preserving India's Inscriptional Heritage (Indain Express)

Context:

The Tirumala Tirupati Devasthanams (TTD) has agreed in principle to allot land for establishing the National Museum of Epigraphy in Tirupati, an initiative of the Ministry of Culture and the Archaeological Survey of India (ASI) to preserve and promote India's inscriptional heritage.

About the National Museum of Epigraphy

- The museum will function as a national repository, research and educational centre showcasing India's epigraphic heritage from ancient to medieval times.
- It will display stone inscriptions, copper-plate grants, photo galleries, digital exhibits and interactive information kiosks, highlighting the evolution of Indian scripts, languages and administrative systems.



Static Perspective

- Epigraphy is the scientific study of inscriptions engraved on durable materials such as stone, metal, terracotta and cave walls. It is one of the most reliable sources for reconstructing ancient and medieval history.
- Major ancient Indian scripts include Brahmi (ancestor of most modern Indian scripts) and Kharosthi (used mainly in the north-western region). Later scripts such as Gupta, Sharada and Tankri reflect the gradual evolution of writing traditions.
- Copper-plate inscriptions generally recorded royal land grants, administrative orders, taxation, genealogy and religious donations, while stone inscriptions commemorated victories, public works and royal proclamations.

Significance

- Preserves India's rich inscriptional and linguistic heritage for future generations.
- Promotes archaeological research, historical studies and awareness of India's cultural evolution.
- Strengthens heritage tourism in Tirupati while creating opportunities for academic collaboration and skill development in archaeology and epigraphy.
- Supports the conservation and digital documentation of fragile historical records.

Way Forward

- Integrate advanced technologies such as 3D scanning, digital archiving and AI-assisted inscription analysis for conservation and research.
- Encourage collaboration among ASI, universities, museums and international research institutions.
- Promote educational outreach through exhibitions, workshops and heritage literacy programmes to popularise India's epigraphic traditions.

Telangana Regional Current Affairs

87. Rising Burden of Non-Communicable Diseases (NCDs) in Telangana (Indian Express)

Context:

The National Family Health Survey (NFHS-6), 2023–24 indicates a rising prevalence of Non-Communicable Diseases (NCDs) such as diabetes, hypertension and obesity in Telangana, highlighting the growing challenge of lifestyle-related illnesses.

About Non-Communicable Diseases (NCDs)

- NCDs are chronic diseases that are generally non-infectious, progress slowly and require long-term management. Major NCDs include cardiovascular diseases, diabetes, cancers and chronic respiratory diseases.
- According to the World Health Organization (WHO), NCDs account for nearly 74% of global deaths, making them the leading cause of mortality worldwide.

Key Drivers

- Rapid urbanisation and sedentary lifestyles.
- Unhealthy diets rich in processed foods, sugar and trans fats.
- Tobacco and alcohol consumption.
- Physical inactivity, obesity, stress and ageing population.
- Delayed diagnosis and inadequate awareness of preventive healthcare.

Implications

- Increases the burden on healthcare infrastructure and public health expenditure.
- Reduces workforce productivity and adversely affects economic growth.
- Raises the risk of premature mortality and long-term disabilities.
- Exacerbates socio-economic inequalities due to high out-of-pocket healthcare expenses.
- Challenges the achievement of SDG 3 (Good Health and Well-being).

Government Initiatives

- National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD).
- Ayushman Bharat – Health and Wellness Centres (AB-HWCs) for community-based screening and early diagnosis.
- Fit India Movement, Eat Right India, and National Tobacco Control Programme (NTCP) to promote healthy lifestyles.

Way Forward

- Strengthen population-based screening, early diagnosis and digital health surveillance.

- Promote healthy diets, regular physical activity and behavioural change through community awareness.
- Enhance primary healthcare services and ensure affordable access to essential medicines.
- Foster multi-sectoral action involving education, urban planning and food regulation to reduce NCD risk factors.

