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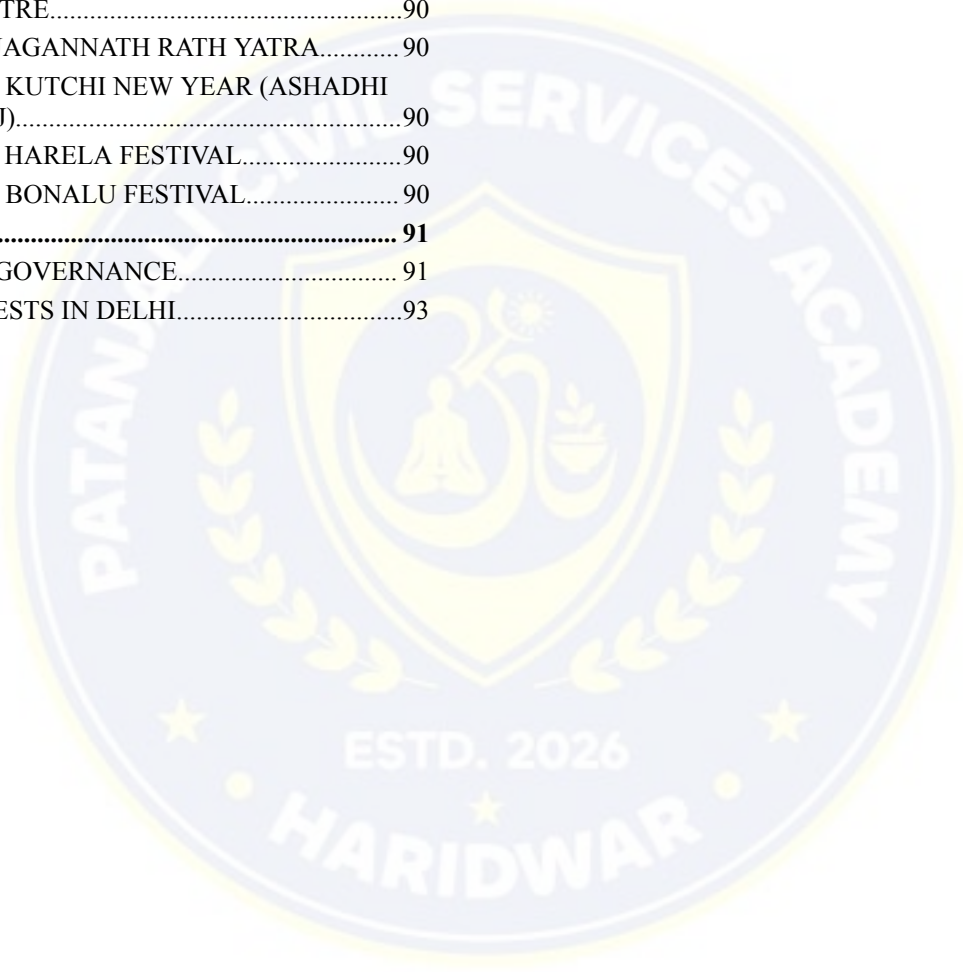
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POLITY AND GOVERNANCE

1. VB-G RAM G ACT, 2025 REPLACES MGNREGA

Context: Effective 1 July 2026, the VB-G RAM G Act, 2025 replaced the 20-year-old MGNREGA, 2005 across rural India.

Key Features of the VB-G RAM G Act, 2025

- **Enhanced Employment Guarantee:** Increased from 100 to 125 days of guaranteed wage employment per rural household annually.
- **60-Day Agricultural Pause:** Introduces a 60-day blackout during peak sowing and harvesting seasons to protect farm labour availability.
- **Higher Wage & Timely Payment:** Sets a national minimum wage floor of ₹300/day with weekly or maximum 14-day wage disbursal.
- **New Worker Identity:** Issues Gramin Rozgar Guarantee Cards; existing e-KYC job cards remain valid during transition.
- **Revised Funding Pattern: 60:40 Centre–State** sharing for normal states; **90:10** for NE/Himalayan states & UTs with legislatures; **100% Central funding** for UTs without legislatures.
- **Normative Fund Allocation:** Replaces the demand-driven model with **Finance Commission-based state expenditure ceilings**.
- **Infrastructure-Focused Works:** Prioritizes **water security, rural infrastructure, livelihood assets, and climate-resilient works**.
- **Integrated Planning:** Viksit Gram Panchayat Plans aligned with PM Gati Shakti for coordinated infrastructure development.
- **Digital Asset Tracking:** All assets are mapped under the **Viksit Bharat National Rural Infrastructure Stack** for centralised monitoring.

Constitutional Provision of Right to Work

Although Right to Work is not a Fundamental Right, it is a constitutional aspiration under Article 41.

Directive Principles of State Policy

- Article 39(a): Adequate means of livelihood for all citizens.
- Article 41: Right to work, education, and public assistance.
- Article 43: Living wage and decent standard of life for workers.

VIKSIT BHARAT-G RAM G ACT, 2025 WHY IT IS BETTER THAN MGNREGA		
MGNREGA (2005)	VS FEATURE	VIKSIT BHARAT-G RAM G (2025)
100 days of wage employment per rural household	EMPLOYMENT GUARANTEE	125 days of wage employment per rural household
No explicit 'pause window'	AGRICULTURAL BALANCE	60-day no-work period during peak sowing & harvesting seasons to protect farm labour supply
No statutory minimum wage floor	WAGE PAYMENT TIMELINE	Minimum wage floor of ₹300 per day (nationwide)
No strict statutory timeline for wage payment	WORKER IDENTIFICATION	Wages disbursed weekly, or within 14 days of work completion
Job cards for workers	FUNDING PATTERN	Gramin Rozgar Guarantee Cards Existing e-KYC job cards remain valid during transition
100% central funding for wages	RESOURCE ALLOCATION	• 60:40 (Centre:State) for normal states • 90:10 for NE/Himalayan states & UTs with legislatures • 100% for UTs without legislatures
Demand-driven funding based on actual demand	FOCUS AREAS (PRIORITY)	• Top-down normative allocation based on 16th Finance Commission's horizontal devolution recommendations • Water security (water conservation and management works) • Core-rural infrastructures • Livelihood-related infrastructure • Special works to mitigate extreme weather events (climate resilience)
Multiple & scattered categories of works with limited strategic focus	PLANNING INTEGRATION	• Bottom-up Viksit Gram Panchayat Plans spatially integrated with PM Gati Shakti for coordinated infrastructure creation
Fragmented planning with limited convergence	DIGITAL ASSET MONITORING	• All assets mapped on Viksit Bharat National Rural Infrastructure Stack for unified, real-time monitoring
Assets tracked through multiple systems	THE BIGGER VISION: From providing work to building a stronger, resilient and self-reliant rural India through timely wages, strategic investments and integrated planning.	

Key Concerns

- **Fiscal Burden on States:** The 60:40 Centre–State funding pattern places

a heavier burden on poorer states with low tax revenues but higher rural poverty and greater dependence on MGNREGA.

- **Rights vs Budget Limits:** Advance budget caps may weaken MGNREGA's status as a demand-driven, legal entitlement by limiting employment despite demand.
- **Digital Barriers:** Biometric authentication and digital systems can exclude eligible workers due to device failures, poor fingerprint recognition, server issues, or weak internet connectivity.
- **Agricultural Work Moratorium:** Suspending MGNREGA work during the **60-day peak agricultural season** may reduce livelihood options for **landless labourers and marginal farmers** if agricultural jobs are unavailable.
- **Implementation Gap:** Although MGNREGA guarantees **100 days of employment**, households typically receive only **45–55 days**, reflecting gaps in planning, funding, administration, and implementation.

Way Forward

- **Strengthen Cooperative Federalism:** Provide a phased funding transition and fiscal support for high-demand, well-performing states.
- **Reduce States' Burden:** Retain 100% Central funding for wages and administration; share material costs in a 75:25 ratio.
- **Expand Convergence:** Include State housing schemes and allow States to approve convergence projects.
- **Decentralize the 60-Day Pause:** Let Gram Sabhas and District Collectors decide work suspension based on local conditions.
- **Protect the Right to Work:** Create a National Contingency Buffer Fund for demand beyond normative allocations.
- **Prevent Digital Exclusion:** Allow offline authentication when biometric or e-KYC systems fail.
- **Empower PRIs:** Strengthen Gram Panchayat autonomy and establish an independent Social Audit Directorate.

Conclusion: VB-G RAM G Act, 2025 can strengthen rural livelihoods through better infrastructure, technology, and convergence. Its success will depend on balancing efficiency with equity, fiscal sustainability with cooperative federalism, and technology with the right to work.



Test Your Knowledge



Prelims Corner	Mains Corner
Q. With reference to the VB-G RAM G Act, 2025, consider the following statements: 1. The Act enhances the guaranteed wage employment from 100 days to 125 days per rural household annually. 2. It continues the demand-driven fund allocation mechanism followed under MGNREGA. 3. It provides for a national minimum wage floor of ₹300 per day with wage payment within a maximum of 14 days. 4. It integrates village-level planning with PM Gati Shakti. Which of the statements given above are correct? (a) 1, 3 and 4 only (b) 1 and 2 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a)	Q. The VB-G RAM G Act, 2025 marks a paradigm shift from a demand-driven rural employment programme to a fiscally managed rural development framework. Critically examine the implications of this transition for the right to work, cooperative federalism, and inclusive rural development. GS Paper II 15 Marks 250 Words

2. NATIONAL REPORT ON GRAM SABHA PARTICIPATION

Context: The Ministry of Panchayati Raj released the National Study Report on Low Participation in Gram Sabha across States and Union Territories. Prepared by the National Institute of Rural Development and Panchayati Raj.

Key Highlights of the Report

- **Multidimensional Barriers:** Socio-economic, institutional, governance & behavioural factors.
- **Livelihood Constraints:** Work schedules and farm activities limit participation.
- **Awareness Gaps:** Poor outreach and procedural awareness.
- **Weak Institutions:** Poor follow-up, grievance redressal and official engagement.
- **Governance Deficit:** Low transparency, political interference and delayed implementation.
- **Social Exclusion:** Migrants, youth, elderly and women underrepresented.
- **Infrastructure Gaps:** Inadequate facilities and digital access.
- **Participation Fatigue:** Transparency concerns, low relevance, repetitive discussions, trust deficit and weak grievance redressal.

73rd & 74th Constitutional Amendments

- **Introduced (1992):** Enacted in 1992; came into force in 1993 to strengthen democratic decentralisation.
- **Constitutional Status:** Granted constitutional recognition to PRIs and ULBs.
- **Local Governance:** Established 3-tier Panchayati Raj and strengthened Urban Local Bodies.
- **Regular Elections & Reservation:** Mandated 5-year elections; reserved seats for SCs/STs and at least one-third for women.
- **Devolution of Powers:** Added the 11th Schedule (29 subjects) and 12th Schedule (18 subjects) with State Finance Commissions (SFCs) for fiscal devolution.

Core Issues Affecting the Functioning of Panchayati Raj Institutions (PRIs)

- **Incomplete Devolution of Functions, Funds & Functionaries (3Fs):** States have not fully devolved powers as envisaged under the 73rd Constitutional Amendment.
- **Financial Weakness:** Limited own-source revenue, weak taxation powers and dependence on Union/State grants.
- **Political & Bureaucratic Interference:** State governments, bureaucracy and local legislators limit PRIs autonomy.
- **Weak Capacity & Governance:** Inadequate training, staff, planning, digital infrastructure and transparency.
- **Poor Participation & Accountability:** Weak Gram Sabhas, elite capture, proxy representation and ineffective social audits.

Policy Recommendations**3. CITIZENSHIP DETERMINATION**

Context: The Supreme Court set aside 27 Gauhati High Court judgments that upheld Foreigners Tribunal (FT) orders declaring individuals as foreigners, holding that **citizenship must be decided through a fair, lawful and reasonable process.**

Case Origin: The ruling arose from 27 appeals filed by individuals from Assam who were declared foreigners by Foreigners Tribunals through **ex parte proceedings** (decisions made in their absence).

Key Supreme Court Observations

- **Fair Procedure:** Citizenship can be revoked only through a fair, lawful and reasonable process under Article 21.
- **Ex Parte Orders:** Tribunals must verify proper notice, opportunity to present evidence and compliance with natural justice.
- **Natural Justice:** Reaffirmed *audi alteram partem* (right to be heard), requiring stronger safeguards in citizenship, detention and deportation cases.

- **Evidence-Based Decisions:** Citizenship must be decided on documentary evidence, not mere procedural lapses.
- **Section 9, Foreigners Act:** Burden of proof lies on the individual but does not override fair adjudication.
- **Fresh Adjudication:** Set aside **27 judgments** and remanded cases, allowing written statements, evidence, witnesses (if needed) and a fresh hearing.

4. WHOLE OF GOVERNMENT (WOG) APPROACH

Context: It refers to a mode of governance where different government departments & ministries work together (rather than in silos) to achieve shared goals that no single agency can tackle alone.

Benefits of the Whole-of-Government (WoG) Approach

- **Better Policy Coordination:** Ensures ministries work together, avoiding conflicting actions. *E.g., preventing newly built roads from being dug up for optical fibre cables.*
- **Improved Service Delivery:** Integrates departments for **faster, more efficient governance**. *E.g., POSHAN Abhiyaan coordinates 26+ ministries to tackle malnutrition.*
- **Optimal Resource Use:** Pools financial, human, and technological resources, reducing duplication, delays, and costs.
- **Greater Public Convenience:** Provides **single-window services**, improving transparency and trust. *E.g., Jan Samarth Portal integrates 13 government credit-linked schemes.*
- **Faster Crisis Response:** Enables **coordinated action during emergencies**, as seen during the COVID-19 pandemic.



Test Your Knowledge

Prelims Corner

With reference to the Gram Sabha, consider the following statements:

1. The Gram Sabha consists of all persons whose names are included in the electoral rolls of a village within the area of a Gram Panchayat.
2. The powers and functions of the Gram Sabha are determined by the State Legislature.
3. The Constitution prescribes a uniform minimum number of Gram Sabha meetings to be held every year across all States.

Which of the statements given above are correct?

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

Answer: (a)

Mains Corner

Financial dependence, administrative constraints and weak citizen participation continue to limit the functioning of Panchayati Raj Institutions in India. Critically analyse these challenges in the light of democratic decentralisation.

(GS Paper II | 15 Marks | 250 Words)

5. INDIA RANKED 9TH IN INTERNET BLACKOUT PREPAREDNESS

STUDENT'S
NOTES 

Context: India ranked **9th globally** in preparedness for major internet disruptions in a study by **U.S.-based TRG Datacenters**. || **Global Ranking:** The **United States** topped the list with a **zero vulnerability score**, followed by **Indonesia** and the **United Kingdom**.

India's Internet Blackout Preparedness

- **Overall Ranking:** Ranked **9th** among ~100 countries for internet disruption resilience; **vulnerability score: 23.4** (*lower = better preparedness*).
- **Cyber Readiness:** Scored **98.5/100** in cybersecurity, reflecting strong protection of critical digital infrastructure.
- **Internet Exchanges:** Has **40 Internet Exchange Point (IXPs)**, enabling direct domestic data exchange, faster speeds, lower costs and better connectivity during global disruptions.
- **Power Infrastructure:** **99.5%** population has electricity access, ensuring reliable operation of data centres, cable landing stations, telecom networks and IXPs.
- **Submarine Cables:** Connected through **22 submarine cables**—fewest among the top 10 countries (*US: 115; Indonesia: 72; UK: 65*).
- **Internet Use:** Around **70%** of Indians use the internet, increasing the economic and social impact of major outages.
- **Key Strengths:** Strong cybersecurity, widespread electricity access and **40 IXPs** strengthen digital resilience.
- **Major Gaps:** Limited submarine cables and dependence on shared cables, landing stations, power systems and fibre routes create single points of failure.
- **Recent Evidence: September 2025:** Cable damage near Saudi Arabia slowed internet services in India, Pakistan and the UAE, exposing vulnerability to external disruptions.



Way Forward: Diversify cable routes, add landing stations, expand domestic fibre and decentralised IXPs, and strengthen disaster recovery, failover testing and telecom route diversity.

6. POINTERS FOR PRELIMS

6.1 E-OCI CARD AND FCRA 2.0 PORTAL

- The Ministry of Home Affairs launched Foreign Contribution (Regulation) Act (FCRA 2.0) Portal and e-OCI (Electronic Overseas Citizen of India) Card.
- **e-OCI Card:** To transform OCI services for the global Indian diaspora through a fully digital system.
- **FCRA 2.0 Portal:** To simplify compliance under the Foreign Contribution (Regulation) Act. It is hosted on the National Government Cloud ('MeghRaj') and is integrated with major government databases and banks, including PAN, Aadhaar, OCI, NGO Darpan, and the ICAI's UDIN system.

6.2. RIGHT TO VOTE

- Context: Demand to make the Right to Vote a Fundamental Right.
- **Status: Constitutional Right.**
- **Art. 325:** No exclusion from electoral rolls on religion, race, caste, or sex.
- **Art. 326: Adult suffrage (18+)** for Lok Sabha & State Assembly elections.

6.3. RIGHT TO LEGAL REPRESENTATION

- Context: Faizabad Bar Association resolved not to represent the accused in the Ayodhya Ram Temple embezzlement case.
- **Constitution & Key Judgements: Art. 22:** Arrested persons have the right to consult and be defended by a lawyer of their choice.
- **Art. 39A:** State must ensure equal access to justice, regardless of economic or other disabilities.
- **Sheikh Mukthar (2020):** Fair trial is integral to **Art. 21**.

6.4 SAMRIDDH GRAM

- The Department of Telecommunications won the WSIS Prizes 2026 for Samriddh Gram, highlighting India's progress in Digital Public Infrastructure (DPI).
- About Samriddh Gram: Rural digital transformation programme by DoT, built on **BharatNet**.
- **BharatNet:** Provides high-speed broadband to **Gram Panchayats** to bridge the digital divide.
- **Objective:** Deliver integrated **phygital** (physical + digital) services through **Samriddhi Kendras**.
- **Services:** Healthcare, education, agriculture, financial inclusion, skilling, e-Governance, and e-commerce.

6.5. LADAKH GOVERNANCE REFORMS

- **Administrative Expansion:** After creating **5 new districts** (April 2026), Ladakh increased tehsils from **15 to 32** by adding **17 new tehsils**.
- **AHDC Expansion:** The **Ladakh Autonomous Hill Development Council (LAHDC) Act, 1995** permits an **Autonomous Hill Development Council (AHDC)** in every district. Extending it to all **7 districts** requires

legal amendments and constituency delimitation.

6.6. ATMANIRBHAR PANCHAYAT PROGRAM

- **Context:** MoPR promotes financially self-reliant Panchayats through this national challenge programme under **Rashtriya Gram Swaraj Abhiyan**.
- **Objective:** Supports **Gram and Block Panchayats** in developing revenue-generating projects.
- **Eligibility:** GP: Own Source Revenue (OSR) $\geq$ ₹50 lakh; Block Panchayats: OSR $\geq$ ₹1 crore; minimum 3-year tenure and Gram Sabha consent required.
- **Targets:** Selects **50 projects in Year 1** and **100 annually in Years 2–4**

6.7. FIVE YEARS OF THE MINISTRY OF COOPERATION

- **5th Foundation Day (6 July 2026)**
- **New Initiatives:** For Urban Cooperative Banks (by National Urban Cooperative Finance and Development Corporation): **Sahakar CBS:** Centralised Core Banking Solution for Urban Cooperative Banks. || **Sahakar Sahyogi:** Conversational AI-powered platform to enhance customer services and banking operations.

6.8. PERFORMANCE GRADING INDEX (PGI)

- The Ministry of Education released **PGI 2.0** reports for **States/UTs (PGI-S)** and **Districts (PGI-D)** for **2025–26**.
- **Objective:** Assess school education systems and promote **systemic improvements**.

INTERNATIONAL RELATIONS

1. 16TH INDIA-JAPAN ANNUAL SUMMIT

Context: the Prime Minister of Japan Ms. TAKAICHI Sanae paid an Official Visit to India from 1-3 July 2026 for the 16th India-Japan Annual Summit.

An Overview of India–Japan Relations

- **Strategic Partnership:** Elevated to a **Special Strategic and Global Partnership** (2014).
- **Economic Cooperation:** **Comprehensive Economic Partnership Agreement (CEPA, 2011)** covers trade, investment, intellectual property rights and movement of professionals; bilateral trade reached **US\$22.85 billion** (FY 2023–24).
- **Security Cooperation:** **2015** defence agreements, **2025 Joint Declaration**, **2+2 Ministerial Dialogue**, and exercises **JIMEX**, **Dharma Guardian**, **MILAN** and **MALABAR**.
- **Development Cooperation:** **Mumbai–Ahmedabad High-Speed Rail** and **India–Japan Act East Forum** for Northeast development.
- **Maritime Cooperation:** Joint development of **Andaman & Nicobar** and **Lakshadweep** as Smart Islands; cooperation in shipbuilding, ports and maritime industrial clusters..



Global Importance of India and Japan

- **Multilateral reform:** Work together in G4 for UN Security Council reform and mutual support for permanent seats.
- **Rules-based Indo-Pacific:** Jointly promote a free, open Indo-Pacific through Quad cooperation on maritime security, critical tech, and resilient supply chains.
- **Africa partnership:** Pursue trilateral projects in Africa via the Asia–Africa Growth Corridor (AAGC, 2017) and the Japan–India Initiative for Sustainable Economic Development.
- **Supply chain resilience:** With Australia, run the Supply Chain Resilience Initiative to diversify sourcing and cut reliance on single suppliers.

Conclusion: India–Japan relations have evolved into a comprehensive Special Strategic and Global Partnership that spans economic, security, technological, and developmental cooperation. This synergy strengthens the rules-based Indo-Pacific, supports multilateral reform, and promotes sustainable growth from Africa to India’s Northeast.


Test Your Knowledge


 Prelims Corner	 Mains Corner
Consider the following statements regarding the strategic significance of India-Japan relations: - Both countries support reform of the United Nations Security Council through the G4 grouping. - Both are members of the Quad, which promotes a free, open and rules-based Indo-Pacific. - The Asia-Africa Growth Corridor (AAGC) is a trilateral initiative involving India, Japan and Australia. Which of the statements given above is/are correct? (a) 1 and 2 only (b) 2 only (c) 1 and 3 only (d) 1, 2 and 3 Answer: (a)	The India-Japan partnership is increasingly driven by converging strategic interests rather than merely economic considerations. Discuss with suitable examples. GS Paper II 10 Marks 150 Words

2. INDIA AND INDONESIA RELATIONSHIP

Context: Prime Minister's Visit to Indonesia concludes with signing of key agreements.

Key Outcomes of the India-Indonesia Summit (2026)

- **Political & Strategic:** Regular summits; stronger **Joint Commission**, Foreign Office, parliamentary, think tank & university engagement.
- **Defence & Maritime:** Cooperation in **BrahMos**, missiles, defence production, joint exercises, **Maritime Domain Awareness (MDA)**, hydrography & capacity building; renewed Maritime Safety MoU; Indonesia posted an **International Liaison Officer (ILO)** at the **Information Fusion Centre-Indian Ocean Region (IFC-IOR)**.
- **Trade & Investment:** Launched **Joint Economic & Financial Dialogue**; promoted **Local Currency Transactions (RBI-Bank Indonesia)**.
- **Critical Minerals:** Agreements on critical minerals, rare earths & steel; **SAIL-PT Krakatau Steel JV**.
- **Connectivity & Digital:** India to support **Sabang Port**; advanced **Andaman-Aceh** connectivity; launched **ION (ONDC-based)**, cross-border QR payments & telecom cooperation.
- **Science & Technology:** Extended **ISRO-BRIN** cooperation, including **Gaganyaan** support; collaboration in **AI, nuclear energy & research**.
- **Culture & Tourism:** India to restore **Prambanan Temple**; **2026-27 Tagore-Dewantara Year**; expanded tourism, visas, student exchanges & proposed **IIM Bangalore** campus.
- **Regional & Global:** Indonesia backed India's **BRICS Chairship (2026)**; support for **UNSC** reforms, **Global South**, **ASEAN centrality**, and a **free, open Indo-Pacific** under **UNCLOS**.

Way Forward for India

- **Expand Trade:** Conclude **AITIGA** review; negotiate **CECA** to improve market access and diversify exports.
- **Critical Minerals:** Build joint value chains for **nickel, rare earths & EV batteries** through investment and processing.
- **Develop Sabang Port:** Set up an **SPV**, ensure financing and fast-track port development near the **Strait of Malacca**.
- **Respect Strategic Autonomy:** Align **SAGAR** with Indonesia's **Global Maritime Fulcrum**, respecting its **Independent & Active** policy and **ASEAN Centrality**.



Conclusion: Guided by India's Act East and SAGAR vision, the partnership with Indonesia is poised to become a model of trusted, resilient and inclusive regional cooperation. Its success will strengthen ASEAN centrality while advancing a free, open and prosperous Indo-Pacific.

3. THIRD INDIA-AUSTRALIA ANNUAL SUMMIT 2026

Context: During the Indian PM's Australia visit, both leaders agreed to speed up the Comprehensive Economic Cooperation Agreement (CECA) and expand ties from the 'Three Cs' (Cricket, Curry, Commonwealth) to the 'Four Ds' (Democracy, Defence, Diaspora, Dosti).

India-Australia Relations

- **Comprehensive Strategic Partnership (CSP):** Elevated in 2020, based on shared democratic values, Commonwealth links, and a common vision for a **free, open, and prosperous Indo-Pacific**.
- **Strategic Cooperation:** Both are key members of the **Quad, G20, East Asia Summit, and Indian Ocean Rim Association (IORA)**.

- **Economic Ties:** Bilateral trade is nearing **\$50 billion**, supported by the **Economic Cooperation and Trade Agreement (ECTA)** (effective **December 2022**), which removed tariffs on **85%+** of Australian exports to India.
- **Defence Cooperation:** Regular joint exercises (**AUSINDEX, AUSTRALIND, Malabar**) and the **Mutual Logistics Support Agreement (2021)** strengthen defence ties.
- **Diaspora:** Australia hosts nearly **1 million** people of Indian origin, including **137,000+ Indian students**, making it the largest and fastest-growing overseas-born community.

3rd INDIA-AUSTRALIA ANNUAL LEADERS' SUMMIT 2026

KEY OUTCOMES

 DEFENCE	- Adopted the Joint Declaration on Defence and Security Cooperation, renewing the 2009 framework. - Launched the Maritime Security Collaboration Roadmap. - Signed an MoU between the Indian Coast Guard and Australia's Maritime Border Command.
 ENERGY	- Operationalised the 2014 Civil Nuclear Agreement. - Adopted the Joint Statement on Energy Security. - Launched the Rooftop Solar Training Academy at Pandit Deendayal Energy University to train 2,000 solar technicians.
 TECHNOLOGY	- Launched the Partnership for Cyber, Critical Technologies and Supply Chains. - Signed the Australia-Canada-India Technology and Innovation Partnership MoU on emerging technologies.
 INVESTMENT	AustralianSuper to invest AUD 500 million more in the National Investment and Infrastructure Fund, taking total investment to AUD 3.3 billion.
 EDUCATION & RESEARCH	- Approved Flinders University and Victoria University campuses in India. - Granted IP Australia access to the Traditional Knowledge Digital Library. - Launched the India-Australia Sports Collaboration Roadmap.
 SPACE	Australia to support Gaganyaan through a tracking station on the Cocos (Keeling) Islands.
 CULTURE	Australia to return three 11th-12th century artefacts.
 SOCIAL MEDIA	PM welcomed Australia's social media ban for minors.

SIGNIFICANCE OF AUSTRALIA FOR INDIA

1 INDO-PACIFIC



Shared commitment to a free, open, inclusive, rules-based Indo-Pacific



QUAD
Quadrilateral Security Dialogue (Quad).



Australia-India Indo-Pacific Oceans Initiative Partnership (AIPOIP).



2+2 Ministerial Dialogue (since 2019).

2 DEFENCE



AUSINDEX naval exercise.



Mutual Logistics Support Agreement (2021).

3 ENERGY



Cooperation on critical minerals, renewable energy, and green hydrogen.

India-Australia Economic Cooperation and Trade Agreement (ECTA)

- **Signed (2022):** Boosted **trade, industry linkages, business opportunities, and employment**. Key benefits include:
- **Exports doubled:** India's exports to Australia rose from **USD 4 billion (FY 2020-21)** to **USD 8.5 billion (FY 2024-25)**.
- **Bilateral trade:** Reached **USD 19.3 billion** in **FY 2025-26** (up to February).
- **Market Access:** India offered preferential access on **70.3%** of tariff lines; Australia on **100%**, covering all Indian imports.
- **Zero-duty Access:** Since **1 January 2026**, all Indian exports enjoy **duty-free access** to Australia.
- **Sectoral Gains:** Higher exports of **textiles, pharmaceuticals, chemicals, and agricultural products**.
- **Organic Trade:** Signed **Mutual Recognition Arrangement (MRA)** for organic products.

Major Challenges

- **Trade Bottlenecks:** Comprehensive Economic Cooperation Agreement (CECA) talks remain stalled over agriculture, dairy, Sanitary and Phytosanitary (SPS) standards, while India's reliance on Australian coking coal and Liquefied Natural Gas (LNG) sustains a trade deficit.
- **Diaspora Frictions:** Temple vandalism, Khalistani activities, and differing views on freedom of expression periodically strain bilateral ties.
- **Strategic Divergence:** Australia is aligned with the US alliance system and AUKUS, while India follows strategic autonomy; differing threat perceptions and Australia's dependence on China constrain strategic alignment.
- **Critical Minerals:** China-linked refining, limited processing capacity, and infrastructure gaps hinder resilient critical mineral supply chains.

Way Forward

- **Defence:** Implement the Joint Declaration on Defence and Security Cooperation (JDDSC) and Maritime Security Collaboration Roadmap (MSCR); expand maritime cooperation, defence R&D, technology transfer, and co-production.
- **Energy:** Ensure long-term Australian uranium supply under the Civil Nuclear Agreement (2014)
- **Economic Integration:** Finalise a balanced Comprehensive Economic Cooperation Agreement (CECA) through Mutual Recognition Agreements (MRAs) on Sanitary and Phytosanitary (SPS) standards while protecting agriculture and dairy.
- **Critical Minerals:** Develop joint refining and processing under the Quad Critical Minerals Initiative (2026) and Partnership for Cyber, Critical Technologies and Supply Chains (PACTS).
- **Security:** Strengthen intelligence sharing and law enforcement against extremist and separatist activities; protect diplomatic missions.

Conclusion: India and Australia can strengthen a secure, resilient, and multipolar Indo-Pacific by bridging strategic differences through greater maritime cooperation while respecting strategic autonomy.

Test Your Knowledge	
Prelims Corner	Mains Corner
Q. Which of the following factors make Indonesia strategically significant for India? 1. Its location astride the Strait of Malacca, a major global shipping lane. 2. Its abundance of nickel and rare earth minerals, critical for clean energy technologies. 3. Its central role in ASEAN and the Indo-Pacific regional architecture. 4. It is India's largest trading partner in ASEAN. Select the correct answer using the code below: (a) 1, 2 and 3 only (b) 1 and 4 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a) Explanation: Indonesia is India's second-largest trading partner in ASEAN (not the largest).	Q. India-Indonesia relations have evolved from shared civilisational ties to a comprehensive strategic partnership with significant implications for the Indo-Pacific. Examine the strategic importance of Indonesia for India's Act East Policy and SAGAR vision. GS Paper II 15 Marks 250 Words

Test Your Knowledge

Prelims Corner

Q. With reference to India–Australia relations, consider the following statements:

1. The Economic Cooperation and Trade Agreement (ECTA) came into force in 2022.
2. Since 1 January 2026, all Indian exports enjoy zero-duty access to the Australian market.
3. The Mutual Logistics Support Agreement (MLSA) between India and Australia was signed in 2021.
4. Australia is a member of both the Quad and AUKUS.

Which of the statements given above are correct?

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

Answer: (d)

Mains Corner

Critically analyse the role of the India–Australia Economic Cooperation and Trade Agreement (ECTA) in deepening bilateral economic integration. What challenges must be addressed to successfully conclude the Comprehensive Economic Cooperation Agreement (CECA)?

