# CURRENT AFFAIRS MAGAZINE

CENTER FOR CIVIL SERVICES
DEDICATED TO UPSC CSE

## February 2026

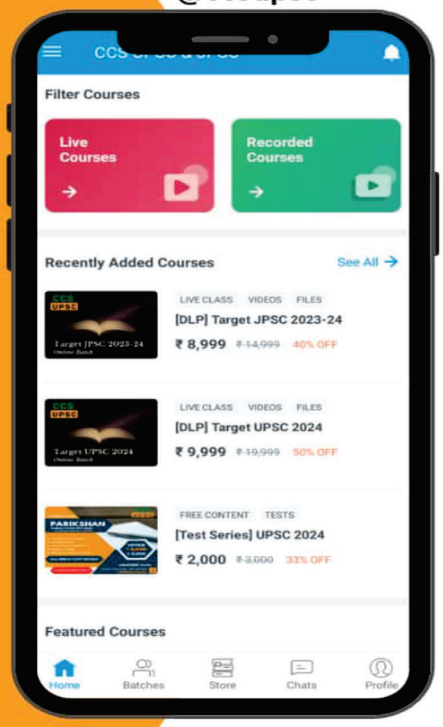

CENTER FOR CIVIL SERVICES
DEDICATED TO UPSC CSE

Address: Police Line Road, Daltonganj, Palamu, Jharkhand
Contact: 7909017633
email: contact@ccsupsc.com Website: ccsupsc.com

# CCS UPSC & JPSC

@ccsupsc

CCS UPSC




## अब करें तैयारी UPSC/JPSC/BPSC की कहीं से!

- Live + Recorded क्लास
- विशेष रूप से तैयार समग्र पाठ्यसमग्री
- अखिल भारतीय टेस्ट सीरीज
- नि:शुल्क पाठ्यसमग्री
- नि:शुल्क टेस्ट सीरीज
- करेंट अफेयर्स
- 24*7 डाउट समाधान
- बेहद किफायती फीस
- उच्च गुणवत्ता की तैयारी

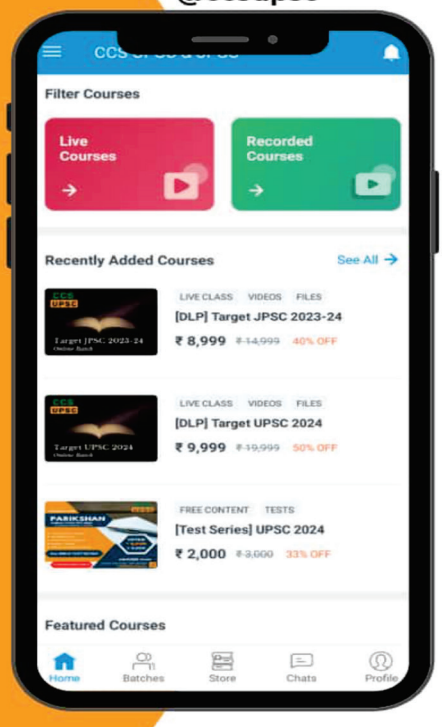
GET IT ON Google Play

**Download: ccsupsc.com/get-app**


# CCS UPSC & JPSC

@ccsupsc

CCS UPSC


## Now prepare for UPSC/JPSC/BPSC from Anywhere!

- Live + Recorded Classes
- Study Materials
- All India Test Series
- Free Study Materials
- Free Test Series
- Current Affairs
- 24*7 Doubt Support
- Highly Affordable Fee
- Highly Effective Prepration


GET IT ON Google Play

**Download: ccsupsc.com/get-app**

February-2026

# Current Affairs

## Contents

Chapter-
1

# HISTORY & CULTURE

## Savitribai Phule

### Context:

Prime Minister paid tributes to Savitribai Phule on her birth anniversary, recalling her lifelong commitment to education, equality, and social transformation.

### About Savitribai Phule:

### Who she was?

- Savitribai Phule (1831–1897) was a pioneering social reformer, poet, and educator, widely regarded as the first female teacher of modern India and a foundational figure of Indian feminism.

### Early life:

- Born in Naigaon (present-day Maharashtra), she was married in childhood to Jyotirao Phule and later moved to Pune.
- Her early exposure to learning ignited a lifelong mission to reform society through education.

### Education and training:

- Encouraged by Jyotirao Phule, she learned to read and write and undertook teacher training at institutions in Ahmednagar and Pune, becoming a qualified teacher in 1847—an extraordinary achievement for women of that era.

### Key contributions:

- Pioneer of girls' education: In 1848, she co-founded India's first girls' school at Bhidewada, Pune, and went on to help establish 18 schools for girls and marginalized communities.
- Social reform for the oppressed: Opened shelters for widows, destitute women, and child brides (1854; expanded in 1864); campaigned against child marriage, caste discrimination, and untouchability.
- Institution building: Played a central role in nurturing the Satyashodhak Samaj, which fought caste hierarchy and promoted equality; popularized Satyashodhak marriages without priests or dowry.
- Public service with courage: Defied social hostility—often facing abuse on her way to school—and served plague victims during the 1897 epidemic, sacrificing her life in the process.

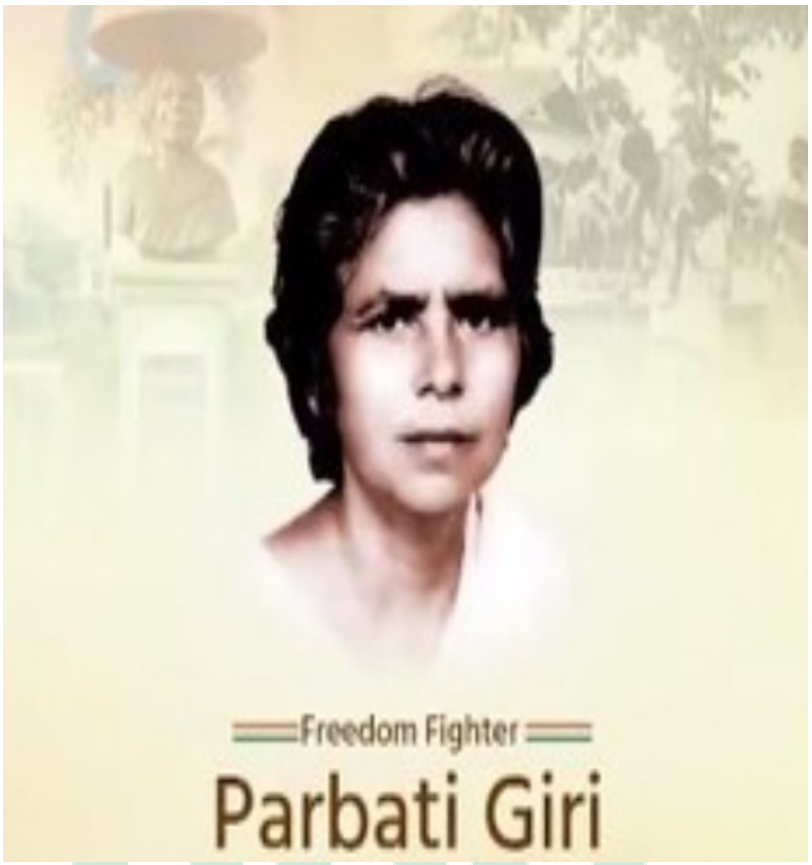
### Significance:

- Savitribai Phule's life symbolizes education as a tool of emancipation, laying the groundwork for women's rights, social justice, and inclusive reform in India.
- Her legacy endures in institutions like Savitribai Phule Pune University, national commemorations, and continued relevance to debates on equality and access to education.