88. Urban Heat Island Effect and Heatwave Resilience in Telangana (Indian Express)

Context:

A study published in Frontiers in Environmental Health identified Hyderabad as one of the benchmark cities for assessing heatwave-related mortality in India, highlighting the growing impact of the Urban Heat Island (UHI) Effect and the need for climate-resilient urban planning.

About the Urban Heat Island (UHI) Effect

- The Urban Heat Island Effect is a phenomenon where urban areas experience significantly higher temperatures than surrounding rural regions due to dense built-up surfaces, reduced vegetation, vehicular emissions and waste heat from buildings and industries.
- Impervious surfaces such as concrete and asphalt absorb and retain heat during the day, resulting in elevated night-time temperatures.

Impacts

- Increases the frequency and intensity of heat-related illnesses, including heat exhaustion, heatstroke and cardiovascular disorders.
- Elevates energy demand for cooling, placing additional stress on power infrastructure.
- Worsens air quality by accelerating the formation of ground-level ozone and aggravating respiratory ailments.
- Reduces labour productivity, especially among outdoor workers, and adversely affects vulnerable groups such as the elderly, children and low-income communities.
- Intensifies water stress and diminishes urban liveability.

Government Initiatives

- National Action Plan on Climate Change (NAPCC) and the National Mission for Sustainable Habitat promote climate-resilient urban development.
- National Disaster Management Authority (NDMA) Guidelines on Heatwaves support preparedness and response.

- Telangana has implemented Heat Action Plans, expanded early warning systems and promoted urban greening initiatives.

Way Forward

- Increase urban green spaces, urban forests, parks and green roofs to reduce surface temperatures.
- Adopt cool roofs, reflective building materials and climate-responsive urban design.
- Strengthen heat early warning systems, public awareness campaigns and cooling centres for vulnerable populations.
- Integrate heat-resilient infrastructure and climate adaptation into urban planning while improving access to drinking water and healthcare during extreme heat events.

89. Pranahita–Chevella Project and Integrated Water Resource Development in Telangana (Indian Express)

Context:

The Pranahita–Chevella Project was recently in the news following discussions on inter-state approvals, bringing renewed attention to its significance for irrigation, drinking water security and regional development in Telangana.

About the Pranahita–Chevella Project

- The project is a major lift irrigation scheme designed to utilise the waters of the Pranahita River, a major tributary of the Godavari, to provide irrigation, drinking water and industrial water to drought-prone regions of Telangana.
- Following the formation of Telangana, parts of the original project were redesigned and integrated into the Kaleshwaram Lift Irrigation Project (KLIP), while proposals for utilising water at Tummidihetti continue to be explored through inter-state consultations.

About Rivers

- Godavari River, known as the “Dakshin Ganga”, is India's second-longest river and the largest peninsular river. It enters Telangana from Maharashtra and is the State's principal river system.
- Pranahita River is the largest tributary of the Godavari in terms of water discharge. It is formed by the confluence of the Wardha and Wainganga rivers and flows along the Telangana–Maharashtra border before joining the Godavari.
- Major tributaries of the Godavari in Telangana include Pranahita, Manjira, Manair, Kinnerasani and Sabari.

Significance

- Expands irrigation in drought-prone districts and enhances agricultural productivity.
- Ensures reliable drinking and industrial water supply while promoting balanced regional development.
- Supports groundwater recharge, rural livelihoods and climate-resilient agriculture.
- Strengthens water security through optimum utilisation of Godavari basin resources.

Challenges

- Inter-state coordination and statutory clearances.
- Environmental and forest clearances in ecologically sensitive areas.
- Rehabilitation and resettlement of project-affected families.
- High financial and operational costs of lift irrigation projects.

Way Forward

- Strengthen cooperative federalism through river basin-level coordination and timely approvals.
- Ensure sustainable river basin management by balancing development with ecological conservation.
- Improve water-use efficiency through micro-irrigation, canal modernisation and real-time water monitoring.
- Integrate irrigation projects with watershed development and climate-resilient water resource planning.