GS Paper III | 15 Marks | 250 Words

4. INDIA–NEW ZEALAND STRATEGIC PARTNERSHIP (2026)

Context: India and New Zealand elevated ties to a Strategic Partnership during the Indian PM's visit. Launched the Roadmap to 2030 for structured implementation of bilateral cooperation.



Key Outcomes

- **Roadmap to 2030:** Elevated ties to a Strategic Partnership covering diplomacy, defence, trade, education, culture, and multilateral cooperation.
- **Trade & FTA:** Targeted NZ\$7 billion bilateral trade by 2030 through early implementation of the Free Trade Agreement (FTA).
- **Trade Facilitation:** Operationalised Mutual Recognition Arrangement (MRA) under the Customs Cooperation Arrangement for faster clearance of trusted traders.
- **Maritime Security:** Institutionalised annual **Maritime Security Dialogue**; New Zealand adopted Maritime Security as an Indo-Pacific Oceans Initiative (IPOI) pillar focusing on Illegal, Unreported and Unregulated (IUU) fishing.
- **Counter-Terrorism:** Established **Joint Working Group on Counter-Terrorism** for intelligence sharing and cooperation against terrorist financing and cross-border terrorism.
- **Climate & Energy:** New Zealand joined the **Global Biofuels Alliance (GBA)** and strengthened cooperation under **Coalition for Disaster Resilient Infrastructure (CDRI)**.
- **Agriculture:** Launched **Kiwifruit Action Plan** and two Centres of Excellence in Nagaland and Uttarakhand for agri-innovation.
- **Research & Innovation:** Strengthened collaboration in Antarctic research (NCPOR–University of Canterbury) and food technology (NIFTEM–Kundli–Massey University).

Challenges in India–New Zealand Relations

- **Trade Constraints:** Bilateral trade remains limited (~NZ\$3.5 billion) due to tariff and market-access barriers.
- **Geographical Distance:** Long maritime routes raise logistics costs and limit supply-chain integration.
- **Defence Gaps:** Defence cooperation remains limited despite shared Indo-Pacific interests.
- **FTA Issues:** Differences over market access, agriculture, and dairy delay a comprehensive agreement.

Way Forward for India–New Zealand Relations

- **Trade Integration:** Fast-track the Free Trade Agreement (FTA) to achieve the NZ\$7 billion trade target by 2030.
- **Maritime Security:** Strengthen Maritime Security Dialogue, logistics cooperation, and Indo-Pacific Oceans Initiative (IPOI) partnership.
- **Innovation Cooperation:** Expand collaboration in agri-tech, Antarctic research, clean energy, and food technology through joint Centres of Excellence.
- **People-Centric Ties:** Promote tourism, education, sports, and cultural exchanges for deeper strategic and economic relations.

Conclusion: India–New Zealand strategic partnership can evolve into a trusted Indo-Pacific collaboration through trade integration, maritime security cooperation, and innovation-led growth, strengthening a free, open, resilient, and inclusive regional order.

5. INDIA–AUSTRALIA CIVIL NUCLEAR COOPERATION

Context: India and Australia finalised an **Administrative Arrangement** under their **Civil Nuclear Cooperation Agreement** to enable long-term Australian uranium supply for India's nuclear energy programme.

**Key Highlights**

- **Background:** The **India–Australia Civil Nuclear Cooperation Agreement** was signed in **2014** and entered into force in **2015** for peaceful nuclear cooperation.
- **Operational Framework:** The arrangement sets procedures for implementing the agreement and facilitating commercial uranium exports.
- **Peaceful Use:** Australian uranium will be used only for civilian purposes under International Atomic Energy Agency (IAEA) safeguards.

- **Industry Participation:** Allows Australian uranium miners to engage with eligible Indian entities, including private firms.
- **Long-Term Cooperation:** Establishes stable government and industry collaboration while ensuring safeguards and non-proliferation compliance.

Nuclear Energy in India: Present Status

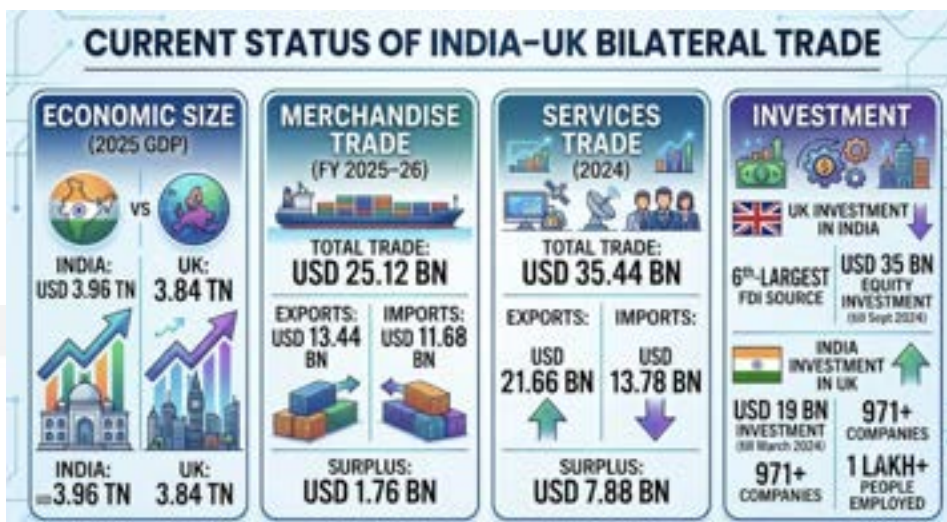
- **Installed Capacity:** India operates **24 reactors** across **7 sites** (Total capacity of **8.78 GW**).
- **Capacity Expansion:** **10 reactors (8,000 MW)** are under construction, with another **10** in pre-project stages.
- **Reactor Portfolio:** Includes Pressurized Heavy Water Reactor (PHWRs), Boiling Water Reactor (BWRs) and Light Water Reactor (LWRs); PHWRs mainly use natural uranium and produce plutonium as a by-product.
- **Fast Breeder Programme:** The indigenous **500 MWe Prototype Fast Breeder Reactor (PFBR)** at **Kalpakkam** achieved first criticality in **April 2026**, initiating the second stage of India's three-stage nuclear programme. It uses plutonium from spent PHWR fuel and produces excess fuel.
- **Thorium Strategy:** India aims to utilise thorium reserves in **Kerala, Tamil Nadu, Andhra Pradesh and Odisha**; FBRs will enable transition to thorium-based reactors and **Uranium-233** production.
- **Small Modular Reactors (SMRs):** **₹20,000 crore** allocated in **Budget 2025–26** for indigenous SMR development; target of **5 SMRs by 2033** for flexible domestic nuclear power.



Test Your Knowledge	
Prelims Corner	Mains Corner
Q. With reference to the India-Australia Civil Nuclear Cooperation, consider the following statements: 1. The Civil Nuclear Cooperation Agreement between India and Australia was signed in 2014 and entered into force in 2015. 2. Australian uranium supplied to India can be used for both civilian and strategic purposes. 3. The recently concluded Administrative Arrangement lays down procedures for implementing the agreement and facilitating commercial uranium exports. 4. The uranium supplied under the agreement is subject to IAEA safeguards. Which of the statements given above are correct? (a) 1, 3 and 4 only (b) 1 and 2 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a) Explanation: Australian uranium can be used only for peaceful civilian purposes under IAEA safeguards.	Discuss the role of nuclear energy in India's energy transition. In this context, explain how indigenous technological developments and international nuclear partnerships can help India achieve long-term energy security. GS Paper III 15 Marks 250 Words

6. INDIA-UK COMPREHENSIVE ECONOMIC AND TRADE AGREEMENT

Context: The India-UK Comprehensive Economic and Trade Agreement (CETA), along with the Double Contribution Convention (DCC), formally came into effect on 15th July 2026



Key Highlights of India-UK CETA

- **India's Tariff Cuts:** Reduced on **89.5%** of tariff lines (covering **91%** of UK exports); **24.5%** become duty-free immediately, rest phased to protect domestic industry.
- **Sensitive Sectors Protected:** Dairy, agriculture, millets, apples, edible oils and gold excluded from tariff concessions.
- **UK Market Access:** Zero-duty on **~99%** of Indian exports (almost **100%** of bilateral trade value), boosting exports, trade and investment.
- **Services Access:** UK's widest commitments cover **12 sectors** and **137 sub-sectors**, benefiting Indian IT, healthcare, finance and engineering.
- **Professional Mobility:** Easier temporary movement by removing hidden quotas and economic needs tests.
- **Auto Liberalisation:** Imports opened through quotas; affordable electric vehicle concessions begin only from **Year 6**, allowing domestic industry to scale up.
- **Steel Safeguards:** Both countries to minimise disruptions from future UK steel trade measures, protecting Indian exporters.
- **Strategic Sectors:** Tariff cuts for **Make in India** and **Production Linked Incentive (PLI)** sectors phased over **5, 7 and 10 years** to build competitiveness..



Key Challenges in India-UK CETA

- **Rules of Origin:** Stringent origin checks and documentation increase compliance costs, especially for MSMEs.
- **Import Diversion:** Lower tariffs may allow third-country goods via the UK, affecting **Make in India** and **Production Linked Incentive**.
- **Non-Tariff Barriers:** Strict SPS, technical standards and certification may limit MSME, agri-food, pharma and engineering exports.
- **UK Carbon Border Adjustment Mechanism:** From **2027**, carbon taxes on steel, aluminium, cement and fertilisers may reduce competitiveness.
- **Limited Mobility:** Despite **Double Contribution Convention**, visa liberalisation remains limited, with small quotas for selected service providers.
- **Low FTA Use:** Limited awareness of CETA provisions and compliance may reduce utilisation.

Measures to Strengthen CETA

- **Support MSMEs:** Establish Trade Facilitation Centres; promote paperless trade and **Authorised Economic Operator** mechanisms.
- **Expand Services:** Fast-track **Model Risk Assessments** and promote AI, cybersecurity and advanced analytics.
- **Reduce NTBs:** Upgrade testing, certification and traceability; use the CETA Joint Committee to resolve trade issues.
- **Green Manufacturing:** Accelerate decarbonisation and align production with global green standards to address climate-based barriers.
- **Protect Industry:** Enforce Rules of Origin, conduct periodic sectoral reviews and use safeguard measures when needed.

Conclusion: The India-UK CETA marks India's shift towards deeper global integration. Its success depends on effective implementation, regulatory reforms, stronger competitiveness, and overcoming non-tariff and carbon-related trade barriers.

Test Your Knowledge	
Prelims Corner With reference to the India-UK Comprehensive Economic and Trade Agreement (CETA), consider the following statements: 1. India reduced tariffs on 89.5% of tariff lines, covering about 91% of UK exports. 2. Nearly 99% of Indian exports receive zero-duty access to the UK market. 3. Sensitive sectors such as dairy, edible oils and gold have been excluded from tariff concessions. 4. The agreement provides immediate duty-free access for all automobile imports into India. Which of the statements given above are correct? (a) 1, 2 and 3 only (b) 1 and 4 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4	Mains Corner Free Trade Agreements can accelerate economic growth only when accompanied by domestic reforms and enhanced competitiveness. Discuss in the context of the India-UK Comprehensive Economic and Trade Agreement (CETA). GS Paper III 15 Marks 250 Words Answer: (a) Explanation: Automobile liberalisation is phased through quotas, with EV concessions beginning only from Year 6.

7. POINTERS FOR PRELIMS**7.1. NORD STREAM PIPELINE**

- **Context:** German prosecutors have accused Ukrainian state authorities of ordering the 2022 explosives attack on the Nord Stream gas pipelines.
- Nord Stream is a major natural gas pipeline between Russia and Germany.
- It passes through the Baltic Sea.
- Pipelines: Nord Stream 1 & Nord Stream 2.
- **Significance:** Ensures energy security for Europe, especially Germany. Provides a direct, reliable gas supply from Russia, bypassing transit countries.

7.2. THE SOUTH-NORTH COMMISSION ON DEVELOPMENT

- It was formally launched by the **Government of Germany at the Hamburg Sustainability Conference (HSC).**

- Independent global body comprising around **20 eminent members from the Global North and South**, representing politics, business, academia, international organisations, and civil society.
- **Purpose:** Strengthen N-S cooperation, deepen engagement with the Global South

7.3. GUWAHATI DECLARATION

- BRICS nations adopted the **Guwahati Declaration to combat drug trafficking.**
- **Purpose:** Strengthens cooperation against transnational organised crime and illicit drug trafficking.
- Promotes intelligence sharing, data-driven approaches & technology use.
- Supports initiatives for demand reduction and healthy lifestyles.

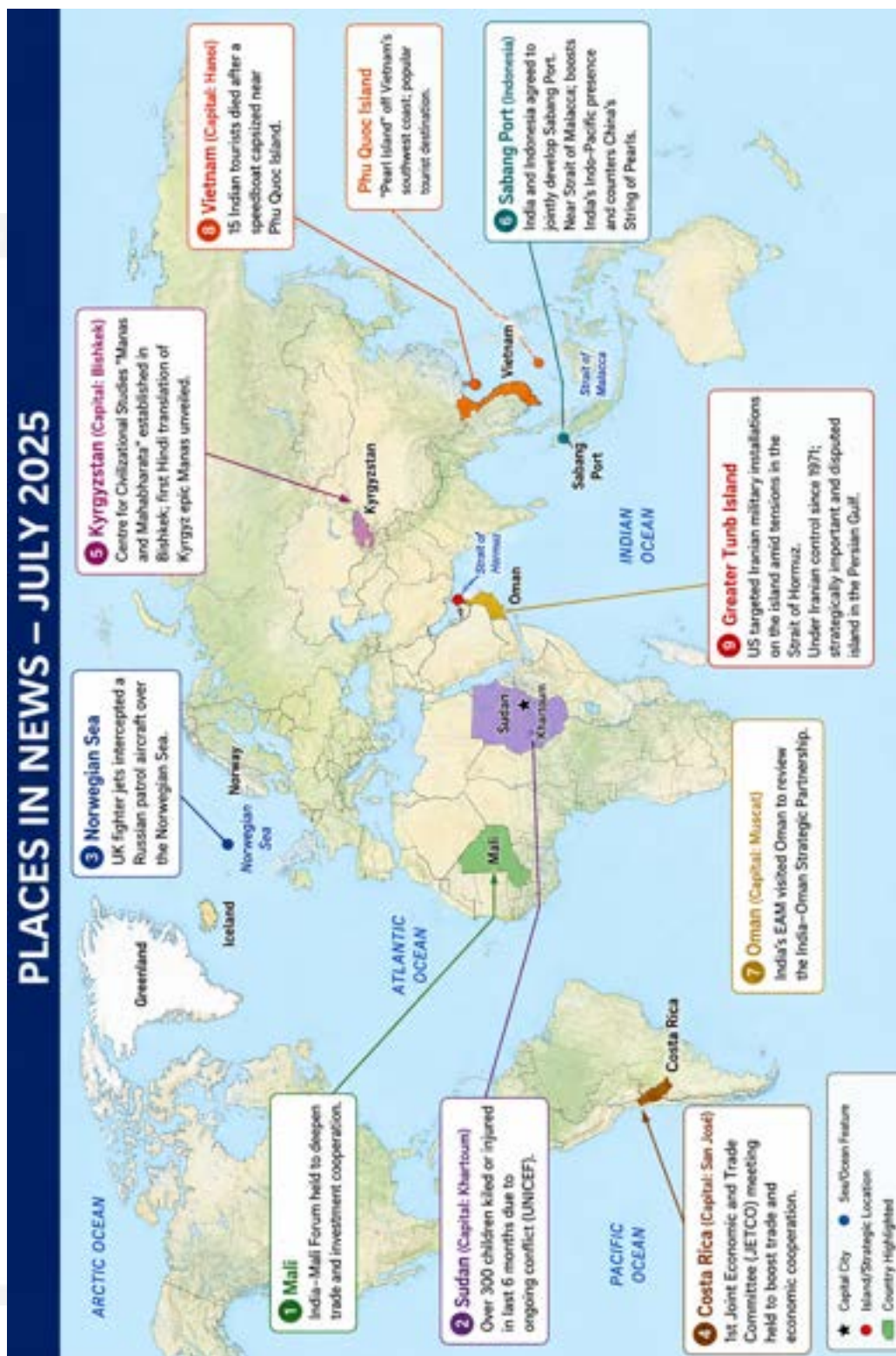
7.4. AUSTRALIA-INDIA PARTNERSHIP ON CYBER, CRITICAL TECHNOLOGIES AND SUPPLY CHAINS (PACTS)

- Signed during the Indian **PM's visit to Australia**, PACTS will replace the 2020 'Framework Arrangement on Cyber and Cyber Enabled Critical Technology Cooperation'.
- **Objective & Governance:** Enhances national security, resilient critical supply chains, and global cyber resilience.
- **Five Pillars:** (1) **Supply chain resilience** (critical minerals,

semiconductors, trusted undersea cables)
(2) **Critical technologies** (AI, space, telecom, biotech, advanced materials, standards) (3) **Cybersecurity** (cybercrime, critical infrastructure, cyber skill hub) (4) **Digital resilience** (scale India's Digital Public Infrastructure (DPI)) (5) **Defence R&D** (DRDO–Australia Defence Science & Technology Group collaboration, maritime technologies).



8. PLACES IN NEWS

STUDENT'S
NOTES 

ECONOMY

1. BILATERAL INVESTMENT AGREEMENT BETWEEN INDIA AND ISRAEL

Context: Recently, the Bilateral Investment Agreement (BIA) between India and Israel came into force.

About: The Bilateral Investment Agreement (BIA) between India and Israel was **signed on 8th September 2025** in New Delhi.

- It **entered into force** with effect from **04th July 2026**.
- It **succeeds** the **India-Israel Bilateral Investment Treaty (BIT), 1996** which was **terminated in 2017**.
- It aims to foster a secure, predictable environment for **cross-border investments**.
- It **balances robust investor protection** with the **sovereign right to regulate**, ultimately deepening economic ties between the two nations.

Benefits of India-Israel relations on the Indian economy

Israel can boost the Indian economy through technology transfers and joint ventures in the following sectors:

- **Water Management & Food Security** → **Drip Irrigation:** Israeli systems (e.g., Netafim) reduce water use by **40%** while increasing crop yields for Indian farmers. || **Desalination Plants:** Israeli technology helps address drinking water shortages in coastal states like **Tamil Nadu** and **Gujarat**. || **Centres of Excellence:** Over **40 centres** train Indian farmers in canopy management and post-harvest technologies.
- **Electronics & Semiconductor Manufacturing** → **Chip Design:** Israel provides advanced chip architecture and intellectual property (IP) to support India's semiconductor mission. || **Fab Joint Ventures:** Israeli firms partner with Indian companies to set up semiconductor testing and assembly plants.
- **Defense & Make in India** → **Joint Co-Development:** India and Israel co-develop drones, missiles, and radar systems, moving beyond a buyer-seller relationship. || **Technology Spillovers:** Aerospace technology transfers strengthen India's civilian aviation and space sectors.
- **DeepTech, Healthcare & AI** → **R&D Funding:** The India-Israel Industrial R&D and Technological Innovation Fund (**I4F**) **Fund** supports startups developing AI, cyber security, and green energy solutions. || **Digital Health:** Israeli medical devices and telemetry technologies expand affordable diagnostics in rural India.
- **Global Supply Chains** → **Haifa Port:** Adani-operated Haifa Port provides Indian exporters a faster and cost-effective gateway to Europe. || **India-Middle East-Europe Economic Corridor**



(IMEC): India-Israel cooperation on IMEC diversifies trade routes and reduces dependence on congested traditional corridors.

Conclusion: Despite regional conflicts and global trade shifts, the India–Israel Bilateral Investment Agreement (BIA) marks a shift from a defence-centric partnership to a secure, rules-based economic partnership, strengthening investment, trade, and long-term strategic cooperation.


Test Your Knowledge


Prelims Corner	Mains Corner
Q. With reference to the India-Israel Bilateral Investment Agreement (BIA), consider the following statements: 1. It entered into force in July 2026, replacing the India-Israel Bilateral Investment Treaty (BIT), 1996. 2. It seeks to balance investor protection with the sovereign right of the host State to regulate in the public interest. 3. It primarily governs bilateral trade in goods and services between India and Israel. Which of the statements given above are correct? (a) 1 and 2 only (b) 2 and 3 only (c) 1 and 3 only (d) 1, 2 and 3 Answer: (a)	Q. Technology partnerships are becoming an important pillar of India's economic diplomacy. Discuss with reference to India-Israel cooperation in agriculture, semiconductors, defence and innovation. GS Paper III Economy/Science & Technology 10 Marks 150 Words

2. REGIONAL CONNECTIVITY SCHEME (RCS) – MODIFIED UDAN LAUNCHED

Context: Approved by the Union Cabinet on 25 March 2026, the scheme aims to boost aviation-led development and support the Viksit Bharat 2047 vision.

Expected Outcomes of the Modified UDAN (Ude Desh ka Aam Nagarik) Scheme

- **Economic Growth:** Boosts trade and tourism in Tier-2 and Tier-3 cities.
- **Affordable Travel:** Expands affordable air connectivity for common citizens.
- **Emergency Response:** Improves healthcare and disaster response in remote and hilly regions.
- **Aerodrome Viability:** Strengthens the financial sustainability of regional airports and airlines.
- **Indigenous Aerospace:** Encourages the growth of India's domestic aerospace industry.
- **Viksit Bharat:** Supports the vision of a developed India by 2047.

About UDAN Scheme

- **Launched:** October 2016 under the National Civil Aviation Policy (NCAP), 2016.
- **Type:** Central Sector Scheme.
- **Ministry / Implementing Agency:** Ministry of Civil Aviation; implemented by the Airports Authority of India.
- **Objective:** Make air travel **affordable and accessible** while improving connectivity to **Tier-2 and Tier-3 cities**.



Test Your Knowledge

Prelims Corner

Q. With reference to the UDAN (Ude Desh ka Aam Nagrik) Scheme, consider the following statements:

1. It was launched under the National Civil Aviation Policy (NCAP), 2016.
2. It is a Centrally Sponsored Scheme implemented jointly by the Union and State Governments.
3. It is implemented by the Airports Authority of India (AAI) under the Ministry of Civil Aviation.

Which of the statements given above are correct?

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

Answer: (a)

Mains Corner

Q. Affordable regional air connectivity is not merely a transportation initiative but an instrument of socio-economic transformation. Discuss with reference to the UDAN Scheme.

GS Paper III | 10 Marks | 150 Words

3. ISSUES WITH CREDIT RATING AGENCIES

Context: The Union Minister criticized global rating agencies such as Moody's and S&P for undervaluing India's sovereign creditworthiness despite its strong macroeconomic fundamentals.

Issues with the Credit Rating Agencies (CRAs)

- **Conflict of Interest:** CRAs are paid by issuers they rate, incentivizing inflated ratings.
- **Rating Shopping:** Issuers solicit multiple ratings and disclose only the best ones, misleading investors.
- **Opaque Methodologies:** Rating models lack transparency, preventing independent scrutiny.
- **Weak Accountability:** Limited liability and weak penalties reduce responsibility for inaccurate ratings.
- **Sovereign Bias (against India):** Global CRAs over-rely on subjective factors while undervaluing India's strong growth, reserves, and default-free record.



Way Forward

- **Reform the issuer-pays model** by introducing neutral fee-allocation mechanisms.
- Strengthen transparency through disclosure of detailed rating methodologies, assumptions, and risk models.
- **Enhance SEBI's supervisory** powers with real-time monitoring, periodic audits, mandatory disclosure and risk-based inspections to eliminate rating shopping.
- Improve **corporate governance** by ensuring independent boards, analyst rotation, and robust internal compliance.


Test Your Knowledge


Prelims Corner	Mains Corner
Q. With reference to Credit Rating Agencies (CRAs), consider the following statements: 1. Credit ratings express the relative credit risk of a borrower or debt instrument but do not guarantee repayment. 2. In India, Credit Rating Agencies are regulated by the Securities and Exchange Board of India (SEBI). 3. Sovereign credit ratings directly determine a country's GDP growth rate. Which of the statements given above are correct? (a) 1 and 2 only (b) 2 and 3 only (c) 1 and 3 only (d) 1, 2 and 3 Answer: (a)	Q. The credibility of Credit Rating Agencies depends as much on their governance framework as on their technical expertise. Discuss in the context of recent concerns over rating practices. GS Paper III 10 Marks 150 Words

4. INDIA'S TOURISM SECTOR - REPORT BY NITI AYOOG

Context: NITI Aayog and the Ministry of Tourism Launch Report on 'Unlocking Growth in Tourism and Hospitality Sector'.

Challenges in India's Tourism Sector:

- **Capacity and project delays:** Limited hotel inventory and long project completion cycles (36–48 months) are holding back sector expansion.
- **Fragmented regulatory landscape:** Differing state-level rules, weak integration of single-window systems, and uneven policy reforms across tourism sub-sectors create inconsistency.
- **Heavy compliance requirements:** Numerous approvals, stringent and overlapping standards, repetitive procedures, and frequent reporting obligations increase operational complexity.
- **Growth in overseas travel:** Growing international travel by Indian residents is diverting spending away from domestic destinations, reducing local tourism demand



Recommendation of the Report

- **Infrastructure development:** Relax building norms, expand homestays, and create conditions that speed up tourism infrastructure and attract private investment.
- **Faster approvals and clearances:** Fast-track environmental and Coastal Regulation Zone (CRZ) clearances, shift to unified licences, drop unnecessary project-stage approvals, and use a single online window for all permissions.
- **Simplified regulations:** Cut down and clarify FSSAI and related compliance requirements.
- **Tourist transport and mobility:** Provide Visa-on-Arrival, simplify visa processes, and ease permits, entry taxes, and vehicle registration for tourist vehicles.
- **Tourism entrepreneurship:** Remove procedural and regulatory entry barriers for new tour operators.



Conclusion: The tourism sector has immense potential for contribution to economic growth, employment generation and regional development while promoting sustainable, inclusive and globally competitive tourism destinations across the country.

5. 10 YEARS OF PRIME MINISTER KRISHI SINCHAYI YOJANA (PMKSY)

Context: Launched on 1 July 2015, Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) has completed more than 10 years of advancing irrigation-led agricultural transformation in India.

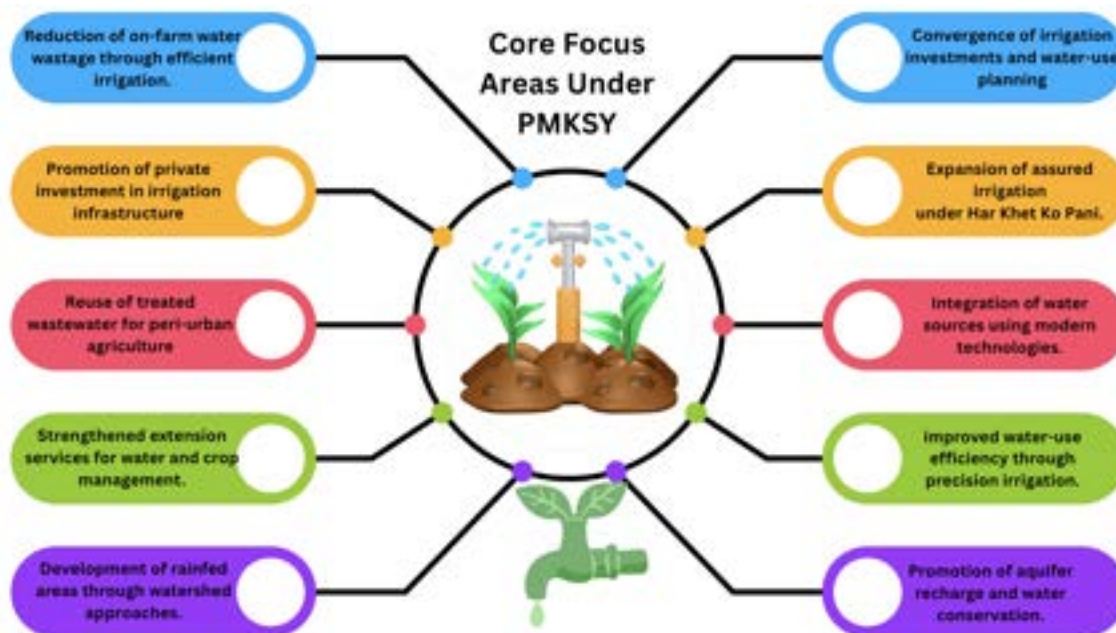
Components of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

- **Accelerated Irrigation Benefits Programme (AIBP):** Completion of major and medium irrigation projects.
- **Har Khet Ko Pani (HKKP):** Expanding irrigation coverage to every farm through surface and groundwater sources.
- **Per Drop More Crop (PDMC):** Promotes micro-irrigation (drip and sprinkler systems) for water-use efficiency.
- **Watershed Development (WDC-PMKSY):** Soil and water conservation, rainwater harvesting, and groundwater recharge in rainfed areas.
- **Command Area Development & Water Management (CADWM):** Improves water distribution and on-farm water management in irrigated command areas.



Impact and Significance of PMKSY

- **Increased Coverage:** Benefited over 27 million farmers and created/restored irrigation potential across 24.61 million hectares.
- **Micro-Irrigation:** It has brought ~ 110 lakh hectares under micro-irrigation (drip and sprinkler irrigation).
- **Yield Enhancement:** Led to increase in crop yields by 25–30% along with reduction in input costs such as fertilisers.
- **Environmental benefits:** Reduces water wastage, improves soil moisture and health, and bolsters climate-resilient farming practices.



Major Challenges in India's Irrigation System

- **Monsoon Dependence & Climate Change:** Erratic rainfall, frequent droughts/floods, and rising climate variability reduce water availability.
- **Poor Irrigation Infrastructure:** Ageing canals, silted reservoirs, leakages, and inadequate maintenance lead to water losses.
- **Groundwater Depletion:** Subsidized electricity and excessive groundwater extraction have caused declining water tables.
- **Low Adoption of Micro-Irrigation:** High upfront costs limit the use of drip and sprinkler systems, especially by small farmers.
- **Weak Water Governance:** Fragmented policy implementation, poor inter-agency coordination, and water pollution reduce irrigation efficiency.

Way Forward

- **Integrated Water Governance:** Strengthen Centre–State coordination and adopt Integrated Water Resources Management (IWRM).
- **Promote Micro-Irrigation:** Expand subsidies and incentives for drip and sprinkler irrigation, especially for small farmers.
- **Water Monitoring:** Develop a national water database for real-time monitoring and efficient water allocation.
- **Adopt Water-Smart Agriculture:** Promote rainwater harvesting, watershed development, zero tillage, and climate-resilient farming.

Conclusion: Ensuring 'Per Drop, More Crop' requires a shift from expanding irrigation to managing water sustainably. With efficient technologies, robust governance, and climate-resilient practices, India can secure both water security and agricultural productivity.

Test Your Knowledge

Prelims Corner	Mains Corner
Q. With reference to the tourism sector in India, consider the following statements: 1. Tourism is a labour-intensive sector with strong forward and backward linkages to several sectors of the economy. 2. Fragmented state-level regulations and multiple compliance requirements increase the cost of doing business in the tourism sector. 3. The NITI Aayog report recommends further tightening of environmental and Coastal Regulation Zone (CRZ) clearance procedures for tourism projects. Which of the statements given above are correct? (a) 1 and 2 only (b) 2 and 3 only (c) 1 and 3 only (d) 1, 2 and 3 Answer: (a)	Q. Tourism has the potential to become a major driver of employment, regional development and economic growth in India. Examine the key structural challenges confronting the tourism sector and suggest measures to unlock its full potential. GS Paper III Economy 15 Marks 250 Words

6. SUB-MISSION ON AGRICULTURAL MECHANISATION (SMAM)

Context: SMAM has expanded access to farm machinery and modern technologies for small farmers, women, disadvantaged groups, and North-Eastern States.

- Since inception, ₹9,404.47 crore has supported 21.61 lakh machines and 40,928 drone demonstrations across 40,918 hectares.