## Parbati Giri

### Context:

Prime Minister of India paid tribute to Parbati Giri on her birth centenary, highlighting her role in the freedom struggle and her lifelong dedication to social service.




## About Parbati Giri:

### Who she was?

- Parbati Giri (1926–1995) was an Indian freedom fighter and social reformer from Odisha, widely known as the "Mother Teresa of Western Odisha" for her humanitarian work among the poor, tribals, and marginalised communities.

### Early days:

- Born on 19 January 1926 at Samlaipadar village, Bargarh district (Odisha).
- Inspired by nationalist activities led by Congress leaders, including her uncle Ramachandra Giri.
- Left formal education at a young age and joined Congress organisational work by 1938, adopting Gandhian principles as a way of life.

### Contributions to the freedom movement:

- Actively participated in Individual Satyagraha (1940) and mobilised villagers for the Khadi and Charkha movement.
- Joined the Quit India Movement (1942) at the age of 16, leading rallies and openly defying British authority.
- Known for bold acts of resistance, including urging Indians to boycott British institutions; arrested and imprisoned for two years.
- Earned the epithet "Banhi Kanya" for her fearless nationalism and mass mobilisation.

### Literary and social work:

- While not primarily known for literary writings, her legacy lies in grassroots activism, institution-building, and community service.
- After Independence, devoted herself to relief work during the 1951 Odisha famine, prison reforms, eradication of leprosy, and welfare of tribal communities.

### End days and recognition:

- Awarded by the Department of Social Welfare, Government of India (1984) for exemplary service.
- Conferred an Honorary Doctorate by Sambalpur University (1988).
- Passed away on 17 August 1995, leaving behind a legacy of service-driven nationalism and ethical public life.

# Paathara (Khoni) Practice

## Context:

The ancient Paathara (or Khoni) grain storage tradition in Andhra Pradesh's Srikakulam district is facing imminent extinction in January 2026.

## About Paathara (Khoni) Practice:

### What is it?

- Paathara (referred to as Khoni in Odia) is a traditional underground grain storage pit. It is a highly scientific, indigenous method used by farmers to preserve freshly harvested paddy for long-term household consumption and rituals.

## Origin:

- Geographical Hub: Observed primarily in the Uddanam region of Srikakulam (Andhra Pradesh), along the banks of the Mahendratanaya River, near the Odisha border.
- Terrain Specificity: The tradition thrives in inland, hilly terrains. It is rarely found in coastal belts because high moisture levels in seaside soil can spoil the grain.

## Key Features:

- The Structure: A rectangular or circular pit is dug into the earth, usually in front of the house or cattle shed.
- Insulation: The pit is meticulously plastered with straw and clay. A base layer of hand-woven straw ropes is laid to prevent ground moisture from touching the grain.
- Sealing: Once filled with paddy, the top is sealed with a thick layer of clay and cow dung, making it airtight and pest-proof.
- Ritualistic Start: The storage process begins with a puja, where women draw a bindi on the pit and offer wildflowers and paddy grains to ensure prosperity.

## Significance:

- Superior flavour and health: Paathara-stored rice is valued as aged rice, with enhanced taste and better nutrition, including a lower glycaemic index—now preferred by health-conscious consumers.
- Natural pest control and security: Its airtight underground storage protects grain from insects and rodents without chemicals, while its location near homes reduces theft.
- Zero-waste sustainability: At a time when India loses nearly 10% of food grains to poor storage, Paathara stands out as a low-cost, zero-carbon method using only local, biodegradable materials.

# The Living Root Bridges

## Context:

India officially submitted the nomination dossier for Meghalaya's living root bridges, titled Jingkieng Jri / Lyu Chrai Cultural Landscape, to UNESCO for the 2026-27 World Heritage evaluation cycle.

## About The Living Root Bridges:

### What is it?

- The Living Root Bridges, locally known as Jingkieng Jri, are extraordinary pedestrian bridges handcrafted from the aerial roots of living trees.
- Unlike steel or concrete bridges, these structures are grown over decades and become stronger as the tree matures, embodying the ultimate form of sustainable bio-engineering.

### Location:

- State: Meghalaya, India.
- Region: Primarily concentrated in the East Khasi Hills and West Jaintia Hills
- Villages: Notable sites include Nongriat (home to the famous Double-Decker bridge), Rewai, and Mawlynnong.

### History & Origin:

- Tribal Heritage: Created by the indigenous Khasi and Jaintia
- Ancient Tradition: Due to a lack of written scripts before the 19th century, their exact age is unknown, but oral legends suggests some bridges are over 500 years old.
- Evolution: The practice emerged as a survival strategy to cross monsoon-swollen rivers in the world's wettest region (Mawsynram/Cherrapunji), where wooden structures would simply rot away.

### Key Features & Construction Process:

- The Species: The bridges are primarily grown from the Ficus elastica (Indian Rubber Tree), known for its robust and flexible aerial root system.

### Guided Growth:

- Planting: Trees are planted on opposite banks of a river.
- Scaffolding: Young roots are guided through hollowed-out Areca palm trunks or bamboo structures to grow across the stream.
- Entwining: Over time, the roots are manually twisted and merged (anastomosis) to form a solid walkway.
- Strengthening: Stones are often placed between the roots to create a flat path. A bridge takes 10 to 15 years to become functional but can last for centuries.

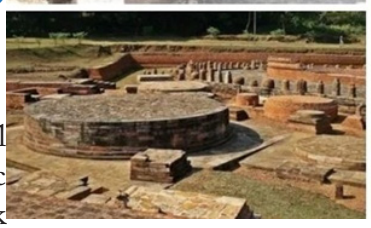
### Significance:

- These bridges are carbon-sequestering, self-repairing, and can withstand the extreme floods and storms of the Meghalayan plateau that would destroy modern infrastructure.
- The nomination recognizes the Mei Ramew (Mother Earth) philosophy, showcasing a harmonious relationship between humans and the ecosystem.
- As the world seeks nature-based solutions to climate change, the Living Root Bridges serve as a global blueprint for regenerative architecture.

## Buddhist Diamond Triangle Joins UNESCO World Heritage Tentative List

### Context:

The UNESCO World Heritage Centre has officially added Odisha's famed Buddhist Diamond Triangle—comprising Lalitgiri, Udayagiri, and Ratnagiri—to India's Tentative List for World Heritage Sites.



### About Buddhist Diamond Triangle Joins UNESCO World Heritage Tentative List:

### What is the Buddhist Diamond Triangle?

- The Diamond Triangle is a serial cultural nomination of three interconnected monastic complexes located in the Jajpur and Cuttack districts of Odisha. These sites are unique because they document 1,500 years of continuous history, showcasing the transition of Buddhism through three major schools:

### Theravada (Hinayana)

### Mahayana

- Vajrayana (Esoteric Buddhism)
- Lalitgiri: The Ancient Spiritual Hub

- Located in the Cuttack district, Lalitgiri is the oldest site in the triangle, dating back to the 2nd–3rd Century BCE.
- Key Discovery: A massive stupa containing sacred relic caskets made of gold, silver, and stone—believed by many to be the relics of Lord Buddha himself.
- Architectural Marvel: Home to an east-facing apsidal chaityagriha, the first of its kind discovered in Odisha.
- Historical Significance: Inscriptions of "Sri Chandraditya Vihara" prove it was a highly organized center of learning for over a millennium.