90. Kakatiya Temple Architecture and Heritage Conservation in Telangana (Indian Express)

Context:

A 700-year-old Kakatiya-era Shiva temple at Sanigaram village, Warangal district, is facing severe structural deterioration, prompting calls for urgent scientific conservation and heritage documentation.

About Kakatiya Temple Architecture

- The Kakatiya Dynasty (12th–14th Century CE), with Warangal (Orugallu) as its capital, made significant contributions to temple architecture, irrigation and urban planning.
- Kakatiya temples are renowned for their star-shaped platforms, richly carved pillars, ornate doorways, intricately sculpted ceilings, lathe-turned pillars and advanced stone masonry, reflecting exceptional engineering and artistic excellence.

- Temples typically consist of a Garbhagriha (sanctum), Antarala (vestibule), Ardha Mandapa and Maha Mandapa, constructed using locally available granite and sandstone.

Significance

- Kakatiya temples are valuable sources for understanding the political, religious and socio-cultural history of medieval Telangana.
- They promote heritage tourism, regional identity and traditional craftsmanship while preserving India's architectural legacy.
- The Sanigaram temple highlights the need to conserve lesser-known heritage monuments beyond major tourist sites.

Challenges

- Structural deterioration due to weathering, vegetation growth and water seepage.
- Urbanisation, encroachments and inadequate maintenance.
- Limited documentation and shortage of skilled conservation professionals.
- Insufficient public awareness and community participation in heritage preservation.

Way Forward

- Undertake scientific conservation using detailed documentation, 3D laser scanning, digital mapping and structural assessment before restoration.
- Strengthen collaboration between the Archaeological Survey of India (ASI), State Archaeology Department, local bodies and academic institutions.
- Promote community participation, heritage education and sustainable cultural tourism.
- Ensure regular monitoring and legal protection under heritage conservation laws.

91. Sustainable Tourism Development in Telangana: Balancing Growth and Heritage Conservation (Indian Express)

Context:

The Telangana Government has initiated the preparation of master plans for eight Special Tourism Areas under the Telangana Tourism Policy to develop world-class tourism infrastructure, promote experience-based tourism and ensure the sustainable utilisation of the State's natural, cultural and heritage assets.

Tourism Potential of Telangana

- Telangana offers a diverse tourism landscape encompassing heritage, spiritual, eco-tourism, adventure and tribal tourism.

- Prominent attractions include the Kakatiya Rudreshwara (Ramappa) Temple (UNESCO World Heritage Site), Yadadri, Bhadrachalam, Nagarjuna Sagar, Bhongir Fort, Kaleshwaram, Pochampally (UNWTO Best Tourism Village) and the tribal landscapes of Adilabad, reflecting the State's rich cultural and ecological diversity.

Significance

- Promotes heritage, eco-, spiritual, adventure and tribal tourism, creating a diversified and resilient tourism economy.
- Generates employment and entrepreneurship in hospitality, handicrafts, transport and allied sectors, fostering inclusive local development.
- Enhances regional connectivity, infrastructure and investment, supporting balanced regional development.
- Preserves cultural heritage, biodiversity and indigenous traditions through sustainable tourism practices.
- Contributes to the Telangana Rising 2047 vision by strengthening economic diversification and sustainable growth.

Challenges

- Balancing tourism growth with environmental conservation and heritage preservation.
- Infrastructure gaps, waste management and carrying-capacity concerns at major tourist destinations.
- Limited promotion of lesser-known destinations and inadequate community participation.
- Shortage of skilled tourism professionals and quality visitor services.
- Climate change and unregulated tourism threatening fragile ecosystems and heritage monuments.