ABOUT SMAM & ITS KEY INITIATIVES

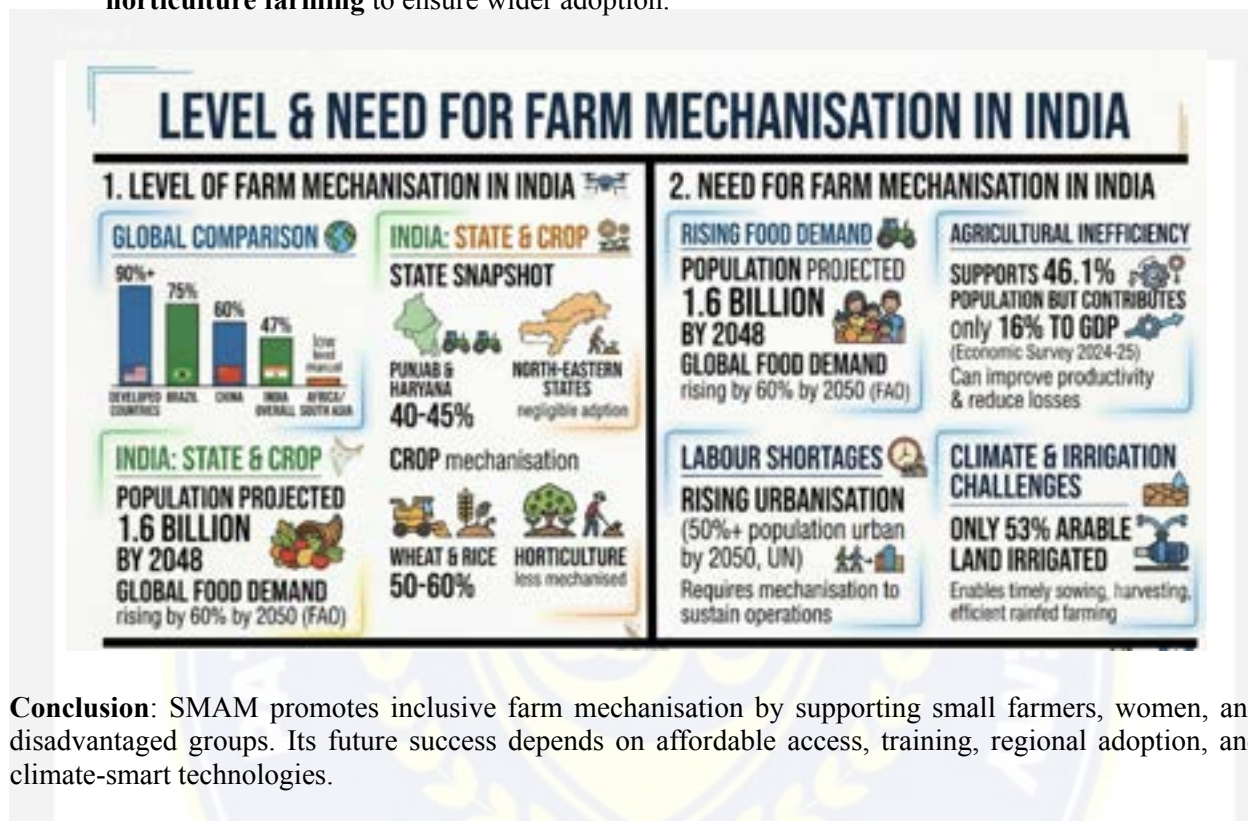
ABOUT SMAM LAUNCHED: 2014-15 MINISTRY: Ministry of Agriculture & Farmers' Welfare TYPE: Centrally Sponsored Scheme under Rashtriya Krishi Vikas Yojana (RKVY) DRONE TECHNOLOGY UNDER SMAM DRONE-BASED FARMING: Promotes agricultural drone adoption through field demonstrations and precision farming. SUPPORT: ₹52.5 crore allocated to ICAR for drone promotion. WOMEN FARMERS: 30% of SMAM funds earmarked to enhance women's access to farm machinery.	OBJECTIVES Promote farm mechanisation to enhance productivity and reduce cultivation costs. Follow 'reach the unreachable' approach supporting small & marginal farmers, women, SCs/STs, FPOs, SHGs, and rural entrepreneurs. DRONE FINANCIAL ASSISTANCE UP TO ₹10 LAKH/DRONE (100%): For ICAR institutes, KVKs, and State Agricultural Universities. 75% GRANT: For Farmer Producer Organisations (FPOs). ₹6,000/ha SUPPORT: For drone service providers.
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Core Pillars of SMAM

- **Mechanisation & Technology:** Training, testing, demonstrations, post-harvest mechanisation, storage, processing, value addition & crop-residue management.
- **Financial Support:** Direct Benefit Transfer (DBT) subsidy—**40%** (general), **50%** (SC/ST, small & marginal farmers, North-East); **₹2,000/ha** for mechanised services via **Custom Hiring Centres (CHCs)**, **Self-Help Groups (SHGs)** & **Farmer Producer Organisations (FPOs)**.
- **Custom Hiring:** **Farm Machinery Banks & CHCs** with **80–90%** assistance for SHGs, FPOs & institutions.
- **Hi-Tech Hubs:** Crop-specific advanced machinery hubs for efficient access to high-value equipment.
- **North-East Focus:** Up to **100%** subsidy for small machinery and **95%** assistance for **Farm Machinery Banks**.

Way Forward

- **Land Consolidation & Custom Hiring:** Promote land consolidation and strengthen **CHCs** to provide costly machinery to small farmers.
- **Technology & Finance:** Expand **subsidies, low-interest credit, tax incentives**, and farm machinery banks in low-mechanisation regions.
- **Research & Development and Capacity Building:** Encourage **farmers–industry collaboration**, machinery standardisation, quality testing, and training for effective use.
- **Inclusive Mechanisation:** Develop region-specific machinery for **hilly, rainfed, and horticulture farming** to ensure wider adoption.



Conclusion: SMAM promotes inclusive farm mechanisation by supporting small farmers, women, and disadvantaged groups. Its future success depends on affordable access, training, regional adoption, and climate-smart technologies.



Test Your Knowledge



Prelims Corner

Q1. With reference to the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), consider the following statements:

1. Per Drop More Crop (PDMC) promotes micro-irrigation to improve water-use efficiency.
2. Har Khet Ko Pani (HKKP) aims to expand irrigation coverage through both surface and groundwater sources.
3. Accelerated Irrigation Benefits Programme (AIBP) focuses on watershed development and rainwater harvesting in rainfed areas.

Which of the statements given above are correct?

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

Answer: (a)
Statement 3 is incorrect. Watershed development is undertaken under WDC-PMKSY, whereas AIBP focuses on completing major and medium irrigation projects.

Mains Corner

Q. Despite substantial investments in irrigation infrastructure, India continues to face challenges of groundwater depletion, inefficient water use and climate vulnerability. Critically analyse the limitations of the current irrigation ecosystem and suggest a roadmap for sustainable water governance.

GS Paper III | Agriculture & Environment | 15 Marks | 250 Words

7. EAC-PM REPORT ON UNCONDITIONAL CASH TRANSFER TO WOMEN

Context: EAC-PM assessed the socio-economic impact of cash transfer schemes for women from families with annual income below ₹2.5 lakh.

- **Majhi Ladki Bahin Yojana (Maharashtra):** ₹1,500/month (₹18,000/year) DBT for eligible women aged 21–65 years.
- **Subhadra Yojana (Odisha):** ₹10,000/year DBT in two installments for eligible women aged 21 to below 60 years.

Key Findings of the Report

- **Financial Security:** Women's savings rose **84% (Maharashtra)** and **45% (Odisha)**; monthly spending increased **46%** and **28%**, respectively.
- **Financial Autonomy:** Women gained greater control over spending (e.g., Odisha's Subhadra Yojana).
- **Financial Inclusion:** Direct bank transfers increased use of digital payments, especially UPI.
- **Better Spending:** Higher spending on **healthcare, education, and lifestyle**, improving overall welfare.

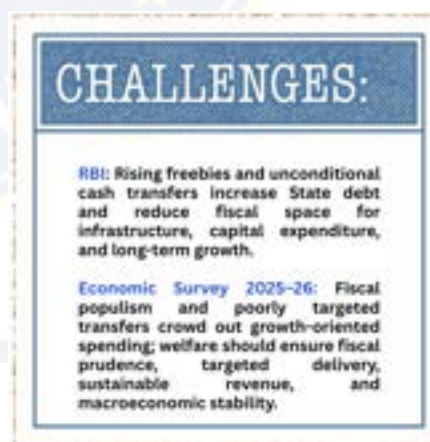
Associated Challenges

- **Fiscal Sustainability:** Large-scale unconditional transfers strain State finances and increase public debt.
- **Crowding Out:** Higher welfare spending may reduce investment in education, healthcare, infrastructure, and capital formation.
- **Targeting & Leakages:** Inclusion and exclusion errors can deny benefits to deserving beneficiaries.
- **Dependency:** Long-term unconditional transfers may discourage labour participation without livelihood support.
- **Inflation:** Rising prices erode the real value of transfers, requiring periodic revision.

Way Forward

- **Improve Targeting:** Use Aadhaar-enabled DBT, SECC data, and real-time verification to reduce leakages.
- **Cash-Plus Models:** Combine cash transfers with skill, financial and digital literacy, and livelihood support.
- **Revise Benefits Periodically:** Adjust transfers for inflation, household needs, and regional costs.
- **Balance Welfare & Fiscal Prudence:** Combine social protection with investment in education, healthcare, infrastructure, and jobs.
- **Strengthen Monitoring:** Regularly assess impacts on poverty, women's empowerment, financial inclusion, and human development.

Conclusion: Well-designed, targeted, and digitally delivered cash transfers enhance women's economic security, household welfare, and financial inclusion. Their long-term success requires fiscal sustainability and integration with capacity-building and livelihood support.

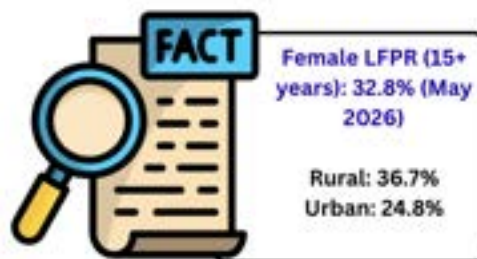


8. FEMALE LABOUR FORCE PARTICIPATION RATE

Context: EAC-PM highlighted weak labour demand, rather than social norms, as a key barrier to women's workforce participation.

Recent Government Measures to Increase Female LFPR

- Mission Shakti:** Integrated scheme for women's safety, security, and empowerment.
- Skill Development Initiatives:** Schemes like PMKVY and women-focused skilling programmes to improve employability.
- Women Entrepreneurship Support:** Mudra Yojana, Stand-Up India, Startup India, Lakhpati Didi, Namo Drone Didi promote self-employment and income generation.
- Maternity & Workplace Support:** Labour reforms provide 26 weeks paid maternity leave, crèche facilities, equal pay provisions, and safer workplaces.
- Employment Generation Programmes:** VBGRAMG, Deendayal Antyodaya Yojana - National Rural Livelihoods Mission, and Prime Minister's Employment Generation Programme (PMEGP) expand livelihood opportunities for women, especially in rural areas.
- Women in STEM (Science, Technology, Engineering, and Mathematics):** Initiatives like WISE-KIRAN and SERB-POWER encourage women's participation in science and research.



Conclusion: Enhancing women's workforce participation requires moving beyond welfare measures towards gender-inclusive economic growth through quality jobs, supportive ecosystems, and social transformation.

Test Your Knowledge

Prelims Corner

With reference to the Female Labour Force Participation Rate (FLFPR) in India, consider the following statements:

1. Female Labour Force Participation Rate includes women who are either employed or actively seeking employment.
2. An increase in women's educational attainment may temporarily reduce FLFPR if many women remain in education instead of entering the labour market.
3. A decline in the unemployment rate necessarily implies an increase in Female Labour Force Participation Rate.

Which of the statements given above is/are correct?

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

Answer: (a)
Explanation: Unemployment is calculated only for the labour force. Women leaving the labour force altogether may reduce unemployment without increasing FLFPR.

Mains Corner

Increasing the Female Labour Force Participation Rate (FLFPR) is essential for achieving inclusive growth and a Viksit Bharat. Discuss the key policy interventions required to achieve this objective.

GS Paper III | 10 Marks | 150 Words

9. PM FORMALISATION OF MICRO FOOD PROCESSING ENTERPRISES (PMFME) SCHEME

Context: PM Formalisation of Micro Food Processing Enterprises (PMFME) Scheme Nearly 90% beneficiaries are first-generation entrepreneurs, 44% are women, and 75,000+ enterprises have been formalised through Udyam, FSSAI and GST registrations.

Growth Enablers

- **Lifestyle Changes:** Young population, rising incomes, urbanisation & busy lifestyles boost ready-to-eat/processed food demand.
- **Abundant Raw Materials:** 1st in milk, banana, mango & ginger; 2nd in rice, wheat, fruits & vegetables.
- **Technology:** Supply-chain digitalisation and Agri-tech (AI, satellites) improve efficiency and farm-to-fork integration.
- **Market Access:** Online delivery, organised retail and 11.74% CAGR in processed food exports (US\$16.2 bn).
- **Cost & Labour Advantage:** ~40% lower production costs and abundant low-cost labour.
- **Investments:** PLI Scheme and 100% FDI (automatic route) attract major investments (e.g., Nestlé).

CURRENT STATUS	
1	VALUED AT US\$336.4 BILLION IN 2023; PROJECTED TO REACH US\$735.5 BILLION BY 2032 AT A CAGR OF 8.8%.
2	RECORDED AN AVERAGE ANNUAL GROWTH OF 3.9% DURING 2013-14 TO 2023-24.
3	INDIA HAS THE WORLD'S 6 TH LARGEST FOOD PROCESSING INDUSTRY; RANKS 2 ND IN FRUIT & VEGETABLE PRODUCTION AND 1 ST IN DAIRY PRODUCTION.
4	CONTRIBUTES ABOUT 9% TO AGRICULTURAL GVA AND 23% TO INDIA'S EXPORTS.
5	SUPPORTS OVER 7 MILLION JOBS DIRECTLY AND INDIRECTLY ACROSS THE VALUE CHAIN.

Role in Grassroots Transformation

- **Empowering Micro-Entrepreneurs:** PMFME sanctioned 1.41 lakh+ loans, benefiting 3.3 lakh+ SHG members and promoting local food enterprises.
- **Skill & Startup Support:** Trained 1 lakh+ people and approved 75 incubation centres to support food startups and regional brands.
- **Rural Livelihoods:** Kisan SAMPADA supported 1,600+ projects, creating 7.6 lakh+ jobs and benefiting 53 lakh+ farmers.
- **PLI Impact:** Attracted ₹8,900 crore investment, generated 3.3 lakh+ jobs, and added 67 lakh MT processing capacity.

Challenges

- **Fragmented Supply Chain:** With 86% small/marginal farmers, aggregation is difficult; farmers receive only 30–35% of value vs 65–70% in developed countries.

- **Infrastructure Gaps:** Weak cold-chain infrastructure causes **₹92,651 crore** annual losses; **25–30%** of fruits and vegetables are lost post-harvest.
- **Regulatory Complexity:** Multiple regulators and no single-window clearance increase compliance costs, especially for MSMEs.
- **Skill Gap:** Only **3%** of the workforce is formally trained, affecting quality, innovation, and food safety.
- **Finance Constraints:** Limited credit access restricts MSMEs from adopting technology and expanding.
- **Quality & Export Issues:** Inconsistent quality causes export rejections; **527** Indian food products were flagged by the EU (2020–24), hurting India's reputation.

Way Forward

- **Cluster-Based Development:** Build food clusters near farms with shared cold chains, labs, and logistics to reduce costs by 25–30%.
- **Tech-Driven Supply Chains:** Use blockchain, IoT, AI, and the **Drone Didi Scheme** for traceability, crop forecasting, and quality control.
- **Regulatory Reforms:** Introduce a single-window clearance system to reduce approval time from **6–8 months** to **2–3 months** while ensuring compliance.
- **Boost R&D:** Establish Food Innovation Labs, provide R&D tax incentives, and modernise traditional food technologies.
- **Strengthen Exports:** Develop export-oriented zones with plug-and-play infrastructure, market intelligence, and customised packaging.

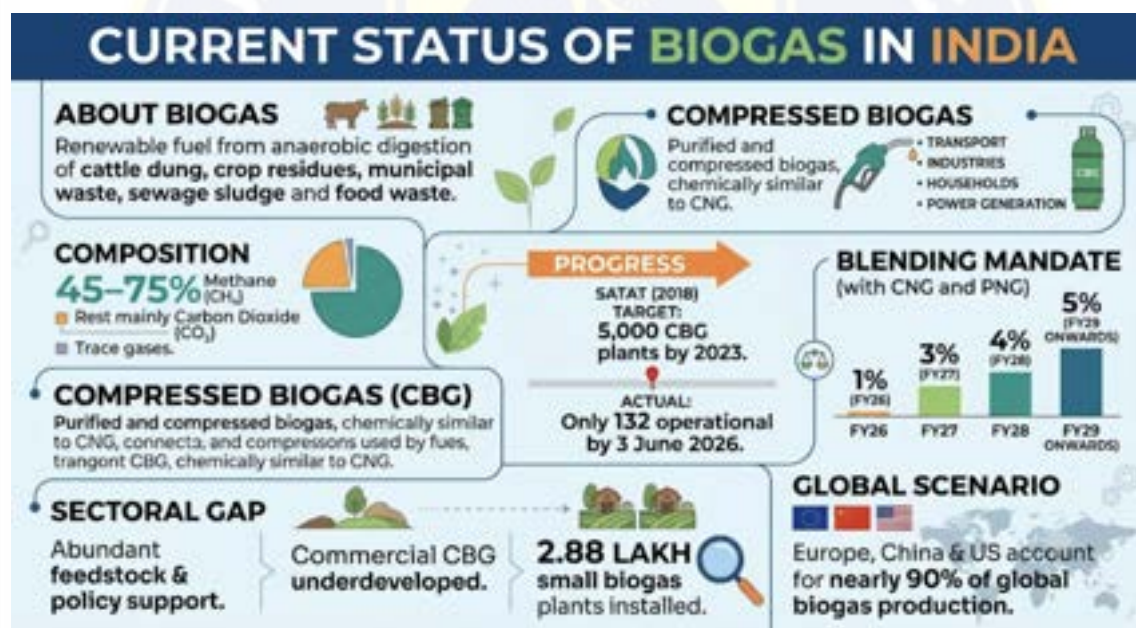


Conclusion: A strong food processing ecosystem can make India a global food processing hub, driving rural prosperity, exports, and sustainable growth.

Test Your Knowledge	
Prelims Corner Q. Which of the following factors strengthen India's comparative advantage in the food processing sector? 1. Abundant agricultural raw materials. 2. Low-cost production and labour. 3. 100% FDI under the automatic route. 4. Expansion of organised retail and digital food delivery platforms. Select the correct answer using the code below: (a) 1 and 2 only (b) 1, 2 and 4 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (d)	Mains Corner Q. Despite its significant potential, India's food processing sector continues to face structural bottlenecks. Discuss the major challenges confronting the sector and suggest measures to transform India into a global food processing hub. GS Paper III 15 Marks 250 Words

10. BIOGAS FOR INDIA'S ENERGY SECURITY

Context: Rising **West Asia** tensions have exposed India's energy vulnerability, as it imports ~85% of crude oil and a significant share of LPG through the **Strait of Hormuz**, highlighting the need for **Compressed Biogas (CBG)**.



Challenges in CBG Adoption

- **High Costs & Limited Scale:** CBG projects need high capital investment. Despite 87 bcm/year potential, India's capacity is <1% (IEA).
- **Credit & Market Risks:** Financing is constrained by uncertain plant performance, gas offtake, CBG pricing and weak **Fermented Organic Manure** demand.
- **Feedstock Challenges:** Seasonal, scattered biomass, land constraints and poor inventories raise costs.
- **Infrastructure Gaps:** Limited pipelines, storage, transport and gas injection points restrict CBG distribution.
- **Policy Fragmentation:** Multiple schemes (SATAT, GOBARdhan, CBG blending) cause overlap, delays and weak monitoring.
- **Food & Land Concerns:** Energy crops may compete with food production.

Way Forward

- **Enhance Financial Support:** Provide viability gap funding, interest subsidies, accelerated depreciation and tax incentives. **Indian Biogas Association (IBA)** has proposed **₹10,000 crore** capital subsidy fund.
- **Improve Credit & Market Access:** Promote green finance, partial credit guarantees and priority-sector lending; ensure stable pricing and assured offtake. **IBA** proposes mandatory **FOM** blending from **1% (2026–27)** to **10% by 2030**.
- **Develop Supply Chains:** Promote farmer cooperatives, aggregation centres, municipal contracts, long-term feedstock agreements, biomass inventories and digital tracking.
- **Expand Infrastructure:** Build common pipelines, local injection points and transport networks; fast-track funding and long-term offtake agreements.
- **Adopt a Unified Mission:** Create a Unified National Biogas Mission with single-window clearances, common standards, centralised monitoring and time-bound approvals.
- **Prioritise Waste Feedstock:** Focus on cattle dung, sewage, press mud, food and municipal waste, and crop residues; emulate Denmark's waste-based biogas model.



Conclusion: CBG can strengthen India's energy security, circular economy, and sustainable development goals by converting waste into wealth. A mission-mode approach with green financing, robust supply chains, and policy convergence can make biogas a pillar of Atmanirbhar energy transition.

10.1 INDIA AS A LEADING BIOECONOMY POWERHOUSE

Context: NITI Aayog launched the **Roadmap for Building India as a Leading Bioeconomy Powerhouse by 2035**, targeting a **\$2.6 trillion** bioeconomy by 2047.

Key Challenges

- **Regulatory Delays:** Multiple approvals extend clearances to about 900 days, compared to 500 days in peer countries.
- **Funding Gap:** Weak **Series A/B** funding limits commercialisation of deep-tech innovations.
- **Talent Shortage:** Only **259 biotech researchers per million** and **25.6% STEM enrolment** constrain skilled manpower.



- **Import Dependence:** Heavy reliance on imported **enzymes, CRISPR kits and bioprocessing reagents** raises costs and weakens supply-chain resilience.
- **Fragmented Data:** Disconnected **genomic, clinical and hospital databases** hinder AI-driven diagnostics and precision medicine.
- **Patent Uncertainty:** Ambiguity over **imported and GM microbes** under the **Patents Act** discourages investment and technology transfer.

Key Recommendations by NITI Aayog

- **BioEconomy Growth Fund:** Create a ₹50,000 crore fund under ANRF/RDI to provide blended finance and viability gap funding for mid- and late-stage biotech ventures.
- **Regulatory Sandbox:** Introduce a **time-bound approval pathway** for **cell therapies, synthetic biology and AI-designed drugs**.
- **Robotic Biofoundries:** Expand automated **Design-Build-Test-Learn (DBTL)** hubs to accelerate biotech prototyping without IP restrictions.
- **National BioMissions:** Merge fragmented schemes into **six mission-mode programmes** (e.g., **GeneIndia, AgriBio 2.0**) with **10-year roadmaps**.
- **Cross-Sector Governance:** Establish bodies such as the **National BioData Council** and an **Empowered Committee** to standardise data and coordinate national assets.
- **Talent Development:** Expand **global-standard research fellowships** and **postdoctoral entrepreneurship programmes** to strengthen biotech talent.

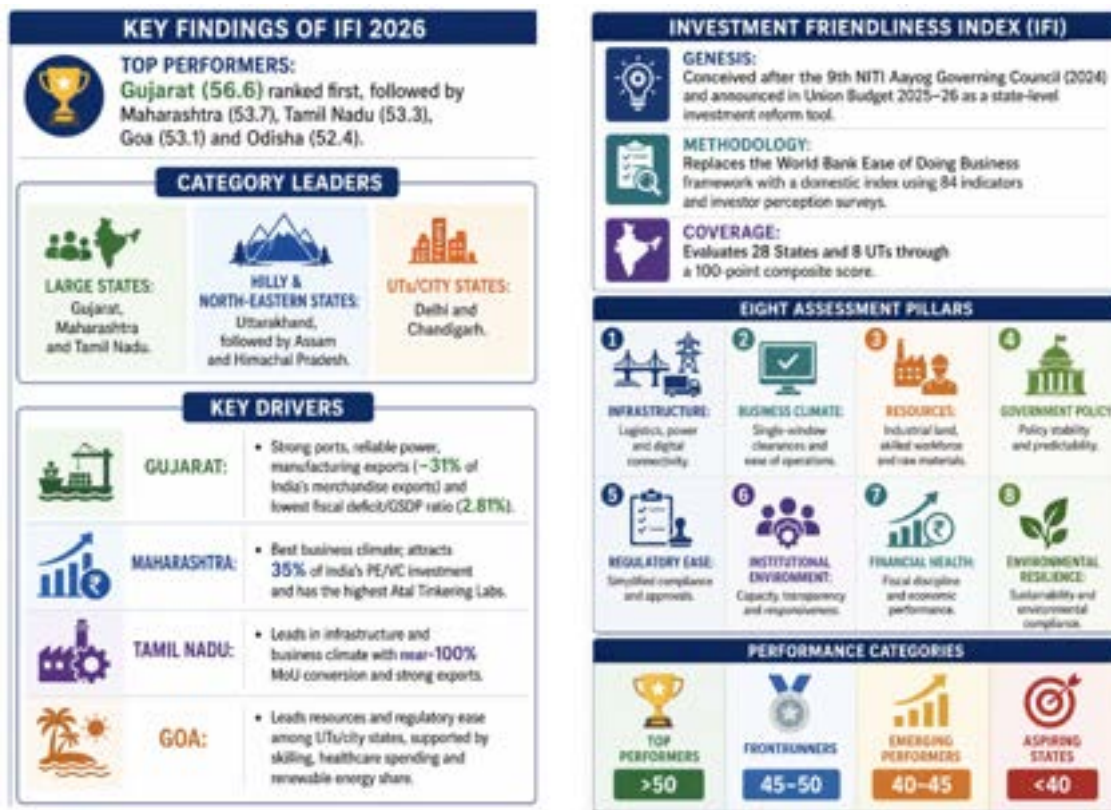
Test Your Knowledge	
Prelims Corner Q2. Which of the following would directly strengthen India's Compressed Biogas (CBG) ecosystem? 1. Assured offtake and stable pricing of CBG. 2. Biomass aggregation centres and digital feedstock tracking. 3. Expansion of gas pipelines and local injection points. 4. Viability Gap Funding and partial credit guarantees. Select the correct answer using the code below: (a) 1 and 2 only (b) 2, 3 and 4 only (c) 1, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (d)	Mains Corner Building a globally competitive bioeconomy requires more than scientific research; it demands robust financing, regulatory reforms and institutional coordination. Discuss in the context of India's bioeconomy ambitions. GS Paper III 15 Marks 250 Words

11. INVESTMENT FRIENDLINESS INDEX (IFI) 2026

Context: NITI Aayog released the first Investment Friendliness Index (IFI) 2026 to assess States' and Union Territories' ability to attract, facilitate and sustain domestic and foreign investment.

Challenges in Attracting Investments Across States

- **Investor Bottlenecks:** Delayed approvals, land acquisition issues and skilled labour shortages hinder manufacturing investment.
- **Regional FDI Concentration:** Top 5 states (**Maharashtra, Karnataka, Gujarat, Delhi, Tamil Nadu**) receive **~85% FDI**; score gap between Gujarat (**56.6**) and Lakshadweep (**24.5**) exceeds **32 points**.
- **Beyond Incentives:** Sustainable investment needs regulatory stability, transparency and policy predictability.
- **Reform Gaps:** No state crossed **60/100**; Gujarat's top score (**56.6**) shows further scope.
- **Skill Shortage:** Talent gaps and migration affect J&K, Chhattisgarh, Rajasthan, Tripura, Nagaland and Uttar Pradesh.
- **Weak Single Window:** Implementation gaps limit digital clearances, especially in J&K.
- **Fiscal Stress:** Bihar's liabilities/GSDP exceed national average; J&K faces high fiscal deficit (**~9% GSDP**) and interest burden.



Measures to Improve Investment Competitiveness

- **Land & Labour Reforms:** Simplify land allotment, improve labour flexibility and strengthen industry-oriented skilling through **Skill India** and **PMKVY**.
- **Effective Single Window:** Fully integrate approvals under **NSWS**, remove manual processes and reduce clearances to **30–60 days**.
- **Targeted Industrial Policies:** Promote sector-specific incentives through **PLI** and state models like Gujarat Semiconductor Policy and Tamil Nadu EV Policy.
- **Infrastructure-Led Growth:** Expand industrial ecosystems through **PM Gati Shakti**, **NICDP**, **GIFT City**, **Samruddhi Corridor** and **Chennai–Bengaluru Industrial Corridor**.
- **Improve Business Climate:** Reduce compliance burden, simplify regulations and align skills with industry needs.
- **Fiscal Strengthening:** Manage debt, diversify revenues and create fiscal space for infrastructure investment.
- **Close Infrastructure Gaps:** Improve power reliability (**Revamped Distribution Sector Scheme**), digital connectivity (**BharatNet**) and logistics through **PM Gati Shakti**.

Conclusion: The Investment Friendliness Index can drive continuous reforms, advancing **Ease of Doing Business** and **Minimum Government, Maximum Governance**.

12. DIGITAL THREAT REPORT 2025–26

Context: MeitY, with **CERT-In**, **CSIRT-Fin** and **SISA**, released the **2nd edition** of the report for India's **BFSI** and **digital payments ecosystem** to strengthen cyber resilience.

Key Highlights

- **AI Asymmetry:** Gap between AI-enabled attack speed and organisations' detection, response and regulation; enables sophisticated attacks by low-resource actors.
- **Faster Threat Evolution:** Cyber threats now evolve in **months/weeks** instead of years.
- **Changing Attack Patterns:** Shift from traditional intrusions to social engineering, credential theft, supply-chain attacks, cloud exploitation, AI fraud and session misuse.

- **Cyber Failure Framework:** Four-layer **Gap Archetype Framework** identifies interconnected vulnerabilities and guides cybersecurity investments.
- **18-Month Roadmap:** Strengthen security controls, continuous risk assessment, coordinated incident response, information sharing and infrastructure resilience.

Major Recommendations

- Shift from periodic audits to **continuous cyber risk assessment**.
- Strengthen **threat intelligence sharing, DFIR, cloud security and supply-chain resilience**.
- Adopt **AI-based cyber defence** and improve coordination among regulators, financial institutions and cybersecurity agencies.

13. SKILLING FRAMEWORK IN INDIA

Context: 15th July Is Celebrated As The Skill India Mission Anniversary And Worldyouth Skill Day.

Need of Skill Development in India

- **Demographic Dividend:** Over **54%** of Indians are below **25 years** and **62%** are in the **15–59** age group. With this advantage lasting till **2040**, skilling is key to a productive workforce.
- **Economic Growth:** Skills improve employability, productivity and entrepreneurship, reducing poverty, creating jobs and driving inclusive growth.
- **Future-ready Workforce:** Rapid technological and economic changes demand skills in **AI, automation, digitalisation, green jobs, climate action** and **advanced manufacturing**, making upskilling and reskilling essential.
- **AI Preparedness:** India scored **49.3** in the **IMF AI Preparedness Index**, above the **42.1** emerging economy average, reflecting strong AI readiness.
- **Global Talent Hub:** India may have a surplus of **45 million skilled professionals by 2030** against a global shortage of **85 million**, creating major export opportunities.

Major Upskilling & Re-Skilling Initiatives in India

- **Skill India Mission (2015):** NSQF-aligned skilling, upskilling and reskilling through Skill India Digital Hub, Skill Development Centres and Rozgar Melas; implemented via PMKVY, JSS, NAPS and CTS.
- **PM-SETU (2025):** Upgrades 1,000 Government ITIs via 200 Hub–800 Spoke model; targets training 20 lakh youth in five years.
- **FutureSkills Pillar (IndiaAI Mission):** Develops AI talent through fellowships, AI education, 570 AI & Data Labs, and hands-on learning in Tier-2/3 cities.
- **PM Viksit Bharat Rozgar Yojana (2025):** Incentives up to ₹15,000 for first-time EPFO employees and ₹3,000/month for employers; 15 lakh jobs supported (June 2026).

Conclusion: A future-ready skilling ecosystem can harness the demographic dividend and strengthen India's knowledge economy



Lifecycle of Major Skill Building Initiatives from an Early Age in India



SKILLING INITIATIVES IN UNION BUDGET 2026-27

- 1. SPORTS**
Kheho India Mission to strengthen talent identification, coach development, and sports science & technology.
- 2. TOURISM**
10,000 tourist guides to be trained through a 12-week hybrid programme.
- 3. CARE ECONOMY**
NSQF-aligned training for 1.5 lakh multi-skilled caregivers in geriatric and allied care.
- 4. EDUCATION & DESIGN**
3 All India Institutes of Ayurveda and a National Institute of Design in eastern India to expand specialised skilling.
- 5. AVGC**
Content Creator Labs in 15,000 schools and 500 colleges to promote Animation, Visual Effects, Gaming & Comics.
- 6. UNIVERSITY TOWNSHIPS**
5 townships near industrial and logistics corridors integrating education, research, skilling and housing.

