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TABLE OF CONTENT

Mains Daily Analysis

1. India climbs 3 spots to 130 among 193 nations in HDI, but inequality continues to be a burden
2. The fragmentation in the global fight against terror
3. Civil defence drill today: what will happen, why
4. Power and pitfalls of digital influence
5. MMR shows a declining trend, reveal latest data
6. Public health in India strained by flawed policy, weak training
7. Is social media defining self-worth?
8. All About IAI HAROP: Loitering Munition Used by India
9. Total Fertility Rate in India remains at 2.0; Bihar records highest, Bengal lowest
10. Why India must get the Caste Census right
11. A fundamental reset to drive manufacturing growth
12. A Fragile Calm
13. Stitching a New Story
14. Why Farmers Prefer Rice, Wheat
15. Single-use food packaging forms 84% of Himalayan plastic waste
16. India's rising e-waste, the need to recast its management
17. How is the shipping industry tackling emissions?
18. Shining a Light on the Court - Public Declaration of Assets of Judges
19. In India, education without employment
20. Ecology is the world's permanent
21. A death that spotlights irrigation problems
22. Challenge beyond Pakistan
23. A caste census is not a silver bullet for social justice
24. Copyright's Tryst with Generative AI
25. From pyramids to hourglasses: how AI can change Indian workplaces
26. The Court's Bind: Presidential Reference in TN Governor Case and Its Legal Limits
27. In the Wake of Crisis, the Need for Bipartisanship
28. Getting the 'micropicture' at the panchayat level
29. Restore Guardrails
 - The Future is Bilingual



30. WHO adopts Pandemic Agreement to strengthen global health preparedness
31. India's 'New Normal' Deconstructed
32. Scheme-based workers, the struggle for an identity
33. The Shadow Triangle – India, Pakistan, and China: A New Strategic Geometry
34. Trump-proofing India-US
35. Warming Likely to Make Cyclones More Destructive Than Ever Before
36. Should Water Be Used as a Weapon?
37. Analysing Poverty Levels in India by Comparing Various Surveys
38. The Illiberal in the Mirror
39. New drugs arrive on the block, but AMR threats continue
40. Tariff wars and a reshaping of AI's global landscape
41. Understanding the Social, Cultural and Geographical Contexts of Buddhism
42. A shadow on our rights
43. Liberty Is Not Licence – Public Discourse Must Align With Constitutional Responsibility
44. The maths of how India's coastline lengthened without gaining land
45. America against America
46. Cultivating a Global Farm
47. Renegotiating Indus Waters Treaty: Way Forward for India
48. The Dawn of Autonomous Satellites and the Legal Vacuum Above Us
49. Focus on heat-resilience despite the monsoon
50. The Nationalism We Forgot
51. What monsoon 'onset' means, why it is early
52. India's New Urban Worry — Rising Overnutrition
53. Experiential learning: how students can learn more effectively
54. Needed, a crypto strategy
55. How FTAs with US, UK, EU could impact India's agriculture trade
56. A Case of Practical, Pragmatic and Innovative Education
57. The Importance of the Deputy Speaker
58. A Vicious Loop: Multilateral agencies need to introspect about need and justification for aid to Pakistan
59. Good news in single digits – India's Poverty Falls Sharply, Inequality Declines
60. Rewriting the Script of Early Childhood Education
61. The Nature of Escalation
62. Drifting Far from Bandung
63. Northeast India: From Periphery to Pivot

64. Logistics for India's Global Trade Ambitions
65. India-Bangladesh Bilateral Dynamics
66. Dynamics of India's Fiscal Decentralization
67. Evolving India-Africa Partnership
68. HDR 2025 & AI-Driven Human Development
69. Modernising India's Defence
70. Transforming India's Gig Economy
71. Active Empowerment of Specially-abled in India
72. Unlocking India's Industrial Potential

PRELIMS BOOSTER & PIB COMPILATION (The Hindu & Indian Express)

1. India's HDI Rank Improves, Yet Inequality Persists

Prelims Focus:

- Human Development Index (HDI) – UNDP
- HDI indicators: Life expectancy, education, and GNI per capita
- India's HDI rank: 130 in 2023 (up from 133 in 2022)
- Key schemes: Ayushman Bharat, NEP 2020, Poshan Abhiyaan

Mains Relevance (GS II & III):

- Developmental issues and welfare schemes
- Inclusive growth and social development indicators

Key Points:

- India's HDI score rose to 0.685 (2023), maintaining its position in the 'medium' category.
- GNI per capita has risen significantly since 1990.
- 135 million exited multidimensional poverty between 2015-16 and 2019-21.
- Life expectancy reached 72 years, showing post-pandemic recovery.
- Despite progress, inequality reduces India's HDI by over 30%.
- Gender inequality remains stark – low female workforce participation and political representation.
- The UNDP's 2025 report also emphasized AI as a key driver of future development, with India showing strong AI-skilling potential.

Analytical Insight:

India has shown improvements in health and income, but inequality and educational

quality remain critical hurdles. The future depends on integrating digital skills, better governance, and targeted welfare.

2. Growing Disunity in Global Anti-Terror Framework

Prelims Focus:

- UNSC and terrorism-related diplomacy
- India's foreign policy and global counter-terrorism narrative

Mains Relevance (GS II & III):

- India's role in global institutions
- Internal security challenges due to external actors

Key Points:

- Despite condemnation of the Pahalgam terror attack (April 22), global powers avoided confronting Pakistan directly.
- UNSC's inaction—linked to Pakistan's seat on the Council—illustrates political deadlock.
- Global focus has shifted to Ukraine and Gaza, weakening the international terror response framework.
- Selective condemnation of terrorism is growing—"your terrorists vs my terrorists."
- Identity politics and geopolitical interests are undermining universal standards.

Analytical Insight:

India must recalibrate its global strategy, build regional alliances, and enhance its soft power. Global counter-terrorism needs reform and consistent accountability. UNSC reforms are crucial for India's strategic interests.

3. Civil Defence Drill Conducted to Test Emergency Readiness

Prelims Focus:

- Civil Defence Act, 1968
- Ministry of Home Affairs
- Classification of Civil Defence Districts

Mains Relevance (GS II & III):

- Disaster preparedness and internal security



- Center-state coordination during emergencies

Key Points:

- Nationwide mock drills held on May 7, 2025, to simulate hostile attacks.
- Drills included blackouts, air raid sirens, and coordinated response mechanisms.
- Based on district-level threat perception, implementation varied from Category I to III.
- Exercises aimed to test community participation, infrastructure protection, and inter-agency coordination.

Analytical Insight:

India is adopting a proactive approach to hybrid threats, including drones and cyberattacks. Civil defence must adapt to modern warfare challenges, with a strong legal and institutional foundation.

4. Navigating the Power and Risks of Digital Influence

Prelims Focus:

- Article 19(1)(a), IT Act, Consumer Protection Act
- SEBI/ASCI regulations for influencer content

Mains Relevance (GS II, III, IV):

- Governance and regulation of digital spaces
- Ethics and misinformation in digital media

Key Points:

- India faces a rising tide of digital misinformation, particularly in health and finance.
- Influencers often promote content with little regard for accuracy or ethics.
- Legal safeguards exist but enforcement remains weak.
- Courts and regulators (SEBI, ASCI) have stepped in to promote accountability.

Analytical Insight:

Digital freedom must be balanced with safeguards. Ethical norms and legal reforms are essential to curb misleading content. Registration and monitoring of digital influencers—especially in health—can protect public trust.

5. Maternal Mortality Declines, But Regional Gaps Persist

Prelims Focus:

- Maternal Mortality Ratio (MMR)
- SDG 3.1; SRS data
- WHO standards on maternal health

Mains Relevance (GS II & III):

- Health indicators and government schemes
- Inter-state disparities in healthcare outcomes

Key Points:

- MMR dropped to 93 (2019-21) from 103 in 2017-19.
- Most deaths occur in reproductive age group (20-34).
- High MMR states: MP, Assam, UP, Odisha, Chhattisgarh.
- Programs like JSY and PMMVY have contributed to progress.

Analytical Insight:

While India is progressing towards SDG targets, persistent inequalities call for focused interventions in lagging states. Investments in maternal healthcare, education, and nutrition are essential for sustained progress.

6. Public Health Governance in India Faces Structural Challenges

Prelims Focus:

- 7th Schedule: Health in State List
- Public health education and MPH courses

Mains Relevance (GS II & III):

- Public health systems and human resources
- Inter-sectoral coordination and governance gaps

Key Points:

- India lacks a coherent public health framework.
- MPH education is fragmented and lacks national standards.



- Key domains like epidemiology, behavioural science, and engineering are underrepresented.
- Absence of a national public health cadre affects workforce deployment and coordination.

Analytical Insight:

India needs a multidisciplinary, skilled public health workforce. Proposals for an Indian Health Service and a unified MPH framework could bridge policy and implementation gaps. Addressing governance fragmentation is key to health resilience.

7. Is Social Media Reshaping Self-Worth?

UPSC Relevance

- **Prelims:**
 - Syllabus: Current events; Social development challenges
 - Focus: Youth psychology, digital culture, mental health impact
- **Mains:**
 - **GS Paper I (Society):** Social change, impact of globalization
 - **GS Paper II (Governance):** Digital mental health policy, adolescent well-being
 - **GS Paper IV (Ethics):** Media influence on values, technology and ethics

Key Insights:

- Social media platforms have evolved into powerful arenas where identity is validated via external metrics—likes, comments, shares—leading to dependency on digital validation.
- Teenagers face immense pressure to maintain a curated online persona, fostering anxiety, distorted body image, and identity confusion.
- Algorithms intensify exposure to unrealistic standards, creating emotional distress and exclusionary experiences.
- Even child influencers are drawn into this ecosystem of content performance, which may hamper natural development.
- Experts argue that it is not just individual influencers, but the very design of digital platforms that incentivizes comparison and emotional manipulation.

- Parents and educators play a vital role in equipping teens with resilience and critical awareness to decouple self-worth from online feedback.
- Shows like *Adolescence* and documentaries like *Bad Influence* highlight the mounting psychological burden of constant digital presence.

Mains Takeaways:

- Digital dependence is a mounting public health challenge, especially among youth.
 - India must promote emotional and digital literacy as part of school curricula.
 - Regulatory frameworks should include protections for children and ethical obligations for tech companies.
 - Ethical innovation in platform design must prioritize healthy digital interaction and inclusive engagement.
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8. IAI HAROP – India's Tactical "Suicide Drone"**UPSC Relevance**

- **Prelims:**
 - Defence Technology, UAVs, Indo-Israel defence cooperation
- **Mains (GS Paper III – Security):**
 - Defence modernisation, ethics of autonomous weaponry

Key Points:

- The IAI HAROP, an advanced loitering munition by Israel Aerospace Industries, functions like a UAV armed with explosives, capable of identifying and crashing into targets.
- With a loiter time exceeding 9 hours, it is highly suited for engaging mobile and high-value enemy assets.
- It utilizes electro-optical targeting for autonomous or remotely controlled operations and resists electronic warfare jamming.
- With deployment options from land or sea, it effectively targets radar systems, command posts, and tanks.
- Derived from the HARPY system, HAROP boasts a combat success rate of 98%, making it a potent asset in India's evolving war doctrine.

Mains Takeaways:

- Reflects India's increasing reliance on autonomous defence technologies in partnership with Israel.
- Enhances India's strategic flexibility in fast-changing combat scenarios.
- Raises significant questions on accountability and legality of AI-driven warfare under international law.

9. Total Fertility Rate (TFR) in India Steady at 2.0**UPSC Relevance**

- **Prelims:**
 - Indian Demography, SRS 2021 Data
- **Mains:**
 - **GS I:** Population dynamics
 - **GS II:** Health sector policies
 - **GS III:** Demographic dividend, inclusive growth

Key Facts:

- As per SRS 2021, India's TFR holds steady at 2.0—just below the replacement level of 2.1.
- Bihar reported the highest TFR (3.0), while Delhi and West Bengal the lowest (1.4).
- Share of the 0-14 age group fell from 41.2% (1971) to 24.8% (2021), while the elderly population is growing steadily.
- Female mean marriage age rose to 22.5 years in 2021.
- Despite public concerns, data shows that India's population growth is stabilizing.

Mains Takeaways:

- India is entering an aging phase, creating potential stress on pensions, healthcare, and the labour market.
- Uneven fertility trends demand tailored state-level interventions.
- The narrowing window of demographic dividend necessitates urgent investment in youth education and skilling.

10. The Case for a Caste Census

UPSC Relevance

- **Prelims:**
 - Articles on equality, SECC 2011, Justice Rohini Commission
- **Mains:**
 - **GS I:** Social justice and inequality
 - **GS II:** Policy effectiveness, welfare targeting
 - **GS III:** Inclusive growth

Key Points:

- India's contradictory stance on caste—abolishing it in principle while using it in policy—has made data collection a political minefield.
- The SECC 2011 was largely ineffective; only a fraction of the caste data was usable.
- The Rohini Commission revealed that a handful of dominant OBCs monopolized welfare benefits.
- A scientifically designed caste census is necessary to enable equitable and evidence-based policymaking.

Mains Takeaways:

- Accurate caste data is essential for targeted affirmative action and to prevent elite capture.
- Transparent processes with expert oversight and digital tools can ensure credibility.
- A caste census can enhance public trust and strengthen social justice mechanisms.

11. Revamping India's Manufacturing Ecosystem**UPSC Relevance**

- **Prelims:**
 - Economy: Industrial indicators
- **Mains (GS III):**
 - Manufacturing growth, innovation, industrial strategy

Key Highlights:

- Despite flagship schemes like Make in India, India's manufacturing sector remains stagnant in productivity and global competitiveness.

- There's a pressing need to revamp engineering education and R&D to align with industrial requirements.
- Strategic investment in sunrise sectors like semiconductors, AI, and green tech is critical.
- A Silicon Valley-style innovation ecosystem is needed to anchor global production networks.

Mains Takeaways:

- Structural reforms in manufacturing require education, infrastructure, and industry linkages.
- Building demand-driven, innovation-led manufacturing ecosystems is key to long-term growth.
- India must be prepared for global supply chain shifts and protectionist shocks.

12. Indo-Pak Relations – Beneath a Fragile Calm**UPSC Relevance**

- **Prelims:**
 - Ceasefire agreements, cross-border tensions
- **Mains:**
 - **GS II:** Neighbourhood policy
 - **GS III:** Terrorism and regional security
 - **Essay:** India's regional diplomacy

Key Reflections:

- India-Pakistan relations remain strained despite ceasefire agreements.
- A military-only strategy cannot resolve deeper political and ideological rifts.
- The changing global balance of power may force India to recalibrate its approach.

Mains Takeaways:

- Lasting peace with Pakistan requires sustained political engagement.
 - Strategic assertiveness should not push the region into broader geopolitical confrontations.
 - Regional stability hinges on a mix of security realism and diplomatic outreach.
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13. India's Textile Export Opportunity

UPSC Relevance

- **Prelims:**
 - Textile sector, FTA with the UK
- **Mains:**
 - **GS II:** International trade
 - **GS III:** Industry and economic growth

Key Points:

- India's apparel exports are set to grow with tariff cuts under the FTA with the UK.
- However, disjointed production hubs and poor logistics remain major challenges.
- Sustainability standards such as CSDD and EU norms will be critical for market access.