Way Forward

- Promote responsible, community-based and eco-friendly tourism through active participation of local communities.
- Develop integrated tourism circuits with improved last-mile connectivity, digital services and smart visitor amenities.
- Strengthen scientific conservation of heritage monuments and natural ecosystems in collaboration with expert agencies.
- Encourage Public-Private Partnerships (PPPs), digital promotion, skill development and sustainable tourism standards to enhance global competitiveness.

92. Hyderabad Bird Atlas: Citizen Science for Urban Biodiversity Conservation (Indian Express)

Context:

The Hyderabad Bird Atlas (HBA) has launched its fourth survey season to strengthen documentation of bird diversity within Hyderabad and promote citizen-led biodiversity monitoring, contributing to scientific research and urban conservation.

About the Hyderabad Bird Atlas

- The Hyderabad Bird Atlas (HBA) is a citizen science initiative jointly organised by WWF-India, Hyderabad Birding Pals and Deccan Birders, with support from the Telangana Forest Department and Greater Hyderabad Municipal Corporation (GHMC).
- The project systematically documents the distribution, abundance, breeding status and seasonal migration of birds within Hyderabad's Outer Ring Road (ORR) limits, creating a scientific database to guide conservation planning.



Significance

- Strengthens urban biodiversity conservation by generating reliable data on bird populations and habitat health.
- Supports evidence-based urban planning by identifying ecologically sensitive habitats requiring protection.
- Tracks the impact of urbanisation, climate change and habitat fragmentation on resident and migratory bird species.
- Promotes citizen science, encouraging public participation in environmental monitoring and fostering environmental stewardship.
- Contributes to achieving Sustainable Development Goal (SDG) 15 – Life on Land through improved biodiversity conservation.

Challenges

- Rapid urbanisation, wetland degradation and loss of green spaces affecting bird habitats.
- Pollution, invasive species and climate change altering migration and breeding patterns.
- Need for sustained public participation, long-term monitoring and integration of scientific data into urban planning.

Way Forward

- Strengthen conservation of urban wetlands, lakes, forests and green corridors to protect avian habitats.
- Integrate biodiversity mapping into city master plans and environmental impact assessments.

- Promote citizen science through educational institutions, digital platforms and community outreach programmes.
- Enhance collaboration among government agencies, research institutions, NGOs and local communities for long-term biodiversity management.

93. Groundwater Quality and Drinking Water Security in Telangana (Indian Express)

Context:

Recent groundwater quality assessments in Telangana revealed persistent fluoride, nitrate and salinity contamination across several districts despite significant improvements in groundwater levels following above-normal rainfall, highlighting concerns over long-term drinking water security.

Groundwater Scenario in Telangana

- Telangana relies heavily on groundwater for drinking, irrigation and domestic use.
- Around 81% of the State is underlain by hard-rock formations such as granites, gneisses, schists, quartzites and Deccan basalts, making groundwater recharge and quality highly dependent on geological conditions and sustainable resource management.

Major Concerns

- Excess fluoride in groundwater poses risks of dental and skeletal fluorosis.
- Widespread nitrate contamination, mainly due to excessive fertiliser use, agricultural runoff, sewage seepage and wastewater infiltration, threatens public health.
- Rising salinity (high Total Dissolved Solids) reduces water quality and affects domestic and agricultural use.
- Groundwater availability has improved, but water quality remains a critical challenge.

Significance

- Ensuring safe drinking water is essential for public health, food security and sustainable development.
- Healthy aquifers support agriculture, rural livelihoods and climate resilience.
- Scientific groundwater monitoring enables evidence-based planning and sustainable water governance.
- Improved groundwater quality contributes to achieving SDG 3 (Good Health and Well-being) and SDG 6 (Clean Water and Sanitation).

Government Initiatives

- Mission Bhagiratha for safe drinking water supply.

- Jal Jeevan Mission to provide functional household tap connections.
- Groundwater quality monitoring by the Telangana Ground Water Department.
- Promotion of rainwater harvesting, watershed development and groundwater recharge measures.