Investing in people, skills and innovation for a developed and future-ready India.

Women-Centric Skilling Initiatives

AI Careers for Women (2025): 320-hour AI training for rural undergraduate women

Women in AI: 25 AI Centres of Excellence (hub-and-spoke) promote women's participation in AI and emerging technologies.

Swavalambini (2025): MSDE-NITI Aayog initiative to build women's entrepreneurship through awareness and development programmes

NAVYA (2025): MSDE-MWCD scheme for girls (16-18 years) in aspirational districts.

Skills: Digital marketing, cybersecurity, AI-enabled services, green jobs, plus life skills, financial & digital literacy.

Test Your Knowledge

Prelims Corner

Q. With reference to the Skill India ecosystem, consider the following statements:

1. The Skill India Mission seeks to promote skilling, upskilling and reskilling through initiatives aligned with the National Skills Qualifications Framework (NSQF).
2. PM-SETU aims to upgrade Government Industrial Training Institutes (ITIs) through a Hub-and-Spoke model.
3. FutureSkills Prime is an initiative of NITI Aayog to promote AI education in schools.
4. PM Viksit Bharat Rozgar Yojana provides incentives to both first-time EPFO employees and employers.

Which of the statements given above are correct?

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

Answer: (a) FutureSkills Prime is a NASSCOM-MeitY initiative, not a NITI Aayog programme.

Mains Corner

Q. India's demographic dividend can become a demographic liability without an effective skilling ecosystem. Examine the need for a future-ready skill development framework in India. Evaluate the role of recent government initiatives in this regard.

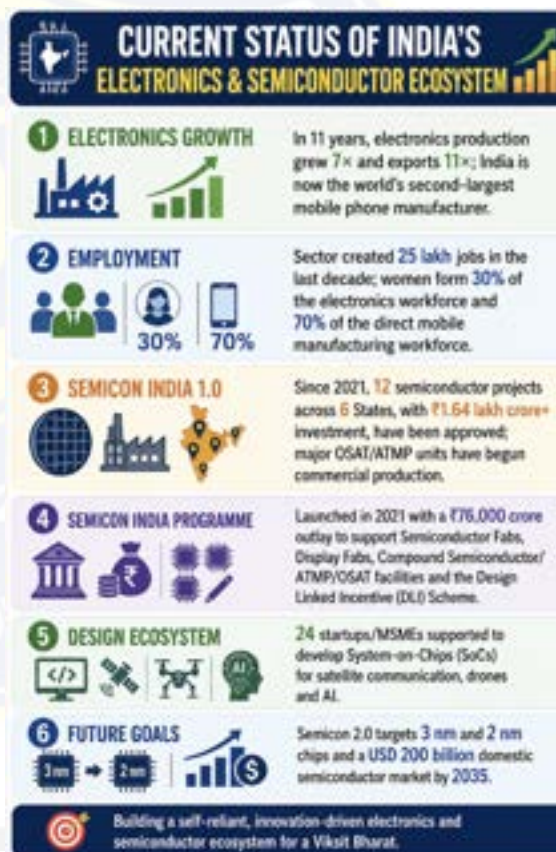
GS Paper III | 15 Marks | 250 Words

14. SEMICON 2.0 (INDIA SEMICONDUCTOR MISSION 2.0)

- **Context:** The Union Cabinet approved **Semicon 2.0** with an **outlay of ₹1,27,500 crore** to build a self-reliant semiconductor ecosystem, focusing on domestic value addition, indigenous IP and technological autonomy.
- **Fiscal Support:** **Silicon Fabs:** 40% of CapEx support. || **Compound/Display Fabs & Advanced Packaging:** 35%. || **Assembly, Testing, Marking, and Packaging/ Outsourced Semiconductor Assembly and Testing (ATMP/OSAT):** 25%.

Six Strategic Pillars

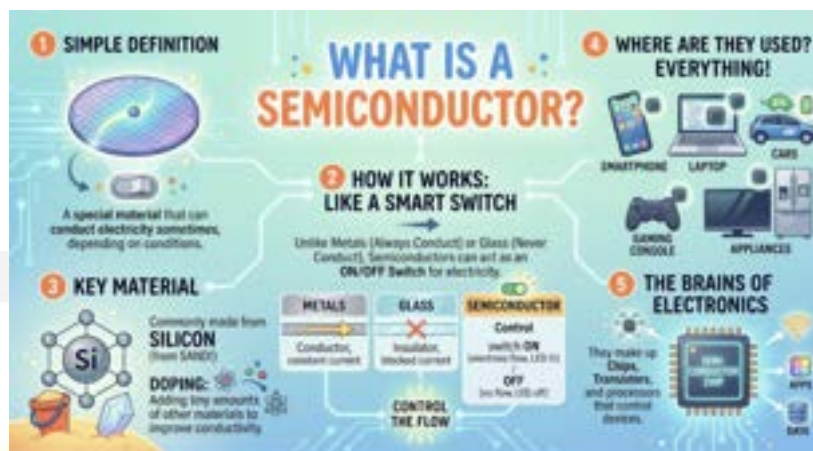
- **Semiconductor Design:** Support start-ups/MSMEs and develop indigenous chip designs.
- **Machines & Materials:** Promote domestic semiconductor equipment, materials, chemicals and gases.
- **Fabrication:** Encourage silicon, compound and display fabs; first commercial fab targeted by 2028.
- **ATMP/OSAT:** Expand assembly, testing and packaging capabilities.
- **R&D:** Promote advanced technologies beyond mature nodes towards sub-10 nm chips.
- **Talent Development:** Build semiconductor skills through university training, **Electronic Design Automation** tools and cleanroom training.



Need for a Comprehensive Semiconductor Ecosystem in India

- **Strategic Autonomy:** The US–China chip rivalry underscores semiconductors as strategic assets; capabilities across design, fabrication, packaging and materials reduce external dependence.
- **National Security:** Indigenous chips reduce hardware trojan and supply-chain risks in defence, ISRO, power grids, telecom and other **Critical Information Infrastructure (CII)**.

- **Economic Competitiveness:** Domestic chip manufacturing reduces electronics imports, eases the **Current Account Deficit (CAD)** and creates higher value through design and fabrication.
- **Industrial Growth:** Supports EVs, consumer electronics, 5G/6G, AI, medical devices, industrial automation and aerospace, strengthening manufacturing and the **PLI** ecosystem.
- **Technological Leadership:** Despite ~20% of global chip design talent, India lacks advanced manufacturing; a full ecosystem supports AI, **Quantum Computing**, **Internet of Things (IoT)** and **High-Performance Computing (HPC)**.
- **Resilient Supply Chains:** Localising equipment, specialty chemicals, industrial gases and critical minerals reduces dependence on global supply chains, especially China.
- **Technology Diplomacy:** Strengthens partnerships under **India-US iCET (Initiative on Critical and Emerging Technology)**, **Quad**, and collaborations with Japan, the Netherlands, Germany, Singapore and the EU, enhancing India's role in global tech governance.



Conclusion: A design-led, innovation-driven and resilient semiconductor ecosystem, supported by strategic partnerships, indigenous capabilities and skilled talent, can strengthen Atmanirbhar Bharat, enhance technological sovereignty and position India as a trusted global semiconductor hub.

Test Your Knowledge

Prelims Corner

Q. With reference to Semicon 2.0 (India Semiconductor Mission 2.0), consider the following statements:

1. The scheme provides 40% fiscal support for establishing silicon semiconductor fabrication units.
2. Fiscal support for ATMP/QSAT facilities is lower than that for compound semiconductor and display fabrication units.
3. The mission seeks to promote indigenous capabilities across semiconductor design, fabrication, packaging and research.
4. The scheme exclusively supports semiconductor manufacturing and does not provide assistance for semiconductor design.

Which of the statements given above are correct?

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

Answer: (a)
Explanation: Semicon 2.0 explicitly supports chip design, startups, MSMEs, R&D and talent development. Hence Statement 4 is incorrect.

Mains Corner

Q. Semiconductors have emerged as the foundation of technological sovereignty in the 21st century. Discuss the significance of Semicon 2.0 in building a resilient semiconductor ecosystem in India. What challenges must India overcome to become a global semiconductor hub?

GS Paper III | 15 Marks | 250 Words

15. POINTERS FOR PRELIMS

15.1. INSURANCE SURETY BONDS (ISBS)

- **Coal Blocks Allocation (Amendment) Rules, 2026** allow **Insurance Surety Bonds (ISBs)** in place of **Performance Bank Guarantees (PBGs)** for coal blocks under the **Mines and Minerals (Development and Regulation) Act, 1957**; proposed to extend to blocks

under the **Coal Mines (Special Provisions) Act, 2015**.

ISBs vs PBGs

- **Insurance Surety Bonds (ISBs):** Insurance company guarantees compensation to the government if the contractor/allocattee defaults.

- **Performance Bank Guarantees (PBGs):** Bank guarantees contractual performance; on default, the government recovers the guaranteed amount from the bank.

15.2. FINANCIAL STABILITY REPORT

- **RBI released the June 2026** edition
- The report reaffirms the resilience of India's financial system, with banks and NBFCs remaining strong due to robust capital, liquidity, profitability, low NPAs, and healthy credit growth.
- It's a **half-yearly report** published by the RBI since 2010.
- Prepared by: **RBI's Financial Stability Unit** under the guidance of the Financial Stability and Development Council (FSDC).

15.3. UPI

Context: Greece becomes the latest country to join the digital payment network of UPI.

- UPI is live in eight other countries also, including the UAE, Singapore, Bhutan, Nepal, Sri Lanka, France, Mauritius and Qatar.

15.4. CONTAINER MANUFACTURING PROMOTION SCHEME (CMPS)

- **Genesis:** Announced in the **Union Budget 2026** with an outlay of **₹10,000 crore**.
- **Aim:** Build a **globally competitive container manufacturing ecosystem** through financial incentives for new and expanded manufacturing units.
- **Nodal Ministry:** **Ministry of Ports, Shipping and Waterways**.
- **Recent Development:** India unveiled its **first indigenously manufactured EXIM shipping container** for **A.P. Moller-Maersk**, marking the scheme's implementation.

15.5. BATTERY MANAGEMENT SYSTEM (BMS)

- **About:** A **BMS monitors and manages battery performance**, ensuring uniform functioning of individual cells and improving efficiency.
- **Role in EVs:** Used in **lithium-ion battery-powered EVs** to extend **battery life** and ensure **safe operation**.

- **Largest Market:** The **automotive sector** accounts for **about 50%** of the BMS market.
- **Connectivity:** Many BMS units support **Bluetooth**, enabling battery monitoring through **smartphone apps**.
- **Recent Issue:** The Centre ordered the removal of certain **BMS-linked apps** after reports they were used to **remotely disable some e-rickshaws**.

15.6. MARITIME DEVELOPMENT FUND (MDF)

- **Established:** **September 2025** with a **₹25,000 crore corpus** to meet the maritime sector's long-term financing needs.
- **Components:** (1) **Maritime Investment Fund – ₹20,000 crore: 49% funded by the Government**, with the rest from institutional, public sector, and private investors. (2) **Interest Incentivization Fund – ₹5,000 crore: Fully funded by the Government of India** to support interest incentives.

15.7. WORLD BANK INCOME CLASSIFICATION

- **Basis:** Classifies countries by **GNI per capita (US\$)** using the **Atlas Methodology**.
- **Income Categories:**
 - **Low Income:** $\leq$ US\$1,175
 - **Lower-Middle Income:** US\$1,176–4,635
 - **Upper-Middle Income:** US\$4,636–14,375
 - **High Income:** $>$ US\$14,375
- The **World Bank** revises classifications **annually on 1 July** based on the previous year's data.
- **Current Status:** **India remains a Lower-Middle-Income economy**, while **Vietnam, Sri Lanka, the Philippines, Jordan, and Micronesia** have been upgraded to **Upper-Middle-Income** status.

15.8. DIRECT-SEEDED RICE (DSR)

- **About:** A **water- and labour-saving rice cultivation method** where **seeds are sown directly** in the field, eliminating nursery raising and transplanting.
- **Methods:** Practised through **dry, wet, or water seeding** using **broadcasting or seed drills**.

- **Benefits:** Reduces water use, cultivation cost, and methane emissions, while enabling timely sowing.
- **Note:** System of Rice Intensification (SRI) uses young seedlings, wider spacing, and intermittent irrigation to improve yields with less water.

15.9. GLOBAL PASSPORT INDEX (GPI)

- **About:** Measures how effectively a passport enables global mobility, investment, security, and quality of life.
- **Published by:** Global Citizen Solutions.
- **Coverage:** Assesses 200 countries.
- **Methodology:** Based on 3 pillars—Mobility, Investment Potential, and Quality of Life—using 15 indicators.
- **Recent Update:** India ranked 125th, down one place from last year.

15.10. LEGAL METROLOGY ACT, 2009

- Government amended the Legal Metrology (General) Rules, 2011 to reduce compliance burden, verification costs, and improve Ease of Doing Business.
- **Objective:** Standardise and enforce weights & measures and regulate their trade.
- **Rules under the Act**
 - **Legal Metrology (General) Rules, 2011:** Regulate design, permissible errors, calibration & stamping of measuring instruments.
 - **Legal Metrology (Packaged Commodities) Rules, 2011:** Mandate package declarations such as Country of Origin, Net Quantity & MRP.

15.11. CAFE NORMS

- The government proposed a **credit trading mechanism** under CAFE norms, allowing manufacturers to trade surplus compliance credits.
- **CAFE (Corporate Average Fuel Efficiency):** Sets fuel-efficiency targets for automobile manufacturers.
- **Implemented by:** Ministry of Power under the **Energy Conservation Act, 2001**.

- **CAFE-III:** Applicable for 2027–2032.

15.12. INDIA'S TOY INDUSTRY

- **17th Toy Biz International B2B Expo, New Delhi** highlighted India's growing toy manufacturing ecosystem.
- **Growth Drivers:** Favourable demographics, e-commerce growth & demand for STEM/educational toys.
- **Exports & Employment:** Exports rose 151.9% to \$384.7M (FY26) with \$152M trade surplus; formal jobs increased from 8,685 (FY19) to 17,693 (FY24).
- **Government Initiatives:** National Action Plan for Toys (2020), Quality Control Orders (QCOs).
- **Heritage Toys:** GI tags & ODOP promote traditional toys like Channapatna toys (Karnataka), leather toys (Madhya Pradesh), Thanjavur dolls (Tamil Nadu).

15.13. PM-SETU

- Centre approved nationwide rollout of **Pradhan Mantri Skilling and Employability Transformation through Upgraded ITIs (PM-SETU)**.
- **Launched by:** Ministry of Skill Development & Entrepreneurship (MSDE) in 2025.
- **Objective:** Transform ITIs into **modern, industry-driven skill institutions** for emerging jobs.
- Upgrade 1,000 Government ITIs (200 Hubs + 800 Spokes) under **Hub-and-Spoke model**. Set up SPVs with industry partnerships for cluster management.
- **Performance-linked funding** with ADB & World Bank co-financing.

15.14. PORT FOR IMPORT OF DRUGS

- **Recent:** Navi Mumbai Airport notified as a **Port for Import of Drugs** under the **Drugs and Cosmetics Act, 1940**.
- **Drugs and Cosmetics Act, 1940:** Regulates the **import, manufacture, distribution, and sale** of drugs; with this, total notified **ports of entry (road/rail/sea/air)** rise to 42.
- **Significance:** Strengthens pharma import logistics, enables faster consignments, reduces load on existing ports, and supports **Ease of Doing**

Business while ensuring regulatory oversight.

15.15. NATIONAL PROGRAMME FOR ISSUANCE OF LETTERS OF AUTHORISATION (LOA) FOR SUSTAINABLE HARNESSING OF FISHERIES IN THE HIGH SEAS

- **Objective:** Operationalises Union Budget 2025–26 announcement for sustainable utilisation of resources in India's Exclusive Economic Zone (EEZ) and High Seas (waters beyond the EEZ, i.e. 200 nautical miles).
- **LoA:** Mandatory, vessel-specific, non-transferable authorisation for Indian-flagged vessels to fish in the high seas; valid for **3 years** under the **Guidelines for Sustainable Harnessing of Fisheries in the High Seas by Indian-Flagged Fishing Vessels, 2025**.
- **Key Features:** Integrated with ReALCraft portal for digital processing | Priority to fisheries cooperatives, **Fish Farmer Producer Organisations (FFPOs)** and Indian fishers | Ensures compliance with **Regional Fisheries Management Organisations (RFMOs)** norms (*catch limits, bycatch mitigation, etc.*).
- **Benefits:** Harnesses high-seas fisheries (*e.g. tuna*), increases fisher incomes & seafood exports, improves traceability & certification, strengthens the **Blue Economy**, and promotes youth entrepreneurship.
- **Related: Odisha Deep Sea Fishing Mission (2026–36):** Develops Odisha into a deep-sea fishing and marine export hub through modern infrastructure, scientific fisheries management, and market linkages.

15.16. WORLD INTANGIBLE INVESTMENT REPORT 2026

- **Published by:** World Intellectual Property Organization (WIPO) and Luiss Business School.
- **Focus:** Tracks global intangible investment trends and their role in innovation and competitiveness.
- **India:** Fastest intangible investment growth among the **15 largest economies**.

- **Leaders:** US leads in total intangible investment; **Sweden** ranks highest in intangible investment intensity.
- **India:** Software and databases are fastest-growing intangible assets.

15.17. NEGOTIATED DEALING SYSTEM–ORDER MATCHING (NDS-OM)

- Bloomberg L.P. launched an electronic platform enabling **FPIs** to directly trade Indian Government Securities via **RBI's NDS-OM**.
- **Launched:** 2005 by Reserve Bank of India.
- **Purpose:** Screen-based, anonymous order-matching system for secondary trading of: Central Government Securities, State Development Loans (SDLs), Treasury Bills (T-Bills) | **Settlement:** T+1 guaranteed by Clearing Corporation of India Limited.
- **Restriction:** Gilt Account Holders cannot undertake short selling of Government securities.

15.18. GLOBAL LIVEABILITY INDEX 2026

- **Released by:** Economist Intelligence Unit (EIU) to assess cities on living conditions, resilience, and quality of life.
- **Top Global Cities:** Copenhagen, Vienna, and Melbourne ranked highest.
- **Indian Cities Ranking:** New Delhi – 120, Mumbai – 121, Chennai – 123, Bengaluru – 127

15.19. DIRECT SEEDING OF RICE (DSR)

- **Chhattisgarh and Punjab are promoting Direct Seeding of Rice (DSR) to farmers.**
- **Process:** Rice seeds are directly sown in the field, avoiding nursery raising, puddling, and transplanting.
- **Resource Efficient:** Saves 20–30% groundwater and reduces labour needs.
- **Eco-Friendly:** Produces lower methane emissions than flooded paddy fields.
- **Agronomic Benefits:** Enables 7–10 days earlier maturity and improves soil for the next crop.
- **Challenges:** **High weed infestation and greater reliance on chemical herbicides.**

15.20. TRADE RECEIVABLES DISCOUNTING SYSTEM (TREDS)

- The **Government** has made **TReDS** mandatory for settlement of **all MSME invoices** by **Central Public Sector Enterprises (CPSEs)**.
- **TReDS: Definition:** An **RBI-regulated electronic platform** for financing and discounting **MSME trade receivables**.
- Key Participants → **Sellers: Only MSMEs.** || **Buyers: Corporates, Government Departments, Public Sector Undertakings (PSUs),** and other entities. || **Financiers: Banks, Non-Banking Financial Company (NBFC)-Factors,** and other **RBI-authorised financial institutions.**

15.21. ESARAS PLATFORM

- **eSaras** has emerged as a key digital commerce platform promoting rural entrepreneurship.
- **ESARAS:** Official **e-commerce platform** of the **Ministry of Rural Development** under **DAY-NRLM**.
- Connects **women-led SHG enterprises** with customers across India, offering handicrafts, handlooms, natural foods, home décor, etc.

15.22. STANDING DEPOSIT FACILITY

- RBI absorbed **₹1.67 lakh crore** from banks through the **Standing Deposit Facility (SDF)**.
- **SDF: Monetary policy tool** introduced by RBI in **2022** to absorb excess banking liquidity.
- **Collateral-free** liquidity absorption mechanism, unlike **Reverse Repo** under the **Liquidity Adjustment Facility (LAF)**.
- Primarily an **overnight facility**; forms the **floor of the LAF corridor** (25 bps below the Repo Rate).
- **SDF deposits** count towards **SLR**, but **not CRR**.
- **Eligibility:** All **LAF participants** can use the SDF.

15.23. SUB-SECTORAL TRIAL INDEX OF SERVICES PRODUCTION (ISP)

- **MoSPI** released India's first trial **ISP** covering **19 services sub-sectors** for **April 2026**.

- **Base & Coverage:** Uses **2024–25** as base year and **NIC 2025**; tracks monthly output changes in the formal services sector. Excludes government services, non-market activities and informal sector.
- **Importance:** Services contribute **50%+ of GDP**.
- **Methodology:** Developed by **TAC-ISP** (formed in May 2025); uses deflation methods with **WPI/CPI** to measure real output.
- **Data Sources:** Uses **GST data, administrative data** (Railways, Aviation, Banking, Insurance) and **ASISSE weights**.
- **Growth (April 2026):** **14 of 19 sectors** recorded double-digit growth. | **Highest: Accommodation & Food (37.2%), Retail (30.8%)** | **Decline: Air Transport (-13.9%), Rail Transport (-0.4%).**
- **Frequency & Expansion:** Released monthly on the **29th**

15.24. INDIA BANS IMPORTS OF GOODS MADE USING FORCED LABOUR

- **Director General Foreign Trade (DGFT)** amended Foreign Trade Policy (FTP) 2023 to allow banning imports of goods produced wholly or partly through forced labour.
- Aligns with **ILO Forced Labour Convention, 1930**, which defines forced labour as work extracted under threat of penalty without voluntary consent.
- Comes amid a **USTR Section 301 investigation** into India's trade practices, which may lead to additional tariffs.

15.25. MOBILE PHONE MANUFACTURING SCHEME (MPMS)

- Cabinet approved **MPMS** with **₹62,500 crore** outlay, replacing **PLI-LSEM** (ended March 2026). **Duration: FY 2026–27 to 2030–31** (5 years).
- **Objectives:** Boost mobile production, domestic value addition, supply chains, exports, Indian brands, design and R&D.
- **Incentives:** **2.25–5%** on eligible mobile sales; additional **1.5%** for domestic component sourcing; **3%** for Indian brands with design and R&D focus.

- Mobile Manufacturing in India: **2nd-largest** mobile phone manufacturer globally by volume.
- **99.2%** of phones used in India are domestically manufactured.
- Smartphones became India's **largest export category in 2025**.

15.26. GREEN SHIPBUILDING CLUSTER

- The Ministry of Ports, Shipping and Waterways approved a **greenfield shipbuilding cluster at Porbandar** and a ship repair facility at Vadinar (Gulf of Kutch) under Shipbuilding Development Scheme (SbDS).

15.27. 49TH SESSION OF CODEX ALIMENTARIUS COMMISSION (CAC)

- CAC49 was held in Geneva to adopt global food safety standards.
- Adopted **7 India-led Codex standards**, including those for **dried coriander seeds and fresh curry leaves**.
- Approved India's proposal for a **Codex Standard on cashew kernels**.
- India elected Co-Chair of the **Electronic Working Group on New Food Sources and Production Systems**.
- Adopted standards for **vanilla and large cardamom** developed under India's co-chairmanship.
- Updated food safety guidelines for **Campylobacter, Salmonella in chicken meat, and Listeria monocytogenes in ready-to-eat foods**.
- Revised food labelling standards and adopted **Precautionary Allergen Labelling (PAL)** guidelines.

About Codex Alimentarius Commission (CAC)

- **Established:** 1963 by Food and Agriculture Organization and World Health Organization. || **Headquarters:** Rome, Italy. || **Members:** 189 (188 countries + European Union); India joined in 1964.

15.28. 12TH BRICS LABOUR & EMPLOYMENT MINISTERS' MEETING

- **Context:** India hosted the 12th BRICS Labour & Employment Ministers'

Meeting in **Hyderabad under its 2026 BRICS Chairship**.

- **Launch of BRICS CONNECT:** Technology-based platform to modernise labour systems, enhance cooperation and promote South-South collaboration.
- **India's DPI Showcase:** Presented e-Shram and National Career Service (NCS).

15.29. RBI'S DRAFT DATA GOVERNANCE FRAMEWORK (DGF) FOR BANKS

- **Objective:** Mandates a Data Governance Framework (DGF) aligned with Enterprise Risk Management (ERM) to manage financial, operational and cyber risks across the data lifecycle.
- **Board Oversight:** Board-level Data Governance Committee to oversee implementation, review breaches and assess effectiveness.
- **Executive Governance:** Executive Data Governance Committee and Data Management Function led by a Chief General Manager (CGM)/equivalent.
- **Defined Roles:** Data Owners (quality & governance), Data Stewards (implementation) and Data Custodians (security, storage, backup & disposal).
- **Single Source of Truth (SSOT):** Mandates SSOT with metadata and data lineage for consistency, traceability and auditability.
- **Integrated Risk Management:** Integrates data quality, privacy, security, ownership, cross-border processing and third-party risks into ERM.
- **Third-Party Accountability:** Banks remain responsible for outsourced data through access controls, encryption, contractual safeguards, monitoring and audits.

15.30. SEMAGLUTIDE PATENT EXPIRY: OPPORTUNITIES FOR INDIA

- The expiry of **Novo Nordisk's Semaglutide patent** in India opens the way for affordable **generic GLP-1 receptor agonists**.
- **GLP-1 Receptor Agonists:** Drugs that mimic the **GLP-1 gut hormone**, improving insulin release, lowering blood sugar, reducing appetite and promoting weight loss.
- **Semaglutide:** A **GLP-1 receptor agonist**, developed by **Novo Nordisk**,

used to treat **Type-2 diabetes** and **obesity**.

- Opportunities for India: **Better Access, export growth** after patent expiry; boosts capabilities in **peptide therapeutics** and advanced **drug-delivery systems**, beyond small-molecule generics.

15.31. PARIVARTAN SCHEME

- **MoHUA** has approved the operational guidelines for implementing the **PARIVARTAN Scheme**.
- **Objective:** Replace old polluting **commercial trucks and buses** with **BS-VI** or **electric vehicles (EVs)** in the **National Capital Region (NCR)**.
- **Coverage:** **Delhi, Haryana, Rajasthan** and **Uttar Pradesh**.
- **Implementation:** Executed by the **Ministry of Road Transport & Highways** and **Ministry of Petroleum & Natural Gas**; funded by the **National Capital Region Planning Board**.

15.32. DRAFT CAFE-III NORMS

- **Context:** The **Ministry of Power** released the draft **Corporate Average Fuel Economy (CAFE-III)** norms to reduce crude oil dependence and promote cleaner vehicles.
- **About:** Notified by the **Bureau of Energy Efficiency (BEE)** under the **Energy Conservation Act** to improve **fleet fuel efficiency** and reduce **CO₂ emissions**.
- **Applicability:** Effective **FY28–FY32**, replacing **CAFE-II**; applies to **M1 passenger cars** (up to **8 seats**, excluding the driver). Manufacturers selling **<1,000 vehicles/year** are exempt.
- **Clean Vehicle Multipliers:** Battery Electric Vehicles/ ge Extender Electric Vehicles (**BEVs/REEVs**) **3.0**, (Plug-in Hybrid Electric Vehicles) **PHEVs/Flex-fuel strong hybrids (2.5)**, **strong hybrids (1.6)** and **flex-fuel ethanol vehicles (1.1)** receive weighted credits.
- **Compliance Mechanism:** Automakers use an **annual passbook** and may meet targets through **credit carry-forward, pooling (up to 3 manufacturers)** or **buying BEE credit**.

SECURITY AND DEFENCE

1. ROLE OF ARTIFICIAL INTELLIGENCE IN MODERN WARFARE

Context: As per experts, the future battlefield dominance across various theatres will depend upon the **trinity of artificial intelligence (AI), military autonomy and algorithmic warfare.**

Key Roles of AI in Combat Operations

- **AI Battlefield Awareness:** Integrates satellite, radar, sensor & social media data into **kill webs** for faster targeting (e.g., **Ukraine's Delta**).
- **Real-Time Analysis:** Fuses surveillance data for rapid tactical decisions (e.g., **U.S. Project Maven**).
- **Minotaur Warfare:** Integrates commanders with autonomous systems (e.g., **U.S. YFQ-44A Fury**).
- **Intelligence, Surveillance & Reconnaissance (ISR):** Tracks enemy movements and predicts behaviour using big data.
- **Autonomous & Swarms:** GPS-independent drones and coordinated swarm attacks.
- **Information & Cyber Warfare:** Automates cyberattacks, intrusion detection and disinformation.
- **Predictive Logistics:** Predicts equipment failures and optimises fuel/ammunition supply chains.

Institutional Architecture & Policy Frameworks in India

- **AI Task Force:** Chaired by N. Chandrasekaran to promote AI in defence.
- **DAIC & DAIPA:** Defence AI Council (DAIC) for policy; Defence AI Project Agency (DAIPA) for implementation.
- **Trustworthy AI:** Chief of Defence Staff (CDS) framework for ethical, responsible and reliable AI.
- **AI Funding & Roadmap:** ₹100 crore/year for military AI; all Defence Public Sector Undertakings (DPSUs) follow AI roadmaps covering 70+ products.
- **iDEX: Innovations for Defence Excellence (iDEX)** supports 600+ startups/MSMEs, converting innovations into defence contracts.



Gaps and Challenges in AI integration in defence in India.

- **Compute Deficit:** Only **38,000–58,000 GPUs**, far below global leaders.
- **Fragmented Data:** No **Joint All-Domain Command and Control (JADC2)**; Army, Navy & Air Force operate in silos.
- **Platform Incompatibility:** Difficult to integrate multi-origin defence systems into one AI network.
- **Data Sovereignty:** Foreign/commercial AI models may fail in **Out-of-Distribution (OOD)** conditions (e.g., Ladakh, Siachen).
- **Slow Procurement:** Hardware-centric procurement lags rapid AI and electronic warfare updates.

Way Forward for India:

- **Develop an AI Battlefield Platform:** Build a secure, indigenous AI platform for unified command, control, and data analytics.
- **Deploy Autonomous Drone Swarms:** Develop AI for decentralized swarm coordination, real-time target detection, and autonomous engagement.
- **Strengthen Space-Based ISR:** Expand **Low-Earth Orbit (LEO)** satellite constellations for continuous surveillance and intelligence.
- **Create Indigenous Terrain Datasets:** Build terrain-specific datasets for mountains and jungles to improve AI accuracy in diverse environments.
- **Increase Strategic Investments:** Expand defence-tech funding to boost drone fleets, edge-computing infrastructure, and **NavIC**-based jam-resistant navigation.

Conclusion: India is moving from AI experimentation to operational integration, with the 2024–25 Technology Absorption phase and the 2026–27 data-centric warfare roadmap driving large-scale AI adoption in the armed forces.

Test Your Knowledge	
Prelims Corner Q. Consider the following pairs: Initiative — Purpose 1. Defence AI Council (DAIC) — Policy guidance for AI adoption in defence 2. Defence AI Project Agency (DAIPA) — Implementation of defence AI projects 3. iDEX — Promoting defence innovation through startups and MSMEs 4. Project SANJAY — AI-enabled predictive maintenance of naval platforms Which of the pairs given above are correctly matched? (a) 1, 2 and 3 only (b) 1 and 4 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a)	Mains Corner Q. India's transition from platform-centric warfare to data-centric warfare requires more than the acquisition of AI technologies. Critically analyse the institutional, technological and ethical reforms needed to build an effective AI-enabled defence ecosystem. GS Paper III Science & Technology 15 Marks 250 Words

2. DEFENCE ACQUISITION COUNCIL (DAC)

Context: Chaired by the Defence Minister, the DAC grants Acceptance of Necessity (AoN) and in-principle approval for capital defence acquisitions under the Long-Term Integrated Perspective Plan (LTIPP).