Mains Takeaways:

- India must adopt green and ethical production standards to sustain export growth.
- Infrastructure and policy support are crucial for textile industry expansion.
- Positioning India in global fashion supply chains requires quality, reliability, and sustainability.

14. Why Indian Farmers Prefer Rice and Wheat

UPSC Relevance

- **Prelims:**
 - MSP, agricultural trends
- **Mains (GS III):**
 - Agriculture, crop diversification, R&D in farming

Key Takeaways:

- MSP guarantees and better yields make rice and wheat more attractive to farmers.
- These crops benefit from decades of research and policy support unlike others like cotton.
- The Green Revolution has made rice and wheat more resilient and predictable.

Mains Takeaways:

- India needs to diversify cropping patterns to conserve water and improve income security.
 - Investment in research for pulses, oilseeds, and coarse cereals is vital for sustainable farming.
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15. Himalayan Plastic Waste Crisis**UPSC Relevance**

- **Prelims:**
 - Pollution, mountain ecology
- **Mains:**
 - **GS III:** Waste management, environmental degradation
 - **GS II:** Role of civil society

Key Findings:

- A staggering 84% of collected Himalayan waste is single-use plastic from food packaging.
- Non-recyclable waste clogs rivers and soil in sensitive mountain ecosystems.
- Grassroots groups like Zero Waste Himalaya are driving cleanup and awareness efforts.

Mains Takeaways:

- Standard waste policies fail in fragile mountain regions—localized strategies are needed.
 - Extended producer responsibility (EPR) must cover multi-layer plastics.
 - Community-led monitoring and eco-friendly packaging alternatives are key solutions.
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16. Tackling India's E-Waste Problem**UPSC Relevance**

- **Prelims:**
 - E-waste, pollution, EPR
- **Mains (GS III):**

- Environmental governance, industrial policy, circular economy

Key Data:

- E-waste in India rose by 151% in just 6 years, making it a global leader in toxic waste.
- Informal recycling dominates, using unsafe methods harmful to health and environment.
- EPR rules of 2022 aim to stabilize the recycling market with minimum pricing mechanisms.

Mains Takeaways:

- Poorly enforced EPR norms hamper formal recycling and circular economy innovation.
- A predictable pricing system is vital to draw investors into sustainable waste management.
- India's informal e-waste sector must be formalized to reduce pollution and unlock economic potential.

17. Maritime Emissions and Global Regulation**Relevance:**

- *Prelims:* Environment, Climate Policies, IMO
- *Mains:* GS2 – International Institutions & Policies | GS3 – Climate Change & Sustainable Development

Summary:

At the IMO's 83rd MEPC meeting, global stakeholders deliberated over market-based mechanisms (MBMs) to reduce GHG emissions from ships. Key proposals included a flat carbon tax, fuel quality standards, and a hybrid Singapore model blending pricing and regulation. A draft MBM framework—aligning with IMO's 2023 Revised GHG Strategy—is set for finalisation by 2025 and enforcement by 2027.

India's stand: Supports equitable carbon pricing rooted in Common But Differentiated Responsibilities (CBDR-RC), while advocating investments in green hydrogen and maritime decarbonisation.

Challenges: Developing nations fear increased logistics costs (5–8.5% by 2030). Equity, climate finance, and tech transfer remain core hurdles.

Key Insight: Balancing global climate commitments with economic justice remains the crux of maritime decarbonisation efforts.

18. Judicial Transparency: Judges Disclose Assets

Relevance:

- *Mains:* GS2 – Judiciary, Transparency & Accountability

Summary:

In a move led by CJI Sanjiv Khanna, 21 SC judges voluntarily disclosed their assets. This marks a shift toward transparency amid rising concerns over judicial corruption and lack of institutional accountability. While laws like the Judges (Protection) Act offer immunity for actions in office, mechanisms for misconduct redress remain weak.

Concerns: India lacks a mandatory judicial accountability framework. Voluntary disclosures, without enforcement, have limited impact.

Global Practice: Countries like the UK and South Korea have codified systems to address judicial misconduct.

Way Forward:

- Establish statutory bodies like a Judicial Complaints Council.
 - Enforce conflict-of-interest disclosures.
 - Clarify applicability of Lokpal and RTI laws to the judiciary.
-

19. Education without Employment in India

Relevance:

- *Prelims:* Education Policies (NEP 2020)
- *Mains:* GS2 – Education Reforms | GS3 – Employment & Economy

Summary:

Despite NEP 2020's ambitious goals, India's education system continues to produce

unemployable graduates. Degrees dominate over skills, and curriculum lacks industry relevance. While global university rankings improve, real-world employability remains stagnant.

Key Critique:

- Little innovation or deep-tech in start-ups; most replicate services.
- Research often misaligned with local development needs.

Solutions:

- Industry-academia synergy for curriculum design
- Focus on interdisciplinary and soft skills
- Autonomy in higher education institutions, away from bureaucratic control

20. Ecology: The Real Economy**Relevance:**

- *Prelims:* Environment, Conservation
- *Mains:* GS1 – Environmental Geography | GS3 – Climate & Biodiversity | GS4 – Ethics and Environment

Summary:

Inspired by Sundarlal Bahuguna's assertion—*"Ecology is the permanent economy"*—the article critiques exploitative development models that ignore environmental costs. Climate change and biodiversity loss expose the flawed premise of growth at nature's expense.

Core Ideas:

- Nature-based solutions must not become exploitation tools.
 - Ethical stewardship, not just techno-economic fixes, is needed.
 - Conservation should be embedded in daily life, not treated as an externality.
- UPSC Insight:** A shift toward biocentric, not anthropocentric, policy-making is essential for long-term sustainability.

21. Irrigation Woes and Agrarian Crisis**Relevance:**

- *Prelims:* Agriculture, Water Resources

- *Mains:* GS2 – Welfare and Governance | GS3 – Agriculture & Water Management

Summary:

The suicide of a young Maharashtra farmer exposes India's chronic irrigation crisis. While agriculture guzzles 80% of India's water, inequitable distribution, unsustainable cropping (e.g., sugarcane in dry zones), and groundwater overuse intensify distress.

Concerns:

- Water access reflects caste and class inequalities.
- Groundwater depletion increases vulnerability.

Policy Directions:

- Shift to water-efficient irrigation (drip/sprinklers)
- Crop diversification and participatory water governance
- Solar-powered pumps with strict resource monitoring

22. Strategic Focus: Beyond the Pakistan Lens**Relevance:**

- *Mains:* GS2 – International Relations & Global Strategy

Summary:

India's security strategy remains overly Pakistan-centric, even as the global order shifts. Events like the Russia-China summit and U.S. Middle East re-alignments reveal a multipolar world in flux.

Core Argument:

- Bilateral obsessions limit India's broader diplomatic engagement.
- US-led unipolarity is waning; new power blocs (China-Russia) are rising.

Way Forward:

- Embrace multipolar diplomacy
- Deepen engagement in West Asia, Indo-Pacific, and Africa
- Diversify strategic partnerships beyond regional rivalries

23. Caste Census: Between Data and Justice

Relevance:

- *Prelims:* Census, Social Justice
- *Mains:* GS1 – Indian Society | GS2 – Welfare and Governance | GS3 – Inclusive Growth

Summary:

The proposed caste census raises hopes for more data-driven affirmative action. However, the article warns against viewing it as a panacea.

Key Arguments:

- Past surveys (SECC, NSSO) already reveal caste-based deprivation.
- Political will, not just data, drives reform (e.g., Mandal Commission).
- Risk of politicisation in polarised settings

Way Ahead:

- Focus on implementation, not just enumeration
- Use data to correct intra-group disparities (e.g., Extremely Backward Classes within OBCs)

24. Copyright vs. Generative AI**Relevance:**

- *Prelims:* IPR, AI
- *Mains:* GS2 – Governance & IPR | GS3 – Tech & Innovation

Summary:

AI models, including those from OpenAI, rely on training datasets that may include copyrighted material. This raises legal and ethical dilemmas, especially in countries like India where copyright law lacks a flexible 'fair use' doctrine.

Legal Grey Areas:

- Does training LLMs on copyrighted content count as infringement?
- Indian courts yet to provide clarity

Global Context:

- U.S. allows broader 'fair use'; India's fair dealing is limited

Policy Needs:

- Define AI-specific copyright rules
- Ensure balance between innovation and protection of creators
- Address monopolisation of training data by tech giants

25. AI and the Reshaping of Indian Workplaces**Relevance:**

- *Prelims:* AI, Digital Economy
- *Mains:* GS3 – Future of Work, Tech Disruption, Employment

Summary:

AI is altering India's employment structure from a pyramid (broad base and middle) to an "hourglass" (growth at the top and bottom but a shrinking middle).

Trends:

- Mid-level jobs automated; high-skill and low-wage jobs grow
- India lags in AI readiness (Human Capital Index: 0.49)
- Tier-2/3 regions face digital exclusion

Required Actions:

- Reskill workers in AI-adjacent fields (AI auditing, cyber ethics)
- Create inclusive AI policies with human oversight
- Invest in digital infrastructure across regions to prevent inequality

26. Legal Deadlock: Presidential Reference in Tamil Nadu Governor Assent Case**UPSC Relevance:**

Prelims: Articles 143, 163, 174

Mains GS II: Centre-State dynamics, Judicial interpretation, Governor's constitutional role

Key Insights:

- The Centre may invoke Article 143 to seek the Supreme Court's advisory opinion on whether a Governor can delay assent to a bill indefinitely, following controversy in Tamil Nadu.

- While Article 143 allows presidential references, its opinions are advisory and do not override previous judicial rulings.
- This strategy echoes the 2012 2G case reference, where the Court reaffirmed auction as the preferred method for natural resource allocation.
- The use of a two-judge bench to rule on such a complex constitutional issue has drawn criticism, raising demands for a Constitution Bench.
- The issue exemplifies the grey areas in the Governor's discretionary powers (Articles 163 and 174) and the ambiguity around the use of Article 143.
- Concerns include "bench hunting" and the need for clearer guidelines for the constitution of larger benches on significant constitutional matters.

27. National Unity in Times of Crisis: A Call for Bipartisanship

UPSC Relevance:

GS II: Governance, Political Ethics

GS III: Internal Security

Key Insights:

- In light of the April 2025 Pahalgam attack, the article stresses that political unity during crises is vital for national security.
- Past experiences, like Pulwama in 2019, highlight how crises have been politicised rather than met with collective resolve.
- Unlike the U.S. post-9/11 or New Zealand post-Christchurch, India lacks a bipartisan security response framework.
- Tharoor argues for cross-party consensus on national security, which should be above electoral rivalry.
- A depoliticised, doctrine-based national security strategy is crucial for long-term planning, regional diplomacy, and credible deterrence.

28. Data at the Grassroots: Panchayat Performance Assessment Index (PAI)

UPSC Relevance:

GS II: Devolution of power, Local Governance

GS III: Data and Development

Key Insights:

- Although large datasets exist under the National Data Sharing Policy (2012), they remain inaccessible to grassroots actors due to poor usability.
- The Panchayat Performance Assessment Index evaluates over 2 lakh gram panchayats on SDG-linked metrics using 566 data points.
- However, data gaps persist: 40% of GPs haven't submitted complete data.
- The article highlights the urgent need for simplified data tools and training of panchayat members and civil society organizations.
- Using PAI can enhance alignment with central schemes and promote data-driven, inclusive governance.

29. Environmental Rule of Law Restored

UPSC Relevance:

Prelims: EIA rules, Key SC Judgments

Mains GS II & III: Judicial Activism, Environment and Development

Key Insights:

- The SC recently struck down the MoEFCC's practice of granting post-facto environmental clearances, reinstating the core of the 2006 EIA rules.
- The court criticized the government's 2017 and 2021 attempts to regularize violations, calling them harmful to environmental justice.
- Past verdicts, including Common Cause (2017) and Alembic Pharmaceuticals (2020), had also rejected post-clearance regularization.
- This judgment strengthens the precautionary principle and highlights the judiciary's role in protecting environmental rights under Article 21.
- It calls for rethinking the "ease of doing business" model in favor of environmentally responsible governance.

30. Bilingual India: Breaking the English Monopoly

UPSC Relevance:

GS I: Language and Society

GS II: Educational Policy

Essay Paper: Cultural Identity, Education

Key Insights:

- India is witnessing a silent linguistic revolution: people are increasingly reading and engaging with content in regional languages.
- This shift is driven by societal change rather than government intervention.
- Translation has emerged as a powerful tool of inclusivity, with Indian languages reclaiming intellectual and cultural space.
- The long-standing dominance of English, rooted in colonial policies like Macaulay's Minute, is being questioned.
- The article calls for a balanced language policy that respects multilingualism and democratizes knowledge without sidelining English entirely.

31. A New Global Pact: WHO's Pandemic Agreement

UPSC Relevance:

Prelims: WHO, International Pandemic Policies

Mains GS II & III: Health Governance, Global Cooperation

Key Insights:

- At the 78th World Health Assembly, WHO members adopted a historic Pandemic Agreement aimed at bolstering preparedness for future global health emergencies.
- The agreement, adopted after years of COVID-19 lessons, stresses equitable access to vaccines, treatments, and diagnostics.
- It represents a shift toward multilateral action over nationalistic responses in global health governance.
- Its success hinges on adequate implementation, financial support, and fair resource distribution, especially for low-income countries.
- The agreement could serve as a template for cooperation in climate change and biodiversity governance.

32. India's Security Doctrine: The Rise of a 'New Normal'

UPSC Relevance:

GS II: Neighbourhood Policy

GS III: Internal and Border Security

Key Insights:

- India's post-Pulwama security strategy marks a shift toward assertive deterrence, moving away from passive restraint.
- Strikes like Balakot and recent drone operations highlight a doctrine of measured, non-escalatory retaliation.
- Strategic messaging, especially in English, is targeted at international stakeholders to build legitimacy.
- The doctrine rejects Pakistan's "plausible deniability" and emphasizes real-time ISR-backed responses.
- This signals a shift in India's defence posture—one that is firm, calibrated, and strategically autonomous.

33. Scheme-Based Workers: Seeking Recognition and Rights

UPSC Relevance:

GS II: Welfare Schemes, Labour Rights

GS III: Inclusive Development

Key Insights:

- Nearly 6 crore scheme-based workers (ASHAs, AWWs, etc.) serve as the backbone of India's welfare programs but lack legal worker status.
- They remain excluded from minimum wages and social protections, despite their essential role in public service delivery.
- While some court rulings have acknowledged their rights (e.g., gratuity), overall recognition remains limited.
- The push to privatize schemes like ICDS further threatens their rights and job security.
- Recognition of these workers is key to ensuring both service quality and social justice.

34. South Asia's Strategic Triangle: India, China, and Pakistan

UPSC Relevance:

Prelims: Regional geopolitics

Mains GS II & III: Security, IR, Border Management

Key Insights:

- India's security calculations are now influenced by a growing China-Pakistan military nexus.
- China's technological and strategic support to Pakistan introduces a tripolar dimension to South Asia's security.
- India has moved away from the old US-driven "India-Pakistan hyphenation" to assert a separate strategic identity.
- Treaties like the Indus Waters Treaty are now part of India's broader deterrence narrative.
- Strategic recalibration must include new crisis management frameworks, deeper alliances, and a readiness for rapid response in a complex threat landscape.

