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INSTITUTE OF BASIC EDUCATION
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Contents

Chapter-
1

HISTORY & CULTURE

Megalithic Rock-Cut Chambers

Context:

A 2,000-year-old laterite rock-cut chamber from the Megalithic period was recently unearthed during construction work in Panayal, Kasaragod district of Kerala.

About Megalithic Rock-Cut Chambers:

What it is?

- These are subterranean burial structures carved directly into laterite rock. They represent a unique funerary architecture where the dead were interred with grave goods, reflecting the Megalithic culture's complex beliefs about the afterlife.

Various Names:

Locally, these structures are known by several evocative names in Kerala and surrounding regions:

- Muniyara (Hermit's cell)
- Pandava Cave (Linked to the mythological Pandavas)
- Peeranki Cave (Cannon cave)
- Nidhikuzhi (Treasure pit)
- Kalppathayam (Stone box/granary)

Origin and Period:

- Era: These structures are generally linked to the Iron Age/Megalithic period in South India, dating back roughly 2,000 to 2,500 years.
- Region: Predominantly found in the laterite-rich belts of Kerala and parts of coastal Karnataka.

Purpose:

- The primary purpose was secondary burial.
- Megalithic communities practiced elaborate rituals where the bones of the deceased were collected and placed inside these chambers, often accompanied by pottery, iron tools, and beads to assist the soul in the journey beyond.

Key Characteristics:

- Architecture: Carved out of laterite rock with a circular inner chamber.
- Entrance: Usually features a narrow shaft leading down to the chamber, with the opening sealed by a heavy stone slab.
- Top Aperture: Often contains a small circular hole (around 5 cm in the recent find) at the top, possibly for ritualistic offerings or as a passage for the spirit.
- Associated Monuments: Frequently found near other Megalithic structures like Umbrella Stones (Kudakkallu) or Cap stones (Toppikallu).

Significance:

- They shed light on the socio-religious practices and ritualistic beliefs (Megalithism) of ancient South Indian societies.
- Demonstrates the early mastery of iron tools used to carve intricate spaces into hard laterite rock.

- Provides physical evidence for dating the transition from the Neolithic to the Iron Age in the Western Ghats region.

Bronze art in India

Context:

The Ashmolean Museum (Oxford) is set to return a 16th-century bronze idol of Saint Tirumankai Alvar, after research indicated it was photographed in 1957 at the Soundarrajaperumal temple, Thadikombu (Tamil Nadu) and later replaced by a replica.

About Bronze art in India:

What it is?

- Bronze art refers to sculptural and ritual objects made from copper-based alloys (bronze/brass; in South India often panchaloha tradition), used for worship icons, processional deities, lamps, utensils, and decorative forms.
- In India, bronze sculptures are not just art objects but living ritual icons, central to temple festivals and devotional culture—especially in the Tamil region.

Technique:

Lost-wax casting (Cire perdue / Madhuchista Vidhan) is the core technique:

1. Wax model: The figure is first sculpted in wax with all details.
2. Clay mould: Wax model is coated with layers of fine clay to make a mould.
3. Dewaxing: The mould is heated so wax melts out, leaving a cavity.
4. Metal pouring: Molten metal/alloy is poured into the cavity.
5. Finishing: Mould is broken, the casting is filed, polished, detailed, and ritually consecrated (for deity icons, often via opening of the eyes).

Important bronze artefacts in Indian history:

- Dancing Girl (Mohenjodaro, c. 2500 BCE): earliest iconic evidence of sophisticated metal casting in the Indus Valley.
- Daimabad bronzes (c. 1500 BCE): notable large bronzes showing advanced casting and likely ritual/ceremonial usage.
- Chola bronzes (c. 9th–13th century CE): the classical peak—especially Nataraja and other temple/processional icons with fluid movement and refined anatomy.

Evolution of bronze art in India:

- Harappan phase: bronze used for tools + a few masterworks (e.g., Dancing Girl) showing early lost-wax competence.
- Early historic–classical phase: bronze becomes more common for ritual and portable icons (Buddhist/Jain/Hindu), aiding mobility of worship and patronage networks.
- Regional flowering: distinct schools develop—Gupta/Vakataka refinement, Pala-Sena Buddhist bronzes, western India traditions, and Himalayan/Kashmir idioms.
- Chola culmination: bronze becomes the supreme temple medium in Tamilakam—icons designed for processions, public darshan, and festival theology.
- Living traditions today: centres like Swamimalai (Kumbakonam region) sustain hereditary artisan lineages (sthapathis), continuing lost-wax methods under shilpa texts—linking craft, faith, and heritage economies.

Golestan Palace

Context:

The Golestan Palace, a UNESCO World Heritage Site in Tehran, reportedly suffered damage due to shockwaves and debris from nearby airstrikes amid escalating US–Israel–Iran tensions in 2026.

About Golestan Palace:

What it is?

- Golestan Palace is a historic royal complex that served as the official residence of the Qajar dynasty and is one of the oldest historic monuments in Tehran.
- The palace complex, comprising multiple buildings, halls, and museums, reflects a unique blend of Persian architecture and European artistic influences.

Located in: Tehran (Iran)

Status: UNESCO World Heritage Site (inscribed in 2013)

History:

- The origins of the site date back to the Safavid era (16th century) when Tehran's royal citadel was developed.
- The complex gained prominence when the Qajar dynasty (1794–1925) made Tehran the capital and adopted Golestan Palace as the royal residence.
- Major reconstruction occurred during the reign of Naser al-Din Shah in the 19th century, giving the palace its current form.
- During the Pahlavi era (1925–1979), it was mainly used for formal state ceremonies, including royal coronations.
- Today, the complex functions as a museum and cultural heritage site.

Key Features:

1. Architectural Complex: The palace consists of 17 structures, including palaces, museums, halls, and gardens built largely during the Qajar period.
2. Blend of Architectural Styles: Combines traditional Persian architectural design with European decorative elements, reflecting Iran's interaction with the West in the 19th century.
3. Major Structures: Important buildings include Marble Throne (Takht-e Marmar), Mirror Hall, Brilliant Hall, Salam Hall, Diamond Hall, and the Edifice of the Sun (Shams-ol-Emareh).
4. Cultural Archives: The complex houses photographic archives, manuscript libraries, and historical documents, representing early photography in Iran.
5. Royal Ceremonial Site: Historically used for coronations, royal receptions, and diplomatic ceremonies.

Significance:

- Symbolises the political and cultural history of the Qajar dynasty and Iran's transformation into a modern state.
- Represents a rare fusion of Persian and European artistic traditions.

Savitribai Phule

Context:

Union Home Minister paid tribute to Savitribai Phule on her death anniversary, recognizing her pioneering role in promoting women's education and social equality in India.

About Savitribai Phule:

Who she was?

- Savitribai Phule (1831–1897) was a pioneering Indian social reformer, educator, poet, and women's rights activist from Maharashtra. She is widely regarded as India's first female teacher and a leading figure of the social reform movement against caste and gender discrimination during the 19th century.

Early Days:

- Savitribai Phule was born on 3 January 1831 in Naigaon, Satara district (Maharashtra) to Khandoji Neveshe Patil and Lakshmi.
- She was married at a young age to Jyotirao Phule, a prominent social reformer.
- At a time when education for women was discouraged, Jyotirao Phule educated Savitribai at home, after which she received teacher training in Pune and Ahmednagar.

Contribution to the Freedom Movement and Social Reform:

- Pioneer of Women's Education: In 1848, Savitribai and Jyotirao Phule established India's first school for girls in Pune (Bhide Wada), challenging rigid social norms.
- Education for Marginalized Communities: She opened schools for Dalits and backward castes, helping expand access to education for oppressed communities.
- Fight Against Social Evils: She campaigned against child marriage, sati, caste discrimination and supported widow remarriage.
- Women's Empowerment: She founded the Mahila Seva Mandal, encouraging women to discuss their rights and social issues.
- Social Welfare Initiatives: The Phule couple established Balhatya Pratibandhak Griha, a shelter to prevent female infanticide and protect widows.
- Satyashodhak Samaj: She actively worked with the reformist organization founded by Jyotirao Phule to fight caste oppression and promote equality.
- Literary Contributions: She authored works like Kavya Phule and Bavan Kashi Subodh Ratnakar, promoting education and social awareness.

Last Days:

- During the 1897 bubonic plague outbreak, Savitribai and her adopted son Yashwantrao opened a clinic to treat affected patients.
- While serving infected individuals, she contracted the plague and died on 10 March 1897, sacrificing her life in service of humanity.

The 250th Anniversary of the American Revolution

Context:

The U.S. government has launched Task Force 250 and the Story of America video series to commemorate the 250th anniversary of the Declaration of Independence on July 4, 2026.

About The 250th Anniversary of the American Revolution:

What it is?

- The American Revolution (1775–1783) was a transformative political and military struggle where thirteen of Great Britain's North American colonies rejected imperial rule to form the independent United States of America.

Factors Leading to the Revolution:

- Taxation Without Representation: After the Seven Years' War, Britain imposed taxes (like the Stamp Act) to pay off debts; colonists resisted because they had no elected representatives in the British Parliament.
- Enlightenment Ideals: Philosophers like John Locke influenced colonists to believe in natural rights and the idea that a government's power must come from the consent of the governed.
- The Proclamation of 1763: Britain prohibited colonists from settling west of the Appalachian Mountains, frustrating those who sought westward expansion and rugged self-reliance.
- The Coercive (Intolerable) Acts: Following the Boston Tea Party, Britain closed Boston Harbor and suspended local governance, which served as the final straw for colonial unity.
- Desire for Economic Freedom: Colonial merchants resented British mercantilist policies and creeping control that restricted their ability to trade freely with other nations.

Chronology of the American Revolution:

The Stamp Act (1765):

- This was the first internal tax levied directly on American colonists by the British Parliament, requiring them to pay a fee on every piece of printed paper used. It ignited the famous slogan No taxation without representation and led to the formation of the Sons of Liberty, who organized effective resistance and boycotts.

The Boston Tea Party (1773):

- In a bold act of defiance against the Tea Act, colonists disguised as Mohawk Indians boarded three British ships and dumped 342 chests of tea into Boston Harbor. This event was a major escalation that provoked the British into passing the Intolerable Acts, effectively ending any hope of a peaceful reconciliation.

Lexington and Concord (1775):

- These initial skirmishes in Massachusetts marked the transition from political unrest to open armed conflict, famously described as the shot heard 'round the world. Colonial minutemen successfully forced a British retreat to Boston, proving that a local militia could stand its ground against a professional imperial army.

Declaration of Independence (July 4, 1776):

- Drafted primarily by Thomas Jefferson, this landmark document formally announced the thirteen colonies' separation from Great Britain and grounded the new nation in Enlightenment principles. It shifted the purpose of the war from seeking rights of Englishmen to a total struggle for the natural rights of all mankind.

Battle of Saratoga (1777):

- This decisive American victory in New York is considered the greatest turning point of the war because it ended British hopes of isolating New England. Most importantly, it provided the necessary leverage for Benjamin Franklin to convince France to sign a formal military alliance, bringing vital naval and financial support.

Surrender at Yorktown (1781):

- Combined American and French land and naval forces trapped General Cornwallis on a Virginia peninsula, forcing the surrender of his entire army. This was the last major land battle of the war, shattering the British government's will to continue the expensive conflict and leading directly to peace negotiations.

Treaty of Paris (1783):

- This formal agreement officially ended the Revolutionary War, with Great Britain finally recognizing the United States as a sovereign and independent nation.

Key Leaders and Contributions:

- George Washington: Served as the Commander-in-Chief of the Continental Army; his leadership and persistence held the rag-tag force together through the harshest winters.
- Thomas Jefferson: The principal author of the Declaration of Independence, providing the intellectual and philosophical foundation for the new republic.
- Benjamin Franklin: Known as the First Diplomat, he spent years in France securing the military and financial aid essential for the American victory.
- John Adams: A fierce advocate for independence in the Continental Congress and a key figure in negotiating the final peace treaty with Britain.
- Ladies of the Revolution (e.g., Abigail Adams): Managed farms and businesses during the war while providing political counsel and supporting the Quest for Freedom through grassroots organizing.

Significant Contribution to the World:

- Birth of Modern Democracy: It established the first large-scale democratic republic in the modern era, proving that a nation could be governed by its citizens rather than a king.
- Inspiration for Global Revolutions: The success of the American colonies directly inspired the French Revolution (1789) and various independence movements across Latin America.
- Codification of Human Rights: The emphasis on inalienable rights led to the creation of the Bill of Rights, which has served as a blueprint for constitutions and human rights charters worldwide.

Conclusion:

The 250th anniversary highlights the American Revolution as a turning point that transformed a colonial struggle into a global symbol of freedom. By honouring its pioneers, the initiative seeks to renew the spirit of innovation and equality, showing how resilience can shape a nation's progress.

Deepening Inequality: The Crisis in India's Education and Employment

Context:

The State of Working India (SWI) 2026 report highlights a severe graduate paradox, where nearly 40% of graduates aged 15–25 are unemployed despite rising educational attainment.

About Deepening Inequality: The Crisis in India's Education and Employment

What it is?

- Inequality in this context refers to the widening gap in access to quality education, formal employment, and economic mobility across different social and regional groups.
- It manifests as a human development deficit where a university degree no longer guarantees a stable career, particularly for those from marginalized backgrounds.

Data & Facts on Education and Unemployment:

- The 7% Club: Less than 7% of male graduates manage to secure a permanent salaried job within one year of finishing their studies.
- Youth Joblessness: Unemployment for the 15–29 age group is approximately 14.8%, nearly three times the national average of 4.9%.
- Degree Inflation: Over two-thirds (67%) of unemployed Indians aged 20–29 were graduates in 2023, up from 46% in 2017.
- Enrolment Reversal: The share of young men in education fell from 38% in 2017 to 34% in late 2024, with 72% citing the need to support household income.
- Social Divide: Only 7% of ST and 10% of SC youth are graduates, compared to over 18% in other social groups, highlighting persistent barriers.

Reasons for the Crisis:

- Structural Mismatch: The economy is underproducing high-quality jobs while the education system overproduces general degrees.
- Example: Every year, 5 million graduates enter the workforce, but only about 2.8 million find any form of employment, often in the informal sector.
- Quality Concentration: Elite educational institutions are concentrated in Southern India, leaving Northern states with general degree programs of limited depth.
- Example: Graduates in Northern states often focus on public service exam prep due to a lack of local technical or vocational training hubs.
- The STEM Vicious Cycle: A shortage of qualified STEM teachers leads to fewer students opting for technical subjects, reducing the pool of employable tech talent.
- Example: Faculty growth has not matched student numbers, with student-teacher ratios in public colleges reaching 47:1, far above the 15:20 norm.
- Dependence on Government Jobs: Public sector roles are seen as a lottery that offers protection against social discrimination, leading to waiting unemployment.
- Example: Youths spend years in their prime preparing for limited government vacancies instead of entering the private workforce.

- Technological Displacement: AI and automation are eliminating entry-level knowledge work tasks that general graduates were traditionally hired for.
- Example: NASSCOM projects a need for 1 million AI professionals, yet only 55% of Indian graduates are considered industry-ready for such roles.

Challenges Associated to Counter:

- Financial Barriers: Professional degrees like Medicine or Engineering cost more than the annual per capita expenditure of poor households.
- Example: This reinforces inequality as high-paying tech and medical roles remain a gated corridor for the wealthy.
- Institutional Quality: While private ITIs have grown by 300%, their training quality is often poor and lacks links to actual manufacturing.
- Example: Only 15% of youth trained under the PM Kaushal Vikas Yojana (PMKVY) actually transition into formal employment.
- The Missing Middle: India's economy skipped a robust manufacturing phase, moving straight to services which require high-skilled labor.
- Example: Agricultural workers cannot easily transition to IT services, leading to disguised unemployment in the farm sector.
- Regional Disparities: Migration is the only outlet for youth in poorer states, but this often leads to precarious and distress migration.
- Example: States like Karnataka and Tamil Nadu absorb talent, but Northern states continue to face an aspirational vacuum.
- Employer Reluctance: Industries are hesitant to invest in on-the-job training for unemployable graduates due to high costs.
- Example: Only 16% of organizations convert internships into full-time roles, leaving interns on the margins of the workforce.

Way Ahead:

1. Apprenticeship Mandate: Shift from unemployment doles to a massive, employer-led apprenticeship program in organized manufacturing.
2. Curriculum Overhaul: Align university syllabi with the digital economy's weekly evolution, focusing on Proof of Work (GitHub, portfolios) over degrees.
3. Decentralized Industry Hubs: Create MSME clusters in Northern India to provide local non-farm jobs and reduce the pressure on Southern metros.
4. STEM Teacher Mission: Launch a national program to recruit and train STEM faculty to break the generational cycle of low technical literacy.
5. Universal Social Security: Establish portable social security for gig and informal workers to reduce the desperation for government jobs.

Conclusion:

India is currently at a critical juncture where its demographic dividend could either power a Viksit Bharat or become a massive social burden. The SWI 2026 report serves as a final warning: after 2030, the demographic window begins to close. To succeed, India must pivot from a degree-producing machine to a skill-validating economy that bridges the gap between learning and earning.

Regional Connectivity Scheme – Modified UDAN

Context:

The Union Cabinet has approved the Regional Connectivity Scheme – Modified UDAN with an outlay of ₹28,840 crore for 2026–2036.

About Regional Connectivity Scheme – Modified UDAN:

What it is?

- Modified UDAN (Ude Desh ka Aam Nagrik) is the evolved second phase of India's flagship regional airport development program, designed to make air travel sustainable and accessible for the next decade.

Launched In:

- While the original scheme began in 2016, the Modified UDAN was approved by the Union Cabinet on March 25, 2026, for implementation starting from FY 2026-27.

Aim:

- The scheme seeks to transform India into a globally competitive aviation ecosystem by connecting underserved regions, reducing travel costs for the common citizen, and supporting the vision of Viksit Bharat 2047.

Key Features:

- Infrastructure Expansion (CAPEX): An outlay of 12,159 crore to develop 100 airports from existing unserved airstrips over the next eight years.
- Modern Helipad Network: Development of 200 modern helipads at a cost of 15 crore each to solve connectivity challenges in hilly, island, and remote areas.
- Viability Gap Funding (VGF): A dedicated fund of 10,043 crore to provide financial support to airline operators, ensuring routes remain profitable while keeping fares low for passengers.
- O&M Support: To ensure sustainability, the government will provide Operation & Maintenance support for three years (capped at 3.06 crore/year per airport) for around 441 aerodromes.
- Atmanirbhar Aircraft Acquisition: Focused on indigenous manufacturing by procuring HAL Dhruv helicopters and HAL Dornier aircraft for state-run carriers like Pawan Hans and Alliance Air.

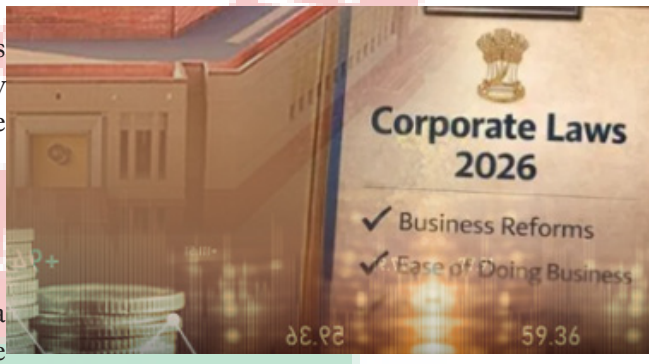
Significance:

- Boosts trade, tourism, and local commerce in Tier-2 and Tier-3 cities by integrating them into the national mainstream.
- Improved helipad infrastructure enables faster medical evacuations and disaster response in difficult terrains.
- Democratizes air travel, allowing common citizens to fly at affordable rates through subsidized seats.

Corporate Laws (Amendment) Bill, 2026

Context:

The Union Cabinet has moved the Corporate Laws (Amendment) Bill, 2026, in the Lok Sabha, subsequently referring it to a 31-member Joint Parliamentary Committee (JPC) for detailed scrutiny.



About Corporate Laws (Amendment) Bill, 2026:

What it is?

- The Corporate Laws (Amendment) Bill, 2026, is a strategic legislative update designed to modernize the regulatory framework governing Indian businesses by amending the Companies Act, 2013, and the Limited Liability Partnership (LLP) Act, 2008.

Aim:

- The primary objective is to foster a more business-friendly environment in India by reducing the compliance burden and fear of imprisonment for minor mistakes. It seeks to align corporate governance with the current economic landscape and the vision of a Viksit Bharat.

Key Features:

- Decriminalization of Offences: Shifts 21 minor/technical offences from a criminal court-based system to an electronic e-adjudication platform where only monetary penalties are levied, removing the risk of imprisonment.
- CSR Threshold Revision: Increases the net profit threshold for mandatory Corporate Social Responsibility (CSR) from 5 crore to 10 crore, exempting many small companies from the 2% spending requirement.
- Hybrid Meetings: Enables companies to hold Annual General Meetings (AGM) and Extraordinary General Meetings (EGM) via video conferencing, with a mandatory physical meeting required only once every three years.

- Extended Timelines: Increases the time allowed to transfer unspent CSR funds for ongoing projects to a designated bank account from 30 days to 90 days.
- Self-Declaration Framework: Replaces several traditional affidavits required under the Acts with simple self-declarations, reducing paperwork and notarization costs.
- LLP Conversion: Introduces a new framework allowing specified trusts (registered under SEBI or IFSC) to convert into Limited Liability Partnerships (LLPs).

Significance:

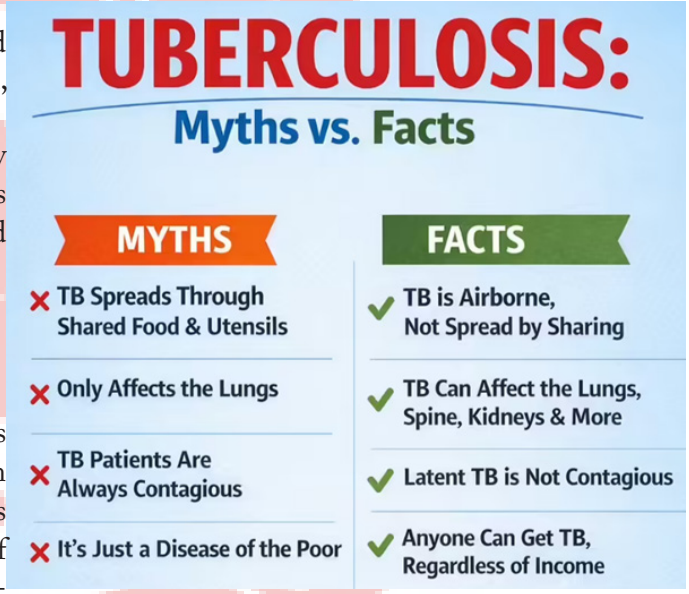
- By removing criminal penalties for procedural errors, the Bill encourages entrepreneurship and reduces the inspector raj or discretionary power of officials.
- The relaxations provided to companies make it easier for smaller, unorganized businesses to register as formal corporate entities.
- The push for digital meetings and e-adjudication aligns Indian corporate law with global standards, increasing shareholder participation and transparency.

India's Fight Against Tuberculosis

Context:

On World Tuberculosis Day, President of India highlighted India's progress under the TB Mukt Bharat Abhiyan, noting a 21% reduction in TB incidence.

- India is currently launching a new 100-day intensified campaign to deepen these gains through Jan Bhagidari (people's participation) and advanced AI diagnostics.



About India's Fight Against Tuberculosis:

What is TB?

- Tuberculosis (TB) is a dynamic infectious disease caused by the bacterium Mycobacterium tuberculosis. It primarily affects the lungs (Pulmonary TB) but can also attack other parts of the body like the spine, brain, and kidneys (Extra-pulmonary TB). It spreads through the air when an infected person coughs or sneezes.

Types of TB Cases:

- Latent TB: The person has the bacteria in their body, but the immune system keeps it in check. They are not symptomatic and cannot spread the disease.
- Active TB: The bacteria multiply, making the person sick and infectious.
- Asymptomatic TB: A critical focus in 2026; patients who do not show typical symptoms (like persistent cough) but can still spread the infection.
- Drug-Resistant TB (MDR/XDR-TB): Cases where the bacteria do not respond to standard first-line or even second-line antibiotics.

Data/Stats on TB in India:

- Incidence Reduction: India has achieved a 21% reduction in TB incidence since 2015, which is nearly twice the global rate of decline.
- Mortality Decline: There has been a 25% decrease in TB-related deaths in the same period.
- Screening Reach: More than 20 crore people have been screened recently, leading to the detection of over 32 lakh cases.
- The Asymptomatic Burden: National surveys reveal that 50% of TB patients do not show typical symptoms, necessitating proactive AI-based screening.

Initiatives Taken to Eradicate TB:

India Level:

- Ni-kshay Poshan Yojana: Provides 500/month nutritional support to every TB patient via DBT.
- Ni-kshay Mitras: A unique Jan Bhagidari initiative where individuals or institutions adopt TB patients to provide nutritional and vocational support.
- AI-Enabled Diagnostics: Deployment of over 3,000 AI-powered handheld X-ray units and Ni-kshay Vahans to reach remote areas.
- 100-Day Intensified Campaign: A multi-ministerial push launched in 2026 to achieve Zero TB at the village and panchayat levels.

Global Level:

- WHO End TB Strategy: A global roadmap aiming for a 95% reduction in deaths and a 90% reduction in incidence by 2035.
- The Global Fund: A multi-billion dollar international financing mechanism to fight AIDS, TB, and Malaria.
- UN High-Level Meeting (UNHLM) Targets: Specific global commitments to put 40 million people on TB treatment.
- Moscow Declaration: A commitment by world leaders to increase multisectoral action and accountability to end TB.

Importance of Eradicating TB:

- Economic Productivity: TB primarily affects the working-age population, leading to massive man-hour losses.
- Example: Eradicating TB could save India billions by preventing the catastrophic costs that push families into poverty.
- Health System Resilience: Reducing the TB burden frees up hospital beds and resources for other emerging threats.
- Example: The infrastructure built for TB (like molecular testing) was successfully repurposed for the COVID-19 pandemic.
- Social Equity: TB is a disease of poverty, disproportionately affecting marginalized communities.
- Example: Successful elimination ensures that migrant workers and slum dwellers have equal access to life-saving healthcare.
- Preventing Antimicrobial Resistance (AMR): Controlling TB prevents the rise of superbugs.
- Example: Proper treatment completion stops the mutation of bacteria into deadly MDR-TB strains.
- Demographic Dividend: Ensuring a TB-free youth allows India to harness its full human potential.
- Example: Programs like MY Bharat engage youth volunteers to ensure the next generation is free from the stigma of the disease.

Challenges Associated with Eradication:

- The Silent Spread: Asymptomatic cases make traditional passive screening ineffective.
- Example: 10.9 lakh asymptomatic cases were only found because India shifted to proactive AI screening.
- Social Stigma: Patients often hide their condition to avoid social isolation or job loss.
- Example: Many women in rural areas delay treatment seeking due to the fear of marital or social rejection.
- Treatment Adherence: The TB course is long (6-9 months), and patients often stop once they feel slightly better.
- Example: High drop-out rates lead to the development of Drug-Resistant TB, which is much harder to treat.
- Nutrition and Living Conditions: Crowded housing and malnutrition weaken the immune system.
- Example: In high-density urban informal settlements, one undiagnosed case can spread rapidly due to lack of ventilation.
- Urbanization and Migration: Tracking floating populations like construction workers is difficult.
- Example: Migrant workers often change locations mid-treatment, leading to lost-to-follow-up cases.

Way Ahead:

- Universal Access to Molecular Testing: Replacing traditional sputum microscopy with faster, more accurate molecular tests (like TruNat/CBNAAT) nationwide.
- Localized Strategy: Utilizing data-driven tools to identify high-risk hotspots at the village and ward levels for targeted intervention.
- Vaccine Research: Accelerating the Made-in-India TB vaccine candidates currently in clinical trials to provide long-term immunity.
- Private Sector Engagement: Integrating private practitioners into the Ni-kshay portal to ensure standardized treatment for all patients.
- Sustaining Jan Bhagidari: Expanding the Ni-kshay Mitra pool to include corporate CSR and youth platforms like My Bharat for psychosocial support.

Conclusion:

India's fight against Tuberculosis has evolved from a clinical program into a massive national movement driven by political will and community participation (Jan Bhagidari). By integrating cutting-edge AI technology with grassroots social support, the nation is steadily moving toward the goal of a TB-Mukt Bharat. If the current momentum is sustained, India can transform TB from a public health crisis into a documented chapter of its history.

Sustainable Water Sources and Issues

Context:

A parliamentary committee warned that the Jal Jeevan Mission (JJM) objectives will remain unfulfilled without finding sustainable water sources, as many existing taps are running dry within a year.

About Sustainable Water Sources and Issues:

What it is?

- Sustainable water sources refer to natural or managed water bodies (rivers, lakes, groundwater) that can provide a consistent, long-term supply of potable water without being depleted or contaminated.

Data/Facts on Water Resources

- Coverage Gap: While 12.56 crore rural households have received connections since 2019, the mission has been stuck at 81% coverage since 2025.
- Investment Scale: The JJM is a massive 8.69-lakh-crore project originally aimed at 100% coverage by 2024.
- Baseline Growth: In 2019, only 17% (3.23 crore) of rural households had tap water; current figures show a significant infrastructure leap.
- Remaining Challenge: Covering the final 19–20% of households is estimated to require more funding than the entire amount spent on the first 80%.

Major Sources of Sustainable Water:

- Perennial Rivers: Surface water from rivers that flow year-round, provided they are managed to prevent seasonal drying.
- Recharged Aquifers: Groundwater sources that are actively replenished through rainwater harvesting to ensure the water table does not drop.
- Natural Ponds and Lakes: Localized reservoirs that capture runoff and serve as decentralized storage units for village-level schemes.
- Spring-fed Sources: Common in hilly regions, these natural discharges are highly sustainable if the catchment area is protected from deforestation.
- Treated Wastewater: Reclaiming greywater for non-potable uses to reduce the stress on fresh drinking water sources.

Initiatives Taken So Far:

- Jal Jeevan Mission (JJM): Launched in 2019 to provide Functional Household Tap Connections (FHTC) to every rural home.

- Sujalam Bharat: A new national digital framework assigning a unique Sujal Gaon ID to map water systems from source to tap.
- Mission Deadline Extension: The official extension to 2028 to allow for the creation of more sustainable service delivery ecosystems.
- Source-to-Tap Integration: Implementing 6.83 lakh sanctioned schemes that account for the entire supply chain, from the natural pool to the household.

Challenges Associated:

- Rapid Source Exhaustion: Many natural pools or groundwater sources are being depleted within a year of the scheme's launch.
- Example: Parliamentary testimony revealed that in several states, taps were installed but sources were exhausted within 12 months.
- Lack of Source-to-Tap Mapping: There is currently a critical data gap regarding how many of the 6.83 lakh schemes actually account for a permanent source.
- Example: The committee noted with concern that states have provided no information on the sustainability of these individual schemes.
- High Cost of Last-Mile Connectivity: The final 20% of households are in geographically difficult terrains (hilly or arid regions).
- Example: Recent reports indicate the remaining 20% coverage will cost significantly more than the 8.69 lakh crore already allocated.
- Climate Change & Seasonal Variability: Rising temperatures and erratic monsoons lead to the drying up of traditional sustainable sources like ponds and lakes.
- Example: Parliamentary panels observed that without long-term source management, JJM assets will likely become useless over the next 25-30 years.
- Institutional Overlap: Coordination between state-level water boards and the central digital framework 'Sujalam Bharat' faces logistical delays.
- Example: The shift from infrastructure creation to service delivery requires a new governance ecosystem that many local bodies aren't yet equipped for.

Way Ahead:

- Mandatory Source Sustainability Audits: Every new and existing JJM scheme should undergo a hydrogeological audit to certify a 30-year water supply.
- Decentralized Rainwater Harvesting: Integrate the MGNREGS with JJM to build check dams and percolation tanks to recharge local aquifers.
- Digital Transparency via Sujalam Bharat: Use the unique Sujal Gaon IDs to monitor live water levels at the source to prevent sudden supply failures.
- Community-Led Governance: Empower Paani Samitis (Water Committees) at the village level to manage and protect their local water sources.
- Incentivizing States: Link future fund releases to the successful implementation of source-to-tap documentation and proven sustainability of connections.

Conclusion:

The Jal Jeevan Mission has made historic strides in infrastructure, yet the threat of dry taps underscores that pipes are only as good as their source. By extending the deadline to 2028 and adopting the Sujalam Bharat framework, the government is rightly pivoting toward long-term water security. True success will be measured not by the number of taps installed, but by the consistent flow of potable water for the next generation.

Joint Parliamentary Committee (JPC)

Context:

The Lok Sabha has extended the tenure of the Joint Parliamentary Committee (JPC) examining the 'One Nation, One Election' proposal till the Monsoon Session 2026.

About Joint Parliamentary Committee (JPC):

What it is?

- An ad-hoc (temporary) committee set up for a specific purpose and duration. It is dissolved once its report is submitted to the Parliament. A JPC is a powerful, ad-hoc legislative body comprising members from both Houses of Parliament, established to investigate specific issues of public importance or to scrutinize complex pieces of legislation.
- Established In: While joint committees have existed since Independence, the structured committee system was formally strengthened in 1993 to ensure greater executive accountability.
- Members: The size is not fixed and depends on the motion passed.
- Usually, the ratio of members is 2:1 (twice as many from Lok Sabha as from Rajya Sabha).

How it is Formed?

- A motion is moved in one House (typically Lok Sabha) and passed.
- The other House must agree to the motion.
- The members are then nominated/elected by the respective Houses.

Functions:

- In-depth Scrutiny: Examines specific bills (like the current 'One Nation, One Election' bill) or financial irregularities.
- Evidence Collection: It has the power to summon individuals, experts, or government officials to testify and can call for confidential documents.
- Fact-Finding: Investigates controversial matters (scams, pesticide residues, etc.) to identify regulatory loopholes.
- Recommendations: Suggests legislative or administrative changes to the government.

Significance

- Bi-partisan Scrutiny: Since it includes members from both Treasury and Opposition benches, it provides a balanced perspective on controversial issues.
- Expert Deliberation: It allows for a more detailed, technical discussion on bills that might not be possible on the floor of the House due to time constraints.
- Accountability: It acts as a check on the Executive, ensuring that government policies and actions are transparent and legally sound.

Appropriation Bill 2026

Context:

Parliament has passed the Appropriation Bill 2026, with the Rajya Sabha returning it to the Lok Sabha after a discussion where Finance Minister defended the government's budgeting as transparent and realistic.

About Appropriation Bill 2026:

What it is?

- An Appropriation Bill is a specialized piece of legislation that authorizes the government to withdraw funds from the Consolidated Fund of India (CFI) to meet its expenditures for a specific financial year.
- Without the passage of this Bill, the government cannot legally spend a single rupee from the CFI, even if the Budget has been presented.

Constitutional Article Associated:

- Article 114: This article mandates that no money shall be withdrawn from the Consolidated Fund of India except under appropriation made by law.
- Article 115 & 116: Related to Supplementary, Additional, or Excess grants and Votes on Account, respectively, which may also require subsequent Appropriation Bills.

Budgetary Process:

- Presentation: The Finance Minister presents the Annual Financial Statement (Budget).
- Discussion: General discussion takes place in both Houses.
- Voting on Demands for Grants: The Lok Sabha votes on the specific expenditure requests of various ministries.
- Introduction of the Bill: Once the Demands for Grants are voted upon, the Appropriation Bill is introduced in the Lok Sabha.
- Passage: After being passed by the Lok Sabha, it is sent to the Rajya Sabha. Since it is treated as a Money Bill, the Rajya Sabha has limited powers and must return it within 14 days.
- Presidential Assent: Once passed by both Houses (or returned by the Rajya Sabha), it receives the President's assent to become an Act.

Features of the Appropriation Bill:

- Scope: It includes both voted expenditures (voted on by Lok Sabha) and charged expenditures (which are not voted upon, such as salaries of the President and Judges).
- Amendments: No amendment can be proposed to the Bill in either House of Parliament which would have the effect of varying the amount or altering the destination of any grant already voted upon.
- Classification: It is classified as a Money Bill under Article 110, meaning the Rajya Sabha cannot reject or amend it; it can only make recommendations.

Significance:

- It ensures that the executive remains accountable to the legislature regarding how public money is spent.
- It provides the legal mandate for the government to execute its schemes and services, such as the Economic Stabilisation Fund mentioned in the recent session.

Section 301 of the Trade Act of 1974

Context:

The U.S. government has launched two major Section 301 investigations against India and several other nations to probe allegations of excess manufacturing capacity and forced labor.

About Section 301 of the Trade Act of 1974:

What It Is?

- Section 301 is a powerful U.S. trade law that grants the Office of the United States Trade Representative (USTR) the authority to investigate and respond to unreasonable, discriminatory, or unjustifiable trade practices by foreign countries that burden or restrict U.S. commerce.

Nations Involved:

- Investigation 1 (Excess Capacity): Involves 16 major economies, including India, China, the EU, Japan, Mexico, and Vietnam.
- Investigation 2 (Forced Labor): A much broader probe involving 60 countries, with India again being a primary focus.

Aim:

- The primary goal is to enforce U.S. rights under trade agreements and eliminate unfair foreign barriers. In the current context, the aim is to determine if foreign surpluses (like India's solar modules) or labor practices (forced labor) are harming American workers and businesses.

Key Features of the Act:

- Unilateral Power: It allows the U.S. to take action without waiting for World Trade Organization (WTO) approval.
- Broad Scope: It covers everything from intellectual property theft and subsidies to unreasonable labor policies and excess production.
- Mandatory Investigations: Once a petition is accepted or the USTR initiates a probe, a formal investigation with public hearings must follow.
- Retaliatory Tools: If the USTR finds a violation, it can recommend various actions, most commonly the imposition of tariffs (import duties) or quotas on goods from the investigated country.
- Time-Bound: These investigations usually last between six to twelve months before a final decision on retaliation is made.

Recent Issue and India:

- The USTR claims India's solar module manufacturing is nearly triple its domestic demand, potentially leading to dumping in the U.S. market. It also highlighted surpluses in steel, petrochemicals, and automotive goods.
- The U.S. cited a bilateral trade surplus with India of $58 billion in 2025, though Indian data estimates it closer to $42.2 billion.
- The second investigation examines whether India has taken sufficient steps to stop goods produced by forced labor from entering global supply chains.

The Transgender Persons (Protection of Rights) Amendment Bill, 2026

Context:

The Union Government introduced a Bill in the Lok Sabha to amend the Transgender Persons (Protection of Rights) Act, 2019, seeking to redefine transgender person and remove the right to self-perceived gender identity.

About The Transgender Persons (Protection of Rights) Amendment Bill, 2026:

What it is?

- The Transgender Persons (Protection of Rights) Amendment Bill, 2026 proposes modifications to the 2019 law that protects transgender persons from discrimination and ensures their welfare.
- The original Act was enacted following the Supreme Court's landmark judgment in the NALSA v. Union of India (2014) case, which recognised transgender persons as the third gender and affirmed the right to self-determination of gender identity under Article 21.

Proposed Changes in the Amendment Bill:

1. Removal of right to self-perceived gender identity

The amendment proposes deleting Section 4(2) of the 2019 Act, which recognises a person's right to self-perceived gender identity.

2. Redefinition of transgender person:

The Bill narrows the definition to include:

- Socio-cultural identities such as hijra, kinner, aravani, jogta, eunuch
- Persons with intersex variations
- Individuals with congenital biological variations in sexual characteristics
- It excludes persons identifying solely based on self-perceived gender identity or gender fluidity.

3. Inclusion of forced gender alteration victims:

The definition also includes individuals forced to adopt transgender identity through mutilation, castration, hormonal procedures or coercion.

4. Introduction of a Medical Authority:

The Bill introduces the concept of an authority (medical board headed by a Chief Medical Officer) to examine gender certification cases.

5. Changes in transgender certificate procedure:

Instead of automatic issuance, the District Magistrate must review recommendations from the medical authority before granting a certificate.

6. Mandatory gender certificate revision after surgery:

Persons undergoing Sex Reassignment Surgery (SRS) must apply for a revised gender certificate, whereas earlier it was optional.

7. Reporting requirement for hospitals:

Medical institutions performing SRS must report procedures to the District Magistrate.

8. Right to change first name in official documents:

A new provision allows transgender persons to change their first name in official records, subject to the new definition criteria.

9. Expansion of offences and punishments:

The Bill expands criminal provisions with graded punishments (including imprisonment and fines up to 5 lakh) for crimes such as:

- Denial of access to public places
- Forced labour
- Expulsion from homes

Initiatives Taken to Empower Transgender Persons

- SMILE Scheme: The Support for Marginalized Individuals for Livelihood and Enterprise provides comprehensive rehabilitation and medical cover for SRS.
- National Portal for Transgender Persons: A digital interface launched to allow trans persons to apply for ID cards and certificates without physical interface with offices.
- Garima Greh: Shelter homes provided by the government to offer safe spaces, food, and skill development for transgender persons in distress.
- Inclusive Education: The NCERT has introduced teacher training modules (updated in 2024-25) to sensitize educators about gender diversity and inclusion.

Challenges Associated:

- Violation of Bodily Autonomy: Requiring a medical board to verify identity forces individuals into invasive examinations.
- Example: Activists in Delhi noted that the return of screening committees mirrors the pre-2019 era where trans persons faced harassment during physical inspections.
- Conflict with Judicial Precedent: The Bill ignores the NALSA (2014) judgment which stated that any insistence for SRS is immoral and illegal.
- Example: Legal experts point out that the Supreme Court explicitly protected self-determination under Article 21, which this Bill seeks to legislate away.
- Erasure of Diverse Identities: By focusing on congenital variations and specific socio-cultural groups, the Bill may exclude gender-fluid or genderqueer individuals.
- Example: Dr. Aqsa Shaikh highlighted that many modern trans identities do not fit into the traditional Kinner/Hijra socio-cultural brackets.
- Bureaucratic Hurdles: Granting District Magistrates the power to seek additional medical assistance could lead to indefinite delays in documentation.
- Example: Trans activists in Tamil Nadu have reported that even under current laws, DM offices often take over a year to process simple name-change requests.
- Stigmatization of Choice: The government's argument that identity shouldn't be a personal choice reinforces the stigma that trans identity is acquirable rather than innate.
- Example: Recent social media campaigns by the Ministry had paradoxically praised self-perception just days before tabling a Bill to abolish it.

Way Ahead:

- Community Consultation: The government should hold nationwide town halls with diverse trans groups to ensure the law reflects lived experiences.
- Adherence to NALSA: Re-incorporate the right to self-identification to ensure the Bill stands the test of constitutional validity in the Supreme Court.
- Sensitization of Medical Boards: If boards are kept, they must include transgender representatives and psychologists rather than just surgeons.
- Horizontal Reservation: Instead of just redefining identity, focus on providing horizontal reservations in jobs and education as suggested by various High Courts.
- Decentralized ID Process: Simplify the certification process to a self-declared affidavit to minimize bureaucratic corruption and harassment.

Conclusion:

The proposed 2026 Amendment threatens to roll back a decade of progress by pathologizing gender identity and stripping away the right to self-determination. For a law to truly protect a marginalized community, it must be rooted in dignity and autonomy rather than medical gatekeeping and narrow biological definitions. The government must strike a balance between preventing benefit fraud and upholding the fundamental constitutional rights of the transgender community.

Supreme Court applies passive euthanasia framework for first time

Context:

The Supreme Court of India, for the first time, applied its passive euthanasia framework to allow the withdrawal of life-sustaining treatment for 32-year-old Harish Rana, who had been in a persistent vegetative state for 13 years.

About Supreme Court applies passive euthanasia framework for first time:

What is Euthanasia?

- Euthanasia is the practice of intentionally ending a life to relieve pain and suffering. It is often referred to as mercy killing, typically occurring in cases where a patient suffers from an incurable or terminal distress.

Types of Euthanasia:

- Active Euthanasia: Taking a specific action to cause death, such as administering a lethal injection. This remains illegal in India.
- Passive Euthanasia: Withdrawing or withholding life-sustaining treatment (like ventilators or feeding tubes) to allow a patient to die naturally. This is legal in India under strict guidelines.

History of Euthanasia in India

1. P. Rathinam Case (1994): The SC initially held that the Right to Life includes the Right to Die, effectively de-criminalizing suicide, though this was later overturned.
2. Gian Kaur Case (1996): A Five-judge bench ruled that the Right to Life under Article 21 does not include the Right to Die, but it distinguished between dying unnaturally and dying with dignity.
3. Aruna Shanbaug Case (2011): The landmark case of a nurse in a vegetative state for 42 years led the SC to legalize Passive Euthanasia in India for the first time, subject to High Court approval.
4. Common Cause Case (2018): The SC recognized the Right to die with dignity as a fundamental right and legalized Living Wills (advance medical directives).
5. 2023 Amendment: The SC simplified the 2018 guidelines, removing the requirement for a judicial magistrate's countersignature on living wills to make the process more practical.

Need for Legislation on Euthanasia

- Clarity on Terminally Ill vs. Vegetative: Legislation is needed to define clear medical boundaries.
- Example: The Delhi HC originally denied Harish Rana's plea because he wasn't terminally ill, despite being in a vegetative state for 13 years.
- Standardizing Medical Boards: A law would create a uniform protocol for Primary and Secondary medical boards.
- Example: In the Rana case, the SC had to manually constitute these boards in 2025 due to a lack of a standing administrative mechanism.

- Protection for Medical Practitioners: Doctors need legal immunity when following a patient's dignity-based choices.
- Example: Under current rules, doctors fear criminal liability for abetment to suicide without a court-sanctioned framework.
- Rights of the Family: Legislation would formalize the role of next of kin in decision-making for incompetent patients.
- Example: Harish Rana's parents had to fight a multi-year legal battle to prove their son's suffering outweighed the futility of his treatment.
- Simplifying Procedures: A statutory law would replace the cumbersome court-monitored process with a streamlined administrative one.
- Example: The SC recently had to waive the mandatory 30-day consideration period for Rana to provide immediate relief, showing the current rules are too rigid.

Challenges in Implementation

- Risk of Misuse: Fear that elderly or disabled individuals might be coerced into euthanasia for property or financial gain.
- Example: The SC continues to mandate Secondary Medical Boards with external nominees specifically to prevent family-driven foul play.
- Religious and Moral Objections: Many socio-religious groups view any form of euthanasia as an interference with the natural cycle of life.
- Example: Public debates following the Common Cause judgement often highlight the conflict between sanctity of life and quality of life.
- Definition of Dignity: Dignity is subjective and hard to quantify in a legal statute.
- Example: While the court called Rana's condition pathetic, others might argue that as long as the brainstem functions, life remains.
- Access to Palliative Care: Euthanasia might become a default choice if quality end-of-life care is unavailable or unaffordable.
- Example: The SC had to specifically order AIIMS Delhi to provide palliative care for Rana, highlighting that such facilities aren't universally accessible.
- Inconsistency in Judicial Interpretation: Different High Courts often interpret passive euthanasia differently.
- Example: The conflict between the Delhi HC's rejection and the Supreme Court's acceptance of the Rana petition shows a lack of judicial consensus.

Way Ahead

1. Drafting the Medical Treatment of Terminally Ill Patients Bill: The government should prioritize a comprehensive statute as urged by the SC.
2. Digital Living Will Registry: Create a national database for Advance Directives to ensure a person's wishes are known instantly in emergencies.
3. Expanding Palliative Care: Increase investment in hospice and end-of-life care to ensure euthanasia isn't chosen simply due to a lack of pain management.
4. Training Medical Professionals: Sensitize doctors on the legal and ethical nuances of the Common Cause framework.
5. Public Awareness Campaigns: Educate citizens on the importance of Living Wills to reduce the burden on families and courts.

Conclusion:

The Supreme Court's intervention in the Harish Rana case marks a transition from theoretical guidelines to the practical application of the right to die with dignity. However, relying on the judiciary for every individual case is unsustainable and creates immense emotional strain on families. A robust, compassionate central legislation is the only way to balance the sanctity of life with the necessity of a peaceful end.

Bug Bounty Programme

Context:

The Unique Identification Authority of India (UIDAI) has launched its first structured Bug Bounty Programme to strengthen the cybersecurity of the Aadhaar ecosystem.

About Bug Bounty Programme:

What it is?

- A Bug Bounty Programme is a cybersecurity initiative where organizations invite ethical hackers and security researchers to identify vulnerabilities in digital systems.
- Participants are rewarded for responsibly reporting security flaws before malicious actors can exploit them.

Aim:

- To strengthen the security of digital platforms by proactively identifying vulnerabilities.
- To promote responsible disclosure of security flaws and enhance trust in digital infrastructure such as Aadhaar systems.

Key Features:

- Expert Participation: 20 experienced ethical hackers and cybersecurity researchers selected for the programme.
- Scope of Testing: Researchers will test key UIDAI digital assets including the UIDAI website, myAadhaar portal, and Secure QR Code application.
- Risk-Based Reward System: Vulnerabilities categorized as Critical, High, Medium, and Low, with rewards based on severity.
- Public–Private Collaboration: Implemented in partnership with ComOlho IT Private Limited, a cybersecurity solutions provider.
- Layered Security Approach: Complements existing security measures such as security audits, vulnerability assessments, penetration testing, and continuous monitoring.

The Essential Commodities Act (ECA)

Context:

Amidst the West Asian crisis and supply disruptions in the Strait of Hormuz, the Centre has invoked the Essential Commodities Act to divert natural gas to priority sectors like households (PNG), transport (CNG), and LPG production.

About The Essential Commodities Act (ECA):

What it is?

- The ECA is a powerful legislative tool that allows the Central Government to regulate the production, supply, distribution, and pricing of specific commodities deemed essential to ensure they are available to the public at fair prices.

Came into existence in: The Act was enacted in 1955.

- Implemented by the Central Government with enforcement largely carried out by State Governments.

Aim:

- The primary objective is to protect consumers from artificial scarcities caused by hoarding and black marketing. It ensures the smooth supply of goods that are vital for everyday life, particularly during emergencies or market distortions.

Coverage:

The Act does not provide a fixed, permanent definition of an essential commodity. Instead, it maintains a list that the Centre can expand or shrink via notified orders. Currently, it includes:

- Foodstuffs: Including edible oils, seeds, pulses, and cereals (regulated under extraordinary conditions).
- Fuels: Coal and its derivatives, Petroleum, and Natural Gas.
- Agriculture: Cattle fodder, Raw Cotton, and Raw Jute.
- Healthcare: Drugs (medicines) and, during emergencies, items like masks and sanitizers.
- Industrial: Iron, steel, and automobile components.