Key Weapon Systems Approved

- **AKASH TARANG:** An **electronic warfare (soft-kill) anti-drone system** that jams **GPS/GNSS and communication links** between UAVs and operators.
- **Medium-Range Surface-to-Air Missile (MR-SAM):** **DRDO–Israel Aerospace Industries** developed a surface-to-air missile with a **range of over 70 km**, based on the **Barak-8** missile.

- **Very Short-Range Air Defence System (V-SHORADS):** An indigenous man-portable air defence system (MANPADS) to destroy low-altitude aerial threats at short range.

3. POINTERS FOR PRELIMS

3.1. INS MAHENDRAGIRI (PROJECT 17A STEALTH FRIGATE)

- **Context:** Indian Navy to commission **INS Mahendragiri**, the **6th Project 17A Nilgiri-class stealth frigate**, with **75%+ indigenous content**.
- **Project 17A:** Indian Navy programme to build **7 Nilgiri-class stealth frigates**. **Built by** Mazagon Dock Shipbuilders Ltd. (MDL), Mumbai. **Designed by the** Indian Navy's **Warship Design Bureau (WDB)**.
- Equipped with **surface-to-surface & surface-to-air missiles**, and **electronic warfare, anti-submarine warfare systems**.

3.2. PINAKA LONG RANGE GUIDED ROCKET (LRGR)

- **DRDO** successfully flight-tested the **Pinaka LRGR** at **Integrated Test Range (ITR)**, **Chandipur**, achieving the **user-specified minimum range of 60 km**.
- **Guided Variant:** Precision-guided version of the indigenous **Pinaka Multi-Barrel Rocket Launcher (PMBRL)**.
- **Developer:** Designed by **Armament Research and Development Establishment (DRDO)** with other DRDO laboratories. **Range:** 60–120 km.

3.3. ASTRA MISSILE (MK-1)

- Indonesia became the **1st country** to sign an agreement to import India's **Astra Mk-1**.
- **Type:** **Beyond-Visual-Range Air-to-Air Missile (BVRAAM)** for the **Air Force & Navy**; engages targets beyond **20 nautical miles (37 km)**.
- **Developer & Features:** Developed by **DRDO**; **Range:** 80–110 km | **Altitude:** Up to 20 km | **Speed:** Mach 4.5 | **Guidance:** Inertial, mid-course update & terminal active radar homing.

3.4. BUREAU OF PORT SECURITY (BOPS)

- The **Union Home Minister** reviewed **BoPS** and directed **deployment of**

CISF-trained licensed private security guards at ports.

- **About BoPS:** Established under **Section 13, Merchant Shipping Act, 2025**. | **Nodal Ministry:** **Ministry of Ports, Shipping and Waterways**. | **Role:** Single statutory authority for ship and port security.
- **Functions:** Enforces the **International Ship and Port Facility Security (ISPS) Code**; coordinates **Coast Guard, CISF, Navy, and State Police**, supports **Maritime India Vision 2030**.

3.5. NIDAR 2.0 (NATIONAL INNOVATION CHALLENGE FOR DRONE APPLICATION AND RESEARCH)

- **MeitY**, with the **Drone Federation India (DFI)**, launched **NIDAR 2.0** (**National Innovation Challenge for Drone Application and Research**) under **SwaYaan**.
- **Background:** The first edition (**NIDAR 2025–26**), launched in **March 2025**, enabled graduates to develop collaborative autonomous drones for predefined problems.
- **SwaYaan:** **MeitY** initiative (2022) to build skilled manpower and strengthen India's **Unmanned Aircraft Systems (UAS)** ecosystem.
- **Objective:** Supports India's goal of becoming a **global drone hub by 2030**.
- **Implementation:** Hub-and-spoke model involving **30 institutions**, including **IISc, IITs, IIITs, NITs, C-DAC and NIELIT**.

3.6. INS MAHENDRAGIRI

- **Context:** The Indian Navy commissioned the indigenously built stealth frigate **INS Mahendragiri** into the **Eastern Fleet** at **Visakhapatnam**.
- **About:** **7th Project 17A (Nilgiri-class)** warship and **6th** commissioned; built by **Mazagon Dock Shipbuilders Ltd. (MDL)**, Mumbai.

ENVIRONMENT AND GEOGRAPHY

1. FLASH FLOODS

Context: Intense rainfall triggered massive flash floods and landslides in Jammu & Kashmir's Chenab Valley. Increasing extreme weather events in the fragile Himalayan region are triggering flash floods.

About Flash Floods: Sudden, short-duration, highly localised floods caused by intense rainfall, rapid snowmelt, dam/levee failure, or ice jams, leaving little time for warning or response. **Recent Occurrences:** Chennai (2015), Kerala (2018), Assam (2024), etc.

Potential Solutions

- **Strengthen Early Warning:** Expand IMD's FFGS, satellite monitoring, and real-time alerts for vulnerable communities.
- **Disaster-Resilient Infrastructure:** Improve drainage, stabilise slopes, and regulate construction in fragile Himalayan regions.
- **Risk-Based Planning:** Treat flash floods as a distinct disaster; undertake vulnerability mapping and state-specific SOPs.
- **Community Resilience:** Integrate indigenous knowledge into early warning and disaster preparedness.

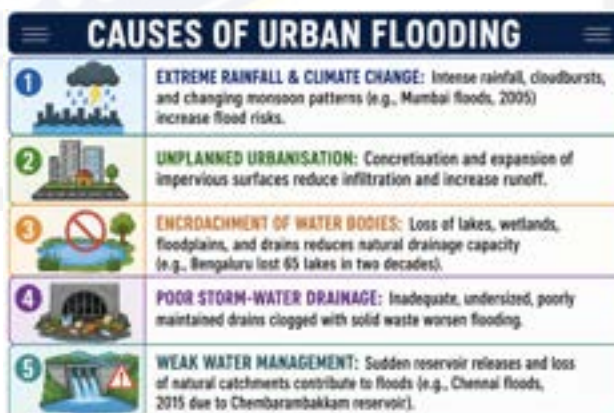


1.1. URBAN FLOODS

Context: IMD issued a Red Alert as the risk of urban floods rises across India. Heavy monsoon rainfall triggered flooding in cities such as Delhi and Surat

About Urban Flooding

- Temporary inundation of **urban land or property** due to excessive runoff overwhelming drainage systems.
- **Urban vs Rural Flooding:** Urbanisation increases **flood peaks by 1.8–8 times** and **flood volumes up to 6 times (NDMA)** due to reduced water absorption.
- **Impacts:** Causes **loss of life and property, displacement, infrastructure damage** (power, water supply), and **public health risks** through water-borne diseases.



Way Forward for Urban Flood Management

- **Data & Forecasting:** Expand Doppler radars, automatic gauges, and real-time monitoring; use GIS-based flood mapping and drainage inventories for risk assessment.
- **Integrated Infrastructure:** Upgrade storm-water drains, ensure regular desilting, and remove encroachments; adopt nature-based solutions like permeable pavements, green roofs, and rain gardens inspired by Sponge City concepts.
- **Governance & Preparedness:** Establish Urban Flood Cells, strengthen city-level disaster plans, and improve coordination among agencies and Urban Local Bodies (ULBs) with community participation.

Government Initiatives for Urban Flooding in India

- **NDMA Guidelines on Urban Flooding (2010):** Framework for prevention, preparedness, mitigation, and response.
- **Central Water Commission (CWC) Flood Forecasting:** Provides real-time flood forecasts and warnings across major river basins.
- **IFLOWS-Mumbai & CFLOWS-Chennai:** GIS-based urban flood early warning and decision support systems.
- **Mission Mausam (Ministry of Earth Sciences):** Expands Doppler weather radars and forecasting systems for timely alerts.
- **AMRUT 2.0:** Improves storm-water drainage, rainwater harvesting, and urban water management.



Test Your Knowledge

Prelims Corner

Q. With reference to urban flooding in India, consider the following statements:

1. Urbanisation generally increases both flood peaks and flood volumes by reducing infiltration.
2. Storm-water drains are designed to carry both sewage and rainwater through a common network.
3. Nature-based solutions such as permeable pavements and rain gardens can help reduce urban flood risk.
4. The IFLOWS-Mumbai system is a GIS-based urban flood forecasting and decision support system.

Which of the statements given above are correct?

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

Answer: (a)
Explanation: Storm-water drainage should ideally be separate from the sewerage network. Statements 1, 3 and 4 are correct.

Mains Corner

Evaluate the role of nature-based solutions and technology-enabled early warning systems in mitigating urban floods in India. What institutional and governance reforms are required for effective implementation?

GS Paper III | 15 Marks | 250 Words

2. RISK OF LANDSLIDES IN INDIA

Context: Concerns over landslide risks in India have renewed after the Kalladi landslide in Wayanad, Kerala.

Impacts of Landslides

- **Loss of Life & Property:** Cause deaths and widespread damage (e.g. Wayanad landslides: ~300 deaths).
- **Infrastructure Damage:** Destroy roads, bridges, power lines, and other key infrastructure.
- **Economic Losses:** Disrupt livelihoods, trade, and tourism (e.g. Darjeeling tea industry).
- **Environmental Damage:** Trigger soil erosion, deforestation, and water pollution.
- **Relief & Rehabilitation Burden:** Divert government resources from development to rescue and rehabilitation.
- **Psychological Impact:** Cause trauma and mental distress among affected people.



NDMA Guidelines on Landslides

- **Data Inventory:** Regularly update the national landslide database.
- **Hazard Zonation:** Prepare macro- and meso-level hazard maps in consultation with **Border Roads Organisation (BRO)**, states, and local communities.
- **Pilot Projects:** Monitor selected landslides for regional risk assessment.
- **Early Warning:** Establish warning systems based on risk and cost-benefit analysis.
- **Capacity Building:** Train professionals and strengthen institutions for landslide management.
- **Code Revision:** Update existing codes and develop new landslide guidelines.
- **Research Centre:** Set up an autonomous **National Centre for Landslide Research, Studies and Management**.

LANDSLIDES IN THE WESTERN GHATS VS HIMALAYAS		
BASIS	WESTERN GHATS	HIMALAYAS
TOPOGRAPHY	Lower altitude, gentler slopes	Higher altitude, steeper slopes
GEOLOGY	Older, relatively stable rocks	Younger, fragile rocks
RAINFALL	Heavy monsoon rainfall	Monsoon rain + higher-altitude snowfall
FREQUENCY	Frequent in monsoon	Very frequent due to rain & earthquakes
MAJOR TRIGGERS	Monsoon, deforestation, construction	Rainfall, snowmelt, earthquakes
MITIGATION	Afforestation, drainage, land-use planning	Slope stabilisation, early warning, engineering measures

Measures Taken by the Government

- **Landslide Early Warning System (LEWS):** Developed by IIT Mandi for daily landslide warnings in the Indian Himalayas.
- **PSInSAR Technique:** Uses **Persistent Scatterer Synthetic Aperture Radar (PSInSAR)** to monitor ground deformation and slope movement.
- **Geological Survey of India (GSI):** Nodal agency under the **Ministry of Mines** for national landslide mitigation.
- **NDMA Guidelines (2009):** Recommend hazard zonation mapping, retaining structures, slope stabilisation, and other mitigation measures.

Test Your Knowledge

Prelims Corner

Q1. With reference to landslide risk management in India, consider the following statements:

1. The Geological Survey of India (GSI) is the nodal agency for landslide studies and mitigation.
2. Persistent Scatterer Synthetic Aperture Radar (PSInSAR) is used to detect slow ground deformation and slope movement.
3. The Landslide Early Warning System (LEWS) developed by IIT Mandi provides operational landslide warnings for parts of the Indian Himalayan Region.

Which of the statements given above are correct?

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

Answer: (d)

Mains Corner

The increasing frequency of landslides in India reflects the combined impact of natural processes and unsustainable development in fragile ecosystems. Examine the major causes of landslides in India. Suggest a comprehensive strategy for landslide risk reduction.

GS Paper III | 15 Marks | 250 Words

3. ETHANOL BLENDING IN INDIA

Context: Under the **Ethanol Blended Petrol (EBP) Programme**, ethanol blending increased from **below 1.5% in 2013–14** to **20% in 2025–26**, with India achieving the **20% blending target five years ahead of the original 2030 timeline**.

Significance of Ethanol Blending

- **Reduces Oil Imports:** Lowers crude oil dependence, enhancing energy security.
- **Saves Forex:** Saved **~₹1.36 lakh crore** through lower crude imports.
- **Cuts Emissions:** 2G ethanol reduces GHG emissions by **50%+** over petrol.
- **Boosts Farmers' Income:** **~₹1 lakh crore** paid since 2014 for ethanol feedstock.
- **Waste-to-Wealth:** Utilises stubble, dung & agri-biomass, promoting a circular economy.
- **Crop Diversification:** Encourages maize cultivation, reducing reliance on sugarcane.
- **Energy Resilience:** Ethanol reserves provide **blending flexibility** during oil price shocks.

ABOUT ETHANOL: A RENEWABLE BIOFUEL

1 WHAT IS IT? Ethanol (C_2H_5OH) is a renewable, colourless, flammable biofuel used mainly as a transport fuel.	2 PRODUCTION Made by fermenting sugars/starches (Grains, Sugarcane) or via ethylene hydration (Petrochemical).	3 ENERGY CHARACTERISTICS High octane rating (improves performance), but contains ~27% less energy than petrol (requires more volume).	4 USES Petrol blending (e.g., E10, E20) and Flex-fuel vehicles (e.g., E85, E100).
4 USES Petrol blending (e.g., E10, E20) and Flex-fuel vehicles (e.g., E85, E100).	5 INDUSTRIAL USES & BY-PRODUCT Uses: Sanitisers, perfumes, alcoholic beverages, and solvents. By-product: DDGS (Distiller's Dried Grains with Solubles) used as high-protein animal feed.	6 TYPES & BENEFITS TYPES: 1G (food crops), 2G (crop residues, bagasse, bamboo), 3G (algae; under research). BENEFITS: Improves combustion and lowers CO (carbon monoxide) & hydrocarbon emissions.	

GOVERNMENT INITIATIVES FOR ETHANOL BLENDING

ETHANOL BLENDING PROGRAMME (EBP)
Promotes key national goals through petrol blending.

- **ENERGY SECURITY:** Reduces dependence on imported.
- **FARMER INCOME:** Flour: Lowers
- **FOREX SAVINGS:** Saves foreign exchange on oil imports.
- **EMISSION REDUCTION:** Lowers.

BLENDING PROGRESS: KEY MILESTONES

- 2014: 1.5% BLENDING.
- 2022: 10% BLENDING ACHIEVEMENT.
- 2025: 20% BLENDING TARGET.

Significant growth achieved in a short time.

FUTURE TARGET: E27 ROLLOUT
Aiming for 27% blending by 2030 through phased rollout.

- 2030 TART: Achieve 27% ethanol blending.
- **PHASED IMPLEMENTATION:** Gradual and strategic rollout plan.

CONSUMER AWARENESS & DISPLAY
Transparency at points of sale and on vehicles.

- **FUEL STATIONS:** Display ethanol blend percentages at pumps/vehicles. Display E-blend compatibility markers.

Issues with Ethanol Blending

- **Food vs Fuel:** Foodgrain diversion may raise prices and threaten food security.

- **High Water Use:** ~3,000 L water needed per litre of ethanol, stressing groundwater.
- **Environmental Impact:** Feedstock expansion may cause **deforestation, soil degradation & monoculture**.
- **Pollution:** Emits **acetaldehyde**, generates **vinasse**, and doesn't fully address **N₂O emissions**.
- **Lower Fuel Efficiency:** E10–E20 reduces mileage by **up to 7%**; E100 by **~30%**.
- **Infrastructure Gaps:** Inadequate **pipelines, storage & rural blending depots**.
- **Pricing Uncertainty:** Volatile **feedstock prices** discourage investment.

Challenges to India's Ethanol Blending Programme

- **High Water Dependence:** Sugarcane-based ethanol is **monsoon-dependent**; 1 L ethanol needs ~2,860 L water (NITI Aayog).
- **Sugar Supply Risk:** Sugarcane diversion for ethanol may reduce **domestic sugar availability**.
- **Lower Energy Content:** Lower calorific value than petrol, reducing **vehicle mileage**.
- **Vehicle Compatibility:** High moisture absorption may cause **fuel tank corrosion and rust**.

Way Forward

- **Roadmap for E27:** Ensure phased implementation by 2030.
- **Promote Maize:** Increase **MSP & acreage** to reduce sugarcane/foodgrain dependence.
- **Expand 2G Ethanol:** Scale production from **bamboo, bagasse & crop stubble**.
- **Improve Water Efficiency:** Mandate **water-use audits** for distilleries.
- **Diversify Feedstock:** Reduce FCI grain use; promote **non-food feedstocks**.
- **Develop Vehicles:** Promote **E20–E100 compatible engines** with better efficiency & corrosion resistance.
- **Global Cooperation:** Collaborate with **Brazil & Sweden** on flex-fuel technology and lifecycle emission assessment.

Conclusion: a sustainable transition requires a balanced approach that aligns biofuel expansion with water security, food security and environmental sustainability.



Test Your Knowledge




Prelims Corner

Q. Which of the following are potential trade-offs associated with large-scale ethanol blending in India?

1. Increased pressure on groundwater resources.
2. Diversion of food crops towards fuel production.
3. Reduction in greenhouse gas emissions through the use of second-generation ethanol.
4. Expansion of monoculture cultivation in certain regions.

Select the correct answer using the code below:

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

Answer: (a)
Explanation: Statements 1, 2 and 4 represent challenges or trade-offs. Statement 3 is a benefit, not a trade-off.


Mains Corner

Q. Discuss the role of second-generation (2G) ethanol in promoting a circular economy and achieving India's long-term biofuel objectives.

GS Paper III | 10 Marks | 150 Words

4. POINTERS FOR PRELIMS

4.1. ZOOLOGICAL SURVEY OF INDIA

Context: Animal Discoveries–2025, released by the Zoological Survey of India (ZSI) reported 709 new faunal records, including 483 new species and 226 species recorded in India for the first time.

ZSI: Established in **1916**. It **functions** under the Union Ministry of Environment, Forests and Climate Change. **HQ:** Kolkata and has 16 regional centers spread across the country.

4.2. MOUNT EREBUS

- **Context:** Scientists have discovered that Mount Erebus emits volcanic gases

containing microscopic crystals of pure gold.

- Location: **Ross Island** in the Ross Sea, Antarctica,
- It is the world's **southernmost active volcano**. It has a permanent lava lake. || It is a **stratovolcano and is part of the Pacific Ring of Fire** that encircles the Pacific Ocean basin.

4.3. BORJULI WETLAND

- **Context:** The Borjuli wetland has been notified as a Biodiversity Heritage Site (BHS).
- **BHS Notification:** by the State Government in consultation with local bodies under the Biological Diversity Act, 2002.
- **National Biodiversity Authority**, under ministry of Environment, advises the State Government in the selection and management
- **Borjuli Wetland:** Sonitpur District, Assam
- It is known for **harbouring a variety of wild rice (*Oryza rufipogon*)**. It is disease- and pest-resistant
- It can tolerate **flooding** and saline conditions.

4.4. CYTTOPSIS INDICA (INDIAN DORY)

- **Discovery:** ICAR-CMFRI, Kochi identified a new deep-sea fish species from the Arabian Sea off Kerala.
- **Habitat:** 350–500 m depth along the eastern Lakshadweep Sea continental slope.
- DNA confirmed a distinct species, correcting a long-standing taxonomic error.
- **Taxonomic Revision:** Indian Ocean *Cyttopsis rosea* reclassified as *Cyttopsis indica*; *C. rosea* restricted to the Atlantic Ocean.

4.5. HIMALAYAN PANGOLIN (*MANIS AURITA*)

- **New Species:** Recently recognised as a **distinct species**, previously classified as a subspecies of the **Chinese pangolin**.
- **Distribution:** Found in the **southern Himalayan foothills of Nepal, South Tibet, and Northeast India (including Assam)**.

- **Features:** **Larger** than the Chinese pangolin, with **smaller ears** and a **shorter, broader nasal bone**.

4.6. INDO-BURMA BIODIVERSITY HOTSPOT

- Mizoram University's **Natural History Museum** became India's **21st biodiversity repository** under the **Biological Diversity Act, 2002**.
- **Extent:** Covers **Cambodia, Lao PDR, Myanmar, Thailand, NE India (excluding Assam), Vietnam & parts of southern China**.
- **Global Significance:** Among top **10 hotspots for irreplaceability** and top **5 most threatened**.

4.7. SPECIES AT RISK OF EXTINCTION

- The International Union for Conservation of Nature (IUCN) highlighted threats to molluscs and Desert Rain Frog from deep-sea mining and diamond mining, respectively.
- About Molluscs: Invertebrates (*animals without backbone*). | **Features:** Have a mantle, respiratory/excretory cavity, and nervous system. | **Major Classes:** **Cephalopods:** Octopus, squid, cuttlefish, nautilus, extinct ammonites; **Gastropods:** Snails and slugs; **Bivalves:** Clams, oysters, scallops, mussels.
- About Desert Rain Frog (*Breviceps macrops*): Fossorial species adapted to burrowing and underground life. | **Habitat:** Sandy dunes with sparse vegetation along **Namaqualand coast (South Africa)** and **south-western Namibia**. | **IUCN Status:** Vulnerable.

4.8. MUGGER CROCODILES (*CROCODYLUS PALUSTRIS*)

- Deaths of Mugger crocodiles in Rajasthan's **Chandraloi River (Kota)** were linked to the banned pesticide **Aldrin**
- About Aldrin: **Banned organochlorine pesticide** due to Persistent environmental presence, soil and water contamination, bioaccumulation in food chains, Neurotoxic effects on humans and wildlife.
- Mugger Crocodile: Medium-sized crocodile (**up to 4–5 m**) with broadest

snout among living *Crocodylus* species. |
Distribution: Indian subcontinent
(India, Pakistan, Sri Lanka, Iran). |
Habitat: Rivers, lakes, marshes,
 reservoirs, canals, and artificial ponds. |
Status: Wildlife Protection Act, 1972:
 Schedule I; **CITES:** Appendix I; **IUCN**
Red List: Vulnerable

- **Characteristics:** Hole-nesting species; digs burrows for shelter.

4.9. CYANOBACTERIA (BLUE-GREEN ALGAE)

- IIT Guwahati study found cyanobacteria can **remove lead from contaminated water**.
- **Cyanobacteria:** Photosynthetic prokaryotic microorganisms under **Kingdom Monera (Bacteria)**. | **Habitat:** Freshwater, marine, and moist terrestrial environments.
- **Nitrogen Fixation:** Species like **Anabaena** and **Nostoc** fix atmospheric nitrogen. Thus, used as **biofertilisers** in paddy fields due to nitrogen-fixing ability.
- **Bioremediation:** Use of microorganisms to reduce pollution by converting harmful pollutants into non-toxic substances.

4.10. GREAT INDIAN BUSTARD

- **Context: Wildlife Institute of India** released the Status and Trend of Great Indian Bustard in Thar report.
- **About Thar Landscape:** Part of India's Desert Biogeographic Zone, a rich arid ecosystem. | Biodiversity: GIB, Chinkara, Desert Fox, Indian Fox, Desert Cat, Spiny-tailed Lizard.

- **About Great Indian Bustard: Status**
 → IUCN: Critically Endangered; Wildlife (Protection) Act, 1972: Schedule I; CITES: Appendix I | **Habitat:** Open agro-grasslands, scrublands, and rainfed farmlands. | **Range:** Endemic to the Indian subcontinent; found in Rajasthan, Gujarat, Maharashtra, and Andhra Pradesh. | **State Bird:** Rajasthan. | **Diet:** Omnivorous. | Major Threats: Infrastructure expansion, invasive predators (feral/free-ranging dogs, nilgai), and habitat degradation.

4.11. CAMPA APPROVED NEW WILDLIFE AND FORESTRY CONSERVATION PROJECTS

- **Context:** Governing Body of National CAMPA approved new wildlife and forestry conservation projects.

Key Approvals

- Conservation & Recovery Action Plan for River Dolphins.
- Project Snow Leopard – Phase II.
- Conservation Action Plan for the Indian Rhinoceros.
- Pan-India Conservation Strategy for the Wild Water Buffalo.
- Aastha Van Sanrakshan Yojana: Conservation and restoration of nearly 15,000 sacred groves (Aastha Vans).
- MISHTI (Mangrove Initiative for Shoreline Habitats and Tangible Incomes): Approved a three-year extension

SPECIES UNDER CONSERVATION

ASPECT	 GANGETIC RIVER DOLPHIN	 SNOW LEOPARD	 WILD WATER BUFFALO	 INDIAN RHINOCEROS (GREATER ONE-HORNED RHINOCEROS)
 Status	IUCN – Endangered WPA, 1972: Schedule I CITES: Appendix I	IUCN – Vulnerable WPA, 1972: Schedule I CITES: Appendix I	IUCN – Endangered WPA, 1972: Schedule I CITES: Appendix III	IUCN – Vulnerable WPA, 1972: Schedule I CITES: Appendix I
 Habitat	Deep freshwater rivers with pools, meanders, and confluences.	Alpine meadows, rocky cliffs, and high-altitude mountains (3,000–5,500 m).	Alluvial grasslands, floodplains, marshes, swamps, and riverine forests.	Riverine grasslands, floodplains, marshes, and alluvial forests.

wool; female plants bear long reddish-brown bristly hairs.

STUDENT'S
NOTES 

4.12 TYPHOON BAVI

- **Typhoon Bavi** struck **Japan's southern islands** and moved towards **China's east coast**.
- Reached **Category 5** on the **Saffir–Simpson Wind Scale**.

4.13. EGYPTIAN VULTURE (*NEOPHRON PERCNOPTERUS*)

- **Egyptian Vulture** has become **locally extinct in the Nilgiris** and is declining across much of **Tamil Nadu**.
- **About: Distribution:** Southern Europe, northern & central Africa, Middle East, Central Asia, and the Indian subcontinent
- **Features:** World's **smallest** and **only tool-using** vulture; breeds later than other vultures; rubs itself with **ferric oxide-rich soil**; scavenges animal carcasses, providing vital ecosystem services.
- **Status: IUCN:** Endangered | **Wildlife (Protection) Act, 1972:** Schedule I.

4.14. PAIZHEN FAULT

- A study found that the **Paizhen Fault** beneath the Brahmaputra mega hydropower project in Tibet could affect its structural stability.
- **Paizhen Fault:** Part of the **tectonic fault network** in the eastern Himalayas.
- Formed by the **collision of the Indian and Eurasian tectonic plates**.
- Active since the **Early Pleistocene (Ice Age)** and remains active during the **Holocene**.

4.15. BEGONIA QUADRICORNUALATA

- **About:** Newly discovered **Begonia** species found in **Papum Pare, Arunachal Pradesh**, at **Senki View** on the eastern edge of **Itanagar Wildlife Sanctuary**, between the **Himalayan and Indo-Burma** biodiversity hotspots. **Conservation Status:** Classified as **Data Deficient**
- **Distinctive Features:** Has upright stems, white-to-pink flowers and distinctive **four-horned fruits**.
- **Name Origin:** *Quadricornualata* derives from Latin for "**four-horned winged**".
- **Unique Characteristics:** Fruits are densely covered with reddish-brown

4.16. PYGOLUCIOLA MAWSYNRAM

- **About:** Newly discovered **firefly species** from **Mawsynram, East Khasi Hills, Meghalaya**—the world's wettest place.
- **Name Origin:** Named after **Mawsynram**, recognising its rich biodiversity and the **Khasi** community's traditional conservation practices.
- **Habitat:** Adults occur near water bodies amid dense vegetation, ferns and semi-evergreen forests; high humidity and leaf litter are vital for survival.
- **Distinctive Features:** Identified by unique body characteristics and flashing patterns.
- **India's Fireflies:** India has **92 known firefly species**, nearly **60% endemic**.

4.17. MUGGER CROCODILE (*CROCODYLUS PALUSTRIS*)

- **Context:** An NGT committee found that the banned pesticide Aldrin caused the deaths of several mugger crocodiles in Rajasthan's Chandraloi River, a right-bank tributary of the Chambal.
- **Aldrin:** Toxic organochlorine insecticide, now globally banned. **Persistent Organic Pollutant**
- **Status in India:** Banned in the **1990s** under the **Insecticides Act, 1968**; new POPs are regulated under the **POP Rules, 2018** in line with the **Stockholm Convention**.
- About the Mugger Crocodile: **Conservation Status** → **IUCN:** Vulnerable | **CITES:** Appendix I | **Wildlife (Protection) Act, 1972:** Schedule I.

4.18. NEMAWASHI

- **Japanese tree-transplantation technique** ("going around the roots") that prepares a mature tree's roots before relocation, improving survival.

4.19. EVAPORATION OF MONSOON RAIN

- **Context:** **IITM, Pune** found that nearly **25% of Southwest monsoon rainfall** over the Western Ghats evaporates before reaching the ground.
- Key Findings: **Rainfall Loss:** **~25%** rain mass evaporates mid-air

(June–September); daily loss varies 4–61% with temperature and humidity.

4.20. INDIAN PLATE BUILT THE 'ROOF OF THE WORLD'

- A study explains how the Indian tectonic plate shaped the Tibetan Plateau (Roof of the World).
- **Key Findings:** The Indian plate underthrust the Eurasian plate **45–20 million years ago**, uplifting the Tibetan Plateau.

4.21. PROJECT GIANT (GREENLAND ICE SHEET TO ATLANTIC TIPPING POINTS)

- About: Five-year (2025–30) project led by the British Antarctic Survey (BAS) to study how Greenland ice melt could weaken the Atlantic Meridional Overturning Circulation (AMOC).
- **Key Feature:** Uses autonomous robots in Greenland's fjords to monitor freshwater interactions with the AMOC.

4.22. ENVI – LESTES PALOTI

- About: New spreadwing damselfly discovered in Kerala's Western Ghats.
- **Key Features:** Changes from **brown (dry season)** to **blue (monsoon)** for camouflage; inhabits scrub near homes and hillocks.

4.23. ECOLOGICAL RECOVERY OF MANASBAL LAKE

- **Location:** Alkaline, spring-fed freshwater lake in Ganderbal, J&K; India's deepest freshwater lake (~13 m), known as the "Supreme Gem of Kashmir Lakes."

4.24. CAPACITIES PROGRAMME

- The **CapaCITIES Programme** completed **10 years**. **Capacity Building Project on Low Carbon and Climate Resilient City Development in India** strengthens cities' capacity for climate planning, financing and implementation.
- **Launch & Funding:** Launched in **2016**; funded by the **Swiss Agency for Development and Cooperation (SDC)**.
- **Implementation:** Executed by **ICLEI South Asia, South Pole** and **econcept**, with **NIUA** as knowledge partner.

- **Coverage:** **8 cities** across **4 States**—Gujarat, Tamil Nadu, Rajasthan and West Bengal.

4.25. COLOBUS CONGOENSIS (LIKWELI MONKEY)

- Scientists discovered **Colobus congoensis** (Likweli monkey) in Lomami National Park, DR Congo.
- **Significance:** **5th** new monkey species discovered in Africa in **75 years**.
- **Features:** Glossy black coat, long fur, sweeping tail, orange-cream facial markings and a distinctive roaring call.

4.26. KEWRA (SCREW PINE)

- Context: 24-million-year-old Kewra fossil leaves found in Assam's Tikak Parbat Formation indicate its presence in the Indian subcontinent before the Himalayas formed.
- **Distribution:** Found across Tropical Asia, Australasia and Africa; **Ganjam (Odisha)** is India's main commercial producer.
- **Ecological Role:** Keystone species that stabilises coastlines.
- **Uses:** Male flowers produce **Kewra water** and **attar**; leaves are used for mats, hats and baskets.
- **GI Tag:** **Ganjam Kewda Flower** and **Ganjam Kewda Rooh** received the GI tag (2012).

4.27. INDIA'S FIRST NIGHT SAFARI

- The Supreme Court allowed Uttar Pradesh to proceed with India's first night safari and zoological park at Kukrail Reserve Forest, Lucknow.
- **Significance:** Will be the **world's fifth night safari** after Singapore, Thailand, China and Indonesia.
- **Approval:** Approved by the **Central Zoo Authority (CZA)** and **MoEFCC**. (*SC earlier mandated prior approval for zoos/safaris in Ashok Kumar Sharma (IFS) vs Union of India.*)
- **Kukrail Reserve Forest:** Named after the **Kukrail stream**, a tributary of the **Gomti River**.
- Houses **Kukrail Gharial Rehabilitation Centre (KGRC)**, India's first gharial conservation centre (1975).