35. 'Trump-Proofing' India-US Relations

UPSC Relevance:

Mains GS II: Foreign Policy, US-India Relations

Key Insights:

- Trump's potential return to power poses a challenge to the US's traditional bipartisan support for India.
- His past remarks on Kashmir and engagement with Pakistan signal a deviation from the de-hyphenated approach.
- India must diversify its engagement with US institutions (Congress, private sector, civil society) beyond the executive.
- Strategic autonomy, long-term planning, and institutional diplomacy are crucial to insulating bilateral ties from individual leadership volatility.
- India's foreign policy should remain steady, leveraging its growing global clout while preparing for an unpredictable global order.

36. Climate Change May Intensify Cyclone Impact and Expand Risk Zones

Prelims: Climate Change, Cyclones, SSP Scenarios, Mangroves

Mains: GS I (Geophysical Phenomena), GS III (Environment & Disaster Management)

ETH Zurich's research warns that under the high-emission SSP5-8.5 scenario, cyclones could not only become more severe but shift toward higher latitudes, affecting regions historically safe from such storms. Mangrove forests—vital for coastal protection—face significant threat, especially in Southeast Asia, where nearly 98% may be exposed under SSP3-7.0. High-intensity cyclones, characterized by >70 m/s winds and sea-level rise above

6 mm/year, may hit previously untouched ecosystems. This underscores the need for climate-adaptive coastal planning and reinforced Paris Agreement commitments.

37. Can Water Be Weaponized in Geopolitics?

Mains: GS II (India-Pakistan Relations), GS III (Water Security, Ethics in Policy)

The Indus Waters Treaty (IWT), despite hostilities between India and Pakistan, remains a model of transboundary water cooperation. While India can harness its water rights for hydropower, weaponizing river flows would violate international norms and treaty obligations. Strategic prudence and ethical considerations demand continued adherence, with cooperative institutions preferred over unilateral action. The IWT's resilience highlights the importance of diplomatic water-sharing even amid geopolitical tensions.

38. Measuring Poverty in India: Discrepancies and Dilemmas

Mains: GS II (Welfare Policies), GS III (Poverty, Data Reliability)

India's progress in reducing poverty has stagnated post-2011-12. Though poverty fell sharply between 2004 and 2012, it declined only marginally to 18% by 2022-23. With no official poverty line updates in over a decade, varying private estimates (ranging 10%–30%) have created policy uncertainty. Slower GDP growth, stagnant rural wages, and jobless growth are key factors. Bridging data gaps using survey imputation techniques can help, but accuracy and transparency are critical for evidence-based policymaking.

39. Dissent and Double Standards in Freedom of Expression

Prelims: Article 19, Free Speech

Mains: GS II (Judiciary, Rights), GS IV (Ethics of Governance)

Recent actions against individuals for voicing dissent post-Pulwama reveal a growing contradiction in the defense of free speech in India. While the Constitution guarantees FoE, political narratives and popular sentiment often stifle it through legal or social pressure. Liberalism must be consistent: protecting even unpopular or opposing views. Otherwise, the misuse of national security and hate speech laws to curb criticism sets dangerous precedents that weaken democratic foundations.

40. New Antibiotics and the Persistent Threat of AMR

Prelims: AMR, New Antibiotics (Nafithromycin, Zosurabalpin)

Mains: GS II (Health), GS III (Biotechnology, Regulation)

Despite breakthroughs like Nafithromycin—India’s first global-class antibiotic in 30 years—antimicrobial resistance (AMR) remains a growing threat. India’s unregulated antibiotic use, especially in outpatient care and animal farming, fuels resistance. The absence of unified surveillance weakens national response strategies. Strengthening public health systems, regulatory mechanisms, and adopting the One Health approach are critical. India’s biotech potential is promising but needs policy and investment support to combat AMR comprehensively.

41. AI, Tariffs, and the Global Tech Tug-of-War

Mains: GS II (Global Trade Policies), GS III (AI & Industrial Strategy)

Escalating U.S. tariffs on semiconductor imports from Asia risk splintering the global AI ecosystem and inflating tech production costs. As data centers migrate and global supply chains reorient, India can position itself as a neutral, cost-effective AI hub, thanks to its engineering talent and digital infrastructure. However, to capitalize, India must ramp up its semiconductor production, reduce import dependence, and promote R&D. Protectionism may temporarily shelter domestic industries but hinders global innovation and cooperation.

42. Rediscovering Buddhism in Modern India

Prelims: Buddhist Sites, Philosophy

Mains: GS I (Culture), GS II (Religion and Social Reform), GS IV (Buddhist Ethics)

Contrary to the popular belief that Buddhism disappeared from India post-13th century, new historical research shows it endured through the 19th century. Works like *Dust on the Throne* uncover Buddhism’s continuous cultural and architectural legacy. Buddhist thought, especially its ethical and egalitarian ideals, offers timely answers to modern challenges—ranging from identity politics to consumerism. Recognizing Buddhism’s historical continuity can reshape how India perceives its pluralistic past and social justice frameworks.

43. Judiciary and Civil Liberties: A Slippery Slope

Mains: GS II (Role of Judiciary), GS II (Rights vs. State Power)

The SC's conditional bail order in *Ali Khan Mahmudabad*—including a writing ban—raises alarms about judicial overreach and dilution of civil liberties. Such actions, absent conviction, blur lines between due process and punishment. When courts echo state sentiment over constitutional protections, the presumption of innocence suffers. The judiciary must remain the protector of freedoms, particularly when dissent or criticism is under fire from state or society.

44. Liberty vs Responsibility in Free Speech Discourse

Mains: GS II (Constitutional Principles), GS IV (Ethical Public Discourse)

The First Amendment of 1951 redefined India's speech freedoms by introducing broad restrictions. Contemporary debates reflect a similar tension—between liberty and responsibility. Courts and political actors often invoke public order or morality selectively, reflecting inconsistent commitment to free speech. True democratic dialogue requires not just tolerance of differing views but equal accountability across ideological lines. Ethical discourse should uphold constitutional values, not partisan agendas.

45. Why India's Coastline Got Longer Without Adding Land

Mains: GS I (Physical Geography), GS III (Coastal Management, Mapping Tech)

India's coastline, previously measured at ~7,500 km, now officially spans over 11,000 km—not due to land gain, but better measurement technologies. High-resolution imaging has captured finer geographical details like estuaries, inlets, and island contours, particularly in A&N and Lakshadweep. This is an example of the “coastline paradox,” where measurement scale affects length. A longer coast means expanded EEZ, greater marine rights—and responsibilities—for disaster management, ecological protection, and national security.

46. America Against America: Higher Education Under Political Siege

GS II: Governance, International Relations

GS IV: Ethics in Public Administration

Summary:

A recent U.S. federal court halted the Trump administration's attempt to curb Harvard University's admission of foreign students, following Homeland Security's accusations that Harvard's diversity, equity, and inclusion (DEI) policies fostered antisemitism and extremist sympathies. The administration had earlier frozen \$2.2 billion in federal funding—crippling key faculties like Harvard Medical School and the School of Public Health. Upon returning to power, the Trump administration escalated pressure, demanding structural changes, audits, and ideological compliance.

Harvard's resistance, led by President Alan Garber, mirrored similar defiance at Columbia University, indicating a broader conservative campaign to bring elite academic institutions under ideological control. The episode reveals deepening tensions between institutional autonomy and political interference, with implications for the U.S.'s global academic credibility.

Analytical Insights:

- **Governance Concerns:** Using executive power to reshape university governance violates academic autonomy and undermines democratic institutions.
- **Global Implications:** The politicization of education weakens U.S. soft power and threatens its leadership in global research and innovation.
- **Ethical Governance:** The move challenges principles of neutrality and institutional independence in public administration.
- **India Relevance:** Raises caution for India against increasing political control in higher education, which can stifle critical thinking and intellectual freedom.

47. Cultivating a Global Farm: India's Agricultural Trade Imperatives**GS III: Agriculture, Economic Development, Environment****Summary:**

In FY25, India's overall exports touched \$802.93 billion, with agriculture accounting for \$52 billion—a 6.3% rise over the previous year. Rice led with 24% of agri-exports, followed by marine products and spices. However, a steep decline in the agri-trade surplus—from \$27.7 billion in FY14 to \$13.8 billion in FY25—highlights challenges. While non-basmati rice exports bounced back post-lifting of export bans, oilseed imports surged due to weak domestic production.

Palm, soybean, and sunflower oils dominate India's edible oil imports, meeting over 55% of domestic needs. With sluggish growth in oilseed yield and poor productivity in pulses, India remains heavily import-dependent.

Analytical Insights:

- **Strategic Diversification:** Boosting domestic oilseed cultivation (mustard, groundnut, sesame) is vital for reducing import reliance.
- **Policy Reform:** Rationalizing subsidies, enhancing R&D, and investing in climate-resilient agriculture can transform export potential.
- **Trade Diplomacy:** FTAs with countries like the UK open up high-value markets, but India needs an agile export strategy and infrastructure readiness.
- **Future Target:** To reach \$100 billion in agri-exports by 2030, annual growth must accelerate to 9–10%, necessitating a clear, long-term vision.

48. Rethinking the Indus Waters Treaty: Strategic Rebalancing
GS II: Bilateral Relations, GS III: Water Security and Environment**Summary:**

The Indus Waters Treaty (1960), brokered by the World Bank, allocated 80% of the basin's waters to Pakistan, with India receiving control over the eastern rivers. India's scope on the western rivers remains limited to non-consumptive uses like hydropower. While projects like Pakal Dul have expanded India's capacity marginally, India has used only a fraction of its permissible rights.

Given Pakistan's repeated attempts to obstruct Indian projects through Article IX and its ongoing support for cross-border terrorism, India is considering revisiting the treaty. Proposals include shifting from project-based approvals to basin-level planning, ensuring equitable access, and accounting for current geopolitical and environmental realities.

Analytical Insights:

- **Outdated Framework:** The treaty fails to reflect 21st-century challenges—climate change, altered hydrology, and regional hostilities.
- **Sovereignty and Security:** India must reclaim strategic leverage while remaining compliant with international norms.
- **China Factor:** As the Indus originates in Tibet, China's role in any future renegotiation becomes geopolitically significant.



- **Way Forward:** A basin-wide, cooperative water management framework can ensure sustainable and secure usage.

49. Autonomous Satellites: The Legal and Ethical Challenge in Outer Space

GS II: International Governance, GS III: Science & Technology, GS IV: Ethics

Summary:

Artificial intelligence has enabled satellites to make autonomous decisions, like evading debris or modifying orbits. However, this technological leap presents a major governance challenge: current space treaties, like the Outer Space Treaty (1967) and the Liability Convention (1972), do not address accountability in case of AI malfunctions. If an AI-controlled satellite misinterprets an object and causes a collision or military incident, it's unclear who bears responsibility—the developer, the state, or the operator. The 2024 IISL report urges the establishment of global norms, accountability systems, and safety protocols for AI in space. Comparisons with aviation or maritime liability frameworks reveal gaps in their applicability to autonomous space operations.

Analytical Insights:

- **Ethical Dilemmas:** Can machines be held liable? If not, where does accountability lie—legally and morally?
- **Diplomatic Risks:** Misjudgments in space could trigger geopolitical confrontations or violate sovereignty.
- **Legal Vacuum:** Existing treaties are insufficient; multilateral legal reform is urgently needed.
- **Strategic Urgency:** As AI and militarization expand into space, global cooperation must keep pace to preserve peace and order.

50. Building Heat-Resilient Public Health Systems in a Warming India

GS II: Health and Governance, GS III: Climate Change and Disaster Management

Summary:

India's vulnerability to heatwaves has become more pronounced, yet public health responses remain reactive and fragmented. Insights from the 'India 2047: Building a Climate-Resilient Future' conference stress that India's primary health infrastructure—

ASHAs, PHCs, and wellness centres—must be trained to detect and manage heat-related illnesses.

Ahmedabad's local innovations like WhatsApp-based early alerts, hydration kits, and targeted outreach offer scalable models. However, systemic reforms are needed to integrate heat risks into chronic disease care and urban planning. Clinical protocols must evolve with dedicated hospital heat units, standardized diagnostics, and patient follow-ups.

Analytical Insights:

- **Equity Dimension:** Heatwaves disproportionately affect the poor, elderly, informal workers, and those in poorly ventilated housing.
- **Policy Shift:** A preventive, equity-centered approach is needed—cooling centres, regulated work hours, hydration access.
- **Cross-Sectoral Coordination:** Health systems must work with city planners, meteorologists, and labor departments.
- **Urgent Imperative:** The narrowing window for adaptation demands swift, inclusive, and science-backed governance responses.

51. Revisiting Forgotten Nationalism

GS II – Constitution, Civil Rights, Role of State; GS I – Freedom Movement; GS IV –

Ethical Governance

The article critiques the transformation of Indian nationalism from its pluralistic roots to a divisive and authoritarian form. Using the Ali Khan Mahmudabad case, it highlights how dissent is vilified as "anti-national", shrinking democratic spaces.

- India's independence struggle was rooted in inclusive, moral nationalism, focused on uniting people across religion and language.
- Presently, there's a shift towards exclusionary politics echoing global ethnonationalist ideologies.
- Constitutional liberties like free speech are being sacrificed for a narrow view of national security.
- The original vision emphasized checks on power, unlike today's trend of silencing opposition.

Mains Takeaway: A vibrant democracy requires dissent and pluralism. There's a need to restore inclusive nationalism that values unity in diversity over majoritarian dominance.

52. Understanding Early Monsoon Onset

GS I – Climatology; GS III – Environment, Climate Science

The 2025 monsoon reached Kerala on May 24—eight days early—marking the earliest onset since 2009.

Onset Criteria (as per IMD):

- 60% of stations in Kerala region must record ≥ 2.5 mm rainfall for two days
- Westerly winds must be dominant up to 600 hPa
- OLR must be below 200 W/m² in the target region

Why Early in 2025?

- Elevated sea surface temperatures
- Favorable Madden-Julian Oscillation phase
- Strengthened Somali Jet and low-pressure system in Arabian Sea

Insight: Early onset doesn't imply a strong monsoon. Rainfall volume and distribution matter more for agriculture and water resource planning.

53. The Silent Urban Epidemic: Overnutrition

GS II – Public Health; GS III – NCDs, Urbanization Effects

A Nature report on Hyderabad's IT workforce revealed 84% had fatty liver and over 70% were obese, underscoring an urban health emergency.

- Obesity, largely driven by sedentary lifestyles and processed foods, now rivals undernutrition in urban India.
- India faces a dual nutrition burden, with WHO warning of rising NCDs in lower-income nations.
- Programs like Eat Right India are a start, but stronger regulations (e.g., food labeling, fat/sugar taxes) are needed.

Mains Insight: Urban health policy must integrate urban planning, food regulation, and physical infrastructure. A preventive, systemic response is essential.

54. Experiential Learning in Indian Education

GS II – Education Reforms; GS IV – Pedagogical Ethics

India's education system still leans on rote learning. Experiential Learning (EL), focused on real-world application, is a more effective alternative.

- EL uses tools like role-playing, project-based learning, and flipped classrooms to improve student engagement.
- It aligns with NEP 2020's goal of competency-based learning and caters to diverse learning needs.

Challenges: Resource limitations, curriculum rigidity, and teacher training gaps hinder implementation.

Mains Insight: EL is vital for preparing youth for dynamic careers. Policy must support pedagogical innovation, equity in access, and teacher empowerment.