Way Forward

- Strengthen continuous groundwater quality monitoring and aquifer mapping.
- Promote Integrated Water Resources Management (IWRM), artificial recharge and protection of recharge zones.
- Encourage balanced fertiliser use, scientific wastewater management and climate-resilient agriculture.
- Enhance community participation, water quality surveillance and awareness to ensure long-term drinking water security.

94. Code on Wages, 2019: Strengthening Labour Welfare and Wage Security (Indian Express)

Context:

The Telangana High Court has decided to reconsider a case relating to the publication of minimum wage notifications under the Code on Wages, 2019, bringing renewed attention to the implementation of wage reforms and protection of workers' rights.

About the Code on Wages, 2019

- The Code on Wages, 2019 consolidates four labour laws relating to wages, bonus and remuneration into a single legislation.
- It aims to ensure fair, timely and equitable payment of wages while simplifying the regulatory framework for employers.
- The Code empowers governments to fix minimum wages and introduces the concept of a National Floor Wage, below which minimum wages cannot ordinarily be fixed.

Significance

- Ensures minimum income security and safeguards workers against exploitation.
- Promotes social justice by extending wage protection across both organised and unorganised sectors.
- Reduces wage discrimination by upholding the principle of equal remuneration.
- Enhances industrial harmony through a transparent and uniform wage framework.
- Supports inclusive economic growth, poverty reduction and improved living standards by strengthening workers' purchasing power.
- Simplifies labour regulations, improving compliance and the ease of doing business.

Challenges

- Weak enforcement, particularly in the informal sector where a majority of workers are employed.
- Delay in periodic revision and notification of minimum wages.
- Low awareness among workers regarding their legal entitlements.
- Rising inflation reducing the real value of minimum wages.
- Ensuring effective coverage of contract, migrant and gig workers.

Way Forward

- Ensure timely revision and transparent notification of minimum wages.
- Strengthen digital wage payments, labour inspections and grievance redressal mechanisms.
- Expand awareness campaigns on labour rights and legal protections.
- Improve coordination among governments, employers and trade unions for effective implementation of labour reforms.

95. Bhimsari Stone Pillar: A Testament to Telangana's Religious Harmony and Cultural Syncretism (Indian Express)

Context:

A 10th-century four-faced stone pillar discovered at Bhimsari village in Adilabad district depicts Buddha in Mahaparinirvana, Vishnu in Sayana (reclining) posture, Uma-Alingana Murti (Shiva embracing Parvati) and a royal warrior, highlighting Telangana's rich tradition of religious coexistence and artistic excellence.

About the Bhimsari Stone Pillar

- The pillar is a rare example of medieval Deccan temple sculpture, reflecting the harmonious coexistence of Buddhist, Shaivite and Vaishnavite traditions.
- The depiction of Mahaparinirvana—the Buddha's final liberation from the cycle of birth and death—is particularly significant, as such sculptures are uncommon in Telangana.
- The monument also demonstrates the continuity of Buddhist influence in temple art even after the decline of organised Buddhism in the region.



Significance

- Reflects religious harmony and cultural syncretism that characterised medieval Telangana.

- Showcases the artistic excellence of temple sculptors through the integration of multiple religious traditions on a single monument.
- Highlights Telangana's rich Buddhist heritage, complementing sites such as Nagarjunakonda, Alampur, Vemulawada and Papanasi.
- Strengthens the historical understanding of the Deccan's pluralistic cultural landscape and supports heritage-based tourism.
- Reinforces the need to preserve lesser-known archaeological sites for future research and cultural education.

Challenges

- Natural weathering, vandalism and encroachments threatening heritage monuments.
- Inadequate documentation, conservation and public awareness of rural archaeological sites.
- Limited heritage tourism infrastructure around lesser-known monuments.