4.28. INDIAN GREY HORNBILL BREEDS AGAIN IN GIR

- Context: After 60+ years, the Indian Grey Hornbill successfully bred in Gujarat's Gir forests for the 4th consecutive year after reintroduction in 2021.
- Indian Grey Hornbill (*Ocyrceros birostris*): India's most widespread hornbill; found from **Jammu to Kerala** and **Rajasthan to West Bengal**, also in Pakistan, Nepal and Bangladesh. || **IUCN Status: Least Concern.**
- **Habitat:** Prefers dry plains, foothills and open landscapes like deciduous forests, scrublands, gardens and urban areas with old trees.
- **Ecological Role:** Important **seed disperser**, aiding forest regeneration and biodiversity

4.29. FIRST-EVER FENCING OF SUNDARBANS BORDER

- MHA plans to fence ~90 km of the Sundarbans stretch along the India-Bangladesh border (West Bengal) to strengthen border management in difficult terrain.
- **India-Bangladesh Border (West Bengal): ~2,216.7 km.**
- Sundarbans: World's largest **mangrove forest** in the **Ganga-Brahmaputra-Meghna delta** on the Bay of Bengal || ~40% in India; remaining in Bangladesh.
- **UNESCO World Heritage Site:** India (1987), Bangladesh (1997) || **Ramsar Site:** Indian Sundarbans (2019).
- **Biosphere Reserve:** Includes: **Sundarbans National Park (India); Sundarbans East, South and West Wildlife Sanctuaries (Bangladesh); Sundarbans Reserve Forest (Bangladesh)**
- Part of **Project Tiger** for conservation of the **Royal Bengal Tiger** population.

4.30. SPOTTED DEER TRANSLOCATION IN GUJARAT

- Gujarat Forest Department relocated 50 spotted deer from Sasan Gir Wildlife Division to Mandvi Forest Range, Surat.
- **Permitted by the Chief Wildlife Warden under the Wild Life (Protection) Act, 1972 for scientific management.**

- **Also Known As:** Chital, Cheetal or Axis Deer. Native to **India, Nepal, Bhutan, Bangladesh and Sri Lanka; invasive in the Andaman Islands.**
- Golden-brown coat with white spots. || Only males have three-pronged antlers, shed and regrown annually. || **IUCN Red List: Least Concern (LC).**
- **Legal Protection: Schedule II under the Wild Life (Protection) Act, 1972.**

4.31. MARINE CLOUD BRIGHTENING (MCB)

- Context: Study suggests MCB may reduce Super El Niño intensity and global climate impacts.
- **MCB:** A Solar Radiation Modification (SRM) technique that reflects sunlight back into space.
- **Method:** Sprays microscopic seawater droplets over oceans; resulting sea salt aerosols act as Cloud Condensation Nuclei (CCN).
- **May weaken the Bjerknes feedback (links Pacific sea surface temperature and trade winds) →** Could reduce Super El Niño severity and related climate disruptions.

4.32. RISING TEMPERATURE IMPACTS PHOTOSYNTHESIS

- Study found heat waves have pushed 57 million hectares of tropical forests beyond their photosynthetic limits.
- **Declining Forest Resilience:** Rising temperatures exceed photosynthetic thresholds, weakening carbon sink capacity.

4.33. NEW SOLITARY BEE SPECIES DISCOVERED

- Researchers identified two new solitary bees, *Elaphropoda triangulata* and *Habropoda* adi, in Siang Valley, Arunachal Pradesh. || **Classification:** Belong to Anthophorinae subfamily; ground-nesting bees that live and breed individually.

4.34. LONAR LAKE

- Context: Recent increases in Lonar Lake's water levels have inundated sections of surrounding shrines, such as the Kamalja Devi Temple.
- Situated within Maharashtra's Vidarbha region.

- **Moon Resemblance:** The soil minerals within the lake closely match those discovered in lunar rocks.
- **Endorheic Basin:** A landlocked drainage area lacking any outward flow.



SOCIAL ISSUES

1. ONLINE CHILD SEXUAL EXPLOITATION AND ABUSE

Context: The Ministry of Electronics and Information Technology (MeitY) directed **Instagram** to remove all advertisements and content that facilitate access to **Child Sexual Exploitative and Abuse Material (CSEAM)**.

- Online Child Sexual Exploitation and Abuse (OCSEA) involves the use of information and communication technology as a means to sexually abuse and/or sexually exploit children.

Consequences of Online Child Exploitation

- Psychological Impact:** Causes depression, anxiety, and PTSD.
- Physical Health Issues:** Leads to sleep disorders, self-harm, and long-term health problems.
- Relationship Strain:** Results in stigma, social isolation, and damaged relationships.
- Socio-economic Hardship:** Affects education, employability, and financial stability.
- Dehumanisation:** Reduces children to objects of exploitation and abuse.

Way Forward

- Strengthen Legal Enforcement:** Ensure strict implementation of the **POCSO Act**, **IT Act**, and Supreme Court rulings.
E.g. Just Rights for Children Alliance v. S. Harish held that possession and circulation of **CSEAM** are punishable under the **POCSO Act** and **IT Act**.
- Comprehensive Sex Education:** Provide age-appropriate education on consent, online safety, and digital ethics.
- Awareness Campaigns:** Conduct nationwide campaigns on child protection, cyber safety, and **POCSO** provisions.
- Early Intervention:** Identify at-risk children early and provide timely counselling and behavioural support.
- Victim Support:** Expand access to psychological counselling, rehabilitation, and educational assistance for survivors.

Initiatives Taken by India

- POCSO Act, 2012:** Section 15 criminalizes the storage and possession of **CSEAM**.
- Information Technology Act, 2000 (Amended 2008):** Section 67B penalizes publishing, transmitting, browsing, or collecting **CSEAM** electronically.
- IT Rules, 2021:** Require social media intermediaries to proactively detect, remove, and block **CSEAM**.
- Juvenile Justice Act, 2015:** Ensures care, protection, and rehabilitation of children vulnerable to sexual exploitation.



- **UN Convention on the Rights of the Child (1989):** Reinforces India's commitment to protect children from online and offline sexual exploitation.


Test Your Knowledge

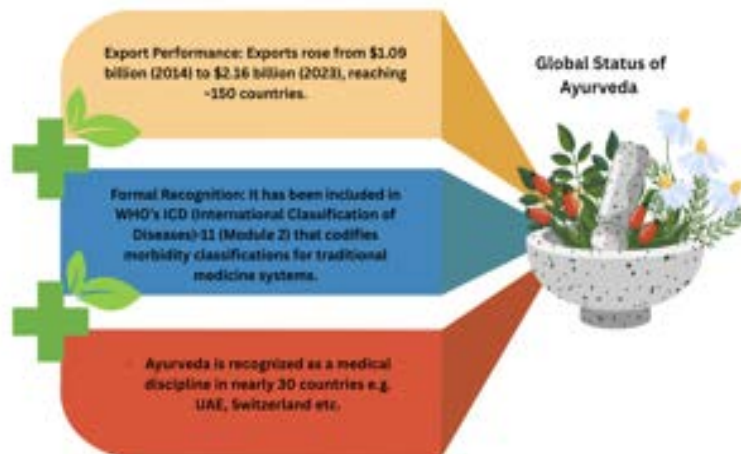

Prelims Corner	Mains Corner
Q. With reference to Online Child Sexual Exploitation and Abuse (OCSEA), consider the following statements: 1. The Protection of Children from Sexual Offences (POCSO) Act, 2012 criminalises the storage and possession of Child Sexual Exploitative and Abuse Material (CSEAM). 2. Section 67B of the Information Technology Act, 2000 deals with offences relating to Child Sexual Exploitative and Abuse Material in electronic form. 3. The Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 require social media intermediaries to take reasonable measures to detect and remove CSEAM. Which of the statements given above are correct? (a) 1 and 2 only (b) 2 and 3 only (c) 1 and 3 only (d) 1, 2 and 3 Answer: (d)	Q. Technology is both an enabler of Online Child Sexual Exploitation and Abuse (OCSEA) and a tool to combat it. Discuss. GS Paper III Internal Security/Science & Technology 10 Marks 150 Words

2. MAKING AYURVEDA GLOBAL

Context: NITI Aayog released the report “Strategic Roadmap for Making Ayurveda Global”.

Main Challenges

- **Limited professional mobility:** While India has over 355,000 qualified practitioners, about 95% remain within the country.
- **Competitive Pressure:** Traditional Chinese Medicine has a more robust global footprint due to long-term state support, extensive overseas centers etc.
- **Evidence Gaps:** lack of scientific validation in formats accepted by international regulators creates scepticism and force high-value Ayurvedic medicines to be sold as dietary supplements rather than therapeutic drugs.



Steps Taken by the Government to Promote Ayurveda in India

- **Ministry of AYUSH (2014):** Established to promote Ayurveda and other traditional systems of medicine.
- **National AYUSH Mission:** Supports AYUSH healthcare, education, medicinal plants, and quality assurance.
- **Ayushman Bharat Integration:** AYUSH services are integrated into **Health and Wellness Centres (HWCs)** for holistic primary healthcare.
- **Education & Research:** Expansion of **All India Institute of Ayurveda** and research through **The Central Council for Research in Ayurvedic Sciences**.
- **Quality Standards:** Strengthening the **Ayurvedic Pharmacopoeia of India**, drug standardisation, testing laboratories, and Good Manufacturing Practices (**GMP**) compliance.

Key recommendations

Conclusion: Through stronger research, standardised products, skilled practitioners, and international collaboration, India can position Ayurveda as a trusted, evidence-based healthcare system serving both national and global needs.

3. RISING ROAD ACCIDENTS AND FATALITIES

Context: The Ministry of Road Transport and Highways (MoRTH) released the Road Accidents in India 2024 report, highlighting rising road accidents and fatalities, emphasizing the need for safe, sustainable, and technology-driven road infrastructure.

Causes of Rising Road Accidents and Fatalities in India

- **Traffic Rule Violations:** Over-speeding, drunk driving, red-light jumping, wrong-side driving, and non-use of helmets/seat belts.
- **Unsafe Infrastructure:** Black spots, poor signage, inadequate lighting, potholes, and unsafe intersections.
- **Weak Enforcement:** Limited technology use, low conviction rates, and inconsistent implementation of traffic laws.
- **Mixed Traffic:** Pedestrians, cyclists, animal-drawn carts, and fast-moving vehicles sharing the same roads.
- **Vehicle Safety Issues:** Old vehicles, poor maintenance, and limited use of advanced safety features.
- **Rapid Motorisation:** Vehicle growth outpaces road infrastructure and traffic management.
- **Urban Congestion:** Illegal parking, roadside encroachments, and unplanned urbanisation increase risks.



- **Adverse Weather:** Fog, heavy rainfall, and poor visibility contribute to accidents.

Government Interventions for Safer Roads and Fewer Accidents

- **Motor Vehicles (Amendment) Act, 2019:** Imposes higher penalties for traffic violations, strengthens licensing norms, and enhances road safety enforcement.
- **Road Safety Audits:** Mandatory safety audits for National Highways during design, construction, and operation stages.
- **Vehicle Safety Standards:** Mandatory ABS, airbags, seat-belt reminders, crash-test norms (Bharat NCAP), and electronic stability features in vehicles.
- **Intelligent Traffic Management Systems (ITMS):** Use of AI-enabled cameras, e-challans, speed detection, and automated enforcement.
- **Good Samaritan Guidelines:** Legal protection and incentives for bystanders assisting accident victims.



Test Your Knowledge	
Prelims Corner Q. With reference to the measures adopted for improving road safety in India, consider the following statements: 1. The Motor Vehicles (Amendment) Act, 2019 prescribes higher penalties for traffic violations and strengthens licensing provisions. 2. Road Safety Audits are undertaken only after the completion of National Highway projects. 3. Bharat NCAP assesses the crashworthiness and safety performance of passenger vehicles. 4. The Good Samaritan Guidelines provide legal protection to persons assisting road accident victims. Which of the statements given above are correct? (a) 1, 3 and 4 only (b) 1 and 2 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a) Explanation: Road Safety Audits are conducted during the design, construction etc stages, not only after project completion.	Mains Corner Q. Road safety is not merely a transport issue but a major public health and governance challenge. Examine the factors responsible for the rising number of road accidents and fatalities in India. Suggest a multi-pronged strategy to achieve safer roads. GS Paper III 15 Marks 250 Words

4. CHALLENGE OF WATER SECURITY IN INDIA

Context: The grave challenge of water security was pointed out in the research by the Council on Energy, Environment and Water (CEEW).

Main Findings:

- **Water Stress:** 11 of India's 15 major river basins face water stress (annual availability <1,700 m³/person).



- **Growing Water Crisis:** Water scarcity has become a structural risk, threatening households, agriculture, industry, and cities such as Bengaluru and Delhi.

Impediments to Water Security in India

- **Water Pollution:** Industrial effluents, untreated sewage, and agricultural runoff contaminate rivers and groundwater.
- **Inefficient Water Use:** Flood irrigation, leakages, and poor water management result in significant water losses.
- **Rapid Urbanisation:** Growing cities increase water demand while reducing groundwater recharge through concretisation.
- **Governance & Institutional Issues:** Fragmented water governance, inter-state disputes, and weak enforcement hinder integrated water management.
- **Limited Freshwater:** India has 18% of the world's population but only 4% of global freshwater.
- **Declining Urban Supply:** Cities like Delhi receive only ~70% of daily water demand.
- **Seasonal Rainfall:** ~70% of rainfall occurs in just 3 months, causing uneven availability; El Niño led to a 40% monsoon rainfall deficit (June 2026).
- **Infrastructure Gaps:** Only 30% of wastewater is treated (CPCB); pollution and inadequate infrastructure worsen water scarcity.

Recent Government Initiatives to Tackle Water Scarcity in India (Latest First)

- **Mission Amrit Sarovar (2022):** Creates and rejuvenates water bodies for storage, groundwater recharge, and conservation.
- **Jal Shakti Abhiyan – Catch the Rain (2021):** Promotes rainwater harvesting, watershed development, and community-led water conservation.
- **Atal Bhujal Yojana (2019):** Enables community-based groundwater management through aquifer mapping and sustainable use.
- **Jal Jeevan Mission (2019):** Provides rural tap water connections with focus on source sustainability and conservation.
- **AMRUT 2.0 (2021):** Enhances urban water security through improved supply, wastewater treatment, and reuse.

Conclusion: As India moves towards becoming a developed nation, water security must become a cornerstone of inclusive and sustainable development. A **"Catch the Rain, Save Every Drop"** approach, backed by **technology, governance reforms, and public participation**, can build a **water-secure** India.

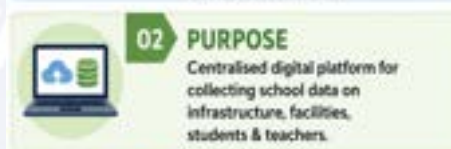
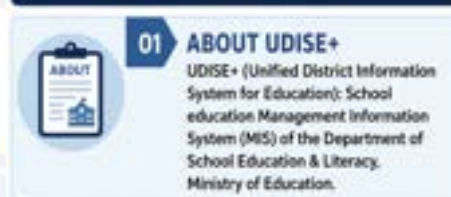
Test Your Knowledge	
Prelims Corner Q. With reference to water security in India, consider the following statements: 1. A river basin is generally considered water-stressed when annual per capita water availability falls below 1,700 cubic metres. 2. India possesses about 18% of the world's freshwater resources. 3. Atal Bhujal Yojana promotes community-led groundwater management through aquifer mapping. 4. AMRUT 2.0 includes wastewater treatment and reuse as components of urban water management. Which of the statements given above are correct? (a) 1, 3 and 4 only (b) 1 and 2 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a) Explanation: India has 18% of the world's population but only about 4% of global freshwater resources. Statements 1, 3 and 4 are correct.	Mains Corner Discuss the role of integrated water resources management (IWRM) in addressing India's water crisis. Evaluate the effectiveness of recent government initiatives in improving water security. GS Paper III 15 Marks 250 Words

5. UNIFIED DISTRICT INFORMATION SYSTEM FOR EDUCATION PLUS (UDISE+) 2025-26 REPORT

Context: Union Ministry of Education released the Unified District Information System for Education Plus (UDISE+) 2025-26 report

Key Findings of the Report

- **Teacher Strength:** Crossed **1.02 crore** (2025–26), up **8.3%** over 2022–23.
- **Pupil–Teacher Ratio:** Improved to **10:1 (Foundational)**, **12:1 (Preparatory)**, **17:1 (Middle)**, **21:1 (Secondary)**—all better than the **National Education Policy (NEP) 2020** norm of **30:1**.
- **Dropouts & Retention:** Dropouts fell to **1.8% (Preparatory)** and **7.0% (Secondary)**; retention rose to **83.7% (Middle)** and **51.9% (Secondary)**.
- **Enrolment:** **Gross Enrolment Ratio** at the secondary level increased from **68.5% to 71.7%**.
- **Infrastructure:** Computer access rose **64.7%→69.9%**; **95%** of schools had electricity and **98.5%** had girls' toilets.
- **Female Participation:** Women formed **54.9%** of teachers; girls **48.4%** of enrolment; **Gender Parity Index** remained **above 1** at all levels.

**Major Challenges in India's School Education System**

- **Accessibility Gaps:** Many schools lack facilities for **Children with Special Needs**.
- **Secondary Drop-off:** Retention drops from **98.5% (Foundational)** to **51.9% (Secondary)** due to weak foundational skills.
- **Weak Foundational Learning:** Poor **Foundational Literacy and Numeracy** limits advanced learning and increases disengagement.
- **Teacher Shortage:** Over **1 lakh** schools have only one teacher.
- **Regional Disparities:** Wide performance gaps (e.g., **31.4%** between Chandigarh and Meghalaya) due to weak capacity, absenteeism, poor fund use and ineffective **School Management Committees (SMCs)**.
- **Low-Performing Districts:** Aspirational districts face resource and administrative gaps, limiting **NEP 2020** implementation (e.g., teacher training, smart classrooms)..

Measures Needed to Strengthen School Education in India

- **Teacher Development:** Fill vacancies through mission-mode recruitment; implement **Integrated Teacher Education Programme**; continuous training via **DIKSHA**.
- **Governance:** Merge single-teacher schools into Composite/Cluster Schools; ensure universal **APAAR** adoption; strengthen **School Management Committees (SMCs)**.
- **Pedagogy:** Implement **NIPUN Bharat** for **Foundational Literacy and Numeracy (FLN)** by Grade 3; promote competency-based assessment through **PARAKH**; use mother tongue/regional languages in foundational years.
- **Equity & Retention:** Introduce vocational education from Class VI; improve **Children with Special Needs (CWSN)** accessibility; strengthen **PM POSHAN** to boost attendance and retention.
- **Monitoring:** Supplement self-reported **UDISE+** data with independent social audits; link findings to **Samagra Shiksha** funding for targeted improvements.

Conclusion: UDISE+ reflects India's progress towards **universal, equitable, and quality education**; however, bridging the **access–learning divide** through **teacher empowerment, inclusive governance, and evidence-based reforms** is crucial for achieving the vision of **Viksit Bharat 2047**.

6. ALL INDIA SURVEY ON HIGHER EDUCATION (AISHE): 2022-23 & 2023-24

Context: Union Ministry for Education Released Reports of the AISHE: 2022-23 & 2023-24. The report collects information from Higher Education Institutions (HEIs) on enrolment, faculty, infrastructure, and examination outcomes to support evidence-based policymaking.

Key Findings of the Report

- **Rising Gross Enrolment Ratio:** Higher education (GER) increased from 23.7 (2014–15) → 29.5 (2022–23) → 30.0 (2023–24); female GER rose to 31.2. GER measures the share of the 18–23 years population enrolled in higher education.
- **Gender Parity:** Female GER exceeded male GER for 7 years; **Gender Parity Index = 1.08 (2023–24).**
- **Social Inclusion:** Enrolment rose among SCs (+51.4%), STs (+75.7%) & OBCs (+60.2%) since 2014–15.
- **Women in STEM:** Female STEM participation increased from 38.4% to 44%.
- **Faculty Growth:** Higher education faculty reached 17.32 lakh (2023–24) with 44.9% female representation.

Measures to Strengthen Higher Education

- **Increase Investment:** Raise education spending to 6% of GDP to build capacity and achieve 50% GER by 2035 (NEP 2020).
- **Promote Multidisciplinary Learning:** Use Academic Bank of Credits, flexible entry–exit, and STEM–humanities integration.
- **Boost Research & Innovation:** Use ANRF to promote venture-based funding and university-led deep-tech innovation.
- **Performance-Based Autonomy:** Link autonomy with NAAC accreditation and NIRF performance.
- **Strengthen Industry Linkages:** Include industry experts in governance; promote relevant curricula, micro-credentials & stackable degrees.
- **AI-Based Learning:** Leverage AI, SWAYAM & DIKSHA for personalised and multilingual learning.

KEY INITIATIVES FOR QUALITY HIGHER EDUCATION	
	1. HEFA: Provides loans for world-class educational infrastructure.
	2. Institutions of Eminence (IoE): Recognised 12 institutions to improve global teaching & research standards.
	3. ANRF: Promotes research, innovation & industry–academia collaboration and supports NEP goals.
	4. Student Support through PM Vidyalaxmi: • Education loans up to ₹10 lakh. • Central Sector Interest Subsidy Scheme: Interest subsidy for EWS students.
	5. PM Internship Scheme: Targets 1 crore internships in 5 years for employability and skill development.
CHALLENGES IN HIGHER EDUCATION SECTOR	
	1. Low Research Investment: GERD remains ~0.6–0.7% of GDP, limiting innovation.
	2. Unregulated Private Growth: Weak quality control leads to substandard and costly education.
	3. Weak State Universities: Funding shortages, poor infrastructure & governance issues affect performance.
	4. Research-Teaching Gap: Limited university–research institution linkages weaken innovation.
	5. Employability Crisis: Skill gaps between education outcomes and industry needs lead to graduate unemployment.
	6. Quality vs Quantity: Universities struggle with global rankings due to limited research output and quality concerns.
	7. Rural–Urban Divide: Unequal access to quality institutions increases dependence on low-tier colleges and dropout rates.

Conclusion: Moving beyond rigid regulation towards a **research-driven ecosystem** is essential to bridge the **education–employability gap** and emerge as a **global knowledge superpower**.

Test Your Knowledge	
Prelims Corner	Mains Corner
Q1. With reference to the All India Survey on Higher Education (AISHE), consider the following statements: 1. AISHE collects data on enrolment, faculty, infrastructure and examination outcomes from Higher Education Institutions. 2. The Gross Enrolment Ratio (GER) in higher education measures the proportion of the 18–23 years age group enrolled in higher education. 3. A Gender Parity Index (GPI) greater than 1 indicates that female enrolment exceeds male enrolment relative to the eligible population. Which of the statements given above are correct? (a) 1 and 2 only (b) 2 and 3 only (c) 1 and 3 only (d) 1, 2 and 3 Answer: (d)	Expanding enrolment alone cannot transform India's higher education system. Examine the reforms needed to build a multidisciplinary, research-driven and industry-aligned higher education ecosystem in line with the objectives of NEP 2020. GS Paper II 15 Marks 250 Words

7. VIKSIT BHARAT SHIKSHA ADHISHTHAN (VBSA) BILL, 2025

Context: Several states and universities have raised concerns over the VBSA Bill, 2025, citing excessive centralisation, reduced institutional autonomy, and weaknesses in the proposed regulatory framework. The Bill is under review by a Joint Parliamentary Committee (JPC).

Key Features of the Viksit Bharat Shiksha Adhishthan (VBSA) Bill, 2025

- **Composition:** Headed by a **Chairperson** with up to **12 members**, including Council Presidents, the Union Higher Education Secretary, experts, and State representatives.
- **Council Functions:** The **Regulatory Council** sets minimum standards, promotes autonomy, and handles grievances; the **Standards Council** defines academic norms and learning outcomes; the **Accreditation Council** manages accreditation.
- **Apex Regulator:** Establishes the **VBSA** as the apex higher education regulator, replacing **UGC, AICTE, and NCTE**. Covers technical, teacher education, and architecture, but excludes medicine and law.
- **Three-Council Structure:** Functions through the **Regulatory Council, Accreditation Council, and Standards Council**, separating regulation, accreditation, and academic standards.
- **Appointments & Removal:** The **Central Government** appoints the Chairperson; Council Presidents and full-time members are selected through a search-cum-selection process. Members may be removed for insolvency, conviction, incapacity, or misuse of office.
- **Degree-Granting Powers:** Degrees can be awarded only by recognised universities, Parliament-established institutions, or institutions authorised by the Regulatory Council with prior Central Government approval.
- **Penalties & Appeals:** The Regulatory Council can impose graded penalties. Unauthorised institutions may face a **minimum ₹2 crore fine** and closure. Appeals lie with the **Central Government**.



Concerns Regarding the Viksit Bharat Shiksha Adhishthan (VBSA) Bill, 2025

- **Legal Ambiguity:** Some provisions may override **Institutions of National Importance (INIs)** and **Institutions of Eminence (IoEs)** Acts despite autonomy safeguards.
- **One-size-fits-all Framework:** Uniform regulation and accreditation may not suit research, rural, tribal and new **Higher Education Institutions (HEIs)**.
- **Over-centralisation:** Replacing **University Grants Commission (UGC)**, **All India Council for Technical Education (AICTE)** and **National Council for Teacher Education (NCTE)** with one regulator may centralise power and reduce States' role.
- **Reduced Autonomy:** **IITs, IIMs, IISERs** and other **INIs** fear curbs on academics, research, curriculum, online education and expansion.
- **Weak Accreditation:** Limited capacity, low coverage, **National Assessment and Accreditation Council (NAAC)** corruption allegations and fake accreditation claims.
- **Harsh Penalties:** Heavy fines and closure provisions may disproportionately affect small, rural and tribal **HEIs**; stakeholders seek an independent appeal mechanism.
- **Structural Gaps:** Fails to adequately address low **GER**, regional disparities, barriers to new **HEIs** and inadequate public funding.

Conclusion: The VBSA Bill should uphold cooperative federalism, institutional autonomy, and light but tight regulation to build an inclusive, globally competitive higher education system that advances the vision of Viksit Bharat 2047.

 **Test Your Knowledge** 

Prelims Corner	Mains Corner
Q. With reference to the proposed Viksit Bharat Shiksha Adhishthan Bill, 2025, consider the following statements: 1. It proposes to establish a single apex regulator for higher education by replacing the UGC, AICTE and NCTE. 2. The proposed regulatory framework covers medical and legal education. 3. The Bill envisages separate councils for regulation, accreditation and academic standards. 4. Under the Bill, unauthorised institutions may face graded penalties, including closure. Which of the statements given above are correct? (a) 1, 3 and 4 only (b) 1 and 2 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a) Explanation: The proposed framework excludes medical and legal education. Statements 1, 3 and 4 are correct.	"Light but tight regulation" is increasingly advocated as the guiding principle for higher education reforms in India. Explain this principle and examine its relevance in the context of the proposed VBSA Bill, 2025. GS Paper II 10 Marks 150 Words

8. NIPUN BHARAT MISSION AND FOUNDATIONAL LEARNING

Context: After 5 years of **NIPUN Bharat (2021)**, focus is on consolidating FLN gains and extending support beyond Grade 3. **NEP 2020** identified FLN as the top priority.

Key Features

Status of Foundational Literacy and Numeracy (FLN) in India

- FLN refers to the ability to **read, understand simple text and solve basic maths** by **Class 3**, forming the base for higher learning and critical skills.
- **Learning Gaps:** Despite NEP 2020 focus, FLN remains weak. **Annual Status of Education Report (ASER):** Grade 3 government school students reading Grade 2 text rose only from **16.3% (2022) to 23.4% (2024)**.
- **Learning Poverty:** Around **55%** of children face learning poverty (World Bank)—unable to read and understand simple text by age 10; worsened after COVID-19.

Policy Frameworks

- **NEP 2020:** Makes FLN the highest priority; targets universal FLN by **Grade 3**.
- **Samagra Shiksha:** Covers **pre-school to Class XII** to improve quality and outcomes.
- **PM SHRI:** Upgrades **14,500+ schools** as NEP model institutions.
- **DIKSHA:** Digital platform providing learning resources for teachers and students.

 **NIPUN BHARAT MISSION**

	ABOUT: National Initiative for Proficiency in Reading with Understanding and Numeracy, launched by MoE (2021) under Samagra Shiksha.
	TARGET: FLN skills for children aged 3–9 years by Grade 3 (Grade 5 by 2026–27).
	APPROACH: Play-based, experiential and multilingual learning.
	FOCUS: Literacy (reading, comprehension, writing) and numeracy (numbers, operations, measurement).
	SUPPORT: Teacher training through NISHTHA; digital resources via DIKSHA; competency-based assessments.
IMPLEMENTATION & OUTCOMES	
	IMPLEMENTED BY Department of School Education & Literacy, MoE through a five-tier structure with SMC/community participation.
	AIMS TO improve learning outcomes, reduce dropouts and promote inclusive education.
	
NIPUN BHARAT envisions every child in India becoming a confident reader and skilled in numeracy by the foundational years.	

Measures to Strengthen FLN through NIPUN Bharat

- **Strengthen Teacher Capacity:** Provide continuous hybrid training aligned with NPST and support **Multi-Grade Multi-Level (MGML)** classrooms.
- **Create Mentor Cadre:** Enable regular classroom observation, student tracking and teacher feedback.

- **Extend NIPUN Bharat to Grade 5:** Focus Grades 3–5 on strengthening foundational skills, as many students lack basic reading and arithmetic abilities.
- **Universalise Balvatika:** Ensure trained educators, learning materials and play-based pedagogy for early readiness.
- **Reform Assessments:** Align **PARAKH, PRS and FLS**; introduce competency-based assessments at Grade 5.
- **Improve Governance:** Develop a district-level **NIPUN Index**, promote parent engagement through reading initiatives and strengthen outcome-based monitoring.

9. WHO GLOBAL STATUS REPORT ON CANCER 2026

Context: The report, released by the World Health Organization (WHO) and the International Agency for Research on Cancer (IARC), is the first global survey of people affected by cancer.

Key Highlights

- **Rising Burden:** Cancer causes 20.6M cases & 10M deaths annually; cases may reach 35M by 2050.
- **Leading Cause:** Lung cancer remains the top cause of cancer deaths.
- **Regional Disparities:** Asia contributes 50.7% cases & 56.5% deaths; Europe has a higher burden relative to population.
- **Economic Impact:** 45% reported financial hardship due to treatment costs.

Cancer Burden in India

- **Women:** Breast cancer most common. || **Men:** Oral cancer most common (linked to tobacco use).
- **15.6 lakh new cases** and **8.7 lakh deaths annually**. || **60–70% cases** detected at advanced stages, reducing survival.
- **2nd leading cause of death** after cardiovascular diseases. || Other major cancers: **Lung, cervical, oesophageal, stomach & colorectal**.
- **NE states** (Mizoram, Nagaland, Meghalaya, Arunachal Pradesh, Assam) show high incidence.



Global Cancer Report 2026: Way Forward

- **Prevention:** Control tobacco/alcohol, promote healthy lifestyles, expand **HPV & Hepatitis B vaccination**.
- **Early Detection:** Strengthen screening, awareness and diagnostics.
- **Equitable Care:** Integrate cancer care into **Universal Health Care** and improve affordability.
- **Health System Strengthening:** Invest in infrastructure, workforce, surveillance & research.

Conclusion: Strengthening health systems, innovation and public awareness will be crucial to achieving a cancer-resilient society and advancing SDG 3: Good Health and Well-being.

STUDENT'S
NOTES 

Test Your Knowledge	
Prelims Corner Q. With reference to the WHO Global Status Report on Cancer 2026, consider the following statements: 1. Lung cancer remains the leading cause of cancer-related deaths globally. 2. In India, breast cancer is the most common cancer among women, while oral cancer is the most common among men. 3. The report was released jointly by the World Health Organization (WHO) and the International Agency for Research on Cancer (IARC). 4. More than half of all cancer cases in India are detected at an early stage. Which of the statements given above are correct? (a) 1, 2 and 3 only (b) 1 and 4 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a) Explanation: Around 60-70% of cancer cases in India are detected at advanced stages, making Statement 4 incorrect.	Mains Corner Discuss how prevention, early diagnosis and equitable access to treatment can reduce the socio-economic burden of cancer in India. Evaluate the role of Universal Health Coverage in this regard. GS Paper III 15 Marks 250 Words

10. DRAFT NATIONAL HEALTH RESEARCH POLICY, 2026

Context: MoHFW released the draft policy, prepared by the Department of Health Research, for public consultation. First unified framework to build an **inclusive, self-reliant and impact-driven** health research ecosystem.