Key Features:

- Stock Limits: The government can impose a ceiling on how much of a commodity a trader or individual can hold to prevent hoarding.
- Price Control: The Centre has the power to fix the Maximum Retail Price (MRP) of any packaged essential commodity.
- Regulatory Flexibility: The Act was amended in 2020 to allow the regulation of agricultural food items only under extraordinary circumstances (e.g., war, famine, or 100% price rise in perishables).
- Enforcement: State governments are usually delegated powers to carry out raids, seizures of excess stock, and legal action against violators.
- Priority Allocation: As seen in the 2026 order, it allows the government to rank sectors to receive limited supplies during a crisis.

Significance:

- It acts as a safety net for the common man by keeping the prices of basic necessities stable during geopolitical or economic shocks.
- By discouraging black marketing, it maintains a level playing field in the supply chain and prevents traders from profiteering during national emergencies.

Removal of the Chief Election Commissioner

Context:

The INDIA bloc parties, led by the Trinamool Congress, are set to move an impeachment motion against Chief Election Commissioner (CEC) Gyanesh Kumar.

About Removal of the Chief Election Commissioner:

What it is?

- The removal of the CEC is a formal, quasi-judicial process designed to ensure the independence of the Election Commission of India (ECI) from executive interference. To protect the sanctity of the democratic process, the CEC is granted security of tenure similar to that of a judge of the Supreme Court of India.

Constitutional Article:

- Article 324(5): This article explicitly states that the Chief Election Commissioner shall not be removed from his office except in like manner and on the like grounds as a Judge of the Supreme Court.

Criteria for Removal:

A CEC can only be removed on two specific grounds:

1. Proved Misbehavior: Acts that violate the code of conduct or involve corruption/partiality.
2. Incapacity: Physical or mental inability to perform the duties of the office.

Procedure for Removal:

The process is rigorous and requires a Special Majority in Parliament:

1. Initiation: A motion must be signed by at least 100 members in the Lok Sabha or 50 members in the Rajya Sabha and submitted to the Speaker/Chairman.

2. Investigation: If the motion is admitted, the Chair constitutes a three-member committee to investigate the charges.
3. Parliamentary Vote: If the committee finds the CEC guilty, the motion is taken up for voting. It must be passed by:
   - A majority of the total membership of that House.
   - A majority of not less than two-thirds of the members present and voting.
4. Presidential Order: Once both Houses pass the motion in the same session, an address is presented to the President of India, who then issues the formal order of removal.
   - Note: Unlike the CEC, other Election Commissioners or Regional Commissioners can be removed by the President simply on the recommendation of the Chief Election Commissioner.

Significance:

- By making the removal process difficult, the Constitution ensures the CEC can function without fear of being sacked by the ruling government for unfavorable decisions.
- The involvement of the Judiciary (via the investigation committee) and the Legislature (via voting) prevents arbitrary executive action.

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LNG and LPG Price Determination

Context:

Amidst the ongoing West Asia conflict in March 2026, global crude oil prices have surged by nearly 30%, directly inflating the cost of LNG and LPG.

About LNG and LPG Price Determination:

What it is?

- Price determination for Liquified Natural Gas (LNG) and Liquified Petroleum Gas (LPG) refers to the global mechanisms and benchmarks used to set the cost of these energy resources.
- Unlike many commodities, these gases do not have a single global price; instead, they are influenced heavily by their relationship with crude oil and specific regional indices.

How it Works?

- Crude Oil Linkage: Globally, both LNG and LPG prices are generally indexed to or float alongside crude oil prices. When crude oil prices rise, the cost of these gases typically follows.

Contractual Structures:

- Long-term Contracts: Much of India's LNG (especially from Qatar) is procured through long-term agreements that provide some price stability.
- Spot Markets: For immediate needs, entities use the spot market, where prices are highly volatile and measured by indices such as the JKM (Japan Korea Marker).

Domestic Production vs. Imports:

- LPG: 60% of India's supply is imported, primarily from Saudi Arabia and Qatar. The remaining 40% is produced domestically by Oil Marketing Companies (OMCs) like IOC and BPCL.
- LNG: Half of India's requirement is produced domestically, while the other half is imported via specialized cryogenic ships.

Factors Affecting Prices

- Geopolitical Stability: Conflicts in West Asia, such as the closure of the Strait of Hormuz, directly hit imports and drive up war premiums on energy.
- Supply Gaps: When major producers like Qatar shut down production, it creates a massive global supply gap, forcing prices higher for all other buyers.
- Transportation and Insurance: Because LNG must be cooled to below –160°C and transported in insulated tanks, rising insurance premiums during wartime significantly increase the final landed cost.
- Storage Capacity: Countries with limited storage, like India, are more vulnerable to immediate price shocks compared to nations with large underground reserves.

Implications for India:

- Higher LPG costs threaten the progress of the Pradhan Mantri Ujjwala Yojana, which has expanded coverage to nearly 100% of households.

- A little less than 30% of natural gas is used to make ammonia for fertilizers; price spikes can lead to higher agricultural costs, though current impacts are mitigated by the off-season for farming.
- Natural gas accounts for 13% of power generation and 21% of City Gas Distribution (CGD); high prices force industrial consumers to switch to alternative fuels like naphtha or furnace oil.

Constitutional Morality

Context:

Senior advocate Kapil Sibal, in a 2026 dialogue with N. Ram, highlighted a complete breakdown of constitutional machinery in India, arguing that constitutional morality must transcend political friction to ensure justice without fear or favor.

About Constitutional Morality:

What is Constitutional Morality?

- Constitutional morality refers to the adherence to the core philosophies and spirit of the Constitution rather than just its literal text.
- It is the bridge between the law and ethics, requiring public officials and citizens to act in a way that preserves democratic institutions and protects individual liberties against the tyranny of the majority.

Key Features:

- Adherence to Constitutional Values: Prioritizing justice, liberty, equality, and fraternity over popular or religious sentiment.
- Institutional Restraint: Ensuring that no branch of government (Executive, Legislature, or Judiciary) oversteps its bounds.
- Protection of Minorities: Safeguarding the rights of marginalized groups from majoritarian impulses.
- Non-Arbitrariness: Guaranteeing that state actions are based on reasoned law rather than the whims of those in power.
- Public Conscience: Cultivating a civic culture where the habits of the people align with democratic norms.

Importance in Modern Times:

- Check on Majoritarianism: It prevents the rule of the many from becoming the oppression of the few.
- E.g. The Supreme Court's scrutiny of state anti-conversion laws ensures that individual choice in marriage isn't sacrificed to communal narratives.
- Upholding Rule of Law: It ensures that the law is applied equally, regardless of political affiliation.
- E.g. The granting of bail to activists and journalists by higher courts, despite stringent laws like the UAPA, reaffirms that liberty is the rule and jail is the exception.
- Ensuring Accountability: It mandates that the Executive remains answerable to the people and the law.
- E.g. The 2024 judgment striking down the Electoral Bond Scheme highlighted the need for transparency in political funding to maintain a level playing field.
- Protecting Dissent: It recognizes that a healthy democracy requires the voice of the Opposition and civil society.
- E.g. Court interventions regarding the suspension of a record number of Opposition MPs from Parliament in late 2023 emphasize the need for parliamentary deliberation.
- Adapting to Social Change: It allows the Constitution to be a living document that addresses modern ethical dilemmas.
- E.g. The recognition of the Right to Privacy and the decriminalization of consensual same-sex acts (Navtej Singh Johar case) reflect evolving moral standards.

Challenges Associated:

- Judicial Overreach vs. Underreach: The thin line between interpreting the law and legislating from the bench (or failing to act).
- E.g. Critics point to the sealed cover jurisprudence where the court accepts government info in secret, potentially undermining the principle of open justice.

- Executive Dominance: When a single party holds a massive majority, the legislature often becomes a rubber stamp.
- E.g. The passage of significant bills (like the new Criminal Codes or Telecommunications Act) through voice votes without extensive debate in 2023-24.
- Politicization of the Judiciary: Perceived bias in case listing or post-retirement appointments can erode trust.
- E.g. Public debates surrounding the master of roster powers, where specific sensitive cases are assigned to certain benches, leading to allegations of favoritism.
- Erosion of Federalism: Use of central agencies or Governors to interfere in state administration.
- E.g. Frequent friction between Governors and elected state governments in Tamil Nadu, Kerala, and West Bengal regarding the passage of state bills.
- Weaponization of Law: Using colonial-era or stringent laws to silence critics.
- E.g. The frequent use of Sedition (now under the new Nyaya Sanhita) and PMLA (Money Laundering) provisions to arrest political opponents before trials begin.

Way Ahead:

- Judicial Independence: Establish a transparent mechanism for judicial appointments and case listings to restore public faith.
- Strengthening Parliamentary Debate: Ensure that all major legislations undergo scrutiny by Standing Committees before being passed.
- Civic Education: Integrate constitutional values into school curricula (without the intent to intimidate specific institutions) to foster habits of democracy.
- Police and Administrative Reforms: Insulate investigative agencies from political interference to ensure justice without fear or favor.
- Protection of Federal Spirit: Establish clearer guidelines for the role of Governors to prevent them from acting as political agents of the Centre.

Conclusion:

Constitutional morality is the lifeblood of a democracy; without it, the Constitution becomes a mere skeleton of words. The ultimate test of this morality is the delivery of justice that is unswayed by the powerful. For India to remain a vibrant republic, its institutions must rediscover the courage to interpret the law for the greater good of all citizens, not just the majority.

Judicial Corruption

Context:

The Supreme Court recently imposed a complete blanket ban on an NCERT Class 8 Social Science textbook due to a controversial section titled Corruption in the Judiciary.

About Judicial Corruption:

What it is?

- Judicial corruption refers to the abuse of judicial power for private gain, manifesting as bribery, nepotism, political interference, or the manipulation of court records.In the Indian context, it represents a significant threat to the Rule of Law and the public's faith in the impartiality of the third pillar of democracy.

Data Points on Judicial Corruption:

Massive Case Pendency (Catalyst):

- As per the National Judicial Data Grid (March 2026), total pending cases have crossed 5.2 crore.
- Over 62% of cases are pending for more than one year, creating incentives for speed money to influence listings and hearings.

WJP Rule of Law Index (2025):

- In the World Justice Project Rule of Law Index 2025, India scores below the global median in the Absence of Corruption in the Judiciary indicator.
- India's overall ranking remains around 77–79 out of 142 countries.

Transparency International Survey (2025):

- Around 20–25% of respondents interacting with district and sessions courts reported paying a bribe or using influence to process legal paperwork.

CVC Administrative Complaints (2025):

- The Central Vigilance Commission Annual Report 2025 recorded a 15% rise in complaints against court registry and clerical staff for illegal gratification related to filing and case numbering.

Bench Hunting Scam (2025)

- A High Court vigilance probe uncovered a racket where lawyers and registry officials manipulated case-listing systems to route cases to favorable benches.

Lower Judiciary Disciplinary Actions (2025):

- 12 judicial officers across three states were suspended or compulsorily retired following inquiries into disproportionate assets and questionable bail orders.

Constitutional Articles and Laws Associated

Constitutional Articles:

- Article 124(4) & 217: Provides the procedure for the removal of judges of the Supreme Court and High Courts on the grounds of proved misbehaviour or incapacity.
- Article 235: Grants the High Court administrative control over subordinate courts, including the power to take disciplinary action against judicial officers.
- Article 50: Directs the State to separate the judiciary from the executive, intended to prevent political corruption and ensure independence.
- Article 227: Power of superintendence over all courts by the High Court to ensure they function within the bounds of law and ethics.

Relevant Laws:

- Judges (Inquiry) Act, 1968: Regulates the procedure for the investigation and proof of misbehaviour of a judge of the Supreme Court or a High Court.
- Prevention of Corruption Act, 1988: Applies to judicial officers as public servants, though the Supreme Court's Veeraswami case (1991) mandated prior sanction from the Chief Justice of India before registering an FIR against a superior court judge.

Challenges Associated with Judicial Integrity:

- The Opaque Collegium System: Lack of transparency in the appointment of judges can lead to allegations of Uncle Judge syndrome or nepotism.
- Example: In 2024-25, several petitions in the Supreme Court challenged the non-disclosure of internal deliberations regarding judicial elevations, citing a lack of meritocratic clarity.
- Absence of an Internal Accountability Mechanism: There is no statutory body to investigate complaints against superior judges, leaving a vacuum between internal peer review and the extreme step of impeachment.
- Example: The long-pending Judicial Standards and Accountability Bill has not been enacted, leaving the 1997 Values of Judicial Life as mere voluntary guidelines.
- Post-Retirement Appointments: The quid pro quo fear where judges might favor the government in anticipation of lucrative administrative or political posts after retirement.
- Example: Recent appointments of retired judges to Rajya Sabha or as Governors within months of retirement have sparked ethical debates regarding judicial independence.
- Administrative Corruption in Registry: Middlemen and court clerks often act as conduits for bribery to manipulate bench hunting or case listings.

- Example: In late 2025, a High Court in North India suspended several registry staff members following an expose on money-for-listing scams.
- Shield of Contempt of Court: The threat of Contempt is often perceived as a barrier to honest criticism or whistleblowing regarding judicial misconduct.
- Example: The NCERT controversy itself highlights how mentioning corruption in textbooks can be viewed as scandalizing the court, leading to a blanket ban on educational content.

Way Ahead:

- Enactment of Judicial Accountability Law: Pass a robust Judicial Standards and Accountability Bill to create a permanent mechanism for investigating complaints against judges without undermining their independence.
- Digitization (Phase III of E-Courts): Fully automate case listing and filing through AI-driven systems to eliminate the human interface where bribery occurs in the registry.
- National Judicial Appointments Commission (NJAC) 2.0: Establish a transparent, bipartisan body for appointments that balances executive input with judicial primacy to end nepotism.
- Cooling-off Period: Mandate a 2-year cooling-off period for retired judges before they can accept any government-appointed positions.
- Transparent Assets Disclosure: Legally mandate the annual public disclosure of assets and liabilities for all judges of the Subordinate, High, and Supreme Courts.

Conclusion:

While the Supreme Court's ban on the NCERT textbook aims to preserve the Dignity of the Institution, the underlying challenge remains the gap between judicial immunity and institutional accountability. Addressing corruption through systemic reforms like E-Courts and a Formal Accountability Bill is essential to ensure that the temple of justice remains beyond reproach.

India's New Standards for Cloud, Data Centre, and Ethical AI

Context:

The Indian government, through the Bureau of Indian Standards (BIS), notified the nation's first-ever standards for cloud computing, data centre performance, and ethical AI deployment.

About India's New Standards for Cloud, Data Centre, and Ethical AI:

What it is?

- The notification under the BIS Rules, 2018, establishes a voluntary but formal framework for digital infrastructure. It marks India's shift toward a globally aligned digital ecosystem, ensuring that as conglomerates invest in AI-ready infrastructure, they adhere to recognized performance and ethical benchmarks.

Key Features and Summary of Notification:

1. International Alignment: The standards are directly derived from the ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) frameworks.
2. Standardized Cloud Terminology: Establishes common definitions and foundational norms for cloud systems to be used across finance, healthcare, and government services.
3. Cooling Efficiency Ratio (CER): Formalizes a methodology to measure how efficiently data centres remove heat relative to electrical energy consumed.
4. Ethical AI Design: Embeds ethical considerations—such as transparency and bias mitigation—directly into the design and deployment phase of AI systems.
5. Global Metric Adoption: Confirms that India will continue to use global benchmarks like PUE (Power Usage Effectiveness), WUE (Water Usage Effectiveness), and CUE (Carbon Usage Effectiveness).

6. Voluntary Status: Currently, the standards are not mandatory; compliance will only become compulsory if the government issues a Quality Control Order (QCO).
7. Infrastructure Roadmap: Aligns with NITI Aayog's projection of growing India's data centre capacity from 1.5 GW in 2025 to 8–10 GW by 2030.

Need for Standards in Cloud and Ethical AI:

- Interoperability in Critical Sectors: Standardized cloud terminology ensures seamless data exchange between different platforms in vital sectors.
- Example: The Ayushman Bharat Digital Mission (ABDM) requires standardized cloud frameworks to ensure patient records are accessible across diverse hospital cloud providers.
- Energy and Thermal Management: With AI workloads intensifying, data centres require massive power; standards prevent operational failures and environmental strain.
- Example: The Adani-EdgeConneX and Reliance data centre expansions in 2025-26 necessitate strict cooling metrics to manage the heat generated by high-density AI chips.
- Building Digital Trust: Ethical AI standards prevent biased algorithms from affecting citizens, which is crucial for public acceptance of automated governance.
- Example: As the Indian Judiciary explores AI for case summarization in 2026, ethical standards ensure that AI-judgments remain free from data-driven prejudices.
- Attracting Global Investment: Aligning with ISO-IEC makes India a trusted partner for global tech giants looking for standardized infrastructure.
- Example: Nvidia and Google's recent partnerships with Indian firms for AI sovereign clouds rely on India having a regulatory environment compatible with international norms.

Challenges Associated

- Pace of Technology vs. Regulation: AI and cyber threats evolve faster than standard-setting bodies can update their documentation.
- Example: The rise of Sovereign AI models in early 2026 has already challenged the initial definitions of cloud systems notified just months ago.
- Compliance Costs for Startups: High standards for data centres and AI ethics may increase the entry cost for smaller Indian startups.
- Example: While conglomerates can afford CER-compliant cooling, smaller players in the MeitY-backed AI startup hub may struggle.
- Security Integration Gap: Standards currently focus on performance and ethics; however, deep-rooted cybersecurity from the start remains a distinct challenge.
- Example: Recent ransomware attacks on Indian healthcare grids in late 2025 highlighted that performing data centres aren't always secure data centres.
- Resource Intensity (Power and Water): AI expansion is projected to raise data centres' share of India's electricity use from 0.8% to 3% by 2030.
- Example: In water-stressed regions like Bengaluru and Chennai, the high WUE (Water Usage Effectiveness) required for AI cooling is creating friction with local resource needs.

Way Ahead:

- Issuance of QCOs: The government should selectively issue Quality Control Orders for critical sectors (like finance and defense) to make these standards mandatory.
- Incentivizing Green Cooling: Provide subsidies for data centres that achieve high Cooling Efficiency Ratios (CER) through liquid cooling or renewable energy.
- Continuous Review Cycle: Establish a Living Standard mechanism where BIS reviews AI ethics annually to keep up with generative AI breakthroughs.
- Capacity Building: Launch nationwide training for IT auditors to certify firms against these new ISO-IEC-aligned Indian standards.
- Focus on Security: Transition from Governance to Secured Governance by adding a cybersecurity layer to the AI deployment framework.

Conclusion:

India's notification of cloud and AI standards is a landmark step in transforming the nation from a consumer of tech to a standard-setter in tech. By balancing high-performance data centre metrics with ethical AI guardrails, the government is ensuring that the digital backbone of Viksit Bharat is both efficient and trustworthy. This formalization provides the necessary stability for India to achieve its 10 GW data centre target by 2030.

Constitutional Morality

Context:

Senior advocate Kapil Sibal, in a 2026 dialogue with N. Ram, highlighted a complete breakdown of constitutional machinery in India, arguing that constitutional morality must transcend political friction to ensure justice without fear or favor.

About Constitutional Morality:

What is Constitutional Morality?

- Constitutional morality refers to the adherence to the core philosophies and spirit of the Constitution rather than just its literal text.
- It is the bridge between the law and ethics, requiring public officials and citizens to act in a way that preserves democratic institutions and protects individual liberties against the tyranny of the majority.

Key Features:

- Adherence to Constitutional Values: Prioritizing justice, liberty, equality, and fraternity over popular or religious sentiment.
- Institutional Restraint: Ensuring that no branch of government (Executive, Legislature, or Judiciary) oversteps its bounds.
- Protection of Minorities: Safeguarding the rights of marginalized groups from majoritarian impulses.
- Non-Arbitrariness: Guaranteeing that state actions are based on reasoned law rather than the whims of those in power.
- Public Conscience: Cultivating a civic culture where the habits of the people align with democratic norms.

Importance in Modern Times:

- Check on Majoritarianism: It prevents the rule of the many from becoming the oppression of the few.
- E.g. The Supreme Court's scrutiny of state anti-conversion laws ensures that individual choice in marriage isn't sacrificed to communal narratives.
- Upholding Rule of Law: It ensures that the law is applied equally, regardless of political affiliation.
- E.g. The granting of bail to activists and journalists by higher courts, despite stringent laws like the UAPA, reaffirms that liberty is the rule and jail is the exception.
- Ensuring Accountability: It mandates that the Executive remains answerable to the people and the law.
- E.g. The 2024 judgment striking down the Electoral Bond Scheme highlighted the need for transparency in political funding to maintain a level playing field.
- Protecting Dissent: It recognizes that a healthy democracy requires the voice of the Opposition and civil society.
- E.g. Court interventions regarding the suspension of a record number of Opposition MPs from Parliament in late 2023 emphasize the need for parliamentary deliberation.
- Adapting to Social Change: It allows the Constitution to be a living document that addresses modern ethical dilemmas.
- E.g. The recognition of the Right to Privacy and the decriminalization of consensual same-sex acts (Navtej Singh Johar case) reflect evolving moral standards.

Challenges Associated:

- Judicial Overreach vs. Underreach: The thin line between interpreting the law and legislating from the bench (or failing to act).
- E.g. Critics point to the sealed cover jurisprudence where the court accepts government info in secret, potentially undermining the principle of open justice.

- Executive Dominance: When a single party holds a massive majority, the legislature often becomes a rubber stamp.
- E.g. The passage of significant bills (like the new Criminal Codes or Telecommunications Act) through voice votes without extensive debate in 2023-24.
- Politicization of the Judiciary: Perceived bias in case listing or post-retirement appointments can erode trust.
- E.g. Public debates surrounding the master of roster powers, where specific sensitive cases are assigned to certain benches, leading to allegations of favoritism.
- Erosion of Federalism: Use of central agencies or Governors to interfere in state administration.
- E.g. Frequent friction between Governors and elected state governments in Tamil Nadu, Kerala, and West Bengal regarding the passage of state bills.
- Weaponization of Law: Using colonial-era or stringent laws to silence critics.
- E.g. The frequent use of Sedition (now under the new Nyaya Sanhita) and PMLA (Money Laundering) provisions to arrest political opponents before trials begin.

Way Ahead:

- Judicial Independence: Establish a transparent mechanism for judicial appointments and case listings to restore public faith.
- Strengthening Parliamentary Debate: Ensure that all major legislations undergo scrutiny by Standing Committees before being passed.
- Civic Education: Integrate constitutional values into school curricula (without the intent to intimidate specific institutions) to foster habits of democracy.
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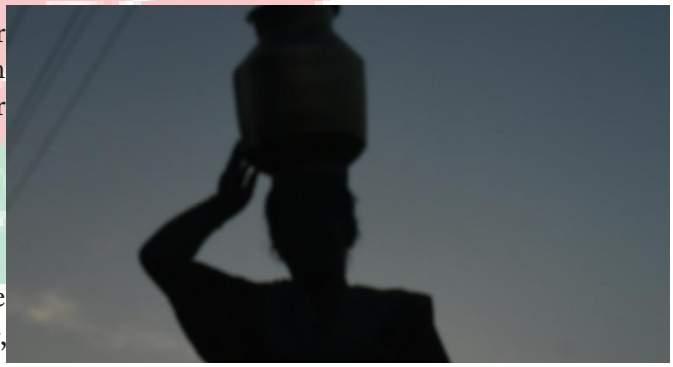
Women and Water Management

Context:

The article highlights World Water Day and its theme Water and Gender, emphasizing the critical need to transition women from mere water collectors to active leaders in water governance and decision-making.



About Women and Water Management:

What it is?

- Women and water management refers to the strategic involvement of women in the planning, distribution, and preservation of water resources.
  It shifts the perspective of women from being passive users or victims of water scarcity to being active stakeholders and decision-makers in formal governance, irrigation, and climate adaptation strategies.

Key Data & Statistics:

- Global Access Crisis: Approximately 2.1 billion people (25% of the global population) still live without access to safe drinking water.
- Economic Impact: Closing gender gaps in agriculture could increase productivity by up to 30% and reduce global hunger for 150 million people.
- Workforce Representation: Women constitute nearly 41% of the global agri-food workforce but face systemic barriers to land and credit.

- Climate Vulnerability: In India, annual economic losses due to climate change in agriculture range between billion and billion, disproportionately impacting women.

Role of Women in Water Management:

- Domestic Stewardship: Women are the primary managers of household water for drinking and hygiene.
- Example: They traditionally bear the burden of water collection and caring for those sickened by water-borne diseases.
- Agricultural Leadership: With the feminization of agriculture, women increasingly manage irrigation and crop water needs.
- Example: Large-scale male migration to cities leaves women in charge of critical tasks like livestock management and inland fisheries.
- Climate Adaptation Experts: Women play a vital role in adopting resilient seeds and managing water during extreme weather.
- Example: In projects like the Kerala Agri-value Chain Modernization, women lead the adoption of innovative practices to sustain food security during droughts.
- Watershed Management: Women contribute to the restoration and maintenance of local water bodies.
- Example: Programs like the REWARD initiative involve women in watershed practices to increase farming resilience and income.
- Policy & Technical Decision-Making: Trained women professionals are now entering formal water departments.
- Example: The Crossing Boundaries Project has produced over 200 female Master's and Ph.D. holders who now influence planning in South Asian water departments.

Initiatives Taken So Far:

- International Year of the Woman Farmer (2026): A UN declaration to recognize and empower women's vital contributions to global food systems.
- REWARD Program: A World Bank-supported initiative helping Indian states adopt improved watershed management with a focus on female participation.
- Crossing Boundaries Project: A South Asian collaboration (2002–2007) that built technical capacity for women in Integrated Water Resources Management (IWRM).
- National Mission for Sustainable Agriculture (NMSA): A Government of India scheme focused on making agriculture climate-resilient, giving special priority to women farmers.

Challenges to Women in Water Management:

- Exclusion from Governance: Women are frequently left out of formal leadership and funding structures.
- Example: Most water systems are governed by male-dominated hierarchies that ignore women's ground-level expertise.
- Limited Resource Rights: Lack of land ownership restricts women's access to water rights and credit.
- Example: Without land titles, women farmers struggle to secure the financing needed for advanced irrigation technology.
- Technical Knowledge Gap: There is often a disconnect between local community experience and macro-level scientific water data.
- Example: Studies show women's participation is often restricted to community programs rather than high-level technical planning.
- Climate Insecurity: Rising temperatures and retreating glaciers disproportionately increase the labor burden on women.
- Example: As groundwater levels decline, women must travel longer distances to fetch water, sacrificing education and safety.
- Social Barriers: Traditional gender roles often prevent women from being viewed as professionals in the water sector.
- Example: Even in South Asia, a lower percentage of women water professionals exists due to deep-seated gender-sensitive constraints.

Way Ahead:

- Rights-Based Approach: Transition to a governance model that views water access as a human right and mandates equitable female representation.
- Capacity Building: Scale up programs like the Crossing Boundaries Project to ensure women are technically equipped for macro-level planning.
- Gender-Inclusive Funding: Ensure that climate adaptation funds and agricultural credits are directly accessible to women-led collectives.
- Formalize Women's Roles: Governments must officially recognize women as the primary stakeholders in irrigation and disaster management policies.
- Data Integration: Use gender-disaggregated data to understand specifically how water scarcity affects women differently and tailor solutions accordingly.

Conclusion:

Water is the nucleus of a stable society, and its management cannot be effective while excluding half of the population. By bridging the gender gap in water governance, we not only fulfill human rights but also unlock massive economic productivity and climate resilience. Bringing women to the helm is no longer just a social goal—it is a survival necessity for a water-stressed planet.

Energy Statistics India 2026

Context:

The National Statistics Office (NSO) has released the 33rd edition of its annual publication, Energy Statistics India 2026, providing a comprehensive integrated dataset on India's energy reserves, production, and consumption.

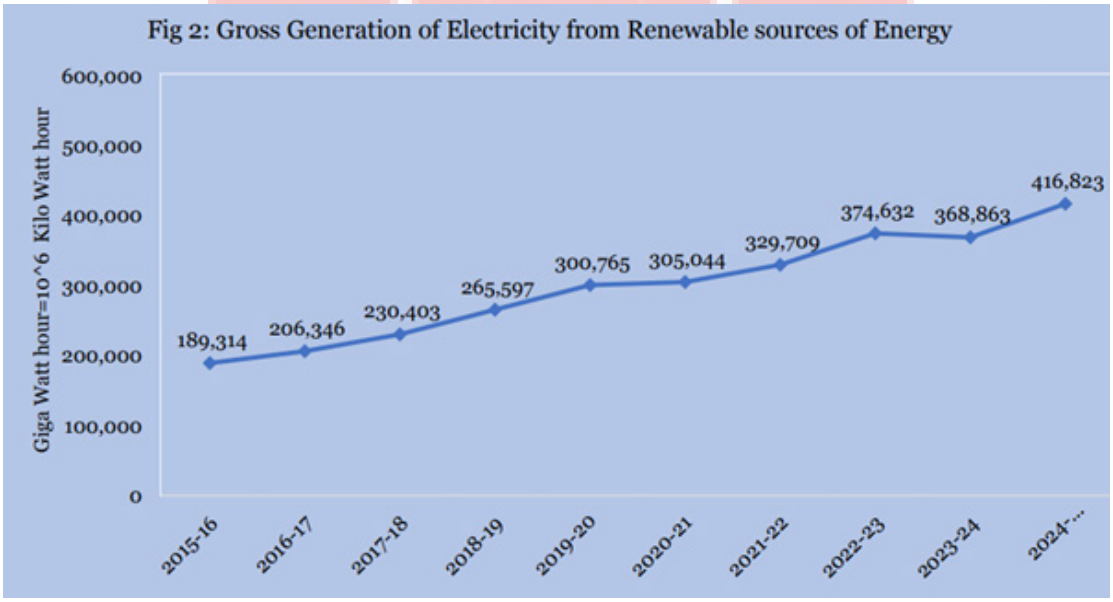
About Energy Statistics India 2026:

What it is?

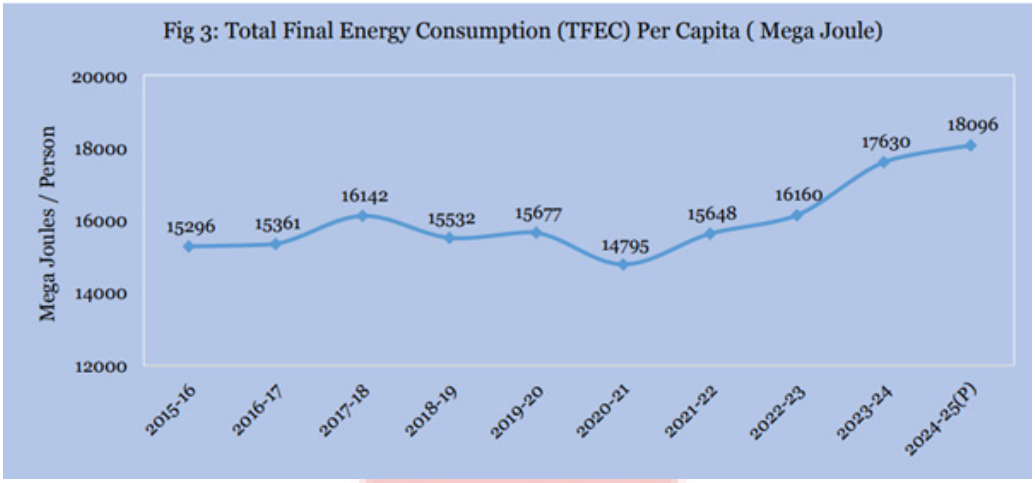
- Energy Statistics India 2026 is the annual publication of the National Statistics Office (NSO), under the Ministry of Statistics and Programme Implementation (MoSPI).
- It serves as a centralized repository of diverse information regarding the reserve, capacity, production, consumption, and trade of all energy commodities, including fossil fuels and renewables.

Key Highlights of the Report:

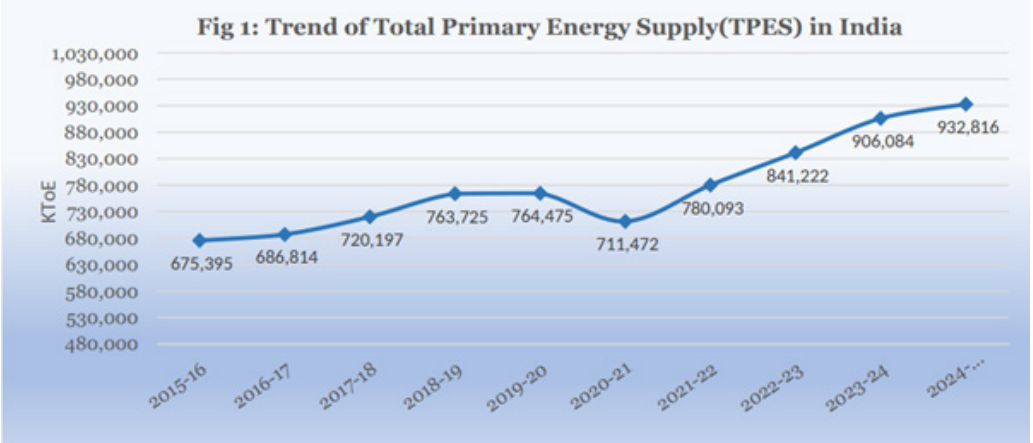
Fig 2: Gross Generation of Electricity from Renewable sources of Energy



- Primary Energy Supply: The Total Primary Energy Supply (TPES) stood at 9,32,816 KTOE in FY 2024-25, marking a growth of 2.95% over the previous year.



- Renewable Energy Potential: India's total RE potential reached 47,04,043 MW as of March 2025, with Solar Energy holding the highest share at approximately 71%.
- State-wise Concentration: Over 70% of RE potential is concentrated in six states: Rajasthan, Maharashtra, Gujarat, Andhra Pradesh, Karnataka, and Madhya Pradesh.
- Capacity & Generation: Installed RE capacity grew at a CAGR of 10.93% (2016–2025), while gross electricity generation from renewables reached 4,16,823 GWh in FY 2024-25.
- Consumption Trends: Per-capita energy consumption rose from 15,296 MJ in 2015-16 to 18,096 MJ in 2024-25.
- Efficiency Gains: Transmission and Distribution (T&D) losses were reduced from 22% in FY 2015-16 to 17% in FY 2024-25.
- Fossil Fuel Dominance: Coal remains the primary energy source, with its supply increasing to 5,52,315 KTOE in FY 2024-25.
- Financial Growth: Credit flow to the energy sector increased over sixfold, rising from 1,688 crore in 2021 to 10,325 crore in 2025.



Analysis:

Positive Aspects:

- Renewable Energy Momentum: The staggering growth of solar potential (from 7.48 lakh MW to 33.43 lakh MW in one year) underscores a successful shift toward green energy targets.
- Improved Efficiency: A 5% reduction in T&D losses indicates better grid management and reduced wastage during electricity utilization.
- Financial Robustness: The sixfold increase in credit flow suggests high investor confidence and aggressive infrastructure financing in the energy sector.
- Enhanced Data Transparency: Incorporating previously missing data, such as international marine bunkers and e-Auction coal consumption, allows for more accurate policy-making.

Challenges Yet to Tackle:

- Heavy Coal Dependency: Coal remains the dominant source, with supply growing to 5,52,315 KTOE, making the transition to net-zero challenging.

- Geographical Imbalance: Over 70% of RE potential is limited to just six states, potentially leading to regional energy security disparities.
- Rising Energy Demand: The 30.41% surge in Total Final Consumption (TFC) since 2015-16 puts immense pressure on existing supply chains.
- Persistent Grid Losses: Despite improvements, a 17% T&D loss is still significant compared to global efficiency standards.
- Rising Imports/Trade Reliance: Consistent growth in Crude Oil and Natural Gas supply indicates a continued high reliance on imports for these commodities.

Way Ahead:

- Decentralize RE Potential: Focus on harnessing renewable resources in states beyond the top six to ensure balanced national energy growth.
- Further T&D Reforms: Implement advanced smart-grid technologies to bring the 17% distribution losses down to single digits.
- Diversify Energy Mix: Accelerate the transition from coal (the dominant source) to natural gas and hydrogen to meet climate commitments.
- Leverage ASI Data: Use the newly integrated Annual Survey of Industries (ASI) data to create targeted energy-efficiency programs for high-consumption industrial sub-sectors.
- Sustain Credit Momentum: Continue facilitating high credit flows (currently 10,325 crore) specifically toward emerging green technologies and storage solutions.

Conclusion:

Energy Statistics India 2026 paints a picture of an economy successfully scaling its renewable capacity and financial investment while battling a persistent reliance on coal. While efficiency gains and solar potential are impressive, the concentration of resources and rising overall demand remain critical hurdles. Ultimately, the report provides the essential data roadmap required to navigate India's complex transition toward a sustainable energy future.

Chokramudi Hills

Context:

The Chokramudi hills in Kerala, previously a hub for illegal encroachment and construction, have been reclaimed by the government and transformed into a thriving natural habitat.

- This restoration has led to the return of the endangered Nilgiri tahr and the revival of the rare Neelakurinji

About Chokramudi Hills:

What it is?

- Chokramudi is one of the highest and most ecologically fragile peaks in the Munnar region. It is characterized by high-altitude shola-grassland ecosystems that are vital for the hydrology and biodiversity of the Western Ghats.
- Located In: Bison Valley Panchayat, near Munnar in the Idukki district of Kerala.

Key Features:

- Strategic Elevation: Being one of the tallest peaks in the area, it offers a distinct microclimate suitable for high-altitude flora and fauna.
- Neelakurinji Habitat: The hills are a major site for the mass flowering of Strobilanthes kunthiana (Neelakurinji), which blooms once every 12 years.
- Eravikulam Link: Its proximity to the Eravikulam National Park makes it a natural corridor for the movement of mountain ungulates.
- Grassland Ecosystem: The peak is covered with Montane Grasslands, which act as a sponge for rainwater, feeding downstream areas like Bison Valley.

About Nilgiri Tahr: (Nilgiritragus hylocrius)

What it is?

- The Nilgiri tahr is a sturdy, mountain goat-like ungulate. It is the State Animal of Tamil Nadu and is the only species of caprine (goat-antelope) found in tropical India.

Habitat:

- Open Montane Grasslands: They prefer high-altitude grasslands interspersed with shola forests (stunted tropical montane forests).
- Cliffs and Crags: They are exceptionally agile and live on steep, rocky cliffs which they use as escape terrain to flee from predators like leopards and tigers.
- Geographic Range: Endemic to the Western Ghats, primarily restricted to a narrow stretch between the Nilgiri Hills and the Kanyakumari hills.

IUCN Status: Endangered (EN).

Key Characters:

- Sexual Dimorphism: Males are larger and darker than females. Adult males develop a distinct light-colored patch on their backs, earning them the name Saddlebacks.
- Curved Horns: Both sexes possess backward-curved horns, though they are larger and more robust in males.
- Social Structure: They live in social groups called droves, typically consisting of several females and their young, led by a dominant male.
- Bristly Mane: Adult males feature a short, dark, bristly mane along the back of the neck and shoulders.

Melting Glaciers Greater Threat

Context:

A new ISRO study published in NPJ Natural Hazards reveals that the August 2025 Dharali flash flood in Uttarakhand was triggered by the collapse of an exposed ice patch on the Srikanta Glacier.

- The findings shift the focus of disaster monitoring from large glacial lakes to smaller, overlooked instabilities in the cryosphere caused by rapid deglaciation.

About Melting Glaciers Greater Threat:

What it is?

- Glacier melting (deglaciation) refers to the reduction in the volume and mass of a glacier's ice due to ablation (melting and sublimation) outstripping the accumulation of new snow. As temperatures rise, the protective layer of seasonal snow and firn (intermediate ice) thins, exposing older, unstable ice patches to the elements.

Data and Facts on Glacier Melting:

- Accelerated Rate: Himalayan glaciers have been losing ice at an average rate of nearly 0.5 meters of vertical height per year since 2000.
- Global Warming Impact: The Hindu Kush Himalaya (HKH) region is warming at a rate higher than the global average, leading to a projected loss of up to 75% of glacier volume by 2100.
- Water Insecurity: Over 1.3 billion people depend on the 10 major rivers originating from the Himalayas; melting glaciers initially increase flow but lead to long-term water scarcity.
- Increased Hazard Frequency: The frequency of Glacial Lake Outburst Floods (GLOFs) and ice-patch collapses has tripled in the last two decades.

Factors Contributing to Glacier Melting:

- Rising Atmospheric Temperatures: Global warming reduces the insulating snow cover, exposing the darker ice beneath.
- Example: The Srikanta Glacier saw its firn cover thin significantly before the 2025 flood due to record summer temperatures.
- Black Carbon Deposition: Pollutants from biomass burning and vehicle emissions settle on glaciers, absorbing sunlight and accelerating melt.
- Example: High levels of black carbon have been recorded near the Gangotri Glacier, leading to faster recession than in neighboring regions.
- Changes in Precipitation Patterns: Shift from snowfall to rainfall at high altitudes prevents the recharging of glaciers.
- Example: Reduced winter snowfall in Ladakh has led to the drying up of several small peripheral glaciers that local farmers rely on.
- Infrastructural Development: Tunnelling and road construction in fragile eco-zones create localized heat islands and vibrations.
- Example: The Char Dham road project in Uttarakhand has faced criticism for increasing slope instability near glaciated zones.
- Nivation and Geomorphic Changes: Alternate freezing and thawing erode the ground beneath snowbanks, creating nivation hollows that eventually collapse.
- Example: The Dharali flash flood was specifically linked to the collapse of an ice patch within such a hollow on steep northeast-facing slopes.

Initiatives Taken:

- National Mission for Sustaining the Himalayan Ecosystem (NMSHE): A part of India's Climate Change Action Plan focused on monitoring forest cover and glacier health.

- ISRO Satellite Monitoring: Use of high-resolution imagery (like RISAT and Cartosat) to map over 9,500 Himalayan glaciers and track GLOF risks.
- Indo-Swiss Collaboration: Joint research programs (CAPH) aimed at improving climate resilience and glaciology expertise in the Indian Himalayas.
- Early Warning Systems (EWS): Installation of sensor-based EWS in high-risk zones like the Rishiganga and Dhauliganga valleys following the 2021 disaster.

Challenges Associated:

- Remote and Rugged Terrain: Difficulty in installing and maintaining ground-based monitoring equipment at high altitudes.
- Example: Reaching the Srikanta peak for manual data verification is hazardous due to its avalanche-prone 6,133 m height.
- Lack of Historical Data: Incomplete records make it difficult to predict black swan events like ice-patch collapses.
- Example: Until the 2025 Dharali event, ice-patch collapse was an under-recognized hazard compared to GLOFs.
- Transboundary Management: Glaciers span borders (India, China, Pakistan), making data sharing and coordinated disaster response difficult.
- Example: Tensions along the LAC often limit the ability of scientists to conduct comprehensive field studies on transboundary glaciers.
- Socio-Economic Vulnerability: Communities live in narrow valleys where even a small flood can be catastrophic.
- Example: Dharali village is split by the Khir Gad stream, making its residents highly vulnerable to sudden surges from the glacier above.
- Unpredictable Micro-Climates: High-altitude weather can change in minutes, bypassing regional forecasts.
- Example: The 2021 Chamoli rock-ice avalanche occurred on a clear day, catching authorities off-guard as there was no heavy rain to signal danger.

Way Ahead:

1. Integrated Monitoring: Combine satellite data with ground-based sensors to monitor smaller nivation hollows and ice patches.
2. Community-Led Warning: Train local populations in high-altitude villages to recognize landscape signals, such as the sudden exposure of dark ice.
3. Climate-Resilient Infrastructure: Enforce strict environmental audits for all construction projects within 50 km of the glaciated line.
4. Regional Cooperation: Establish a Himalayan Council for real-time data sharing on glacier health across neighboring countries.
5. Nivation Mapping: Systematically identify and monitor north-facing steep slopes as geomorphologically sensitive zones.

Conclusion:

The Dharali disaster proves that Himalayan hazards are evolving beyond traditional glacial lake outbursts to more subtle cryospheric collapses. As deglaciation exposes unstable ice patches, the ridge-to-valley monitoring approach must become the new standard for disaster risk reduction. Protecting these fragile ecosystems is no longer just an environmental goal but a critical necessity for the safety of millions living downstream

Iran

Context:

Reports claiming the death of Iran's Supreme Leader Ayatollah Ali Khamenei during U.S.–Israel strikes have intensified global attention on Iran's political future and regional stability.

About Iran:

What it is?

- Iran (officially the Islamic Republic of Iran) is a major West Asian country with a long civilizational history dating back to the ancient Persian Empire.
- Since the 1979 Islamic Revolution, it has functioned as an Islamic republic combining republican institutions with clerical authority, where the Supreme Leader holds ultimate power.

Location:

- Located in Southwestern Asia (West Asia / Middle East).
- Strategically positioned between Central Asia, South Asia, and the Middle East, overlooking key maritime routes in the Persian Gulf.

Capital: Tehran

Bordering Nations:

- Azerbaijan, Armenia, Turkmenistan, Afghanistan, Pakistan, Turkey, and Iraq.

It also has coastlines along:

- Caspian Sea, Persian Gulf and Gulf of Oman.

History:

- Ancient centre of the Persian (Achaemenid) Empire beginning around 550 BCE.
- Influenced by Arab conquest and the spread of Islam in the 7th century CE.
- Safavid dynasty (16th century) established Twelver Shi'ism as the state religion.
- Pahlavi monarchy (1925–1979) attempted modernization but was overthrown during the 1979 Islamic Revolution led by Ayatollah Khomeini.
- Since then, Iran has emerged as a major regional power with significant influence through the Islamic Revolutionary Guard Corps (IRGC) and its regional alliances.

Key Features:

- Dominated by a central arid plateau surrounded by mountain ranges.
- Zagros Mountains: Stretch northwest–southeast; major barrier and resource region.

- Alborz Mountains: Located near the Caspian Sea; includes Mount Damavand, Iran's highest peak.
- Large deserts: Dasht-e Kavir and Dasht-e Lut.
- Highly seismic region with frequent earthquakes due to tectonic activity.
- Important water bodies include Lake Urmia and rivers like Karun and Sefid.

Significance:

- Controls access near the Strait of Hormuz, through which a major share of global oil trade passes.
- Possesses vast reserves of oil and natural gas, influencing global energy markets.

Lebanon

Context:

Lebanon has been drawn deeper into the Middle East conflict after the militant group Hezbollah launched missiles toward Israel, prompting large-scale retaliatory strikes by Israel Defense Forces.

About Lebanon:

What it is?

- Lebanon is a small sovereign country in the Middle East located on the eastern shore of the Mediterranean Sea.
- It has historically served as a commercial and cultural crossroads between the Arab world, Europe, and Asia.

Location:

- Lebanon lies in the Levant region of West Asia along the eastern Mediterranean coast.
- Capital: The capital city of Lebanon is Beirut.
- Neighbouring countries: Lebanon shares borders with:
- Syria, Israel, and Mediterranean Sea

Features:

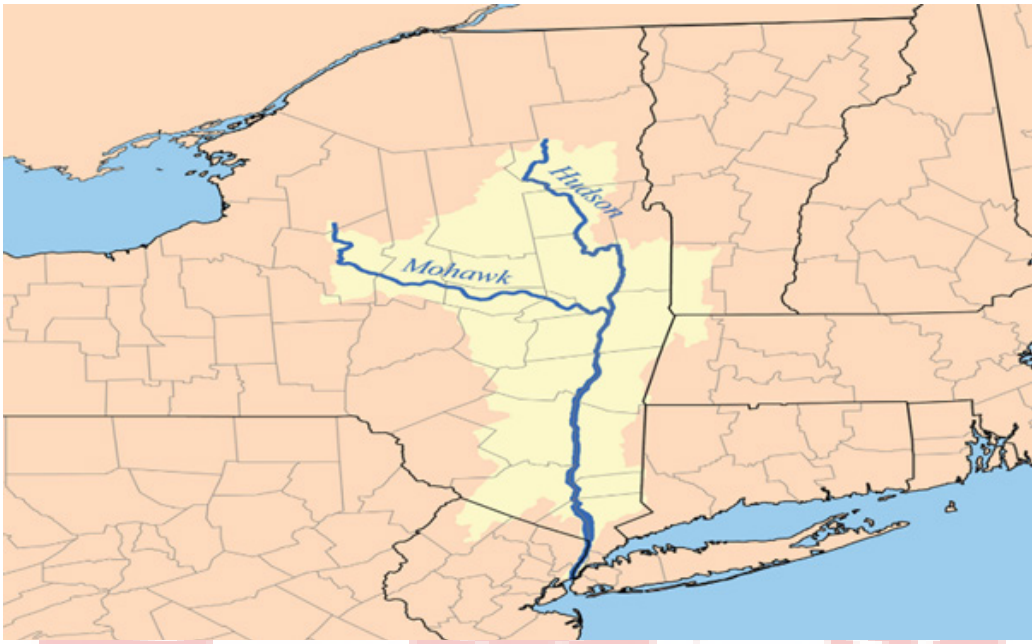
- Lebanon has diverse mountainous terrain and four major physiographic regions:
- Coastal Plain – A narrow fertile strip along the Mediterranean coast containing major cities like Beirut and Sidon.
- Lebanon Mountains (Mount Lebanon Range) – A prominent limestone mountain chain running parallel to the coast, famous for the Cedars of Lebanon forests.
- Bekaa Valley – A fertile agricultural valley between the Lebanon and Anti-Lebanon mountain ranges; it forms part of the Great Rift Valley system.
- Anti-Lebanon Mountains and Mount Hermon – Eastern mountain chain forming a natural border with Syria.

- Highly mountainous terrain, making internal travel difficult.
- One of the most densely populated Mediterranean countries.

Hudson River

Context:

A Cessna 172 aircraft crashed into the Hudson River near the Newburgh–Beacon Bridge, drawing national attention to the river corridor.



About Hudson River:

What it is?

- The Hudson River is a major river in the state of New York, United States, and one of the country's most historically and economically significant waterways.

Location:

- Flows almost entirely within New York State.
- Forms part of the boundary between New York and New Jersey in its final stretch.
- Connects inland New York to the Atlantic Ocean via Upper New York Bay.

Origin:

- Originates in the Adirondack Mountains near Mount Marcy, the highest peak in New York.
- Lake Tear of the Clouds is regarded as the source of its main headstream (Opalescent River).
- Mouth: Empties into Upper New York Bay at the Battery in New York City.