### Udayagiri: The Sunrise Hill of Monasteries

- Udayagiri, the largest complex in the group, flourished between the 1st and 13th Century CE.
- Advanced Architecture: Features a unique double-storeyed monastery and the Madhavapura Mahavihara.
- Artistic Grandeur: The site is famous for its colossal images of Avalokiteswara and the Pancha Dhyani Buddhas, representing the peak of Mahayana artistic complexity.

### Ratnagiri: The Epicentre of Vajrayana Buddhism

- Often compared to Nalanda, Ratnagiri is a powerhouse of Vajrayana (Tantric) Buddhism.
- Vajrayana Iconography: The site boasts an incredible collection of sculptures including Tara, Vajrapani, and Jambhala.
- Female Patronage: Evidence suggests significant support from female devotees, notably Queen Karpurashri.
- Architectural Syncretism: Its stupas blend Buddhist motifs with Brahmanical architectural styles, creating a unique aesthetic found nowhere else in the world.

## Graça Machel Wins Indira Gandhi Prize for Peace 2026

### Context:

Graça Machel, a globally respected humanitarian and women's rights advocate from Mozambique, has been selected for the Indira Gandhi Prize for Peace, Disarmament and Development (2026).


### About Graça Machel Wins Indira Gandhi Prize for Peace 2026:

### What is the Indira Gandhi Prize for Peace, Disarmament and Development?

- The Indira Gandhi Prize for Peace, Disarmament and Development is an international award conferred annually on an individual or organisation for outstanding creative contributions to global peace, nuclear disarmament, equitable development, and human welfare.

### When and why was the Prize instituted?

### Year of institution: 1985

- Instituted by: Government of India
- Administered by: Indira Gandhi Memorial Trust, New Delhi
- The Prize was created to commemorate the global vision and leadership of Indira Gandhi, particularly her commitment to peace, non-alignment, and justice in international relations.

### What are the core objectives of the Indira Gandhi Prize?

- The Prize seeks to uphold and promote ideals consistently championed by Indira Gandhi, including:
- International peace and nuclear disarmament, especially in a divided world order
- Equitable global development with emphasis on South–South cooperation
- Expansion of human freedom, dignity, and social justice
- Use of science, technology, and knowledge for human welfare, not militarism

- These objectives align with India's post-colonial foreign policy ethos and leadership in the Non-Aligned Movement (NAM).

### Who is eligible for the Prize?

### Eligible candidates:

- Individuals or organisations

### Eligibility conditions:

- No distinction of nationality, race, religion, or gender
- Only living persons may be nominated

### Who can nominate?

- Parliamentarians
- Past awardees
- Jury members
- Reputed national or international organisations
- Legislators from UN member states

### How is the Indira Gandhi Prize selected?

- Selection authority: International Jury
- Jury size: 5 to 9 members
- Decision method: Consensus
- Nature of decision: Final and binding
- The jury may choose to divide the prize or withhold it if no suitable candidate is found.

### What does the award consist of?

- Prize money: 10 million ( 1 crore) or equivalent in foreign exchange

### Components:

- Cash prize
- Formal citation
- Trophy made of Haematite Jasper, the stone used at Indira Gandhi's samadhi (Shakti Sthal), featuring a Jaipur miniature–style silver-rimmed portrait
- Funding source: Endowment provided by the Government of India to the Trust
- Frequency: Annual.

## Netaji Subhas Chandra Bose

### Context:

The Centre is organising Parakram Diwas–2026 in the Andaman and Nicobar Islands to commemorate the 129th Birth Anniversary of Netaji Subhas Chandra Bose, celebrating his legacy of courage, sacrifice, and patriotism.

### About Netaji Subhas Chandra Bose:

### Who he was?

Netaji Subhas Chandra Bose was a revolutionary nationalist leader who advocated complete independence through assertive and military means, diverging from the dominant non-violent strategy of the freedom movement.

### Early life:

- Born on 23 January 1897 in Cuttack, Odisha, to a prominent family.
- Brilliant student; studied at Presidency College and Scottish Church College.
- Cleared the Indian Civil Services (ICS) exam in England (1920) but resigned voluntarily to serve the freedom struggle.

### Contribution to the Freedom Movement:

- Radical Congress leadership: Rose as a mass leader of the Left wing; elected Congress President in 1938 (Haripura) and 1939 (Tripuri), signalling a shift towards assertive anti-colonial politics.
- Uncompromising demand for Purna Swaraj: Rejected dominion status and constitutional gradualism; argued for immediate independence, especially during Britain's wartime vulnerability.
- Socialist economic vision: Founded the National Planning Committee (1938), advocating state-led industrialisation, scientific planning, and economic self-reliance.
- Ideological challenge within the INC: Resigned after the Tripuri crisis, exposing tensions between Gandhian non-violence and Bose's militant political realism.
- Forward Bloc and radical mobilisation: Established the Forward Bloc (1939) to consolidate leftists, youth, and workers under a militant nationalist platform.

### Exile and Armed Struggle:

- Escape and globalisation of the struggle: Escaped house arrest in 1941, internationalising India's freedom movement and shifting it to the geopolitical arena.
- Pragmatic Axis engagement: Sought support from Germany and Japan as a strategic anti-imperialist move, not ideological alignment.
- Revival of the INA: Reorganised the Indian National Army, instilling discipline, nationalism, and a direct military challenge to British authority.
- Azad Hind Government (1943): Proclaimed India's first government-in-exile, with symbols of sovereignty including currency, courts, and diplomatic recognition.
- Psychological blow to colonial rule: INA's advance to Imphal and Kohima (1944), though militarily unsuccessful, broke the myth of British invincibility and hastened colonial exit.

### Last days and mystery:

- Reported to have died in a plane crash in Taiwan on 18 August 1945, though circumstances remain controversial.
- Multiple inquiries were held; debates over his death continue to this day.

### Significance and legacy:

- Popularised the slogan "Give me blood, and I will give you freedom."
- Inspired mass nationalism, particularly among soldiers and youth.
- INA trials (1945–46) weakened British moral authority and accelerated India's independence.
- 23 January is celebrated as Parakram Diwas to honour his indomitable spirit.

## Sammakka–Saralamma Jatara

### Context:

Telangana is preparing for the biennial Sammakka–Saralamma Jatara beginning 28 January 2026, alongside a large-scale redevelopment of the sacred precinct at Medaram.

### About Sammakka–Saralamma Jatara:

### What it is?

- A biennial tribal spiritual festival honouring Sammakka and Saralamma, revered as ancestral goddesses of the Koya Adivasi community.
- Recognised as Asia's largest tribal festival and one of the largest human congregations in the world.

### Held in:

- Celebrated at Medaram village in Mulugu district, Telangana, located inside the Eturnagaram Wildlife Sanctuary, part of the Dandakaranya forest belt.
- Conducted during the full moon of the Hindu month of Magh.

### Origin:

- Rooted in Koya tribal history and legend, centred on Sammakka, a forest-born woman adopted by tribals, and her daughter Saralamma.
- According to tradition, they resisted the Kakatiya rulers' tax oppression, attained martyrdom, and are remembered as symbols of tribal resistance and sacrifice.
- The deities are not worshipped permanently in temples; instead, they are symbolically brought from the forest to stay with the people for a few sacred days.

### Key features:

- Rituals are conducted exclusively by Koya tribal priests, following indigenous customs.
- Devotees offer "Bangaram" (jaggery) instead of gold or money, symbolising equality and agrarian life.
- Worship centres around sacred trees, bamboo totems, flags (dalgudda) and clan symbols rather than idols.
- Attracts over one crore devotees, second only to the Kumbh Mela in scale within India.
- The festival space has recently expanded with arches, platforms and granite flooring to manage massive crowds.