55. Why India Needs a National Crypto Strategy

GS II – Tech Diplomacy; GS III – Digital Economy, Blockchain Policy

A crypto alliance between Pakistan and US-based WLF1 indicates geopolitical realignment in the digital finance sector.

- Pakistan aims to use blockchain for remittances, asset tokenization, and economic innovation.
- India must avoid complacency; Trump's team, including figures like Elon Musk, is aggressively promoting pro-crypto ecosystems.
- India needs to guard its regional tech advantage by framing a strategic, forward-looking crypto policy.

Mains Insight: Ignoring crypto's strategic potential could be costly. India must prepare a calibrated policy integrating regulation, innovation, and global leadership.

56. FTAs and Their Impact on Indian Agriculture

GS II – Trade Relations; GS III – Agriculture, Globalization, MSP

India's agri-trade is expanding, but FTAs with the US, UK, and EU pose both risks and opportunities.

- Export growth is being offset by rising imports (especially edible oils and pulses), narrowing the agri-trade surplus.
- FTAs can boost high-value exports (marine, spices, processed foods) but risk exposing Indian farmers to cheap, subsidized imports.

Mains Insight: FTAs must balance market access with farmer protection. Trade deals should factor in food security, sanitary standards, and subsidy frameworks.

57. NEP 2020 – Towards Practical and Employable Education

GS II – Education; GS III – Employment, Innovation; Essay – Education and Reforms

The NEP 2020 is a landmark policy to modernize education, promote research, and improve job-readiness.

- Offers flexible degrees, re-entry options, and industry-academia collaboration.
- India's global education rankings and patent filings have improved, indicating policy impact.
- However, youth unemployment, especially among educated women, remains high.

Mains Insight: NEP bridges academia and employment, but needs deeper labor market reforms, equitable implementation, and gender-sensitive support systems.

58. The Missing Deputy Speaker: A Democratic Deficit**GS II – Parliament, Constitutional Accountability**

Since 2019, the Deputy Speaker's post in Lok Sabha remains unfilled, raising democratic and constitutional concerns.

- Articles 93 and 94 mandate early election of Speaker and Deputy Speaker to ensure institutional continuity.
- The Deputy Speaker also acts as a democratic check, often coming from the Opposition.
- Avoiding this appointment sidelines bipartisan norms and concentrates power in the ruling party.

Mains Insight: Codifying parliamentary conventions can prevent democratic erosion and protect institutional resilience.

59. Multilateral Aid to Pakistan: A Questionable Practice**GS II – International Institutions, GS III – Fiscal Prudence, Development Aid**

India questions the continued financial support to Pakistan by the IMF and World Bank despite its weak governance and rising defense spending.

- Pakistan lacks mechanisms like India's parliamentary scrutiny over foreign borrowing.
- There's concern that multilateral funds are indirectly enabling military expansion or corruption.

Mains Insight: Reform is needed in global financial oversight to ensure responsible use of aid. India's position reflects its evolving role as a fiscally responsible global player.

60. Poverty and Inequality – India’s Surprising Progress

GS II – Welfare; GS III – Inclusive Growth, Inequality

New HCES data reveals a sharp fall in poverty and income inequality between 2011–12 and 2023–24.

- Rural poverty dropped from 19.5% to 6.2%, urban from 7.5% to 2.4%.
- Gini coefficient also declined notably, especially in urban areas.
- World Bank data confirms India’s extreme poverty fell from 16.2% to 2.3% in a decade.

Mains Insight: Growth has been more inclusive than expected. However, sustaining this requires improved service delivery, job creation, and rural-centric policies

61. Transforming Early Childhood Education (ECE): A Strategic Imperative

GS II – Education, Policy for Vulnerable Sections, Role of NGOs

ECE plays a transformative role in shaping an individual's long-term potential and breaking intergenerational poverty. Referencing James Heckman's research, early investments significantly impact future earnings and cognitive outcomes. However, India's ECE system is underfunded and poorly structured:

- **Key Issues:**
 - Instructional hours in Anganwadis average just 30 minutes daily.
 - Only 9% of pre-primary setups have trained educators.
 - Foundational abilities are weak—just 15% can match objects; only 30% can identify numbers.
- **Fiscal Gap:** India spends merely ₹1,263 per child annually on ECE compared to ₹37,000 in school education.
- **Reform Initiatives:** States like UP and Odisha are investing in trained ECE educators and innovative programs (e.g., Balavatikas, Jadupedi Kits).
- **Community Engagement:** Parental involvement is vital but hampered by low awareness. Programs like *Bal Choupal* and digital tools (e.g., WhatsApp learning modules) can bridge this gap.

Way Forward:

- Prioritize ECE in national policy with trained teachers, better infrastructure, and increased funding.
- Leverage public-private and NGO partnerships to scale innovation.

- Empower parents through tech-enabled learning and grassroots awareness.

62. Rethinking Escalation: India's New Strategic Posture

GS II/III – India-Pakistan Relations, Counterterrorism, Internal Security

India's response to cross-border terrorism has evolved into a doctrine of calibrated deterrence. The 2024 Operation Sindoor exemplifies this shift with surgical airstrikes across the LoC—India's boldest move since 1971.

- **Doctrinal Shift:** From strategic restraint to assertive deterrence since 2016 (e.g., surgical strikes, Balakot).
- **Strategic Clarity:** Emphasis on swift, limited military action to neutralize threats without triggering full-scale war.
- **Diplomatic Narrative:** India now actively seeks global support by exposing state-sponsored terror in Pakistan.

Challenges:

- Avoiding escalation beyond control.
- Balancing military readiness with diplomatic prudence.

63. India's Foreign Policy Drift: Moving Away from Bandung Ideals

GS II – India's Multilateral Vision, Foreign Policy Strategy

The absence of a formal observance of Bandung's 70th anniversary reflects India's departure from its foundational foreign policy ethos. Once a leader in the Non-Aligned Movement and post-colonial diplomacy, India is now criticized for adopting a more transactional, short-term approach.

- **Earlier Stance:** India championed sovereignty, multilateralism, and ethical diplomacy.
- **Current Trends:** Foreign policy increasingly driven by domestic optics, strategic alignments, and tactical interests.

Implications:

- Weakening of India's moral leadership in the Global South.
- Erosion of soft power tools like academia and cultural diplomacy.

Recommendations:

- Restore principled diplomacy rooted in strategic autonomy.
- Reinvest in multilateral platforms and intellectual leadership.

64. Northeast India: From Margins to Strategic Core

GS I/II/III – Regional Development, Infrastructure, Federalism

The Northeast is emerging as India's growth and diplomatic gateway, given its geostrategic location, biodiversity, and cross-border potential. Yet, ethnic unrest, ecological sensitivity, and infrastructural lag continue to hinder its development.

- **Strategic Location:** Borders five nations, vital to India's Indo-Pacific and Act East Policy.
- **Natural Wealth:** Over 50,000 MW hydropower potential; part of Indo-Burma biodiversity hotspot.
- **Cultural Diplomacy:** 135+ tribes offer rich soft power opportunities.

Persistent Issues:

- Insurgency and ethnic conflict (e.g., Manipur crisis).
- Environmental concerns over hydro projects.
- Porous borders and trafficking.

Reform Roadmap:

- Prioritize peace agreements and tribal recognition.
- Expand digital and physical infrastructure via Gati Shakti and Sagarmala.
- Promote eco-tourism, renewable energy, and organic agriculture.
- Engage youth through skill-building and anti-drug campaigns.

65. Building Logistics Backbone for Trade and Growth

GS II/III – Governance, Infrastructure, Economic Policy

India's ambitious export target of USD 2 trillion by 2030 hinges on its ability to modernize logistics. Current logistics inefficiencies increase trade costs and reduce competitiveness.

- **Sectoral Insights:**
 - Market projected to grow from USD 338 billion (2023) to USD 800 billion (2030).
 - National Logistics Policy (2022) targets cost reduction from 14% to 8% of GDP.

- Programs like ULIP and LDB improve transparency and coordination.
- **Challenges:**
 - Delays in multimodal logistics park development.
 - Skill deficits—estimated 4.3 million new logistics professionals needed.
 - Fragmented digital adoption among small enterprises.

Strategic Recommendations:

- Fast-track AI-powered customs and logistics platforms.
- Expand multimodal hubs and port electrification under Sagarmala.
- Develop tech-oriented logistics skill centers aligned with ESG goals.

66. Deepening India-Bangladesh Relations Amid Emerging Challenges**GS II – Bilateral Relations, Neighborhood Diplomacy**

India's ties with Bangladesh are anchored in cultural proximity and strategic alignment. Yet, recent political instability and growing Chinese influence raise concerns.

- **Key Achievements:**
 - Trade worth USD 14.01 billion; energy cooperation >1,160 MW.
 - Landmark agreements: Land Boundary Agreement (2015), PIWTT, maritime access to Chittagong.
- **Major Frictions:**
 - Teesta water-sharing impasse.
 - Border management issues linked to migration and Rohingya crisis.
 - Political rhetoric around NRC/CAA impacting perception.

Strategic Steps Ahead:

- Operationalize CEPA and SEZs for deeper economic integration.
- Resolve Teesta via Joint Rivers Commission.
- Expand cross-border digital platforms (e.g., UPI).
- Collaborate on environmental and minority rights issues.

67. Fixing the Gaps in India's Fiscal Federalism**GS II/III – Centre-State Relations, Budgeting, Local Governance**

Despite a federal structure, India's fiscal decentralization remains imbalanced. States face constraints in resource mobilization and autonomy, affecting localized development.

- **Key Constitutional Mechanisms:**

- Articles 246, 270, 280, and 293 define fiscal sharing and borrowing.
- GST has reduced States' tax discretion.
- SFCs often ignored, undermining local body funding.

- **Current Challenges:**

- Rising share of non-divisible cess/surcharge (25% of Union tax revenue).
- Horizontal imbalances penalize high-performing States.
- Decline in untied grants and Panchayat empowerment.

Reform Agenda:

- Increase devolution share beyond 41% in 16th Finance Commission.
- Include cess in divisible pool for equitable sharing.
- Reform GST architecture and restore State autonomy.
- Empower PRIs through fiscal and functional devolution.

68. Reimagining the India-Africa Partnership

GS II/III/IV – Foreign Policy, Economic Development, Global South Cooperation

India's evolving partnership with Africa draws strength from shared historical struggles and mutual developmental goals. However, India must now recalibrate its approach amid rising global competition and regional volatility.

- **Strategic Focus Areas:**

- Maritime cooperation (e.g., Mauritius base).
- Critical mineral access for green energy.
- Tech partnership via IIT Zanzibar and solar alliances.
- Peacekeeping and counterterrorism collaboration.

- **Key Bottlenecks:**

- Africa's debt burden and fragile security landscape.
- Infrastructure bottlenecks and diplomatic delays (e.g., IAFS gaps).
- Rising influence of China and Western powers.

Strategic Recommendations:



- Launch a permanent India-Africa Strategic Forum.
- Build innovation hubs and joint ventures in AfCFTA zones.
- Use blended finance tools and diaspora bonds for sustainable projects.
- Lead digital infrastructure development through Pan-African DPI based on India Stack.

69. AI and the Human Development Paradigm Shift: Insights from HDR 2025

GS II – Governance, Welfare Policies | GS III – Role of Technology, AI | GS I – Society & Development

The **Human Development Report (HDR) 2025** by UNDP highlights the pivotal role Artificial Intelligence (AI) can play in addressing long-standing developmental deficits across education, healthcare, and governance. Although **India has advanced to the 130th rank** with a Human Development Index (HDI) value of **0.685**, it still grapples with deep-rooted inequality and gender gaps.

HDI: Conceptual Foundation

- A multidimensional index conceptualized by Mahbub ul Haq and Amartya Sen (1990).
- Covers **health (life expectancy)**, **education (mean and expected years of schooling)**, and **income (GNI per capita, PPP)**.
- Shifts development discourse from GDP-centric to people-centric.

Global Observations

- Post-pandemic stagnation in human development.
- **Iceland tops (0.972), South Sudan lowest (0.388).**
- 1 in 5 people globally now engage with AI, creating both opportunities and new digital inequalities.

India's Performance Snapshot

- **HDI up from 133 to 130 (2023)**; life expectancy at 72 years.
- Mean schooling increased to 13 years; GNI per capita jumped to \$9,046.
- AI leadership evident—highest AI skill penetration, with public innovations like **Bhashini** and **MuleHunter.AI**.

- Yet, 30.7% HDI loss due to inequality and <5% student readiness in digital skills are concerning.

Key Challenges

- Gender disparity in labor force participation.
- Low spending on health (3.8% GDP) and education (4.6% GDP).
- Risks of **technosolutionism**—AI without institutional capacity may widen digital divides.

Way Forward

- Build inclusive digital ecosystems accessible to marginalized groups.
- Human-centered AI policy with strong ethical safeguards.
- Invest in foundational education, vocational skills, and digital literacy.
- Create diverse, AI-ready public institutions that empower rather than automate out human roles.

70. Defence Modernisation: Towards Strategic Autonomy and Technological Edge

GS II – Border Security | GS III – Internal Security, Indigenisation, Defence R&D

Triggered by security challenges like the **Pahalgam attack** and **Operation Sindoor**, India's defence strategy is moving toward **self-reliance, tech innovation, and integrated capability-building**.

Recent Gains

- **Indigenous defence output** reached ₹1.27 lakh crore in FY24; 65% defence procurement is now domestic.
- Defence exports hit a record ₹21,083 crore—30x growth in 10 years.
- DICs in UP and TN drew over ₹8,600 crore in investments.
- 619 startups engaged under **iDEX and TDF** platforms.

Key Assets

- New acquisitions: LCH *Prachand*, ATAGS, SCALP missiles, and loitering munitions.
- BrahMos export to Indonesia and deeper ASEAN military engagement.
- INS *Vikrant* with 76% indigenous content embodies naval resilience.

Critical Challenges

- 36% of procurement still import-dependent.
- Slow roll-out of Integrated Theatre Commands.
- Defence R&D gets just 3.94% of the defence budget.
- Cyber vulnerabilities, as seen in the 2020 Mumbai grid incident, remain under-addressed.

Strategic Measures

- Enhance AI, cyber and quantum capabilities via tech partnerships.
- Reform procurement (DAP) and incentivize private sector through Defence Innovation Zones (DIZs).
- Launch a **Defence Talent Academy** for high-end R&D skills.
- Develop export ecosystems and open up new defence markets in Africa and Latin America.

71. Gig Economy in India: Enabler of Jobs, But at What Cost?

GS III – Informal Sector, Employment | GS II – Government Policies | Essay – Digital Economy

India's gig economy is set to employ **23.5 million workers by 2030**, driven by digital penetration, job flexibility, and informal-to-platform employment transitions.

Opportunities Offered

- Short-term employment for youth in logistics, food delivery, and online services.
- Bridges informal and formal sectors—encourages entrepreneurial gig work.
- Women (28%) and rural workers find greater participation via digital platforms.
- Platforms contribute to tax compliance via e-Shram and digital payment trails.

Systemic Vulnerabilities

- No legal recognition of gig workers under traditional labor laws.
- Unstable incomes, long work hours, and lack of job security.
- Gig workers excluded from **universal social protections**, despite initiatives like AB-PMJAY.
- Algorithm-driven deactivation and harassment without grievance recourse.