Key Features:

- Length (315 miles / 507 km): It flows over 500 km from the Adirondacks to New York Bay, making it one of the longest rivers in the northeastern U.S.
- Tidal River: Ocean tides influence water levels and currents up to Troy, showing its strong connection to the Atlantic.
- Drowned Valley: Its lower stretch is a glacially carved valley flooded by rising sea levels, giving it fjord-like depth and width.
- Major Tributary – Mohawk River: The Mohawk links the Hudson to the Erie Canal and Great Lakes, forming a historic inland trade corridor.
- Navigability: Deep channels allow large oceangoing vessels to reach Albany throughout the year, supporting commercial shipping.

Durand Line

Context:

Renewed military clashes between Pakistan and Afghanistan have intensified tensions across the Durand Line, signalling a deep rupture in political and military ties.

About Durand Line:

What it is?

- The Durand Line is a 2,600-km international land boundary separating Afghanistan and Pakistan, originally drawn in 1893 to demarcate spheres of influence between British India and the Emirate of Afghanistan.

Location:

- Extends from the Iran–Afghanistan border in the west to the China–Pakistan border in the east.
- Passes through rugged terrains including the Karakoram Range, Spīn Ghar (White Mountains), and the historic Khyber Pass.
- Divides Pashtun and Baloch tribal regions across both countries.

History:

- Established in 1893 under an agreement between Sir Henry Mortimer Durand (British India) and Emir Abdur Rahman Khan of Afghanistan.
- Formalised through joint surveys between 1894–1896.
- Reaffirmed in the 1919 Treaty of Rawalpindi after the Third Anglo-Afghan War.
- After Pakistan's creation in 1947, it inherited the border agreement, but Afghanistan refused to recognise it as a legitimate international boundary.
- Since 1947, the issue has remained contentious, particularly over Pashtun identity and territorial claims.

Key Features:

- Colonial Legacy Border: Drawn during the Great Game between Britain and Russia to secure British India's northwest frontier.
- Ethnic Division: Splits Pashtun and Baloch communities across two states, fueling cross-border militancy and identity politics.
- Strategic Corridor: Includes the Wakhan Corridor, created as a buffer between British India and Tsarist Russia.
- Militarised Frontier: Pakistan began fencing the border in 2017, intensifying friction with Afghanistan.
- Geographically Rugged: Traverses deserts, mountains, and tribal belts, complicating border management.

Significance:

- The line remains central to Pakistan–Afghanistan tensions, especially regarding the Tehrik-e-Taliban Pakistan (TTP) and cross-border militancy.
- Historically tied to Pakistan's strategic depth policy in Afghanistan, which has now backfired amid Taliban-Pakistan tensions.

Chapter-
4

ENVIRONMENT

Solid Waste Management (SWM) Rules, 2026

Context:

The Ministry of Environment, Forest and Climate Change (MoEFCC) has notified the Solid Waste Management (SWM) Rules, 2026, which will replace the existing 2016 framework starting April 1, 2026.

About Solid Waste Management (SWM) Rules, 2026:

What it is?

- The SWM Rules, 2026, are a comprehensive regulatory framework designed to modernize India's waste management system. They shift the focus from a collect-and-dump model to a circular economy approach that prioritizes resource recovery, recycling, and accountability for all waste generators.
- Notifying Authority: Ministry of Environment, Forest and Climate Change (MoEFCC).
- Legal Basis: Issued under the Environment (Protection) Act, 1986.
- Predecessor: These rules supersede the Solid Waste Management Rules, 2016.
- Aim: The primary objective is to achieve Zero Waste to Landfill by strengthening source segregation, enhancing the accountability of bulk generators, and leveraging digital governance to track waste lifecycles.

Key Features of the New Rules:

Mandatory Four-Stream Segregation: Waste must be separated at the source into four categories:

1. Wet Waste: (Organic/Food) to be composted or bio-methanated.
2. Dry Waste: (Plastic, paper, metal) to be sent to Material Recovery Facilities (MRFs).
3. Sanitary Waste: (Diapers, napkins) to be wrapped securely for separate handling.
4. Special Care Waste: (Domestic hazardous items like paint, bulbs, medicines).

- Extended Bulk Waste Generator Responsibility (EBWGR): Entities generating more than100 kg/day, consuming more than 40,000 liters of water/day, or having more than 20,000 sq.m. area must process organic waste on-site or obtain EBWGR certificates.
- Digital Governance: A Centralised Online Portal will track waste from generation to final disposal, including registrations, reporting, and audits.
- Polluter Pays Principle: Introduction of Environmental Compensation for non-compliance, such as operating without registration or submitting false data.
- Refuse-Derived Fuel (RDF) Promotion: Mandates industries (like cement plants) to increase RDF substitution from 5% to 15% over six years.
- Landfill & Legacy Waste: Strict restrictions limit landfills to non-recyclable/inert waste only. It mandates time-bound biomining and bioremediation of existing legacy dumpsites.
- Special Provisions for Hilly/Island Regions: Local bodies can levy user fees on tourists and regulate inflow based on waste processing capacity.
- Land Allocation: Graded criteria for faster land allocation for waste processing units and mandatory buffer zones for large facilities.

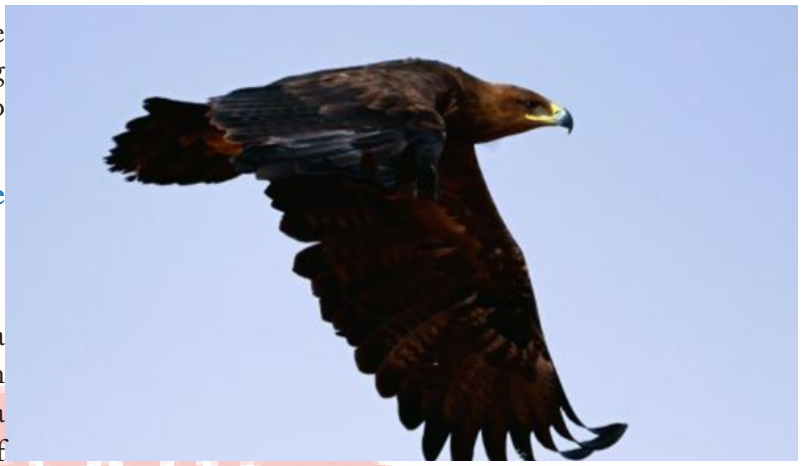
Significance:

- Reduces methane emissions from landfills and prevents soil/water contamination through scientific remediation of legacy sites.
- Promotes a circular economy by turning waste into wealth (compost, energy, and recycled materials).

Global Action Plan for the Steppe Eagle

Context:

The Global Action Plan (GAP) for the Steppe Eagle (2026–2035) was officially adopted during CMS COP15, which concluded, in Campo Grande, Brazil.



About Global Action Plan for the Steppe Eagle:

What It Is?

- The Steppe Eagle Global Action Plan is a science-based international conservation framework designed to provide a coordinated strategy for the survival of the Endangered steppe eagle (Aquila nipalensis).
- It serves as a roadmap for range states to mitigate anthropogenic threats and stabilize the species' population.

Aim:

- The central vision is to halt and reverse the decline of the steppe eagle by delivering innovative, science-based conservation actions and community engagement across its entire migratory range.

Key Features (6 Strategic Goals)

The plan is built around 49 specific actions categorized under six primary goals:

1. Energy Infrastructure: Reducing mortality caused by electrocution and collisions with powerlines and wind farms.
2. Take and Trade: Significantly reducing both legal and illegal killing, trapping, and trade (including online markets).
3. Poisoning Prevention: Understanding and mitigating the impact of unintentional poisoning from pesticides, NSAIDs (like Diclofenac), and heavy metals.
4. Habitat Restoration: Attaining and maintaining high-quality habitats and stable prey populations across the breeding and wintering grounds.
5. Knowledge Gap Closure: Increasing international research collaboration to better understand movement patterns and spatial hotspots.
6. Effective Implementation: Ensuring all range states endorse the plan through outreach, stakeholder engagement, and community involvement.

About Steppe Eagle:

What It Is?

- The Steppe Eagle is a large, migratory bird of prey belonging to the family Accipitridae. It is a quintessential raptor of the open plains and is known for its impressive transcontinental migrations, often traveling thousands of kilometers between its breeding and wintering grounds.

IUCN Status: Endangered

Habitat:

- Global: It breeds in the vast, open steppes, semi-deserts, and montane grasslands of the Palearctic region, stretching from Romania and Russia through Kazakhstan to Mongolia and China.
- India: It is frequently spotted in open habitats such as grasslands, semi-arid regions, agricultural fields, and even garbage dumps in states like Rajasthan, Gujarat, and Haryana.
- The Thar Desert has emerged as a critical lifeline for these raptors, with the Jorbeer Conservation Reserve and Desert National Park now included in the Global Action Plan (2026–2035).

Characters:

- Plumage: Adults are dark brown with a pale golden nape; juveniles show a broad white band under the wings.
- Size: Large, heavy eagle with a wingspan of 7–2.1 m and a long gape extending beyond the eye.
- Feeding: Hunts small mammals but also scavenges at carcasses and landfills.
- Migration: A soaring migrant that uses thermal currents; an important species of the Central Asian Flyway (CAF).

The Microplastic Problem

Context:

A new study by has revealed that while microplastic abundance on Chennai's beaches is lower than global averages, the high concentration of nylon fibers poses a severe ecological risk.

About The Microplastic Problem:

What it is?

- Microplastics are plastic particles smaller than 5 mm in diameter. They are categorized into primary microplastics (purposely manufactured small, like microbeads in scrubs) and secondary microplastics (resulting from the breakdown of larger plastic items like bottles, nets, and synthetic clothes).

Microplastics in India – Key Facts:

1. Airborne Exposure in Cities: Microplastics form ~5% of PM2.5/PM10 in cities like Delhi & Kolkata (~14.2 $\mu g/m^3$), with lifetime inhalation ~3 grams per person.
2. High Aquatic Pollution Load: India releases ~3.9 lakh tonnes of microplastics annually into waterbodies, ranking among top global contributors.
3. Food Chain Contamination: 100% of sampled sea salt and most seafood contain microplastics (13–27 particles per 100g), indicating widespread ingestion risk.
4. Human Ingestion Levels: Urban Indians may ingest ~5–7 grams annually—equivalent to consuming a credit card worth of plastic regularly.

Sources of Microplastics in India:

- Fishing Industry: Abandoned or damaged nylon nets and ropes shed fragments directly into the sea.
- Example: In Chennai, nylon fibers from fishing gear were identified as the most harmful persistent pollutant.
- Synthetic Textiles: Washing clothes like polyester and nylon releases thousands of microfibers per wash into the drainage system.
- Example: Urban sewage in cities like Mumbai and Chennai serves as a direct conveyor belt for these fibers to reach the ocean.
- Mismanaged Plastic Waste: Improper disposal of single-use plastics leads to their fragmentation under UV radiation and wave action.
- Example: Discarded PET bottles and HDPE bags on Mamallapuram beach break down into secondary microplastics over time.
- Personal Care Products: Microbeads in exfoliating soaps and toothpaste bypass traditional filtration systems.
- Example: These primary microplastics are frequently detected in the riverine systems of the Ganges and Yamuna before they reach the coast.

Initiatives Taken So Far:

- Single-Use Plastic Ban (2022): India banned 19 items of high-littering potential to reduce the source of secondary microplastics.
- Plastic Waste Management Rules (Amended 2021/2024): Mandatory Extended Producer Responsibility (EPR) for plastic packaging to ensure recycling.
- Swachh Sagar, Surakshit Sagar: A massive coastal cleanup campaign covering 75 beaches to remove plastic litter before it fragments.
- National Marine Litter Policy: A draft framework aimed at coordinating between states to monitor and reduce land-based sources of marine pollution.

Challenges Associated with Microplastics

- Detection Difficulty: Traditional monitoring focuses on counts, which ignores the chemical toxicity of specific shapes like fibers.
- Example: Chennai's low count masked the high danger of nylon fibers which are more toxic than standard beads.
- Bioaccumulation: Microplastics move up the food chain, concentrating toxins in top predators, including humans.
- Example: Consumption of contaminated shellfish in Kerala has been linked to potential hormonal and immune system disruptions.
- Transboundary Nature: Ocean currents carry microplastics far from their original source, making local regulation difficult.
- Example: Plastic waste from neighboring maritime nations often washes up on the Andaman and Nicobar Islands.
- Lack of Alternatives: Many industries, like fishing, lack affordable, biodegradable alternatives to high-strength nylon.
- Example: Fishermen continue using plastic nets because biodegradable hemp or cotton is more expensive and less durable.

Way Ahead for India:

- Mandatory Washing Machine Filters: Legislate the inclusion of microfiber filters in all new washing machines to trap synthetic lint.
- Biodegradable Fishing Gear: Provide subsidies for the development and adoption of compostable fishing nets and ropes.
- Shift to Risk-Based Monitoring: Update FSSAI and environmental standards to evaluate polymer type and shape rather than just particle count.
- Enhanced STP Infrastructure: Upgrade urban sewage plants with tertiary filtration (sand filters or membranes) specifically to catch microplastics.
- Public Awareness & Labeling: Introduce Plastic Footprint labeling on clothing to inform consumers about synthetic fiber shedding.

Conclusion:

Microplastics represent an invisible but existential threat to India's blue economy and public health. While abundance levels in cities like Chennai may seem manageable today, the persistence and toxicity of fibers like nylon demand immediate policy intervention. Only a combination of technological upgrades and circular economy practices can prevent these microscopic toxins from permanently altering our coastal ecosystems.

Chokramudi Hills

Context:

The Chokramudi hills in Kerala, previously a hub for illegal encroachment and construction, have been reclaimed by the government and transformed into a thriving natural habitat.

- This restoration has led to the return of the endangered Nilgiri tahr and the revival of the rare Neelakurinji

About Chokramudi Hills:

What it is?

- Chokramudi is one of the highest and most ecologically fragile peaks in the Munnar region. It is characterized by high-altitude shola-grassland ecosystems that are vital for the hydrology and biodiversity of the Western Ghats.
- Located In: Bison Valley Panchayat, near Munnar in the Idukki district of Kerala.

Key Features:

- Strategic Elevation: Being one of the tallest peaks in the area, it offers a distinct microclimate suitable for high-altitude flora and fauna.
- Neelakurinji Habitat: The hills are a major site for the mass flowering of Strobilanthes kunthiana (Neelakurinji), which blooms once every 12 years.
- Eravikulam Link: Its proximity to the Eravikulam National Park makes it a natural corridor for the movement of mountain ungulates.
- Grassland Ecosystem: The peak is covered with Montane Grasslands, which act as a sponge for rainwater, feeding downstream areas like Bison Valley.

About Nilgiri Tahr: (Nilgiritragus hylocrius)

What it is?

- The Nilgiri tahr is a sturdy, mountain goat-like ungulate. It is the State Animal of Tamil Nadu and is the only species of caprine (goat-antelope) found in tropical India.

Habitat:

- Open Montane Grasslands: They prefer high-altitude grasslands interspersed with shola forests (stunted tropical montane forests).
- Cliffs and Crags: They are exceptionally agile and live on steep, rocky cliffs which they use as escape terrain to flee from predators like leopards and tigers.
- Geographic Range: Endemic to the Western Ghats, primarily restricted to a narrow stretch between the Nilgiri Hills and the Kanyakumari hills.
- IUCN Status: Endangered (EN).

Key Characters:

- Sexual Dimorphism: Males are larger and darker than females. Adult males develop a distinct light-colored patch on their backs, earning them the name Saddlebacks.
- Curved Horns: Both sexes possess backward-curved horns, though they are larger and more robust in males.
- Social Structure: They live in social groups called droves, typically consisting of several females and their young, led by a dominant male.
- Bristly Mane: Adult males feature a short, dark, bristly mane along the back of the neck and shoulders.

Blur Over India's Carbon Credit Plan: CCUS vs Carbon Farming Debate

Context:

Union Budget 2026 announced a 20,000 crore carbon credit program based on the DST's CCUS roadmap.

- This has created confusion between its focus on industrial decarbonisation and the parallel narrative of farmer income through soil-based carbon credits.

About Blur Over India's Carbon Credit Plan: CCUS vs Carbon Farming Debate:

What CCUS Targets?

- The Carbon Capture, Utilization, and Storage (CCUS) initiative specifically targets hard-to-abate industries

where emissions are concentrated and technically difficult to eliminate through renewable energy The primary sectors identified for the large-scale deployment of these technologies include:

- Power and Refineries.
- Steel and Cement.
- Chemicals.

Why Agriculture is Not Included in CCUS?

- Diffuse Emission Sources: Unlike industrial point-source emissions from factory flues, agricultural emissions are spread across vast landscapes.
- Biological Mediation: Emissions in agriculture (primarily methane and nitrous oxide) are biologically mediated, making them unsuitable for mechanical capture technology.
- Technological Mismatch: CCUS is defined by capturing CO2 from concentrated gas streams, whereas agricultural solutions focus on drawing down existing atmospheric CO2.
- Strategic Distinction: The DST roadmap draws a clear line between preventing new industrial emissions (CCUS) and Carbon Dioxide Removal (CDR) through nature-based solutions like soil sequestration.

Key Opportunities:

- Industrial Decarbonization: CCUS provides a critical pillar for cleaning up sectors responsible for a quarter of India's emissions.
- Example: The 20,000 crore investment aims to capture CO2 from factories and either use it industrially or store it underground.
- New Rural Income Streams: Creating a trusted domestic carbon market for agriculture could unlock significant economic benefits for farmers.
- Example: Farmers can earn credits by adopting regenerative practices that turn farms into climate solutions.
- Enhanced Soil Carbon Sequestration: India's vast agricultural lands hold immense potential to act as a carbon sink.
- Example: Practices such as agroforestry and biochar application can effectively draw down atmospheric CO2.
- Growth of Voluntary Carbon Markets: There is a rising global and domestic demand for nature-based carbon credits.
- Example: Private sector initiatives are already piloting models that compensate farmers for enhancing soil organic carbon.
- Climate Resilient Farming: Transitioning to carbon-friendly practices aligns with long-term goals for soil health.
- Example: The Agriculture Ministry has been exploring climate-resilient farming as a logical next step to traditional soil management.

Challenges Associated:

- Communication Gaps: The use of the familiar term carbon credit in the Budget has blurred the lines between distinct industrial and agricultural concepts.
- Example: Conflicting reports have led the public to expect a funded farmer scheme from an outlay actually earmarked for heavy industry.
- High Implementation Costs: CCUS is a tech-heavy and expensive initiative that requires massive capital investment.
- Example: The government has bet 20,000 crore over five years just to begin large-scale industrial deployment.
- Monitoring and Verification: Agricultural emissions are difficult to measure accurately compared to concentrated industrial sources.
- Example: The soil narrative requires a robust institutional framework to be credible, which is currently distinct from the industrial roadmap.
- Policy Conflation: Existing frameworks do not clearly demarcate between preventing new emissions and removing existing atmospheric CO2.
- Example: Critics argue that a structured carbon farming program would need entirely separate funding and policy from the CCUS initiative.

- Managing Stakeholder Expectations: There is a risk of public disappointment if farmers realize the current Budget outlay does not directly fund their carbon projects.
- Example: The government must now work to clarify that the 20,000 crore is a bet on industrial decarbonization specifically.

Way Ahead:

- Clear Policy Demarcation: The government must explicitly separate smokestack (industrial) and soil (agricultural) initiatives to manage public and investor expectations.
- Dedicated Carbon Farming Framework: Develop a separate, well-funded policy and institutional framework specifically for agricultural carbon sequestration.
- Strengthen Communication: Close the communication gap by using precise terminology that distinguishes between CCUS technologies and voluntary carbon markets.
- Scale Industrial Deployment: Ensure the successful execution of the DST roadmap for hard-to-abate sectors to meet national net-zero goals.
- Promote Multi-Sectoral Ambition: Advance both industrial and agricultural fronts with equal vigor to forge a comprehensive and sustainable climate strategy.

Conclusion:

India's climate strategy currently stands at a crossroads, balancing a heavy financial bet on industrial CCUS with a growing demand for nature-based carbon markets. While the 20,000 crore Budget outlay is strictly industrial, the intense interest in carbon farming signals a massive opportunity for a parallel agricultural policy.

Western Tragopan

Context:

The Western Tragopan, popularly known as the King of Birds (Jujurana), has drawn attention due to concerns over declining populations in the western Himalayas.

About Western Tragopan:

What it is?

- The Western Tragopan is a rare pheasant species endemic to the western Himalayas.
- It is the state bird of Himachal Pradesh and is revered locally as Jujurana (King of Birds).

Habitat:

- Found in temperate and subalpine forests with dense undergrowth.
- Typically inhabits elevations between 2,400–3,600 metres in the western Himalayas.
- Its range extends across Himachal Pradesh, Uttarakhand, Kashmir, and parts of Pakistan.
- Strongholds include Great Himalayan National Park, Daranghati Wildlife Sanctuary, and Rupi Bhaba Wildlife Sanctuary.

IUCN Status: Vulnerable

Key Characteristics:

- Distinctive pheasant species: One of the rarest pheasants in the world, with a fragmented population of roughly 2,500–3,500 individuals.
- Striking plumage: Males have dark feathers with white spots, crimson neck patch, blue throat, and orange fore-neck.
- Horn-like display: During breeding season, males raise two fleshy blue horns, giving the bird the nickname horned pheasant.
- Secretive behaviour: Usually seen in pairs or small groups, moving quietly through dense mountain forests.
- Breeding behaviour: Breeding peaks in May–June, with females laying 3–6 eggs in well-hidden nests.

Significance:

- Acts as an indicator species for the health of Himalayan temperate forest ecosystems.
- Protecting the bird helps conserve fragile Western Himalayan biodiversity.

Human-Wildlife Conflict (HWC)

Context:

A recent study in Conservation Biology has revealed that Anti-Depredation Squads (ADS) in Assam, designed to reduce human-elephant conflict, are associated with a 200-300% increase in accidental elephant deaths.

About Human-Wildlife Conflict (HWC)

What it is?

- Human-Wildlife Conflict refers to negative interactions between humans and wild animals, resulting in undesirable consequences for both. This includes loss of human life, livestock predation, and crop damage on one side, and retaliatory killing, habitat destruction, or accidental deaths of wildlife on the other.

Data & Statistics on Conflicts:

- Elephant Mortality: India loses approximately 100 elephants annually to non-natural causes like electrocution, train hits, and poaching.
- Human Toll: Over 500 people are killed annually in India due to encounters with elephants, primarily in states like Odisha, West Bengal, and Assam.
- Economic Impact: Millions of hectares of crops are damaged every year, often pushing marginal farmers into deep debt.
- Scale of Intervention: In Sonitpur alone, the presence of organized squads (ADS) was linked to 14 additional elephant deaths over 14 years compared to non-ADS areas.

Need for Balancing Human-Wildlife Conflict:

- Economic Security for Farmers: Conflicts often destroy the entire annual livelihood of rural families.
- Example: In the Sonitpur tea gardens, elephants frequently range over croplands, necessitating organized guarding to prevent total financial ruin for villagers.
- Conservation of Keystone Species: Elephants are ecosystem engineers; their loss disrupts forest health.
- Example: The 2-3x increase in accidental deaths in ADS-active villages threatens the long-term viability of Assam's 5,000-strong elephant population.
- Psychological Well-being and Safety: Constant fear of wildlife attacks reduces the quality of life in fringe villages.
- Example: The formation of ADSs was originally intended to give villagers safety in numbers, reducing the panic that leads to violent retaliatory killings.
- Maintaining Ecological Corridors: Balancing conflict ensures that traditional migratory paths remain functional.
- Example: When elephants are frightened by ADS searchlights, they stray from safe corridors into dangerous linear infrastructure like railway tracks.
- Reducing State-Community Friction: Effective management mends the mistrust between the Forest Department and local communities.
- Example: ADSs in Assam incentivized communities to cooperate with the Forest Department rather than resorting to illegal traps or poisoning.

Initiatives Taken So Far

- Anti-Depredation Squads (ADS): Community-led volunteer groups equipped with searchlights and firecrackers to drive away elephants.

- Project Elephant (1992): A central scheme providing financial and technical support to states for elephant management and corridor protection.
- Linear Infrastructure Guidelines: Measures like underpasses and overpasses on highways and railways to allow safe wildlife passage.
- Early Warning Systems (EWS): Use of SMS alerts, thermal sensors, and Elephant cells to track herd movement and alert villagers in real-time.

Challenges Associated:

- The Landscape of Fear: Aggressive deterrents can backfire by causing animals to lose caution.
- Example: The study shows frightened elephants in Assam are more likely to fall into ditches or be hit by trains because they are distracted by pursuers.
- Fragmented Habitats: Developmental projects break continuous forests into small patches, forcing animals to cross human settlements.
- Example: The loss of forest cover in Sonitpur over decades has forced elephants to range through tea plantations and banks of the Brahmaputra.
- Unsystematic Responses: Lack of training turns organized squads into local mobs.
- Example: A 2019 Union Environment Ministry review noted that ADS operations often involve unsystematic firing, which reduces their effectiveness.
- Underreporting and Data Gaps: Actual conflict levels are often higher than official records due to poor department-community relations.
- Example: The study had to adjust for underreporting bias because villagers often hide conflict details to avoid legal scrutiny.
- Seasonality of Conflict: Deterrents are often temporary, and animals eventually adapt to them (habituation).

Way Ahead

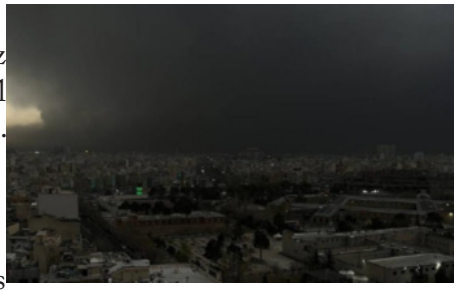
1. Shift to Passive Deterrents: Move away from firecrackers toward non-threatening barriers like bee-fencing or chili-based deterrents.
2. Rigorous Impact Evaluation: Adopt the study's recommendation to pause the rapid expansion of ADSs until their mortality impact is statistically cleared in other states.
3. Community-Led Insurance: Implement rapid crop-compensation schemes to reduce the urge to chase among farmers.
4. Smart Infrastructure: Install sensor-based speed restrictors for trains in identified elephant corridors to prevent accidental deaths.
5. Habitat Restoration: Prioritize the reforestation of lost corridors in priority landscapes like Sonitpur to keep elephants away from human habitations.

Conclusion:

The unexpected findings from Assam demonstrate that well-intentioned conservation strategies can inadvertently increase wildlife mortality if they rely on fear-based deterrence. Effective conflict management must transition from organized chasing to science-backed, passive co-existence strategies. Balancing the safety of rural communities with the preservation of India's heritage animal requires a data-driven re-evaluation of current national guidelines.

Black Rain

Context:



Following Israeli airstrikes on oil storage facilities in Tehran and Alborz (March 7–8), residents reported black rain — oily, pollutant-laden rainfall caused by smoke and toxic particles from burning oil mixing with rain clouds.

About Black Rain:

What it is?

Black rain is a form of environmental fallout where precipitation becomes heavily contaminated with soot, hydrocarbons, and other pollutants. Unlike normal rain, it is dark, oily, and carries a strong chemical odor, coating everything it touches in a layer of toxic residue.

How it Formed:

1. Combustion: Israeli strikes ignited massive fires at the Tehran refinery and oil depots, releasing thick plumes of black smoke.
2. Atmospheric Loading: Huge quantities of particulate matter (soot) and chemical vapors were pushed into the atmosphere.
3. Coalescence: A weather pattern brought rain clouds over the city. As the rain fell through the smoke-saturated air, the water droplets absorbed the suspended particles and chemicals.
4. Topographic Trap: Tehran's surrounding mountains acted as a barrier, preventing the smoke from dispersing and forcing the pollutants to settle over the urban center.

Chemicals Involved:

- Toxic Hydrocarbons: Including Benzene (a known carcinogen).
- Sulfur Oxides (SOx) & Nitrogen Oxides (NOx): Which react with water to form acid rain.
- Particulate Matter (Soot): Concentrated carbon particles.
- Forever Chemicals (PFAS): Likely released from industrial fire-retardant systems at the hit facilities.

Characteristics:

- Appearance: Oily, jet-black droplets that leave permanent or difficult-to-remove stains.
- Odor: A pervasive, bitter smell of burning petroleum and chemicals.
- Texture: Viscous and greasy to the touch compared to normal water.
- Reach: Capable of falling dozens of miles away from the actual site of the fire due to wind patterns.

Implications

- Health Hazards: Causes skin burns, eye irritation, and respiratory problems; prolonged exposure may lead to lung damage and cancers.
- Environmental Contamination: Toxic pollutants can contaminate soil and groundwater, entering the food chain through crops and livestock.
- Acid Rain Effects: Sulfur and nitrogen oxides can cause acidic rainfall, damaging buildings, infrastructure, and vegetation.
- Long-term Persistence: Presence of forever chemicals means environmental damage can persist for decades as they do not degrade naturally.

Desalination Plants

Context:

Recent military strikes in the escalating US–Israel–Iran conflict in West Asia have targeted desalination plants, raising concerns over water security and humanitarian crises in the region.

About Desalination Plants:

What it is?

- A desalination plant is a facility that converts saline seawater or brackish water into potable freshwater by removing dissolved salts and minerals.
- The most common technology used is Reverse Osmosis (RO), where high pressure pushes seawater through semi-permeable membranes to separate salt from water.

Where they are located:

- Desalination plants are primarily concentrated in arid and water-scarce coastal regions, especially:
- West Asia / Gulf Region – Saudi Arabia, UAE, Kuwait, Qatar, Oman, Bahrain
- North Africa – Libya, Algeria
- Other regions – Israel, Spain, Australia, United States, and China

- West Asia alone accounts for nearly 70% of global desalination capacity, making it the global hub of desalinated water production.

Aim:

The primary objectives of desalination plants are:

1. Ensure freshwater supply in regions with scarce natural water resources.
2. Support urban populations and industrial development in arid coastal countries.
3. Provide water security during droughts and climate variability.
4. Reduce dependence on groundwater and rivers in water-stressed regions.

Key Features:

- Reverse Osmosis Technology – Uses semi-permeable membranes to remove salts and impurities from seawater.
- Energy Intensive Process – Requires significant electricity, often integrated with thermal or gas-based power plants.
- Large-scale Infrastructure – Many plants are co-located with power plants to share energy and reduce costs.
- Brine Discharge – Produces concentrated saltwater (brine) that is typically released back into the ocean.
- Growing Global Sector – Over 21,000 desalination plants operate worldwide, with capacity growing 6–12% annually.

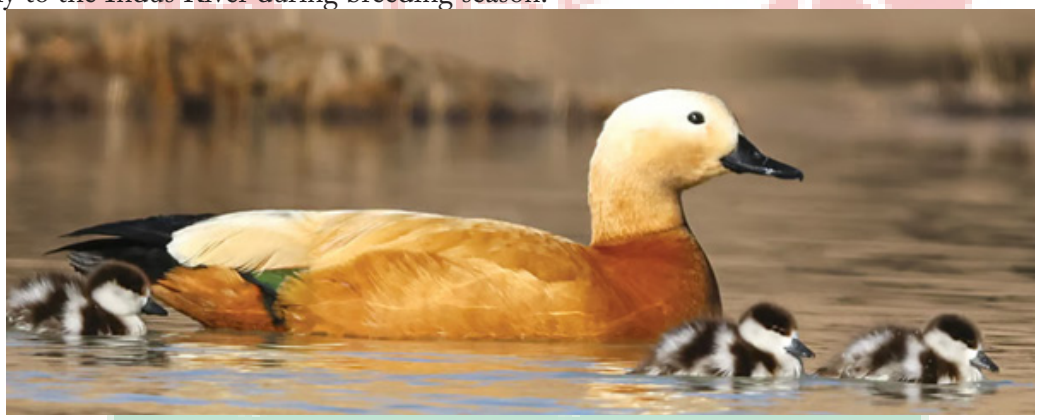
Significance:

- Provides drinking water where natural freshwater sources are scarce.
- In Gulf countries, desalination supplies 40–90% of drinking water, making it critical for survival.
- Supports megacities and industrial zones in desert regions.

The Ruddy Shelduck

Context:

Residents of Mudh village in Ladakh have been protecting the Ruddy Shelduck for over two decades, escorting fledglings safely to the Indus River during breeding season.



About The Ruddy Shelduck:

What it is?

- The Ruddy Shelduck (Tadorna ferruginea), also known as the Brahminy duck, is a large migratory waterfowl species found across Europe, Central Asia, and parts of Africa, wintering in South Asia.
- In India, Ladakh is its only breeding site, where it nests in high-altitude wetlands between June and August.

Habitat:

- Occupies diverse ecosystems: rivers, lakes, marshes, ponds, deltas, and even man-made reservoirs.
- Found from sea level to elevations up to 4,800 metres, including deserts, steppes, and Himalayan plateaus.
- In Ladakh, it breeds in high-altitude valleys before moving broods to the Indus River.
- IUCN Status:
- Classified as Least Concern by the International Union for Conservation of Nature (IUCN).

Key Characteristics:

1. Physical Features:

- Distinctive orange-brown (ruddy) plumage with a creamy white head.
- Males have a dark neck ring during breeding season.
- Wings show striking contrast of white coverts and black flight feathers.

2. Biological Traits:

- Highly adaptable to varied climates and altitudes.
- Can be sedentary, migratory, or semi-nomadic depending on region.
- Migratory populations traverse extreme terrains like the Himalayas and Gobi Desert.

3. Reproductive Behaviour:

- Generally monogamous, with long-term pair bonds.
- Clutch size ranges from 8–13 eggs.
- Nests in unconventional sites such as tree hollows, rock crevices, fox dens, or building attics.

4. Social Behaviour:

- Adults often cooperatively monitor multiple broods.
- Known for strong pair fidelity, symbolizing marital loyalty in Buddhist culture.

Significance:

- Contributes to wetland biodiversity and acts as an indicator of ecosystem health in fragile Himalayan habitats.
- Revered in Buddhism; considered sacred and a symbol of fidelity, encouraging community protection.

Project HANUMAN

Context:

The Government of Andhra Pradesh launched Project HANUMAN on World Wildlife Day 2026 to address the rising human–wildlife conflict in the state.

About Project HANUMAN:

What it is?

- Project HANUMAN stands for Healing and Nurturing Units for Monitoring, Aid and Nursing of Wildlife.
- It is a state-level wildlife protection and conflict mitigation initiative aimed at rescuing, treating, rehabilitating, and monitoring wildlife while protecting communities near forests.

State: Andhra Pradesh

Aim:

- To reduce human–wildlife conflict and ensure coexistence between local communities and wildlife.
- To improve rapid response, wildlife rescue operations, and scientific monitoring of animal movement.

Key Features:

1. Rapid Response Infrastructure – Deployment of 100 vehicles (93 rapid response units and 7 wildlife ambulances) for quick rescue and medical aid.
2. Wildlife Rescue Centres – Establishment of four rescue and treatment centres in Visakhapatnam, Rajamahendravaram, Tirupati, and Birlut.
3. Village-level Volunteer Teams – Creation of 'Vajra' (Wildlife Rakshak) teams to handle snake rescues and minor wildlife incidents in villages.

4. AI-based Monitoring – Use of Artificial Intelligence systems to track wildlife movement and provide early warnings when animals approach human settlements.
5. HANUMAN Digital App – A digital platform for wildlife monitoring, reporting conflicts, and coordination with authorities.
6. Compensation Support – Increase in compensation for wildlife attacks: 10 lakh for death and 2 lakh for injuries, with livestock compensation based on market value.
7. Use of Kumki Elephants – Deployment of trained elephants to manage and drive away wild elephant herds in conflict-prone districts.
8. Inter-departmental Coordination – Collaboration between forest, police, agriculture, revenue, horticulture, and Panchayati Raj departments.

Significance

- Human safety: Protects communities living near forests from wildlife attacks.
- Wildlife conservation: Ensures safe rescue, treatment, and rehabilitation of injured animals.

Solid Waste Management (SWM) Rules, 2026

Context:

The Ministry of Environment, Forest and Climate Change (MoEFCC) has notified the Solid Waste Management (SWM) Rules, 2026, which will replace the existing 2016 framework starting April 1, 2026.

About Solid Waste Management (SWM) Rules, 2026:

What it is?

- The SWM Rules, 2026, are a comprehensive regulatory framework designed to modernize India's waste management system. They shift the focus from a collect-and-dump model to a circular economy approach that prioritizes resource recovery, recycling, and accountability for all waste generators.
- Notifying Authority: Ministry of Environment, Forest and Climate Change (MoEFCC).
- Legal Basis: Issued under the Environment (Protection) Act, 1986.
- Predecessor: These rules supersede the Solid Waste Management Rules, 2016.
- Aim: The primary objective is to achieve Zero Waste to Landfill by strengthening source segregation, enhancing the accountability of bulk generators, and leveraging digital governance to track waste lifecycles.

Key Features of the New Rules:

Mandatory Four-Stream Segregation: Waste must be separated at the source into four categories:

1. Wet Waste: (Organic/Food) to be composted or bio-methanated.
2. Dry Waste: (Plastic, paper, metal) to be sent to Material Recovery Facilities (MRFs).
3. Sanitary Waste: (Diapers, napkins) to be wrapped securely for separate handling.
4. Special Care Waste: (Domestic hazardous items like paint, bulbs, medicines).

- Extended Bulk Waste Generator Responsibility (EBWGR): Entities generating more than100 kg/day, consuming more than 40,000 liters of water/day, or having more than 20,000 sq.m. area must process organic waste on-site or obtain EBWGR certificates.
- Digital Governance: A Centralised Online Portal will track waste from generation to final disposal, including registrations, reporting, and audits.
- Polluter Pays Principle: Introduction of Environmental Compensation for non-compliance, such as operating without registration or submitting false data.
- Refuse-Derived Fuel (RDF) Promotion: Mandates industries (like cement plants) to increase RDF substitution from 5% to 15% over six years.
- Landfill & Legacy Waste: Strict restrictions limit landfills to non-recyclable/inert waste only. It mandates time-bound biomining and bioremediation of existing legacy dumpsites.

- Special Provisions for Hilly/Island Regions: Local bodies can levy user fees on tourists and regulate inflow based on waste processing capacity.
- Land Allocation: Graded criteria for faster land allocation for waste processing units and mandatory buffer zones for large facilities.

Significance:

- Reduces methane emissions from landfills and prevents soil/water contamination through scientific remediation of legacy sites.
- Promotes a circular economy by turning waste into wealth (compost, energy, and recycled materials).

Global Action Plan for the Steppe Eagle

Context:

The Global Action Plan (GAP) for the Steppe Eagle (2026–2035) was officially adopted during CMS COP15, which concluded, in Campo Grande, Brazil.

About Global Action Plan for the Steppe Eagle:

What It Is?

- The Steppe Eagle Global Action Plan is a science-based international conservation framework designed to provide a coordinated strategy for the survival of the Endangered steppe eagle (Aquila nipalensis).
- It serves as a roadmap for range states to mitigate anthropogenic threats and stabilize the species' population.

Aim:

The central vision is to halt and reverse the decline of the steppe eagle by delivering innovative, science-based conservation actions and community engagement across its entire migratory range.

Key Features (6 Strategic Goals)

The plan is built around 49 specific actions categorized under six primary goals:

1. Energy Infrastructure: Reducing mortality caused by electrocution and collisions with powerlines and wind farms.
2. Take and Trade: Significantly reducing both legal and illegal killing, trapping, and trade (including online markets).
3. Poisoning Prevention: Understanding and mitigating the impact of unintentional poisoning from pesticides, NSAIDs (like Diclofenac), and heavy metals.
4. Habitat Restoration: Attaining and maintaining high-quality habitats and stable prey populations across the breeding and wintering grounds.
5. Knowledge Gap Closure: Increasing international research collaboration to better understand movement patterns and spatial hotspots.
6. Effective Implementation: Ensuring all range states endorse the plan through outreach, stakeholder engagement, and community involvement.

About Steppe Eagle:

What It Is?

- The Steppe Eagle is a large, migratory bird of prey belonging to the family Accipitridae. It is a quintessential raptor of the open plains and is known for its impressive transcontinental migrations, often traveling thousands of kilometers between its breeding and wintering grounds.

IUCN Status: Endangered

Habitat:

- Global: It breeds in the vast, open steppes, semi-deserts, and montane grasslands of the Palearctic region, stretching from Romania and Russia through Kazakhstan to Mongolia and China.
- India: It is frequently spotted in open habitats such as grasslands, semi-arid regions, agricultural fields, and even garbage dumps in states like Rajasthan, Gujarat, and Haryana.
- The Thar Desert has emerged as a critical lifeline for these raptors, with the Jorbeer Conservation Reserve and Desert National Park now included in the Global Action Plan (2026–2035).

Characters:

- Plumage: Adults are dark brown with a pale golden nape; juveniles show a broad white band under the wings.
- Size: Large, heavy eagle with a wingspan of 7–2.1 m and a long gape extending beyond the eye.
- Feeding: Hunts small mammals but also scavenges at carcasses and landfills.
- Migration: A soaring migrant that uses thermal currents; an important species of the Central Asian Flyway (CAF).

Chapter-
5

SCIENCE & TECHNOLOGY

SRY Gene Screening

Context:

The International Olympic Committee (IOC) announced a seismic policy change mandating SRY gene screening for all female athletes in international elite sports.

- This decision effectively bans transgender women and many DSD (Differences in Sex Development) athletes from female categories.

About SRY Gene Screening:

What it is?

- SRY stands for 'Sex-determining Region Y'. It is a specific segment of DNA usually found on the Y chromosome. This gene acts as a biological master switch that triggers the development of testes and the production of male levels of testosterone, leading to male physical development.

Developed By: The SRY gene was first discovered in 1990 by Professor Andrew Sinclair.

Aim:

- The primary objective is to protect the female category in elite sports.
- The IOC aims to ensure that athletes competing in the female category do not have the physiological advantages associated with male puberty and male chromosomal development, such as increased bone density and explosive muscle power.

How it Works?

1. Sample Collection: The athlete provides a simple saliva sample or a cheek swab at a certified diagnostic lab.
2. DNA Analysis: The lab analyzes the sample to detect the presence or absence of the SRY gene.
3. Turnaround Time: The process typically takes about one week for results to be issued.
4. Verification: The results are submitted to the relevant international sports body. If negative, the athlete is permanently cleared for the female category.

Key Features:

- Once-in-a-Lifetime: Since the SRY gene is fixed at birth, the test is generally required only once in an athlete's career.
- Predictive Marker: The IOC views the gene as a highly accurate indicator of whether an athlete has experienced or will experience male sex development.
- Selective Application: It applies only to elite-level international athletes (Olympics, World Championships) and not to grassroots or leisure sports.
- Exceptions for Rare DSDs: Athletes with specific conditions like Complete Androgen Insensitivity Syndrome (CAIS)—where the body cannot process testosterone—may still be eligible for the female category even if they are SRY-positive.
- Voluntary but Mandatory for Entry: Athletes can refuse the test, but refusal results in immediate disqualification from IOC-sanctioned events.

Significance:

- The IOC cites scientific data showing a 10% to 100% performance advantage for male-developed athletes depending on the sport.

- This marks a major shift from self-identification models to biological/genetic models for gender classification in sports.
- The IOC advises early screening so athletes can make informed decisions about their training and investment in the female category.

Natural Mineral Water

Context:

New regulatory insights highlighted the rigorous standards for natural mineral water in India, which must be bottled at the source without chemical disinfection.

About Natural Mineral Water:

What it Is?

- It is water obtained directly from underground as opposed to surface sources (like rivers). To be labeled Natural Mineral Water in India (under IS 13428), it must be microbiologically wholesome and possess a constant level of minerals and trace elements.
- Unlike packaged drinking water, which can be treated by Reverse Osmosis (RO) and then re-mineralized, natural mineral water must remain in its original chemical state.

Origin:

- It originates from protected underground aquifers or natural springs. As rainwater or snowmelt percolates through geological layers like limestone, granite, or volcanic rock over decades, it naturally dissolves minerals from these stones.
- Natural pressure then pushes this enriched water to the surface or into subterranean reservoirs.

Key Characteristics:

- Source-Bottled: It must be bottled as close to the source as possible to prevent contamination or loss of minerals.
- No Chemical Treatment: Producers are strictly prohibited from using chlorine or other chemical disinfectants; they may only use filtration, aeration, or UV light.
- Stable Composition: The Total Dissolved Solids (TDS) and mineral proportions must remain consistent across all batches.
- Zero Contamination: The source must be naturally protected from environmental pollution by geological formations.

Minerals Found:

The specific fingerprint of the water depends on the local geology:

- Calcium & Magnesium: Provide hardness and a smooth, chalky mouthfeel.
- Bicarbonates: Help neutralize stomach acidity and add a sweet finish.
- Sodium & Potassium: Essential electrolytes that can add a faint saline note.
- Sulphates: Often found in volcanic springs, contributing a crisp, bitter taste.
- Silica: Known for adding a glow to the skin and supporting tissue elasticity.

Significance:

- While not a replacement for food, it provides highly bioavailable calcium and magnesium that support bone density and cardiovascular health.
- Bicarbonate-rich and magnesium-rich waters are proven to assist with indigestion and functional constipation.

Floating LiDAR Buoy System

Context:

The National Institute of Ocean Technology (NIOT) has successfully tested an indigenous Floating LiDAR Buoy System off the Muttom coast in Tamil Nadu.

About Floating LiDAR Buoy System:

What it is?

- The Floating LiDAR (Light Detection and Ranging) Buoy is a sophisticated oceanic platform designed to provide high-resolution vertical wind profiles and meteorological data from the sea surface.
- Developed By: The National Institute of Ocean Technology (NIOT), an autonomous body under the Ministry of Earth Sciences, Government of India.
- Aim: To accurately map offshore wind energy potential, enhance cyclone tracking, and provide real-time data for Blue Economy initiatives.

Science Behind Working:

- The system operates on the principle of Optical Remote Sensing.

1. The buoy remains stable on the ocean surface while its integrated LiDAR unit emits infrared laser pulses into the atmosphere.
2. These pulses hit aerosols, dust, and water droplets in the air and reflect back (Backscattering).
3. The system measures the Doppler Shift in the frequency of the returned light to calculate wind speed and direction at various altitudes simultaneously.

Key Functions:

- Vertical Profiling: Unlike traditional anemometers, it can measure wind conditions at multiple heights up to 300 metres above sea level.
- Real-time Monitoring: It continuously tracks wind speed, direction, turbulence, and atmospheric pressure.
- Ocean-Atmosphere Interaction: It gathers data on how sea surface conditions influence air movement, which is critical for climate modeling.
- Data Transmission: Equipped with satellite or cellular telemetry to transmit live data to shore-based research stations.

Significance:

- Crucial for identifying the best locations for offshore wind farms, supporting India's renewable energy targets.
- Provides more accurate data for predicting the intensity and landfall of cyclones and storms.
- Reduces India's dependence on expensive imported buoy technologies and foreign consultancy for marine surveys.

BRICS and Scientific Collaboration

Context:

Under India's 2026 Presidency, the BRICS grouping is set to deepen its scientific partnerships under the theme 'Building for Resilience, Innovation, Cooperation and Sustainability'.

- This follows the 17th annual summit in Rio de Janeiro, where members aimed to leverage expanded membership to address global digital divides and climate resilience.

About BRICS and Scientific Collaboration:

What it is?

- Scientific collaboration within BRICS is a strategic pillar aimed at establishing a multipolar world system by pooling the research and technological capacities of member states.
- It has evolved from a focus on basic, fundamental sciences toward innovation-driven ecosystems and technology transfers intended to reduce the Global South's dependency on Western hegemony.

Initiatives Taken So Far:

- Strategic Frameworks: A 2015 Memorandum of Understanding established Science, Technology, and Innovation (STI) as a core pillar, providing an institutional framework for joint research.
- Action Plans: The first BRICS Action Plan for Innovation Cooperation (2017-2020) launched programs focused on entrepreneurship networks and the role of women and youth in STI.
- Institutional Centers: The establishment of the BRICS Technology Transfer Centre (TTC) and the iBRICS initiative has created policy links for cross-border technology commercialization.
- Sectoral Agreements: Significant progress includes the 2021 intergovernmental agreement on space cooperation and the establishment of the BRICS Institute of Future Networks for ICT.

Need for Collaboration on Science and Tech in BRICS:

- Addressing Social Challenges: Collaboration is essential to tackle shared development issues in areas like energy, water, and health.
- Example: The COVID-19 pandemic accelerated joint efforts in vaccine research, biosecurity, and digital health.
- Reducing Technological Dependency: Member nations seek to build shared capacities to move away from Western technological reliance.
- Example: The 2022 launch of BRICS+ signaled a move toward inclusive political and technical cooperation across the Global South.
- Economic Governance: STI cooperation allows members to coordinate strategies and influence global development finance.
- Example: Members use the platform to amplify their collective voice in institutions like the New Development Bank.
- Governance of Emerging Tech: There is a critical need to establish equitable and development-oriented norms for new technologies.
- Example: The 2025 Declaration on AI elevated artificial intelligence to a central pillar of multilateral governance.
- Countering Geopolitical Pressures: Joint STI efforts help members navigate global tensions, sanctions, and export controls.
- Example: BRICS assumes a critical role in providing an alternative STI landscape amidst rising techno-nationalism.

Challenges Associated:

- Uneven Participation: The expansion to BRICS+ has highlighted disparities in how actively new members engage in joint calls.
- Example: Of the most recent additions, only Egypt and Iran joined the call for proposals issued last December.
- Innovation Gaps: Most BRICS nations lag significantly behind global leaders in research expenditure and innovation indicators.
- Example: Excluding China, the gross domestic expenditure on R&D (GERD) is relatively lower across the group compared to nations like South Korea.
- Heterogeneity of Interests: Differences in economic development and scientific capacity make it difficult to align the interests of all members.
- Example: Experts suggest BRICS+ may have to focus on paired links between specific members rather than group-wide projects.
- Infrastructure and Resource Limits: High-cost areas of research have seen much slower progress due to a lack of shared heavy infrastructure.
- Example: Exploratory fields like mega-science projects and ocean or polar research have developed at a slower pace than ICT.
- Institutional Instability: The lack of a permanent managing body hinders long-term scientific planning and monitoring.
- Example: The current system relies on a rotating leadership that changes annually with the presidency, which is not ideal for multi-year projects.

Way Ahead:

- Permanent Mechanism: Establish a central Secretariat, modeled after the EU's Horizon Program, to manage funds and monitor long-term project outcomes.
- Mega-Science Projects: Develop large-scale, long-term scientific initiatives to foster deeper institutional cooperation among members.
- Inclusive Capacity Building: Focus the next decade on assessing and strengthening the National Innovation Systems (NIS) of newer BRICS+ members.
- Governance Research: Expand the framework beyond technical funding to include research into the impact and governance of emerging technologies.
- Scaling Impact: Shift from small-scale networking toward scaling projects in biotechnology, climate tech, and industrial innovation for direct societal relevance.