### Significance:

- Represents tribal identity, collective memory and resistance against historical injustice.
- Preserves an animistic, kinship-based belief system, where deities are treated as family members.

## Iranian conundrum

### Context:

Iran is witnessing fresh nationwide unrest that began with bazaar shutdowns on 28 December 2025 amid a sharp rial collapse (market rate reported around ~1.45 million rials/USD).

### About Iranian conundrum:

### What it is?

- The "Iranian conundrum" refers to Iran's recurring cycle of economic distress + political legitimacy stress + external pressure, where short-term control measures contain unrest, but structural causes (sanctions, inflation, governance constraints, factional power centres) keep reproducing crises.

### Key recent incidents

- Bazaar-led trigger (Dec 2025): Tehran's commercial districts saw merchant/shop closures protesting currency instability and rising costs.
- Rapid spread nationwide: What started as economic protest reportedly broadened into wider anti-government agitation across many locations.
- High-casualty crackdown claims: Iranian authorities and independent trackers have cited very different numbers (illustrating fog-of-war + information controls).
- Leadership context: President Masoud Pezeshkian (elected July 2024) operates within a system where key levers remain outside the presidency, complicating reform delivery.

### History of Iran:

### Constitutional Awakening (1905–1911)

- Iran witnessed its first mass political movement demanding a Majlis (Parliament) and a written constitution.
- Though a constitution was created, royal authority and foreign interference (Britain & Russia) weakened genuine democracy.

### Pahlavi Monarchy (1925–1979)

- Reza Shah and Mohammad Reza Shah pursued rapid modernisation, centralisation and Westernisation.

- Oil wealth grew, but so did inequality, political repression and elite corruption.
- Democratic institutions remained weak, creating popular resentment.

### Mossadegh and the 1953 Coup

- Prime Minister Mohammad Mossadegh nationalised Iran's oil, challenging British and US interests.
- He was overthrown in a CIA–MI6 backed coup, leaving Iranians deeply distrustful of foreign intervention.

### Islamic Revolution (1979)

- Popular anger against dictatorship, inequality and foreign dominance brought Ayatollah Khomeini to power.
- The monarchy was abolished and replaced by the Islamic Republic.

### Post-Revolutionary Iran (1979–Present)

- Recurrent mass protests — 2009 (election), 2019 (fuel prices), 2022 (women's rights), 2025–26 (economic collapse) — show persistent instability between state control and social aspiration.

### Current Governance Structure of Iran

### Supreme Leader (Ultimate authority)

- Heads the state and the Islamic system.
- Controls armed forces, judiciary, state media, and key security bodies.
- Has final say on foreign policy, defence and nuclear matters.

### Elected Government (President & Parliament)

- President runs the executive, budgets and day-to-day governance.
- Majlis (Parliament) passes laws and approves ministers.
- Their powers are subordinate to clerical institutions and can be overruled.

### Guardian Council (Gatekeeper of politics)

- 12 members (6 clerics + 6 legal experts).
- Approves or rejects election candidates (President, MPs, Assembly of Experts).
- Vets all laws passed by Parliament for Islamic and constitutional compliance.

### Clerical Oversight Bodies

- Assembly of Experts appoints and theoretically can remove the Supreme Leader.
- Expediency Council resolves disputes between Parliament and Guardian Council and advises the Supreme Leader.
- These bodies ensure religious supremacy over elected institutions.

### Security–Economic Power Centres (IRGC & Bonyads)

- IRGC (Revolutionary Guards) controls major sectors of the economy, internal security and regional military operations.
- Bonyads (religious foundations) run large businesses with little accountability.
- Together they form a deep state that limits civilian and reformist control.

### Implications of the recent protests:

### For India:

- Energy security: Gulf turbulence can affect oil supply stability and prices, directly impacting India's inflation and current account.
- Diaspora & remittances: Wider West Asia instability threatens Indian workers and remittance flows.
- Connectivity strategy: Prolonged instability/sanctions complicate India's access routes to Afghanistan/ Central Asia and long-term projects with Iran.
- Domestic socio-political sensitivity: Events in Iran resonate with India's sizeable Shia community and broader public discourse.

### At the global level:

- Oil price + shipping risk: Any Hormuz-adjacent escalation can reprice energy and insurance risk worldwide.
- Great-power contestation: Iran becomes a pressure point in wider US-led sanction architecture and regional alignments.
- Norms of intervention: Open encouragement of protests by external actors can harden Iranian threat perceptions and intensify crackdowns.

### Conclusion:

- Iran's crisis is no longer just "street unrest"; it is a structural stress test of currency credibility, governance capacity, and external-pressure resilience. Short-term containment may recur, but without durable economic normalisation, the cycle is likely to repeat. For India, the priority is risk insulation—energy buffers, diaspora safety, and calibrated regional diplomacy—while keeping long-term connectivity options alive.

## Jharkhand Megaliths

### Context:

Jharkhand has initiated a push to secure a UNESCO World Heritage Tag for its extensive megalithic landscapes, with Jharkhand CM highlighting them internationally at Davos and the UK.

### About Jharkhand Megaliths:

### What are they?

- Megaliths are large stone structures such as menhirs (standing stones), dolmens (table-like tombs), burial slabs, cairns and stone circles.
- They were built for burials, ancestor memory, rituals, boundary marking, and in some cases tracking the sun's movement.

### Region:

### Spread across many districts, especially:

- Ranchi–Khunti belt (e.g., Chokahatu)
- Hazaribagh region (monolith clusters and alignments)
- Chatra–Ramgarh–Lohardaga–Gumla–Simdega

### Singhbhum (Ho areas)

- Many villages have dedicated burial grounds often locally known as hargarhi/hargarha.
- History and cultural base:
- Jharkhand's megaliths connect strongly with Adivasi life, especially Munda, Ho, Oraon and Asur traditions.
- Unlike many megalith sites that are only "old ruins", Jharkhand has layered landscapes—old stones + new stones added over generations.

### Key characters:

- Living megalithism: In some places, communities still place new memorial stones for ancestors—this continuity is globally rare.

### Local forms & names:

- Sasandiri: commonly used term for dolmen-type family burial structures.
- Birdiri/Biridiri: commonly used for memorial standing stones (menhirs).
- Astronomy linkages: Some sites show deliberate alignment with equinox/solstice sunrise or sunset, acting like prehistoric calendars.
- Multiple functions: Not all stones are "tombs"—some served as commemorative markers, boundary stones, or observatory markers.

### Significance:

- Preserves indigenous systems of memory, lineage and ritual—a living archive in stone.
- Provides rich material for studying prehistoric–historic transitions in eastern India.
- The "living tradition + large landscape + uniqueness" combination strengthens its case for global heritage recognition.

Chapter-
2

# POLITY

## A call for ban on 10-minute deliveries

### Context:

Gig workers from platforms like Swiggy, Zomato, Blinkit and Zepto went on nationwide strikes on Christmas and New Year's Eve, demanding a ban on 10-minute delivery models.


### About A call for ban on 10-minute deliveries:

### What it is?

- The 10-minute delivery model promises ultra-fast doorstep delivery of food and groceries through algorithm-driven task allocation.
- It relies on dense dark-store networks, real-time tracking, and high-speed last-mile delivery, with penalties and incentives linked to time targets.

### Trends of 10-minute delivery:

- Rapid expansion since 2021 with quick-commerce platforms competing on speed as a differentiator.
- Increasing use of algorithmic management to push delivery partners to meet tight timelines.
- Peak-demand dependence during festivals and late-night hours, intensifying work pressure.
- Rising worker mobilisation and strikes globally against hyper-speed delivery promises.