Policy Imperatives

- Enact a national Gig Workers' Bill with enforceable rights, floor wages, and social safety nets.
- Portable benefits—health insurance, pensions, and life insurance—linked to worker IDs.
- Invest in digital skilling for rural and semi-skilled workers.
- Learn from state-led initiatives like Rajasthan's Gig Workers Act.

72. Mainstreaming PwDs in India's Governance and Development Framework

GS II – Vulnerable Sections, Social Justice | GS I – Empowerment | GS IV – Ethics of Inclusion

Tamil Nadu's law reserving seats for **Persons with Disabilities (PwDs)** in local governance marks a watershed moment in participatory inclusion.

Existing Legal Framework

- **RPwD Act, 2016** mandates 4% job and 5% education reservation.
- Schemes like **Accessible India Campaign, DDRS, and National Trust Act** aim for rehabilitation and accessibility.

Persistent Exclusion

- One in four disabled children never attend school.
- Only 36% of PwDs are employed; female participation is even lower at 23%.
- Infrastructure remains inaccessible (only 3% of public buildings disabled-friendly).
- Healthcare costs are disproportionately high (~20% of household expenditure).

Policy Recommendations

- **Universal design norms** for transport, buildings, and digital infrastructure.
- Skill development aligned with specific disabilities.
- Incentivize private sector hiring through tax breaks and performance-linked incentives.
- Strengthen the institutional architecture with empowered Disability Commissions.
- Promote positive representation in media and public life.

73. Reviving India's Industrial Engine Amid Global and Domestic Challenges

GS III – Economy, Industry, Infrastructure | GS II – Policy and Governance



Industrial growth fell to **4% in 2025**, the weakest in four years, despite high FDI inflows and digital transformation under Industry 4.0.

Growth Catalysts

- **PLI and Make in India** attracted over ₹14 lakh crore in FDI.
- Record-high **PMI of 59.1**, especially in electronics and automotive manufacturing.
- Infrastructure gains via Smart Cities, logistics corridors, and affordable housing drive demand for steel and cement.
- Exports like mobile phones saw 92% growth in FY24.

Structural Bottlenecks

- Rural inflation and slowing demand hinder industrial output.
- Logistics costs are among the highest globally (14–18% of GDP).
- MSMEs face credit access barriers and red tape.
- Green manufacturing adoption remains low due to cost burdens.

Strategic Revival Plan

1. **Promote AI & automation** adoption, especially in MSMEs.
2. Scale up **multi-modal logistics infrastructure** under Gati Shakti.
3. Integrate **skilling missions** with advanced tech training in robotics and AI.
4. Incentivize **deep-tech startups** and boost R&D to 2% of GDP.
5. **Boost rural demand** via MGNREGA and rural infrastructure.
6. Enable **green industrialization** through PLI schemes and circular economy models.
7. Expand **fintech-based MSME financing** and simplify business regulations.
8. Fast-track **FTAs** and enhance global market access.
9. Emulate **PURA** model for rural industrial hubs.

PRELIMS BOOSTER

1. Innovative Method for Producing Green Hydrogen

A heterostructure combining copper tungsten oxide (CuWO_4) and copper oxide (CuO) has been developed to improve the Hydrogen Evolution Reaction (HER). This enhancement arises from a built-in electric field (BIEF). The structure is synthesized by growing CuWO_4 nanoparticles onto a Cu(OH)_2 base, forming a p–n junction that causes uneven electron distribution. A Gibbs Free Energy (ΔG) gradient at the CuO – CuWO_4 interface aids in proton adsorption on CuO and facilitates desorption on CuWO_4 , demonstrating negative cooperativity that significantly raises desorption efficiency in alkaline conditions. Green hydrogen refers to zero-emission hydrogen produced by electrolyzing water using renewable energy. Major

production techniques include Alkaline Electrolysis, Proton Exchange Membrane (PEM) Electrolysis, and Solid Oxide Electrolysis (SOEC).

2. Near-Surface Shear Layer (NSSL) of the Sun

The Sun has a layer beneath its visible surface called the Near-Surface Shear Layer, stretching roughly 35,000 km deep. In this region, the Sun's angular rotation speed declines rapidly, with variations linked to depth, latitude, and solar cycles. Plasma flows here converge around sunspot latitudes but reverse direction midway through the layer, creating vast circulation patterns. These flows are shaped by solar rotation and the Coriolis force but do not trigger torsional oscillations. Observations from helioseismology using data from SDO-HMI and GONG provided three-dimensional velocity maps confirming these phenomena.

3. WAVES Anime & Manga Contest (WAM!)

WAM! (WAVES Anime & Manga Contest) is India's first large-scale effort to encourage homegrown anime, manga, webtoons, and cosplay. Spearheaded by the Ministry of Information and Broadcasting in collaboration with the Media & Entertainment Association of India, it will culminate in a national finale from May 1–4, 2025, at Mumbai's Jio World Convention Centre. WAVES 2025 will serve as a major platform for India's Animation, VFX, Gaming, Comics, and XR sectors, under the theme "Create in India, Create for the World." The event will feature international partnerships, the Create in India Challenge, and exhibits spanning AI, AR, VR, and extended reality technologies.

4. Brain-Computer Interface (BCI)

Brain-Computer Interfaces (BCIs) create direct links between human brain signals and external devices, translating neural activity into commands to control machines or restore lost functions caused by neurological conditions. Early BCIs were slow and imprecise with limited command sets. Modern BCIs involve implanting sensors, decoding signals through machine learning, training in virtual environments, and performing real-world tasks. BCIs have enabled people with conditions like ALS to regain speech using neural networks and digital speech avatars, with one patient achieving communication speeds up to 62 words per minute.

5. AIM4NatuRe Programme

AIM4NatuRe is a global initiative led by the FAO from 2025–2028, funded by the UK (GBP 7 million, approximately USD 9 million), aimed at supporting nations to monitor and report on ecosystem restoration progress. It contributes to Target 2 of the Kunming-Montreal Global Biodiversity Framework, which commits to restoring 30% of degraded ecosystems by 2030. The project leverages advanced technology, standardized data collection, and capacity-building support to cover diverse ecosystems—forests, wetlands, grasslands, marine, and agricultural areas. It is part of FAO's Action Against Desertification and the AIM4Forests Programme, promotes biocentric restoration approaches, empowers Indigenous Peoples, and provides Framework for Ecosystem Restoration Monitoring (FERM) tools and resources.

6. Raghuji Bhosale I (1695–1755)

Raghuji Bhosale I established the Nagpur branch of the Bhosale dynasty and was a distinguished Maratha military leader during Chhatrapati Shahu Maharaj's reign. Recognized for

his valor and strategic skill, he was awarded the title 'Senasaheb Subha.' Raghuji led crucial military expeditions into Bengal in 1745 and 1755, significantly extending Maratha influence into Bengal and Odisha. He also defeated the Nawabs of Kurnool and Cuddapah, further consolidating Maratha power in southern India.

7. Muziris Heritage Project

Recently, Kerala's Leader of Opposition credited historian M.G.S. Narayanan as a major inspiration behind the Muziris Heritage Project, despite differing academic views. Launched in 2009, this project is among India's most ambitious heritage conservation efforts, jointly implemented by the Kerala Government and the Government of India, with UNESCO's support. Its mission is to preserve and revitalize Muziris, an ancient maritime trade center with over 3,000 years of history.

8. Gyan Post Service

Gyan Post is a new India Post service designed to deliver educational, cultural, religious, and social books across the country at low cost using trackable surface transport. This initiative aims to make learning resources accessible regardless of income or location. Only printed materials with clearly identified publishers or printers will qualify. The service begins on May 1st.

9. National Internet Exchange of India (NIXI)

NIXI is a non-profit entity registered under Section 8 of the Companies Act, 2013, and established in 2003. It was created to enable Internet Service Providers (ISPs) to peer and exchange domestic internet traffic within India, rather than routing it through servers abroad (e.g., in the US). This reduces costs for ISPs by saving international bandwidth and improves overall service quality.

2nd May 2025:

1. Global Antibiotic Research & Development Partnership (GARDP)

GARDP is a non-profit organization dedicated to creating new antibiotics to combat drug-resistant bacterial infections. Its mission is to meet critical public health demands related to Antimicrobial Resistance (AMR) and secure long-term access to vital antibiotics. It was founded by the World Health Organization (WHO) and the Drugs for Neglected Diseases initiative (DNDi) under the 2015 Global Action Plan on AMR. Established as an independent foundation in Geneva in 2018, GARDP collaborates with both public and private sectors to accelerate the development and availability of antibiotics worldwide.

2. NOTAM (Notice to Air Mission)

A NOTAM is a notice issued by a country's aviation authority to alert pilots about temporary changes or hazards affecting flight operations, such as airshows, VIP movements, runway closures, or military activities. These notices are encoded for accuracy but remain generally comprehensible. When advance notice of seven days isn't feasible, NOTAMs are quickly disseminated to all relevant stakeholders. They can be accessed online and through aviation information services. Checking NOTAMs before flights is crucial for safety and operational awareness.

3. Red-Crowned Roofed Turtle

Scientific Name: Batagur kachuga

Also called the Bengal Roof Turtle, this species is native to India, Nepal, and Bangladesh, though it now mainly survives in the National Chambal Sanctuary. It is medium-sized, growing up to 56 cm long and weighing up to 25 kg, with males being smaller. Its distinctive features include a reddish-orange head marked by a black crown and a greenish-brown shell patterned with yellow. This omnivorous turtle is critically endangered, protected under Schedule I of India's Wildlife Protection Act, 1972, listed as Critically Endangered by the IUCN, and included in CITES Appendix II.

4. Natural Hydrogen

Natural or "white" hydrogen refers to molecular hydrogen occurring naturally within the Earth's crust, produced through processes like serpentinization, radiolysis, and decomposition of organic matter. It represents a clean, affordable, low-emission energy alternative that can help cut global carbon output. Its extraction cost is expected to be lower than that of green hydrogen (possibly under \$1 per kilogram). This hydrogen is typically located in tectonic zones, ophiolite complexes, ultramafic rocks, and hydrothermal systems. In India, promising reserves exist in the Dharwar Craton, Singhbhum, Vindhyan and Cuddapah basins, Andaman ophiolites, and the Himalayas.

5. Vembanad Lake

Vembanad Lake is India's longest lake and Kerala's largest, covering about 2,033 square kilometers and stretching around 5 kilometers. It spans the districts of Alappuzha, Kottayam, and Ernakulam and is also known locally as Vembanad Kayal, Punnamada Lake, and Kochi Lake. The lake receives water from several rivers, including the Meenachil, Achankovil, Pamba, and Manimala, before emptying into the Arabian Sea. Its islands include Pathiramanal and Perumbalam. Notable attractions are the Kumarakom Bird Sanctuary and the annual Nehru Trophy Boat Race. Since 2002, it has been designated a Ramsar Wetland under the Vembanad-Kol wetland system.

MAY 6

1. Shear-wave Splitting

Shear-wave splitting happens when seismic shear waves divide and travel at **different speeds** due to **aligned fractures in rocks**. Underground changes in **magma and fluid movement** can alter stress, modifying how shear waves behave. An increase in shear-wave splitting may indicate **rising internal pressure**, serving as an **early warning for volcanic eruptions**.

► Important Fact:

- *Mount Ontake* (Japan's **second-highest volcano**) is located in **Central Honshū**, near Tokyo.
- In **2014**, it experienced a **fatal phreatic eruption** caused by **steam pressure**, which was difficult to predict and lacked clear seismic warnings.

2. Pulsar G359 – Galactic ‘Bone’

Pulsar G359.13 is a **230-light-year-long** non-thermal filament near the **Galactic Center**, emitting **radio waves** through *synchrotron radiation*. A break in this filament aligns with a **rapidly moving pulsar traveling at 1–2 million mph**, detected via **X-rays (Chandra)** and **radio telescopes (MeerKAT, VLA)**. The pulsar’s motion **disturbed G359.13’s magnetic field and structure**.

► Important Facts:

- **Chandra X-ray Observatory** (launched **1999**) spotted high-energy emissions from the pulsar and nearby particles.
- This phenomenon offers insights into **how pulsars interact with galactic magnetic fields**.

3. Pwani Molecular Form

The *Pwani Molecular Form* belongs to the **Anopheles gambiae complex**, the main vector transmitting **malaria**. It shows strong **genetic divergence**, suggesting it may have **distinct ecological or behavioral traits**.

► Important Facts:

- Limited to **coastal East Africa** (*especially Tanzania and Kenya*).
- It **lacks standard insecticide resistance markers**, raising concerns that it could be **vulnerable or have alternative resistance mechanisms**.
- This creates challenges for malaria control measures like **insecticide-treated nets** and **indoor residual spraying**.

4. SVAMITVA Scheme

SVAMITVA was launched in **2020** as a **Central Sector Scheme** by the **Ministry of Panchayati Raj** to create **rural property ownership records using drones**. It helps property owners **use land as a financial asset** for **loans and government benefits**.

► Important Facts:

- Supports **rural development planning** through **accurate GIS-based maps**.
 - Aids **property tax assessment** for Gram Panchayats or states.
 - Reduces **legal disputes** over property ownership.
 - Implemented by **State Revenue Departments** with **Survey of India** as the technology partner.
-

5. Axial Seamount

Axial Seamount is an **underwater shield volcano** about **300 miles off Oregon's coast** on the **Juan de Fuca Ridge**, sitting **1,400 meters below sea level** with a **large summit caldera**.

► Important Facts:

- It is the **most active submarine volcano in the Northeast Pacific**, erupting in **1998, 2011, and 2015**.
- Formed by a **hotspot**, it hosts **hydrothermal vents** that support unique marine ecosystems.
- Part of the **Ocean Observatories Initiative** and home to the **New Millennium Observatory (NeMO)**.

MAY 7

1. Organization of Islamic Cooperation (OIC)

The *Organization of Islamic Cooperation* is the **second-largest intergovernmental organization after the UN**, with **57 member countries across four continents**. It was founded on **25 September 1969 in Rabat, Morocco**, following the arson attack on *Al-Aqsa Mosque*. Its goals are to **safeguard Islamic values**, uphold the **sovereignty and independence** of its members, and contribute to **global peace and security**.

► Important Facts:

- **Headquarters:** Jeddah, Saudi Arabia
 - **Official Languages:** Arabic, English, French
 - **Key Bodies:** Islamic Summit Conference (ISC), Council of Foreign Ministers (CFM), General Secretariat
 - Works with **UN agencies, national governments, and civil society groups**
-

2. ECINET (Election Commission Integrated Network Enabled Technology)

ECINET is a unified **digital platform** built by the **Election Commission of India (ECI)** to streamline election operations. It integrates **40+ existing applications**, including Voter Helpline, cVIGIL, Suvidha 2.0, ESMS, Saksham, and KYC App.

► Important Facts:

- Provides a **simplified user interface (UI) and experience (UX)**
- Eliminates the need for multiple logins
- Only **authorized personnel can enter data**
- Ensures compliance with the **Representation of the People Acts (1950 & 1951)**
- Expected to benefit **100 crore voters** and over **70 lakh election staff**

3. Alcatraz Island

Alcatraz Island, or "**The Rock**," is a **22-acre island** in **San Francisco Bay, California**. It was home to California's **first lighthouse in 1854**, became a military fort in 1859, and turned into a **military prison in 1861**.