Challenges

- **Uneven Capacity:** Research concentrated in few institutions/regions.
- **Misaligned Priorities:** Limited focus on health needs, equity and preparedness.
- **Procedural Delays:** Administrative and regulatory hurdles slow research.
- **Limited Assessment:** Evaluation focuses on publications rather than wider impact.

Key Highlights

- **Funding:** Raise health research spending from **0.024% of GDP** to **0.072% by 2037** and **0.15% by 2047**.
- **National Health Research Agenda (NHRA):** Align research with health priorities, equity, preparedness and innovation.
- **Governance:** Three-tier framework—**National Health Research Stewardship Committee, DHR** and **ICMR**.
- **State Participation:** States to develop local health research agendas aligned with national priorities.
- **Research Infrastructure & Ethics:** Faster ethics approvals, **National Research Integrity Office (NRIO)**, responsible AI use and shared research facilities.
- **Impact-Based Evaluation:** Move beyond publications/patents to assess impact on policy, healthcare, technology, programmes and health equity.

11. EMPOWERING WOMEN THROUGH DEMOCRATIC DECENTRALISATION

Context: During BRICS Women Ministerial Meeting in Kochi, Kerala, Ministry of Panchayati Raj showcased India's transformative initiatives in empowering women through democratic decentralisation.

Status of Women in PRIs

- **Representation:** **14.5 lakh Elected Women Representatives (EWRs)**, **~46%** of PRI representatives (July 2025).
- **Leadership:** **25/42 Gram Panchayats** under **National Panchayat Awards** were women-led.

Benefits of Women's Participation

- **Water Conservation:** Piplantri Gram Panchayat (Rajasthan) promoted environmental conservation through "one tree for every girl child".
- **Climate Resilience:** Odanthurai Gram Panchayat (Tamil Nadu) promoted community-based solar energy.
- **Gender-Sensitive Governance:** Tackled child marriage and gender discrimination. *Example:* Nongarh Gram Panchayat (Bihar) launched a child marriage prevention drive.
- **Women Empowerment:** Women-led governance broke social barriers. *Example:* Jorhat Gram Panchayat (Assam) launched "Own Farm–Own Market" for women farmers.

Initiatives

- **73rd & 74th Amendments:** Mandated 1/3 reservation for women in PRIs and ULBs.
- **Reservation within Reservation:** SC/ST reserved seats also include women reservation.
- **106th Constitutional Amendment:** Provides 1/3 reservation for women in Lok Sabha, State Assemblies & Delhi Assembly.
- **Model Women-Friendly Gram Panchayat (MWFGP):** Promotes gender-responsive governance.
- **Capacity Building:** Training in leadership, communication, negotiation & decision-making.

Way Forward

- Strengthen women's grassroots leadership for **inclusive, equitable and sustainable development**.
- Greater participation will ensure **responsive governance and social transformation**.

Conclusion: From participation to decision-making, women in PRIs are reshaping governance. Supporting their leadership is essential for a more equitable India.



Test Your Knowledge

Prelims Corner

Q. Greater participation of women in Panchayati Raj Institutions is expected to contribute to which of the following?

1. Improved management of natural resources and water conservation.
2. Greater emphasis on gender-sensitive issues such as child marriage and women's welfare.
3. Enhanced community participation in climate-resilient development.
4. Strengthening grassroots democracy through inclusive decision-making.

Select the correct answer using the code below:

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

Answer: (d)

Mains Corner

Discuss how greater participation of women in local self-government can strengthen good governance, gender justice and sustainable development in rural India.

GS Paper II | 10 Marks | 150 Words

12. CIVIL REGISTRATION SYSTEM (CRS) REPORT 2024

Context: India achieved **99%+ registration coverage** in 2024: **births – 99.1%, deaths – 99.4%** (2000: births **56%**, deaths **48%**).

About CRS: Released by **Registrar General & Census Commissioner of India (MHA)**. Continuous mandatory system for recording **births, deaths and stillbirths** under the **Registration of Births and Deaths Act, 1969** (amended in 2023).

Key Findings

- **Near-Complete Registration:** 99.1% births and 99.4% deaths registered in 2024.
- **State Performance:** 18 States/UTs achieved 100% birth registration; 21 achieved 100% death registration.
- **Progress:** Coverage improved from 2000 (56% births, 48% deaths) to 2014 (86.6%, 72.5%) and 2024 (99.1%, 99.4%).
- **Delayed Registration:** Many events are not registered within the prescribed 21 days.
- **Infant Death Gaps:** Reporting remains uneven—**urban: 84.2%, rural: 15.8%**.
- **Cause-of-Death Data:** Limited medical certification reduces usefulness for mortality and disease analysis.
- **Estimation Concerns:** CRS completeness based on SRS data may overestimate actual coverage if SRS undercounts events.

Significance of CRS

- **Vital Statistics:** Data on births, deaths, fertility, mortality and sex ratio at birth.
- **Policy Planning:** Supports evaluation of health policies and demographic trends.
- **Decentralised Governance:** District-level planning and programme implementation.

PROVISIONS FOR REGISTRATION OF BIRTHS AND DEATHS

	1. MANDATORY REGISTRATION: Under the RBD Act, 1969 (amended in 2023), all births and deaths must be registered at the place of occurrence.
	2. REGISTRATION AUTHORITIES: • RGI supervises nationally; • Chief/District Registrars manage state/district implementation; • Local Registrars issue certificates.
	3. DIGITAL REGISTRATION: Since October 2023, all births and deaths are registered digitally through CRS.
	4. TIMELINE: Events must be reported within 21 days; delayed registration attracts late fees.
	5. STILLBIRTH: Fetal death after 28 weeks of pregnancy before/during birth.
	6. EVENTS ABROAD: • Births: Registered under the Citizenship Act, 1955 and Consular Rules, 1956; returnees can register within 60 days under Section 20 of RBD Act. • Deaths: Registered at Indian consulates and recognised under the RBD Act, 1969.
	7. PENALTY: Registrars' negligence may attract a fine up to ₹1,000 under the RBD Act.
	Timely registration ensures legal identity, protects rights, and supports good governance and planning.

- **Legal Identity:** Birth/death certificates support education, identity, welfare schemes, pensions, insurance and inheritance.
- **Public Health:** Helps monitor mortality trends, seasonal variations and health emergencies.

13. POINTERS FOR PRELIMS

13.1. NATIONAL SC-ST HUB (NSSH) SCHEME

- **Launched: 2016** under the **Ministry of MSME**. || **Implementing: National Small Industries Corporation.**
- **Aim:** Empower SC/ST entrepreneurs through professional and business support.
- **Key Objectives:** Enable SC/ST MSEs to meet the **4% procurement sub-target** under the **Public Procurement Policy for MSEs, 2012.**

13.2. NATIONAL ACTION PLAN FOR DRUG DEMAND REDUCTION (NAPDDR)

- **Ministry:** Ministry of Social Justice and Empowerment.
- **Key Features:** Forms the policy framework for **Nasha Mukh Bharat Abhiyaan (2020)** and supports NGOs, IRCAs, and **Community-based Peer-led Interventions (CPLI).**

13.3. ULLAS (UNDERSTANDING LIFELONG LEARNING FOR ALL IN SOCIETY)

- **Uttarakhand** became the **6th fully literate state** under **NEP 2020** and the **ULLAS** scheme, joining **Mizoram, Goa, Tripura, Himachal Pradesh, and Sikkim.**
- **About:** Centrally Sponsored Scheme aligned with **NEP 2020** | **Period:** 2022–27 | **Vision:** *Jan Jan Saakshar* based on **Kartavya Bodh** through volunteerism.
- **Objective:** Cover **non-literates (15+ years)** across all States/UTs; provide **Foundational Literacy & Numeracy (FLN)** to **5 crore learners** (1 crore/year) through **hybrid mode.**

13.4. NASHA MUKT BHARAT ABHIYAAN (NMBA)

- **NMBA** has reached **29.24+ crore** people nationwide.
- **About:** Launched in **2020** across **272 vulnerable districts**; expanded to **all districts** in **2023** | **Nodal Ministry:**

Ministry of Social Justice & Empowerment (MoSJE) | Objective: Achieve a **Drug-Free India** through youth, women, and community participation.

- **Three-Pronged Strategy:** **Supply Control–Narcotics Control Bureau (NCB) | Demand Reduction & Awareness–MoSJE | Treatment & Rehabilitation–MoHFW.**

13.5. AYUSHMAN BHARAT DIGITAL MISSION (ABDM)

- **ABDM** crossed **93.95 crore Ayushman Bharat Health Account (ABHA) IDs**, becoming one of the world's largest digital health ecosystems.
- **Nodal Agency:** **National Health Authority** under the **Ministry of Health and Family Welfare.**
- **Objective:** Build the **digital backbone** for an integrated healthcare system.
- **Core Components:** **Ayushman Bharat Health Account (ABHA): 14-digit unique health ID** for secure storage and sharing of health records. || **Registries:** **Healthcare Professionals Registry** and **Health Facility Registry.**

13.6. NAMASTE DAY

- Observed by the **Ministry of Social Justice & Empowerment** on **July 14**, marking 3 years of the **NAMASTE Scheme (2023).**
- **Significance:** Honours sanitation workers, including sewer/septic tank workers, waste pickers and former manual scavengers.

13.7. UN WOMEN REPORT ON GLOBAL AID CUTS

- **UN Women** highlighted the impact of declining foreign aid on women-led humanitarian organisations.
- **Reduced Support:** Since **January 2025**, **1 million+** women and girls lost access to essential humanitarian aid.

13.8. UN-HABITAT

- Andhra Pradesh signed an MoU with **UN-Habitat** to promote inclusive and sustainable urban development and establish a **Centre of Excellence for Urban Affairs** in Amaravati.
- **UN HABITAT:** UN agency promoting socially and environmentally sustainable towns and cities. | **Established: 1978** after **Habitat I Conference (Vancouver, 1976)**. | **Headquarters: Nairobi, Kenya**.
- **UN-Habitat Assembly:** Includes all **193 UN Member States**; meets every **4 years**.
- Major Initiatives: **World Cities Report, Global Urban Observatory, New Urban Agenda** (Habitat III, Quito, 2016), **Strategic Plan 2026–2029:**

13.9. DEMOGRAPHIC FUTURES SURVEY 2026

- **UNFPA** released “Lives, Choices and Futures – Demographic Futures Survey 2026”.

13.10 WORLD BANK (WB) DROPS KEY CLIMATE FINANCE TARGETS

- Following objections from the United States, the World Bank proposed dropping its 45% climate co-benefits target and 35% target under the Climate Change Action Plan
- About **CCAP:** Launched In **2016** after **Paris Agreement** as a five-year Climate Change Action Plan 2016-2020.
- Building on its achievements, the **second CCAP covering 2021-2025 allocated 35% to climate finance**.
- It was extended until **June 30, 2026**.

SCIENCE AND TECHNOLOGY

1. ISRO'S GAGANYAAN MISSION

Context: Recently, the **first ground test** of the Sub-Orbital Launch Vehicle for Experiments (**SOLVE**) **solid motor** was carried out by the Indian Space Research Organisation (ISRO) at the Static Test Facility, Satish Dhawan Space Centre, Sriharikota.

Details:

- **First Ground Test:** Conducted on 3 July 2026.
- **Purpose:** ISRO test platform for **Gaganyaan** Integrated Parachute Tests.
- **Integrated Parachute Tests:** Validate the Crew Module's deceleration system under different flight conditions.
- **Process:** Crew Module lifted to **10–17 km**, separated, then safely recovered using **10 parachutes** before sea splashdown.



About SOLVE:

- **About:** An **ISRO-developed** solid motor-based launch vehicle.
- **Purpose:** Designed to test and validate critical technologies for the **Gaganyaan** human spaceflight mission.
- **Role:** Carries the **Crew Module** to the required altitude to evaluate its re-entry, deceleration, and safe recovery systems under mission-like conditions.

How Does SOLVE Work?

- **Launch:** The solid motor lifts the **Crew Module** to an altitude of **10–17 km**.
- **Separation:** The Crew Module detaches from the launch vehicle.
- **Parachute Deployment:** A sequence of **10 parachutes** is deployed to gradually reduce speed.
- **Controlled Descent:** The parachutes stabilize the module for a safe descent.
- **Splashdown:** The Crew Module lands in the sea for recovery.

Test Your Knowledge	
Prelims Corner Q1. With reference to SOLVE (Sub-Orbital Launch Vehicle for Experiments), consider the following statements: 1. It is an ISRO-developed solid motor-based launch vehicle designed to validate technologies for the Gaganyaan mission. 2. It carries the Crew Module to an altitude of about 10-17 km for integrated parachute tests. 3. The Crew Module undergoes atmospheric re-entry from orbit before splashdown during SOLVE tests. 4. The integrated parachute test involves the deployment of multiple parachutes to ensure the safe recovery of the Crew Module. Which of the statements given above are correct? (a) 1, 2 and 4 only (b) 1 and 3 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a) Explanation: SOLVE is a sub-orbital test vehicle. It does not perform orbital re-entry; it only simulates key phases such as parachute deployment and recovery.	Mains Corner Explain the importance of Crew Escape, Recovery and Parachute Systems in ensuring the success of India's Gaganyaan Mission. GS Paper III 10 Marks 150 Words

2. I-2SEA SUBMARINE CABLE SYSTEM (SCS)

Context: The construction of the 3,600 km long I-2SEA submarine cable system connecting India, Malaysia, and Singapore by a consortium comprising Microsoft, Singtel, Tata Communications, and Lightstorm has been announced.

What is a Submarine Cable System?

- They are **fibre optic cables** laid on the ocean floor that connect countries across the world to provide internet and telecommunications.
- Optical fibres are used to **transmit information** as light pulses.
- It works based on a **principle called 'total internal reflection'**-where the light in a fibre-optic cable travels through the core (hallway) by constantly bouncing from the cladding (mirror-lined walls).
- These "**invisible highways**" transmit between **95% and 99% of all international data traffic**.
- United Nations General Assembly (UNGA) in 2010 had described the Submarine cable as **critical communication infrastructure**.
- **Major Challenges to SCS:** Risks from accidental or deliberate damage (e.g., anchoring) Environmental factors like earthquakes, Ageing infrastructure, etc.



3. INDIA BATTERY ENERGY STORAGE SYSTEM (BESS) MARKET REVIEW REPORT

Context: Released by India Energy Storage Alliance (IESA) and Customised Energy Solutions (CES), report projects that India will require 888 GWh of Energy Storage System (ESS) capacity by 2035-36, comprising 321 GWh of BESS.

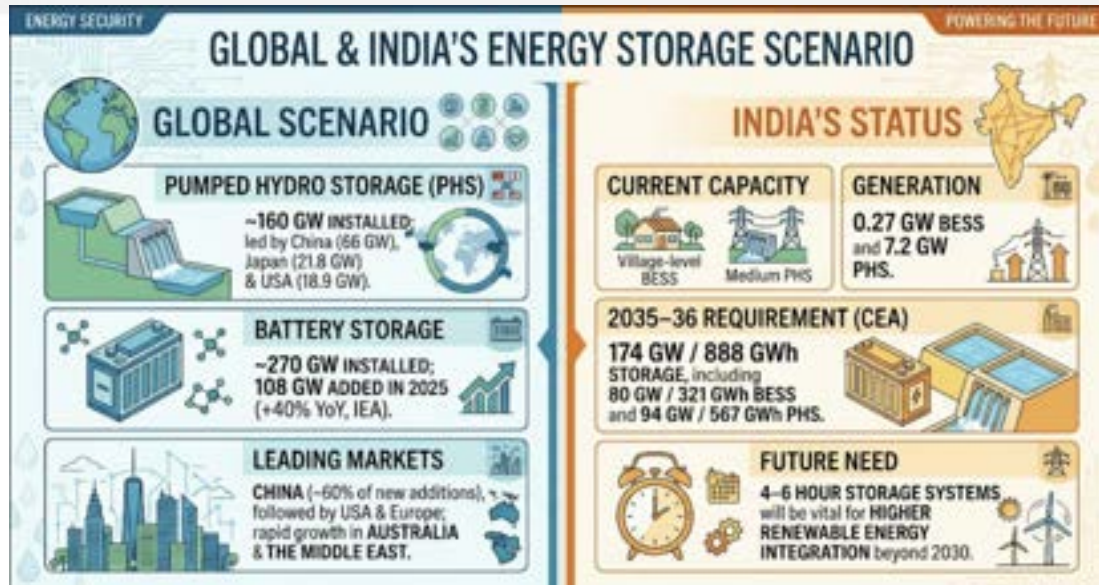
Battery Energy Storage Systems (BESS)

- Stores electricity as **chemical energy** and reconverts it into electricity.
- **Part of ESS:** One of the major **Energy Storage System (ESS)** technologies.

- **Types:**
 - **Solid Batteries:** Lead-acid, Lithium-ion, Zinc-air.
 - **Flow Batteries:** Vanadium redox, Zinc-iron, Zinc-bromine.

Need for ESS

- **Rising Demand:** Peak electricity demand projected at **300 GW**.
- **Renewable Integration:** Essential for integrating **520 GW** installed capacity (**52.3% non-fossil**, Jan 2026).
- **Grid Stability:** Improves **frequency regulation, voltage control & black-start capability**.

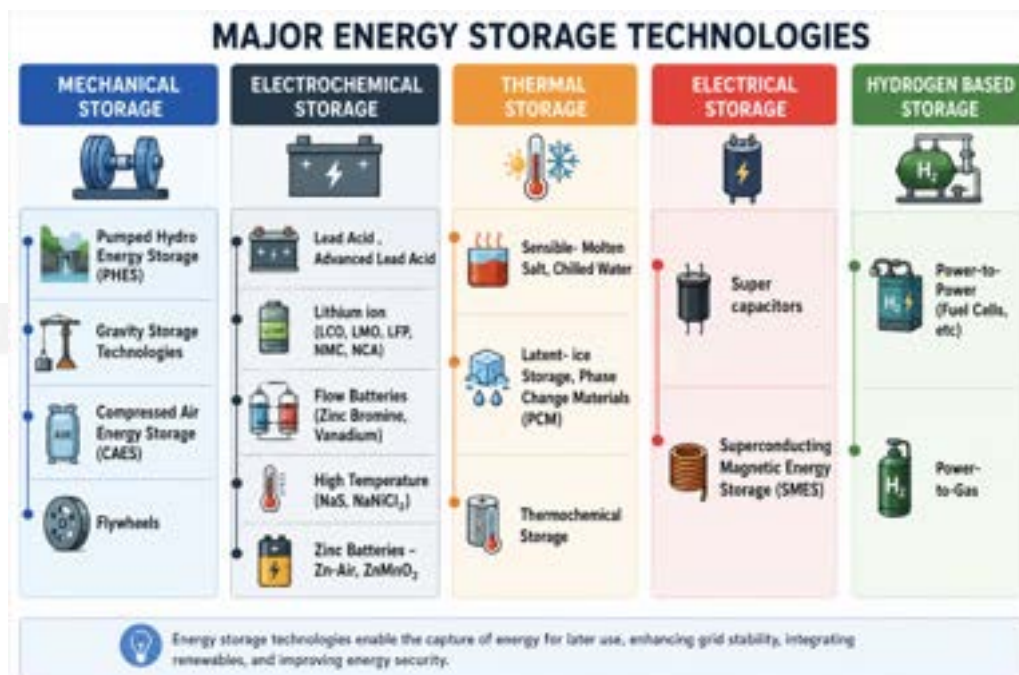


Challenges in Energy Storage

- **Import Dependence:** Imports **75–80% of lithium-ion (Li-ion) cells**, exposing India to supply-chain and price risks.
- **High Capital Cost:** Large upfront investment for **BESS**.
- **Limited Manufacturing:** Weak domestic **Advanced Chemistry Cell (ACC)** and battery component production.
- **Critical Minerals:** Heavy reliance on imported **lithium, cobalt, nickel & graphite**.
- **Land & Environment:** **Pumped Hydro Storage (PHS)** projects require large land and face environmental challenges.
- **Long Timelines:** Delayed approvals and construction of **Pumped Hydro Storage** projects.
- **Financing Risks:** Uncertain revenue models and long payback periods deter investment.
- **Battery Recycling:** Recycling ecosystem remains underdeveloped.

Government Initiatives

- **Central Electricity Authority (CEA) Roadmap:** Targets **174 GW / 888 GWh** energy storage by 2035–36.
- **Viability Gap Funding (VGF):** Improves viability of **BESS**.
- **Production-Linked Incentive (PLI) Scheme:** Promotes domestic **Advanced Chemistry Cell (ACC)** manufacturing.
- **National Programme on ACC Battery Storage:** Supports indigenous next-generation battery technologies.
- **Pumped Hydro Storage (PHS):** Fast-tracks approval and construction of projects.
- **Energy Storage Obligation (ESO):** Mandates procurement of storage-backed renewable power.



Test Your Knowledge

Prelims Corner

Q2. Large-scale deployment of Battery Energy Storage Systems (BESS) is considered crucial for India's energy transition because it can:

1. Facilitate greater integration of renewable energy into the grid.
2. Improve grid stability through frequency regulation and voltage support.
3. Reduce dependence on imported fossil fuels by storing surplus renewable electricity.
4. Eliminate the need for transmission infrastructure expansion.

Select the correct answer using the code below:

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

Answer: (b)
 Explanation: While BESS improves grid flexibility, it does not eliminate the need for transmission infrastructure, which remains essential for power evacuation and grid reliability.

Mains Corner

Examine the role of Battery Energy Storage Systems (BESS) and Pumped Hydro Storage (PHS) in supporting India's clean energy targets. How can policy interventions accelerate the growth of the energy storage sector?

GS Paper III | 15 Marks | 250 Words

4. PLACENTA FUNCTION RECREATED ON A CHIP

Context: Researchers from ICMR-NIRWoH (Mumbai) and IIT Bombay have developed an indigenous, lab-grown placenta-on-a-chip platform that replicates key functions of the human placental barrier.

Placenta-on-Chip

- **Significance:** Enables **stage-specific pregnancy modelling**, gestational diabetes research & **drug safety testing**, reducing animal testing.
- **Placenta:** Temporary organ regulating **nutrient/oxygen transfer**, **waste removal & hormone secretion** between mother and fetus.

Organ-on-Chip Technology

- **What is it?** Miniaturised devices with **living human cells** that mimic human organs.
- **Working:** Combines **tissue engineering & microfabrication** to recreate organ-like conditions.
- **Components:** **Microchannels**, **porous polymer membranes & living cells**.
- **Types:** **Single-organ**, **multi-organ (body-on-chip)** & **tissue (parenchymal/mesenchymal) chips**.
- **Significance:** Reduces **animal testing**; enables **personalised medicine**, **disease modelling**, **drug discovery**, **toxicity testing & clinical trial design**.

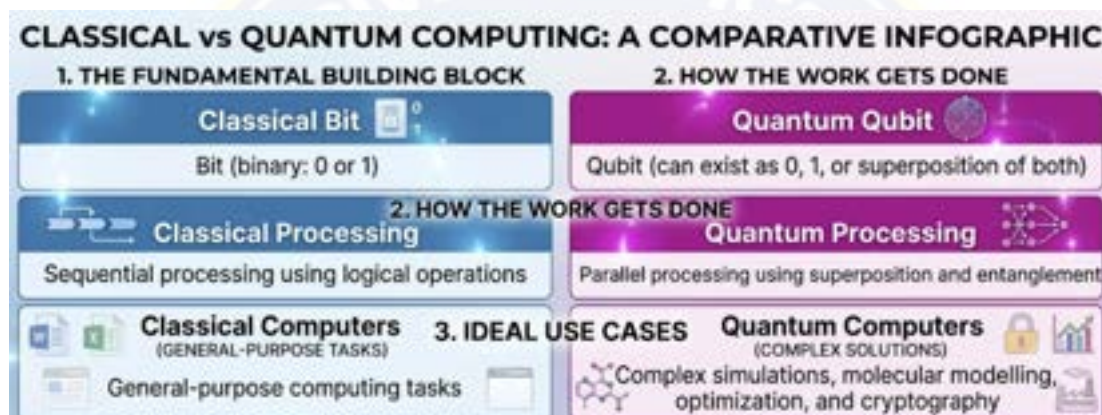
- **Challenges:** Replicating **dynamic organ complexity**; limited **scalability, standardisation & regulatory approval**.

5. QUANTUM COMPUTING ALGORITHM TO BEAT CLASSICAL COMPUTERS

Context: Indian Lab Designs Quantum Computing Algorithms to Beat Classical Computers. BITS Pilani scientists, in collaboration with IBM Quantum, simulated subatomic particle behaviour using 120 qubits on an IBM quantum processor, demonstrating progress towards quantum advantage.

About Quantum Computing

- An advanced computing technology that uses principles of quantum mechanics to solve complex problems beyond the capability of classical computers.
- **Quantum Advantage:** Occurs when quantum computers perform specific complex tasks faster, more accurately, or at lower cost than the best classical supercomputers.

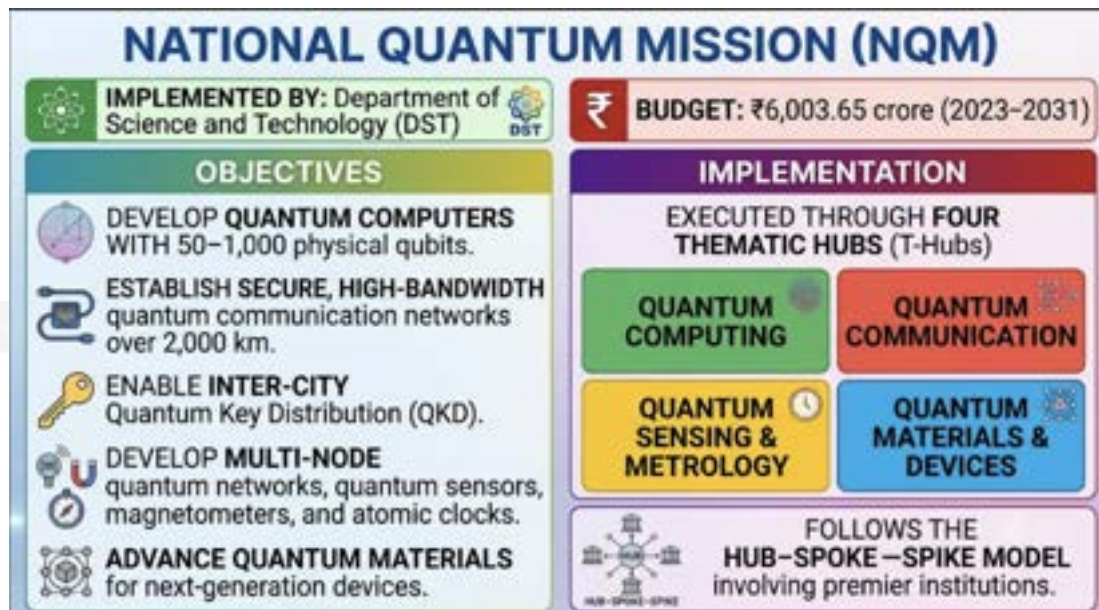


Challenges with Quantum Computing

- **Decoherence & Noise:** Qubits lose quantum states quickly, reducing accuracy.
- **Error Correction:** Requires many physical qubits to create a reliable logical qubit.
- **Hardware Dependence:** Domestic capability for qubit-grade materials and cryogenic systems is still developing.


Test Your Knowledge


 Prelims Corner	 Mains Corner
Q. With reference to Organ-on-Chip technology, consider the following statements: 1. It uses living human cells in micro-engineered devices to mimic the structure and function of human organs. 2. The technology combines tissue engineering with microfabrication techniques. 3. Organ-on-chip platforms can be used for drug discovery, toxicity testing and disease modelling. 4. They have completely replaced animal testing in biomedical research. Which of the statements given above are correct? (a) 1, 2 and 3 only (b) 1 and 4 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (a) Explanation: Organ-on-chip technology reduces but has not completely replaced animal testing.	Q. How can placenta-on-a-chip technology improve maternal and foetal healthcare? Discuss its significance for drug safety testing and pregnancy-related disease research. GS Paper III 10 Marks 150 Words



Test Your Knowledge

Prelims Corner

Q1. With reference to the National Quantum Mission (NQM), consider the following statements:

1. It is implemented by the Department of Science and Technology (DST).
2. One of its objectives is to develop indigenous quantum computers with 50-1,000 physical qubits.
3. The Mission aims to establish secure quantum communication networks using Quantum Key Distribution (QKD).
4. The Mission is implemented through four Thematic Hubs (T-Hubs) covering quantum computing, communication, sensing & metrology, and materials & devices.

Which of the statements given above are incorrect?

(a) 1 and 2 only
(b) 2, 3 and 4 only
(c) 1, 3 and 4 only
(d) None of the Above

Answer: (d). All statements are correct

Mains Corner

What are the major technological barriers to achieving practical quantum computing? Discuss the significance of indigenous research in advancing India's quantum ecosystem.

GS Paper III | 10 Marks | 150 Words

6. INDIA'S FIRST HYDROGEN TRAIN

Context: India set to launch its First Hydrogen Train under the "Hydrogen for Heritage" Project.

- **Context:** The Prime Minister will flag off India's first **green hydrogen-powered train** on **17 July 2026** from **Jind, Haryana**, marking a major step towards zero-emission transport.

About Green Hydrogen

- **Green Hydrogen:** A zero-emission fuel produced by splitting water into hydrogen and oxygen using renewable energy such as solar or wind.
- **"Hydrogen for Heritage" Project:** A 2023 Indian



Railways initiative to run **35 hydrogen trains** on scenic and ecologically sensitive routes (**₹80 crore/train** and **₹70 crore/route**).

Significance for India

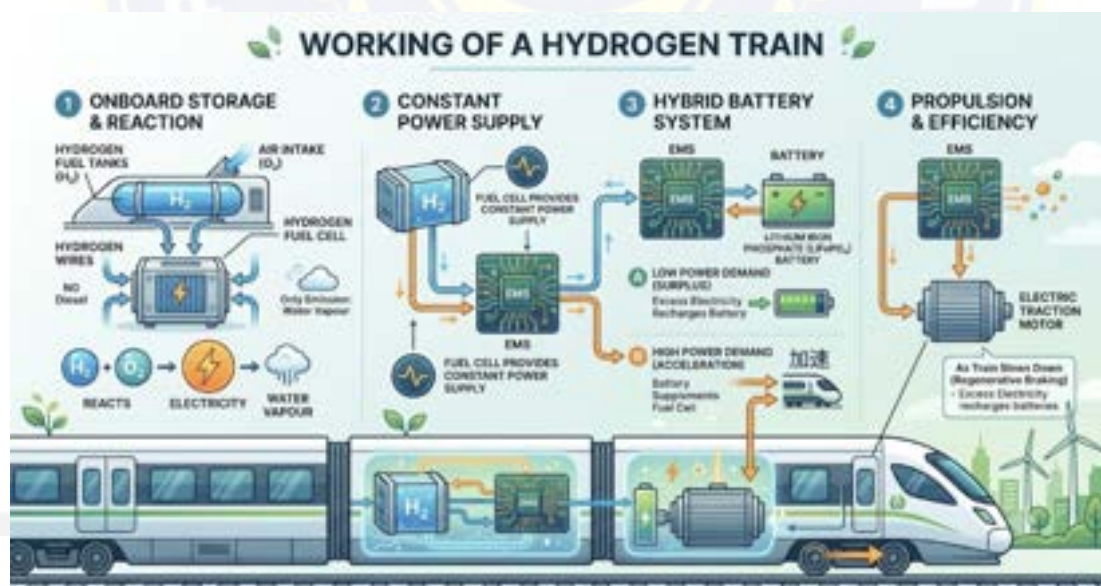
- **Green Transport:** Enables zero-emission rail travel and replaces diesel on non-electrified routes.
- **Climate Action:** Supports **Net Zero 2070** and railway decarbonisation goals.
- **Hydrogen Economy:** Advances the **National Green Hydrogen Mission (2023)**.
- **Energy Security:** Cuts fossil fuel imports and promotes indigenous hydrogen technology for energy independence by **2047**.