### The Case for Banning 10-Minute Deliveries

- Road Safety & Public Risk: Ultra-compressed delivery timelines convert public roads into performance arenas, incentivising riders to violate traffic norms to avoid algorithmic penalties and income loss.
- E.g. In Bengaluru delivery clusters, traffic police reports show spikes in wrong-way driving and signal jumping during peak "instant delivery" hours, directly linking speed targets to unsafe behaviour.
- Occupational Health Crisis: Algorithmic gamification pushes riders into prolonged high-stress cycles, where earnings depend on continuous hyper-alertness, leading to physical exhaustion and psychological burnout.
- E.g. Medical clinics around Delhi-NCR dark stores report increased cases of back injuries, wrist strain, and anxiety disorders among riders working 10–12 hour speed-based shifts.
- Human Rights & Labor Dignity: Reducing workers to time-optimised "delivery nodes" strips them of rest, autonomy, and humane working conditions, undermining the principle of dignified labour.
- E.g. Rider protests near quick-commerce warehouses highlight the absence of toilets, shade, or rest areas, revealing systemic neglect of basic workplace dignity.
- Externalization of Costs: Platforms internalize profits from speed while offloading fuel costs, vehicle depreciation, and accident risks entirely onto workers, distorting fair compensation.
- E.g. Despite higher delivery intensity, riders report declining per-order earnings as bonuses replace stable pay, while repair and fuel expenses rise sharply.
- Regulatory Misalignment: The instant delivery model circumvents the employer's duty of care by treating safety risks as individual choices rather than structural obligations.
- E.g. This directly conflicts with the Code on Social Security, which mandates health protection and accident safeguards for platform-based workers.\

### Challenges in Regulating Instant Delivery:

- Consumer Dependency: Once hyper-convenience becomes habitual, political resistance grows against any regulation perceived as reducing consumer comfort.

- E.g. During recent gig-worker strikes, public backlash against service suspensions revealed how instant delivery has become a perceived necessity rather than a luxury.

- Algorithmic Opacity: Opaque algorithms mask penalties through ranking and visibility controls, making regulatory detection and enforcement extremely difficult.
  - E.g. Instead of explicit fines, platforms silently deprioritize slower riders via "shadow-banning," reducing orders without leaving auditable evidence.
- Policy Arbitrage: Inconsistent state-level regulation allows platforms to concentrate operations in regions with weaker labour protections.
  - E.g. States like Rajasthan with specific gig-worker laws contrast sharply with states lacking any framework, enabling regulatory evasion.
- Revenue vs. Safety Trade-off: Speed restrictions may reduce order volumes, creating fear among workers that safety reforms will cut their already precarious incomes.
  - E.g. Many riders hesitate to support bans as surge incentives linked to fast deliveries form a significant portion of daily earnings.
- Evasive Business Modeling: Platforms adapt language without changing pressure, maintaining unsafe expectations under new branding.
  - E.g. Rebranding "10-minute delivery" as "Fastest" or "Priority" preserves the same speed incentives while bypassing explicit bans.

### The Way Ahead:

- Mandatory Safety Windows: Regulation should replace arbitrary time promises with distance- and traffic-calibrated delivery windows prioritising legal compliance.
  - E.g. A 5-km/20-minute cap aligns delivery expectations with urban traffic realities, reducing incentives for rule violations.
- Algorithmic Accountability: Platforms must disclose speed, pay, and penalty logic to ensure fairness and prevent hidden coercion.
  - E.g. Mandating Explainable AI audits would allow regulators to detect discriminatory or unsafe incentive structures.
- Inflation-Indexed Earnings: Stable livelihoods require pay structures that automatically adjust to rising fuel and maintenance costs.
  - E.g. Linking per-kilometre rates to CPI or fuel indices protects riders from real-income erosion.
- Judicial Oversight: Dedicated grievance forums are needed to address arbitrary de-platforming and wage disputes swiftly.
  - E.g. Karnataka's proposed Grievance Redressal Officer model offers a template for speedy, worker-centric justice.
- Universal Social Security: Safety nets must be automatic and universal rather than optional or privately negotiated.
  - E.g. Shifting from opt-in insurance to state-mandated welfare boards ensures coverage irrespective of platform policies.

### Conclusion:

A 10-minute delivery promise is effectively a time tax on worker safety, pushed by algorithms and market competition. India should pivot to a "safe delivery economy" with transparent pay, enforceable protections, and social security that actually reaches riders. Regulating speed models now will prevent a future where convenience is subsidised by injury, debt, and silent coercion.

## India's renewable energy transition

### Context:

India's energy transition debate has shifted from capacity creation to system reform, as renewable generation now outpaces the grid's ability to efficiently absorb and utilise it.

## About India's renewable energy transition:

### What it is?

- India's renewable energy transition refers to the shift from fossil-fuel–dominated power generation to a low-carbon system driven by solar, wind, hydro, and storage, supported by reforms in grids, tariffs, and electricity markets to ensure reliability and affordability.

### Trends:

- Rapid capacity expansion: India's installed solar and wind capacity has crossed 180 GW, making renewables among the cheapest sources of new power generation.
- Cost competitiveness: Solar and wind tariffs in India are now lower than new coal-based power, strengthening the economic case for clean energy.
- Smart grid foundations: Around 49 million smart meters have been installed nationwide, enabling time-of-day tariffs and demand-side management.
- Demand concentration vs resource location: Renewable resources are concentrated in western and southern states, while demand is highest in urban and industrial clusters elsewhere.

### Current Indian status:

- Time-of-Day tariffs: States have mandated differential pricing for peak and off-peak hours to signal real system costs, supported by rapid smart-meter rollout, though behavioural response remains limited.
- Renewable curtailment: Despite sufficient solar and wind capacity, green power is frequently curtailed due to grid congestion, forecasting gaps, and rigid contract-based scheduling.
- Limited role of power exchanges: Only about 7–9% of electricity is traded on exchanges, restricting nationwide optimisation as most power remains locked into long-term PPAs.
- DISCOM reforms with lingering stress: Schemes like UDAY and RDSS improved infrastructure and metering, but weak revenue recovery continues to strain DISCOM finances.

### Challenges associated:

- DISCOM financial stress: AT&C losses hover around 16%, while tariff under-recovery persists, limiting the ability of DISCOMs to invest in modern grids and flexibility solutions.
- Misaligned tariff design: Volumetric tariffs fail to recover fixed network costs, making efficiency gains and rooftop solar appear as revenue losses rather than system benefits.
- Cross-subsidy dependence: High-tariff industrial and commercial consumers cross-subsidise households and agriculture; their shift to open access or captive power destabilises DISCOM revenue bases.
- Limited demand flexibility: Time-varying tariffs alone cannot shift load at scale because most consumers lack automation, real-time information, and coordinated response mechanisms.
- Fragmented wholesale markets: Self-scheduling under long-term PPAs prevents least-cost dispatch of renewables across regions, leading to inefficiencies and higher system costs.

### Way ahead:

- Prioritise distribution reform: Redesign incentives so DISCOMs earn returns for reliability, loss reduction, and system efficiency, not just electricity sales volume.
- Dynamic tariffs with automation: Combine time-of-day pricing with smart appliances, EV charging control, and automated demand response to manage peaks cost-effectively.
- Nationwide MBED: Implement market-based economic dispatch to ensure cheapest power is used first, with CERC estimating savings of about billion annually.
- Integrate captive power plants: Bringing captive generation into markets would increase liquidity, flexibility, and competition, lowering overall system costs.
- Redefine the DISCOM role: Shift DISCOMs from passive intermediaries to active system optimisers, managing demand, flexibility, and grid reliability in a renewable-heavy system.