Way Forward

- Undertake comprehensive archaeological documentation and scientific conservation of the site.
- Promote digital archiving, heritage mapping and community participation in conservation efforts.
- Integrate such monuments into Telangana's heritage tourism circuits through improved interpretation facilities and visitor infrastructure.
- Strengthen collaboration among government agencies, academic institutions and local communities to safeguard Telangana's cultural legacy.

96. Hasthala Veeranna Sculpture: Preserving Telangana's Kakatiya Sculptural Heritage (Indian Express)

Context:

A rare 600–800-year-old Kaala Bhairava sculpture, locally worshipped as Hasthala Veeranna, has drawn attention due to concerns over its neglect. Located in the Kanakagiri Hills of Bhadrachalam district, the monument underscores the need to conserve Telangana's rich archaeological and cultural heritage.

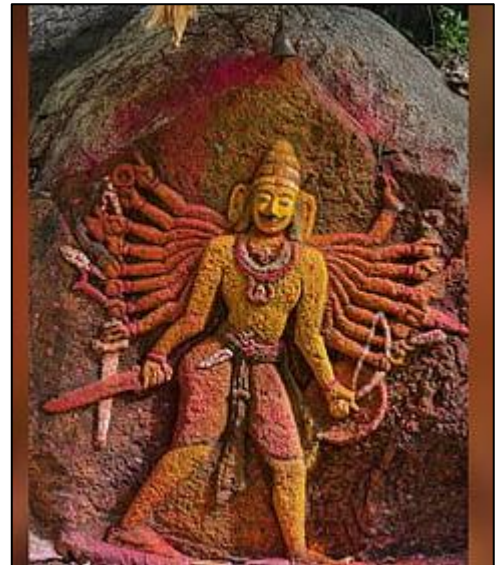
About the Sculpture

- Believed to date to the Kakatiya period (12th–14th century CE), the sculpture is carved on a massive boulder and represents one of the rarest depictions of Kaala Bhairava, a fierce manifestation of Lord Shiva associated with protection and guardianship.

- The deity is portrayed in the Tribhanga posture, with 18 arms carrying different weapons, flaming hair (Jwalakesha) and a garland and belt of skulls (Kapala Mala and Kapala Mekhala), reflecting the exceptional craftsmanship and iconographic traditions of medieval Telangana.

Significance

- Showcases the artistic excellence and sculptural traditions of the Kakatiya dynasty.
- Reflects the prominence of Shaivism and the rich iconographic heritage of medieval Telangana.
- Strengthens the historical significance of the Kanakagiri region and enriches the State's archaeological record.
- Offers immense potential for heritage tourism, cultural education and academic research.
- Reinforces the importance of preserving lesser-known monuments as symbols of Telangana's cultural identity.



Challenges

- Natural weathering, vegetation growth and inadequate conservation measures.
- Limited documentation, research and heritage awareness.
- Poor accessibility and lack of tourism infrastructure.
- Threats from vandalism and unregulated human activity.

Way Forward

- Undertake scientific documentation, archaeological excavation and conservation of the monument.
- Strengthen protection through the State Archaeology Department and promote digital heritage mapping.
- Develop the site as part of Telangana's heritage tourism circuits with eco-sensitive infrastructure.
- Encourage community participation, academic research and awareness programmes to safeguard the State's cultural legacy.

Practice MCQs

1. Consider the following statements regarding the Ordinance-making power in India:

1. An Ordinance can be promulgated with retrospective effect but cannot be used to amend the Constitution.
2. The President's satisfaction to promulgate an Ordinance is completely immune from judicial review.
3. A Governor requires prior instructions from the President to issue an Ordinance if a similar Bill requires the President's prior sanction.

How many of the above statements are correct?

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

Answer: b

2. Consider the following statements regarding Rajya Sabha elections:

1. The Constitution of India specifies the term of a Rajya Sabha member as six years.
2. A candidate contesting the election must be a registered elector in the specific State from which they are contesting.
3. State representatives in the Rajya Sabha are elected by the elected members of the State Legislative Assembly.
4. Voting in these elections is conducted through an open ballot system.