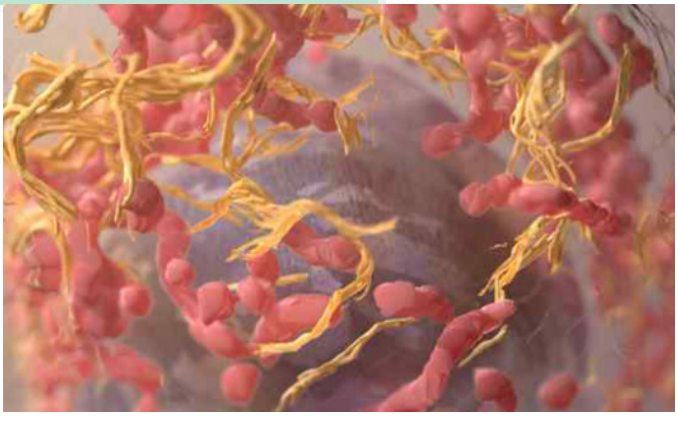
Conclusion:

While BRICS has successfully transitioned from basic science to socially relevant innovation, the current rotating framework must evolve to meet future long-term needs. India's 2026 Presidency offers a pivotal opportunity to establish a more agile, permanent mechanism that can bridge the innovation gap within the expanded BRICS+ membership.

High Cholesterol Helps Cancer Spread

Context:

A recent study by the U.S. National Institutes of Health discovered that high cholesterol levels in the nuclear envelope make the cell nucleus squishy, facilitating the spread of melanoma.



About High Cholesterol Helps Cancer Spread:

What is happening?

- It stores DNA and directs all cell activities, like a command hub.
- The nucleus is surrounded by a delicate membrane acting like a flexible shell.
- Excess cholesterol makes this shell softer and more deformable (squishy).

How does this help cancer spread?

- Easier movement: Softer nucleus allows cancer cells to squeeze through tight tissue gaps easily.
- Weak outer layer: High cholesterol makes the nuclear membrane fragile and prone to damage.
- DNA damage: Tears in the membrane expose DNA, causing mutations that worsen cancer.

Role of LBR (Lamin B Receptor):

- LBR protein location: It sits in the nuclear membrane and connects DNA to the nucleus wall.
- Dual function: It helps both in DNA attachment and cholesterol production inside the cell.

In cancer cells:

- Excess LBR production: Cancer cells overproduce LBR, increasing cholesterol inside the nucleus.
- Structural impact: This makes the nucleus softer and weaker, aiding cancer spread.
- Clinical link: Higher LBR levels are associated with more aggressive and severe cancers.

What happens in such cancer cells?

- Rapid growth: Cells divide uncontrollably due to accumulated genetic changes.
- Survival advantage: They adapt better to low nutrients and stressful environments.
- Enhanced spread: Softer structure helps them invade nearby tissues and distant organs.
- Frequent damage: Fragile nuclei tear often, increasing mutation rates further.

Treatment & Future Possibilities

- Targeting LBR: Blocking LBR may reduce cholesterol buildup and slow metastasis.
- Lowering cholesterol: Reduced cholesterol strengthens the nucleus and limits invasiveness.
- Statins effect: Cholesterol-lowering drugs are linked with slower cancer progression.

NavIC's Atomic Clock Failure

Context:

ISRO recently reported that the atomic clock on the IRNSS-1F satellite has failed, reducing the number of functional positioning satellites in the NavIC constellation.

About NavIC's Atomic Clock Failure:

What is an Atomic Clock?

- An atomic clock is an ultra-precise timekeeping device that uses the vibrations of atoms (usually Rubidium or Cesium) to measure time. In navigation satellites, these clocks are essential because even a billionth of a second of error can lead to a location inaccuracy of several meters on the ground.

How it Works?

- Atomic Resonance: The clock measures the precise frequency of electromagnetic radiation emitted or absorbed by electrons when they change energy levels within an atom.
- Ultra-Stability: Unlike mechanical or quartz clocks, atoms vibrate at a perfectly constant rate, providing a stable frequency that does not drift over time.
- Time-of-Flight Measurement: The satellite sends a signal with a timestamp. By comparing when the signal was sent to when it was received, the receiver calculates the distance.
- Trilateration: By calculating distances from at least four different satellites simultaneously, a receiver can pin-point a user's exact latitude, longitude, and altitude.

Features:

- Precision: They are accurate to within one second every few million years.
- Redundancy: Satellites usually carry multiple clocks (often three or four) in case one fails.
- Indigenization: While earlier NavIC clocks were imported, the new generation (NVS series) features India-developed Rubidium atomic clocks.

About The NavIC Satellite System:

What it is?

- NavIC (Navigation with Indian Constellation), originally called the IRNSS (Indian Regional Navigation Satellite System), is India's independent, regional satellite navigation system.

Launched In:

- The first satellite, IRNSS-1A, was launched in July 2013. The constellation was intended to be completed with seven satellites by 2016, though replenishment launches (like NVS-01 in 2023) continue to sustain the system.
- Aim: The primary goal is to provide reliable position, navigation, and timing services over India and a region extending approximately 1,500 km around its borders, ensuring strategic independence from foreign systems like the American GPS.

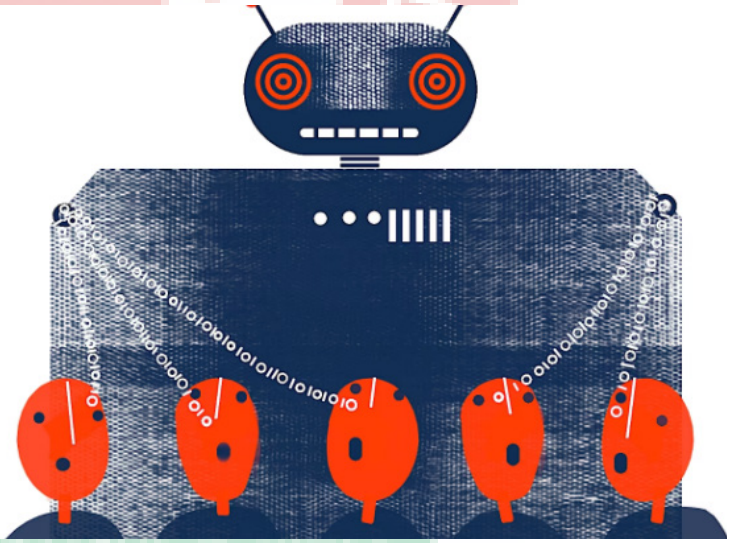
Features:

- Dual Service: Provides Standard Positioning Service (SPS) for civilians and Restricted Service (RS)—an encrypted signal for military use.
- Geosynchronous Orbit: Unlike GPS satellites that move around the Earth, NavIC satellites are placed in higher orbits (36,000 km) that keep them permanently visible over the Indian region.
- Superior Accuracy: Because the satellites are always overhead for India, they provide better accuracy (approx. 10 meters) in dense forests and mountainous terrain compared to GPS.
- Frequency Bands: It operates in the L5 and S bands. Newer satellites (NVS series) have added the L1 band, making them compatible with common wearable devices like smartwatches.

Democratising AI Governance: Giving Society a Voice

Context:

As the proliferation of Artificial Intelligence outpaces traditional regulation, there is an urgent call for participatory governance to ensure AI aligns with public values rather than just private interests.



About Democratising AI Governance: Giving Society a Voice

What it is?

- Democratising AI governance refers to an inclusive regulatory framework that shifts power from a state-centric or private-sector monopoly to a multi-stakeholder model. The goal is to pierce the social black box—the upstream human choices about data and automation—to ensure AI systems are transparent, culturally sensitive, and democratically accountable.

Data & Statistics: The AI Landscape:

- Rapid Adoption: India's AI market is projected to grow at a CAGR of 25-35%, significantly outpacing the development of statutory legal frameworks.
- The Skills Gap: Over 70% of the public feels they lack the technical literacy to understand how AI decisions (like loan approvals or job screening) are made.
- Risk Bearing: While private firms hold nearly 90% of AI technical IP, the public bears 100% of the socio-economic risks related to labour displacement and bias.
- Bias Incidence: Recent studies show that non-participatory AI models can have up to 30% higher error rates when processing regional Indian dialects compared to standard English.

AI's Growing Societal Impact:

- Labor Markets: AI is automating routine tasks, threatening entry-level roles in the IT and BPO sectors.
- Example: Indian IT giants have begun freezing certain junior-level recruitments as AI tools now handle basic coding and documentation tasks.
- Healthcare Access: Predictive AI is being used for diagnostics, but can prioritize certain demographics based on biased historical data.
- Example: AI health-tech pilots in rural India sometimes struggle with accuracy due to lack of diverse genomic and lifestyle data from those regions.
- Finance & Credit: Automated credit scoring can unintentionally exclude marginalized communities who lack a traditional digital footprint.
- Example: Fintech startups using alternate data for loans have faced scrutiny for potentially high interest rates targeting the unbanked.
- Democratic Processes: Generative AI and deepfakes can manipulate public opinion and erode trust in information.
- Example: The 2024 and subsequent local elections saw a surge in synthetic media where AI-generated voices of leaders were used for campaigning.

Need for Participatory Governance:

- Detecting Emerging Harms: Diverse communities can spot biases that developers—often from urban, elite backgrounds—might overlook.
- Example: Local activists in India were the first to flag that facial recognition systems often fail to distinguish between different tribal features.
- Experiential Knowledge: Governance needs the on-ground context of users to understand how a tool functions in real-world conditions.
- Example: Farmers using AI-driven crop advisory apps provide vital feedback on local soil variations that global datasets lack.
- Piercing the Social Black Box: Public oversight ensures that the choice of what to automate is made ethically, not just profitably.
- Example: Public debate in India has slowed the deployment of AI in judicial sentencing, prioritizing human empathy over algorithmic speed.
- Building Public Trust: Transparency in how models are trained and audited reduces AI anxiety and fosters adoption.
- Example: The Bhashini project's open-source approach has gained more trust by involving citizens in contributing local language data.

Challenges Associated:

- Technical Asymmetry: The vast knowledge gap between developers and the general public makes meaningful participation difficult.
- Example: During public consultations on the Digital Personal Data Protection Act, many citizens struggled to grasp the technicalities of automated processing.
- Fragmented Ecosystems: Regulation is often siloed within specific ministries, preventing a unified participatory standard.
- Example: AI in healthcare is governed by the Health Ministry, while AI in finance falls under RBI, leading to inconsistent user-protection rules.
- Corporate Secrecy: Private firms often cite proprietary secrets to avoid the transparency required for public audits.
- Example: Major social media platforms have resisted sharing their recommendation algorithms with Indian researchers, citing trade secret protections.
- Infrastructure Barriers: Meaningful participation requires digital platforms for reporting and open datasets that currently don't exist for all.
- Example: Rural Indians often lack the high-speed internet required to access and use AI transparency dashboards or reporting portals.

Way Ahead:

- Institutionalized Audits: Mandate Community-led AI Audits where civil society groups stress-test systems before and after deployment.
- Targeted Literacy Programs: Launch national campaigns to move beyond basic digital literacy to AI Literacy, enabling citizens to identify and report bias.
- Open Data Infrastructure: Create secure, accessible Data Commons that allow independent researchers to verify the datasets used by big tech.
- Intersectional Coordination: Establish a cross-sectoral AI Regulatory Body that includes representatives from labor unions, academia, and linguistic minorities.

Conclusion:

To prevent AI from becoming a tool that deepens inequality, governance must move from the boardroom to the public square. By adopting a participatory approach, India can ensure that its technological future is built on democratic oversight rather than opaque algorithms. Ultimately, the goal is to redistribute power equitably, ensuring AI serves the common good and earns the trust of the society it impacts.

Kavach 4.0 System

Context:

Union Railway Minister informed the Lok Sabha that Kavach 4.0 has been successfully commissioned across 1,452 route kilometers on the high-density Delhi-Mumbai and Delhi-Howrah corridors.

About Kavach 4.0 System:

What it is?

- Kavach is an indigenous Automatic Train Protection (ATP) It is a state-of-the-art electronic safety system that prevents train collisions by automatically managing speed and braking if the loco pilot fails to do so.
- Developed by: It was developed by the Research Design and Standards Organisation (RDSO) in collaboration with the Indian industry.
- Aim: The primary goal is to achieve Zero Accidents by preventing Signal Passing at Danger (SPAD), controlling overspeeding, and ensuring safe train operations during adverse weather conditions like dense fog.

How it Works?

- The system operates through a network of RFID tags on tracks, on-board equipment in locomotives, and radio towers at stations.
- These components communicate in real-time to monitor the train's location and speed. If the system detects a potential collision or a violation of speed limits, it automatically triggers the brakes without manual intervention.

Key Features of Kavach 4.0:

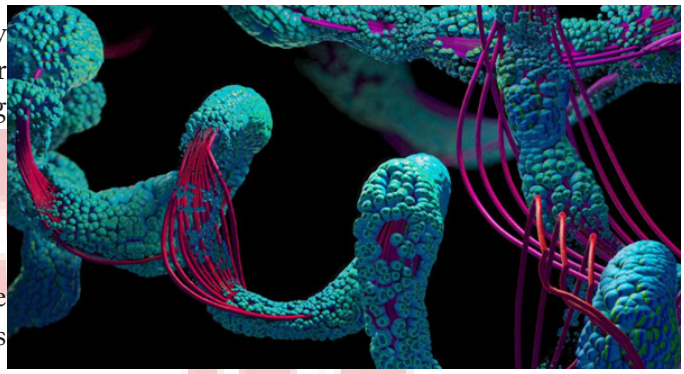
- Enhanced Precision: Improved location accuracy and better signal information handling, especially in complex and crowded railway yards.
- Direct Integration: Seamlessly integrates with Electronic Interlocking systems to receive real-time updates on track occupancy and signal status.
- Advanced Communication: Utilizes station-to-station communication via Optical Fibre Networks and UHF radio for uninterrupted connectivity.
- Automatic Braking: Automatically applies brakes if the loco pilot fails to respond to a red signal or exceeds the permitted speed limit.
- SOSR (Save Our Souls) Feature: Allows for the broadcast of emergency messages to all trains within a specific radius to prevent large-scale accidents during a crisis.

Significance:

- Contributes to the sharp decline in consequential train accidents (down nearly 90% since 2014) by eliminating human error.
- Enables trains to maintain higher speeds safely during low-visibility conditions (fog), reducing delays during winters.

Nutrient Transporter Protein

Context:



Scientists from ETH Zurich and the Technical University of Munich have engineered bacteria to produce designer proteins using artificial amino acids, enabling precise drug delivery and multifunctional therapeutic proteins.

About Nutrient Transporter Protein:

What it is?

- A nutrient transporter protein is a membrane protein that helps cells import nutrients such as peptides and amino acids across the cell membrane.
- In this research, scientists engineered an ABC transporter in bacteria (E. coli) to import peptides carrying artificial amino acids so that cells can build customised proteins.

Aim:

- To enable cells to efficiently incorporate artificial amino acids into proteins, allowing the creation of designer proteins with new biological or chemical functions.
- This helps overcome the difficulty of transporting synthetic amino acids across the cell membrane.

How it Works?

- Scientists engineered an ABC transporter protein, which normally imports small peptides as nutrients.
- Artificial amino acids are hidden inside tripeptides or tetrapeptides (short chains of natural amino acids).
- The transporter carries these peptides into the cell.
- Once inside, cellular enzymes break the peptides apart, releasing the artificial amino acids.
- The ribosome then uses these amino acids to produce custom-designed proteins.

Key Features:

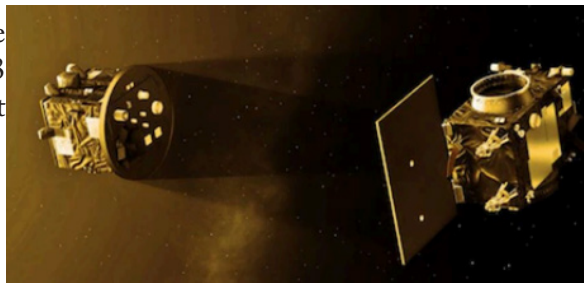
- Trojan Horse Strategy: Artificial amino acids are hidden inside natural peptide chains to bypass membrane barriers.
- Engineered ABC Transporter: Modified transporter can import up to 10× more artificial amino acids than natural versions.
- Directed Evolution: Scientists evolved the transporter protein to improve efficiency in crowded nutrient environments.
- Multi-functional Proteins: The system can insert two different artificial amino acids into a single protein.
- Compatibility with Standard Lab Conditions: Works efficiently even in common laboratory growth media.

Significance:

- Advanced Drug Delivery: Designer proteins can carry drugs to precise locations inside the body.
- Biotechnology Applications: Enables creation of proteins with novel chemical properties not found in nature.
- Synthetic Biology Breakthrough: Expands the genetic code beyond the natural 20 amino acids.

Proba-3 mission

Context:



The European Space Agency (ESA) has lost contact with the Coronagraph spacecraft, one of the two satellites in the Proba-3 mission, after an anomaly caused a power failure and sent the craft into a silent survival mode.

About Proba-3 mission:

What it is?

- Proba-3 is the world's first precision formation-flying mission, designed to study the Sun's atmosphere with unprecedented clarity.
- Launched By: European Space Agency (ESA) in December 2024 (aboard ISRO's PSLV-C59).
- Aim: To create an artificial solar eclipse in space to observe the Sun's faint outer atmosphere—the corona—which is usually obscured by the intense light of the solar disk.

Key Features:

1. Twin Spacecraft System: The mission consists of two independent satellites: the Coronagraph (carrying the camera) and the Occulter (the disk that blocks the Sun).
2. Precision Formation Flying: The two satellites must maintain a fixed distance of approximately 150 meters with millimeter-level accuracy, acting as a single, giant virtual instrument.
3. Artificial Eclipse: The Occulter blocks the Sun's bright disk, casting a precise shadow onto the Coronagraph's lens, mimicking a natural total solar eclipse.
4. Autonomous Maneuvering: The satellites use advanced sensors (lasers and cameras) and cold-gas thrusters to coordinate their relative positions without constant ground control intervention.
5. High-Cadence Data: Before the anomaly, the mission completed over 60 orbits, providing hours of continuous solar data that is impossible to capture during short-lived Earth-based eclipses.

Significance:

- By studying the corona, scientists can better understand Solar Winds and Coronal Mass Ejections (CMEs), which can disrupt satellite communications and power grids on Earth.
- If successful, the formation-flying technology proven by Proba-3 will pave the way for future distributed space telescopes that are too large to be launched as a single piece.

Very Low Earth Orbit (VLEO) Satellite Systems

Context:

State-run defense major Bharat Electronics Limited (BEL) and space-tech startup Bellatrix Aerospace have signed an MoU to jointly develop Very Low Earth Orbit (VLEO) satellite systems.

About Very Low Earth Orbit (VLEO) Satellite Systems:

What it is?

- The collaboration is a strategic partnership to design, develop, and manufacture next-generation satellite platforms and payloads specifically for the Very Low Earth Orbit (VLEO) It combines high-end defense electronics manufacturing with innovative satellite propulsion technologies.
- Organizations Involved: Bharat Electronics Limited (BEL) and Bellatrix Aerospace.

Aim:

- To build indigenous capabilities in VLEO satellite platforms.

- To develop integrated satellite solutions for both strategic (defense) and civilian applications.
- To combine PSU manufacturing depth with the agility of a deep-tech startup to accelerate space innovation.

How VLEO Systems Work?

- VLEO refers to altitudes between 150 km and 450 km, which is significantly lower than traditional Low Earth Orbit (LEO) (500 km – 2,000 km).

1. Atmospheric Interaction: At these altitudes, satellites encounter a thin atmosphere that creates significant aerodynamic drag.
2. Advanced Propulsion: To prevent the satellite from falling back to Earth, Bellatrix's specialized electric/green propulsion systems provide constant station-keeping thrust to counter the drag.
3. Proximity: Being closer to the surface allows for better optical resolution and faster signal transmission back to ground stations.

Key Features of the Technology:

- Superior Imaging: Proximity to Earth allows for sub-meter resolution imaging with smaller, less expensive optical sensors.
- Ultra-Low Latency: Signals have a shorter distance to travel, making it ideal for real-time strategic communication and high-speed internet.
- Reduced Launch Costs: Deploying to a lower altitude requires less fuel/energy, potentially lowering the cost of putting assets into space.
- Self-Cleaning Orbit: If a satellite fails, the atmospheric drag naturally pulls it down into the atmosphere to burn up, significantly reducing space debris.

Significance of the Partnership:

- Strengthens India's self-reliance in a critical emerging space domain, reducing dependence on foreign satellite platforms.
- VLEO satellites are game-changers for border surveillance and intelligence gathering due to their high-resolution capabilities.

Chile Eliminate Leprosy

Context:

The World Health Organization (WHO) and the Pan American Health Organization (PAHO) officially verified Chile as the first country in the Americas—and the second globally—to have eliminated leprosy.

About Leprosy (Hansen's Disease):

What it is?

- Leprosy is a chronic infectious disease caused by the slow-growing bacterium Mycobacterium leprae. It primarily affects the skin, the peripheral nerves, mucosal surfaces of the upper respiratory tract, and the eyes. If left untreated, it can cause progressive and permanent damage to the skin, nerves, limbs, and eyes.

Origin and History:

- Ancient Disease: Leprosy is one of the oldest recorded diseases in human history, mentioned in ancient civilizations' texts from China, Egypt, and India.
- Chilean Context: It was historically recorded in Chile at the end of the 19th century, specifically on Rapa Nui (Easter Island). It remained localized there through strict isolation and treatment until the late 1990s.

Key Features

- Transmission: It is transmitted via droplets from the nose and mouth during close and frequent contact with untreated cases. It is not highly infectious.
- Incubation Period: The disease has a very long incubation period, averaging 5 years, though symptoms can take up to 20 years to appear.
- Symptoms: Pale or reddish skin patches with loss of sensation, painless ulcers on the soles of feet, and muscle weakness or tingling in the hands and feet.

Treatment

- Multi-Drug Therapy (MDT): Since the 1980s, WHO has provided MDT (a combination of rifampicin, dapsone, and clofazimine) for free globally.
- Curability: Leprosy is 100% curable. Early treatment prevents most disabilities associated with the disease.
- Stigma: Historically, patients were shunned or leper colonies were created. Modern public health focuses on stigma-free, integrated care.

About Chile:

What it is?

- Chile is a sovereign country in western South America, known for its extreme geographic diversity and highly developed economy (the first South American member of the OECD).
- Geography: It occupies a long, narrow strip of land between the Andes Mountains to the east and the Pacific Ocean to the west.
- Borders: Peru, Bolivia, Argentina and the Drake Passage.

Geographic Features

- Atacama Desert: Located in the north, it is known as the driest non-polar place on Earth.
- Central Valley: A Mediterranean-climate region that is the agricultural and population heartland of the country.
- The South: Characterized by alpine tundras, glaciers, fjords, and lakes.
- Insular Territories: Includes the famous Rapa Nui (Easter Island) in Polynesia and the Juan Fernández Archipelago.

Space Re-entry

Context:

Space re-entry has gained attention with advancing human spaceflight missions, especially India's Gaganyaan programme, which focuses on safely returning astronauts to Earth.

About Space Re-entry:

What is Space Re-entry?

- Space re-entry refers to the process by which a spacecraft or crew capsule returns from orbit and safely passes through Earth's atmosphere to land on the surface.

What is a Re-entry Corridor?

- The re-entry corridor is a narrow, precisely defined atmospheric window through which a spacecraft must enter Earth's atmosphere to ensure safe return.
- Too shallow (Overshoot): The spacecraft may skip off the atmosphere and return to space.
- Too steep (Undershoot): Extreme heat and deceleration forces can destroy the vehicle or endanger the crew.
- Hence, maintaining the correct entry angle is critical for survival.

How Space Re-entry Works?

- De-orbit Burn: The spacecraft turns opposite to its direction of travel and fires engines to reduce orbital velocity, allowing gravity to pull it into the atmosphere.
- Atmospheric Aerobraking: Atmospheric drag converts kinetic energy into heat, slowing the capsule rapidly.
- Thermal Protection: Heat shields protect the capsule using ablation or insulation to withstand temperatures generated during re-entry.
- Controlled Guidance: Semi-ballistic design and attitude control help maintain the vehicle within the re-entry corridor and guide it toward the landing zone.
- Communication Blackout: Ionised plasma forms around the capsule, temporarily blocking radio communication.
- Parachute Deployment & Landing: At lower altitudes, multi-stage parachutes reduce speed for safe splashdown or landing.

What is a Semi-Ballistic Body?

- A semi-ballistic body is a re-entry vehicle that is not fully steerable like an aircraft but is also not completely passive like a falling object.
- By flying at a controlled angle of attack (created through an offset centre of gravity), it generates limited aerodynamic lift in addition to drag.
- This lift allows the capsule to perform small steering corrections, control descent path, and accurately reach a designated landing zone during atmospheric re-entry.

What is a Communication Blackout?

- A communication blackout occurs during re-entry when extreme heat ionises surrounding air, creating a plasma layer around the spacecraft. This plasma sheath blocks or reflects radio signals, temporarily preventing communication between the spacecraft and ground stations.
- Communication resumes once the vehicle slows down and the plasma dissipates at lower altitudes.

How will the Gaganyaan Crew Module Re-enter?

- The Orbital Module consists of a Crew Module (CM) and a Service Module (SM).
- Re-entry begins with a de-orbit burn performed by the SM to reduce orbital velocity.
- After de-orbiting, the Service Module separates and burns up in the atmosphere.
- The Crew Module enters Earth's atmosphere within a carefully controlled re-entry corridor to avoid overshoot or undershoot.
- Operating as a semi-ballistic body, it performs controlled manoeuvres using thrusters to maintain trajectory.
- A robust thermal protection system shields the module from intense heating.
- At lower altitudes, a three-stage parachute system deploys to reduce speed.
- The capsule finally performs a safe splashdown in the Bay of Bengal, the designated recovery zone for the mission.

Oleum Gas

Context:

A major oleum gas leak at Bhageria Industries Ltd in Boisar, Maharashtra, forced the evacuation of over 2,000 residents, including 1,600 students.

About Oleum Gas:

What it is?

- Oleum, commonly referred to as fuming sulfuric acid, is a highly corrosive chemical consisting of dissolved sulfur trioxide (SO_3) in concentrated sulfuric acid (H_2SO_4). It releases dense white fumes when exposed to moist air.

Chemical Name:

- Oleum (Fuming Sulfuric Acid)
- Chemical representation: $H_2SO_4 \cdot xSO_3$
- When x = 1, the compound is Disulfuric Acid ($H_2S_2O_7$), also called Pyrosulfuric Acid

Production:

Oleum is produced through the Contact Process, which involves:

1. Burning sulfur to produce sulfur dioxide (SO_2).
2. Oxidizing SO_2 to sulfur trioxide (SO_3).
3. Absorbing SO_3 into concentrated sulfuric acid to form oleum.

This method avoids directly dissolving SO_3 in water, which would create an uncontrollable acid mist.

Properties of the Gas:

Physical Properties:

- Appearance: It appears as dense, white cloudish smoke when leaked into the air.
- Freezing Point: Its freezing point varies strongly with concentration; it can be solid at room temperature or remain liquid as low as zero degree.

Chemical Properties:

- Dehydration: It is an extremely strong dehydrating agent, capable of pulling water elements out of sugars to leave pure carbon (the carbon snake reaction).
- Corrosivity: It is highly corrosive but lacks free water to attack surfaces, making it less corrosive to certain metals in its pure form compared to diluted acid.
- Hydration: It has a very high enthalpy of hydration; when SO3 in oleum meets water/moisture, it forms a fine mist of sulfuric acid.

Impact on Health:

- Acute Irritation: Exposure can cause minor to severe eye irritation.
- Respiratory Distress: Hazardous fumes can cause irritation to the respiratory tract; emergency responders use Self-Contained Breathing Apparatus (SCBA) to avoid inhalation.
- Sulfuric Acid Mist: In large releases, it creates a mist of micrometre-sized sulfuric acid particles that are hazardous over wide areas.

Applications:

- Sulfuric Acid Manufacture: Used as an intermediate to produce concentrated sulfuric acid by dissolving SO3 without creating difficult-to-manage mists.
- Explosives: Used in manufacturing explosives like Trinitrotoluene (TNT) to create anhydrous nitration mixtures.
- Organic Chemistry: Acts as a harsh reagent for secondary nitration of nitrobenzene.
- Industrial Transport: Transported in rail tank cars as a safe way to move sulfuric acid compounds between refineries and consumers.

Moonshot Project

Context:

The Indian Institute of Science has launched a Moonshot project on brain co-processors in partnership with the Pratiksha Trust.

About Moonshot Project:

What it is?

- The Moonshot Project is an advanced research initiative to develop brain co-processors—devices that interface with the human brain to decode neural signals, process them using AI, and stimulate the brain to restore lost functions.
- It combines neuromorphic computing, artificial intelligence, neuroscience, and bioelectronics to create closed-loop brain–machine systems.

Launched by:

- The project is led by the Indian Institute of Science.
- It is funded by the Pratiksha Trust, founded by Kris Gopalakrishnan and Sudha Gopalakrishnan.

Aim:

- To develop AI-driven brain co-processors that restore cognitive and motor functions, especially in patients affected by neurological disorders such as stroke.
- To build indigenous neurotechnology solutions suited for clinical use in India and other low-resource healthcare systems.

Key features:

1. Neuromorphic hardware + AI algorithms – Devices mimic brain-like computing systems to process neural signals efficiently.
2. Closed-loop brain interface – The system decodes brain signals, processes them using AI, and sends feedback via neural stimulation or neurofeedback.
3. Implantable and non-invasive versions – Development of both external devices and minimally invasive implants.
4. Stroke rehabilitation focus – Designed to restore sensorimotor functions such as reaching and grasping in stroke survivors.
5. Creation of neural datasets – Development of India-specific stereo EEG and ECoG brain-signal databases.
6. Open digital tools – AI tools, datasets, and visualization platforms will be developed as open digital public goods.
7. wo-phase development plan
   - Phase 1: Non-invasive neural co-processor for sensorimotor feedback.
   - Phase 2: Minimally invasive embedded implant to restore coordination in chronic stroke patients.

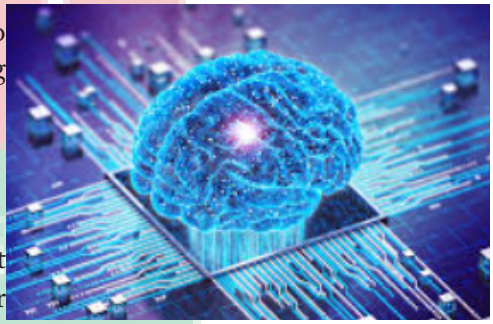
Significance:

- Positions India at the frontier of AI-driven brain-machine interface research.
- Could transform stroke rehabilitation and treatment of neurological disorders.

AI and the National Security Calculus

Context:

The U.S. military has reportedly integrated Anthropic's Claude AI into its kill chain for real-time target identification and legal approval during strikes in Iran.



About AI and the National Security Calculus:

What it is?

- The national security calculus refers to the strategic assessment of how AI—a dual-use technology—alters the balance of power between nations. Unlike nuclear technology, which is government-controlled and scarce, AI is driven by the private sector and defined by mathematical models and ubiquitous semiconductors.

Data/Stats on AI and National Security:

- Defense Speed: In the first 24 hours of the 2026 Iran conflict, the U.S. military leveraged AI targeting tools to strike over 1,000 targets, prioritizing them quicker than the speed of thought.
- Industrial Distillation: Anthropic reported 16 million unauthorized exchanges targeting its Claude model from approximately 24,000 fraudulent accounts linked to Chinese labs.
- Indian Cybersecurity Spending: India's information security spending is projected to reach $3.4 billion in 2026, an 11.7% increase from 2025, driven by sophisticated AI-led threats.
- Compute Power: Under the IndiaAI Mission, India has onboarded over 38,000 GPUs (targeting 100,000) to provide subsidized compute for national security and innovation.

Role of AI in National Security:

- Surveillance and Border Monitoring: AI-enabled drones and satellite imagery provide real-time reconnaissance of difficult terrains.
- Example: In early 2026, the Indian Army integrated AI-driven swarm drones for automated reconnaissance along the Line of Actual Control (LAC).
- Predictive Threat Analysis: Using machine learning to identify patterns in terrorist communication and movement.
- Example: The National Security Council Secretariat (NSCS) uses AI models to conduct national security impact assessments and scenario-based risk exercises.
- Cyber Defense and Anomaly Detection: Protecting critical infrastructure from polymorphic malware and deepfake-enabled fraud.
- Example: The CyberGuard AI Hackathon (2025) led to the deployment of AI-driven SOCs (Security Operation Centres) across India's power grids to detect intrusions.
- Internal Security and Crowd Control: Real-time facial recognition and behavioral analytics to maintain order during mass gatherings.
- Example: During the Maha Kumbh 2025, police used 2,700 AI-enhanced CCTV cameras to monitor crowd density and flag individuals with criminal records.
- Logistics and Autonomous Systems: Streamlining military supply chains and reducing human risk in hazardous zones.
- Example: The iDEX (Innovations for Defence Excellence) program has funded startups building AI-powered autonomous underwater vehicles for the Indian Navy.

Initiatives Taken So Far:

- IndiaAI Mission: A 10,372 crore flagship program focused on building sovereign compute, foundation models, and Safe and Trusted AI frameworks.
- BharatGen: The world's first government-funded multimodal large language model, supporting 22 Indian languages to ensure Cognitive Sovereignty.
- U.S.-India iCET (initiative on Critical and Emerging Technology): A bilateral partnership to co-develop defense AI and secure semiconductor supply chains.
- India AI Governance Guidelines (2026): A principle-based framework released at the New Delhi Summit to regulate autonomous weapons and surveillance tools.

Challenges Associated:

- The Black Box Strategic Problem: Difficulty in explaining AI's decision-making process during lethal operations.
- Example: If an AI-powered missile guidance system fails during a border skirmish, determining whether it was a software bug or a hack is nearly impossible.
- Dependence on Foreign Stacks: Relying on proprietary U.S. or open-source Chinese models risks kill switches or covert surveillance.
- Example: Analysts at the India AI Impact Summit 2026 warned that using imported models for policing creates an illusion of control that could collapse during a crisis.
- AI-Driven Disinformation: The use of deepfakes to manipulate public sentiment or destabilize the democratic process.
- Example: In 2025, security agencies flagged multiple AI-generated deepfake videos designed to incite communal tension during regional elections.
- Evasion of Export Controls: Sophisticated actors can bypass semiconductor restrictions through proxy services or model distillation.
- Example: Reports in early 2026 indicated that restricted Nvidia Blackwell chips were being used in Inner Mongolia to train models that rival top U.S. systems.
- Ethical and Human Control Dilemma: The risk of decision compression reducing human legal review to a mere rubber-stamping of machine decisions.

Way Ahead:

- Sovereign AI Infrastructure: India must control its own cognitive infrastructure by training models on locally relevant, diverse Indian datasets.
- Plurilateral Commitments: States must agree on universal red lines, such as maintaining meaningful human control over lethal autonomous weapons.
- Model-Level Safeguards: Developing technical fingerprinting to detect unauthorized model distillation and prevent IP theft.
- AI Red-Teaming: Establishing dedicated units within the Armed Forces to stress-test AI systems against adversarial machine learning attacks.
- Ethical Auditing: Moving toward Responsible AI 2.0, which involves continuous, auditable assurance of AI systems used in public and military sectors.

Conclusion:

The integration of AI into national security marks the end of traditional warfare and the beginning of algorithmic competition. For a nation like India, the challenge lies in balancing the tactical speed of AI with the ethical accountability of human judgment. Ultimately, true security will depend on achieving technological sovereignty and a robust, indigenous AI ecosystem that cannot be overridden by foreign interests.

GPS Jamming and Electronic Interference

Context:

The ongoing conflict in the Middle East has led to a 55% surge in electronic warfare incidents, with over 1,650 vessels experiencing GPS jamming and spoofing near the Strait of Hormuz.

About GPS Jamming and Electronic Interference:

What it is?

- GPS Jamming is a form of electronic warfare where a terrestrial device emits high-power radio frequency signals to overpower or drown out the relatively weak signals coming from GNSS satellites (like GPS, GLONASS, or NavIC).

How it Works?

- Satellite signals travel thousands of kilometers and are extremely faint by the time they reach Earth. A jammer works by broadcasting noise on the same frequency as the GPS signal (L1 and L2 bands). This creates a high signal-to-noise ratio that prevents the receiver on a ship or aircraft from locking onto the satellite data, effectively blinding the navigation system.

Types of GNSS Interference:

- Jamming (Denial of Service): Complete loss of signal. The receiver shows No Signal or Searching, forcing the operator to use manual navigation.
- Spoofing (Deception): A more sophisticated attack where the jammer sends a fake signal that mimics a real one. The receiver believes it is in a different location (e.g., a ship in the Strait of Hormuz might suddenly appear to be at an inland airport).

About Electronic interference:

What it is?

- Electronic interference, commonly known as Electromagnetic Interference (EMI), is the invisible pollution of the digital age. It occurs when an unwanted electromagnetic field disrupts the normal operation of an electronic device or communication system.

How Electronic Interference Works?

EMI operates through a three-part chain:

1. The Source: An object that generates electromagnetic energy (e.g., a motor, lightning, or a smartphone).
2. The Path (Coupling): The medium through which the energy travels to reach the victim device.
3. The Victim: An electronic device whose performance is degraded by the incoming energy.

The Four Coupling Mechanisms?

- 3Inductive (Magnetic): Occurs when a magnetic field from one wire leaks into a nearby wire without touching it.
- Capacitive (Electric): Occurs when two nearby conductors store an electric charge between them, causing voltage noise to transfer across.

Types of Interference:

- Narrowband: Affects only a specific, small frequency range. This is usually man-made noise from radio transmitters or mobile phones.
- Broadband: Affects a wide range of the radio spectrum. This is often caused by malfunctioning equipment, sunspots, or natural phenomena like lightning.
- Continuous: Interference that is constantly emitted (e.g., background radiation from a power line).
- Impulse/Transient: A short-duration burst of energy, such as a lightning strike or an electrostatic discharge (ESD) from your finger.

Asteroid 2024 YR4

Context:

NASA has officially ruled out the possibility of asteroid 2024 YR4 colliding with the Moon on December 22, 2032. Refined calculations using the James Webb Space Telescope (JWST) have confirmed the object will pass at a safe distance of 21,200 km.

About Asteroid 2024 YR4:

What it is?

- 2024 YR4 is a Near-Earth Object (NEO) classified as an Apollo-type asteroid (Earth-crossing). Discovered in December 2024 by the ATLAS survey in Chile, it briefly gained international attention as one of the most hazardous objects found in recent decades, reaching a Torino Scale rating of 3—the highest since the infamous asteroid Apophis in 2004.

Origin and Formation

- Main Belt Suburb: Recent studies link its origin to the central region of the Main Asteroid Belt between Mars and Jupiter.
- The Yarkovsky Effect: Scientists believe it was nudged toward Earth by the Yarkovsky effect, where uneven heating from the Sun acts as a mini-thruster, gradually shifting its orbit over millions of years.
- Former Boulder: Its size and solid composition suggest it may have once been a large boulder perched on the surface of a much larger rubble-pile asteroid before being chipped off by a collision.

Characteristics:

- Size: Estimated to be between 53 and 67 meters in diameter (roughly the size of a 15-story building).
- Shape: Observations indicate a distinctly flattened, oblate shape, often described as a hockey puck.
- Composition: It is a stony S-type asteroid, composed primarily of silicates and nickel-iron.
- Rapid Spin: It has an exceptionally fast rotation period of approximately 19.5 to 20 minutes.

Significance:

- It was the first asteroid to trigger a coordinated international response from the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG).
- Tracking the asteroid in early 2026 while it was extremely faint demonstrated the James Webb Space Telescope's capability to assist in planetary defence, a role for which it wasn't originally designed.

HALEU-Thorium Fuel

Context:

Nuclear scientists are divided over a study published in Current Science by BARC researchers questioning the viability of HALEU-Thorium (HALEU-Th) fuel for India's reactors.

About HALEU-Thorium Fuel:

What It Is?

- HALEU-Th is an advanced nuclear fuel mix combining High Assay Low Enriched Uranium (HALEU) with Thorium. A specific commercial version of this fuel is called 'ANEEL' (Advanced Nuclear Energy for Enriched Life), developed by the U.S.-based company Clean Core Thorium Energy (CCTE).

How Fuel is Developed?

- Enrichment: Natural uranium is processed to increase the concentration of the fissile isotope U-235.
- Mixing: To create HALEU-Th, uranium is enriched to between 5% and 20% (HALEU) and then mixed with Thorium.
- Fission Process: While Thorium itself is not fissile (cannot sustain a chain reaction), the U-235 in the HALEU act as the driver to initiate and maintain the nuclear reaction, eventually converting Thorium into fissile U-233.

Types of Uranium in the Mix:

1. Low Enriched Uranium (LEU): Contains less than 5% U-235 (used in most global reactors).
2. HALEU: Contains 5% to 20% U-235 (used in ANEEL/HALEU-Th).
3. Highly Enriched Uranium (HEU): Over 20% U-235 (restricted as it can be weapons-grade).

Key Features:

- High Burn-up: It offers a significantly higher energy output (up to 50–60 GWd/t) compared to natural uranium.
- Reduced Waste: The fuel produces significantly less spent fuel (radioactive waste)—only about 14% of what current reactors generate.
- Non-Proliferation: By keeping enrichment below 20%, the fuel remains unsuitable for nuclear weapons.
- Thorium Utilization: It allows for the immediate use of Thorium in existing Pressurised Heavy Water Reactors (PHWRs) without waiting for the third stage of India's nuclear program.

Limitations:

- Reactor Design Changes: BARC scientists claim it is not a drop-in fuel; it may reduce the effectiveness of shutdown rods by 26%, requiring structural modifications to reactors.
- Cost & Availability: HALEU is commercially limited and expensive to produce or import.
- Reprocessing Issues: Unlike India's traditional closed fuel cycle (which extracts plutonium from waste), HALEU-Th is not primarily designed for easy reprocessing.

Space Reactor 1 (SR-1) Freedom Spacecraft

Context:

NASA has revamped the Artemis programme, scrapping the Lunar Gateway plan and prioritizing a moon base and Mars missions.

- It also announced Space Reactor 1 Freedom, a nuclear-powered spacecraft to be launched by 2028.

About Space Reactor 1 (SR-1) Freedom Spacecraft:

What it is?

- Space Reactor 1 Freedom is set to be the first interplanetary spacecraft powered by a nuclear fission reactor, marking a transition from experimental laboratory research to active deep-space operations. It is a pathfinder spacecraft utilizing Nuclear Electric Propulsion (NEP).
- Announced By: The mission was officially announced by NASA.

Aim:

- To prove the viability of advanced nuclear electric propulsion for long-duration, deep-space travel.
- To deliver the Skyfall payload—a fleet of robotic helicopters—to the Martian surface to scout for water ice and human landing sites.
- To retire flight risks and activate the industrial supply chain for future nuclear-powered missions to the outer solar system.

Key Features:

- Repurposed Hardware: It will utilize the Power and Propulsion Element (PPE) originally designed for the now-paused Lunar Gateway station.
- Fission Reactor: Features an onboard reactor that splits uranium atoms to provide a continuous, high-output power source independent of sunlight.
- Skyfall Payload: Carries three (or up to six, per some reports) Ingenuity-class helicopters equipped with ground-penetrating radar and high-resolution cameras.
- Launch Date: Scheduled for launch in December 2028.

Significance:

- This will be the first U.S. space reactor since SNAP-10A in 1965, and the first ever used for propulsion beyond Earth orbit.
- Nuclear power allows for missions to the outer planets and through Martian dust storms where solar panels fail.

AI Tokens

Context:

The AI industry is shifting its economic focus toward tokenomics, where the cost per token has become the primary metric for global competition.

About AI Tokens:

What They Are?

- Tokens are the smallest units of data that a Large Language Model (LLM) processes. While humans read words, AI models break text down into tokens. A token can be a single character, a whole word, or even a part of a word (like the ing in running).

How It Works?

1. Tokenization: When you enter a prompt, the tokenizer slices the text into tokens.
2. Numerical Conversion: Each token is converted into a unique numerical ID (vector) that the model can understand.
3. Processing: The AI predicts the next most likely token in a sequence based on mathematical patterns learned during training.
4. Detokenization: The predicted numerical tokens are converted back into human-readable text for the final response.

Key Characteristics

- Language Variability: Different languages require different numbers of tokens; for example, complex scripts or rare languages often use more tokens per word than English.
- Context Window: Every AI model has a context window limit (e.g., 128k tokens), which defines how much information it can remember or process at one time.
- Statelessness: Models generally process tokens in chunks; they don't know who you are unless the previous tokens of the conversation are re-sent to the model.
- Granularity: Tokens allow models to understand the relationship between different parts of words, enabling them to handle spelling, grammar, and even coding languages effectively.

Significance:

- Tokens are the utility meter for AI. Most providers (OpenAI, Google, DeepSeek) charge developers based on Input Tokens (what you send) and Output Tokens (what the AI generates).
- China's lead in pricing per token makes its models highly attractive for AI Agents—automated systems that run thousands of background tasks and consume millions of tokens daily.

Chapter-
6

ECONOMY

The Fuel Excise Duty Cut

Context:

The Indian government has reduced excise duty on petrol and diesel by 10 per litre to shield consumers and Oil Marketing Companies (OMCs) from rising global crude prices.

About The Fuel Excise Duty Cut:

What it is?

- An excise duty is an indirect tax levied by the Central Government on the manufacture or sale of specific goods within the country.
- In this recent move, the government slashed the duty to ease the financial burden on OMCs, bringing the excise on petrol down to approximately 3 per litre and effectively reducing the diesel excise to zero.

How Fuel Prices are Derived in India?

Crude Oil Cost:

- This is the raw material price. Since India imports approximately 85% of its oil, this cost is highly sensitive to global benchmarks (like Brent Crude) and the USD-INR exchange rate.
- A weaker Rupee automatically makes fuel more expensive, even if global oil prices remain flat.

Refinery Transfer Price (RTP):

- Once crude arrives, it must be processed. RTP is the price charged by refineries to Oil Marketing Companies (OMCs).
- It includes the actual cost of refining (turning crude into petrol/diesel), plus ocean freight, insurance, and port charges.

OMC Margin:

- Oil Marketing Companies (like IOCL, BPCL, and HPCL) add an operational margin to cover their own costs.
- This includes the expense of transporting fuel from refineries to storage depots and then to petrol pumps, as well as their corporate overheads and profit.

Central Excise Duty:

- This is a fixed-rate tax levied by the Union Government. Unlike some taxes that are a percentage, this is usually a specific Rupee amount per litre.
- It includes basic duty, the Road and Infrastructure Cess (RIC), and the Agriculture Infrastructure and Development Cess (AIDC).

Dealer Commission:

- This is the earnings paid to the petrol pump owner. It covers the cost of running the station, employee wages, electricity, and the dealer's profit margin. It is revised periodically by the government.

State VAT (Value Added Tax):

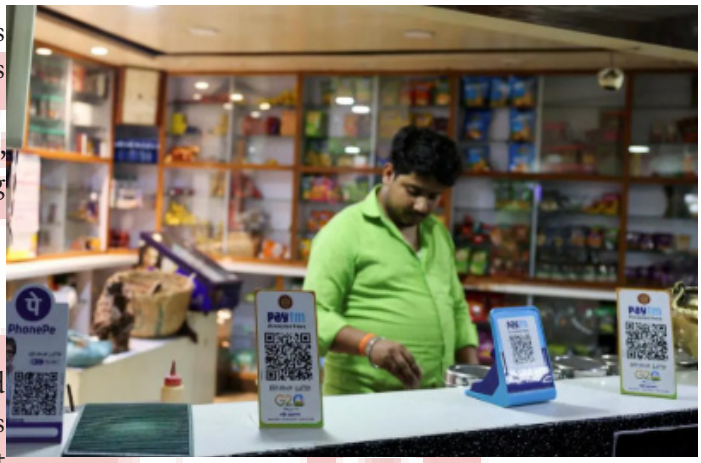
- This is an ad valorem tax (a percentage) imposed by individual State Governments. Because it is a percentage of the sum of all previous costs, the tax amount increases as the base price rises.
- This is why fuel prices vary significantly between states like Goa (lower VAT) and Rajasthan or Maharashtra (higher VAT).

Fuel Price Breakdown (Percentage Share)

Component	Share of Final Price (%)
Base Price	45% – 50%
Central Taxes	3% – 20%
State VAT	15% – 25%
Dealer Commission	3% – 4%
Final Retail Price	100%

RBI Payments Vision 2028

Context:



The Reserve Bank of India (RBI) has released its 'Payments Vision 2028' document, titled Shaping India's Payment Frontier.

- This strategic roadmap succeeds the 4Es (Everyone, Everywhere, Every time) vision of 2025, shifting the focus toward deepening consumer trust.

About RBI Payments Vision 2028:

What it is?

- It is a comprehensive policy framework and roadmap designed to guide the evolution of India's payment systems. It marks a transition from just expanding reach to scaling global dominance and ensuring the digital ecosystem is secure, interoperable, and resilient against emerging cyber threats.

Organization Involved: Reserve Bank of India (RBI).

- Aim: The primary goal is to empower users while providing robust safeguards against fraud.

Key Features:

- Interoperability in TReDS: Proposes a unified framework for Trade Receivables Discounting Systems to streamline MSME financing and extend services to export-oriented MSMEs.
- Payments Switching Service (PaSS): A centralized service allowing customers to migrate payment instructions seamlessly when switching bank accounts (Account Portability).
- Enhanced User Controls: Introduction of a Switch On/Off facility for all digital payment modes (UPI, IMPS, etc.), similar to current credit/debit card controls, to mitigate fraud.
- Shared Liability Framework: A new responsibility model where both issuing and beneficiary banks share liability for unauthorized transactions to protect consumers.
- Cyber Resilience (KRI): Introduction of Cyber Key Risk Indicators for non-bank payment operators to provide early warning signals for potential security breaches.
- Cross-Border Overhaul: A Single-Window authorization for international payments and periodic benchmarking of transaction costs and speeds against global standards.
- Cheque Modernization: Reviewing physical cheque security while introducing Electronic Cheques to merge traditional reliability with digital speed.
- AI and Data Integration: Creation of an AI-enabled payments data repository for better transparency and research-led policy making.
- Small Payment System Providers (SPSPs): Recognition of smaller players under a Perpetual Regulatory Sandbox to encourage niche innovations.