### Conclusion:

India's energy transition now depends less on adding renewables and more on running the power system intelligently. Without distribution and market reforms, green power will remain underused despite surplus capacity. A grid that rewards efficiency, flexibility, and coordination will decide whether renewables become India's advantage or its constraint.

## State-led capital spending

### Context:

State governments' ability to sustain capital expenditure has come under focus as several States breached the 3% fiscal deficit norm using enhanced borrowing space during FY2021–FY2025.

### About State-led capital spending:

### What it is?

- State-led capital spending refers to expenditure by State governments on asset creation such as roads, irrigation, power, health, education infrastructure, and urban development.
- It is distinct from revenue spending as it raises long-term productive capacity and crowds in private investment.

### Trends in India (FY2021–FY2025):

- Strong capex growth: Combined capital expenditure and loans & advances of 28 States grew at a CAGR of 18.5%, doubling to 8.4 trillion.
- Role of Centre's support: Expansion driven by GST compensation loans ( 2.6 trillion in FY21–22) and 50-year interest-free capex loans ( 3.7 trillion over FY21–FY25).
- Borrowing flexibility: Additional borrowing of 0.5–1.1% of GSDP allowed under Union government relaxations and 15th Finance Commission provisions.
- Reforms-linked borrowing: Power sector reforms enabled several States to access ~ 1.3 trillion in extra borrowing between FY22–FY25.

### Current Spending Pattern of States:

- Surge in Lado-Virhu Style Transfers: Cash transfers to women jumped from 120 billion in FY23 to 1.5 trillion in FY26, representing a massive 1,150% increase in just three fiscal years.
- Expenditure Switching Strategy: States contained revenue deficits at approximately 0.5% of GSDP by aggressively retiring older, high-cost subsidies in the power and fertilizer sectors.
- Divergent Capex Growth: Maharashtra and Gujarat maintained a Capex-to-GSDP ratio above 3.5%, while others relied on Central Scheme for Special Assistance to keep infrastructure numbers afloat.
- Borrowing Cap Constraint: Despite a 10.5% growth in nominal GSDP, state spending remains strictly anchored to the Article 293(3) permissions granted by the Union Ministry of Finance.

- Fiscal Capacity Bifurcation: States like Karnataka and Tamil Nadu leverage a high Tax-to-GSDP ratio of over 8%, allowing them to fund welfare without breaching the 3% fiscal deficit target.

### Challenges Associated:

- End of 50-Year Interest-Free Loans: The potential phasing out of the 1.3 trillion Central capex support scheme creates a massive funding vacuum for state-led rural infrastructure.
- Sticky Revenue Expenditure: Once committed, cash transfers become obligatory spending, leaving less than 20% of total budget receipts for discretionary development projects.
- Interest Payment Stress: States with Debt-to-GSDP ratios exceeding 30%, such as Punjab and Rajasthan, now spend over 20% of their revenue receipts solely on debt servicing.
- Regulatory Compliance Burden: Access to the extra 0.5% borrowing headroom is currently tied to specific power sector reforms, which many states find politically difficult to implement.
- Execution Bottlenecks: Despite higher allocations, actual Value for Money is declining as project cost overruns in irrigation and road sectors average 15-20% across several regions.

### Expectations from the 16th Finance Commission:

- Recalibrated Article 293 Benchmarks: States are seeking a shift from a uniform 3% borrowing limit to a performance-linked range between 3% and 4% based on debt-servicing capacity.
- Institutionalizing Capex Support: There is a proposal to convert the current ad-hoc interest-free loan windows into a permanent, formula-based grant for green infrastructure.
- Fiscal Buffer Provisions: The Commission is expected to allow states to "bank" unused borrowing limits during high-growth years to be used during cyclical economic downturns.
- Standardization of Welfare Accounting: States want clear definitions to distinguish merit goods (education/health) from non-merit freebies to avoid unfair fiscal penalties.
- GST Compensation Integration: With the 2022-26 transition period ending, states require a new mechanism to bridge the revenue gap as the GST compensation cess expires.

### Way Ahead:

- Targeting Multiplier Sectors: Analysis shows road and bridge projects offer a multiplier of 2.5 times, compared to 0.9 times for cash transfers, necessitating a shift toward asset creation.
- Implementation of PFMS: Universal adoption of the Public Financial Management System is required to track Just-in-Time fund releases and reduce idle cash balances in state accounts.
- Sunset Clauses for Welfare: New cash transfer schemes should include periodic eligibility audits and income-based graduation criteria to prevent permanent fiscal leakage.
- Expanding Non-Tax Revenue: States must aggressively modernize mining auctions and user-charge frameworks to reduce the current 35% reliance on Central transfers.
- Medium-Term Fiscal Frameworks: Moving toward a three-year rolling budget will provide the predictability needed for private contractors to commit to long-term state infrastructure bids.

### Conclusion:

State-led capital spending has emerged as a critical engine of India's post-pandemic growth, supported by exceptional fiscal flexibility. However, sustaining this momentum will depend on how the 16th Finance Commission balances fiscal discipline with growth needs. A stable borrowing framework, efficient capex, and prudent welfare design are essential for durable state finances.

## Privatisation threatening India's public health system

### Context:

India's public health system is under renewed scrutiny due to rising privatisation, chronic underfunding, and regulatory gaps, which are worsening health inequities and patient outcomes.

## About Privatisation threatening India's public health system:

### What it is?

- Privatisation in public health refers to the growing role of private hospitals, insurers, and corporate entities in financing, delivering, and training healthcare, often using public funds.
- It includes public–private partnerships (PPPs), insurance-based purchasing of care, and expansion of private medical education.

### Trends:

- India spends only ~2.1% of GDP on public health (2023–24), among the lowest globally.
- Over 60% of total health expenditure is out-of-pocket, pushing millions into poverty annually.
- Schemes like Ayushman Bharat PM-JAY increasingly reimburse private hospitals, diverting public funds.
- Private medical colleges charge 40–50 lakh+ for MBBS, reshaping medical priorities toward profit recovery.

### Need for Privatisation in Public Health

- Bridging tertiary care infrastructure gaps: Private hospitals supplement shortages in ICUs, cardiology, oncology, and renal care where public capacity is inadequate.
  - o E.g. In Uttar Pradesh, district dialysis services are delivered through private hospitals empanelled under PPP models due to lack of public renal units.
- Expanding access to advanced diagnostics: The private sector provides nearly 70% of high-end diagnostics (MRI, CT, PET scans), which public hospitals cannot rapidly scale.
  - o E.g. Tier-2 cities rely predominantly on private diagnostic chains for cancer and neuro-imaging.
- Driving technology adoption and innovation: Corporate hospitals act as early adopters of advanced medical technologies before public diffusion.
  - o E.g. Apollo Hospitals pioneered robotic surgeries and AI-based cardiac risk tools, later informing national clinical benchmarks.
- Rapid surge capacity during health emergencies: Private healthcare can quickly mobilise infrastructure and manpower during crises.
  - o E.g. During COVID-19, private laboratories conducted ~45% of India's RT-PCR tests, preventing systemic collapse.

### Initiatives taken by the government

#### 1. Ayushman Bharat programme

- PM-JAY for secondary/tertiary care insurance.
- Health and Wellness Centres for primary care strengthening.

### 2. National Health Policy 2017

- Target of 2.5% GDP public health spending (yet to be achieved).