Challenges

- **High Costs:** Green hydrogen and fuel cell technologies remain expensive.
- **Hydrogen Storage:** Requires high-pressure or cryogenic storage, increasing cost and safety needs.
- **Infrastructure Gap:** Limited hydrogen production, transport, and refuelling facilities.
- **Lower Efficiency:** Hydrogen conversion causes higher energy losses than direct railway electrification.
- **Safety Risks:** Hydrogen is highly flammable and needs specialised storage, handling, and monitoring.

Working of a Hydrogen Train

- Runs on hydrogen fuel cells instead of diesel or overhead electric lines.
- Hydrogen reacts with oxygen in the fuel cell to produce **electricity** and **water vapour** as the only emission.
- Fuel cells provide continuous power to the train.
- **LiFePO₄ batteries** store surplus electricity during low power demand.
- During acceleration, batteries supplement the fuel cell.
- During braking or low demand, excess electricity recharges the batteries.



7. VIKRAM 1

Context: Skyroot Aerospace successfully launched **Vikram-1**, India's first privately developed orbital rocket, placing payloads accurately into **Low Earth Orbit (LEO)**.

- India became the **third country after the US and China** where a private company independently achieved orbit, marking a major milestone for the private space sector.

Key Highlights of Vikram-1

- **About: Vikram-1**, named after **Dr. Vikram Sarabhai**, is an orbital launch vehicle by **Skyroot Aerospace**, India's first space-tech unicorn.
- **Milestone: Mission Aagaman** marked India's first successful private orbital launch, following the **Vikram-S (2022)** suborbital mission.
- **Payload Capacity:** Carries **300–480 kg** payloads to **LEO**, targeting the small satellite market.
- **Carbon Composite Design:** Reduces weight, improving fuel efficiency and payload capacity.
- **3D-Printed Engine:** Uses **Raman engine**, a 3D-printed liquid-fuel engine enabling precise insertion with lower cost and production time.
- **Solid Propulsion:** **Kalam-series** solid motors provide high thrust and reliability.
- **Symbolic Payload:** Carries "**Cosmic Bloom**" artwork and an **18-karat gold micro-rocket** honouring C.V. Raman, Vikram Sarabhai and A.P.J. Abdul Kalam.

**Significance of Vikram-1**

- **Space Reforms:** Validates **2020 space reforms**, supported by **IN-SPACe** and **Indian Space Policy, 2023**.
- **Commercial Space Hub:** Strengthens public-private space ecosystem and India's small satellite launch capabilities.
- **Low-Cost Innovation:** Showcases cost-effective **3D printing** and carbon-composite aerospace technologies.
- **Strategic Autonomy:** Reduces reliance on **ISRO's PSLV/SSLV**, allowing focus on **Gaganyaan**, deep-space missions and advanced R&D.

Government Reforms Enabling Private Space Sector

- **Indian Space Policy, 2023:** Opened the entire space value chain to **Non-Government Entities (NGEs)**, enabling private participation in satellites, launches and downstream activities.
- **NSIL:** ISRO's commercial arm for space-system production, end-to-end services, PSLV commercialisation and technology transfer; launched **141 satellites (138 customer + 3 Indian)** till **July 2026**.
- **IN-SPACe:** Single-window regulator authorising private space activities and providing access to ISRO facilities, technologies and expertise.
- **Investment Support:** Facilitated **USD 150 million** private investment (2025), **118 technology transfers** and **189 partnerships**.

Challenges for India's Private Space Sector

- **Limited Launch Infrastructure:** Dependence on **Satish Dhawan Space Centre (Sriharikota)** limits launch frequency.
- **No Reusable Launchers:** Expendable rockets increase costs compared to reusable systems like **SpaceX**.
- **Legal Gaps:** Lack of a **Space Activities Act** creates uncertainty in liability, insurance, IP rights and dispute resolution.
- **Lack of Anchor Customers:** Unlike **NASA/US DoD**, limited assured government procurement slows commercialisation.

- **Orbital & Spectrum Competition:** Rising competition for ITU slots and spectrum from mega-constellations like **Guowang** and **Qianfan**.
- **Import Dependence:** Limited domestic production of space-grade chips, radiation-hardened electronics, sensors and propulsion systems.
- **Space Security:** Need stronger **Space Situational Awareness (SSA)** for debris, cyber threats and dual-use technologies.



Conclusion: Vikram-1 marks a new era of **private sector-led space innovation**, where **policy reforms, indigenous technology and global partnerships** can propel India towards a **competitive, self-reliant and globally integrated space economy**.

Test Your Knowledge

Prelims Corner	Mains Corner
Q1. With reference to Vikram-1, consider the following statements: 1. It is India's first privately developed orbital launch vehicle to successfully place payloads into Low Earth Orbit. 2. It uses Kalam-series solid motors along with a 3D-printed liquid-fuel Raman engine. 3. It is capable of carrying payloads to Geostationary Transfer Orbit (GTO). 4. Its successful launch validates the space sector reforms initiated after 2020. Which of the statements given above are correct? (a) 1 and 3 only (b) 1, 2 and 4 only (c) 2, 3 and 4 only (d) 1, 2, 3 and 4 Answer: (b)	The successful launch of Vikram-1 marks the coming of age of India's private space sector. Discuss the significance of this achievement. Also examine the policy reforms and institutional support required to make India a globally competitive commercial space power. GS-III 15 Marks 250 Words

8. POINTERS FOR PRELIMS

8.1. CENTRE AMENDS DRUGS RULES 1945 FOR ADVANCED THERAPIES

- **Context:** The new amendment will bring **Cell or Stem Cell derived products, Gene therapeutic products and Xenografts** under the ambit of the Centrally License Approving Authority (CLAA) framework. || CLAA is a division of the Central Drugs Standard Control Organisation (CDSCO).
- **Expansion of CLAA Framework:** Previously covering vaccines, large volume parenterals (IV solutions >100 ml), and recombinant DNA (r-DNA) medicines, the framework has now been expanded to regulate advanced cell and gene therapies.

- **Cell or Stem Cell-derived Products:** These include stem cell-based regenerative therapies and CAR-T cell therapies, which are increasingly used to treat blood cancers such as leukemia and lymphoma.
- **Gene Therapeutic Products:** These include gene replacement and gene-editing therapies used in the treatment of genetic disorders and several types of cancers.
- **Xenografts:** Xenografts are animal tissue-derived products, such as heart valves, transplanted into humans and widely used in cardiology and orthopedics.

8.2. STRAWBERRY MOON

- **Context:** The full moon appearing in June is popularly known as the Strawberry Moon.
- **Not Actually Red** | Named by Indigenous North American tribes (e.g., Algonquian) to mark the wild strawberry harvest.
- **Low in the Sky:** Occurs near the summer solstice. | **Appears Larger** near the horizon due to the Moon Illusion.
- **Golden/Orange Appearance:** Rayleigh scattering filters blue light, thus golden or orange glow.
- **Seasonal Marker:** 1st summer full moon in the Northern Hemisphere.

8.3. AI FOR GOOD GLOBAL COMMISSION

- A global body of **40+ leaders**, including **Heads of State, CEOs, and UN agency heads**, to promote responsible AI.
- **Led by:** **International Telecommunication Union (ITU)** → A **UN specialised agency** established in **1865 (HQ: Geneva, Switzerland)** that coordinates **radio spectrum, satellite orbits, and global ICT standards**.
- **Recent Development:** The **Chairman of Reliance Industries** and the **Founder of Bharti Enterprises** have been named **founding members** of the Commission.

8.4. LARGE HADRON COLLIDER (LHC)

- The **world's largest and most powerful particle accelerator**, operated by the **European Organization for Nuclear Research (CERN)**.

- **Location & Operations:** Began operations in **2008**; located in a **27-km underground tunnel** on the **France–Switzerland border** near Geneva.
- **Purpose:** Collides **protons and heavy ions** at near light speed to study **fundamental particles** and the **early universe after the Big Bang**.
- **Key Features:** Houses **ATLAS, CMS, ALICE, and LHCb** detectors and uses **superconducting magnets cooled to -271.3°C** with liquid helium.
- **Major Achievement:** Discovered the **Higgs boson (2012)**, which explains how **fundamental particles acquire mass**.
- **Recent Context:** CERN has shut down the Large Hadron Collider (LHC) for its third Long Shutdown (2026–2030) to upgrade it into the High-Luminosity LHC (HL-LHC).

8.5 HAYABUSA2 MISSION

- **About:** Japan's **asteroid sample-return mission**, developed by the Japan Aerospace Exploration Agency (**JAXA**).
- Launched in **2014** and returned **asteroid samples to Earth in 2020**.
- **Target:** Explored the **carbon-rich asteroid Ryugu** and became the **first mission to deploy rovers on an asteroid**.
- **Extended Mission:** Currently en route to **asteroid 1998 KY26**, with arrival planned in **2031**.
- **Note:** National Aeronautics and Space Administration's **OSIRIS-REx** returned samples from **asteroid Bennu in 2023**.
- **Recent Context:** Japan's Hayabusa2 performed a successful flyby of an asteroid during its extended mission.

8.6. E-MERLIN RADIO ARRAY

- **UK's national radio telescope interferometer.**
- **Infrastructure:** Network of **7 radio telescopes** across **217 km** in Great Britain.
- **Recent Context:** Used to discover a hidden population of faint, weakly active supermassive black holes in nearby galaxies.

8.7. MICROGASTRINAE

- Subfamily of parasitoid wasps that develop on butterfly and moth larvae.
- Useful indicators for estimating global insect diversity due to their high diversity and host specificity.
- **Recent Context:** Study on Microgastrinae estimates Earth may have 14.2–20.3 million insect species.

8.8. MISSION DRISHTI & OPTOSAR SATELLITE

- Mission Drishti, the world's first **OptoSAR satellite** by Indian space start-up **GalaxEye**, lost communication after a **geomagnetic solar storm**.
- First commercial **Earth Observation satellite** combining **Synthetic Aperture Radar (SAR)** and **Multi-Spectral Imaging (MSI)** sensors on one platform. | **India's largest privately built satellite.**

8.9. PROTACS (PROTEOLYSIS-TARGETING CHIMAERAS)

- **U.S. Food and Drug Administration approved** vepdegestrant, the first PROTAC-based therapy, for ESR1-mutated, ER-positive, HER2-negative advanced breast cancer by degrading oestrogen receptors.
- **PROTACs:** Molecules that selectively degrade disease-causing proteins inside cells.
- **Mechanism:** Acts as a bridge between target proteins and **E3 ligase (protein-degrading enzyme)**, tagging proteins for destruction.
- **Catalytic Action:** One PROTAC molecule can degrade multiple target proteins, enabling lower-dose therapies.

8.10. PARROT BORNAVIRUS 4 (PABV-4)

- Detected in India for the first time among captive birds.
- **Pathogen:** Highly contagious single-stranded RNA virus of the Bornaviridae family (*Orthobornavirus alphapsittaciforme*).
- **Hosts:** Mainly psittacine birds (parrots, macaws, cockatiels, cockatoos, etc.).
- **Transmission:** Through contaminated food, faeces, and aerosols. | **Treatment:** **No vaccine or cure available.** |

Zoonotic Status: Not zoonotic; limited to avian health. | **Threat:** High asymptomatic carriage threatens conservation of vulnerable bird species.

8.11. SCHEDULE K OF THE DRUGS RULES, 1945

- The **Ministry of Health and Family Welfare** withdrew **Schedule K** exemption for medicines with high ethyl alcohol content.
- **Formulations containing >12% v/v ethanol** (pack size >30 mL) now require a licence and are classified **under Schedule H1 (prescription-only)** to prevent misuse.
- **Ethyl Alcohol (Ethanol):** A psychoactive, volatile organic compound used as a solvent and preservative in medicinal preparations.
- **About Schedule K:** Provision under the Drugs Rules, 1945 framed under the Drugs and Cosmetics Act, 1940.

8.12. HELIUM

- China has temporarily banned helium exports.
- **Helium:** A colourless, odourless, non-toxic, non-flammable, inert noble gas; the **second-lightest element**.
- **Occurrence:** Non-renewable; formed by radioactive decay of uranium and thorium; extracted mainly from natural gas.
- **Uses:** MRI scanners, semiconductor and optical fibre manufacturing, quantum computing, leak detection, rocket fuel systems, etc.
- **Major Producers:** United States and Qatar. **India:** 100% import-dependent.

8.13. GAGANYAAN MISSION

- ISRO successfully tested the **Gaganyaan Crew Module (CM)** systems.
- **Crew Module (CM):** Habitable part of the Orbital Module providing an Earth-like environment for astronauts.
- **Gaganyaan Mission:** ISRO's **first human spaceflight mission**.
- India will become the **4th country**, after Russia, the US and China, to independently achieve human spaceflight.

- Send **3 astronauts** to **400 km Low Earth Orbit (LEO)** for **3 days** and safely recover them at sea.
- **Launch Vehicle:** Human-Rated LVM3 (HLVM3).

- **About:** Annual international **physics competition** for **secondary-school students**.
- **Host:** Held in **Bucaramanga, Colombia**.

8.14. REUSABLE ROCKET

- Japan's **JAXA** successfully tested lift-off and landing of its prototype reusable rocket.
- **SpaceX** pioneered operational reusable rockets with **Falcon 9**.
- **China** also recently achieved its first successful reusable rocket landing.
- A **reusable rocket** recovers and reuses some or all components (mainly the first-stage booster) after launch instead of discarding them.
- **India's Efforts:** **ISRO's Reusable Launch Vehicle (RLV)** programme aims to develop low-cost reusable space transport. **RLV-LEX** successfully demonstrated autonomous runway landing.

8.15. EARENDIL-1 SATELLITE

- The U.S. has authorised a startup to launch **Earendil-1**, an experimental satellite that reflects sunlight onto selected areas at night.
- **About:** A **non-geostationary** satellite with a large steerable thin-film mirror to redirect sunlight to Earth.
- **Purpose:** Extends daylight for solar power generation and provides temporary illumination.

8.16. LONG MARCH 10B

- China successfully landed the reusable **Long March 10B** for the first time. Earlier, only **SpaceX** and **Blue Origin** had achieved reusable rocket landings.
- **About:** Reusable launch vehicle capable of carrying up to **16 tonnes** to **Low Earth Orbit (LEO)**.
- **Reusable Rocket:** Designed to return and land safely for refurbishment and reuse, reducing launch costs.

8.17. 56TH INTERNATIONAL PHYSICS OLYMPIAD (IPHO) 2026

- India jointly topped the **56th IPhO** with **China, Kazakhstan, Russia, South Korea and Taiwan**, with all **five Indian participants winning gold**.

8.18. TRITIUM FILTRATION

- **Context:** Researchers developed a **Metal–Organic Framework (MOF)** material to remove tritium from nuclear wastewater by replacing it with normal hydrogen.
- **Significance:** Provides a cost-effective solution for the **Fukushima Advanced Liquid Processing System (ALPS)** challenge, as ALPS cannot remove tritium.
- **MOFs:** Porous materials of metal ions and organic linkers that selectively capture pollutants.
- Tritium (^3H): **Properties:** Radioactive hydrogen isotope with **2 neutrons**, **12.3-year half-life** and low-energy beta radiation; forms **tritiated water (HTO)**.
- **Sources:** Natural (cosmic rays) and artificial (nuclear reactors, lithium/boron irradiation).
- **Uses:** Fusion fuel (with deuterium) and nuclear weapon booster.

8.19. PARAQUAT DICHLORIDE

- The Agriculture Ministry proposed a nationwide ban on **paraquat dichloride**.
- **Ban Covers:** Manufacture, import, transport, distribution, sale and use.
- **About:** Non-selective herbicide used for weed control and crop desiccation.
- **Health Risk:** Causes irreversible organ damage and death; no known antidote.
- Banned/restricted in **70+ countries**, including EU nations and China.

8.20. CYCLOSPORIASIS

- Foodborne disease caused by the microscopic parasite *Cyclospora cayetanensis*.
- **Transmission:** Faeco-oral spread through contaminated food or water; **not person-to-person**.
- **Symptoms:** Prolonged watery diarrhoea with fatigue, weight loss and abdominal cramps etc.
- **Diagnosis:** Often missed due to irregular parasite shedding; confirmed by **stool Polymerase Chain Reaction (PCR)** or

stool microscopy, often requiring multiple samples.

- **Treatment:** 7–10 days of trimethoprim-sulfamethoxazole (TMP-SMX) with adequate hydration.
- **Common Sources:** Contaminated raw produce, including leafy greens, lettuce, spinach, basil and cilantro.
- **Prevention:** Thorough washing and good hand hygiene are essential; Chemical sanitisers may be ineffective.

8.21. WHITE RABBIT (WR) TECHNOLOGY

- **Context:** The White Rabbit (WR)-based Indian Standard Time (IST) Distribution Demonstration Network was inaugurated at the Regional Reference Standards Laboratory, Jakkur (Bengaluru).
- **Objective:** Create a secure, indigenous national time standard independent of GPS under the "One Nation, One Time" initiative.
- **Nodal Ministry:** Legal Metrology Division, Ministry of Consumer Affairs, Food & Public Distribution.
- **About:** White Rabbit (WR) is an open-source, Ethernet-based protocol enabling sub-nanosecond synchronisation, picosecond precision and gigabit-speed data transfer.

8.22. DARK WEB

- A **ransomware** group allegedly leaked sensitive data of the Kudankulam Nuclear Power Plant (KKNPP) on the dark web, highlighting cyber risks to critical infrastructure.
- **Dark Web:** Hidden part of the internet not indexed by regular search engines;

8.23. SPIN HALL NANO-OSCILLATORS (SHNOS)

- **Scientists from IIT Bhubaneswar, University of Gothenburg** and Tohoku University developed the largest network of 1.05 lakh synchronised SHNOS.
- **SHNOS:** Nanoscale spintronic devices that convert direct current into microwave signals. | **Structure:** Made of

a bilayer of **heavy metal** and **ferromagnetic material**.

8.24. SOYUZ MS-29

- Russian spacecraft Soyuz MS-29 was launched aboard the Soyuz-2.1a rocket from Kazakhstan, carrying three crew members, including Indian-origin NASA astronaut Anil Menon, to the International Space Station (ISS).
- **Soyuz Spacecraft:** Non-reusable spacecraft with three modules: **Orbital Module**; **Descent Module** (re-entry capsule); **Service Module**

8.25. INTRON

- Researchers directly observed an **intron transferring between two organisms**, providing the first visual evidence of **cross-species gene transfer without a carrier**. (Jumping genes are linked to antibiotic resistance and several cancers.)

CULTURE

1. SANTHAL HOOL (SANTHAL REBELLION)

Context: The 170th anniversary of Santhal Hool is being celebrated across India.

About Santhal Hool (1855–1856)

- It was a major tribal uprising in the Rajmahal Hills (modern-day Jharkhand, Bihar and West Bengal) against British rule and oppressive landlords.
- Leaders:** Four brothers, Sidho, Kanho, Chand, and Bhairav Murmu, along with sisters Phulo and Jhano.



2. PERSONALITY IN NEWS

2.1. DR. SYAMA PRASAD MOOKERJEE

Context: The Prime Minister paid tribute to Dr. Syama Prasad Mookerjee on his 125th birth anniversary.

About Dr. Syama Prasad Mookerjee (1901–1953)	Key Contributions
- Born in Calcutta; qualified as a barrister after being called to the English Bar (1926). - Became the youngest Vice-Chancellor of Calcutta University in 1934, at the age of 33. - Elected to the Bengal Legislative Council in 1929	- Played a major humanitarian role during the Bengal Famine (1943). - Served as Minister for Industry and Supply in Jawaharlal Nehru's Cabinet. - Earned the title "Lion of Parliament". - Became the Acting President of the All-India Hindu Mahasabha in 1940. - Founded Bharatiya Jana Sangh in 1951; served as its first President.

- Represented West Bengal in the Constituent Assembly.

- **Literary Works:** Autobiographical Leaves from a Diary, A Phase of the Indian Struggle
- **Values Reflected:** Leadership, Empathy, Social harmony, Nationalism, Cultural identity and distinctiveness

2.2. K. KAMARAJ (1903–1975)

- **Freedom Struggle:** Inspired by the **Jallianwala Bagh massacre**; joined the **Salt Satyagraha (1930)**, jailed during the **Quit India Movement (1942)**; elected to the **Constituent Assembly (1946)** and **Parliament (1952)**.
- **Public Life:** Served as **Chief Minister of Madras (1954)** and **Congress President (1963)**; regarded as India's **first non-English-speaking Chief Minister**.
- **Kamaraj Plan (1963):** Urged senior Congress leaders to resign from ministerial posts and strengthen the party organisation over positions of power.
- **Education Reforms:** Introduced **free education** and the **mid-day meal scheme** in schools.
- **Education Development Day:** His **birth anniversary** is observed as **Education Development Day** in Tamil Nadu.
- **Legacy:** Awarded the **Bharat Ratna** posthumously in **1976**; passed away in **1975** at the age of **72**.

2.3. R. VAIRAMUTHU RECEIVES 60TH JNANPITH AWARD

- **Context:** Tamil poet and lyricist R. **Vairamuthu** received the **60th Jnanpith Award (2025)**.
- Became the **3rd Tamil writer** after Akilan and Jayakanthan to receive the award, ending a 24-year gap for Tamil literature.
- Earlier received the Sahitya Akademi Award (2003) for *Kallikattu Ithikasam*

3. POINTERS FOR PRELIMS

3.1 PETROGLYPHS

- Work has begun on India's first Petroglyph Conservation Park in Leh, with the planned relocation of petroglyphs (ancient rock carvings) from vulnerable sites across Ladakh, including Saboo Thang, Phyang Thang, Stakmo Thang, and Likir Hill.
- **Petroglyphs:** Rock carvings made by chiselling or pecking directly onto rock surfaces using stone tools.

3.2. PANDAVANI

- A **traditional narrative folk art** of **Chhattisgarh**, based on the **Mahabharata**.
- **Features:** Combines **music, storytelling, dialogue, and dramatic performance**.
- **Styles: Vedamati:** Story is **recited** with the **Bhumbo** (a stringed instrument). || **Kapalik:** A **solo performance** where the artist **narrates and enacts** different characters.

- **Recent Context:** Renowned **Pandavani** exponent **Teejan Bai**, the only person from Chhattisgarh to receive the **Padma Vibhushan**, passed away.

3.3. CHANGPA COMMUNITY

- **About:** A **semi-nomadic pastoral community** of the **Changthang Plateau, Ladakh**, mainly inhabiting the **Changthang Cold Desert Wildlife Sanctuary**. (ST status)
- **Livelihood:** Rear **Changthangi (Changra)** goats that produce the famous **Pashmina (cashmere) wool**; also rear **yaks and sheep**.

3.4. TRIBEX

- The Ministry of Tribal Affairs launched **TribeX**, a digital learning platform for tribal art, culture & traditional knowledge.
- **Courses:** Offers **5 UGC-recognised one-year hybrid diploma programmes**, including **Santali language (Ol Chiki)**.

3.5. PRAMBANAN TEMPLE

- India will support the **conservation and restoration** of the 1,000+ year-old Prambanan Temple in Indonesia.
- **Location:** Near **Yogyakarta, Java Island, Indonesia**. Largest **Hindu temple complex** in Indonesia.
- **Built by:** Ruler of the **Sanjaya dynasty (Sanjaya Vamsha)**. **Heritage Status:** **UNESCO World Heritage Site**.

3.6. JODHPURI MOJARI

- The Centre granted a **GI tag** to the nearly **200-year-old Jodhpuri Mojari** craft.
- **Jodhpuri Mojari:** Traditional **handcrafted leather footwear** from **Jodhpur, Rajasthan**.
- Crafted mainly by the **Jinagar (Jingar) community**.
- **GI Tag: Intellectual Property Right (IPR)** for products whose quality, reputation, or characteristics are linked to their **geographical origin**. 10 years validity.

3.7. RAVIDASSIA DEMAND FOR SEPARATE RELIGION

- The **Ravidassia community** has renewed its demand for a separate **"Ravidassia religion"** category in the Census, citing distinct identity, worship places, scripture, symbols and practices.
- Followers of **Guru Ravidas (15th–16th century)**, a Bhakti saint and social reformer who advocated equality, dignity and a caste-free society (*Begampura*).
- **Population:** Largest concentration in **Punjab**; Dalits constitute around **32%** of Punjab's population.
- **Institution:** **Dera Sachkhand Ballan (Punjab)**. **Scripture:** **Amritbani Guru Ravidass Ji** (around 200 hymns).

3.8. MANAS AND MAHABHARATA CENTRE

- **Context:** **International Centre for Civilizational Studies** launched in **Bishkek, Kyrgyzstan** by Manas National

Academy and India's Centre for Studies of International Relations (CSIR).

- **Objective:** Promote comparative research on Manas and Mahabharata and strengthen India–Kyrgyzstan cultural ties.

3.9. JAGANNATH RATH YATRA

- The annual Lord Jagannath Rath Yatra began in **Puri, Odisha** on **16th July 2026**.
- **About:** Major Hindu festival marking the journey of Lord Jagannath, Lord Balabhadra and Goddess Subhadra from the 12th-century Jagannath Temple to Gundicha Temple.
- **Three Chariots:** Nandighosha: Lord Jagannath; Taladhawaja: Lord Balabhadra; Darpadalana/Devadalana: Goddess Subhadra
- **Return:** After 9 days, deities return through Bahuda Yatra (Return Car Festival).

3.10. KUTCHI NEW YEAR (ASHADHI BEEJ)

- Marks the beginning of the Kutchi calendar → second day (Beej) of Shukla Paksha in Ashadha month.
- **Significance:** Coincides with the monsoon onset and is especially important for agrarian communities of Kutch, Gujarat.

3.11. HARELA FESTIVAL

- **About:** Hindu folk festival celebrated on **Kark Sankranti** (first day of **Shravan**) in **Kumaon, Uttarakhand**.

3.12. BONALU FESTIVAL

- Began at **Sri Jagadamba Mahankali Temple, Golconda Fort, Hyderabad**.
- Annual state festival of **Telangana** honouring **Goddess Mahakali** for protection and fulfilment of vows. Traces roots to the **Kakatiya dynasty** and **Qutb Shahi period**.

ETHICS

1. AI IN GOVERNANCE

Context: United Nations (UN) report warns AI is advancing faster than scientific understanding, safety, and governance.

Major Ethical Concerns

- **Compute Concentration (Compute Divide):** Concentration of global compute in a few countries raises concerns over distributive justice, technological sovereignty, unequal AI access, and obligations toward developing nations.
- **Human Control & AI Safety:** Highly autonomous AI raises concerns about public safety, non-maleficence, accountability, and liability when systems independently cause unintended harm.
- **Democracy & Misinformation:** AI-driven misinformation and political manipulation undermine informed consent, public trust, electoral fairness, democratic deliberation, and the integrity of elections.
- **Child & Human Protection:** AI must protect vulnerable users by safeguarding child rights, mental well-being, privacy, and ensuring developers fulfil their duty of care.
- **Language & Cultural Bias:** Bias against underrepresented languages undermines equality, non-discrimination, and epistemic justice, restricting equitable AI access in healthcare, law, and governance.



Key Ethical Thinkers

- Immanuel Kant — **Categorical Imperative (Human Dignity):** AI must treat people as **ends, not merely as means**, respecting autonomy and informed consent.
- John Rawls — **Justice as Fairness (Difference Principle):** AI should benefit the **least advantaged** through equitable access and inclusive governance.
- Amartya Sen & Martha Nussbaum — **Capabilities Approach:** AI should **expand human capabilities** and reduce digital, linguistic, and social exclusion.
- Jürgen Habermas — **Communicative Action / Deliberative Democracy:** AI should strengthen **informed public discourse**, not misinformation or manipulation.
- Luciano Floridi — **Information Ethics:** AI must protect the **infosphere** through responsible data use, transparency, and human values.

- Helen Nissenbaum — **Contextual Integrity**: AI should preserve **privacy** by using personal data only in contextually appropriate ways.

Way Forward

- **Human-Centric AI Governance (UNESCO Recommendation on the Ethics of AI, 2021; OECD AI Principles)**: Ensure human oversight, explainability, and accountability so AI augments—not replaces—human judgment in critical decisions.
- **Justice, Inclusion & Digital Equity (Global Digital Compact, 2024; Sustainable Development Goals)**: Bridge compute and language divides through open infrastructure, multilingual AI, and capacity building for developing countries and marginalized communities.
- **Ethics by Design (Privacy by Design; NIST AI Risk Management Framework)**: Mandate fairness audits, privacy-by-design, bias testing, and independent safety assessments before deploying high-risk AI systems.
- **Democratic & Rights-Based Regulation (Universal Declaration of Human Rights; European Union AI Act)**: Adopt risk-based regulation to curb misinformation, protect children, safeguard privacy, and uphold constitutional values and human rights.
- **Global Cooperation & Responsible Innovation (Bletchley Declaration, 2023; Global Partnership on AI)**: Promote common standards, knowledge sharing, and multi-stakeholder cooperation to balance innovation with safety, sustainability, and public welfare.



Conclusion: As AI reshapes governance, the goal is not merely smarter systems but trustworthy innovation rooted in human-centric governance, algorithmic accountability, and ethical stewardship, ensuring technology advances both democracy and inclusive human progress.

Question for Practice: "The ethical challenge in AI governance is not technological advancement, but ensuring that innovation remains human-centric, fair, and accountable." Discuss. [10 Marks | 150 Words]

2. PROTESTS IN DELHI

Context: In 2026, **Sonam Wangchuk** led a 26-day hunger strike over examination paper leaks and Ladakh's Sixth Schedule status, highlighting **Satyagraha**, **constitutional morality**, and the **ethics of democratic dissent**.

Relevant Thinkers

- **Mahatma Gandhi** — **Satyagraha:** Truth and non-violent self-suffering as instruments of moral persuasion.
- **Immanuel Kant** — **Human Dignity:** Respect protesters as ends in themselves, not merely as instruments.
- **John Rawls** — **Justice as Fairness:** Protect equal liberties while ensuring justice for marginalized regions.
- **Jürgen Habermas** — **Deliberative Democracy:** Resolve conflicts through dialogue, public reasoning, and citizen participation.
- **Hans Jonas** — **Principle of Responsibility:** Protect fragile ecosystems for present and future generations.
- **Lawrence Kohlberg** — **Post-Conventional Morality:** Wangchuk prioritizes universal ethical principles over obedience to authority or procedural rules.



Ethical Concepts

- **Constitutional Morality:** Upholding constitutional values, rights, and justice over political expediency or majoritarian interests.
- **Satyagraha & Non-violence:** Pursuing truth through peaceful self-suffering and moral persuasion rather than coercion.

- **Justice & Fairness:** Ensuring equitable treatment, equal rights, and impartial resolution of public grievances.
- **Rule of Law:** Exercising authority within legal limits while respecting fundamental rights and due process.
- **Accountability & Transparency:** Holding public authorities answerable through openness, responsiveness, and institutional integrity.
- **Democratic Participation:** Enabling citizens to meaningfully engage in governance through peaceful dissent and dialogue.
- **Human Dignity:** Respecting every individual's autonomy, rights, and intrinsic worth regardless of disagreement.
- **Environmental Stewardship:** Protecting ecological resources through responsible and sustainable decision-making.
- **Intergenerational Equity:** Safeguarding natural and institutional resources for the well-being of future generations.



Way Forward

- **Institutional Dialogue:** Create structured consultation mechanisms between governments, citizens, and regional representatives before conflicts escalate.
- **Citizen-Centric Administration:** Balance procedural legality with empathy, proportionality, and constitutional values while managing protests.
- **Transparent Accountability:** Conduct independent inquiries into public grievances and ensure timely corrective action.
- **Protect Democratic Freedoms:** Facilitate peaceful assembly while imposing only necessary and proportionate restrictions.
- **Sustainable Regional Governance:** Integrate ecological conservation, local aspirations, and inclusive development into policymaking.

Quotes for Value Enrichment

- *"Injustice anywhere is a threat to justice everywhere" - Martin Luther King Jr.*
- *"Liberty cannot be preserved without a general knowledge among the people, but it also cannot survive when lawlessness masks itself as liberty." — John Adams*

Question for Practice: Examine the ethical dilemmas faced by public administrators while dealing with peaceful protests. How can constitutional morality and citizen-centric governance help resolve such situations? Discuss. [10 Marks | 150 Words]



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