Significance:

- By benchmarking against 15 global indicators, India seeks to maintain its status as a world leader in real-time digital payments.

- Interoperability in TReDS and factoring with recourse will unlock much-needed liquidity for small businesses, boosting the Make in India initiative.

Raajmarg Infra Investment Trust (RIIT)

Context:

The NHAI-sponsored Raajmarg Infra Investment Trust (RIIT) is being officially listed on the Bombay Stock Exchange (BSE) today.

About Raajmarg Infra Investment Trust (RIIT):

What it is?

- RIIT is an Infrastructure Investment Trust (InvIT), a collective investment vehicle similar to a mutual fund but specifically designed for infrastructure assets. It is registered with SEBI and constituted as an irrevocable trust under the Indian Trusts Act, 1882.

Established In:

- Trust Registered: December 22, 2025.

Organizations Involved:

- Raajmarg Infra Investment Managers Private Limited (RIIMPL) – responsible for day-to-day management.

Aim:

- To monetize completed National Highway assets by pooling retail and institutional investment, thereby generating long-term sustainable value for investors while freeing up capital for the government to build new infrastructure.

Key Functions:

- Asset Monetization: Transfers income-generating highway stretches from NHAI to the Trust to raise upfront capital.
- Investment Management: Decisions regarding the acquisition of new assets and the optimization of the existing portfolio are managed by RIIMPL.
- Revenue Collection: Managing toll collection and operational revenues from the highway assets under its control.
- Distribution of Returns: Distributes a significant portion of the net cash flows (typically at least 90%) to the unit holders as dividends or interest.
- Regulatory Compliance: Ensures all operations and financial disclosures strictly adhere to SEBI (Infrastructure Investment Trusts) Regulations, 2014.

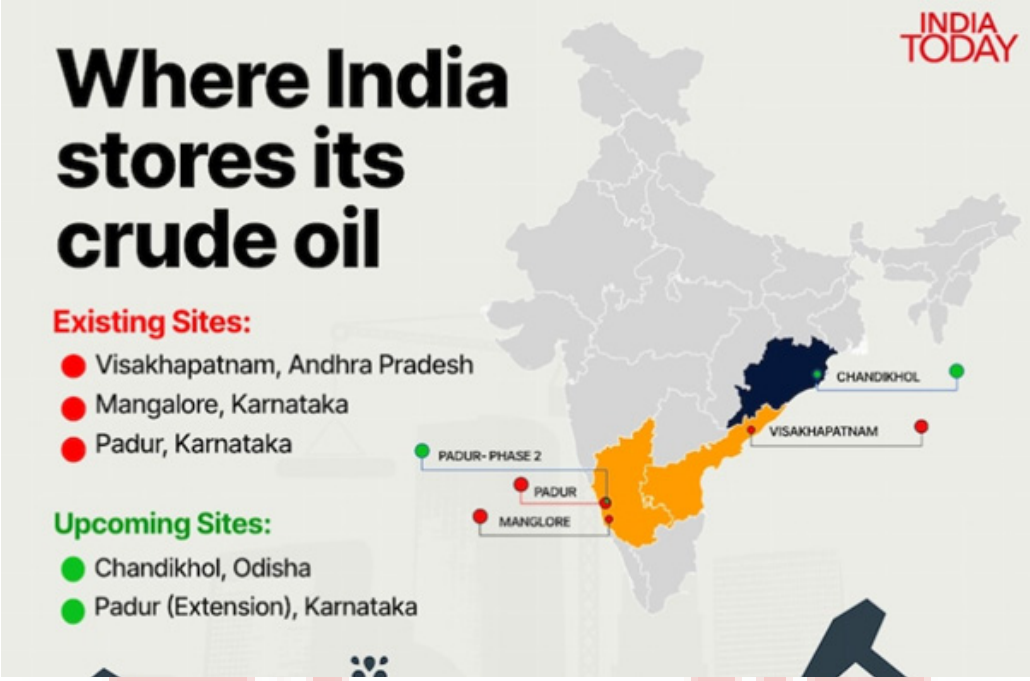
Significance of Listing:

- Allows individual retail investors to own a piece of India's highway infrastructure, which was previously accessible only to large institutional players.
- Enables NHAI to unlock equity from toll-ready roads and reinvest that money into the construction of new expressways and greenfield projects.
- Reduces the government's dependence on the union budget and high-interest bank loans for infrastructure development.

Strategic Petroleum Reserves (SPRs)

Context:

The Ministry of Petroleum and Natural Gas informed the Rajya Sabha that India's Strategic Petroleum Reserves (SPRs) are currently at only 64% capacity.



About Strategic Petroleum Reserves (SPRs):

What it is?

- Strategic Petroleum Reserves are massive stockpiles of crude oil stored in underground rock caverns. They serve as a specialized insurance policy to protect the nation against unplanned supply disruptions caused by geopolitical wars, natural disasters, or global price shocks.

Established In:

- The concept was mooted after the 1973 oil crisis.
- Indian Strategic Petroleum Reserve Limited (ISPRL), the Special Purpose Vehicle (SPV) managing them, was created in 2004 under the Oil Industry Development Board (OIDB).

Initiative is Part of:

- India's broader Energy Security Strategy and its commitment as an Associate Member of the International Energy Agency (IEA), which recommends maintaining a 90-day reserve of net oil imports.

Located In (Phase-I):

1. Visakhapatnam, Andhra Pradesh.
2. Mangaluru, Karnataka.
3. Padur, Karnataka.
   - Phase-II expansion is planned for Chandikhol, Odisha, and further expansion in Padur.

Aim:

- To ensure energy sovereignty by providing a short-term buffer (currently covering approximately 9.5 days of India's requirement) during emergencies, effectively shielding the domestic economy from volatile global oil markets.

Key Features:

- Underground Storage: Oil is stored in unlined underground rock caverns, which is safer and more cost-effective than above-ground tanks.
- Hydrostatic Containment: These caverns use the pressure of surrounding groundwater to keep the oil trapped inside, preventing leaks.
- Strategic-cum-Commercial Model: The government allows foreign National Oil Companies (like ADNOC of UAE) to lease space, reducing the government's storage costs while ensuring the oil remains in India for emergencies.

- Dynamic Stocking: ISPRL manages the inventory by buying crude when international prices are low (downcycle) to save on the exchequer's bill.
- Refiner Integration: The SPRs are strategically located near the coast and existing refineries to ensure quick mobilization of crude during a crisis.

Significance:

- Protects India—the world's third-largest oil consumer—which imports over 88% of its crude requirement.
- Prevents sudden spikes in petrol and diesel prices at the pump, which can trigger inflation across the entire supply chain.

Economic Stabilisation Fund

Context:

Finance Minister has announced an allocation of 57,381 crore for a new Economic Stabilisation Fund to help India navigate global headwinds, such as the West Asia conflict and supply chain disruptions.

About Economic Stabilisation Fund:

What it is?

- The Economic Stabilisation Fund is a specialized fiscal mechanism designed to provide the Central Government with the necessary headroom to respond to unanticipated global and domestic economic shocks.
- It acts as a financial buffer to absorb the impact of volatile external factors without derailing the national budget.
- Launched by: The fund was introduced by the Ministry of Finance, Government of India.
- Aim: The primary goal of the fund is to protect the Indian economy from global headwinds, including oil price shocks (such as the $100-per-barrel surge), energy shortages, and sudden supply chain disruptions arising from international conflicts.

How it Works?

- The government allocates specific sums (currently 57,381 crore) through Supplementary Demands for Grants.
- These funds are then utilized to offset extra expenditures caused by external crises.
- Crucially, the government manages these extra allocations alongside additional receipts to ensure that the overall fiscal deficit target (set at 4% of GDP for 2025-26) remains unaffected.

Key Features:

- Fiscal Headroom: It provides the government with the flexibility to spend on emergency measures without immediate legislative delays during a crisis.
- Targeted Response: Specifically designed to address unanticipated supply chain disruptions and unexpected shocks to sub-sectors of the Indian economy.
- Deficit Neutrality: The Minister asserted that the expenditure from this fund would not lead to missing the Centre's fiscal deficit targets.
- Macroeconomic Shield: It builds upon the post-COVID-19 recovery framework to strengthen the country's ability to absorb diverse economic shocks.
- Large-Scale Allocation: The initial corpus is significant, forming a major part of the 2.01 lakh crore net additional cash spending approved by the Lok Sabha.

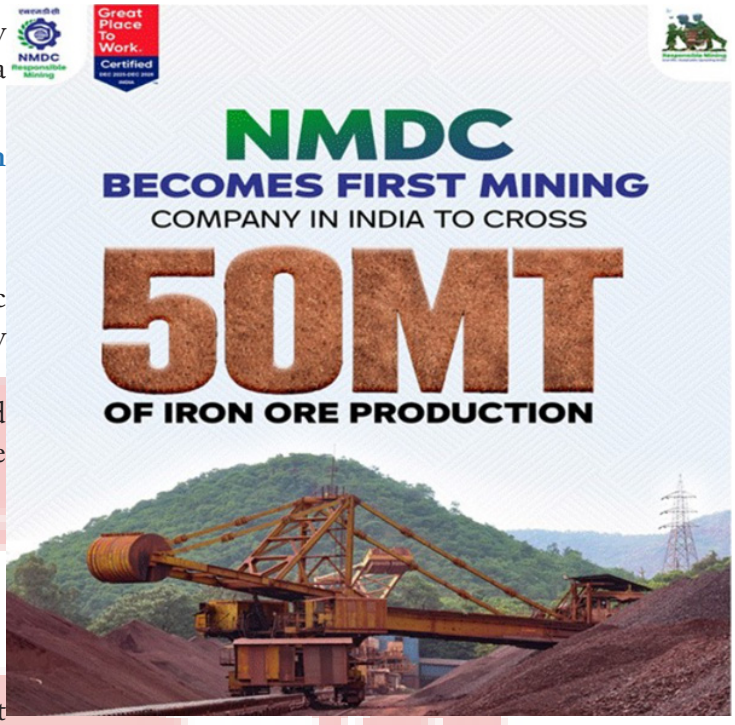
Significance:

- Enables India to maintain its growth momentum even when global markets are volatile due to West Asia conflicts or U.S.-Iran tensions.
- Provides a cushion against oil shocks, ensuring that domestic fuel prices and energy supplies can be stabilized.

National Mineral Development Corporation (NMDC)

Context:

NMDC Limited has become the first mining company in India to produce 50 million tonnes of iron ore in a single financial year (FY 2025–26).



About National Mineral Development Corporation (NMDC):

What it is?

- NMDC Limited is a Navratna Central Public Sector Enterprise (CPSE) under the Ministry of Steel.
- It is the largest producer of iron ore in India and a key entity in the country's mineral resource development.

Established in: 1958

Headquarters: Hyderabad

Aim:

- To explore, develop, and sustainably exploit mineral resources in India.
- To ensure reliable domestic supply of iron ore for the steel industry.
- To support India's goal of expanding steel production capacity to 300 million tonnes by 2030.

Functions:

- Iron ore production: Operates large mechanised iron ore mines mainly in Chhattisgarh and Karnataka.
- Mineral exploration: Conducts geological surveys and exploration to identify mineral deposits.
- Diamond mining: Operates India's only mechanised diamond mine at Panna.
- Research and development: Maintains an R&D centre in Hyderabad recognized as a Centre of Excellence by United Nations Industrial Development Organization.
- Sustainable mining practices: Adopts scientific mining methods and environmental management systems.
- Community development: Undertakes CSR initiatives to improve livelihoods and infrastructure in mining regions.

Significance

- Backbone of India's iron ore supply: Provides raw material critical for the country's steel manufacturing sector.
- Supports industrial growth: Essential for achieving the 300 MT steel capacity target by 2030.
- Strategic mineral security: Reduces dependence on imported iron ore.

The Essential Commodities Act, 1955 (ECA)

Context:

In response to an energy crisis triggered by recent geopolitical strikes on Iran, the Centre invoked the Essential Commodities Act (ECA), 1955.

About The Essential Commodities Act, 1955 (ECA):

What it is?

- The Essential Commodities Act is a central legislation enacted to control the production, supply, and distribution of specific commodities deemed essential for the general public. It empowers the government to prevent hoarding and black marketing while ensuring equitable distribution at fair prices.

Aim:

- To ensure the steady availability of essential goods.
- To prevent artificial scarcity and regulate the prices at which these commodities are bought or sold.
- To secure commodities for the defense of India or the efficient conduct of military operations.

Key Features

- Declaration of Commodities: Essential commodity means any item specified in the Schedule of the Act.
- Amending the Schedule: The Central Government can add or remove commodities from the Schedule in consultation with State Governments.
- Stock Limits: The government can fix the quantity of a commodity any person or trader can hold in stock.
- Price Regulation: The Act allows for the fixation of prices, particularly for items like foodgrains, edible oils, and sugar.
- Penalties: Contravention of orders under Section 3 can lead to imprisonment ranging from three months to seven years, plus fines.
- Confiscation: Authorities have the power to seize and confiscate commodities, along with the vehicles or animals used for their transport, if the Act is violated.

When the Act is Invoked:

- The Act is typically invoked during extraordinary circumstances to protect consumers:
- War or Famine: As seen in the recent 2026 energy crisis linked to the U.S.-Israel-Iran conflict.
- Natural Calamities: Used during the COVID-19 pandemic to ensure the availability of masks and sanitizers.
- Extraordinary Price Rise: Invoked when the retail price of non-perishable agricultural produce increases by 50%, or horticultural produce by 100%.
- Festive Seasons/Elections: Historically used to moderate prices of wheat or sugar before major festivals or state elections to maintain stability.

Significance

- Acts as a primary tool to ensure that essential food items remain affordable for vulnerable sections of society.
- Prevents traders and wholesalers from hoarding goods to create speculative price hikes.

SEBI Mandates Registered Name & Number Disclosure on Social Media

Context:

SEBI has issued a new circular mandating all SEBI-registered market intermediaries to disclose their registered name and registration number while posting securities-related content on social media.

About SEBI Mandates Registered Name & Number Disclosure on Social Media:

What it is?

- A regulatory directive issued by the Securities and Exchange Board of India (SEBI) requiring all SEBI-regulated entities and their agents to prominently display their registered identity and registration number on social media platforms while sharing securities market-related content.

Aim:

- To help investors clearly distinguish between authorized SEBI-regulated entities and unregistered or misleading financial influencers, thereby improving transparency and trust in digital investment communication.

Key Features:

- Mandatory Identity Disclosure: Registered name and SEBI registration number must appear on social media profiles and at the beginning of each securities-related post or video.
- Wide Coverage: Applies to stockbrokers, mutual funds, investment advisers, research analysts, portfolio managers, AIFs, AMCs, REITs, InvITs and their distributors/agents.

- Broad Platform Scope: Includes YouTube, Instagram, WhatsApp, Telegram, X, Facebook, LinkedIn, Reddit, Threads and even closed or semi-closed groups.
- Multiple Registration Rule: Entities with multiple registrations must provide a web link listing all registrations; individual posts need only relevant registration details.

Significance:

- Investor Protection: Reduces misinformation and fake financial advice by enabling easy verification of regulated entities.
- Market Transparency: Strengthens accountability and credibility in digital financial communication under SEBI's Ease of Doing Investment initiative.

Sixteenth Finance Commission — Misses and Concerns

Context:

The Sixteenth Finance Commission (16th FC), chaired by Dr. Arvind Panagariya, submitted its final report for the period 2026–31.

- The recommendations have sparked a nationwide debate, with former RBI Governor C. Rangarajan and several state governments expressing concerns over the discontinuation of traditional grants.

About Sixteenth Finance Commission — Misses and Concerns:

What it is?

- The Finance Commission is a constitutional body established under Article 280 to define the financial relations between the Union and the States.
- The 16th FC's mandate was to recommend the vertical share of taxes for states and the horizontal formula to distribute those funds among them for the five-year award period starting April 1, 2026.

Recommendations of the 16th FC:

1. Vertical Devolution (41%): The Commission recommended retaining the states' share in the divisible pool of central taxes at 41%, maintaining the status quo from the 15th FC.
2. Horizontal Devolution Formula: A new formula was introduced with a 10% weightage for Contribution to GDP (measured by the square root of GSDP), replacing the previous Tax Effort criterion.
3. Local Body Grants (7.9 Lakh Crore): Substantial funds were allocated for rural and urban local bodies, with 80% as basic grants and 20% as performance-linked grants.
4. Disaster Management: A corpus of 2.04 Lakh Crore was recommended for State Disaster Relief and Mitigation Funds, with a 75:25 cost-sharing ratio (90:10 for Himalayan/NE states).
5. Urbanisation Premium: A unique 10,000 Crore grant was proposed to incentivise the merger of peri-urban villages into larger urban local bodies.
6. Fiscal Deficit Targets: The Commission recommended that the Centre reduce its deficit to 3.5% of GDP by 2030-31, while States must strictly adhere to a 3% GSDP cap.

Concerns Associated with the Recommendations:

- Cesses and Surcharges: The Commission failed to cap non-shareable cesses and surcharges, which now account for nearly 20% of the Centre's gross tax revenue, effectively reducing the actual money available for states.
- End of Revenue Deficit Grants: For the first time, the FC discontinued Article 275 revenue deficit grants, leaving states with high debt (like Himachal Pradesh and Punjab) in a precarious fiscal debt spiral.
- Overestimation of Growth: Critics argue the projected 32.7% effective transfer ratio for 2026-27 is based on an optimistic 11% nominal GDP growth, which may not materialize.

- GST Reform Impact: The 16th FC did not factor in the revenue-reducing effects of the September 2025 GST rate cuts (which moved most 12% and 28% items into 5% and 18% slabs).
- Horizontal Inequity: The use of GSDP Contribution (10%) favors industrially advanced richer states, while the reduction in weight for Income Distance may hurt poorer states like Bihar and Uttar Pradesh.

Way Ahead:

- Constitutional Amendment on Cesses: There is a growing demand to amend Article 270 to include cesses and surcharges in the divisible pool to protect the spirit of cooperative federalism.
- Equalisation Grants: The Centre should consider Need-based equalisation grants under Article 275 to support states struggling with the delivery of essential services like health and education.
- Off-Budget Borrowing Transparency: States must move all off-budget liabilities onto their main budgets as recommended, to ensure long-term debt sustainability.
- Performance Tracking: A robust, independent mechanism is needed to monitor the Performance Component of local body grants to ensure money leads to actual urban/rural infrastructure improvement.
- GST Compensation Review: Given the 2025 reforms, the GST Council and the Centre may need to revisit the compensation mechanism if state revenues fall significantly below the 14% growth benchmark.

Conclusion:

The 16th Finance Commission marks a philosophical shift toward a compliance-driven, performance-oriented fiscal model that prioritizes economic contribution over traditional gap-filling. While it offers predictability by maintaining the 41% share, the withdrawal of safety nets like revenue deficit grants puts the onus of fiscal survival squarely on the states.

The Sliding of the Indian Rupee

Context:

The Indian Rupee breached the psychologically crucial 92-mark, sliding to 92.17 against the US Dollar.

- This sharp depreciation is primarily driven by escalating geopolitical tensions in West Asia (Iran conflict) and a 10% surge in global crude oil prices, threatening India's inflation targets and current account stability.

About The Sliding of the Indian Rupee:

What it is?

- The sliding of the rupee refers to its depreciation—a decrease in its value relative to the US Dollar.
- In a market-linked system, this means it now takes more rupees to buy one dollar, making imports (like oil and electronics) more expensive while potentially making Indian exports (like IT services and pharma) more competitive in global markets.

How Rupee Valuation Works?

1. Market Forces (Demand & Supply): The value is primarily determined by the demand for dollars (for imports and investments) versus the supply of dollars (from exports and FDI/FII).
2. Current Account Balance: A higher trade deficit (importing more than exporting) increases the demand for dollars, putting downward pressure on the rupee.
3. Capital Flows: Inflow of foreign investment (FII/FDI) strengthens the rupee, while capital flight (investors pulling out due to global risks) weakens it.
4. RBI Intervention: While the rupee is managed float, the RBI intervenes by selling dollars from its forex reserves to curb excessive volatility and prevent a free-fall.

Reasons for the Fall of the Rupee:

- Surging Global Crude Oil Prices: As India imports ~80% of its oil, rising prices increase the demand for dollars to settle trades.

- Example: Brent crude's 10% spike in early March 2026, following fears of a Strait of Hormuz shutdown, has significantly bloated India's import bill.
- Geopolitical Risk-Off Sentiment: The Iran-West Asia conflict has led global investors to move capital to safe-haven assets like the US Dollar and Gold.
- Example: In the first week of March 2026, Foreign Institutional Investors (FIIs) turned net sellers in Indian equities, liquidating positions to repatriate funds in dollars.
- Disruption in Remittance Corridors: Conflict in the GCC (Gulf Cooperation Council) region threatens the steady flow of remittances, a major source of dollar supply for India.
- Example: Economists have flagged that a prolonged Iran-Israel-US conflict could reduce the $100 billion+ annual remittance inflow that typically supports the rupee.
- Widening Current Account Deficit (CAD): The gap between what India earns from exports and spends on imports has expanded due to high energy and electronic costs.
- Example: India's CAD increased to $13.2 billion (1.3% of GDP) in Q3 of FY 2025-26, up from 1.1% in the previous year, creating a structural weakness in the currency.

Implications of a Fallen Rupee on the Indian Economy:

- Imported Inflation: Costlier oil and components lead to higher transport and manufacturing costs, which are eventually passed on to consumers.
- Example: In March 2026, the RBI revised its retail inflation projection upward, reflecting the potential pass-through of higher fuel prices to retail goods.
- Margin Compression in Energy-Intensive Sectors: Industries like aviation, logistics, and paints face rising input costs, hitting their quarterly profitability.
- Example: Several Indian airlines announced fuel surcharges in March 2026 to offset the combined blow of higher ATF prices and a weaker rupee.
- Increased Cost of External Debt: Indian companies with large External Commercial Borrowings (ECBs) find it more expensive to service their dollar-denominated loans.
- Example: As of December 2025, India's ECBs stood at $44.36 billion; the slide to 92+ against the dollar has increased the rupee-repayment burden by nearly 5-7% for these firms.
- The Silver Lining for Export Sectors: IT and Pharma sectors see a boost in rupee-denominated earnings as their dollar billing translates into more domestic currency.
- Example: Large-cap IT firms like TCS and Infosys are expected to see a currency tailwind in their Q4 FY26 results, providing a buffer against slower global tech spending.

Way Ahead:

- RBI Market Intervention: The central bank must strategically use its $600 billion+ forex reserves to defend the 92-level and prevent panic-driven volatility.
- Monetary Policy Vigilance: The Monetary Policy Committee (MPC) may need to maintain an extended pause or even hike rates if imported inflation threatens to unanchor expectations.
- Diversifying Energy Sourcing: Accelerating oil imports from non-conflict zones and increasing the share of renewables to reduce the structural dollar demand for energy.
- Incentivizing Non-Basal Capital Inflows: Providing tax breaks or easier norms for FPIs in government bonds to attract stable dollar inflows to counter the trade deficit.
- Boosting Domestic Manufacturing: Reducing the reliance on imported electronic and chemical components through schemes like PLI 2.0 to lower the long-term trade deficit.

Conclusion:

The breach of the 92-mark is a Geopolitical Stress Test for the Indian economy, where the benefits for IT exporters are outweighed by the risks of imported inflation. While the RBI's reserves offer a safety net, the long-term stability of the rupee will depend on India's ability to navigate the West Asian energy crisis. Ultimately, a stable rupee is more important for the economy than a strong one.

Variable Rate Repo (VRR) Auctions

Context:

The RBI injected 55,837 crore into the banking system via a 3-day VRR auction to address tightening liquidity.

About Variable Rate Repo (VRR) Auctions:

What is Variable Rate Repo (VRR) Auctions?

- A Variable Rate Repo (VRR) is a monetary policy tool used by the RBI to inject liquidity into the banking system when cash becomes scarce. Unlike the fixed-rate repo, the interest rate in a VRR is determined through a competitive bidding

How it Works?

1. Announcement: The RBI notifies banks of its intent to lend a specific amount (e.g., 1 lakh crore) for a set duration (e.g., 3 days).
2. Bidding: Commercial banks submit bids stating the amount they want to borrow and the interest rate they are willing to pay.
3. Allotment: The RBI accepts bids starting from the highest rate offered down to a cut-off rate, which is the lowest rate at which funds are disbursed.
4. Collateral: Banks provide government securities to the RBI as collateral, which they repurchase (Repo) at the end of the term.

Aim of VRR:

- The primary objective is liquidity management. By infusing cash, the RBI ensures that banks have enough funds to meet daily requirements, preventing the Call Money Rate (the rate at which banks lend to each other) from spiking far above the policy Repo rate.

Key Features of Short-Term VRR:

- Flexibility: It targets immediate, temporary deficits (usually 1 to 14 days) caused by seasonal factors like tax payments or festivals.
- Market-Driven: The Variable Rate allows the market to determine the cost of funds based on actual demand.
- Short Duration: These are tactical tools, unlike Open Market Operations (OMO), which provide long-term durable liquidity.
- Collateralized: Like all repo transactions, these are backed by high-quality government bonds.

Implications:

- By filling the liquidity gap, it prevents volatility in the short-term money market.
- Ensures that banks don't tighten lending to businesses and consumers just because they are temporarily low on cash.
- High demand for VRR funds usually indicates that the banking system is in a deficit mode rather than a surplus mode.

Gruh Sugam Portal

Context:

The National Housing Bank (NHB) has launched the Gruh Sugam portal, a specialized digital lending platform designed for Defense, Paramilitary, and Government personnel.

About Gruh Sugam Portal:

What it Is?

- It is a dedicated digital bridge between government employees and lending institutions. The portal functions as an aggregator where employees can register their home loan requirements, receive multiple competitive offers from banks, and complete the application process digitally through their respective administrative units.

Organisation Involved:

- The project is spearheaded by the National Housing Bank (NHB), which is the apex regulatory body for housing finance in India under the Government of India.

Aim:

- The primary objective is to foster financial inclusion and affordable home ownership for Defense and Government personnel.
- It specifically targets the challenges faced by soldiers and officials posted in remote or high-altitude areas who find it difficult to physically coordinate with financial institutions for documentation and approvals.

Key Features:

- Administrative Unit Integration: Personnel can apply for loans directly through their office/unit's digital interface, eliminating the need to visit banks.
- Unified Digital Marketplace: Provides a transparent platform where users can discover and compare the best-suited loan offers from various registered banks.
- Minimal Data Entry: Applicants can register their requests with basic data, which is then securely relayed to multiple lending institutions for bidding.
- Seamless Operations: Integrated directly with the NHB and major lending institutions to ensure high processing efficiency and faster disbursement.
- Support & Protection: Features an online chat facility for real-time query resolution and a dedicated grievance redressal mechanism for consumer protection.

Significance:

- It provides banking at the doorstep for soldiers in border areas, ensuring their families can secure housing while they are on duty.
- Accelerates the adoption of digital lending in the public sector, reducing the paper trail and bureaucratic delays in loan processing.
- By allowing users to compare offers, it forces banks to offer competitive interest rates, making housing more affordable.

Periodic Labour Force Survey (PLFS) Annual Report, 2025

Context:

The Ministry of Statistics and Programme Implementation (MoSPI) released the Periodic Labour Force Survey (PLFS) Annual Report for 2025.

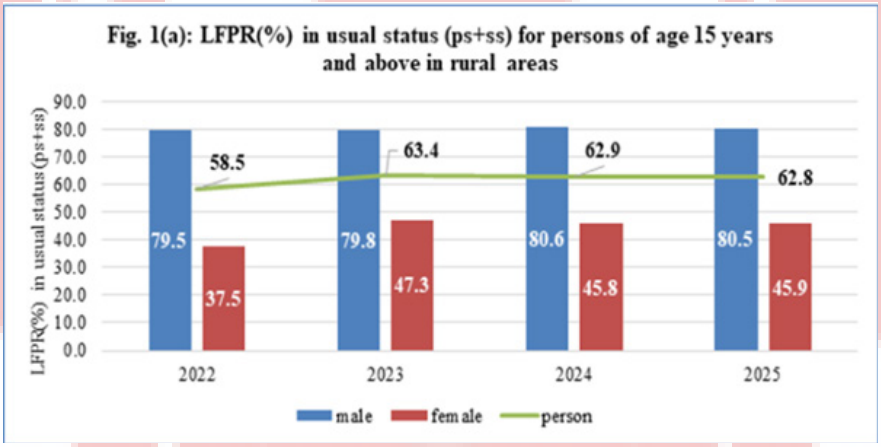
About Periodic Labour Force Survey (PLFS) Annual Report, 2025:

What it is?

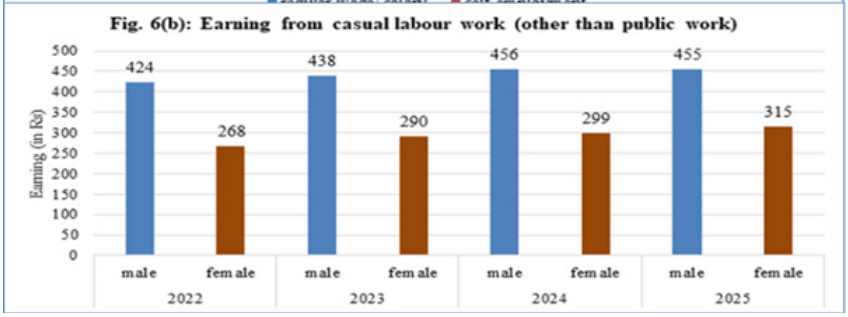
- The PLFS was launched by the National Statistical Office (NSO) in 2017 to estimate key employment and unemployment indicators. It provides data in two formats: Usual Status (ps+ss), which maps activity over the preceding 365 days, and Current Weekly Status (CWS), which maps the preceding 7 days.

Key Summary of the PLFS Annual Report 2025:

- Stable Participation: The Labour Force Participation Rate (LFPR) for ages 15+ remained stable at 59.3%, with male participation at 79.1% and female at 40.0%.



- Steady Employment: The Worker Population Ratio (WPR) stood at 57.4%. Notably, rural female WPR held steady at 44.9%, sustaining gains made since 2022.
- Declining Unemployment: The overall Unemployment Rate (UR) was 3.1%. Youth unemployment (ages 15-29) saw a drop to 9.9% from 10.3% in the previous year.



- Shift to Regular Wage: There is a positive shift in employment quality, with regular wage/salaried employees increasing to 23.6%, while self-employment declined to 56.2%.
- Sectoral Recomposition: Agriculture's share of employment decreased from 44.8% to 43.0%, while manufacturing saw an improvement to 12.1%.
- Education & Unemployment: The unemployment rate among educated persons (secondary and above) reduced to 6.5%, reflecting better absorption of the skilled workforce.
- Gender Wage Growth: Nominal wages for women grew across all sectors, with the highest growth of 8.8% observed in the self-employed category.
- Education Attainment: At the all-India level, the average number of years in formal education for those aged 15+ reached 10.0 years.

Challenges Associated:

- Gendered Reasons for Inactivity: A massive disparity exists in why individuals stay out of the labor force.
- Example: While 69.8% of males cite continued studies, 44.4% of females cite child care/home-making, highlighting persistent socio-economic barriers for women.
- Working Hour Disparity: There is a significant gap in the duration of economic work between genders.
- Example: Urban self-employed males work 17.5 hours more per week than females, suggesting women bear a disproportionate burden of unpaid domestic work.
- High NEET Rates: A large portion of the youth remains outside the productive ecosystem.
- Example: Approximately 25.0% of persons aged 15-29 are Not in Employment, Education, or Training (NEET), posing a risk of a wasted demographic dividend.
- Low Vocational Training: The reach of formal skill development remains minimal.
- Example: Only 4.2% of the 15-59 age group reported receiving formal vocational or technical training, indicating a massive skill gap in the workforce.
- Comparability Issues: The change in survey methodology makes historical trend analysis difficult.
- Example: Because the 2025 report uses a revamped sampling design and a calendar-year cycle, results are not strictly comparable with reports prior to December 2024.

Way Ahead:

- Bridging the Gender Gap: Implement policies that reduce the home-making burden on women, such as expanded affordable childcare and flexible work models.
- Scaling Vocational Training: Revitalize the Skill India Mission to increase the 4.2% vocational training rate to at least 20% to meet manufacturing demands.
- Targeting Urban Youth: Address the higher urban youth unemployment rate (13.6%) by incentivizing start-ups and service-sector hubs in Tier-2 and Tier-3 cities.
- Formalization of Jobs: Continue the shift from self-employment to regular salaried jobs by providing social security benefits to a wider array of workers.
- Utilizing the NEET Population: Create targeted bridge courses and apprenticeships specifically for the 25% of youth currently not in education or employment.

Conclusion:

The PLFS 2025 report paints a picture of a resilient Indian labor market that is successfully transitioning toward manufacturing and regular salaried employment. While declining unemployment and rising female wages are positive indicators, the high percentage of youth in the NEET category and the low levels of vocational training remain critical hurdles. Addressing these structural gaps will be essential for India to fully capitalize on its demographic transition by 2028 and beyond.

India's Nationally Determined Contribution (2031-2035)

Context:

The Union Cabinet has approved India's updated Nationally Determined Contribution (NDC) for 2031-2035 to be submitted to the UNFCCC.

About India's Nationally Determined Contribution (2031-2035):

What it is?

- Nationally Determined Contributions (NDCs) are climate action plans submitted by countries under the Paris Agreement to describe their self-defined targets for reducing greenhouse gas emissions and adapting to climate impacts.
- Term: This specific NDC covers the period from 2031 to 2035, building upon the targets previously set for 2030.
- Aim: The primary goal is to align India's rapid economic growth with environmental sustainability, moving closer to the long-term vision of Viksit Bharat @2047 and the ultimate goal of Net-Zero emissions by 2070.

Key Targets Announced:

1. Emissions Intensity: Reduce the emissions intensity of its GDP by 47% by 2035 (from 2005 levels).
2. Non-Fossil Fuel Power: Achieve 60% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2035.
3. Carbon Sink: Create an additional carbon sink of 3.5 to 4.0 billion tonnes of CO2 equivalent through expanded forest and tree cover by 2035.

Other Key Features:

- Whole-of-Government Approach: Formulated through 10 NITI Aayog working groups involving central ministries, industry bodies, and civil society to ensure targets are realistic and inclusive.
- Focus on Adaptation: Beyond mitigation, it emphasizes disaster resilience, including mangrove restoration (MISHTI), Heat Action Plans, and glacier monitoring in the Himalayas.
- People-Centric Initiatives: Promotes the LiFE (Lifestyle for Environment) movement and community-driven actions like Ek Ped Maa Ke Naam to turn climate action into a mass movement.
- Clean Energy Missions: Leverages the Green Hydrogen Mission, PM Surya Ghar (Solar Rooftop), and Carbon Capture, Utilization, and Storage (CCUS) technologies.
- Global Leadership: Reaffirms India's role in international alliances like the International Solar Alliance (ISA) and the Global Biofuel Alliance.

Significance:

- India met its original 2015 targets (33-35% intensity reduction and 40% non-fossil capacity) nearly a decade ahead of schedule, lending high global credibility to these new 2035 goals.

- The transition is expected to generate green jobs and new industrial opportunities for youth and women in the renewable energy and electric vehicle sectors.

Women Farmers in Agriculture

Context:

The United Nations has designated 2026 as the International Year of the Woman Farmer (IYWF 2026) to recognize their indispensable role in global food security.

- In alignment, India hosted the Global Conference on Women in Agri-Food Systems (GCWAS–2026) in New Delhi to drive policy reforms and celebrate women's contributions to agriculture.

About Women Farmers in Agriculture:

What it is?

- Women farmers are the backbone of the rural economy, engaging in the entire agricultural value chain from land preparation to marketing. While often categorized as invisible laborers, they are increasingly being recognized as independent entrepreneurs and decision-makers who drive household nutrition and rural resilience.

Data & Stats on Women Farmers:

- Primary Livelihood: 80% of all economically active women in rural India are employed in the agricultural sector.
- Workforce Composition: Out of the rural female workforce, 33% are agricultural laborers and 48% are self-employed farmers.
- Financial Inclusion: Under the PM-KISAN scheme, approximately 25% of the total benefits (over 1.01 lakh crore since inception) go to women beneficiaries.
- Skill Development: Between 2022 and 2025, 2.58 crore women farmers were trained in agro-ecology and livestock management under DAY-NRLM.
- Collectivization: There are currently 1,175 FPOs in India with 100% women shareholders, indicating a strong trend toward women-led formal business structures.

Role of Women Farmers in Agriculture:

- Crop Production and Pre-harvest: They handle labor-intensive tasks like sowing, weeding, and transplanting.
- Example: Women's meticulous involvement in paddy transplantation is crucial for maintaining optimal plant density and yield.
- Livestock Management: Women are the primary managers of dairy, poultry, and small ruminants.
- Example: The success of Pashu Sakhis shows women providing doorstep veterinary and management services, reducing animal mortality.
- Post-Harvest Processing and Value Addition: They transform raw produce into marketable goods.
- Example: Women-led SHGs often engage in mushroom cultivation and spice grinding, increasing the shelf life and value of farm produce.
- Natural Resource Management and Agro-ecology: They play a key role in preserving biodiversity and soil health.
- Example: Over 70,000 SHG women have been trained specifically in Natural Farming to promote chemical-free agriculture.
- Technology Adoption and Modernization: Transitioning from traditional tools to high-tech solutions.
- Example: The Namo Drone Didi program empowers women to operate drones for precision liquid fertilizer and pesticide application.

Initiatives Taken So Far:

- Namo Drone Didi Scheme: Provides 15,000 drones to women SHGs with 80% central assistance to modernize farming and create new service-based livelihoods.
- Mahila Kisan Sashaktikaran Pariyojana (MKSP): A sub-component of DAY-NRLM specifically aimed at empowering women in agriculture through skill development.
- Agriculture Infrastructure Fund (AIF): Offers 3% interest subvention for women-led projects to build warehouses and cold storage.

- Krishi Sakhi Programme: Training 70,000 women as para-extension workers to bridge the gap between scientific research and field application.
- Dedicated Institutions: Establishment of the ICAR-Central Institute for Women in Agriculture (CIWA) in Bhubaneswar to develop women-friendly tools and research.

Challenges to Women Farmers in Agriculture:

- Lack of Land Ownership: Most women do not have land titles in their names, making them invisible in official records.
- Example: Without land titles, many women struggle to register for the PM-KISAN portal or access formal institutional credit.
- High Physical Drudgery: Women often use traditional, heavy tools designed for men.
- Example: Standard paddy weeders or coconut dehuskers can cause significant musculoskeletal strain; hence the need for CIWA's drudgery-reducing tools.
- Limited Access to Credit: Lack of collateral (land) prevents them from getting bank loans.
- Example: While the collateral-free limit for KCC has increased to 2 lakh, many women still rely on SHGs because they lack individual bankable assets.
- Knowledge and Information Gap: Extension services have traditionally targeted male farmers.
- Example: Technical training for high-yield variety (HYV) seeds or pesticide usage often misses women who are the actual implementers in the field.
- Climate Vulnerability: Women have fewer resources to adapt to sudden climate shocks.
- Example: During droughts, women must walk longer distances for water and fodder, leaving less time for productive farm management.

Way Ahead:

- Digital Verification of Land: Speeding up the digital verification of land records to ensure more women can self-register for DBT schemes like PM-KISAN.
- Gender-Sensitive Mechanization: Expanding the FMTTIs to specifically train women in operating and repairing small-scale machinery.
- Scaling Women-led FPOs: Reaching the target of 10,000 FPOs with a focus on states like Odisha and Bihar, where women-led collectives are already thriving.
- Strengthening Market Linkages: Using the AMI/ISAM schemes to ensure women have 33.33% subsidies for building their own village-level markets.
- Mainstreaming Krishi Sakhis: Institutionalizing the role of Krishi Sakhis as formal links between the government's technical departments and the rural farming community.

Conclusion:

The empowerment of women farmers is not just a matter of social equity but a prerequisite for India's food security and a $5 trillion economy. By transforming them from laborers to entrepreneurs through schemes like Namo Drone Didi and Bio-RIDE, India can lead the global narrative during the International Year of the Woman Farmer 2026. Strengthening women's leadership in agriculture will ultimately create a more resilient, inclusive, and climate-smart agri-food system for the future.

Remission of Duties and Taxes on Exported Products (RoDTEP)

Context:

The Government of India has restored the full RoDTEP rates and value caps (withdrawing a previous 50% restriction) to support exporters facing high freight costs and logistics disruptions due to the ongoing geopolitical crisis in West Asia.

About Remission of Duties and Taxes on Exported Products (RoDTEP):

What it is?

- RoDTEP is a flagship export promotion scheme that refunds currently un-refunded central, state, and local duties/taxes incurred in the process of manufacturing and distributing exported products. It ensures that taxes are not exported, making Indian goods competitive globally.

Launched In:

- January 1, 2021 (Replacing the previous MEIS – Merchandise Exports from India Scheme).
- Organizations Involved: Ministry of Commerce and Industry

Aim:

- To provide a mechanism for the reimbursement of taxes, duties, and levies that are not refunded under any other existing mechanism (like GST or Duty Drawback), thereby boosting India's export volume and value.

Key Features:

- Comprehensive Coverage: Covers over 10,000 export items, including sectors like marine, agriculture, leather, and gems.
- Digital Transferable Scripts: Credits are issued in the form of transferable duty credit scrips maintained in an electronic ledger by Customs.
- WTO Compliance: Unlike its predecessor (MEIS), RoDTEP is strictly based on the principle of remission of taxes, making it fully compliant with World Trade Organization (WTO) norms.
- Automatic Processing: The rebate is calculated as a percentage of the Freight On Board (FOB) value of the export, processed automatically upon filing the shipping bill.
- Inclusive of Local Taxes: It covers costs like mandi tax, VAT on fuel used in transportation, and electricity duty, which were previously embedded costs for exporters.

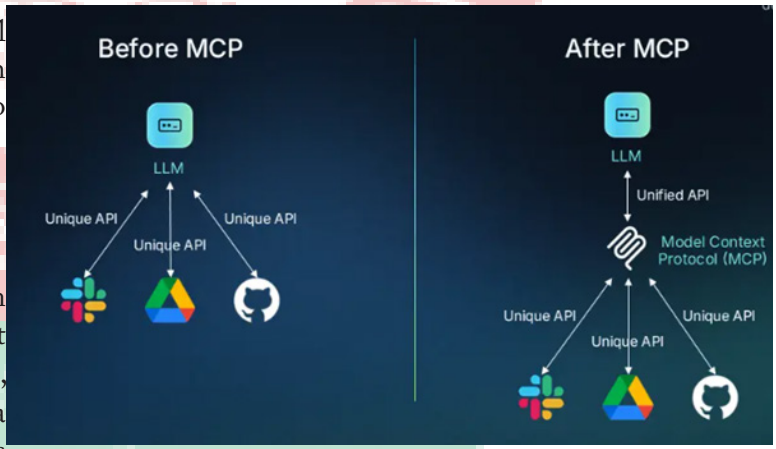
Significance:

- By removing the burden of embedded taxes, Indian products become price-competitive against rivals like Vietnam or China.
- The digital scrips provide immediate financial relief to exporters, especially during global supply chain shocks (like the West Asia crisis).
- The paperless, digital-only interface reduces human intervention and delays in the refund process.

Model Context Protocol (MCP)

Context:

The Government of India has launched a Model Context Protocol (MCP) server to link AI tools with the e-Sankhyiki portal, allowing AI applications to access verified official statistical data directly.



About Model Context Protocol (MCP):

What it is?

- The Model Context Protocol (MCP) is an open-source standard designed to connect Artificial Intelligence models (like Claude, ChatGPT, or Gemini) to external data sources, tools, and workflows. It acts as a universal interface that allows AI to reach out and interact with databases or local files securely and efficiently.

Launched In:

- Originally introduced as an open standard in late 2024 (by Anthropic), with the Indian Government's specific implementation for official statistics launched in early 2026.

Aim:

- To eliminate the silos between AI models and real-world data, enabling AI tools to provide more accurate, data-driven, and context-aware responses by accessing verified, live databases rather than relying solely on their training data.

How it Works?

- Standardized Interface: It functions like a USB-C for AI, providing a common port that any AI application can use to plug into any data source.
- Client-Server Architecture: The AI application acts as the Client, and the data source (like the e-Sankhyiki portal) acts as the Server.
- Contextual Retrieval: When a user asks a question, the AI uses the MCP to pull the relevant statistics from the server to use as context for its answer.
- Permission-Based Access: The protocol ensures that the AI can only access the specific data tools or files it has been granted permission to use.

Key Features:

- Open Source: It is a non-proprietary standard, meaning any developer or government body can build and deploy their own MCP servers.
- Universal Integration: A single MCP server allows a data source to be integrated with multiple AI assistants (Claude, ChatGPT, IDEs) simultaneously.
- Real-Time Data Access: Unlike static training data, MCP allows AI to fetch the latest available figures (e.g., current month's inflation data).
- Tool Orchestration: It allows AI to not just read data but also perform actions, like running a calculation or generating a chart based on a specific database query.
- Reduced Hallucination: By providing the AI with ground truth from verified official databases, the likelihood of the AI making up fake statistics is significantly reduced.

Significance

- For Governance: It democratizes access to Official Statistics, making complex data sets easily queryable by the public and policymakers through simple chat interfaces.
- For Developers: It drastically reduces the complexity and time required to build AI Agents that need to interact with enterprise or government data.
- For the Economy: By linking AI with the National Statistical Portal, it enhances the precision of economic analysis and planning for businesses and researchers.

The India BioEconomy Report (IBER) 2026

Context:

Union Minister unveiled the India BioEconomy Report (IBER) 2026 during the 14th Foundation Day of BIRAC in New Delhi.

- The report highlights that India's bioeconomy reached a record $195.3 billion in 2025, now contributing nearly 5% to the national GDP.

About The India BioEconomy Report (IBER) 2026:

What it is?

- The IBER 2026 is a comprehensive annual document developed by the Association of Biotechnology Led Enterprises (ABLE). It serves as the primary benchmark for measuring the growth, sectoral contributions, and startup ecosystem of India's biotechnology sector, tracking the country's progress toward its long-term economic goals.

Key Summary Points of the Report:

- Record Market Size: India's BioEconomy grew by $29.6 billion in 2025 to reach a total of $195.3 billion.
- Highest Growth Rate: The sector witnessed an 18% growth in 2025, the highest rate recorded in recent years.
- GDP Contribution: The BioEconomy's share of the national GDP rose to 4.8%, up from 4.2–4.3% in previous years.
- Sectoral Leader: The BioIndustrial segment was the largest contributor, valued at $90.2 billion.
- BioPharma Strength: This segment reached $64.5 billion, with significant growth expected in biosimilars and peptide manufacturing as global patents expire.

- BioServices and Agri: BioServices contributed $26 billion, while BioAgri accounted for $14.6 billion of the total economy.
- GCC Expansion: India now hosts over 150 healthcare and life sciences Global Capability Centres (GCCs), employing 300,000+ professionals.
- Startup Surge: The number of registered biotech startups rose to 11,855, with 1,780 new startups established in 2025 alone.

Key Opportunities in India's Bioeconomy:

- Biosimilar and Peptide Manufacturing: Expiry of major drug patents (e.g., GLP-1 therapies) gives India a chance to produce affordable biosimilars and dominate global pharma markets.
- Global Capability Centres (GCCs) Expansion: India can move from backend roles to advanced R&D, bioinformatics, and digital health innovation, enhancing value addition and global leadership.
- BioIndustrial and BioServices Growth: Emerging sectors like bio-manufacturing and contract research are entering a scale-up phase, enabling large industrial applications and exports.
- Start-up Ecosystem Scaling: With ~12,000 biotech startups and steady growth, India can convert scientific research into market-ready products and deep-tech innovations.
- Domestic Market Contribution: Rising GDP share (~4.8%) offers scope to integrate biotechnology across agriculture, healthcare, and industry for holistic economic growth.

Initiatives Taken So Far:

- BIRAC Support: The Biotechnology Industry Research Assistance Council (BIRAC) provides the necessary interface to nurture and scale biotech startups.
- SIGHT Program: Financial incentives for green hydrogen and electrolyzer manufacturing to bolster the BioIndustrial segment.
- National Bio-Pharma Mission: An industry-academia collaborative mission for accelerating biopharmaceutical development.
- Bio-E3 Policy: (Biotechnology for Economy, Environment, and Employment) Focusing on high-performance biomanufacturing to achieve a $1 trillion target by 2047.

Challenges Associated:

- Intellectual Property (IP) Barriers: While GLP-1 patents are expiring, navigating complex biosimilar litigation remains a hurdle for Indian firms.
- Global Work Distribution: Multinational companies are distributing research across global networks, which can lead to brain drain if domestic high-end roles aren't created.
- High Capital Intensity: Biotech startups require long-term funding; while 1,780 new ones launched in 2025, sustaining them through clinical trials is difficult.
- Regulatory Complexity: Expanding analytics and regulatory functions in GCCs requires a highly specialized workforce that keeps pace with changing global standards.
- Sectoral Imbalance: The BioAgri segment ($14.6B) is significantly smaller than the BioIndustrial segment ($90.2B), showing a lag in agricultural biotech adoption.

Way Ahead:

- Collaborative Ecosystem: Strengthen the Sustained collaboration between government, academia, and industry to translate lab research into market-ready technology.
- Biosimilar Leadership: Leverage the upcoming patent cliff to establish India as a global hub for peptide and biosimilar manufacturing.
- Expanding GCC Functions: Transition GCCs from support roles to core hubs for data analytics, bioinformatics, and digital health platforms.
- Incentivizing Startups: Provide targeted fiscal support to the nearly 12,000 registered startups to move beyond the establishment phase.
- Focus on 2047 Vision: Align all sectoral policies toward the long-term goal of building a $1 trillion BioEconomy by 2047.

Conclusion:

India's BioEconomy has entered a transformative phase, shifting from a niche sector to a primary driver of national GDP at nearly 5%. With a robust startup ecosystem and leadership in BioPharma, the nation is well-positioned to meet its ambitious $1 trillion goal. Sustaining this 18% growth through strategic collaboration will be essential to cement India's status as a global biotechnology leader.

RELIEF (Resilience & Logistics Intervention for Export Facilitation)

Context:

The Government has approved RELIEF (Resilience & Logistics Intervention for Export Facilitation) under the Export Promotion Mission to support exporters affected by West Asia maritime disruptions.

About RELIEF (Resilience & Logistics Intervention for Export Facilitation):

What it is?