### 3. Digital health push

- Ayushman Bharat Digital Mission for health records and interoperability.

### 4. Medical education expansion

- Increase in government medical colleges and seats post-2014.

### Challenges Associated with Privatisation:

- Profit-driven clinical decision-making: Revenue targets incentivise unnecessary procedures and overtreatment.
  - o E.g. Multiple state audits flagged unwarranted C-sections and hysterectomies in private hospitals.
- Weak and uneven regulatory enforcement: Price caps and quality standards vary widely across States.
  - o E.g. The same cardiac stent procedure shows 3–5x price variation across private hospitals.
- Erosion of public health infrastructure: Public funds flow to private reimbursements instead of strengthening government facilities.
  - o E.g. PM-JAY reimbursements often bypass underfunded district hospitals.
- Commercialisation of medical education: High fees distort career choices away from public service and primary care.
  - o E.g. Private MBBS seats costing 40 lakh– 1 crore push doctors toward high-paying urban specialisations.

### Way Ahead:

- Rebuild public health as the primary provider: Increase public health spending to at least 3% of GDP with priority to government facilities.
  - o E.g. Countries with strong public systems (UK, Thailand) show lower OOPE.
- Strengthen primary care first: Treat most illnesses locally to reduce dependence on expensive tertiary care.
  - o E.g. Ayushman Arogya Mandirs can address 80–90% of disease burden if fully staffed.
- Tighten regulation of private providers: Enforce Standard Treatment Guidelines, audits, and transparent pricing.
- Reorient insurance schemes toward public hospitals: Use PM-JAY funds to upgrade government infrastructure instead of passive purchasing.
- Reform medical education and workforce policy: Cap fees, mandate rural service, and prioritise skill-based clinical training.

### Conclusion:

Privatisation can only be a supporting instrument, not the foundation of public health. Unchecked market logic deepens inequality and weakens state capacity. India's health future depends on a strong public system with a tightly regulated private complement.

## Constitutional duty of the Election Commission of India

### Context:


The Election Commission of India (ECI) told the Supreme Court of India that Article 324 grants it constitutional control over the preparation of electoral rolls, including the power to conduct Special Intensive Revision (SIR).

### About Constitutional duty of the Election Commission of India:

### What it is?

- The ECI is a constitutional authority entrusted with ensuring free, fair, and credible elections in India.
- A core constitutional obligation of the ECI is to maintain the purity of the electoral process, which includes ensuring that only eligible Indian citizens are enrolled as voters.

### Constitutional articles associated with the Election Commission:

- Article 324 – Superintendence, direction and control of elections
- Vests the ECI with complete control over the preparation of electoral rolls and conduct of elections to Parliament, State Legislatures, and the offices of President and Vice-President.
- Forms the constitutional basis for exercises like Special Intensive Revision (SIR).
- Article 325 – One general electoral roll
- Mandates a single electoral roll for each constituency.
- Prohibits discrimination in voter inclusion on grounds of religion, race, caste, sex, etc.
- Article 326 – Adult suffrage
- Restricts the right to vote to Indian citizens aged 18 years and above, subject to lawful disqualifications.
- Makes citizenship a foundational requirement of voter registration.
- Article 327 – Parliamentary power over elections
- Empowers Parliament to make laws on elections, including preparation of electoral rolls, but subject to Article 324, preserving ECI's operational control.
- Article 328 – State legislature powers
- Allows States to legislate on elections where Parliament has not acted, again within the constitutional framework.

### Significance of ECI's constitutional duty:

- Safeguards electoral integrity by preventing inclusion of ineligible persons.
- Ensures citizenship-based franchise, a core feature of Indian democracy.
- Balances autonomy of the ECI with legislative oversight, preventing executive overreach.

## Right to Menstrual Health as a Fundamental Right

### Context:

The Supreme Court of India, in a landmark verdict Dr. Jaya Thakur vs Government Of India, declared the right to menstrual health a fundamental right under Article 21, ordering all schools to provide free sanitary pads and gender-segregated toilets.


### About Right to Menstrual Health as a Fundamental Right:

### What it is?

- The Supreme Court has expanded the scope of the Right to Life to include menstrual hygiene management (MHM). It ruled that menstruation is a biological reality that should not lead to structural exclusion or the loss of educational opportunities.
- By elevating it to a fundamental right, the Court established that providing pads and toilets is not an act of charity by the State, but a constitutional obligation to ensure dignity, privacy, and equality for girl students.

### Constitutional Articles Involved:

- Article 21: Right to life and personal dignity. The court held that dignity is violated when girls face humiliation or absenteeism due to lack of facilities.
- Article 14: Right to equality. Inaccessible MHM creates a gender-specific barrier that prevents girls from competing equally with boys.
- Article 21A: Right to free and compulsory education. The ruling ensures that menstrual poverty does not force girls to drop out of the education system.

### Supreme Court Judgment Outcome:

1. Mandatory Free Pads: All government and private schools must provide free, bio-degradable (ASTM D-6954 standard) sanitary napkins to girls in Classes 6–12.
2. Infrastructure Mandate: Schools must ensure functional, gender-segregated, and disabled-friendly toilets with consistent water supply and soap.

3. MHM Corners: Establishment of Menstrual Hygiene Management Corners in schools equipped with spare uniforms, innerwear, and disposal bags for emergencies.
4. Enforcement & Accountability: District Education Officers (DEOs) must conduct annual inspections and collect anonymous student feedback; non-compliant private schools face de-recognition.

## Importance of Recognizing Menstrual Rights:

- Ensuring Educational Continuity: Prevents girls from falling behind due to monthly absences.
- E.g. Recent 2025 reports indicate girls in rural India miss 2–5 days of school monthly; this ruling aims to end such punctuated schooling.
- Upholding Human Dignity: Protects girls from the shame and biological burden associated with lack of privacy.
- E.g. The Court noted that girls often hesitate to ask for help, and this legal recognition empowers them to claim their rights without stigma.
- Improving Health Outcomes: Prevents Reproductive Tract Infections (RTIs) caused by using unhygienic alternatives like old rags.
- E.g. Studies in 2024-25 show a direct link between poor MHM and rising cases of bacterial vaginosis among adolescent girls in urban slums.
- Promoting Gender Equality: Levels the playing field by removing a barrier that only affects female students.
- E.g. Addressing menstrual poverty ensures that a girl's biology does not dictate her economic and social mobility compared to male peers.
- Environmental Sustainability: Mandating biodegradable products prevents massive plastic waste in school sanitation systems.
- E.g. The 2026 directive specifically mentions oxo-biodegradable pads to align with India's Green Initiatives and Solid Waste Management Rules.

## Challenges in Implementation:

- Infrastructure Maintenance: Building toilets is easier than ensuring they remain functional and clean over time.
- E.g. 2025 surveys found that while many schools have separate toilets on paper, many lack water connectivity or working locks.
- Deep-Rooted Social Stigma: Cultural taboos often prevent students and even teachers from discussing or utilizing provided facilities.
- E.g. In parts of Rajasthan and Odisha, girls are still restricted from communal spaces during periods, affecting their willingness to use school MHM corners.
- Last-Mile Supply Chain: Ensuring a consistent supply of pads to remote, tribal, or hilly regions remains a logistical hurdle.
- E.g. Implementation gaps in the Menstrual Hygiene Scheme have previously led to months of stock-outs in rural Bihar and Jharkhand.
- Sensitivity of Male Staff: A lack of awareness among male teachers can lead to insensitive questioning of girls needing breaks.
- E.g. The SC specifically highlighted that male students and teachers must be sensitized to prevent harassment or invasive questioning.
- Disposal Mechanisms: Improper disposal can lead to clogged drains and health hazards if incinerators or bins aren't maintained.
- E.g. Several urban schools in 2024 reported unsafe disposal (flushing pads) due to a lack of discrete, functional dustbins in stalls.