▶ **Important Facts:**

- Designated the **Pacific Branch of the U.S. Military Prison** in 1907
- Served as a **federal prison (1934–1963)** housing up to **330 inmates** (usually fewer than 260)
- Closed due to **high costs**
- Became a **tourist destination in 1972**

4. Sanjay Gandhi National Park (SGNP)

SGNP lies near Borivali, spanning **Mumbai Suburban and Thane districts**. Originally called **Krishnagiri National Park**, it was renamed in **1981**.

▶ **Important Facts:**

- Covers **103 sq.km**, making it among the **largest city-based parks in the world**
- Home to the **Kanheri Caves** (1st–10th century CE) showcasing Buddhist heritage
- Contains **Tulsi and Vihar Lakes**, which supply water to South Mumbai
- Rich in biodiversity: **Teak, Kadamba trees, leopards, deer, butterflies, birds**

5. Total Allowable Catch (TAC)

TAC sets the **maximum amount of fish that can be legally caught** in a specific period to ensure **sustainable fishing** and protect marine life.

▶ **Important Facts:**

- India applies this principle through **seasonal fishing bans during breeding seasons:**
 - **East Coast:** April 15 – June 14
 - **West Coast:** June 1 – July 31
- Helps **restore fish populations** during monsoon months

6. Santhara

Santhara (also called **Sallekhana** or **Samadhi Maran**) is a **Jain spiritual practice** involving voluntary, gradual fasting to death to attain **detachment and purify karma**.

▶ **Important Facts:**

- Intended only for **terminal illness, extreme old age, or severe hardship**
 - Example: A person losing eyesight who may unknowingly harm life (violating *ahimsa*) could choose Santhara
 - **Recent controversy:** The death of a **toddler** under Santhara has raised **ethical and legal concerns** about whether children can give informed consent
-

7. Mangar Bani

Mangar Bani is a **Paleolithic archaeological site** and a **sacred grove hill forest** located in the **Aravalli range** on the **Delhi-Haryana border**.

► **Important Facts:**

- It is the **only primary forest** in the Delhi NCR
 - Despite having forest characteristics, **not officially notified** under the Forest (Conservation) Act
 - A **primary forest** is a mature, naturally regenerated ecosystem with **minimal human disturbance**
-

8. Procedure for Voter Registration

The **Election Commission of India (ECI)** requires new voters to apply using **Form 6**.

► **Important Facts:**

- Applicants must provide:
 - **Self-attested age and address proof** (e.g., utility bills, passport)
 - A **signed declaration of Indian citizenship**
 - Proof of citizenship is **not mandatory** unless the Electoral Registration Officer (ERO) doubts the claim
 - The process involves:
 - **Document verification**
 - **Hearings for objections**
 - **Acceptance or rejection** of the application
 - **Section 31 of the RP Act, 1950** penalizes **false declarations**
-

9. OPEC+

OPEC+ consists of **22 oil-producing countries** (12 OPEC members and 10 non-OPEC nations).

► **Important Facts:**

- Formed in **2016** after the **Algiers Accord** (September) and the **Vienna Agreement** (November)
- Created in response to **plummeting oil prices due to U.S. shale oil production**
- **Non-OPEC members include:** Russia, Kazakhstan, Azerbaijan, Brunei, Bahrain, Mexico, Oman, South Sudan, Sudan, Malaysia

10. NAMASTE Scheme

NAMASTE (National Action for Mechanised Sanitation Ecosystem) was launched in **July 2023** by the **Ministry of Social Justice and Empowerment** with the **Ministry of Housing and Urban Affairs**.

► **Important Facts:**

- Aims to **end hazardous manual cleaning** of sewers and septic tanks by promoting **mechanized, safe practices**
- Components include:
 - Profiling sanitation workers
 - **Health insurance (AB-PMJAY)**
 - **Occupational safety training**
 - **Capital subsidy** for equipment
 - **PPE kits and safety devices**
 - **Awareness campaigns**
- In **2024**, the scheme was expanded to cover **waste pickers**, supporting **safe, dignified livelihoods**

MAY 8

1. Lagrangian Growth-Advection (GA) Model

The *Lagrangian Growth-Advection Model* merges **particle tracking** with **advection processes** and **biological growth** to simulate **phytoplankton succession** and **carbon transport** through ocean currents. It accounts for **spatial and temporal lags** in carbon generation and export, incorporating the role of **zooplankton** and **biological succession**.

► **Important Facts:**

- Validated using **deep-sea data from Station M**
- More accurately captures **carbon flux events** previously undetected by older models

- Improves understanding of **oceanic carbon storage** and **climate regulation**
-

2. Human Development Report 2025

Released annually by the **UNDP**, the *Human Development Report* evaluates nations via the **Human Development Index (HDI)**. The **2025 edition**, titled “*A Matter of Choice*”, explores **AI’s** impact on development.

► Important Facts:

- **Iceland ranked highest** on HDI
 - **India placed 130th** with an improved score of **0.685**
 - India showed progress in **life expectancy, education, and gross national income**
 - India excelled in **AI skills and retaining talent among developing countries**
-

3. Kaleshwaram Lift Irrigation Project (KLIP)

KLIP is a **multi-purpose irrigation project** on the **Godavari River** at Kaleshwaram, Telangana. It provides **water for irrigation and drinking** to **45 lakh acres** across **20 districts**, including Hyderabad.

► Important Facts:

- World’s **largest multi-stage lift irrigation project**
 - Begins at the **Pranhita-Godavari confluence**
 - Involves **7 links and 28 packages over 500 km**
 - Total **canal network exceeds 1,800 km**
 - Designed to handle **240 TMC of water** for various uses
-

4. Bhimgad Wildlife Sanctuary

Located in **Belgaum district, Karnataka**, *Bhimgad Wildlife Sanctuary* was declared in **December 2011**. Named after **Bhimgad Fort**, built by **Shivaji Maharaj** in the 17th century.

► Important Facts:

- Borders **five sanctuaries**, including Dandeli and Mhadei
- Contains diverse terrain: **hills, valleys, plateaus**
- Headwaters for **Tillari, Malaprabha, and Mhadei Rivers**
- Home to the **Barapede Caves**, the **only breeding site** of the *Wroughton’s Free-tailed Bat*
- Dominated by **moist broadleaf forests**

5. IXPE (Imaging X-ray Polarimetry Explorer)

IXPE is a mission by **NASA and the Italian Space Agency**, launched on **9 December 2021**. It is the **first satellite dedicated to measuring X-ray polarization**.

► **Important Facts:**

- Studied **BL Lacertae (BL Lac)**, a type of *blazar*
- Detected **weak X-ray polarization (~6%)** and **high optical polarization (~5%)**
- Findings confirmed that **electrons, not protons**, produce X-rays via **Compton Scattering**

MAY 9

1. Chirality in Quantum Materials

Chirality describes when an object or molecule **cannot be superimposed on its mirror image**—like left and right hands.

► **Important Facts:**

- **KV₃ Sb₅** (Potassium Vanadium Antimonide) has a **Kagome lattice structure**
- Researchers used a **Scanning Photocurrent Microscope (SPCM)** to detect the **Circular Photogalvanic Effect (CPGE)**, a signature of chirality
- At **4 Kelvin**, it showed **spontaneous symmetry breaking** through **Charge Density Waves (CDW)**
- First evidence of **chiral charge order** in a bulk quantum material

2. Kosmos 482

Kosmos 482 was a **Soviet Venus lander**, launched on **31 March 1972** as part of the **Venera programme**.

► **Important Facts:**

- A **timer malfunction** left it in **Earth orbit** rather than heading to Venus
- The main spacecraft burned up, but a **500-kg lander module remains**
- Expected to re-enter Earth's atmosphere **around 10 May 2025**
- *Venera programme* (1961–1984) launched **28 probes**, with **10 successful Venus landings**
- Landers had **titanium hulls and cooling systems** to endure Venus's **extreme heat and pressure**

3. IMDEX Asia

IMDEX Asia is a leading **maritime and defence exhibition**, held **every two years in Singapore since 1997**.

▶ **Important Facts:**

- Platform for **navies, coast guards, and defence firms** to showcase systems and technology
- Includes **International Maritime Security Conference (IMSC)**, started in **2009**
- Focuses on **maritime security and cooperation**
- Co-organised by **Singapore Navy** and **RSIS**

4. SCALP (Storm Shadow)

SCALP is a **long-range, air-launched cruise missile**, developed by **France and the UK** for **deep strike missions**.

▶ **Important Facts:**

- Range: **~500 km**
- Warhead: **450 kg**
- Speed: **Mach 0.8 (subsonic)**
- Guidance: **Terrain-following navigation, GPS/INS, infrared homing**
- Deployed with **Rafale jets in the Indian Air Force**
- **Stealthy, precise, all-weather capable**

5. Anak Krakatau Volcano

Anak Krakatau is an **active stratovolcano** in the **Sunda Strait**, Indonesia.

▶ **Important Facts:**

- Emerged in **1927** from remains of the **1883 Krakatoa eruption**
- Part of the **Pacific Ring of Fire**
- Known for **frequent strombolian eruptions**
- **2018 flank collapse** triggered a **tsunami** that devastated nearby coasts

MAY 12

1. Pangenome of Asian Rice

Scientists created the **first pangenome for Asian rice (*Oryza sativa* L.)**, using **144 wild and cultivated varieties**.

▶ **Important Facts:**

- Maps **all core and unique genes**, revealing full genetic diversity
- Comparable to the **Human Genome Project**, but for rice
- Aims to breed **disease-resistant, climate-resilient rice varieties**
- Rice feeds **two-thirds of humanity**
- India achieved a **record 220 million tonnes production** in **2024–25**, yield **4.2 tonnes/hectare**

2. RNA Exosomopathies

RNA exosomopathies are **genetic disorders** that affect **RNA exosome function**, causing **brain maldevelopment** (e.g., *PCH1*).

▶ **Important Facts:**

- RNA exosome degrades faulty RNA and matures rRNA
- **Humanised yeast models** confirmed mutations disrupt exosome function
- Yeast systems enable **rapid, low-cost research** on these diseases

3. Magnetars

Magnetars are **neutron stars with the strongest known magnetic fields**.

▶ **Important Facts:**

- A **2004 giant flare** revealed delayed **gamma-ray emissions**, hinting at **radioactive decay of neutron-rich isotopes**
- Suggests **r-process nucleosynthesis**, forming **heavy elements like gold and uranium**
- Implies magnetars may have contributed to the **universe's early chemical enrichment**

4. Credit Guarantee Scheme for Startups (CGSS)

Launched in **2022** to back loans for **DPIIT-recognized startups**. Managed by **National Credit Guarantee Trustee Company Ltd. (NCGTC)**.

▶ **Important Facts:**

- Guarantees given to **banks, NBFCs, and SEBI-registered AIFs**
- Covers **venture debt, working capital, debentures, mezzanine finance**

- Recent revisions:
 - **Guarantee limit raised to ₹20 crore**
 - **Coverage up to 85%**
 - **Annual Guarantee Fee reduced to 1% for Champion Sectors**

5. LICONN (Light-microscopy-based Connectomics)

LICONN is a new brain mapping technique developed by Institute of Science and Technology Austria (ISTA).

▣ Important Facts:

- Combines **light microscopy**, **hydrogel expansion**, **fluorescent tagging**, **AI analytics**
- Overcomes **electron microscopy limitations** by offering **both structural and molecular visualization**
- Brain tissue is **expanded 16 times** to achieve **sub-microscopic resolution**
- First non-EM method to **fully reconstruct synaptic connections**

13 May

1. Central Public Health and Environmental Engineering Organisation (CPHEEO)

CPHEEO is the **technical division of the Ministry of Housing and Urban Affairs**, originally set up in **1954 under the Ministry of Health**.

◆ **Role:** Advises states and urban bodies on **water supply, sanitation, and solid waste management**.

◆ **Staff:** Group 'A' engineers selected by **UPSC** in public and environmental engineering.

◆ **Functions:** Provides **technical guidance, policy input, scheme appraisals (including projects funded by international agencies)**, and develops national strategies and guidelines.

Note: While it guides policy, **water and sanitation are State subjects**.

2. Magnetic Flip-Flop

Earth's magnetic field shields us from harmful space radiation and is generated by **electric currents in the molten outer core**.

◆ **Magnetic Reversals:** Poles swap over long periods (e.g., **Brunhes-Matuyama reversal, ~780,000 years ago**).

◆ **Geomagnetic Excursions:** Shorter, partial flips (e.g., **Laschamps event, ~41,000 years ago**).

◆ **History:** ~183 reversals over **83 million years** due to fluid turbulence in the core.

◆ **Recent Trend:** Field has weakened **10% in the last 200 years**, and the poles are moving faster.

3. Indian Grey Wolf

A subspecies of the grey wolf distributed from **Israel to India**, inhabiting **scrublands and semi-arid grasslands**.

- ◆ **Traits:** Nocturnal, small pack hunter, lacks a thick winter coat.
- ◆ **Status:** IUCN Least Concern globally, but **locally endangered in India**.
- ◆ **Protection:** Listed in **CITES Appendix I** and **Schedule I of Wildlife Protection Act, 1972**.
- ◆ **Threats:** Disease from domestic dogs (e.g., **canine distemper**) and genetic dilution.
- ◆ **Management:** Vaccination preferred over culling to address ethical concerns.

4. Chenab River

Named from 'Chan' (Moon) + 'nab' (Water), the Chenab starts at the **confluence of Chandra and Bhaga rivers in Himachal Pradesh**.

- ◆ **Course:** Flows through Jammu & Kashmir into Pakistan, joining the **Jhelum at Trimmu** before merging with the **Sutlej**.
- ◆ **Length:** ~974 km, **largest river by volume in Himachal**.
- ◆ **Tributaries:** Miyar Nalla, Sohal, Thiro, Bhut Nalla, Marusudar, Lidari.
- ◆ **Governance:** Water use regulated under the **Indus Waters Treaty**.

5. Crohn's Disease

A **chronic inflammatory bowel disease (IBD)** that causes swelling mainly in the **end of the small intestine and start of the large intestine**.

- ◆ **Symptoms:** Diarrhea, abdominal pain, cramping, weight loss.
- ◆ **Complications:** Can lead to severe health issues.
- ◆ **Treatment:** No cure, but therapies can reduce symptoms and achieve **long-term remission**, allowing patients to live normal lives.

6. Great Nicobar Island

The **southernmost island** in the Nicobar chain, separated from Andaman by the **Ten Degree Channel**.

- ◆ **Size:** ~1,044 sq. km; >85% is dense rainforest.
- ◆ **Features:** ~100 km of unspoiled beaches, coral reefs, **Indira Point (India's southern tip)**.
- ◆ **Highest Peak:** Mount Thullier (2,105 ft).
- ◆ **Conservation:** **Great Nicobar Biosphere Reserve (UNESCO site)** with rare species like Dugong, Saltwater Crocodile, and Nicobar Megapode.

14 May

1. Germanium

India is negotiating with China over **export restrictions** on germanium—a critical input for **semiconductors, fiber optics, and solar panels**.

- ◆ **Properties:** Silver-grey metalloid (atomic number 32), similar to silicon, with a **diamond-like lattice**.
 - ◆ **History:** Predicted by **Mendeleyev (1871)**, discovered by **Clemens Winkler (1886)**.
 - ◆ **Extraction:** Mainly from **zinc ores (75%)** and **coal (25%)**.
 - ◆ **Global Supply:** China produces **60% of the world's germanium**.
-

2. Bhoramdeo Wildlife Sanctuary

Located in **Kawardha, Chhattisgarh**, within the **Maikal range of the Satpura hills**.