- RELIEF is a time-bound financial and risk mitigation intervention under the Export Promotion Mission (EPM) aimed at supporting Indian exporters facing logistics disruptions, cost escalation, and geopolitical risks in West Asia.

Launched In:

- Approved in March 2026 under the Export Promotion Mission framework
- Nodal Ministry: Ministry of Commerce & Industry
- Implementing Agency: Export Credit Guarantee Corporation of India (ECGC Ltd.)

Aim:

- To mitigate logistics and financial risks faced by exporters
- To ensure continuity of export flows amid geopolitical disruptions
- To protect MSME exporters and employment in export sectors
- To strengthen India's trade resilience and competitiveness

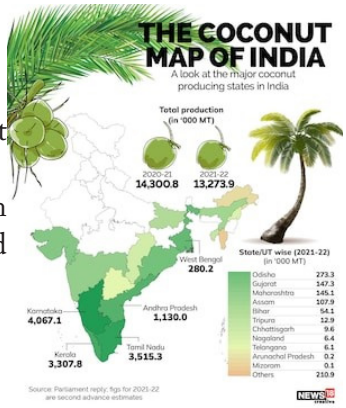
Key Features:

1. Enhanced risk coverage: Up to 100% risk coverage for already insured consignments during disruption period.
2. Support for future exports: Up to 95% coverage for upcoming shipments with government-backed support.
3. MSME reimbursement mechanism: Up to 50% reimbursement for freight and insurance cost escalation (cap 50 lakh/exporter).
4. Coverage across export cycle: Includes both past shipments (Feb–Mar 2026) and future exports (till June 2026).
5. Real-time monitoring system: Dashboard-based tracking of claims, fund utilisation, and logistics conditions.

Significance:

- Trade resilience: Helps India withstand global supply chain disruptions and geopolitical shocks.
- Exporter confidence: Prevents order cancellations and loss of international markets.
- MSME support: Provides crucial relief to small exporters facing cost pressures.

Coconut Promotion Scheme



Context:

The Government of India highlighted India's position as the largest global coconut producer (30.37%).

- Simultaneously, the Coconut Promotion Scheme announced in Union Budget 2026–27 is currently under formulation to enhance productivity and competitiveness.

About Coconut Promotion Scheme:

What it is?

- A central sector initiative aimed at enhancing coconut productivity, quality, and value addition across major coconut-growing regions.

Announced in:

- Union Budget 2026–27, under a broader 350 crore allocation for high-value crops (coconut, cashew, cocoa).

Aim:

- To increase production and productivity while improving farmers' income and global competitiveness.

Key Features:

- Replantation & Rejuvenation: Replacement of old, senile, and low-yielding coconut trees with high-yielding varieties.
- Improved Varieties: Promotion of disease-resistant and climate-resilient coconut cultivars.
- Productivity Enhancement: Focus on better agronomic practices, irrigation, and nutrient management.
- Value Addition: Encouragement for processing, branding, and export of coconut-based products.
- Farmer Support: Strengthening livelihoods of coconut farmers through targeted interventions.
- Scheme Status: Currently under formulation; State/UT-wise fund allocation yet to be finalized.

India and coconut production stats:

Parameter	Data
Global Rank	1st (Largest producer globally)
Share in Global Production	30.37%
Area under Cultivation (India)	2165.20 thousand hectares
Global Area	~12390 thousand hectares
Annual Production	21373.62 million nuts
Average Productivity	9871 nuts/hectare
Livelihood Dependence	~30 million people (including ~10 million farmers)

Sujal Gaon ID

Context:

The Union Ministry of Jal Shakti has launched Sujal Gaon ID, a unique digital identifier for mapping rural piped water supply schemes across India.

About Sujal Gaon ID:

What it is?

- Sujal Gaon ID is a scheme-based unique digital identifier assigned to each rural piped drinking water supply scheme in India.
- It enables digital mapping of rural water supply assets and service areas, integrating them into a unified national water management platform.

Launched Under:

- It has been introduced under Jal Jeevan Mission 2.0, the flagship programme aimed at providing Functional Household Tap Connections (FHTCs) to all rural households.

Aim:

- To digitally map and monitor rural drinking water infrastructure across India.
- To strengthen transparency, service delivery, and evidence-based decision making in rural water governance.

Key Features:

- Unique Digital Identification – Every rural drinking water scheme is assigned a distinct Sujal Gaon ID, ensuring traceability of assets and services.
- Integration with Sujalam Bharat Platform – The ID is linked with Sujalam Bharat IDs, combining infrastructure ID and service-area ID for complete mapping of water supply systems.
- National Digital Architecture – Creates a source-to-tap digital monitoring system for rural water supply schemes across the country.
- Real-time Monitoring and Data Governance – Enables governments to track scheme performance, infrastructure status, and service delivery outcomes in real time.
- Wide Coverage – Around 1.64 lakh Sujal Gaon IDs across 31 States and UTs have already been generated and linked with 67,000 Sujalam Bharat IDs.

Significance:

- Digital mapping reduces leakages and improves monitoring of rural water infrastructure.
- Data-driven tracking helps policymakers plan maintenance, expansion, and water security strategies.
- Ensures efficient operation and maintenance of piped water supply systems.

Dumpsite Remediation Accelerator Programme (DRAP)

Context:

The Government of India has launched the Dumpsite Remediation Accelerator Programme (DRAP) to fast-track the clearance of legacy waste dumpsites across urban India.

About Dumpsite Remediation Accelerator Programme (DRAP):

What it is?

- DRAP is a year-long targeted programme designed to accelerate the remediation of legacy waste dumpsites in urban areas.
- It follows a structured and fast-tracked approach to remove garbage mountains and reclaim land for productive use such as parks, community facilities, and waste-management infrastructure.
- Launched in: November 2025.
- Ministry: Ministry of Housing and Urban Affairs (MoHUA).

Part of Initiative:

- Implemented under Swachh Bharat Mission – Urban 2.0 (SBM-U 2.0).

Aim:

- Achieve 100% dumpsite clearance within one year of adoption.
- Accelerate the processing of legacy waste and prevent creation of new dumpsites.
- Reclaim valuable urban land and improve environmental and public health outcomes.

Key Features:

1. Lakshya Zero Dumpsites Target: Supports SBM-U 2.0 goal of eliminating dumpsites by September 2026.
2. Focus on High-Impact Sites: Prioritizes 214 major dumpsites across 202 urban local bodies, where about 80% of legacy waste is concentrated.
3. Financial Support: Central Financial Assistance (CFA) provided at 550 per tonne for legacy waste remediation.
4. 5P Framework: Implementation based on Political leadership, Public financing, Partnerships, People's participation, and Project management.
5. Partnership Model: Involvement of PSUs, NGOs, technical partners, and infrastructure agencies for waste utilization and disposal.
6. Technology-based Monitoring: Use of digital dashboards, GPS/RFID tracking, and daily reporting to ensure transparency and progress monitoring.

Significance:

- Reduces soil, air, and groundwater pollution from legacy waste.
- Converts dumpsites into usable spaces such as parks and infrastructure facilities.

Samriddh Gram Phygital Services Pilot Initiative

Context:

The Union Minister of Communications is set to inaugurate the Samriddh Gram Phygital Services Pilot Project at Umri village in Madhya Pradesh.

About Samriddh Gram Phygital Services Pilot Initiative:

What it is?

- Samriddh Gram is a pilot project for integrated Phygital (Physical + Digital) service delivery in rural areas.
- It aims to create village-level service hubs called Samriddhi Kendras that provide multiple citizen services using digital connectivity.
- Implemented by: the Department of Telecommunications.

Part of Initiative:

- Built on the digital infrastructure of BharatNet, one of the world's largest rural broadband connectivity projects.

Pilot Locations:

The pilot project is being implemented in three villages representing diverse socio-economic contexts:

- Umri
- Narakoduru
- Chaurawala
- Each Samriddhi Kendra is designed to serve multiple villages within a 5 km radius.

Aim:

- To demonstrate the use of BharatNet connectivity for delivering integrated public services at the village level.

- To develop a replicable model for rural digital transformation through convergence of digital infrastructure, governance services, and community participation.

Key Features:

- Phygital service delivery: Combines physical service centres with digital platforms to improve accessibility in rural areas.
- Samriddhi Kendra model: A one-stop village service hub located at the Panchayat Bhawan.
- Multi-sector service integration: Provides services across multiple domains such as:
- Education and skill development
- Agriculture advisory
- Health and telemedicine
- e-Governance services
- Financial inclusion and e-commerce
- Digital connectivity and access
- Safety and surveillance systems
- BharatNet-enabled connectivity: Uses high-speed rural broadband infrastructure to deliver services efficiently.
- Community participation: Local engagement and awareness programmes ensure effective adoption.

Significance:

- Strengthens digital access and public service delivery in villages.
- Integrates digital services with local governance institutions like Panchayats.

Jal Jeevan Mission (JJM)

Context:

The Union Cabinet has officially approved the extension of the Jal Jeevan Mission (JJM) until 2028, shifting the program's focus from mere infrastructure creation to sustained service delivery.

About Jal Jeevan Mission (JJM):

What it is?

- The Jal Jeevan Mission is a flagship central government initiative designed to provide safe and adequate drinking water through individual Functional Household Tap Connections (FHTC) to all households in rural India.
- Launched in: August 15, 2019.
- Nodal Ministry: Ministry of Jal Shakti.
- Aim: The primary objective is to ensure Har Ghar Jal (Water in Every Home) by providing 55 liters of water per person per day to every rural household through tap connections by the new deadline of December 2028.

Key Features of the Scheme:

- Service Delivery (JJM 2.0): Shifting focus from building pipes to ensuring a 24×7 utility-based service delivery approach through structural reforms and MoUs with States.
- Sujalam Bharat Digital Framework: Every village will be assigned a unique Sujal Gaon ID, digitally mapping the water supply from source to tap for better transparency and monitoring.
- Water Quality Monitoring: Heavy emphasis on regular testing of water samples using field test kits and a network of certified laboratories.
- Greywater Management: The mission includes the management of greywater (household wastewater) through soak pits and kitchen gardens to ensure sustainability.
- Convergence with Other Schemes: Integration with MGNREGS, SWACHH BHARAT MISSION (G), and 15th Finance Commission grants for water conservation and source strengthening.

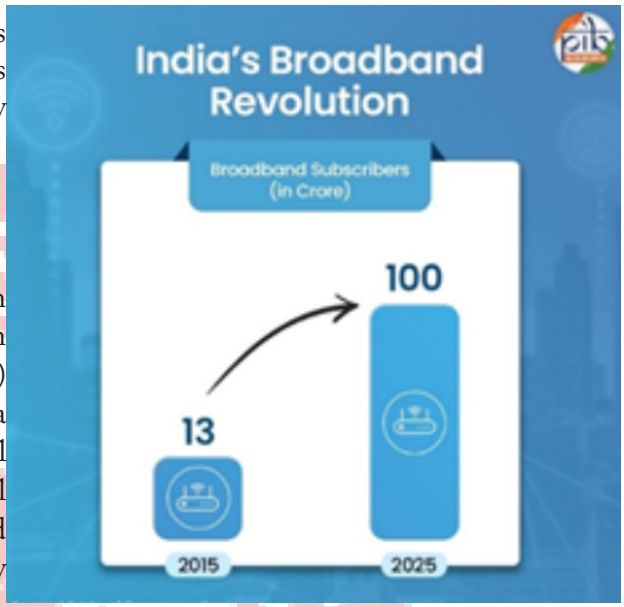
Significance:

- Access to potable water significantly reduces the burden of water-borne diseases (like cholera and dysentery), particularly improving child health and nutrition.
- The decentralized approach (Paani Samitis) empowers villagers to manage their own water resources, fostering a sense of ownership.

Bridging the Digital Divide

Context:

India is witnessing a monumental shift in its digital landscape as the BharatNet project reaches over 2.15 lakh Gram Panchayats and broadband subscriptions cross the 1 billion mark as of early 2026.



About Bridging the Digital Divide:

What it is?

- The Digital Divide refers to the gap between demographics and regions that have access to modern information and communication technology (ICT) and those that don't. Bridging this divide in India involves a three-pronged strategy: building Universal Connectivity (optical fiber/5G), deploying Digital Public Infrastructure (DPI) (Aadhaar/UPI), and enhancing Digital Literacy to ensure that technology leads to socio-economic empowerment for every citizen.

Data/Stats on Digital Divide in India:

- Broadband Surge: India crossed 100 crore (1 billion) broadband subscriptions in November 2025, a sixfold increase from 13.15 crore a decade ago.
- Data Affordability: Data costs have plummeted by over 96%, from 269 per GB in 2014 to roughly 8–10 per GB in 2026.
- Infrastructure Reach: Optical fiber deployment has more than doubled in five years, reaching 42.36 lakh route km by 2025.
- Rural Literacy: The PMGDISHA program has successfully trained over 6.39 crore rural individuals in digital skills as of 2024.

Need for Bridging the Digital Divide:

- Inclusive Governance and Welfare: To ensure Antyodaya (serving the last person), digital access is mandatory for receiving government benefits.
- Example: Aadhaar-enabled Direct Benefit Transfers (DBT) have ensured that subsidies for gas and grains reach 143 crore users without middleman leakages.
- Financial Inclusion: Digital connectivity allows rural populations to access banking services without physical bank branches.
- Example: The UPI ecosystem now processes 28.33 lakh crore monthly, enabling even small street vendors in Tier-III cities to accept digital payments.
- Equitable Education: Bridging the divide ensures that a student in a remote village has access to the same quality of study material as one in a metro.
- Example: Platforms like DIKSHA and SWAYAM host over 18,000 courses, allowing students in rural Bihar or Ladakh to learn from top IIT/IISC professors.
- Economic Empowerment of Farmers: Digital tools help farmers bypass traditional cartels by providing direct market linkages.
- Example: The e-NAM (National Agriculture Market) platform has digitally integrated 1,522 mandis, helping 1.79 crore farmers get better price discovery.

Initiatives Taken So Far:

- BharatNet: Connecting all 2.5 lakh Gram Panchayats with high-speed optical fiber to provide a rural internet backbone.
- PM-WANI: Deploying over 4 lakh Wi-Fi hotspots via local shops (Public Data Offices) to provide low-cost internet in shadow areas.
- Common Service Centres (CSCs): A network of 6.5 lakh VLEs (Village Level Entrepreneurs) providing assisted digital services to those who cannot use devices themselves.
- Namo Drone Didi: Training women SHGs to use drones for agricultural purposes, merging high-tech with rural livelihoods.
- IndiaAI Mission: A 10,300 crore initiative to provide subsidized computing power and AI datasets to startups and researchers across all districts.

Challenges Associated:

- The Gender Gap: Despite progress, women in rural areas still have significantly lower access to personal mobile devices compared to men.
- Example: Statistics indicate that while mobile penetration is high, only a fraction of rural women use the internet for financial or educational purposes independently.
- Language Barriers: Much of the internet's high-value content remains in English, creating a language divide for non-English speakers.
- Example: While Bhashini (AI translation tool) is being deployed, many deep-tech resources and certifications are still not available in local dialects.
- Last-Mile Quality of Service: While fiber reaches the Panchayat, last-mile connectivity to individual homes often remains erratic.
- Example: In hilly terrains like Uttarakhand or the North East, physical fiber damage frequently leads to prolonged internet outages in remote villages.
- Cybersecurity and Digital Frauds: Low digital literacy makes the newly connected rural population vulnerable to phishing and financial scams.
- Example: Rise in Jamtara-style phishing cases targeting rural citizens who are unfamiliar with secure digital banking practices.

Way Ahead:

- Expansion of 6G and Satellite Internet: Utilizing LEO (Low Earth Orbit) satellites to provide internet to dark zones where laying fiber is geographically impossible.
- Mainstreaming Bhashini: Integrating real-time voice-to-voice translation in all government apps to remove the literacy and language barrier.
- Digital Skills 2.0: Moving beyond basic literacy to teaching AI, coding, and cybersecurity at the school level via Atal Tinkering Labs.
- Universal Device Access: Incentivizing the production of low-cost, high-quality smartphones and tablets to ensure the device divide is bridged.
- Strengthening inclusive TBIs: Setting up more Inclusive Technology Business Incubators in Tier-II and III cities to encourage local entrepreneurship.

Conclusion:

India's journey from a connectivity-starved nation to a global digital leader proves that technology can be the ultimate equalizer when backed by robust public infrastructure. By integrating digital literacy with affordable access and indigenous innovation, Bharat is ensuring that the digital revolution is not just an urban phenomenon but a grassroots movement.

Khelo India Tribal Games (KITG)

Context:

Union Minister for Youth Affairs and Sports announced that the first-ever Khelo India Tribal Games (KITG) will be held in Chhattisgarh from 25 March to 6 April 2026.

About Khelo India Tribal Games (KITG):

What it is?

- The Khelo India Tribal Games (KITG) is a national-level multi-sport event dedicated exclusively to tribal athletes across India.
- It is organised under the Khelo India Scheme, a flagship programme of the Ministry of Youth Affairs and Sports to promote sports culture and excellence.

Host and Venue:

- Host State: Chhattisgarh
- Host Cities: Raipur, Jagdalpur and Sarguja

Aim of the Games:

- To identify and nurture sporting talent from tribal regions at an early stage.
- To promote mass participation in sports among tribal youth.
- To integrate talented tribal athletes into the national sports ecosystem and support India's vision of Viksit Bharat.

Sports Involved

Medal Sports (7):

- Athletics, Football, Hockey, Weightlifting, Archery, Swimming, and Wrestling

Demonstration Sports (2):

- Mallakhamb and Kabaddi

Key Features:

- First-ever national sporting event exclusively for tribal athletes in India.
- Competitions will follow technical standards aligned with international sporting events.
- The official mascot Morveer symbolizes courage, pride and identity of tribal communities.
- Organised as part of the broader Khelo India initiative, declared an Event of National Importance in 2020 under the Sports Broadcasting Signals Act, 2007.

Significance

- Promotes tribal empowerment and social inclusion through sports.
- Helps discover raw sporting talent from remote tribal regions.

25 Years of Bureau of Energy Efficiency (BEE)

Context:

The Bureau of Energy Efficiency (BEE) under the Ministry of Power commemorated its 25th Foundation Day, marking a major milestone in India's energy-efficiency journey.

About 25 Years of Bureau of Energy Efficiency (BEE):

What it is?

- The Bureau of Energy Efficiency (BEE) is a statutory body under the Ministry of Power, responsible for promoting energy efficiency and reducing energy intensity across sectors of the Indian economy.
- It acts as India's nodal institution for designing and implementing energy conservation policies and programmes.

Established in:

- Established: 1 March 2002
- Legal Basis: Energy Conservation Act, 2001
- Parent Ministry: Ministry of Power, Government of India
- Headquarters: New Delhi, India

Brief History:

- Created after the enactment of the Energy Conservation Act, 2001 to institutionalise energy efficiency in India.
- Over two decades, BEE expanded from appliance labeling initiatives to large-scale industrial, building, and transport efficiency programmes.
- Key milestones include the Standards & Labelling Programme, Perform, Achieve and Trade (PAT) Scheme, and transition toward market-based carbon mechanisms such as the Carbon Credit Trading Scheme (CCTS).

Aim / Mission:

- Reduce the energy intensity of the Indian economy.
- Promote self-regulation and market-based mechanisms for energy conservation.
- Enable sustainable development through efficient energy use across all sectors.

Key Functions:

- Policy Leadership: Provides recommendations and direction for national energy conservation strategies.
- Programme Implementation: Designs and coordinates schemes such as PAT, Standards & Labelling, and energy efficiency in buildings and industries.
- Monitoring & Verification: Develops systems for measuring and verifying energy savings.
- Standards & Certification: Establishes testing and certification protocols for appliances and equipment.
- Energy Audits: Mandates audits for designated energy-intensive industries.
- Research & Capacity Building: Promotes R&D and strengthens consultancy services in energy conservation.
- Consumer Awareness: Encourages informed purchasing through star labelling and digital tools like the Star Label App.

Significance:

- Energy Security: Reduces demand growth by conserving electricity, lowering dependence on additional generation capacity.
- Climate Commitments: Supports India's goals of lowering emissions intensity and increasing non-fossil energy share.

70 Years of Central Warehousing Corporation (CWC)

Context:

The Central Warehousing Corporation (CWC) celebrated its 70th Foundation Day on March 2, 2026, marking seven decades of contribution to India's food security and logistics infrastructure.

About 70 Years of Central Warehousing Corporation (CWC):

What it is?

- The Central Warehousing Corporation (CWC) is a Central Public Sector Enterprise (CPSE) under the Ministry of Consumer Affairs, Food & Public Distribution.
- It serves as a premier logistics and warehousing organization supporting India's food security, agricultural storage, and integrated supply chain management.

Established in:

- 1957 under the Warehousing Corporations Act, 1962 (later governed under Companies Act framework).

Historical Evolution:

- Roots trace back to wartime food administration during World War II, when a separate Food Department was set up in 1942.
- Post-independence restructuring of the Food Ministry (1947–1958) led to the transfer of warehousing functions to the central government.

Aim:

- To provide scientific storage, handling, and logistics support for foodgrains and essential commodities.
- To strengthen India's food security framework and reduce post-harvest losses.
- To improve supply chain efficiency and contribute to lowering national logistics costs.

Key Functions:

- Scientific Storage: Construction and management of warehouses and godowns for foodgrains, sugar, fertilizers, and other commodities.
- Logistics & Supply Chain Services: Inland container depots (ICDs), container freight stations (CFSs), and integrated logistics hubs.
- Support to PDS & Food Security: Assists procurement, buffer stocking, and distribution under the Public Distribution System (PDS).
- Custom Bonded Warehousing: Facilitates import-export trade by offering bonded storage and customs clearance support.
- Infrastructure Development: Acquisition and leasing of land for warehousing expansion across states.

Significance:

- Plays a critical role in maintaining buffer stocks and ensuring smooth distribution of essential commodities nationwide.
- Contributes to India's goal of becoming a top global logistics performer by improving storage efficiency and reducing supply chain bottlenecks.

Wildlife Conservation

Context:

The world observed World Wildlife Day on 3 March 2026 under the theme "Medicinal and Aromatic Plants: Conserving Health, Heritage and Livelihoods."

About Wildlife Conservation:

What it is?

- Wildlife conservation is the practice of protecting wild plant and animal species and their habitats to ensure that healthy native ecosystems are restored, protected, or maintained.
- It involves a multidisciplinary approach encompassing law enforcement, scientific research, and community participation to prevent species extinction and maintain biodiversity.

Data and Statistics on Wildlife in India:

- Mega-Biodiversity Hub: India is one of the 17 mega-biodiversity rich countries, harboring nearly 7-8% of the world's recorded species while occupying only 2.4% of the global land area.
- Medicinal Wealth: India possesses approximately 15,000 medicinal plant species, with about 8,000 species utilized in traditional Indian systems of medicine (AYUSH).
- Protected Area Network: As of 2026, India has a robust network of 1,000+ Protected Areas, including National Parks, Wildlife Sanctuaries, and Conservation Reserves.
- Economic Scale: The annual domestic demand for medicinal plants in India is estimated at over 5,12,000 metric tonnes, with 242 species traded in high volumes exceeding 100 MT per annum.
- Global Export Share: India is the second-largest exporter of medicinal plants globally, significantly contributing to the multi-billion dollar traditional medicine market.

Types of Conservation Methods:

1. In-Situ Conservation (On-site)

- Protecting species within their natural habitats where they have evolved.
- National Parks & Sanctuaries: Areas with strict protection for flora and fauna (e.g., Corbett, Kaziranga).
- Biosphere Reserves: Large areas for ecosystem conservation and sustainable development (e.g., Nilgiri).
- MPCDAs: Medicinal Plants Conservation and Development Areas specifically designated for medicinal flora.
- Sacred Groves: Community-protected forest fragments based on religious and cultural beliefs.

2. Ex-Situ Conservation (Off-site)

- Protecting species outside their natural habitats in controlled environments.
- Gene Banks: Long-term preservation of genetic material (e.g., National Seed Gene Bank at NBPGR).
- Botanical Gardens & Zoos: Providing breeding grounds and educational displays for rare species.
- Cryopreservation: Storage of seeds, pollen, or embryos at ultra-low temperatures to maintain viability.
- Herbal Gardens: Institutional or school gardens (e.g., Aushadhi Vantika) used for awareness and local supply.

Key Initiatives Taken So Far:

1. Central Sector Scheme (NMPB): A flagship scheme for the conservation and sustainable management of medicinal plants with an outlay of 322.41 crores (2021-2026).
2. e-CHARAK Portal: A digital platform and mobile app to enable information exchange and market access between farmers and herbal traders.

3. National Ayush Mission (NAM): Promotes the integration of medicinal plant cultivation with traditional farming to enhance farmer income.
4. GI Tagging: Protecting the heritage of specific plants like Nagauri Ashwagandha (registered Nov 2025) and Kashmir Saffron to ensure quality and origin.

Challenges Associated:

- Overexploitation of Wild Stocks: High market demand leads to unsustainable harvesting, threatening the survival of rare species in the wild.
- Example: In 2025, the Himalayan Trillium faced severe depletion in the high-altitude zones due to illegal extraction for its high-value medicinal roots.
- Habitat Fragmentation: Infrastructure development and agricultural expansion continue to shrink the natural corridors required for species migration.
- Example: The Western Ghats have seen localized extinctions of endemic aromatic plants in 2026 due to land-use changes for tourism and plantations.
- Inadequate Standardisation: Lack of uniform quality testing and certification makes it difficult for small farmers to access premium global markets.
- Example: Recent rejections of herbal raw drug exports in late 2025 highlighted the gap in GACP (Good Agricultural and Collection Practices) compliance.
- Climate Change Vulnerability: Shifting rainfall patterns and rising temperatures are altering the chemical composition (potency) and flowering cycles of medicinal plants.
- Example: The Kashmir Saffron yields in 2025-26 were affected by erratic snowfall, directly impacting the livelihoods of thousands of farmers.

Way Ahead:

- Mainstreaming Cultivation: Shifting the supply chain from wild-collection to controlled cultivation on private lands to reduce pressure on forests.
- Blockchain in Supply Chain: Implementing Traceability Systems on platforms like e-CHARAK to ensure that herbs are sourced sustainably and ethically.
- R&D in Bio-Prospecting: Investing in scientific research to unlock the modern pharmaceutical potential of the 15,000 identified species.
- Community-Led Conservation: Empowering Biodiversity Management Committees (BMCs) to ensure fair benefit-sharing and protection of traditional knowledge.

Conclusion:

India's medicinal plant heritage is a unique confluence of ancient wisdom and modern economic potential. By bridging the gap between digital platforms like e-CHARAK and grassroots conservation in MPCDAs, India is securing its role as a global pharmacy. Protecting these green healers is not just an environmental duty, but a prerequisite for the health and prosperity of Viksit Bharat.

Finland

Context:

The President of Finland, Alexander Stubb, is on a State Visit to India and is scheduled to meet the President of India and Prime Minister.

About Finland:

What it is?

- Finland is a Nordic country in Northern Europe, known for its strong welfare system, advanced technology sector, and high environmental standards.
- It gained independence from Russia on 6 December 1917 after being part of Sweden and later the Russian Empire.
- Capital: Helsinki

Neighbouring Nations:

- Norway, Russia, and Sweden.
- Surrounded by water bodies such as the Gulf of Finland and Gulf of Bothnia.

Key Features:

1. Highly Forested Landscape – Nearly two-thirds of Finland is covered by forests, making it one of the most densely forested countries in Europe.
2. Land of Lakes – Finland has about 56,000 lakes, with Lake Saimaa being the largest.
3. Precambrian Shield – The country sits on an ancient granite shield formed during Precambrian geological periods.
4. Glacial Landforms – Landscapes shaped by Ice Age glaciation, producing features like moraines and eskers (gravel ridges).
5. Arctic Geography – Around one-third of Finland lies north of the Arctic Circle, experiencing phenomena such as the midnight sun and polar night.

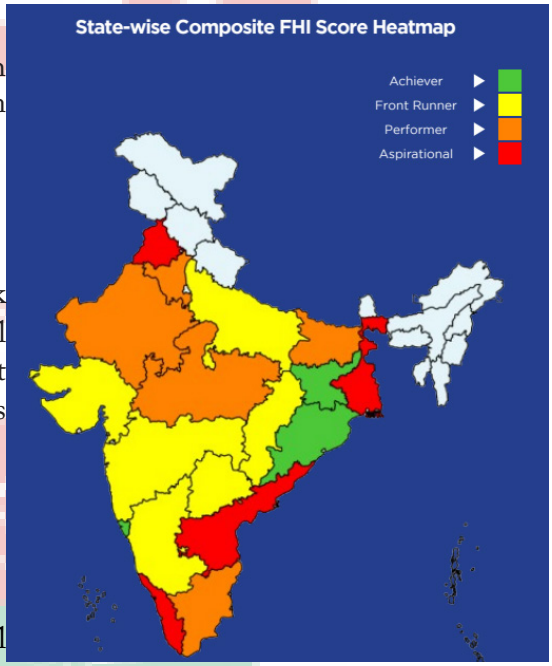
Significance:

- Strategic location in Northern Europe, acting as a bridge between Western Europe and Russia.
- Technological hub known for innovation in telecommunications, digital technology, and clean energy.

Fiscal Health Index 2026

Context:

NITI Aayog released the second annual edition of the Fiscal Health Index (FHI) 2026, which evaluates the fiscal performance of Indian states for FY 2023–24.



About Fiscal Health Index 2026:

What it is?

- The Fiscal Health Index is a comprehensive framework designed by NITI Aayog to evaluate and compare the fiscal soundness of Indian states. It moves beyond simple deficit indicators to provide a structured assessment of fiscal strengths and vulnerabilities across states.

About the Report

- Published By: NITI Aayog, Government of India.
- Criteria Used: The index is built on five core pillars:

1. Quality of Expenditure: Focuses on developmental and capital spending versus committed outlays.
2. Revenue Mobilisation: Measures the capacity to generate internal tax and non-tax revenues.
3. Fiscal Prudence: Assesses deficit management and adherence to FRBM norms.
4. Debt Index: Evaluates the size and burden of outstanding liabilities.
5. Debt Sustainability: Analyzes the long-term ability to service debt without fiscal stress.

Ranking (State-wise for 2023-24):

Top Performers

1. Odisha – Rank 1 (Score: 73.1)
2. Goa – Rank 2 (Score: 54.7)
3. Jharkhand – Rank 3 (Score: 50.5)
4. Gujarat – Rank 4
5. Maharashtra – Rank 5

Bottom Performing States

- Punjab – Rank 18
- Andhra Pradesh – Rank 17
- West Bengal – Rank 16
- Kerala – Rank 15

Summary of the Report:

- Expanding Coverage: This edition expanded its scope to include 10 North-Eastern and Himalayan States, recognizing their unique structural and geographic fiscal constraints.
- Top Performers: Odisha maintained its leadership due to stable revenues and controlled deficits, while Arunachal Pradesh led the NE/Himalayan category with high expenditure quality.
- Persistent Stress: States like Punjab, Kerala, and West Bengal continue to face fiscal stress due to rising debt, high deficits, and low revenue growth.
- Expenditure Shifts: Recent years have seen a greater emphasis on capital expenditure and social sector spending across several states.
- Macro-Fiscal Linkage: State finances now account for roughly one-third of India's general government debt, making their fiscal health critical for national macroeconomic stability.

Challenges Associated:

- High Committed Expenditure: Fixed costs like salaries and pensions limit funds for development.
- Example: In Punjab, committed expenditure reached 80% of revenue receipts in 2023-24, severely restricting discretionary spending.
- Weak Own-Revenue Mobilization: Many states rely heavily on central transfers rather than internal taxes.
- Example: In Bihar, the state's own revenue contributes less than one-third of total receipts, leaving it vulnerable to transfer volatility.
- Breaching Fiscal Deficit Targets: Persistent spending beyond income leads to non-compliance with FRBM norms.
- Example: Andhra Pradesh's fiscal deficit reached 4.35% of GSDP in 2023-24, exceeding the prescribed 4% ceiling.
- Rising Interest Burdens: Increasing debt leads to higher interest payments that consume revenue.
- Example: West Bengal consistently spends more than 20% of its revenue receipts on servicing debt.
- Structural Geographic Constraints: Difficult terrain increases service delivery costs for specific regions.
- Example: Himachal Pradesh faces structural stress due to the high cost of maintaining infrastructure in mountainous regions combined with rising pension liabilities.

Way Ahead:

- Broaden Tax Bases: States must enhance own-tax capacity and broaden the GST base to increase fiscal self-reliance.
- Rationalize Expenditures: Curbing committed spending and rationalizing subsidies (especially in sectors like power) is essential to restore fiscal flexibility.
- Improve Capital Outlay Quality: Prioritize high-quality capital spending that creates assets and promotes long-term growth.
- Adopt Medium-Term Fiscal Plans: Implement structured, multi-year fiscal frameworks to stabilize debt trajectories and contain deficits.
- Enhance Transparency: Use CAG-verified data and peer benchmarking tools like the FHI to support data-driven and transparent decision-making.

Conclusion:

The Fiscal Health Index 2026 underscores that the financial resilience of states is indispensable for India's long-term growth and macroeconomic stability. While some states have shown exemplary discipline, others face deep-rooted structural challenges that require targeted reforms. Strengthening fiscal governance at the state level is a vital pillar for achieving the national vision of Viksit Bharat @2047.

24 Speed Post

Context:

The Department of Posts is launching 24 Speed Post on 17 March 2026 to provide next-day guaranteed delivery services.

- The premium service will initially be introduced in six major metro cities to strengthen India Post's express delivery capabilities.

About 24 Speed Post:

What it is?

- 24 Speed Post is a premium next-day guaranteed delivery service introduced by India Post for urgent and time-sensitive consignments.
- It offers assured D+1 delivery timelines with enhanced tracking and secure delivery features.
- Department Involved: The service is launched by the Department of Posts, functioning under the Ministry of Communications.

Aim:

- Provide fast, reliable, and guaranteed next-day delivery for urgent consignments.
- Strengthen India Post's premium express logistics services.
- Support businesses and individuals with time-sensitive shipments.

Cities Available (First Phase):

- The service will initially be available across all PIN codes of six metro cities: New Delhi, Mumbai, Chennai, Kolkata, Bengaluru, and Hyderabad

Key Features:

- Guaranteed Next-Day Delivery: Assured D+1 delivery timeline for urgent consignments.
- OTP-Based Secure Delivery: Delivery confirmation through OTP verification to ensure secure handover.
- Real-Time Tracking: End-to-end online tracking with SMS alerts for booking and delivery status.
- Money-Back Guarantee: Full postage refund if next-day delivery is delayed.
- Dedicated Logistics Support: Enabled through priority air transmission and dedicated processing windows.
- Corporate Services: Includes BNPL credit facility, API integration, centralized billing, and free pickup for bulk bookings.
- Parcel Capacity: Supports parcels up to 5 kg.
- Seven-Day Delivery: Service operates seven days a week including Sundays.

Significance:

- Enhances India Post's competitiveness with private courier services.
- Improves logistics efficiency and express delivery infrastructure.

India's First National Report on Implementation of the Nagoya Protocol

Context:

India has submitted its First National Report (NR1) on the implementation of the Nagoya Protocol to the Convention on Biological Diversity Secretariat.

Convention on Biological Diversity

About India's First National Report on Implementation of the Nagoya Protocol:

What it is?

- India's First National Report (NR1) is an official submission to the Convention on Biological Diversity (CBD) detailing the country's implementation of the Nagoya Protocol on Access and Benefit Sharing (ABS).

- The report was prepared by the Ministry of Environment, Forest and Climate Change in collaboration with the National Biodiversity Authority.

Key Summary:

- Reporting Period: The report covers the period from 1 November 2017 to 31 December 2025.

Community Participation:

- 2,76,653 Biodiversity Management Committees have been established across India.

ABS Approvals:

- 12,830 approvals issued during 2017–2025.
- 5,913 approvals by NBA (research, commercial use, IPR etc.).
- 6,917 approvals by SBBs/UTBCs for commercial utilisation.

Benefit Sharing:

- 216.31 crore mobilised through NBA approvals.
- 139.69 crore distributed to local communities, farmers and traditional knowledge holders.

About Nagoya Protocol:

What it is?

- The Nagoya Protocol is a supplementary agreement to the Convention on Biological Diversity (CBD).
- It provides a legal framework for access to genetic resources and fair sharing of benefits arising from their use.

Launched / Adopted in:

- Adopted: 29 October 2010 in Nagoya
- Entered into force: 12 October 2014

Aim:

- Ensure fair and equitable sharing of benefits arising from genetic resources.
- Promote biodiversity conservation and sustainable use.
- Protect traditional knowledge associated with genetic resources.

Key Features:

- Access to Genetic Resources: Countries must establish clear rules and procedures for accessing genetic resources.
- Prior Informed Consent (PIC): Users must obtain prior informed consent from the provider country before using genetic resources.
- Mutually Agreed Terms (MAT): Benefit-sharing must occur based on mutually agreed contractual terms.
- Benefit Sharing Mechanism: Benefits may be monetary (royalties, payments) or non-monetary (technology transfer, research collaboration).
- Compliance Mechanisms: Countries must monitor the utilisation of genetic resources across the research and commercialization chain.
- Protection of Traditional Knowledge: Ensures indigenous and local communities receive benefits when their knowledge is used.

Reform Express Initiative

Context:

Union Railway Minister has announced five new reforms under the Reform Express initiative to modernize cargo and passenger services.

About Reform Express Initiative:

What it is?

- The Reform Express is a comprehensive policy framework launched in 2026 to fast-track the transformation of Indian Railways into a more efficient, transparent, and passenger-friendly network.
- Organisation Involved: The initiative is spearheaded by the Ministry of Railways, Government of India.

Aim:

- The primary objective is to overhaul legacy systems by integrating advanced technology, improving ease of doing business for cargo transporters, and eliminating inefficiencies in project execution and passenger ticketing.

Key Features:

- Specialized Cargo Logistics: Introduction of stainless steel, top-loading, and hydraulic side-discharge containers specifically for salt transportation to prevent wagon corrosion and leakage.
- Infrastructure Quality Control: Implementation of stricter contractor eligibility, fixed 2% bid security, and safeguards against predatory bidding (bids significantly below cost) to ensure project durability.
- Ticketing Integrity: Removal of nearly 3 crore fake IRCTC accounts and the introduction of Aadhaar-based OTP verification to prevent touts from cornering tickets.
- Passenger Flexibility: New rules allowing passengers to change boarding stations or upgrade travel classes digitally up to 30 minutes before departure.
- Automobile Transport Optimization: Introduction of flexible wagon designs tailored to specific rail routes to bypass constraints like low bridges and narrow tunnels, increasing the rail share of auto logistics.

Significance:

- By targeting salt and automobile sectors, the Railways aims to lower logistics costs for essential and high-value goods, supporting the national economy.
- Stricter bidding rules and the cleanup of the IRCTC database reduce corruption and ensure that government funds are used effectively.

PRISM-SG Portal

Context:

Union Ministers have launched the PRISM-SG portal to digitize the approval and inspection processes for Steel Girders in Road Over Bridges (ROBs).

About PRISM-SG Portal:

What it Is?

- The PRISM-SG Portal (Portal for Rail-Road Inspection & Stages Management – Steel Girders) is a dedicated digital platform designed to streamline the complex technical approvals required for the construction of bridges where highways and railways intersect.
- Launched In: The portal was officially launched on March 25, 2026, in New Delhi.

Aim:

- The primary objective is to enhance inter-agency coordination and eliminate bottlenecks in the construction of Road Over Bridges (ROBs).
- By digitizing technical scrutiny, the government aims to ensure the structural integrity of bridges while drastically reducing the time lost in manual paperwork and physical inspections.

Key Features:

- Digital Submission & Scrutiny: Enables contractors and fabricators to submit QAPs and welding specifications online, allowing railway officials to review and raise queries digitally.
- Real-Time Monitoring: Offers a dashboard for stakeholders to track the exact status of approvals and fabrication stages in real-time.
- Automated Scheduling: Facilitates the online scheduling of physical inspections and the immediate uploading of inspection reports, photographs, and test results.
- Audit Trail: Maintains a complete, unalterable digital record of every approval and inspection, ensuring high levels of accountability and transparency.
- Integration with RRCAS: Complements the existing RRCAS portal (used for GAD and Structural Drawings) to provide a 360-degree digital approval ecosystem for bridge projects.

Significance:

- Reducing the approval cycle by 70% (from 1 year to ~100 days) ensures that highway projects are not stalled at railway crossings.
- Faster approvals lead to fewer project overruns, saving the exchequer and private contractors significant capital.
- By removing the offline mode, it eliminates the possibility of corruption or administrative lethargy in the inspection process.

Nasha Mukt Vidyalaya Initiative

Context:

The Ministry of Education has issued a comprehensive 3-year Action Plan for the Nasha Mukt Vidyalaya initiative to eliminate substance abuse in schools.

About Nasha Mukt Vidyalaya Initiative:

What it is?

- Nasha Mukt Vidyalaya (Drug-Free Schools) is a specialized initiative under the broader Nasha Mukt Bharat Abhiyan (NMBA) designed to transform educational institutions into a primary defense against drug addiction.

Aim:

- The initiative aims to curb the rising incidence of substance abuse among youth by using schools as a key platform for behavioral change, early intervention, and sustained awareness.

Key Features:

- Drug-Free Zones: Mandatory declaration of the area within a 500-metre radius of every school as a drug-free zone.
- Mandatory Reporting: School heads and nodal teachers are required to report any drug-related violations within the protected zone to local police and authorities.
- Peer-Led Initiatives: Active engagement of students through peer-led programs to foster a culture of mutual support and prevention.
- Capacity Building: Systematic training of teachers and school heads to recognize early signs of abuse and manage sensitization programs.
- Integrated Monitoring: A clearly defined reporting framework at the school, district, and state levels to track progress and ensure measurable outcomes.

Significance:

- By targeting the school environment, the plan addresses substance abuse at a critical age, preventing long-term addiction patterns.
- The roadmap aligns multiple government departments, from education to law enforcement, ensuring a unified fight against narcotics.

Chapter-
8

INTERNATIONAL RELATION

WTO MC14 Conference

Context:

The World Trade Organization's 14th Ministerial Conference (MC14) concluded in Yaoundé, Cameroon, without a final agreement on major issues like the e-commerce moratorium.

About WTO MC14 Conference:

What it is?

- The Ministerial Conference is the highest decision-making body of the WTO, typically held every two years to negotiate global trade rules.
- Host: Held at the Palais des Congrès in Yaoundé, Cameroon; this was only the second time a Ministerial Conference took place in Africa.
- Aim: To modernize WTO operations, address fisheries subsidies, advance WTO reform, and decide on the future of digital trade customs duties (e-commerce moratorium).

Key Outcomes of the MC14 Conference:

Fisheries Subsidies:

- Ministers reached an agreement to persist with negotiations regarding fisheries subsidies.
- The objective is to provide final recommendations by the 15th Ministerial Conference.
- These recommendations aim to achieve comprehensive disciplines on harmful subsidies as outlined in the Agreement on Fisheries Subsidies.

Small Economies and Development:

- Specific decisions were adopted to improve the integration of small economies into the multilateral trading system.
- The focus is on ensuring these smaller nations can participate more effectively in global trade.
- Sanitary and Phytosanitary and Technical Barriers to Trade Agreements:
- The conference enhanced the implementation of special and differential treatment provisions.
- These measures are designed to help developing nations navigate sanitary, phytosanitary, and technical trade barriers.
- The goal is to make these provisions more precise, effective, and operational for member states.

Trade and Climate Agenda:

- Member nations reaffirmed their high-level commitment to fossil fuel subsidy reform.
- A communiqué was adopted that outlines a menu of voluntary climate actions to guide future work at the intersection of trade and the environment.

- Progress was noted through the Integrated Forum on Climate Change and Trade, which is scheduled to launch a three-year work programme in June 2026.
- Least Developed Countries Package:
- Significant progress was achieved on a dedicated package designed to support Least Developed Countries.
- This package is considered a core component of the emerging outcomes that will be finalized in Geneva.

The Yaoundé Package Draft Declaration:

- Ministers developed a collection of draft texts known as the Yaoundé Package.
- This package includes a draft Ministerial Declaration on World Trade Organization Reform and a work plan.
- It also contains draft decisions on Electronic Commerce and the Agreement on Trade-Related Aspects of Intellectual Property Rights.
- Because members ran out of time in Cameroon, these texts will serve as the basis for finalizing agreements at the next General Council meeting in Geneva.

Success of Outcomes:

- Modernized Work Methods: Director-General Okonjo-Iweala noted a new WTO way of working that is more nimble and responsive.
- Climate Integration: Successfully moved the trade-climate interface forward through the Integrated Forum on Climate Change and Trade (IFCCT).
- Institutional Continuity: Preserved important draft texts (the Yaoundé Package) to prevent total collapse and provide a basis for future talks.
- Inclusivity for Small States: Formalized support mechanisms for smaller and developing economies to better navigate multilateral systems.

Failures of the Conference:

- E-commerce Deadlock: Failed to extend the moratorium on customs duties for digital transmissions due to a clash between the US (seeking a permanent extension) and Brazil.
- TRIPS Moratorium Lapse: No agreement was reached on the non-violation complaint moratorium under TRIPS, which is expected to expire at the end of March 2026.
- Agriculture Impasse: Negotiations remained mired in long-standing disputes over domestic support and market access between the US and Brazil.
- Investment Facilitation: India and South Africa successfully blocked the inclusion of the Investment Facilitation for Development (IFD) agreement, citing it as outside the WTO's mandate.
- Dispute Settlement Reform: Despite two days of thematic discussions, there was no convergence on restoring the WTO's appellate body or reform system.

Way Ahead:

- Geneva Resumption: Members must use the Yaoundé Package draft texts to finalize agreements at the next General Council meeting.
- Addressing the Deadline: Urgently resolve the e-commerce and TRIPS moratoriums before they officially expire and disrupt digital trade.
- Inclusive Reform: Shift toward the member-driven reform approach demanded by India and South Africa to ensure developing nations aren't sidelined.
- Fisheries Recommendations: Accelerate technical work in Geneva to ensure comprehensive recommendations are ready for MC15.
- Bridging Major Gaps: Direct high-level diplomatic engagement is needed between the US, Brazil, and India to find middle ground on agriculture and digital trade.

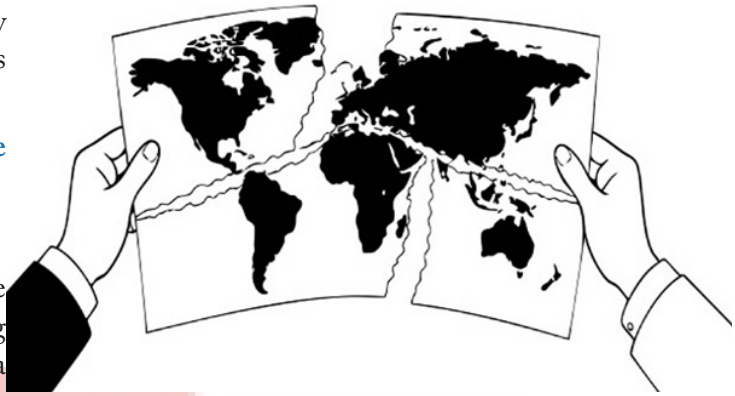
Conclusion:

The MC14 conference demonstrated a renewed Yaoundé way of working but ultimately fell short of delivering legally binding results on critical digital and agricultural issues. While progress on climate and LDC support is encouraging, the looming expiration of trade moratoriums poses a significant risk to global stability. The WTO's future relevance now hinges on whether Geneva can bridge the deep geopolitical fractures exposed in Cameroon.

In a fractured world, WTO matters more than ever

Context:

The 14th Ministerial Conference (MC14) is currently underway in Yaoundé, Cameroon, where trade ministers are grappling with a fractured global economy.



About In a fractured world, WTO matters more than ever:

What it is?

- The World Trade Organization (WTO) is the only global international organization dealing with the rules of trade between nations. In a fractured world—characterized by trade wars and decoupling—the WTO acts as a critical stabilizer, preventing economic competition from devolving into uncontrolled retaliatory tariffs and absolute chaos, especially for smaller developing nations.

WTO History and Functions:

- Historical Transition: Established on January 1, 1995, following the Uruguay Round negotiations, it replaced the General Agreement on Tariffs and Trade (GATT) which had existed since 1948.
- Trade Negotiations: It serves as a forum for member governments to negotiate the reduction or elimination of obstacles to trade (tariffs and non-tariff barriers).
- Dispute Settlement: It operates a legal mechanism to resolve trade conflicts between member nations, ensuring that trade flows as predictably and freely as possible.
- Capacity Building: The WTO provides technical assistance and training to help developing countries build their trade capacity and participate in global commerce.

Rise of a Fractured World:

- Return of Protectionism: Nations are increasingly prioritizing domestic industry over global openness.
- Example: The return of Donald Trump to the White House and his threats of broad baseline tariffs have signaled a shift toward America First trade policies.
- Strategic Rivalry: Trade is being used as a weapon in the geopolitical competition between superpowers.
- Example: The U.S.-China technology war has led to export controls on semi-conductors and critical minerals, splitting the global supply chain.
- Weaponization of Dependencies: Europe and other regions are de-risking to avoid over-reliance on single sources for energy or medicine.
- Example: Following the Russia-Ukraine war, the EU drastically shifted its energy policy to end dependency on Russian gas, leading to regional trade realignments.
- Supply Chain Disruptions: Conflicts in vital maritime corridors have made just-in-time global trade unpredictable.
- Example: Houthi attacks in the Red Sea have forced shipping companies to reroute around Africa, spiking costs and destabilizing food systems.
- Industrial Policy Surge: Governments are using massive subsidies to secure future industries, often bypassing WTO rules.
- Example: The U.S. Inflation Reduction Act (IRA) and similar EU subsidies for green tech have triggered subsidy races that disadvantage poorer nations.

Challenges Faced by the WTO:

- Paralysis of the Appellate Body: The enforcement arm of the WTO is currently non-functional.
- Example: The U.S. has blocked the appointment of new judges, leaving trade disputes in a legal limbo where countries can ignore rulings without consequence.
- Consensus Deadlock: The requirement for all 164+ members to agree on every decision often leads to stagnation.
- Example: Years of negotiations on fisheries subsidies and digital trade have faced delays because a single member can veto a global agreement.

- Crisis of Legitimacy: Globalisation is increasingly blamed for job losses and regional decline in developed nations.
- Example: Rising populism in Western Europe and the U.S. has turned voters against free trade, making it politically difficult for leaders to support WTO mandates.
- Abrupt Policy Reactions: Nations are bypassing consultation during emergencies, leading to market panic.
- Example: Recent export bans on food and fertilizers during the 2026 energy crisis have exacerbated global hunger and created artificial shortages.
- Digital Trade Lag: Existing WTO rules were designed for physical goods, not the modern digital economy.
- Example: The lack of a global framework for cross-border data flows has led to a splinternet where different countries have conflicting data privacy laws.