Which of the statements given above are correct?

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

Answer: c

3. Consider the following statements regarding the Anti-Defection Law:

1. The Tenth Schedule was inserted into the Constitution by the 52nd Amendment Act.

2. A merger is valid only if at least two-thirds of the legislative party members agree to it.
3. The 91st Amendment Act introduced the provision allowing a party split by one-third of its members.
4. Members who choose to remain in their original party after a valid merger are subject to disqualification.

Which of the statements given above are correct?

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

Answer: a

4. Which of the following countries share a coastline directly on the Strait of Hormuz?

1. Iran
2. Saudi Arabia
3. Oman
4. Yemen

Select the correct answer using the code given below:

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

Answer: d

5. Consider the following statements regarding the PM SVANidhi scheme:

1. It is a Central Sector Scheme implemented by the Ministry of Finance.
2. Beneficiaries are eligible for an interest subsidy of 7% per annum on timely repayment.
3. Collateral security is mandatory for availing the third tranche of the loan.
4. Street vendors belonging to peri-urban and rural areas are excluded from its benefits.

How many of the above statements are correct?

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

Answer: a

6. Consider the following statements regarding the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA):

1. It guarantees assured and free antenatal care services on the first day of every month.
2. Its benefits are exclusively restricted to pregnant women belonging to Below Poverty Line (BPL) households.
3. It aims to provide comprehensive antenatal care to pregnant women in their second and third trimesters.
4. The scheme encourages private medical practitioners to offer voluntary services at government health facilities.

Which of the statements given above are correct?

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

Answer: c

7. "Mission Senehjori", recently seen in the news, is an initiative primarily aimed at:

- (a) Promoting the commercial cultivation of aromatic medicinal plants in the Western Ghats.
- (b) Transforming Assam's Muga silk sector into a globally competitive luxury textile ecosystem.
- (c) Creating a digital health registry and telemedicine network for rural households in Northeast India.
- (d) Reviving traditional bamboo-based water harvesting structures in the Himalayan region.

Answer: b

8. With reference to the 'Potato Patch Coral', recently seen in the news, consider the following statements:

It is a giant species of soft coral that completely lacks a calcium carbonate skeleton.

It is a deep-water cold coral found exclusively in the aphotic (lightless) zone of the ocean.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answer: d

9. Consider the following statements regarding "Operation Sheruwali", recently seen in the news:

1. It is a joint anti-terror combing operation conducted by the Indian Army, CRPF, and Jammu and Kashmir Police.
2. It is primarily focused on tracking down and neutralizing elusive terrorists hiding in the dense forested regions of the Rajouri district.
3. It is a bilateral counter-terrorism exercise conducted between the armed forces of India and Nepal.

Which of the statements given above is/are correct?

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

Answer: a

10. "Project UDAYAK", sometimes seen in the news, is primarily associated with which one of the following?

- (a) Upgradation of tribal education infrastructure in Central India.
- (b) Modernisation of the Indian Navy's eastern submarine fleet.

- (c) Construction and maintenance of border road infrastructure in North-East India.
- (d) Development of inland national waterways in the Brahmaputra basin.

Answer: c

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Practice Mains Questions

1. The Right to be Forgotten has emerged as an important facet of the right to privacy in the digital age. Discuss its significance and the challenges associated with its implementation in India. (10 Marks, 150 Words)

2. Examine the role of the India–UK Critical Minerals Global Supply Chain Observatory in enhancing India's resource security. (15 Marks, 250 Words)

3. How can grassroots innovation contribute to the vision of Atmanirbhar Bharat? Discuss. (10 Marks, 150 Words)

4. Climate finance is central to balancing India's developmental priorities with climate commitments. Discuss. (15 Marks, 250 Words)

5. Analyze the role of the Prime Minister Research Chair (PMRC) Scheme in promoting research excellence and innovation in India. (15 Marks, 250 Words)

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