- ◆ **Area:** 352 sq. km.
 - ◆ **Named after:** **Bhoramdeo Temple**, known as the “Khajuraho of Chhattisgarh”.
 - ◆ **Connectivity:** Part of the **Kanha–Achanakmar Corridor**.
 - ◆ **Ecosystem:** Moist and dry deciduous forests; sources of **Fen and Sankari rivers**.
 - ◆ **Fauna:** Tigers, leopards, sloth bears, deer, diverse birds.
-

3. Buddhavanam and Nagarjunakonda

Buddhavanam is a **279-acre Buddhist theme park** in Telangana, along the Krishna River.

- ◆ **Purpose:** Attract global tourists as part of the **Integrated Buddhist Circuit**.
 - ◆ **Components:** Buddhacharitha Vanam, Jataka Park, Dhyana Vanam, Stupa Vanam, heritage museum.
 - ◆ **Nearby:** **Nagarjunakonda**, ancient capital of the **Ikshvaku dynasty** (3rd–4th century CE), a major Mahayana Buddhist center with stupas and monasteries.
-

4. Ferroelectricity

Refers to the **spontaneous alignment of electric dipoles in certain crystals**, reversible by an external electric field.

- ◆ **Examples:** **Barium titanate (BaTiO₃)**, **Rochelle salt**.
 - ◆ **Features:** Domains (aligned dipole regions), domain walls, **ferroelectric hysteresis**.
 - ◆ **Curie Temperature:** Threshold beyond which alignment disappears.
 - ◆ **Technique:** **ORNL's SOPFM** (Scanning Oscillator Piezoresponse Force Microscopy) uses **atomic force microscopy with precise timing** to track domain wall motion.
-

5. Axions and HAYSTAC Experiment

Axions are theoretical particles proposed to solve the **Strong CP problem in QCD**, also considered candidates for **Cold Dark Matter**.

- ◆ **Properties:** Electrically neutral, extremely light, weakly interacting.



◆ **HAYSTAC:** Aims to detect axions by observing their conversion into photons in a **strong magnetic field**.

◆ **Innovation:** Uses **quantum squeezing** to lower noise—shared only with **LIGO** among major experiments.

19 May

1. BSF (Border Security Force)

India's **First Line of Defence**, under the **Ministry of Home Affairs**.

◆ **Raised:** 1 December 1965, post Indo-Pak war.

◆ **Duties:** Border security, wartime support to the Army, anti-Naxal operations.

◆ **Strength:** 186 battalions, ~2.57 lakh personnel.

◆ **Assets:** Air, Marine, Artillery units, Tear Smoke Unit, Camel & Dog squads.

◆ **Leadership:** DG is from the **IPS**.

2. GRAIL Mission

NASA's *GRAIL* (Gravity Recovery and Interior Laboratory) was a **2011 lunar mission** with twin spacecraft **Ebb and Flow**.

◆ **Goal:** Produce the **most detailed lunar gravity map** by tracking distance shifts between the orbiters.

◆ **Discoveries:**

- Thinner, porous crust
 - Tidal differences across the Moon
 - Volcanic and heat imbalances
 - Evidence of dikes (past expansion)
 - Crustal asymmetry affecting lava flows
-

3. World Food Prize

Award honoring contributions to **global food security**, called the “**Nobel Prize for Food and Agriculture**.”

◆ **Established:** 1986 by **Dr. Norman Borlaug**.

◆ **Prize:** \$500,000, awarded during the **Borlaug Dialogue** in Iowa.

◆ **First Winner:** **M.S. Swaminathan (1987)**.

◆ **2025 Winner:** **Mariangela Hungria**, Brazilian microbiologist for biological seed and soil treatments.

4. e-Passport

Digital passport with an **RFID chip** storing **biometric and personal data**.

◆ **Security Features:**

- **BAC:** Prevents unauthorized scanning
 - **PA:** Detects tampering
 - **EAC:** Secures fingerprint data
 - **PKI:** Ensures authenticity
- ◆ **Benefits:** Faster processing, better security, global compatibility.
-

5. Coral Reefs

Marine structures formed by **calcium carbonate-secreting coral polyps**.

◆ **Types:** Fringing reefs, barrier reefs, atolls.

◆ **Conditions:**

- Warm ($\leq 20^{\circ}\text{C}$), clear, shallow tropical seas
 - Depth ≤ 55 m, minimal pollution, abundant plankton
- ◆ **Examples:** Great Barrier Reef, Gulf of Mannar, Lakshadweep.
-

20 May

1. Polar Satellite Launch Vehicle (PSLV)

ISRO's **four-stage rocket** for launching satellites into **sun-synchronous polar orbits**.

◆ **Stages:**

- **Stage 1:** Solid fuel with 6 strap-on boosters (thrust ~ 4.8 MN).
 - **Stage 2:** Liquid fuel (UDMH + N_2O_4), Vikas engine.
 - **Stage 3:** Solid fuel.
 - **Stage 4:** Liquid fuel with twin engines.
-

2. Presidential Reference (Article 143)

Allows the **President to consult the Supreme Court** on legal/constitutional questions.

◆ **Types:**

- **143(1):** Public importance issues.
- **143(2):** Pre-Constitution treaties.
 - ◆ **Nature:** Advisory, non-binding but persuasive.
 - ◆ **Procedure:** Heard by **minimum 5-judge Bench**, on advice of Union Cabinet.

3. RS-24 Yars

Russian **ICBM with MIRV capability**, introduced in **2010**.

◆ **Specs:**

- Range: 2,000–10,500 km
- Warheads: Up to 10 MIRVs (300 kilotons each)
- Guidance: Inertial + Glonass
- Features decoys, manoeuvrability to evade missile defence.

4. Canary Islands

Spanish archipelago in the **North Atlantic**, ~100 km off Morocco.

◆ **Key Facts:**

- Largest in **Macaronesia**
- Area: ~7,447 sq.km
- **Teide Peak** (3,718 m) is Spain's tallest point.
- Subtropical climate, major tourism hub.

5. Indrayani River

Tributary of the **Bhima River**, which flows into the Krishna.

◆ **Origin:** Western Ghats near **Lonavala**.

◆ **Length:** ~103.5 km.

◆ **Cultural Sites:** Alandi (Dnyaneshwar's samadhi), Dehu (Saint Tukaram's birthplace).

◆ **Uses:** Irrigation, hydroelectricity (Valvan Dam at Kamshet).

21 May

▣ **Market Infrastructure Institutions (MIIs)**

- **What are they?** Critical entities forming the backbone of India's capital markets.
- **Components:**
 - Stock Exchanges
 - Clearing Corporations
 - Depositories
- **Functions:** Enable efficient trading, clearing, settlement, and record-keeping.



- **Importance:** Any disruption can destabilize the entire financial system.
 - **Governance:** Profit-oriented but act as **first-line regulators** with stringent compliance standards.
 - **Regulator:** **SEBI**, which mandates all MIs to be registered to protect investors.
-

2 Udanti Sitanadi Tiger Reserve

- **Location:** Gariaband and Dhamtari districts, Chhattisgarh.
 - **Formed by:** Merging **Udanti** and **Sitanadi Wildlife Sanctuaries**.
 - **Area:** 1,872 sq km.
 - **Rivers:** Mahanadi, with tributaries Udanti, Sitanadi, Indravan, Pairi.
 - **Significance:** Corridor linking to **Indravati Tiger Reserve**.
 - **Terrain:**
 - Highest peak: **Deo Dongri**
 - Prominent mountain: **Atānga Dongar**
 - **Forests:** Tropical Peninsular Sal and Dry Deciduous Mixed.
 - **Wildlife:** Tigers, endangered Wild Buffalo, Indian Wolf, Sloth Bear, Mouse Deer.
-

3 Nineveh

- **Ancient Capital:** Assyrian Empire under **King Sennacherib** (late 8th century BCE).
 - **Location:** East bank of Tigris River (modern **Mosul, Iraq**).
 - **Founded:** Settled as early as **6000 BCE**.
 - **Religious Center:** Worship of goddess **Ishtar** by 3000 BCE.
 - **Golden Age:** Neo-Assyrian Empire (**912–612 BCE**).
 - **Features:** Famous gardens, zoo, art, and urban culture.
 - **Destruction:** Fell in **612 BCE** to the Babylonians and Medes, ending Assyrian dominance.
-

4 Directorate General of Foreign Trade (DGFT)

- **Role:** Apex body for India's trade policy.
- **Parent Ministry:** **Ministry of Commerce and Industry**.



- **Earlier Name:** Chief Controller of Imports & Exports (CCI&E) before 1991 reforms.
 - **Key Functions:**
 - Formulates and implements **Foreign Trade Policy (FTP)**.
 - Issues **Importer Exporter Code (IEC)** – a unique 10-digit identifier.
 - Regulates exports under bilateral treaties.
 - Prescribes **input-output norms** for exporters.
 - **Network:** HQ in New Delhi + **24 regional offices**.
 - **Trade Promotion:** Facilitates regional trade, especially with neighbouring nations.
-

5 National Investigation Agency (NIA)

- **Established:** Under **NIA Act, 2008** after the **26/11 Mumbai attacks**.
 - **Mandate:** India's main **counter-terrorism investigative agency**.
 - **Jurisdiction:** Nationwide, plus extraterritorial offences involving Indians or Indian interests.
 - **Powers:**
 - Investigates **Scheduled Offences** (e.g., UAPA, Arms Act).
 - Files charges in **Special NIA Courts**.
 - Coordinates with state police.
 - **HQ:** New Delhi; zonal offices in **Guwahati** and **Jammu**.
 - **Leadership:** Led by a **Director-General (DG)** (senior IPS officer).
-

6 e-Zero First Information Report (FIR) Initiative

- **Launched by:** **Indian Cybercrime Coordination Centre (I4C)**, Ministry of Home Affairs.
- **Purpose:** Automate FIR registration for **financial cybercrimes over ₹10 lakh**.
- **How it Works:**
 - Complaints via **1930 helpline** or **National Cybercrime Reporting Portal**.
 - Auto Zero FIR generated at Delhi's e-Crime Police Station.
 - Victims must convert Zero FIR to regular FIR within **3 days**.

- **Integration:** Combines NCRP, Delhi Police's e-FIR system, and **NCRB's CCTNS**.
 - **Goal:** Faster investigations, reduced delays, and better victim support.
-

22 May

📦 PBAT (Polybutylene Adipate Terephthalate)

- **Type:** Biodegradable thermoplastic polymer.
 - **Composition:** Adipic acid + 1,4-butanediol + terephthalic acid.
 - **Properties:**
 - 100% **compostable** within **180 days** under industrial composting.
 - Flexible, tough, moisture-resistant.
 - Chemically inert.
 - **Comparison with PLA:**
 - PBAT: More flexible, faster degradation, less costly.
 - PLA: Rigid, used in cutlery and electronics packaging.
-

📦 Jarosite

- **Description:** Yellow-brown mineral of potassium, iron, sulphate.
 - **Found in:** Arid saline environments like **Kachchh, Gujarat**.
 - **Research:** Indian study explored Jarosite as a “**natural clock**” on **Mars** via luminescence dating.
 - **Observation:** Four stable luminescent emissions (100–350 °C).
 - **Significance:** Simulates Mars-like conditions for planetary science.
-

📦 Shirui Lily Festival

- **Location:** Ukhrul district, Manipur.
- **Organising Tribe:** Tangkhul Nagas.
- **Focus:** Celebrates **Shirui Lily (Lilium mackliniae)** – endemic to Shirui Hills.
- **History:**
 - Discovered in **1946**.
 - RHS award in **1948**.



- Declared **Manipur's State Flower in 1989**.
 - **Purpose:** Conservation and cultural promotion.
-

4 Vitamin D

- **Type:** Fat-soluble vitamin (**calciferol**).
 - **Sources:**
 - **Synthesized in skin via UV sunlight.**
 - Fatty fish, liver, mushrooms, eggs.
 - Fortified foods: milk, cereals.
 - **Functions:** Aids **calcium & phosphorus absorption**, supports bone health.
 - **Deficiency:** Leads to rickets, osteoporosis, hypocalcemia.
 - **Supplements:** Widely used among those with low sun exposure or darker skin.
-

5 Operation Olivia

- **Agency:** Indian Coast Guard.
- **Period:** Annual operation (**November–May**).
- **Goal:** Protect **Olive Ridley turtles** along Odisha coast (Gahirmatha Beach).
- **Activities:**
 - Continuous patrolling and aerial surveillance.
 - Promotion of **Turtle Excluder Devices (TEDs)**.
 - Collaboration with NGOs and locals.
- **Status:** Olive Ridley – **Vulnerable**, protected by IUCN Red List, **WPA 1972 (Schedule I)**, and **CITES Appendix I**.

23 May

1 The International Booker Prize

- **What:** Annual literary award for **best fiction or short stories translated into English** and published in the UK/Ireland.
- **Founded:** **2005** (biennial), switched to **annual in 2015**.
- **Prize Money:** £50,000 shared **equally between author and translator**; shortlisted teams get £2,500 each.



- Administered by: Booker Prize Foundation.
 - 2025 Winner: *Heart Lamp* by **Banu Mushtaq**, translated from Kannada by **Deepa Bhasthi**.
 - Significance:
 - First **Kannada work** to win.
 - First **short story collection** to win.
 - Explores **Muslim women's experiences in South India (1990–2023)**.
-

🌍 International Day for Biological Diversity (IDB)

- **Date:** May 22 every year.
 - **Purpose:** Raise awareness about **biodiversity challenges**.
 - **2025 Theme:** *Harmony with nature and sustainable development*.
 - Linked to **SDGs** and the **Kunming-Montreal Global Biodiversity Framework (KMGBF)**.
 - **Origin:**
 - Initially marked on **29 December** (date of Convention on Biological Diversity's entry into force).
 - **Shifted to May 22 in 2000** to mark the **1992 Nairobi Final Act**.
-

📶 CEIR (Central Equipment Identity Register)

- **Developed by:** Department of Telecommunications (DoT).
- **Purpose:** Track lost or stolen mobile phones using IMEI.
- **Features:**
 - Maintains a **central IMEI database**.
 - Users can report loss with **IMEI + FIR copy**.
 - Tracks devices **even with SIM changes**.
- **IMEI:** 15-digit unique identifier linked to each handset.
- **EIR Lists:**
 - **White List:** Authorized devices.

- **Grey List:** Monitored devices.
 - **Black List:** Blocked/stolen devices.
 - **Objectives:** Discourage theft, protect consumers, detect fraud, and restrict illegal imports.
-

4 SWOT (Surface Water and Ocean Topography) Satellite

- **Agency:** NASA & CNES (France) collaboration.
 - **Launch:** 2022.
 - **Technology:** Ka-band Radar Interferometer (KaRIn) for precise water measurements.
 - **Capabilities:**
 - Measures elevation, width, movement of water bodies.
 - Covers **55% of major floods globally** during their lifecycle.
 - **Use:** Improves understanding of river waves, floods, and nutrient transport.
 - **Advantage:** Overcomes sparse coverage of traditional **stream gauges**.
-

5 NSV Kaundinya

- **Launch:** July 2023.
 - **Partners:** Ministry of Culture, Indian Navy, Hodi Innovations.
 - **Purpose:** Promote India's maritime heritage.
 - **Planned Voyage:** Gujarat to Oman in **2025**, retracing ancient trade routes.
 - **Construction:**
 - Ancient **stitched shipbuilding technique**.
 - Inspired by **Ajanta murals**.
 - **Symbols:** Gandabherunda, Simha Yali, Harappan-style stone anchor.
 - **Name:** Commemorates **Kaundinya**, legendary Indian mariner.
-

6 Intercrystals

- **What:** Structures combining features of **crystals** and **quasicrystals**.
- **Formed by:** Stacking **twisted graphene layers** over hexagonal boron nitride (h-BN).