Way Ahead:

- Restore Dispute Settlement: Re-establishing a credible, two-tier enforcement mechanism must be the immediate priority at MC14 to restore trust.
- Plurilateral Agreements: Move toward Flexible Multilateralism where groups of like-minded countries can agree on specific issues (like digital trade) without waiting for a total consensus.
- Focus on Fairness: Integrate development needs and food security into trade rules to ensure that poorer nations aren't left behind in a power-based trade world.
- Transparency in Subsidies: Create a clear, updated framework for Green Subsidies to allow for climate action without triggering global trade wars.
- Emergency Consultation: Establish a Crisis Management role for the WTO to prevent sudden export bans on essential medical and food supplies during global shocks.

Conclusion:

The WTO remains the only buffer preventing the global economy from sliding back into a lawless era of might makes right. While its flaws are evident, the choice in 2026 is between a reformed, flexible WTO and a world of retaliatory blocs and deep economic disorder. Ultimately, rules that are credible and responsive to today's geopolitics are not just idealistic—they are essential for global survival.

The UN Commission on the Status of Women

Context:

The UN Commission on the Status of Women (CSW) concluded its 70th session on March 19, 2026, where 190 member states adopted historic Agreed Conclusions.

About The UN Commission on the Status of Women:

What it is?

- A functional commission of the Economic and Social Council (ECOSOC) and the primary organ for global policy-making on women's rights.
  The CSW is the principal global intergovernmental body exclusively dedicated to the promotion of gender equality and the empowerment of women.
- Established In: June 1946, shortly after the founding of the United Nations.
- Aim: To promote women's rights in political, economic, civil, social, and educational fields and to ensure that gender equality is integrated into all UN activities and national policies.

Key Functions:

1. Setting Global Standards: It formulates policies, standards, and norms that define the rights of women and girls globally, such as the landmark Beijing Declaration (1995).
2. Monitoring Progress: It reviews the implementation of international agreements by member states and monitors the progress of the 2030 Agenda for Sustainable Development (specifically SDG 5).
3. Thematic Policy Development: Each year, the commission focuses on a priority theme to create actionable strategies for member states.

4. Advocacy and Awareness: It provides a high-level platform for heads of state, NGOs, and civil society to highlight emerging issues affecting women, such as digital exclusion or climate impact.
5. Addressing Crisis Contexts: The commission brings global attention to the highest price paid by women in conflict zones, from Afghanistan and Gaza to Ukraine and Sudan.
6. Coordination and Accountability: It supports the work of UN Women in coordinating the UN system's gender-related activities and ensuring institutional accountability.

Key Outcomes of the Agreed Conclusions:

- Mandatory Reform of Discriminatory Laws: States must amend laws on marriage, property, and family to eliminate gender bias, ensuring women achieve equal legal rights and protection.
- Formal Recognition of Community Justice: Paralegals and community justice workers are formally integrated into legal systems to improve access for rural women.
- Digital Justice and AI Governance: Promotes use of technology for justice delivery while regulating AI biases and tackling tech-enabled gender violence.
- Survivor-Centered Justice in Crisis Contexts: Ensures trauma-informed, accessible justice systems for victims of violence, especially in conflict and humanitarian situations.
- Universal Access to Sexual and Reproductive Health: Reaffirms women's rights to healthcare and reproductive autonomy as essential for dignity, equality, and justice.

India's Stakes in West Asia

Context:

As the war in West Asia enters its seventh day following the February 2026 strikes on Tehran, Shashi Tharoor warns that the conflict has shattered regional order and directly threatened India's national interests.

About India's Stakes in West Asia:

What it is?

- India's stakes refer to the critical, multidimensional dependence on the Gulf region for its economic survival and social stability. This is not merely a matter of foreign policy but a domestic priority, as any instability in the extended neighborhood has an immediate cost-push effect on the Indian kitchen and the safety of millions of Indian households.

Data/Facts on India-West Asia:

- Energy Dependency: In 2025, West Asia accounted for approximately 49% to 55% of India's total crude oil imports and nearly 70% of its gas.
- The Chokepoint: Nearly 40-50% of India's crude oil passes through the Strait of Hormuz, which is currently facing a naval blockade.
- The Diaspora: Over 9 million to 1 crore Indian expatriates live and work in the Gulf, representing one of the largest workforces in the region.
- Financial Lifeline: The region contributes roughly 38% of India's total global remittance inflows (with 19% from UAE alone), vital for foreign exchange stability.

Dependency of India on West Asia:

1. Energy Security: India relies on the Gulf for over half of its hydrocarbon needs, making it vulnerable to war premiums and supply shocks.

Example: The 2026 conflict has pushed Brent crude prices toward $83-$100 per barrel, threatening to widen India's Current Account Deficit (CAD).

1. Remittance Inflow: Millions of Indian households in Kerala, UP, and Bihar depend on monthly transfers from workers in the GCC.

Example: Hostilities in early 2026 have sparked fears of large-scale displacement, which would jeopardize the billions of dollars sent home annually.

1. Agricultural Export Market: The region is the primary destination for India's high-value agricultural staples.

Example: In March 2026, over 400,000 tonnes of Basmati rice were reported stuck at ports due to the disruption of trade routes to Saudi Arabia and Iran.

1. Fertilizer Imports: India imports nearly 40% of its Urea and NPK fertilizers from West Asia, which is critical for its food security.

Example: Logistics bottlenecks in the Gulf are currently threatening to inflate the government's subsidy burden and cause domestic food inflation.

Importance of India to West Asia:

1. Economic Reconstruction Partner: India is viewed as a civilizational anchor capable of leading post-war infrastructure rebuilding.

Example: Indian public sector giants like IRCON and ONGC have shelf-ready plans for the Zahedan railway line and Farzad-B gas field in Iran.

1. Stabilizing Diplomatic Pivot: India is the only major power maintaining a Special Strategic Partnership with Israel while keeping open lines with Tehran.

Example: In March 2026, EAM S. Jaishankar held emergency Hotline calls with both Israel and the Interim Leadership Council in Tehran to negotiate de-escalation.

1. Human Resource Backbone: The Gulf's infrastructure, healthcare, and service sectors are structurally dependent on the Indian professional and labor force.

Example: Despite the 2026 war, host governments have actively engaged with New Delhi to ensure Indian workers remain to prevent a total economic collapse.

1. Maritime Security Provider: The Indian Navy acts as a Net Security Provider for commercial shipping in the Indian Ocean and North Arabian Sea.

Example: Operation Sankalp was institutionalized in 2026 into a permanent escort architecture to protect merchant vessels from regional proxy attacks.

Challenges Associated:

1. The Diplomatic Tightrope: Balancing ties with the US-Israel axis against the historical and energy-linked relationship with Iran is increasingly difficult.

Example: India faced severe domestic criticism in March 2026 for its initial silence following the strike on the Iranian leadership.

1. Chokepoint Vulnerability: The closure of the Strait of Hormuz effectively paralyzes India's primary energy and trade artery.

Example: Reports in March 2026 indicate Qatar has declared force majeure on LNG shipments, forcing Indian factories to look for costlier alternatives.

1. Connectivity Paralysis: Strategic projects like the IMEC (India-Middle East-Europe Corridor) have been rendered non-viable by the war.

Example: At the February 2026 Munich Security Conference, officials noted that IMEC progress has stalled as regional attention shifted to survival.

1. Evacuation Logistics: The sheer scale of the Indian diaspora makes any mass evacuation a logistical nightmare.

Example: Senior officials in March 2026 indicated that a Total War would require an epic rescue effort exceeding the scale of past operations like Rahat.

Way Ahead

- Energy Diversification: Rapidly accelerate crude sourcing from the Americas and Eurasia while expanding Strategic Petroleum Reserves.
- Institutionalize Maritime Security: Move from periodic patrols to a permanent Maritime Security Escort Architecture for Indian-flagged vessels.
- Lead Global South Diplomacy: Use India's G20 and BRICS influence to push for a UN-monitored ceasefire that respects Iranian sovereignty and Israeli security.
- Rupee-Settlement Hubs: Accelerate offshore Rupee-swap hubs to bypass the weaponization of SWIFT and maintain trade during sanctions.

- Strategic Autonomy: Maintain a Neutral Interlocutor status to facilitate a De-escalation Corridor between the warring factions.

Conclusion:

India's path to becoming a global power is inextricably linked to the peace and stability of West Asia. The 2026 conflict is not a distant fire but a direct threat to the Indian economy, energy security, and the livelihoods of millions. Only through proactive, civilizational diplomacy can India help pull the region back from an abyss that threatens to derail the growth story of the entire Global South.

India-Canada Bilateral Relations

Context:

Bilateral relations between India and Canada have undergone a strategic reset following Prime Minister Mark Carney's visit to India and his high-level talks with Prime Minister of India.

About India-Canada Bilateral Relations:

What it is?

- India and Canada share a relationship built on a "Strategic Partnership" centered around shared democratic values, the rule of law, and strong people-to-people ties. The partnership spans several critical sectors including nuclear energy, trade, education, and maritime security in the Indo-Pacific.

History of India-Canada Relations:

- Early Cooperation: Traditionally, the two nations shared a cooperative bond, particularly in the nuclear field, until it was disrupted in the 1970s.
- Economic Integration: Over the last 25 years, Canada has made major investments in India, with approximately 600 Canadian companies now operating on Indian soil.
- The Trudeau Strain: Relations faced severe deterioration during Justin Trudeau's tenure due to allegations regarding the killing of Hardeep Singh Nijjar.
- The Carney Transition: Ties began to improve last year after Mark Carney assumed office, leading to the resumption of high-level visits and trade talks.
- Modern Strategic Reset: The relationship has now shifted toward a "Strategic Energy Partnership" and a focus on middle-power collaboration against global power hegemony.

Need for Reset:

1. Energy Security: India requires stable long-term partners to meet its massive and growing energy demands through nuclear and renewable sources.

Example: The new $2.6-billion, 10-year deal for Canadian uranium is essential for fueling Indian nuclear reactors.

1. Economic Protectionism: Both nations are seeking to defend their economies against the impact of great power hegemony and restrictive trade policies.

Example: Strengthening ties serves as a shield against the United States' current tariff policies affecting both countries.

1. Trade Diversification: There is an urgent need to expand bilateral trade to its full potential through a formal Economic Partnership Agreement.

Example: Leaders aim to double bilateral trade to $50 billion by 2030 to bolster already robust economic ties.

1. Indo-Pacific Stability: Regional security requires coordinated efforts between democratic middle powers to ensure maritime safety.

Example: A planned defense dialogue aims to support maritime security cooperation across the Indo-Pacific region.

1. Diaspora Management: The presence of a massive Indian community in Canada necessitates a stable diplomatic environment for their welfare.

Example: With 1.8 million Indo-Canadians and 400,000 Indian students in Canada, the reset ensures their safety and academic continuity.

Challenges Associated:

1. Sovereignty and Security Allegations: Past accusations regarding extrajudicial activities remain a sensitive "under-the-surface" issue for both governments.

Example: The severe strain caused by allegations in the Hardeep Singh Nijjar case highlights how security issues can paralyze diplomacy.

1. Trade Barriers: Navigating complex regulatory frameworks to finalize the Economic Partnership Agreement by year-end remains a hurdle.

Example: Restarting trade talks required overcoming months of total deadlock following the diplomatic fallout of 2024-25.

1. Extremism and Diaspora Politics: The activities of separatist elements within Canada continue to be a primary point of contention for New Delhi.

Example: India has consistently raised concerns about the safety of its diplomats in Canada amidst protests by Khalistan supporters.

1. Nuclear Regulatory Hurdles: Expanding nuclear cooperation to build large and small reactors requires navigating strict international and bilateral safeguards.

Example: The plan to use Canadian expertise for Indian reactors depends on the successful execution of the 10-year uranium deal.

1. Global Power Dynamics: External pressures from great power rivalries and shifting US trade stances could disrupt middle-power alignment.

Example: Both nations must balance their reset while simultaneously reacting to the unpredictable tariff shifts from the US.

Way Ahead:

- Finalize CEPA: Conclude the India-Canada Comprehensive Economic Partnership Agreement by the end of 2026 to provide a legal framework for trade.
- Operationalize Energy Pact: Rapidly implement the Strategic Energy Partnership covering nuclear, LNG, solar, and hydrogen energy.
- Strengthen Security Ties: Operationalize the planned defense dialogue to maintain a rules-based order in the Indo-Pacific.
- Critical Minerals Collaboration: Secure supply chains for critical minerals necessary for India's green energy transition and technological growth.
- Enhance Student Welfare: Streamline exchange programs and ensure a supportive environment for the 400,000 Indian students currently in Canada.

Conclusion:

The strategic reset between India and Canada marks a transition from a period of deep mistrust to a pragmatism-driven partnership centered on energy and economic security. By moving past historical grievances, both nations are positioning themselves as collaborative middle powers capable of navigating global trade uncertainties. This renewed bond is essential for India's energy future and the prosperity of its vast diaspora living in Canada.

The Iran-Israel War

Context:

The United States and Israel launched a massive joint military operation, Operation Epic Fury (or Operation Genesis), against Iran.

- The strikes resulted in the assassination of Supreme Leader Ayatollah Ali Khamenei and approximately 40 high-ranking officials, triggering a multi-front regional war

About The Iran-Israel War:

What it is?

- This conflict marks a departure from decades of shadow war into a direct, high-intensity confrontation. Initiated as a pre-emptive strike by the Trump administration and the Netanyahu government, it aims for regime change in Tehran and the total dismantling of Iran's nuclear and ballistic missile capabilities.
- Iran has responded with Operation Truthful Promise 4, launching hundreds of drones and missiles at Israel and US-allied Gulf nations.

History & Causes of Tensions:

- The 1953 Coup: The CIA-backed overthrow of democratically elected PM Mohammad Mosaddegh planted the seeds of anti-US sentiment.
- The 1979 Islamic Revolution: The shift from a natural alliance under the Shah to a clerical regime that views the US as the Great Satan and Israel as an illegitimate regime.
- Nuclear Ambitions: Decades of dispute over Iran's uranium enrichment, which Israel views as an existential threat and the US sees as a global security risk.
- Regional Proxy Wars: Persistent friction caused by Iran's Axis of Resistance (Hezbollah, Hamas, Houthis) operating against US and Israeli interests.
- Failure of Diplomacy: The collapse of various nuclear deal iterations and failed negotiations in early 2026 led to the current military escalation.

Recent Events Contributing to War:

- Assassination of Ali Khamenei: A joint US-Israeli daytime airstrike on February 28, 2026, destroyed the Supreme Leader's compound in Tehran, killing him and his family.
- E.g. President Trump confirmed the operation, calling it justice and a move to facilitate regime change in Iran.
- Retaliatory Strikes on GCC States: Iran launched hundreds of missiles at the UAE, Saudi Arabia, Qatar, Bahrain, and Kuwait.
- E.g. Tehran targeted these nations for hosting US military bases, such as Al Udeid in Qatar and the 5th Fleet in Bahrain.
- Economic Disruption at Chokepoints: The Strait of Hormuz has become a combat zone, with the US reporting the sinking of nine Iranian naval vessels.
- E.g. This maritime escalation immediately caused global oil prices to soar and grounded international flights across Middle Eastern hubs like Dubai.
- Domestic Unrest in Iran: Celebrations and mourning simultaneously broke out in Iranian cities following the news of the leadership's demise.
- E.g. Reports from Tehran describe a spontaneous reaction where some citizens celebrated the death of a dictator while others demanded severe revenge.
- Spread to Lebanon: Israel began striking Hezbollah targets in Beirut on March 2, 2026, after the group launched rockets in solidarity with Iran.
- E.g. The IDF stated these were pre-emptive and retaliatory strikes to prevent a massive northern front from opening.

Challenges Associated to the World:

- Global Energy Crisis: The threat to the Strait of Hormuz risks a permanent spike in fuel costs, threatening global inflation.
- E.g. Oil prices surged on March 2, 2026, as shipping insurance for the Gulf became prohibitively expensive.
- Regional Polarization: Gulf states like Qatar and Oman, which previously balanced ties, are now forced to pick sides.
- E.g. The joint statement by the US and six Arab allies condemning Iran signals a collapse of the hedging strategy.
- Humanitarian Crises: Intense urban bombing in Tehran and retaliatory strikes on civilian areas in Israel and the Gulf are causing high casualty rates.
- E.g. A strike on an Iranian school reported 165 casualties, while missiles hit residential hotels in Dubai.

- Great Power Involvement: The risk of Russia or China intervening to protect their energy interests or strategic partners.
- E.g. Vladimir Putin condemned the assassination of Khamenei as a cynical murder and a violation of international law.
- Security of Nuclear Sites: The ongoing bombardment of Iranian territory raises the risk of environmental disaster if nuclear facilities are compromised.
- E.g. The IAEA has called a special session for March 2nd to discuss the status of Iran's nuclear reactors under fire.

Way Ahead:

- Immediate Ceasefire: Urgent UN Security Council intervention is needed to halt the Epic Fury operation and Iranian retaliations.
- Succession Management: International monitors must watch the Assembly of Experts in Iran to see if a moderate or a hardline IRGC military junta takes power.
- Protection of Maritime Trade: Establishing a neutral international naval task force to keep the Strait of Hormuz open for non-combatant commercial vessels.
- Humanitarian Corridors: Opening safe zones for Iranian civilians and foreign nationals trapped in the Gulf conflict zones.
- Return to the Table: Using mediators like Switzerland or the UN to establish a hotline between the US and the transitional Iranian government to prevent total regional collapse.

Conclusion:

The death of Ali Khamenei marks the end of an era and the beginning of a highly volatile and unpredictable chapter in Middle Eastern history. While the US and Israel aim for a New Middle East, the immediate result is a region on fire, with global economic and security systems under unprecedented strain. The coming weeks will determine if this is a short, sharp transition or the start of a multi-decade regional war.

Operation Epic Fury

Context:

The United States military has officially named its recent strikes on Iran as Operation Epic Fury, amid escalating tensions over Iran's nuclear programme and regional security concerns.

About Operation Epic Fury:

What it is?

- Operation Epic Fury is the codename adopted by the Pentagon for US military operations targeting Iranian military infrastructure, carried out in coordination with Israeli strikes.
- It represents a large-scale military campaign aimed at weakening perceived threats posed by Iran's military and strategic capabilities.

Nations Involved:

- United States – Led and officially named the operation.
- Israel – Conducted coordinated strikes alongside US forces.
- Iran – Targeted country; responded with retaliatory actions.

Aim:

- Neutralise perceived military and missile threats.
- Constrain Iran's nuclear and strategic capabilities.
- Strengthen regional security from the perspective of US–Israel strategic interests.

Key Features:

- Codename Formalisation: Pentagon officially designated the operation as Operation Epic Fury, indicating a major organised military campaign.

- Coordinated Strikes: Conducted jointly with Israel against multiple targets in Iran.
- Precision Military Operations: Included air and missile strikes targeting military infrastructure and strategic assets.
- High Regional Impact: Triggered retaliatory responses and heightened military alerts across the Middle East.
- Escalation of US–Iran Tensions: Occurs amid long-standing disputes over Iran's nuclear programme and regional influence.

Significance:

- Major Geopolitical Escalation: Signals a sharp rise in military confrontation in West Asia.
- Regional Security Implications: Raises risks of wider conflict involving Gulf states and allied forces.

WTO's 14th Ministerial Conference (MC14)

Context:

India has officially submitted a robust set of proposals for the WTO's 14th Ministerial Conference (MC14), focusing on a permanent solution for food security and protecting the livelihoods of traditional fishermen.

About WTO's 14th Ministerial Conference (MC14):

What it is?

- The Ministerial Conference is the highest decision-making body of the World Trade Organization (WTO). Comprising trade ministers from all 166 member nations, it is the forum where major multilateral agreements are negotiated, trade disputes are addressed, and the future roadmap of global trade is legalized.

Origin:

- Established: Under the Marrakesh Agreement (1994) which created the WTO.
- Frequency: The WTO Agreement mandates that the Ministerial Conference must meet at least once every two years.
- Successor to GATT: It replaced the informal Ministerial Meetings held under the General Agreement on Tariffs and Trade (GATT).

Host for MC14:

- Location: Yaoundé, Cameroon.
- Dates: 26 to 29 March 2026.
- Chair: Luc Magloire Mbarga Atangana, Cameroon's Minister of Trade.

Aim of MC14:

- Resolving the long-standing dispute over food subsidies for developing nations.
- Finalizing Phase 2 of the agreement to curb overcapacity and overfishing while protecting small-scale fishers.
- Restoring the non-functional Appellate Body to ensure a rules-based trading system.
- Deciding whether to end or extend the Moratorium on Customs Duties on electronic transmissions.

Key WTO Ministerial Conferences and Their Outcomes

MC1: Singapore (1996)

- Significance: This was the inaugural WTO Ministerial Conference.
- The Singapore Issues: It introduced four major topics into the WTO agenda that were pushed by developed nations: Trade and Investment, Competition Policy, Transparency in Government Procurement, and Trade Facilitation. These remained controversial for years as developing nations feared they would favor large corporations.

MC4: Doha (2001)

- Significance: Known for launching the Doha Development Agenda (DDA).
- Focus on Development: This round was specifically designed to make the trading system more relevant to developing countries.
- Key Outcomes: It achieved a major breakthrough in the TRIPS and Public Health declaration, allowing countries to bypass patents for essential medicines during health crises. It also set the stage for long-running negotiations on agricultural subsidies.

MC9: Bali (2013)

- Significance: Resulted in the Bali Package, the first major multilateral agreement since the WTO's creation.
- Trade Facilitation Agreement (TFA): Members concluded the TFA to simplify and modernize customs procedures globally.
- The Peace Clause: Crucial for India, this established an interim Peace Clause that prevents member countries from legally challenging a developing nation if it breaches its agricultural subsidy limit (10%) for food security programs like the PDS.

MC10: Nairobi (2015)

- Significance: Focused on the Nairobi Package for agriculture and Least Developed Countries (LDCs).
- Export Subsidies: Members made a historic commitment to eliminate agricultural export subsidies, which helped level the playing field for farmers in developing nations who were previously being undercut by subsidized foreign goods.

MC12: Geneva (2022)

- Significance: Known as the Geneva Package, it addressed several modern global crises.
- Fisheries Subsidies: Members reached a landmark deal to curb subsidies that contribute to illegal, unreported, and unregulated fishing.
- TRIPS Waiver: Agreed to a partial waiver on IP rights for COVID-19 vaccines to allow developing countries to manufacture them more easily.
- E-commerce: Extended the moratorium on customs duties for electronic transmissions.

MC13: Abu Dhabi (2024)

- Significance: Focused on expansion and regulatory streamlining.
- Membership: Formally admitted Comoros and Timor-Leste as the newest members of the WTO.
- Service Regulations: Advanced the Investment Facilitation for Development agreement and focused on domestic regulation in services to reduce hidden barriers to trade.

The Iran-Israel War

Context:

The United States and Israel launched a massive joint military operation, Operation Epic Fury (or Operation Genesis), against Iran.

- The strikes resulted in the assassination of Supreme Leader Ayatollah Ali Khamenei and approximately 40 high-ranking officials, triggering a multi-front regional war

About The Iran-Israel War:

What it is?

- This conflict marks a departure from decades of shadow war into a direct, high-intensity confrontation. Initiated as a pre-emptive strike by the Trump administration and the Netanyahu government, it aims for regime change in Tehran and the total dismantling of Iran's nuclear and ballistic missile capabilities.
- Iran has responded with Operation Truthful Promise 4, launching hundreds of drones and missiles at Israel and US-allied Gulf nations.

History & Causes of Tensions:

- The 1953 Coup: The CIA-backed overthrow of democratically elected PM Mohammad Mosaddegh planted the seeds of anti-US sentiment.
- The 1979 Islamic Revolution: The shift from a natural alliance under the Shah to a clerical regime that views the US as the Great Satan and Israel as an illegitimate regime.
- Nuclear Ambitions: Decades of dispute over Iran's uranium enrichment, which Israel views as an existential threat and the US sees as a global security risk.
- Regional Proxy Wars: Persistent friction caused by Iran's Axis of Resistance (Hezbollah, Hamas, Houthis) operating against US and Israeli interests.
- Failure of Diplomacy: The collapse of various nuclear deal iterations and failed negotiations in early 2026 led to the current military escalation.

Recent Events Contributing to War:

- Assassination of Ali Khamenei: A joint US-Israeli daytime airstrike on February 28, 2026, destroyed the Supreme Leader's compound in Tehran, killing him and his family.
- E.g. President Trump confirmed the operation, calling it justice and a move to facilitate regime change in Iran.
- Retaliatory Strikes on GCC States: Iran launched hundreds of missiles at the UAE, Saudi Arabia, Qatar, Bahrain, and Kuwait.
- E.g. Tehran targeted these nations for hosting US military bases, such as Al Udeid in Qatar and the 5th Fleet in Bahrain.
- Economic Disruption at Chokepoints: The Strait of Hormuz has become a combat zone, with the US reporting the sinking of nine Iranian naval vessels.
- E.g. This maritime escalation immediately caused global oil prices to soar and grounded international flights across Middle Eastern hubs like Dubai.
- Domestic Unrest in Iran: Celebrations and mourning simultaneously broke out in Iranian cities following the news of the leadership's demise.
- E.g. Reports from Tehran describe a spontaneous reaction where some citizens celebrated the death of a dictator while others demanded severe revenge.
- Spread to Lebanon: Israel began striking Hezbollah targets in Beirut on March 2, 2026, after the group launched rockets in solidarity with Iran.
- E.g. The IDF stated these were pre-emptive and retaliatory strikes to prevent a massive northern front from opening.

Challenges Associated to the World:

- Global Energy Crisis: The threat to the Strait of Hormuz risks a permanent spike in fuel costs, threatening global inflation.
- E.g. Oil prices surged on March 2, 2026, as shipping insurance for the Gulf became prohibitively expensive.
- Regional Polarization: Gulf states like Qatar and Oman, which previously balanced ties, are now forced to pick sides.
- E.g. The joint statement by the US and six Arab allies condemning Iran signals a collapse of the hedging strategy.
- Humanitarian Crises: Intense urban bombing in Tehran and retaliatory strikes on civilian areas in Israel and the Gulf are causing high casualty rates.
- E.g. A strike on an Iranian school reported 165 casualties, while missiles hit residential hotels in Dubai.
- Great Power Involvement: The risk of Russia or China intervening to protect their energy interests or strategic partners.
- E.g. Vladimir Putin condemned the assassination of Khamenei as a cynical murder and a violation of international law.
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United Nations Convention on the Law of the Sea (UNCLOS)

Context:

An Iranian warship IRIS Dena was sunk by a US submarine off the coast of Sri Lanka while returning from the International Fleet Review 2026 at Visakhapatnam.

About United Nations Convention on the Law of the Sea (UNCLOS):

What it is?

- UNCLOS is the comprehensive international treaty that establishes the legal framework governing the use of the world's oceans and seas.
- It is often called the Constitution of the Oceans because it defines rights and responsibilities of states in maritime zones.

Came into force:

- Adopted in 1982 at Montego Bay, Jamaica.
- Entered into force in 1994 after sufficient ratifications.

Members:

- 168 parties including the European Union.
- Major maritime powers like India are parties, while the United States has signed but not ratified the convention.

Aim:

- To ensure peaceful use of oceans, equitable use of marine resources, protection of marine environment, and regulation of maritime boundaries.

Key functions:

- Defines Maritime Zones – Establishes legal zones such as Territorial Sea, Contiguous Zone, Exclusive Economic Zone (EEZ), and High Seas.
- Navigation Rights – Guarantees freedom of navigation and innocent passage for ships through territorial waters.
- Resource Governance – Regulates exploration and exploitation of marine resources such as fisheries, oil, and minerals.

- Marine Environmental Protection – Provides legal provisions to prevent pollution and protect marine biodiversity.
- Dispute Settlement – Establishes mechanisms like the International Tribunal for the Law of the Sea (ITLOS) for resolving maritime disputes.
- Seabed Governance – Creates the International Seabed Authority (ISA) to regulate mineral resources in areas beyond national jurisdiction.

About UNCLOS and International Waters:

What are International Waters?

- International waters, also called the High Seas, are areas of the ocean beyond the Exclusive Economic Zone (200 nautical miles) of any coastal state.

Features associated with International Waters:

- Freedom of Navigation – Ships of all states can sail freely without interference.
- Freedom of Overflight – Aircraft can pass over high seas without restriction.
- Peaceful Use Principle – Under Article 88 of UNCLOS, high seas must be reserved for peaceful purposes.
- The latest strike off Sri Lanka has raised questions about the legality of a military strike in international waters.
- A state could use force in international waters if it was responding in self-defence.
- Shared Global Commons – No country can claim sovereignty over international waters.
- Limited Use of Force – Military action in international waters is generally restricted unless self-defence or UN Security Council authorization exists.
- Common Heritage Principle – Resources in the seabed beyond national jurisdiction are treated as the common heritage of mankind.

United Nations Security Council (UNSC)

Context:

India has co-sponsored a Gulf Cooperation Council (GCC) resolution at the UN Security Council demanding the immediate cessation of Iranian attacks on GCC nations and the Strait of Hormuz.

About United Nations Security Council (UNSC):

What It Is?

- The UNSC is one of the six principal organs of the United Nations, charged with the primary responsibility of maintaining international peace and security. It is the only UN body with the authority to issue binding resolutions that member states are obligated to implement.
- Established In: The Council was established by the UN Charter in 1945 and held its first session on January 17, 1946, at Church House, London.
- Headquarter: It is now permanently headquartered in New York City.

Aim:

- The central aim of the UNSC is to prevent commercial and military conflicts between nations, foster friendly global relations, and provide a platform for harmonizing the actions of nations to solve international problems.

Functions:

- Investigative & Mediatory: The Council investigates disputes that might lead to international friction and recommends methods of adjustment or terms of settlement.
- Conflict Management: It can issue ceasefire directives, dispatch military observers, or deploy peacekeeping forces to reduce tensions and separate opposing factions.

- Enforcement Measures: When peaceful means fail, it can impose economic sanctions, arms embargoes, financial penalties, travel bans, or even authorize collective military action.
- Legal Obligation: Under the UN Charter, all member states agree to accept and carry out the decisions of the Security Council.
- Its structure, including five permanent members (P5) with veto power, ensures that major global powers are central to any enforceable international security decision.

Significance:

- It acts as the ultimate arbiter in matters of global security, with the power to intervene in domestic conflicts that threaten international stability.
- A UNSC resolution provides international legal legitimacy to interventions or sanctions, making it the most influential body in global diplomacy.

Neighbourhood Diplomacy and Its West Asia Challenges

Context:

The sinking of the Iranian warship IRIS Dena by the U.S. in the Indian Ocean has brought the West Asia conflict to South Asia's doorstep, disrupting regional trade and security.

About Neighbourhood Diplomacy and Its West Asia Challenge:

What it is?

- This refers to India's complex task of managing its Neighbourhood First policy while navigating the spillover effects of the West Asia war. As the conflict expands, India must reconcile its strategic alignment with the West with the economic, cultural, and security concerns of its South Asian neighbors, who often hold different diplomatic stances on the crisis.

Data / Facts:

- Demographic Stakes: Approximately 25 million South Asians live and work in West Asia, including 10 million Indians and 5 million Pakistanis.
- Maritime Contribution: Indians account for about 15% of the global population of seafarers, making them highly vulnerable in conflict zones like the Strait of Hormuz.
- Refugee Crisis: Between 5 to 8 million Afghans are currently refugees in Iran, complicating the humanitarian landscape.

Strategic Implications of the West Asia Conflict for South Asia:

- Security at Home: The conflict is no longer distant; the sinking of IRIS Dena occurred in the Indian Ocean, directly impacting South Asian maritime zones.
- Diplomatic Divergence: India's perceived pro-Israel stance is creating a diplomatic gap between New Delhi and neighbors like the Maldives and Bangladesh.
- International Norms: The targeted killing of a state's religious leader is viewed by regional actors as a violation of international sovereignty, regardless of political affiliation.
- Trust Deficit: India's initial failure to criticize U.S.-Israeli unilateral actions has raised questions about its traditional role as a neutral, stabilizing force in the region.

India's Diplomatic Balancing Challenge in West Asia:

- The U.S.-Israel Tilt: PM Modi's stand with Israel commitment at the Knesset has made a balanced response to Iranian retaliation more difficult to maintain.
- Historical Neutrality: India has traditionally avoided taking sides in West Asian regional fault lines, a policy that previously earned it trust and goodwill from all parties.
- Reactive vs. Proactive: India was criticized for its delayed response to civilian casualties in Iran, such as the school bombing in Minab, compared to the swift reactions of ASEAN.

- BRICS Leadership: As the host of the 2026 BRICS Summit, India faces the daunting task of forging consensus between rival members like Iran and the UAE.

Regional and Maritime Security Dimensions:

- Net Security Provider: The U.S. sinking a ship in the Indian Ocean challenges India's self-styled role as the primary security provider in its own backyard.
- Quad Dynamics: As a member and current Chair of the Quad, India must address the unilateral actions of the U.S. that conflict with the Quad's peace and stability mandate.
- Maritime Coalitions: There is an urgent need to strengthen local frameworks like the Indian Ocean Rim Association (IORA) and the Colombo Security Conclave.
- Rescue Operations: While the Indian Navy successfully assisted the Sri Lankan Navy in rescue efforts, the lack of official condolences for fallen sailors (who were guests at MILAN 2026) remains a point of friction.

Economic and Neighbourhood Diplomacy Challenges:

- Energy Security: Neighbors like Bangladesh and Sri Lanka are turning to India for petrol and diesel as West Asian supply chains are throttled.
- Remittance Volatility: Constant flare-ups in West Asia threaten the massive flow of remittances that sustain the economies of India, Pakistan, and Nepal.
- Youth Disaffection: Economic instability from the war fuels youth protests, leading to political shifts like Nepal's Gen-Z-led government and coalition pressures in India.
- Supply Chain Vulnerability: The conflict compounds existing stresses from COVID-19, LAC tensions with China, and U.S. tariff policies on South Asian exports.

Way Ahead:

- Restoring the Balance: India must return to its tightrope diplomacy, offering a more balanced critique of unilateral actions to regain regional trust.
- All-of-Region Approach: Reassure neighbors of a consistent supply of essentials (fuel, food, medicine) to avoid the vaccine supply pitfalls of 2021.
- Institutional Strengthening: Use the IFC-IOR and other maritime bodies to ensure better communication and prevent unilateral military escalations in the Indian Ocean.
- Diplomatic Outreach: Convene a Quad Foreign Ministers' meeting to set clear red lines regarding maritime conduct and civilian safety in the region.

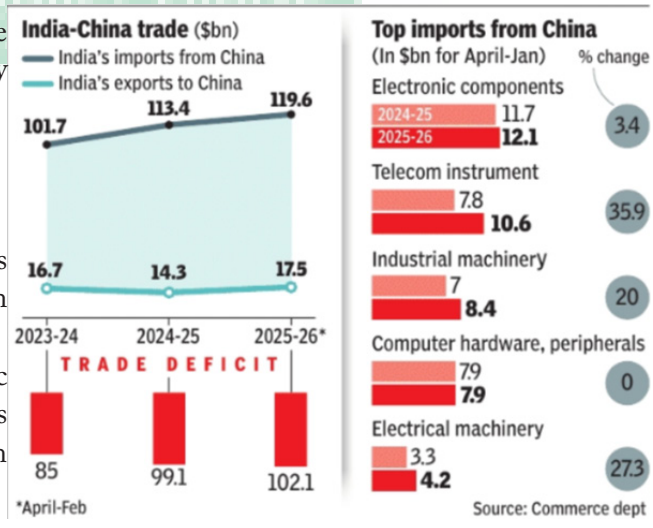
Conclusion:

India finds itself at a critical crossroads where its global strategic ambitions must be reconciled with its regional responsibilities. By restoring a balanced West Asia policy, New Delhi can protect its millions of citizens abroad while stabilizing its immediate neighborhood. Steering this middle path is essential to maintaining India's credibility as a leader of the Global South and a stable maritime power.

India China Trade Deficit

Context:

India's trade deficit with China crossed $100 billion for the first time, reaching about $102 billion during April–February FY2025-26.



About India China Trade Deficit:

What it is?

- A trade deficit occurs when the value of a country's imports exceeds the value of its exports over a given period.
- In India's case with China, imports such as electronic components, telecom equipment, machinery, and APIs significantly exceed Indian exports like petroleum products, copper items, and electronics.

Features:

- Persistent Import Dependence – India imports high-value manufacturing inputs (electronics, machinery, chemicals) from China to sustain domestic production.
- Sectoral Imbalance – Imports are concentrated in capital goods and intermediate goods, while exports remain relatively low-value commodities or limited manufactured goods.
- Market Access Asymmetry – China maintains strict regulatory standards and inspection barriers, limiting the entry of Indian products into its market.

Implications:

- A large trade deficit contributes to current account deficits, affecting foreign exchange stability.
- Heavy reliance on Chinese imports in electronics, pharma APIs, and machinery creates vulnerabilities during geopolitical tensions.

WTO MC14 Conference

Context:

The World Trade Organization's 14th Ministerial Conference (MC14) concluded in Yaoundé, Cameroon, without a final agreement on major issues like the e-commerce moratorium.

About WTO MC14 Conference:

What it is?

- The Ministerial Conference is the highest decision-making body of the WTO, typically held every two years to negotiate global trade rules.
- Host: Held at the Palais des Congrès in Yaoundé, Cameroon; this was only the second time a Ministerial Conference took place in Africa.
- Aim: To modernize WTO operations, address fisheries subsidies, advance WTO reform, and decide on the future of digital trade customs duties (e-commerce moratorium).

Key Outcomes of the MC14 Conference:

Fisheries Subsidies:

- Ministers reached an agreement to persist with negotiations regarding fisheries subsidies.
- The objective is to provide final recommendations by the 15th Ministerial Conference.
- These recommendations aim to achieve comprehensive disciplines on harmful subsidies as outlined in the Agreement on Fisheries Subsidies.

Small Economies and Development:

- Specific decisions were adopted to improve the integration of small economies into the multilateral trading system.
- The focus is on ensuring these smaller nations can participate more effectively in global trade.
- Sanitary and Phytosanitary and Technical Barriers to Trade Agreements:
- The conference enhanced the implementation of special and differential treatment provisions.
- These measures are designed to help developing nations navigate sanitary, phytosanitary, and technical trade barriers.
- The goal is to make these provisions more precise, effective, and operational for member states.

Trade and Climate Agenda:

- Member nations reaffirmed their high-level commitment to fossil fuel subsidy reform.
- A communiqué was adopted that outlines a menu of voluntary climate actions to guide future work at the intersection of trade and the environment.
- Progress was noted through the Integrated Forum on Climate Change and Trade, which is scheduled to launch a three-year work programme in June 2026.

Least Developed Countries Package:

- Significant progress was achieved on a dedicated package designed to support Least Developed Countries.
- This package is considered a core component of the emerging outcomes that will be finalized in Geneva.

The Yaoundé Package Draft Declaration:

- Ministers developed a collection of draft texts known as the Yaoundé Package.
- This package includes a draft Ministerial Declaration on World Trade Organization Reform and a work plan.
- It also contains draft decisions on Electronic Commerce and the Agreement on Trade-Related Aspects of Intellectual Property Rights.
- Because members ran out of time in Cameroon, these texts will serve as the basis for finalizing agreements at the next General Council meeting in Geneva.

Success of Outcomes:

- Modernized Work Methods: Director-General Okonjo-Iweala noted a new WTO way of working that is more nimble and responsive.
- Climate Integration: Successfully moved the trade-climate interface forward through the Integrated Forum on Climate Change and Trade (IFCCT).
- Institutional Continuity: Preserved important draft texts (the Yaoundé Package) to prevent total collapse and provide a basis for future talks.
- Inclusivity for Small States: Formalized support mechanisms for smaller and developing economies to better navigate multilateral systems.

Failures of the Conference:

- E-commerce Deadlock: Failed to extend the moratorium on customs duties for digital transmissions due to a clash between the US (seeking a permanent extension) and Brazil.
- TRIPS Moratorium Lapse: No agreement was reached on the non-violation complaint moratorium under TRIPS, which is expected to expire at the end of March 2026.
- Agriculture Impasse: Negotiations remained mired in long-standing disputes over domestic support and market access between the US and Brazil.
- Investment Facilitation: India and South Africa successfully blocked the inclusion of the Investment Facilitation for Development (IFD) agreement, citing it as outside the WTO's mandate.
- Dispute Settlement Reform: Despite two days of thematic discussions, there was no convergence on restoring the WTO's appellate body or reform system.

Way Ahead:

- Geneva Resumption: Members must use the Yaoundé Package draft texts to finalize agreements at the next General Council meeting.
- Addressing the Deadline: Urgently resolve the e-commerce and TRIPS moratoriums before they officially expire and disrupt digital trade.
- Inclusive Reform: Shift toward the member-driven reform approach demanded by India and South Africa to ensure developing nations aren't sidelined.
- Fisheries Recommendations: Accelerate technical work in Geneva to ensure comprehensive recommendations are ready for MC15.
- Bridging Major Gaps: Direct high-level diplomatic engagement is needed between the US, Brazil, and India to find middle ground on agriculture and digital trade.

Conclusion:

The MC14 conference demonstrated a renewed Yaoundé way of working but ultimately fell short of delivering legally binding results on critical digital and agricultural issues. While progress on climate and LDC support is encouraging, the looming expiration of trade moratoriums poses a significant risk to global stability. The WTO's future relevance now hinges on whether Geneva can bridge the deep geopolitical fractures exposed in Cameroon.

Chapter-
9

SOCIAL ISSUES

Breaking the Cycle of Violence Against Women

Context:

The recent murder of a 27-year-old pregnant Delhi Police commando by her husband has reignited a national debate on the cycle of violence and trauma bonding.

- The case highlights that even women in positions of institutional power are not immune to domestic abuse, financial coercion, and the deadly grip of patriarchal expectations.

About Breaking the Cycle of Violence Against Women:

What it is?

- Breaking the cycle involves disrupting the predictable phases of domestic abuse—tension building, explosion, and the honeymoon period (reconciliation).
- It requires a multi-pronged approach that addresses psychological trauma bonding, financial debt traps, and the social normalization of harm, ensuring that a woman's career or financial independence actually translates into bodily autonomy and safety.

Data/Stats on Violence Against Women in India:

- Prevalence: According to NFHS-5, nearly one in three women in India has experienced physical or sexual violence.
- Domestic Abuse: Over 30% of ever-married women (ages 18-49) have experienced spousal violence.
- Reporting Gap: Less than 14% of women who experience violence ever seek help from the police or institutional mechanisms.
- Dowry Deaths: Despite being banned for decades, India still records nearly 20 cases of dowry deaths every single day (NCRB data).
- Cyber Violence: Recent trends show a sharp rise in digital harassment, with a 25% increase in reported cases of stalking and bullying against women in 2024-25.

Causes of Violence Against Women:

- Trauma Bonding & Stockholm Syndrome: Victims develop a psychological attachment to their abuser as a survival mechanism.
- E.g. The Delhi Police commando reportedly spent nights crying due to her partner's abuse but refused to leave him, citing love as the primary reason.
- Patriarchal Social Obligations: Society expects women, even those in high-ranking jobs, to be obedient and subservient followers of family elders.
- E.g. Research shows women police officers often face greater suspicion from matrimonial families who fear their professional domineering attitude.
- Financial Coercion and Debt Traps: Abusers force women to take loans or relinquish salaries, making them financially incapable of leaving.
- E.g. In the 2026 Delhi case, the victim was buried under loan installments taken in her name, leaving her with insufficient funds to survive independently.
- The Dowry Menace: Relationships are still viewed as financial transactions, where unmet demands lead to physical and emotional torture.

- E.g. Testimonies from the commando's brother confirmed that persistent expectations of marital gifts (obligatory dowry) eroded the relationship before the murder.
- Lack of Institutional Support for Saviors: Women in uniform feel a cost of vulnerability, fearing that reporting abuse will damage their professional image of strength.

Initiatives Taken:

- One Stop Centres (Sakhi): Established to provide integrated support, including medical, legal, and psychological help under one roof.
- Fast Track Special Courts (FTSCs): Launched for the swift disposal of cases related to rape and the POCSO Act to ensure timely justice.
- Mission Shakti: An umbrella scheme aimed at strengthening interventions for women's safety, security, and empowerment.
- 181 Women Helpline: A 24/7 emergency response system specifically for women facing violence or distress.

Challenges Associated:

- Normalization of Private Harm: Domestic violence is often treated as a family matter rather than a criminal act.
- E.g. The persistent focus on saving the marriage in 2025 mediation centers often forces women back into dangerous environments.
- Legal Hurdles in Proving Emotional Abuse: Law enforcement often prioritizes physical marks, ignoring the coercive control that precedes violence.
- E.g. Victims who report trauma bonding or narcissistic abuse often find their complaints dismissed by police as minor domestic tiffs.
- Ineffective Pre-Marriage Counseling: Most marital preparation focuses on wedding ceremonies rather than conflict resolution or identifying red flags.
- E.g. Despite red flags during the courtship period, the 2026 victim proceeded with the marriage due to a lack of professional psychological guidance.
- Occupational Stressors: Professional women face a double burden of high-stress jobs and traditional domestic expectations.
- E.g. Police officers working erratic hours are often accused by families of neglecting familial needs, leading to increased domestic friction.
- Slow Judicial Redressal: High pendency of cases in courts discourages victims from pursuing legal battles against their abusers.

Way Ahead:

- Sensitization on Trauma Bonding: Police and social workers must be trained to recognize psychological entrapment, not just physical injury.
- Occupational Social Work: Integrate specialized mental health support within high-stress departments like the Police to address domestic stressors.
- Mandatory Pre-Marital Counseling: Implement community-level programs focusing on well-being, reciprocity, and identifying abusive personality traits.
- Safe Exit Pathways: Provide anonymous, state-sponsored halfway houses where women can stay safely while detaching from an abuser.
- Digital Financial Audits: Create awareness about financial coercion and provide legal protection for women against forced loans taken by spouses.

Conclusion:

Violence against women is a systemic failure, not a private tragedy, that persists even when women achieve financial and professional heights. True empowerment requires a society that values a woman's life over marital sanctity and a legal system that recognizes emotional terror as a precursor to physical death. Until we provide psychologically safe spaces to listen, the flowers of today will continue to be the flowers for a funeral tomorrow.

PM Matsya Sampada Yojana (PMMSY)

Context:

The Union Government has allocated ₹2,500 crore for the fisheries sector under the Pradhan Mantri Matsya Sampada Yojana (PMMSY) in the Union Budget 2026–27.

About PM Matsya Sampada Yojana (PMMSY):

What it is?

- PM Matsya Sampada Yojana (PMMSY) is a flagship umbrella scheme for the sustainable and responsible development of India's fisheries sector, designed to modernize the fisheries value chain and improve the socio-economic welfare of fishers and fish farmers.
- Launched in: The scheme was launched on 10 September 2020.
- Ministry: It is implemented by the Department of Fisheries under the Ministry of Fisheries, Animal Husbandry and Dairying, Government of India.

Aim:

- To enhance fish production and productivity in a sustainable and inclusive manner.
- To modernize fisheries infrastructure and strengthen the value chain including post-harvest management and marketing.
- To increase income and livelihood opportunities for fishers and fish farmers while ensuring ecological sustainability.

Key Features of the Scheme:

- Large Investment Framework: The scheme was approved with a total investment of about ₹20,050 crore for holistic fisheries sector development.
- Two Implementation Components: It operates through Central Sector (CS) and Centrally Sponsored Scheme (CSS) components.
- Infrastructure Development: Focus on fishing harbours, cold chain facilities, processing units, and modern fish landing centers.
- Aquaculture Promotion: Support for activities such as biofloc farming, sea cage farming, seaweed cultivation, ornamental fisheries, and pearl farming.
- Fisher Welfare Measures: Financial assistance for fishing boats, gear upgrades, and support during fishing ban periods.
- Sustainable Fisheries Management: Promotion of artificial reefs, mariculture, and ecosystem restoration to replenish fish stocks.
- Capacity Building: Training programmes and skill development initiatives for fishers and entrepreneurs.

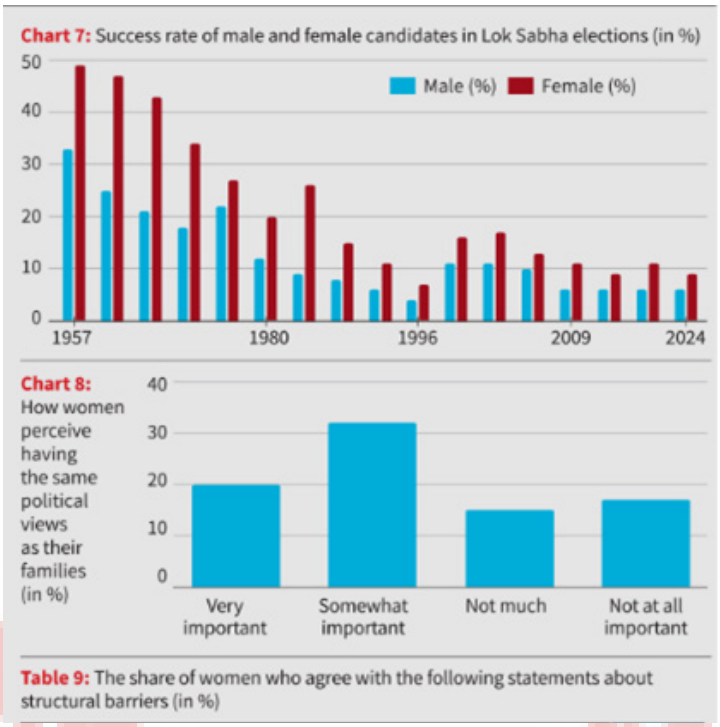
Significance:

- Strengthens India's position as the second-largest fish producer globally, contributing nearly 8% of global fish production.
- Supports millions of fishers and coastal communities through income generation and employment opportunities.

Women's Political Participation in India

Context:

While women's voter turnout has reached near-parity with men in the 2019 and 2024 Lok Sabha elections, a significant participation-representation gap persists in Indian politics.



About Women's Political Participation in India:

What it is?

- It refers to the involvement of women in the various levels of the political system, ranging from exercising their right to vote (electoral turnout) and participating in election campaigns (rallies, canvassing) to holding office in legislative bodies (representation in Lok Sabha/Rajya Sabha and State Assemblies).

Key Data and Facts:

- Voter Turnout Parity: The gender gap in Lok Sabha turnout narrowed from 11.2% in 1967 to practically zero in 2019 and 2024.
- Legislative Representation: In the 2024 Lok Sabha, women occupy only 74 seats (approx. 13.6%), a slight dip from the historic high of 78 in 2019.
- Candidature Gap: While 800 women contested in the 2024 elections, they remain a small fraction compared to thousands of male candidates.
- Higher Success Rate: Data consistently shows women candidates often have a higher winnability rate; in 2024, 9% of women won compared to 6% of men.
- State Assembly Trends: In many state elections after 2011, women's turnout has actually surpassed male turnout by an average of nearly 2%.

Dimensions of Women's Political Participation:

- Electoral Turnout (The Silent Revolution): Women have transitioned from being passive observers to active voters.
- Example: In the 2024 General Elections, female voter turnout was neck-and-neck with men, reflecting higher political consciousness among women across rural and urban divides.
- Campaign Participation: Women are increasingly attending rallies and door-to-door canvassing, though they still lag behind men.
- Example: Attendance at election meetings rose to 16% in recent years, showing that women are moving beyond the household to public political spaces.
- Grassroots Leadership: Due to 33% reservation in Panchayati Raj Institutions (PRIs), millions of women hold local offices.
- Example: India currently has over 1.4 million elected women representatives in local bodies, acting as a nursery for future national leadership.
- Independent Decision Making: There is a growing trend of women choosing candidates independently of their male family members.

- Example: In 2024, 50% of women reported voting without advice from others, showcasing a steady rise in political autonomy.
- Issue-Based Voting: Women are increasingly voting based on specific women-centric policies rather than traditional caste or party lines.
- ample: The Ladli Behna scheme in Madhya Pradesh is credited with mobilizing a massive female vote bank that determined the electoral outcome.

Initiatives Taken:

1. Nari Shakti Vandan Adhiniyam (128th Constitutional Amendment Act): Reserves one-third of seats for women in the Lok Sabha and State Legislative Assemblies.
2. 73rd and 74th Amendment Acts: Mandated 33% reservation for women in Panchayats and Urban Local Bodies (some states have increased this to 50%).
3. SVEEP (Systematic Voters' Education and Electoral Participation): Targeted outreach by the Election Commission of India to bridge the gender gap in voter registration and turnout.
4. Political Literacy Clubs: Initiatives in schools and colleges to encourage young women to understand and enter the political process early.

Challenges Associated:

- The Electability Myth: Political parties often deny tickets to women claiming they cannot win against male opponents.
- Example: In the 2024 elections, women made up only roughly 10% of total candidates despite having higher statistical winnability.
- Patriarchal Social Norms: Deep-seated norms often require women to seek family permission before engaging in public politics.
- Domestic Burden: The double burden of household chores and caregiving limits the time women can dedicate to active campaigning.
- Criminalization and Muscle Power: The entry of money and muscle power in politics deters many qualified women from contesting.
- Example: The high cost of campaigning and the prevalence of candidates with criminal records creates a hostile environment for women entrants.
- Information Gap: Lower literacy levels in some regions and limited access to digital political discourse hinder informed participation.

Way Ahead:

- Implementation of Reservations: Ensure the swift implementation of the 33% reservation in Parliament following the delimitation exercise.
- Internal Party Reforms: Political parties should voluntarily adopt quotas for women in their organizational hierarchies and ticket distribution.
- Capacity Building: Provide leadership training and mentorship for women at the Panchayat level to help them transition to state and national politics.
- Safe Political Environment: Stricter enforcement of laws against character assassination and online harassment of female political figures.
- Economic Empowerment: Linking political participation with economic independence to ensure women have the financial resources to contest elections.

Conclusion:

India has successfully closed the gender gap at the polling booth, but the journey toward equal representation in the corridors of power has only just begun. While the Women's Reservation Bill is a landmark structural fix, it must be supported by a shift in social mindsets and political party cultures. True democracy will only be achieved when women are not just voters, but equal architects of the nation's policies.

Chapter-
10

DEFENCE

Tunguska Air Defence Missile System (2K22M)

Context:

The Ministry of Defence signed a Rs 445 crore contract with Russia's JSC Rosoboronexport, to procure the Tunguska Air Defence Missile System for the Indian Army.

About Tunguska Air Defence Missile System (2K22M):

What it is?

- The Tunguska (NATO reporting name: SA-19 Grison) is a Soviet-origin, tracked, self-propelled anti-aircraft weapon system. It is a unique hybrid platform that combines both surface-to-air missiles and high-speed anti-aircraft guns on a single chassis to provide comprehensive protection to ground forces.

Developed By:

- Originally developed by the KBP Instrument Design Bureau in the Soviet Union, the system is currently managed and exported by JSC Rosoboronexport, Russia.

Aim:

- The system is designed to provide low-altitude air defense for infantry and armored regiments. Its main objective is to protect ground troops on the move against low-flying targets, including:
- Attack helicopters and close-support aircraft.
- Cruise missiles and precision-guided munitions.
- Modern tactical drones and Unmanned Aerial Vehicles (UAVs).

Key Features:

- Dual-Armament Hybrid System: It integrates 9M311 missiles for long-range engagement (up to 8–10 km) and twin 30 mm autocannons for close-in defense, firing up to 5,000 rounds per minute.
- Target Acquisition & Tracking: Equipped with a 360-degree radar capable of detecting threats up to 18 km away, along with a digital fire control system for high precision.
- All-Terrain Mobility: Mounted on a tracked armored chassis, it can keep pace with tanks and infantry fighting vehicles across rugged terrain and in diverse weather conditions.
- Optical Backup: Includes optical tracking capabilities, allowing the system to engage targets even in environments where its radar is being jammed by enemy electronic warfare.
- Engagement Altitude: The missile component can strike targets at altitudes of up to 3,500 meters, filling the gap between man-portable systems and long-range high-altitude batteries.

Significance for India:

- As modern warfare shifts toward drone-heavy tactics, the Tunguska's rapid-fire guns provide a cost-effective and highly efficient solution to swarm threats.
- It strengthens India's multi-layered air defense network, acting as a vital shield for mobile army columns that are vulnerable to sudden aerial strikes.

The Pinaka Multi-Barrel Rocket Launcher (MBRL) System

Context:

The Indian Army has operationalized its seventh Pinaka regiment and is currently raising an eighth, with plans to reach ten regiments by next year.

About The Pinaka Multi-Barrel Rocket Launcher (MBRL) System:

What it is?

- Pinaka is an indigenous, multi-barrel rocket launcher (MBRL) system capable of firing a salvo of 12 rockets in under 44 seconds. It is a high-volume, area-saturation weapon designed to neutralize enemy troop concentrations and infrastructure over large areas.
- Developed By: the Armament Research and Development Establishment (ARDE).

Aim:

- The primary objective of the Pinaka system is to provide the Indian Army with deep-strike capability, allowing it to destroy enemy communication hubs, logistics depots, and artillery gun positions well behind the front lines.

Key Features of the System:

- Rapid Fire Capability: A single battery of six launchers can fire 72 rockets in just 44 seconds, covering an area of roughly 1,000 by 800 meters.
- Range Variants: The system is versatile, featuring Mk-I (38 km), Mk-II Extended Range (60 km), and Guided variants (75–90 km).
- High Precision: Guided Pinaka rockets utilize an Integrated Navigation System (INS) combined with GPS/NavIC for pinpoint accuracy.
- Mobility: The launchers are mounted on high-mobility Tatra trucks, allowing for shoot-and-scoot tactics to avoid enemy counter-fire.
- Automation: Equipped with an Automated Gun Aiming and Positioning System (AGAPS) and a computerized fire control system for quick deployment.
- Extreme Weather Resilience: The system is designed to operate in diverse Indian terrains, from the high-altitude cold of Ladakh to the intense heat of the Thar Desert.

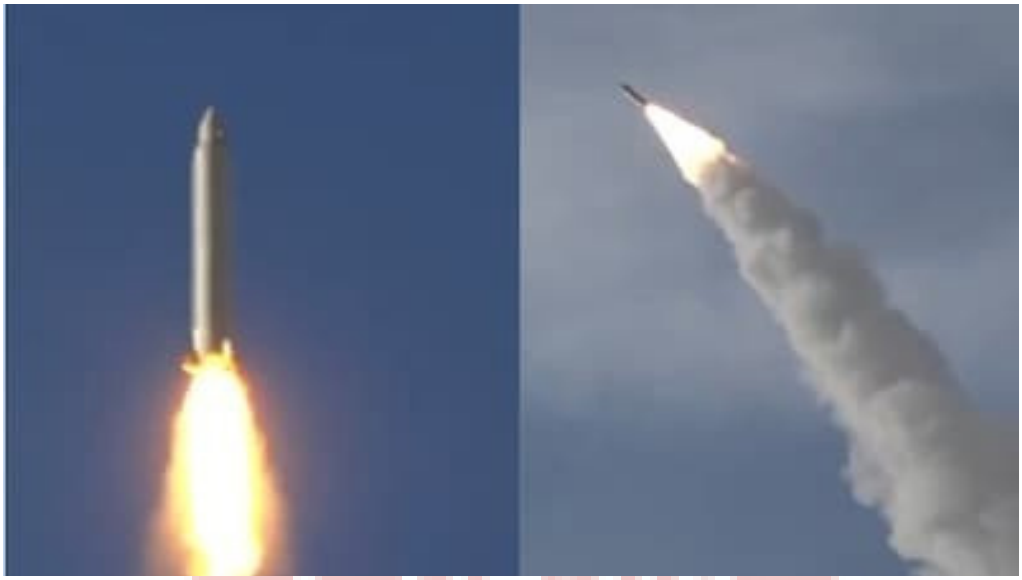
Significance:

- The Pinaka system is strategically vital as it reduces India's dependence on Russian Smerch and Grad systems.
- With the development of the Long-Range Guided Rocket (LRGR), which recently hit targets at 120 km, India is building a formidable Rocket Force capable of matching the integrated artillery networks of the PLA along the Line of Actual Control (LAC).

The Sejjil Ballistic Missile

Context:

Iran officially deployed the Sejjil ballistic missile for the first time in active combat during Wave 54 of its military operations against US and Israeli positions.



- The missile, nicknamed the dancing missile for its evasive maneuvers, reportedly struck strategic infrastructure.

About The Sejjil Ballistic Missile:

What it is?

- The Sejjil (also known as Sajjil or Ashura) is an indigenous, two-stage, medium-range ballistic missile (MRBM). It represents a major leap in Iranian missile technology, moving away from older liquid-fueled designs to more reliable and faster-launching solid-fuel systems.
- Developed By: The missile was indigenously developed by Iran's aerospace industries.

Aim:

- The primary objective of the Sejjil is to provide Iran with a rapid-response deterrent capable of striking targets across the Middle East and Southeastern Europe, specifically designed to bypass sophisticated missile defense shields like Israel's Iron Dome and Arrow systems.

Key Features:

- Solid-Fuel Propellant: Unlike liquid-fueled missiles, it can be stored fully fueled for long periods, allowing for near-instant launches.
- Two-Stage Design: Uses two separate solid-propellant motors to achieve high altitudes and high speeds during its flight path.
- Extended Range: It has an operational strike range of approximately 2,000 kilometers, putting the entire Levant region within reach.
- High Payload Capacity: Capable of carrying a warhead weighing roughly 700 kilograms.
- Evasive Maneuverability: Known as the dancing missile because it can maneuver at high altitudes, making its trajectory difficult for radar and interceptors to track.
- Advanced Guidance: The Sejjil-2 variant used in the current conflict features integrated GPS and inertial guidance systems for improved terminal accuracy.

Significance:

- The use of the Sejjil signifies that Iran is now utilizing its most survivable assets—weapons that are hard to detect on the ground and difficult to intercept in the air.
- While some experts view its deployment as a sign of desperation following the death of Ayatollah Ali Khamenei, it proves that Iran's missile force has transitioned from a theoretical threat to a functional, high-tech combat tool.

Cold Response Drill

Context:

NATO has begun the 2026 edition of the Cold Response military exercise in the Arctic, with a stronger focus on civilian preparedness and total defence.

About Cold Response Drill:

What it is?

- Cold Response is a large-scale biennial NATO military exercise conducted in the European Arctic, primarily in northern Norway and surrounding regions, designed to test the alliance's ability to defend NATO territory under extreme Arctic conditions.
- The exercise simulates collective defence scenarios under Article 5 of NATO, including amphibious operations, air support, logistics, and coordination between allied forces.
- Nations Involved: North Atlantic Treaty Organization (NATO)

Aim:

- Strengthen NATO's collective defence capability in the Arctic region.
- Enhance interoperability among allied forces operating in harsh Arctic environments.
- Demonstrate NATO's deterrence posture against potential adversaries near Arctic borders.

Key Features

- Arctic Warfare Simulation – Conducted in snow-covered mountainous terrain and freezing temperatures to test combat readiness.
- Large Multinational Participation – About 25,000 troops from 14 NATO and partner countries take part.
- Integration with Arctic Sentry Mission – Supports NATO's broader effort to strengthen presence in the Arctic region.
- Civilian Preparedness Component – Hospitals, businesses, and public institutions participate to support military operations.
- Total Defence Strategy – Norway has declared 2026 as the Year of Total Defence, emphasizing society-wide resilience.
- Medical and Logistics Exercises – Includes scenarios like treating mass casualties transported from a simulated frontline in Finland.

Significance

- Strengthening Arctic Security – The Arctic is emerging as a strategic theatre due to melting ice, new sea routes, and resource competition.
- Deterrence Against Russia – Conducted near the Russia–Finland border, reinforcing NATO's eastern flank after Finland joined NATO.

Exercise Lamitiye 2026

Context:

An Indian Armed Forces contingent has arrived in Seychelles to participate in the 11th edition of the joint military exercise Lamitiye 2026.

About Exercise Lamitiye 2026:

What it is?

- Exercise Lamitiye is a biennial joint military training exercise conducted between India and Seychelles to enhance operational coordination, tactical skills, and military cooperation.
- The term Lamitiye means Friendship in the Creole language, reflecting the close strategic and defence partnership between the two nations.

Host Country: Seychelles

Nations Involved: India and Seychelles

Aim:

1. Enhance interoperability and coordination between Indian and Seychellois forces during joint military operations and peacekeeping missions.
2. Improve tactical capabilities in handling sub-conventional threats in semi-urban environments.

Key Features:

- Tri-service participation – Involves the Indian Army, Navy, and Air Force, highlighting integrated joint operations.
- Tactical training drills – Includes field exercises, combat discussions, demonstrations, and case studies.
- Semi-urban warfare focus – Troops train to neutralize threats in semi-urban and coastal environments.
- Technology showcase – Demonstration of new-generation military equipment and technologies.
- Validation phase – The exercise concludes with a two-day validation drill to test operational readiness.
- Capacity building – Facilitates exchange of skills, best practices, and operational experiences.

Significance:

- The exercise reinforces India's strategic partnership with Seychelles, an important Indian Ocean maritime partner.
- Cooperation helps counter threats like piracy, illegal fishing, and maritime crime in the region.
- Supports India's policy of Security and Growth for All in the Region (SAGAR) by promoting regional stability.

The Sukhoi Su-30MKI

Context:

An Indian Air Force (IAF) Sukhoi-30MKI fighter jet tragically crashed at Inglong Ekopi Hill in Assam during a routine training mission on March 5, 2026.

About The Sukhoi Su-30MKI:

What it is?

- The Sukhoi Su-30MKI (NATO reporting name: Flanker-H) is a heavy, all-weather, long-range, two-seater multirole air superiority fighter. It serves as the primary strike and air defense platform for the Indian Air Force, capable of performing complex missions ranging from ground attack to maritime strikes.

Developed By:

- Design: Originally designed by Russia's Sukhoi Corporation.
- Manufacturing: Built under license by India's Hindustan Aeronautics Limited (HAL) at its Nashik facility.
- Collaboration: It is a unique fusion aircraft, integrating Russian airframe technology with Indian avionics, and sub-systems from France and Israel.

Purpose:

- The primary aim of the Su-30MKI is to maintain air dominance over the Indian subcontinent.

Key Features:

- Super Maneuverability: Equipped with thrust-vectoring nozzles and canards, allowing the aircraft to perform extreme maneuvers (like the Cobra) that are impossible for standard fighters.
- Advanced Avionics: Features a hybrid of international technology, including a powerful passive electronically scanned array (PESA) radar (being upgraded to Indian Uttam AESA radar) and sophisticated electronic warfare suites.
- Weaponry & Range: It is the only aircraft in the world capable of carrying the BrahMos-A supersonic cruise missile.
- It can carry a massive 8,000 kg combat payload, including Astra (BVR), R-77, and Kh-59 missiles.
- Twin-Engine Power: Powered by two Al-31FP turbofans, providing the speed and reliability needed for long-range patrols.
- Indigenization: As of 2026, the aircraft features over 62.6% indigenous content, including Indian-made flight control systems and radar warning receivers.

Significance:

- With over 260 aircraft in inventory, it forms the largest component of India's fighter strength.
- Specific batches are believed to be optimized for the Strategic Forces Command for nuclear weapons delivery.

Centre designates Legacy Thrust Territories

Context:

The Ministry of Home Affairs has introduced the concept of Legacy Thrust Territories to prevent the resurgence of Left Wing Extremism (LWE) after major operational gains against Naxalism.

About Centre designates Legacy Thrust Territories:

What it is?

- Legacy Thrust Territories are previously Naxal-affected districts identified by the Union Government for continued security presence and focused developmental intervention, even after major decline in insurgent activities.
- The framework ensures that gains achieved against Left Wing Extremism are not reversed.

Regions Designated:

- Earlier, nearly 200 districts were affected by LWE (around 2000).
- By 2025, the number declined to 38 districts.
- Currently, only 7 districts remain on the LWE list:
- 5 in Chhattisgarh
- 1 in Jharkhand
- 1 in Odisha
- These and other formerly affected districts are being brought under the Legacy Thrust framework for sustained monitoring.

Aim:

- Prevent resurgence of Naxalism after operational successes.
- Ensure smooth transition from security-led operations to governance-led development.
- Consolidate peace through infrastructure, administration, and socio-economic integration.

Key Features:

- Sustained Security Deployment: Continued presence of central forces to avoid security vacuums.
- Development Push: Focus on roads, telecom connectivity, governance delivery, and public services.
- Phased Redeployment: Gradual withdrawal/redeployment instead of abrupt exit.
- Centre–State Coordination: Joint strategy with operational freedom for security forces.
- Administrative Strengthening: Improving bureaucratic responsiveness in former conflict zones.
- Monitoring of Extremist Propaganda: Increased intelligence surveillance, including digital spaces.
- Rehabilitation Focus: Encouraging surrender of remaining cadres alongside targeted operations.

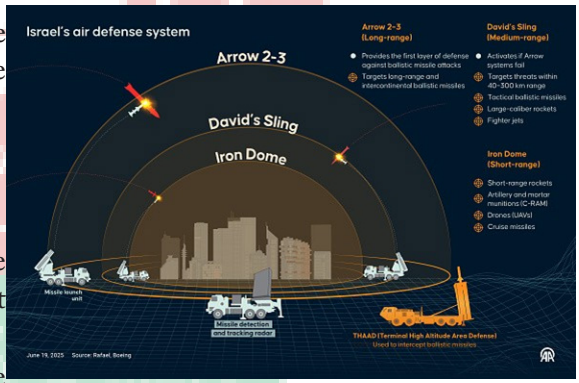
Significance:

- Prevents Relapse: Addresses historical risk of insurgency revival after security gains.
- Governance Consolidation: Bridges administrative gaps that extremists exploit.

Israel's Multi-Layered Defence System

Context:

Fresh hostilities involving Iran, Israel, and a U.S.-led coalition have renewed global attention on Israel's multi-layered missile defence architecture amid large-scale missile and drone attacks.



About Israel's Multi-Layered Defence System:

What it is?

- Israel's multi-layered defence is an integrated air and missile defence architecture designed to intercept aerial threats at different ranges, altitudes, and flight phases.
- It combines space/long-range interception, mid-range missile defence, short-range rocket protection, and directed-energy systems, supported by advanced radar and command networks.

Key Defence Security Systems:

1. Arrow System (Arrow-2 & Arrow-3)

- Long-range missile defence developed by Israel with U.S. cooperation.
- Arrow-3 intercepts missiles outside the atmosphere (exo-atmospheric), while Arrow-2 operates within the atmosphere.
- Designed mainly against medium- and long-range ballistic missile threats.

2. David's Sling

- Mid-range interceptor system designed to neutralize ballistic missiles (100–200 km range), cruise missiles, and aircraft.
- Uses Stunner interceptors with high precision targeting.

3. Iron Dome

- Short-range defence system operational since 2011.
- Intercepts rockets, mortars, and drones using radar-guided Tamir interceptors.
- Selectively engages only threats projected to hit populated areas, improving efficiency.

4. Iron Beam

- High-energy laser defence system declared operational in late 2025.
- Uses directed energy to disable drones, rockets, and mortars at low cost compared to missile interceptors.

5. THAAD (U.S.-supplied)

- Terminal High Altitude Area Defense system deployed to enhance protection against ballistic missiles in their terminal phase.
- Adds an additional high-altitude interception layer.

6. Air-to-Air Defence

- Israeli fighter jets and helicopters use air-to-air missiles to intercept incoming drones and airborne threats.

Significance:

- Multiple interception layers increase probability of successful defence against diverse threats including ballistic missiles and drone swarms.
- Enhances national security, reduces damage from missile barrages, and provides decision-makers more response time during conflicts.

Shtil Missiles

Context:

The Ministry of Defence signed 5,083-crore defence contracts to strengthen India's maritime security, including procurement of Shtil surface-to-air missile systems for frontline Indian Navy warships.

About Shtil Missiles:

What it is?

- Shtil is a ship-based surface-to-air missile (SAM) system designed to intercept aircraft, helicopters, anti-ship missiles, and other aerial threats targeting naval vessels.
- It is primarily deployed on frontline warships to provide medium-range air defence in maritime combat environments.

Developed by:

- The system was developed by Russian defence industries, with export handled by JSC Rosoboronexport.
- It is based on the Buk missile family, widely used in Russian air defence systems.

Aim:

- To strengthen the layered air-defence architecture of naval fleets.
- To provide rapid-reaction protection to warships against multiple aerial threats, especially in contested maritime zones.

Key features:

- Medium-range naval SAM system capable of engaging aircraft, UAVs, and anti-ship missiles.
- Vertical Launch System (VLS) allows missiles to be fired quickly in multiple directions without rotating launchers.
- All-weather operational capability, enabling engagements day and night in complex maritime environments.
- Rapid reaction time for quick interception of incoming aerial threats.
- Integration with naval radar and fire-control systems for improved target tracking and engagement.

Significance for India:

- Enhances survivability of frontline warships of the Indian Navy.
- Strengthens India's maritime security architecture in the Indian Ocean Region (IOR).
- Supports layered air defence strategy, complementing other naval missile systems like Barak-8.

Operation Sankalp

Context:

Against the backdrop of escalating tensions in West Asia, Indian Navy warships deployed under Operation Sankalp have been placed on standby for potential Humanitarian Assistance and Disaster Relief (HADR) operations.

About Operation Sankalp:

What it is?

- Operation Sankalp (Sanskrit for Commitment) is the Indian Navy's proactive maritime security initiative launched to ensure the safety of Indian-flagged merchant vessels and maintain regional stability in the Indian Ocean Region (IOR).
- Launched in: The operation was officially launched on June 19, 2019, following escalating security concerns and attacks on commercial shipping in the Gulf of Oman and the Strait of Hormuz.
- Organizations Involved: The mission is executed through meticulous coordination between the Indian Navy and several key ministries.

Aim:

- To guarantee the secure passage of Indian commercial vessels through the Strait of Hormuz, Gulf of Aden, and Gulf of Oman.
- To combat the growing threat of piracy in the IOR.
- To safeguard India's substantial maritime trade, particularly oil imports, from unconventional threats.

Key Features:

- Continuous Presence: Maintains a steady deployment of frigates and destroyers in the Gulf of Aden and the Gulf of Oman.
- First Responder Status: Positions the Indian Navy as the Preferred Security Partner in the region, providing immediate assistance during maritime emergencies.
- Anti-Piracy Legislation: Supported by the Maritime Anti-Piracy Act 2022, which provides the legal framework to criminalize and prosecute piracy.
- Comprehensive Surveillance: Utilizes maritime surveillance aircraft and Special Forces (MARCOS) for 24/7 monitoring of sea lanes.
- Escort Missions: Since its inception, the Navy has safely escorted hundreds of merchant vessels carrying millions of tonnes of cargo.

Significance:

- Protects trade routes vital for India's energy security; nearly 62% of India's oil imports originate from the Persian Gulf.
- Demonstrates India's capability as a blue-water navy to project power and protect national interests independently.

Exercise Sea Dragon

Context:

The Indian Navy has deployed a P-8I maritime patrol aircraft to Guam to participate in the Exercise Sea Dragon.

About Exercise Sea Dragon:

What it is?

- Exercise Sea Dragon is a US-led multinational anti-submarine warfare (ASW) exercise conducted in the Western Pacific Ocean near Guam.

Established in:

- Initiated by the United States Navy as an annual multinational ASW training exercise to strengthen Indo-Pacific maritime security cooperation.

Aim:

- Enhance anti-submarine warfare proficiency among participating navies.
- Improve interoperability and coordination between maritime patrol aircraft.
- Strengthen cooperation to ensure a free, open, and secure Indo-Pacific maritime domain.

Member Nations:

Participants typically include maritime forces from key Indo-Pacific partners:

- Indian Navy
- United States Navy
- Japan Maritime Self-Defense Force
- Royal Australian Air Force
- Royal New Zealand Air Force

Key Features:

- Anti-Submarine Warfare Training: Participants conduct tracking and detection of simulated and live submarines, strengthening underwater surveillance capabilities.
- Maritime Patrol Aircraft Operations: The exercise primarily uses long-range maritime patrol aircraft such as the P-8 Poseidon and P-1 aircraft equipped with advanced sensors and data-link systems.
- Integrated Tactical Planning: Aircrews conduct tabletop planning sessions and coordinated missions to develop joint ASW tactics.
- Performance Evaluation: Participating teams are assessed on speed, accuracy, and operational coordination, with the best-performing team awarded the Dragon Belt.
- Extensive Flight Training: The exercise includes over 200 hours of cumulative in-flight training, improving operational readiness.

Significance:

- Strengthens Indo-Pacific maritime security cooperation among allied nations.
- Enhances the Indian Navy's submarine detection and surveillance capabilities in the Indian Ocean Region.

Asymmetric Warfare

Context:

The ongoing West Asia conflict has seen a massive surge in electronic warfare, with over 1,600 vessels experiencing GNSS (GPS) disruptions in the Persian Gulf within a single 24-hour period.

About Asymmetric Warfare:

What it is?

- Asymmetric warfare is a type of conflict where there is a significant imbalance in the military power, resources, or technology between the opposing sides. Instead of a direct force-on-force conventional battle, the weaker party uses unconventional tactics, unpredictable methods, and low-cost technologies to exploit the vulnerabilities of the more powerful opponent.

Types of Asymmetric Warfare:

- Electronic & Cyber Warfare: Jamming communication and navigation systems (e.g., GPS/GNSS).
- Unconventional Naval Tactics: Using sea mines, fast attack boats, and suicide drone boats.
- Aerial Drone Strikes: Utilizing low-cost loitering munitions to bypass expensive air defense systems.
- Economic Disruption: Targeting critical maritime chokepoints to cause global price volatility.

Factors Causing Asymmetric Warfare:

- Cost-Effectiveness: Small actors can cause massive damage with minimal investment.
- Example: Iran uses low-cost drones and sea mines to deter high-cost US and Israeli naval destroyers.
- Geographical Advantage: Leveraging chokepoints to negate the enemy's numerical superiority.
- Example: Iran's proximity to the narrow Strait of Hormuz allows it to control traffic without a massive fleet.
- Denial of Technology: Using electronic interference to neutralize advanced Western military tech.
- Example: Widespread GNSS spoofing makes precision-guided missiles and ship navigation systems unreliable.
- Psychological Deterrence: Creating fear and uncertainty to halt commercial activity.
- Example: The mere threat of hidden sea mines has caused shipping insurance premiums to skyrocket, stopping trade.

Issues Associated with Asymmetric Warfare:

- Navigation Risks: Constant interference leads to physical accidents in congested waters.
- Example: Over 1,100 vessels in the Persian Gulf showed navigation anomalies, increasing the risk of groundings or collisions.
- Tracking Difficulties: Authorities lose the ability to monitor vessel movements for safety.
- Example: Ships are switching off their Automatic Identification System (AIS) trackers to avoid being targeted, making the Gulf blind.
- Legal Enforcement Gaps: International laws like UNCLOS are difficult to enforce against shadow tactics.
- Example: While UNCLOS guarantees free transit, the US/Israel cannot legally stop jamming that originates from within a sovereign nation's borders.
- Prolonged Recovery: Asymmetric threats are difficult to clear even after active fighting stops.
- Example: Clearing thousands of cheap sea mines from the Strait of Hormuz could take months, keeping energy prices high.

Implications:

- Energy Security Crisis: Vital fuel supplies for developing nations are at high risk.
- Example: India's 2.6 million barrels of crude oil per day are currently under threat due to the de facto closure of Hormuz.
- Global Inflation: Disruption in shipping leads to a surge in the cost of goods and fuel.
- Example: The drop in shipping traffic has forced alternate, longer routes, drastically increasing freight costs.
- Aviation Disruptions: Electronic warfare in West Asia is now affecting civilian flights.
- Example: Pilots in the region report spoofed flight paths, forcing emergency manual navigation over conflict zones.
- Shift in Military Doctrine: Global powers must now spend billions to counter cheap threats.
- Example: The US Navy is forced to use million-dollar missiles to intercept drones that cost only a few thousand dollars.

Way Ahead for India:

1. Diversification of Suppliers: Accelerate oil and gas imports from the US, Brazil, and Russia to reduce dependence on the Strait of Hormuz.
2. NavIC Integration: Mandate the use of India's indigenous NavIC system for all Indian-flagged vessels to provide a backup against GPS jamming.
3. Strategic Reserves: Increase the capacity of India's Strategic Petroleum Reserves (SPR) to handle supply shocks lasting more than 90 days.
4. Naval Escorts: Continue and expand Operation Sankalp, where the Indian Navy provides direct escorts to Indian oil tankers in the Persian Gulf.
5. Indigenous Counter-Electronic Tech: Invest in domestic R&D for anti-jamming and anti-spoofing hardware for both maritime and aviation sectors.

Conclusion:

The West Asia conflict marks a turning point where electronic disruption has become as potent as physical explosives. For a nation like India, which sits at the crossroads of global energy trade, the transition to asymmetric warfare is not just a military concern but a direct threat to economic stability. Adapting to this invisible battlefield through technological self-reliance and supply-chain flexibility is now a national imperative.

Exercise Dweep Shakti

Context:

The Indian Armed Forces successfully concluded Dweep Shakti, a high-intensity tri-service exercise.

- The drill demonstrated seamless synergy between the Army, Navy, and Air Force in securing India's strategic island territories and maritime frontiers.

About Exercise Dweep Shakti:

What It Is?

- Dweep Shakti is a large-scale Tri-Service joint military exercise designed to test and validate India's integrated combat capabilities in coastal and island environments. It focuses on the rapid deployment of forces to protect remote island territories from maritime threats.

Host:

- The exercise was conducted under the aegis of the Andaman and Nicobar Command (ANC)—India's only theater command—utilizing the strategic geography of the Andaman and Nicobar archipelago.
- Organizations Involved: Indian Army, Indian Navy and Indian Air Force.
- Aim: The primary objective is to refine integrated tactics and procedures for rapid response, ensuring the three services can operate as a single cohesive unit during amphibious assaults and maritime dominance operations.

Key Features:

- Amphibious Assaults: Execution of complex sea-to-land maneuvers where troops were moved from naval ships to shore via landing crafts.
- Maritime Dominance: Coordinated patrols and drills to establish control over sea lines of communication and deter adversarial naval presence.
- Beach Landing Drills: Heavy equipment, including tanks and armored vehicles, were landed on simulated hostile shores to test logistical speed.
- Next-Gen Tech Integration: Extensive use of swarming drones and electronic warfare suites for reconnaissance and precision strikes.
- Multi-Domain Interoperability: Testing of unified communication protocols to ensure real-time data sharing between aircraft, ships, and ground troops.

Significance:

- Sends a strong signal of India's readiness to defend its unsinkable aircraft carriers (the island territories) in the face of rising regional maritime competition.
- Bolsters the defense of India's vast coastline and Exclusive Economic Zone (EEZ) by perfecting rapid-response mechanisms.

11 DISASTER

Energy Statistics India 2026

Context:

The National Statistics Office (NSO) has released the 33rd edition of its annual publication, Energy Statistics India 2026, providing a comprehensive integrated dataset on India's energy reserves, production, and consumption.

About Energy Statistics India 2026:

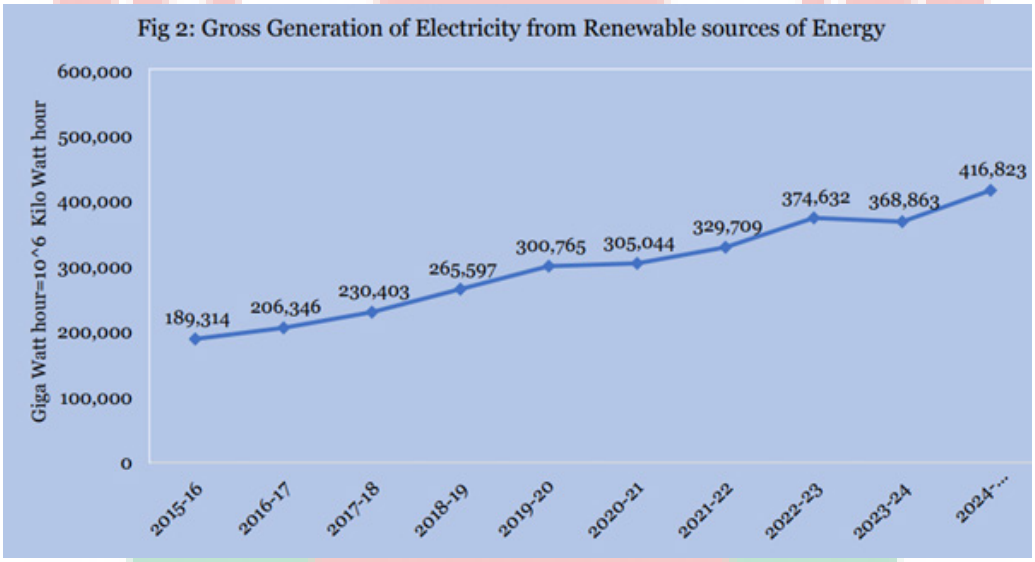
What it is?

- Energy Statistics India 2026 is the annual publication of the National Statistics Office (NSO), under the Ministry of Statistics and Programme Implementation (MoSPI).
- It serves as a centralized repository of diverse information regarding the reserve, capacity, production, consumption, and trade of all energy commodities, including fossil fuels and renewables.

Key Highlights of the Report:

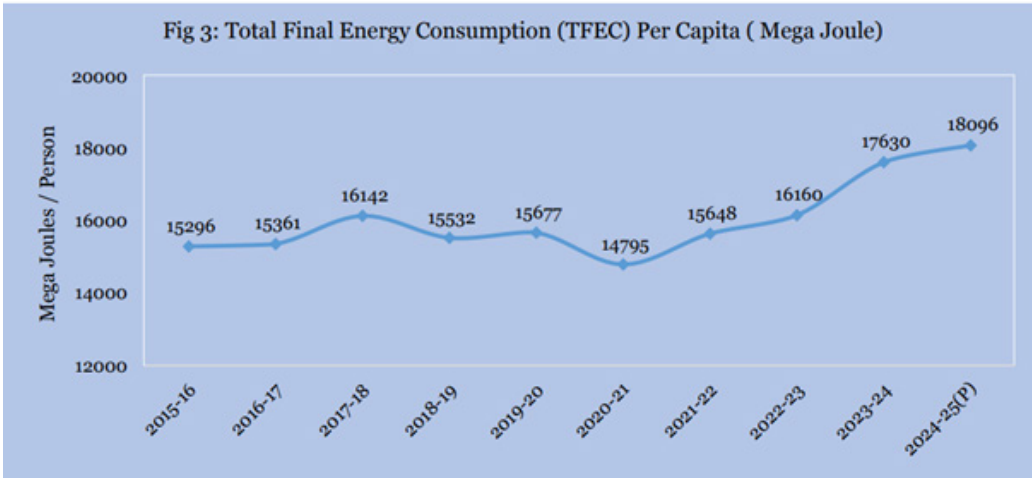
- Primary Energy Supply: The Total Primary Energy Supply (TPES) stood at 9,32,816 KTOE in FY 2024-25, marking a growth of 2.95% over the previous year.

Fig 2: Gross Generation of Electricity from Renewable sources of Energy

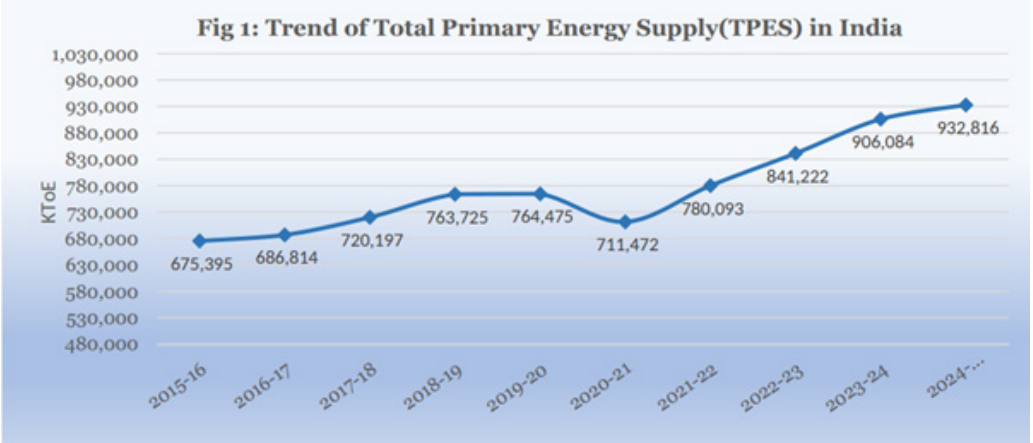


- Renewable Energy Potential: India's total RE potential reached 47,04,043 MW as of March 2025, with Solar Energy holding the highest share at approximately 71%.
- State-wise Concentration: Over 70% of RE potential is concentrated in six states: Rajasthan, Maharashtra, Gujarat, Andhra Pradesh, Karnataka, and Madhya Pradesh.

Fig 3: Total Final Energy Consumption (TFEC) Per Capita (Mega Joule)



- Capacity & Generation: Installed RE capacity grew at a CAGR of 10.93% (2016–2025), while gross electricity generation from renewables reached 4,16,823 GWh in FY 2024-25.
- Consumption Trends: Per-capita energy consumption rose from 15,296 MJ in 2015-16 to 18,096 MJ in 2024-25.
- Efficiency Gains: Transmission and Distribution (T&D) losses were reduced from 22% in FY 2015-16 to 17% in FY 2024-25.
- Fossil Fuel Dominance: Coal remains the primary energy source, with its supply increasing to 5,52,315 KTOE in FY 2024-25.
- Financial Growth: Credit flow to the energy sector increased over sixfold, rising from 1,688 crore in 2021 to 10,325 crore in 2025.



Analysis:

Positive Aspects:

- Renewable Energy Momentum: The staggering growth of solar potential (from 7.48 lakh MW to 33.43 lakh MW in one year) underscores a successful shift toward green energy targets.
- Improved Efficiency: A 5% reduction in T&D losses indicates better grid management and reduced wastage during electricity utilization.
- Financial Robustness: The sixfold increase in credit flow suggests high investor confidence and aggressive infrastructure financing in the energy sector.
- Enhanced Data Transparency: Incorporating previously missing data, such as international marine bunkers and e-Auction coal consumption, allows for more accurate policy-making.

Challenges Yet to Tackle:

- Heavy Coal Dependency: Coal remains the dominant source, with supply growing to 5,52,315 KTOE, making the transition to net-zero challenging.
- Geographical Imbalance: Over 70% of RE potential is limited to just six states, potentially leading to regional energy security disparities.
- Rising Energy Demand: The 30.41% surge in Total Final Consumption (TFC) since 2015-16 puts immense pressure on existing supply chains.
- Persistent Grid Losses: Despite improvements, a 17% T&D loss is still significant compared to global efficiency standards.
- Rising Imports/Trade Reliance: Consistent growth in Crude Oil and Natural Gas supply indicates a continued high reliance on imports for these commodities.

Way Ahead:

- Decentralize RE Potential: Focus on harnessing renewable resources in states beyond the top six to ensure balanced national energy growth.
- Further T&D Reforms: Implement advanced smart-grid technologies to bring the 17% distribution losses down to single digits.
- Diversify Energy Mix: Accelerate the transition from coal (the dominant source) to natural gas and hydrogen to meet climate commitments.

- Leverage ASI Data: Use the newly integrated Annual Survey of Industries (ASI) data to create targeted energy-efficiency programs for high-consumption industrial sub-sectors.
- Sustain Credit Momentum: Continue facilitating high credit flows (currently 10,325 crore) specifically toward emerging green technologies and storage solutions.

Conclusion:

Energy Statistics India 2026 paints a picture of an economy successfully scaling its renewable capacity and financial investment while battling a persistent reliance on coal. While efficiency gains and solar potential are impressive, the concentration of resources and rising overall demand remain critical hurdles. Ultimately, the report provides the essential data roadmap required to navigate India's complex transition toward a sustainable energy future.

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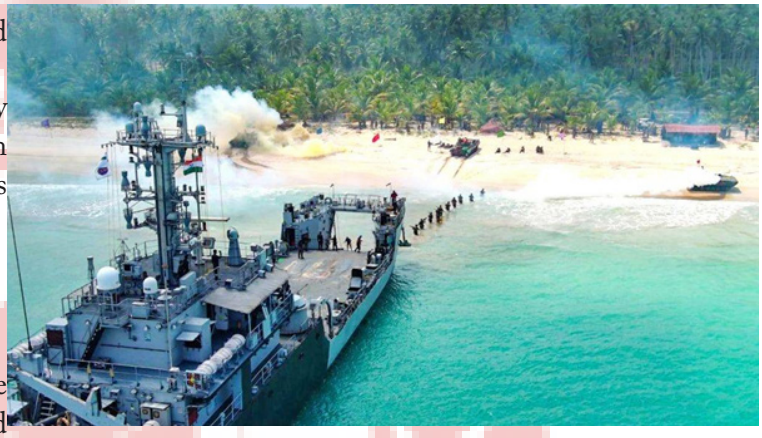

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Honeybee Attacks

Context:

Rising incidents of honeybee attacks across India, including fatalities in Uttar Pradesh, Gujarat, and Maharashtra, have raised public safety concerns.

About Honeybee Attacks:

What it is?

- A honeybee attack is a defensive mobilization by a colony in response to a perceived threat or external disturbance. While bees do not usually attack on their own, they act like soldiers to protect their hive, pursuing targets at speeds of up to 35 km per hour over considerable distances.

Species Behind the Attack:

- The Apis dorsata, commonly known as the giant rock bee, is responsible for most major incidents.
- These bees build large, open-air nests in elevated locations such as cliff faces, fort ramparts, and tall trees, with a single colony housing approximately 60,000 bees.

The Science Behind the Bee Sting:

- Defense Mechanism: Bees sting only when they sense a threat to the hive; however, the act of stinging is fatal for the bee itself.
- Pheromone Signaling: When a bee stings or is swatted, it releases pheromones—an odor-based chemical signal—that alerts and attracts more bees from the colony to the target.
- Triggers: Aggression peaks during summer when hives are at maximum strength. Common triggers include loud noises, bright colors, drones, and strong odors from perfumes, scented lotions, or incense.

Dangers:

- Toxic Shock: While a single sting causes localized swelling, hundreds of simultaneous stings can cause toxic shock in healthy adults.
- Anaphylaxis: In allergic individuals, even a few stings can trigger a life-threatening reaction characterized by throat swelling, dropped blood pressure, and breathing difficulties.
- Vulnerability: Risks are significantly higher for children, the elderly, and those with underlying health conditions.

Treatment and Response:

- Immediate Action: Run immediately toward an enclosed space like a vehicle or room. If escape isn't possible, cover your face and vital organs with thick clothing.
- Stinger Removal: Once safe, scrape the stingers out sideways using a fingernail or a card edge; do not pinch or pull them, as this may release more venom.
- Medical Care: Apply ice to reduce swelling. Seek emergency medical help immediately if the victim shows signs of dizziness, vomiting, or difficulty breathing.

Early Summer and Heat-Wave Conditions

Context:

North India is experiencing a rare and early arrival of heat-wave conditions, with temperatures in regions like Himachal Pradesh soaring 8 to 13 degrees Celsius above normal within the first week of the month.

About Early Summer and Heat-Wave Conditions:

What it is?

- A heat-wave is a period of abnormally high temperatures, more than the normal maximum temperature, that occurs during the summer

season. In the current context of North India, early summer refers to the sudden transition from winter to summer-like heat in February and March, effectively bypassing the traditional spring transition.

Data/Stats on Heatwaves in India:

- Extreme Deviations: Temperatures in North and West India have been recorded at 8°C to 13°C above the seasonal average in early March 2026.
- Mountain Warming: Shimla, typically cool until May, has seen temperatures rise above 25°C in March, a probability previously considered negligible.
- Rainfall Deficit: All-India rainfall for January and February 2026 was just 16 mm, which is 60% below the normal average.
- Historical Context: February 2026 has been classified as the third driest February in India since record-keeping began in 1901.

Factors Driving the Early Heatwave:

- Dry Winter Effect: A lack of winter rain prevents soil moisture evaporation; instead, the dry soil absorbs heat directly, causing rapid surface warming.
- Weak Western Disturbances: The east-moving rain-bearing winds from the Mediterranean were subdued since November 2025, leading to a lack of cooling snowfall and rain.
- Lack of Wind Convergence: There was no significant meeting of westerly and easterly winds, which usually brings moisture from the seas to Central and North India.
- Atmospheric Anticyclones: High-pressure systems over Western India have led to sinking air that compresses and warms up, preventing cloud formation.
- Climate Change Trends: Long-term global warming is shifting seasonal boundaries, making early-onset heatwaves a recurring new normal in the subcontinent.

Initiatives Taken

- IMD Seasonal Forecasts: The India Meteorological Department (IMD) issued early warnings for above normal heatwave days specifically for Gujarat and Andhra Pradesh.
- Agricultural Advisories: Government agencies have issued frequent irrigation alerts to farmers to save standing Rabi crops from wilting.
- Heat Action Plans (HAPs): Municipalities in North India are activating local HAPs to manage public health risks and cooling centers.
- National Disaster Management Authority (NDMA) Guidelines: Revision of standard operating procedures for heatwave management, focusing on labor timings and water access.

Challenges Associated:

- Rabi Crop Vulnerability: Sudden heat during the grain-filling stage can shrivel crops like wheat and mustard, reducing yields.
- Example: Wheat farmers in Punjab and Haryana are facing potential terminal heat stress, requiring urgent and frequent irrigation to save the harvest.
- Water Resource Depletion: Increased demand for irrigation and drinking water during a dry spell exhausts local groundwater and reservoirs.
- Example: The lack of winter snow in Himachal has led to lower discharge in downstream rivers, threatening the summer water supply for Chandigarh and Delhi.
- Public Health Risk: Early heatwaves find the human body unacclimatized, leading to higher instances of heat exhaustion and strokes.
- Example: In Shimla and Jammu, where residents are unprepared for 25°C+ temperatures in March, there is a spike in dehydration-related hospital visits.
- Power Demand Spikes: Unseasonal heat leads to an early surge in air conditioning and cooling loads, stressing the power grid.
- Example: Delhi's peak power demand in early March has already begun to mirror late April levels, forcing discoms to arrange for early power procurement.
- Economic Impact on Labor: Outdoor workers in construction and agriculture face reduced productivity and health hazards during peak sun hours.

- Example: MNREGA workers in Rajasthan are seeing their work hours shifted to early morning to avoid the 13°C-above-normal midday heat.

Way Ahead

- Climate-Resilient Crops: Accelerating the distribution of heat-tolerant varieties of wheat and mustard.
- Enhanced Micro-Irrigation: Promoting drip and sprinkler systems to maintain soil moisture without exhausting water tables.
- Urban Heat Mitigation: Increasing green cover and using cool roofs to reduce the Urban Heat Island effect in North Indian cities.
- Predictive Health Surveillance: Using AI-based models to predict localized heat impacts on vulnerable populations like the elderly and children.
- Water Harvesting: Strict implementation of winter rainwater harvesting to ensure soil remains moist even during dry winters.

Conclusion:

The 2026 early heatwave serves as a stark reminder of the volatile shifts in India's seasonal cycles driven by a lack of Western Disturbances and dry soil conditions. Addressing this requires a shift from reactive relief to proactive adaptation, particularly in protecting India's food security and public health. As the International Year of the Woman Farmer, 2026 must focus on helping rural workforces navigate these increasingly hostile climatic shifts.

Use Of AI In Disaster Management

Context:

The Government of India highlighted the expanding use of Artificial Intelligence (AI) in disaster management following the enactment of the Disaster Management (Amendment) Act, 2025.

About Use Of AI In Disaster Management:

What it is?

- The application of Artificial Intelligence (AI) and Machine Learning (ML) across the disaster management cycle—preparedness, mitigation, response, and recovery—to enhance prediction, decision-making, and coordination.

Various AI Applications in Disaster Management:

Weather Forecasting & Early Warning:

- India Meteorological Department uses AI/ML for 7-day advance weather predictions .
- Cyclone tracking and intensity prediction under Mission Mausam.

Flood Forecasting & Hydrological Modelling:

- Central Water Commission uses AI for short-range flood forecasting.
- Real-time flood advisory via digital portals using rainfall-based modelling .

Risk Mapping & Decision Support Systems:

- National Disaster Management Authority developed Web-DCRA & DSS tools.
- Dynamic risk atlases help in cyclone preparedness and evacuation planning.

Remote Sensing & Hazard Mapping:

- National Remote Sensing Centre developed Flood Hazard Atlases .
- Satellite data + AI used for mapping vulnerable regions.

Avalanche Forecasting & Geo-Intelligence:

Defence Research and Development Organisation uses AI for:

- Avalanche prediction
- Remote sensing-based detection
- Autonomous forecasting systems