- **Phenomenon: Twistronics**—tiny rotation angles create **moiré patterns**.
 - **Properties:**
 - Show both **symmetry and non-repeating patterns**.
 - Small structural shifts trigger **superconductivity, magnetism, and exotic quantum states**.
 - **Applications:** Developing new materials with **tunable electronic properties**.
-

26 May

☐ Tianwen-2 Mission

- **Agency:** China National Space Administration (CNSA).
 - **Targets:**
 - Asteroid **Kamoʻoalewa**—Earth’s quasi-satellite discovered in **2016**.
 - Later, comet **311P/PANSTARRS**.
 - **Launch Vehicle:** Long March 3B.
 - **Sampling Methods:**
 - **Touch-and-go collection**.
 - **Anchor-and-attach technique**.
 - **Significance:** Part of China’s **Tianwen series**:
 - Tianwen-1: Mars orbiter and rover.
 - Tianwen-3: Planned **Mars sample return by 2028**.
-

☑ Debt Recovery Tribunals (DRTs)

- **Established:** Recovery of Debts Act, 1993.
- **Role:** Adjudicate loan defaults over **₹20 lakh**.
- **Jurisdiction:**
 - Secured debt cases.
 - **Securitisation Applications (SAs)** under **SARFAESI Act, 2002**.
- **Structure:**
 - **39 DRTs** across India.



- Each led by a **Presiding Officer**.
 - **5 Debt Recovery Appellate Tribunals (DRATs)** hear appeals.
 - **Powers:** Summon witnesses, examine evidence, conduct hearings.
-

3 New Development Bank (NDB)

- **Formed by:** **BRICS nations** (Brazil, Russia, India, China, South Africa).
 - **Purpose:** Finance infrastructure and sustainable development projects.
 - **Proposed:** **2012 New Delhi Summit**.
 - **Established:** **2014 Fortaleza Summit**.
 - **Operations Began:** **2015**.
 - **Headquarters:** **Shanghai**; regional offices in **South Africa, Brazil**.
 - **Membership:** Open to **all UN members**, equal voting rights.
 - **Capital:**
 - Authorized: **USD 100 billion**.
 - Subscribed: **USD 50 billion**, equally shared.
 - **Governance:** Rotating leadership among BRICS, Board of Governors & Board of Directors.
-

4 Nagshankar Temple

- **Location:** **Biswanath district, Assam** (north bank of Brahmaputra).
 - **Dedication:** Lord **Shiva**.
 - **History:**
 - Built by **King Narasankar** (Nagakha dynasty, 4th century AD).
 - Renovated by **Ahom King Su-sen-pha in 1480**.
 - **Unique Feature:** Large pond housing **250–300 rare turtles**—black softshell, Indian softshell, Malayan softshell.
 - **Wildlife:** Peacocks, deer, pythons.
 - **Cultural Importance:** One of Assam's oldest Hindu temples.
-



5] NSACOG (Indian SARS-CoV-2 Genomics Consortium)

- **Established:** December 2020.
- **Led by:**
 - Ministry of Health.
 - Department of Biotechnology (DBT).
 - CSIR.
 - ICMR.
- **Network:** 54 labs, coordinated by **NCDC** and **IDSP**.
- **Focus:** Genomic surveillance of COVID-19 and emerging variants.
- **Objectives:**
 - Detect variants with **public health impact**.
 - Investigate unusual patterns (e.g., vaccine breakthroughs).
 - Integrate genomic & epidemiological data for policy action.

27 May

1] Association of Southeast Asian Nations (ASEAN)

- **What:** A regional intergovernmental organisation for **political, economic, and security cooperation** in Southeast Asia.
- **Founded:** 1967 via the **Bangkok Declaration**.
- **Original Members:** Indonesia, Malaysia, Philippines, Singapore, Thailand.
- **Current Members (10):** Includes Brunei, Vietnam, Laos, Myanmar, Cambodia.
- **Headquarters:** Jakarta, Indonesia.
- **Key Bodies:**
 - ASEAN Summit
 - Coordinating Council
 - Secretariat
 - ASEAN Regional Forum (India joined ARF in 1996)
- **Decision-making:** Based on **consultation and consensus**.

2] Indian National Space Promotion and Authorisation Centre (IN-SPACe)

UNIT- 6B & C, UNIQUE AVENUE BUILDING, 6TH FLOOR, SUPER MARKET, GS ROAD,
GUWAHATI-781006
6001657575 /6913203751



TAKSHASHILA

SCHOOL OF CIVIL SERVICES

- **What:** An **autonomous agency** under **Department of Space (DoS)**.
 - **Purpose:** Authorize and promote **private sector participation in space**.
 - **Functions:**
 - Provides **access to ISRO facilities**.
 - Supports **startups and academia** in space innovation.
 - **Headquarters:** Bopal, Ahmedabad.
 - **Related Facilities:**
 - **ISRO Propulsion Complex (IPRC)** at Mahendragiri, Tamil Nadu.
 - Upcoming **spaceport at Kulasekarapattinam**, Tamil Nadu.
 - **Space Technology Incubation Centre (STIC)** at NIT Trichy.
-

3 Kiru Hydropower Project

- **Type:** Run-of-river hydroelectric scheme.
 - **Capacity:** 624 MW.
 - **Location:** Chenab River, Kishtwar district, J&K.
 - **Features:**
 - 135 m high concrete gravity dam.
 - Underground powerhouse with 4 x 156 MW Francis turbines.
 - **Cost:** Estimated ₹4,287 crore.
 - **Developer:** CVPP, a JV of NHPC (49%), JKSPDC (49%), PTC (2%).
 - **Goal:** Reliable power supply to **northern grid**.
-

4 Bharat Forecasting System (BFS)

- **Developed by:** IITM Pune.
- **What:** Advanced high-resolution weather prediction model.
- **Resolution:** 6 km, compared to older 12 km GFS.
- **Powered by:** Arka supercomputer (11.77 petaflops, 33 PB storage).
- **Coverage:** Tropical zone (30°S to 30°N).

- **Features:**
 - Integrates **AI/ML**.
 - Data from **40 Doppler radars** (to be expanded to 100).
 - **Open access** to global researchers.
-

5 **Caliphaea sinuofurcata**

- **What:** Newly discovered damselfly species.
 - **Location:** Arunachal Pradesh (**Upper Siang & Lower Dibang Valley**).
 - **Nickname:** *Bearded Bronzeback* (due to **dense black bristles on mouthparts**).
 - **Significance:**
 - Only the **second Caliphaea species** in India after *C. confusa* (recorded 165+ years ago).
 - **Habitat:** Rocky seasonal streams in **broadleaf evergreen forests, 1200–1300 m elevation**.
 - **Features:**
 - Metallic copper-green body.
 - Brownish wings.
 - Sinuous forked paraproct used for identification.
-

□ **28 May**

□ **Kumbakonam Vetrilai**

- **What:** A betel leaf variety from **Thanjavur's Cauvery basin**, Tamil Nadu.
 - **Cultivation Areas:** Kumbakonam, Ayyampettai, Swamimalai, Rajagiri.
 - **Uses:** Central to **paan preparation**, also exported.
 - **Harvest Stages:**
 - **Kolundhuvetrilai:** First leaves (20–25 days).
 - **Maaruvethalai:** Larger, first-year leaves.
 - **Kelavethalai/Kattavethalai:** Smaller leaves in years 2–3.
-

2 **Semi-transparent Perovskite Solar Cells**

- **What:** High-efficiency solar cells layered over silicon in 4-terminal tandem configuration.
- **Technology:** Halide perovskite semiconductors (ABX_3 crystals).
- **Efficiency:** ~30%, vs ~20% for silicon.
- **Advantages:**
 - Higher efficiency.
 - Lower cost.
- **Challenges:**
 - Shorter lifespan.
 - Stability issues.

3 Panchayat Advancement Index (PAI)

- **Purpose:** Assess holistic development of Panchayats.
- **Alignment:** Localised SDGs & India's 2030 Agenda.
- **Indicators:** 435 metrics (331 mandatory + 104 optional) across 9 LSDG themes.
- **Categories:**
 - Achiever
 - Front Runner
 - Performer
 - Aspirant
 - Beginner
- **Version:** PAI 2.0, covering 2.16 lakh Gram Panchayats in 29 States/UTs.

4 East China Sea

- **Where:** Western Pacific Ocean, East Asia.
- **Borders:** China, Japan, Taiwan, South Korea.
- **Connections:**
 - To **Japan Sea** via Tsushima Strait.
 - To **South China Sea** via Taiwan Strait.

- **Major Rivers:** Yangtze and Yellow River.
 - **Features:**
 - Monsoon-dominated.
 - Contains **disputed islands**—Diaoyu/Senkaku, Ryukyu.
 - **35% of global petroleum shipments** passed through in 2023.
-

5. Jinchuanloong niedu

- **What:** Early eusauropod dinosaur species.
 - **Period:** Middle Jurassic (~165 million years ago).
 - **Discovery Site:** Xinhe Formation, **Gansu, China**.
 - **Group:** Eusauropods—large herbivorous quadrupeds like Shunosaurus and Omeisaurus.
 - **Significance:** Survived **global warming in Early Jurassic**, later dominated ecosystems.
-

□ 29 May

□ Ghaggar River

- **Type:** Seasonal/intermittent river.
 - **Origin:** Shivalik Range, Himachal Pradesh.
 - **Course:** Flows through India into Pakistan, vanishing in **Thar Desert**.
 - **Pakistan Section:** Called **Hakra River**.
 - **Historical Importance:**
 - Associated with **Vedic Saraswati River**.
 - Linked to **Indus Valley Civilization**.
 - **Main Tributaries:** Kaushalya, Markanda, Sarsuti, Tangri, Chautang.
-

2. Breakthrough Prizes

- **Founded:** **2013** by Zuckerberg, Brin, Wojcicki, Milners, etc.
- **Focus:** **Life Sciences, Fundamental Physics, Mathematics**, including Parkinson's and neurodegenerative disease research.

- **Prize: \$3 million each** (higher than Nobel).
 - **Selection:** By past laureates; open public nominations.
 - **Nicknamed:** *Oscars of Science*.
 - **Features:** Televised ceremonies, public lectures, repeat winners allowed.
-

3 Invar Missile

- **What:** Anti-tank guided missile (ATGM) for T-90 tanks.
 - **Built by:** Russia's Rosoboronexport, licensed to **Bharat Dynamics Limited**.
 - **Guidance:** Semi-automatic laser beam riding, resistant to jamming.
 - **Capabilities:**
 - Defeats **Explosive Reactive Armour (ERA)**.
 - Engages targets up to **5 km** away.
 - Effective against moving targets (**up to 70 km/h**).
 - **Specs:**
 - Flight time: **17.6 sec**.
 - Weight: **17.2 kg**.
 - Caliber: **125 mm**.
-

4 Mt. Khangchendzonga

- **Height:** **8,586 m**—India's tallest peak, world's **third highest**.
 - **Location:** **India-Nepal border** (Sikkim/Darjeeling).
 - **Meaning:** *Five Treasuries of the Great Snow* (five summits).
 - **Glaciers:** Zemu, Talung, Yalung, Kanchenjunga.
 - **Features:**
 - Heavy monsoon snow.
 - **Khangchendzonga National Park** to the east.
 - **First Ascent:** **1955**, British team led by **Charles Evans**.
-

5 Bow Echo

- **What:** Radar signature shaped like an archer's bow, indicating intense thunderstorms.
- **Size:** 20–100 km wide, lasting 3–6 hours.
- **Named by:** Ted Fujita (1970s).
- **Formation:** Rain-cooled gust fronts lift warm air, generating new storms that bend into an arc.
- **Impact:** Produces strong damaging winds.
- **Recent Example:** 2022 bow echo struck **Delhi-Noida**, winds up to **100 km/h**.

30 May

📦Nurdles

- **What:** Small plastic pellets (1–5 mm) used as primary feedstock in plastic production.
- **Composition:** Made of polyethylene, polypropylene, polystyrene, and PVC.
- **Uses:** Manufacture of packaging, bottles, toys, textiles.
- **Environmental Impact:**
 - Major source of primary microplastics.
 - Break down further into micro and nano plastics.
 - Pollute marine and coastal ecosystems.
 - Enter food chains, threatening wildlife and human health.

📋Modified Interest Subvention Scheme

- **Type:** Central Sector Scheme providing low-cost short-term loans to farmers.
- **Target:** Loans via Kisan Credit Cards (KCC).
- **Features:**
 - 1.5% interest subvention on crop loans up to ₹3 lakh at a base 7% interest.
 - Prompt Repayment Incentive (PRI) of 3%, reducing effective rate to 4%.
 - For animal husbandry/fisheries, applies to loans up to ₹2 lakh.
- **Administration:** Implemented by RBI and NABARD through eligible banks.
- **Note:** No structural changes made to the scheme.

❏ Stromatolites

- **What:** Layered sedimentary formations created by algae and cyanobacteria.
- **Era:** Flourished in the **Precambrian**, over **2.5 billion years old**.
- **Present:** Rare today, surviving mainly in **saline lagoons**.
- **Significance:**
 - Evidence of **ancient microbial life**.
 - Provide insights into **tectonic history and Earth's early atmosphere**.
- **Example:** Krol Group stromatolites in Chambaghat formed in the **Tethys Sea during Gondwana**.
- **Indian Sites:**
 - Chitrakoot
 - Morni Hills
 - Mussoorie
 - Nainital
 - Jaisalmer
 - Dharwar
 - Bhima Basin

❏ Seven Summits Challenge

- **What:** Climbing the **highest peak on each continent**.
- **First Completion:** Richard Bass, 1985.
- **Peaks:**
 - **Mount Everest (Asia)** – 8,848 m
 - **Aconcagua (South America)** – 6,962 m
 - **Denali (North America)** – 6,194 m
 - **Kilimanjaro (Africa)** – 5,892 m
 - **Elbrus (Europe)** – 5,642 m
 - **Mount Vinson (Antarctica)** – 4,892 m



- **Kosciuszko (Australia)** – 2,228 m
 - **Puncak Jaya (Oceania)** – 4,884 m
 - **Versions:**
 - **Bass List:** Includes **Kosciuszko**.
 - **Messner List:** Includes **Puncak Jaya**.
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📌 “Dark Patterns”

- **Definition:** Deceptive interface designs that manipulate users into actions they didn’t intend.
- **Origin:** Term coined in **2010** by **Harry Brignull**.
- **Techniques:**
 - **“Sneak into basket”** (automatic additions to carts)
 - Hidden fees
 - Misleading cookie consent prompts
- **Legal Status in India:**
 - No dedicated law yet.
 - Covered under **Consumer Protection Act, 2019**.
 - In **November 2023**, India issued guidelines identifying **13 dark patterns** as **unfair trade practices**.