## Way Ahead:

- Curriculum Integration: NCERT/SCERT should include age-appropriate menstrual education for all genders to normalize the topic.
- Vending Machines & Incinerators: Prioritize automated dispensing and safe disposal units within toilet stalls to ensure maximum privacy.
- Community Engagement: Involve ASHAs and Anganwadi workers to educate parents, ensuring the silence at home is broken alongside the school.

- Digital Monitoring: Develop a real-time portal for schools to report stock levels and for DEOs to upload inspection photos.
- Incentivizing Local Production: Support Self-Help Groups (SHGs) to manufacture biodegradable pads locally to reduce costs and ensure supply.

### Conclusion:

The Supreme Court's verdict marks a shift from viewing menstruation as a private hygiene issue to a public constitutional right. By setting a three-month deadline for compliance, the judiciary has sent a clear message: a girl's period should end a sentence, not her education. Success now depends on turning these legal words into functional school infrastructure.

## Supreme Court Stays UGC Equity Regulations 2026

### Context:


The Supreme Court of India, stayed the implementation of the UGC (Promotion of Equity in Higher Education Institutions) Regulations, 2026.

- The court directed that the previous 2012 guidelines remain in force while expressing concerns that the new rules were vague and capable of dividing society.

### About Supreme Court Stays UGC Equity Regulations 2026:

### What is the issue?

- The controversy stems from the UGC's attempt to replace the 14-year-old equity framework with a more stringent, enforceable set of rules. While intended to curb caste-based discrimination following high-profile tragedies (like those of Rohith Vemula and Payal Tadvi), the 2026 regulations sparked a massive backlash.

### Key Features of the 2026 Guidelines:

1. Separate Definitions: It distinguishes between general discrimination and caste-based discrimination, specifically identifying SC, ST, and OBC groups.
2. Mandatory Infrastructure: Every institution must establish an Equal Opportunity Centre (EOC) and appoint Equity Ambassadors and Equity Squads.
3. Strict Timelines: Mandatory 24-hour response to complaints and a 15-day window for completing detailed investigations.
4. Punitive Action: Non-compliant institutions face de-recognition, loss of grants, and debarment from UGC schemes.
5. Direct Accountability: The Head of the Institution is personally responsible for ensuring a discrimination-free environment.
6. 24/7 Support: Compulsory operation of a round-the-clock Equity Helpline and an online portal for reporting incidents.

### Need for Strong UGC Rules:

- Curbing the rising trend of caste-based discrimination: Weak, advisory-only 2012 guidelines failed to create deterrence, allowing exclusionary practices to persist across campuses without accountability.
  - E.g. UGC data (2026) shows a 118.4% rise in reported caste-discrimination cases in five years, exposing the ineffectiveness of voluntary compliance.
- Addressing the epidemic of student suicides: Structural discrimination often manifests as social isolation and academic marginalisation, requiring time-bound intervention rather than slow grievance redressal.
  - E.g. In 2025, the Supreme Court flagged a disturbing suicide pattern at IIT Delhi, linking Dalit students' deaths to sustained institutional neglect.
- Ensuring financial justice and scholarship timelines: Delays in scholarships compound vulnerability, pushing marginalised students into debt, dropout, or psychological distress.

- E.g. The 2026 SC directions imposed a four-month deadline for clearing scholarship backlogs, recognising financial stress as a suicide trigger.

- Fixing paper-only redressal mechanisms: SC/ST Cells without autonomy often hesitate to act against senior faculty, turning grievance systems into procedural formalities.
  - E.g. Prof. N. Sukumar (2026) noted that administration-nominated cells lack credibility, resulting in biased resolutions and low student trust.
- Combating epistemic and invisible bias: Discrimination increasingly occurs through subtle academic practices—grading, vivas, and intellectual exclusion—beyond formal misconduct.
  - E.g. 2025 studies documented epistemic caste bias, where Dalit students' ideas were systematically devalued, necessitating Equity Squads.

### Challenges Associated:

- Exclusionary Scope: The definition of caste-based discrimination excludes General Category students, denying them equal protection under the law.
  - E.g. Petitioners cited 2022 JNU incidents where Brahmins Leave Campus graffiti appeared, arguing that the 2026 rules would offer no specific remedy for such targeted harassment.
- Potential for Misuse: The lack of safeguards or penalties for false or malicious complaints raises fears of the law being used as a tool for vendettas.
- Vagueness in Language: The Supreme Court noted that terms like segregation in hostels or mentorship groups were poorly defined and could lead to arbitrary implementation.
- Omission of Ragging: Unlike the 2012 version, the 2026 rules do not explicitly detail ragging as a form of discrimination, which remains a primary threat on Indian campuses.
- Social Polarization: There is a growing concern that the rules institutionalize caste identities rather than fostering a casteless academic environment.
  - E.g. The CJI warned that separate hostels or wards (if interpreted as such) would reverse 75 years of progress toward social assimilation.

### Way Ahead:

1. Inclusive Redrafting: Redesign the definition of discrimination to be universal, ensuring any student, regardless of caste or category, can seek redressal.
2. Expert Panel Review: Follow the SC's suggestion to form a committee of eminent academicians and jurists to modulate the language for clarity.
3. Anti-Misuse Guardrails: Incorporate specific provisions to penalize false or malicious complaints to build trust among all stakeholders.
4. Holistic Protection: Re-integrate specific mentions of ragging, regional discrimination, and cultural bias (North-South divide) into the equity framework.
5. Focus on Sensitization: Shift from a purely punitive model to one that prioritizes mandatory orientation and empathy-building programs for both students and faculty.

### Conclusion:

The 2026 UGC Regulations represent a well-intentioned but legally flawed attempt to legislate social equity on Indian campuses. By staying the rules, the Supreme Court has underscored that a protective law must be inclusive and precise to avoid becoming an instrument of further division. The path forward lies in creating a framework that protects the marginalized without alienating the general student body.

## New Aadhaar App

### Context:

The Government of India has launched the New Aadhaar App in January 2026, dedicated to the nation.

- This next-generation app, introduces a Privacy-First approach, allowing users to update mobile numbers from home.

## About New Aadhaar App:


### What is it?

- The New Aadhaar App is a secure, next-generation mobile platform designed by the Unique Identification Authority of India (UIDAI).
- It is significantly different from the old mAadhaar app, focusing on consent-based control and data minimization in line with the DPDP Act.
- Developed by: This next-generation app, developed by UIDAI.

### Aim & Objectives:

- Eliminate Photocopies: To stop the misuse of Aadhaar data during routine checks at hotels and airports.
- Resident-Centricity: To provide Identity at Fingertips while allowing users to choose exactly what data they share.
- Ease of Living: To reduce physical visits to Aadhaar Seva Kendras for routine updates.

### Key Features:

### Secure Offline Verification (No Internet Needed):

- Users can now verify their identity without an active internet connection or sharing their 12-digit number.
- Share ID: Generate a password-protected file with only limited fields (e.g., just Name and Age).
- QR Scanning: Scan an entity's QR code to provide instant, digitally signed proof of identity.

### Update Mobile Number & Address from Home:

- For the first time, residents can update their registered mobile number directly through the app using Face Authentication.
- Fee: A nominal fee of ₹75 is applicable.
- Timeline: Updates are typically reflected within 15 days.

### One Family – One App:

- The app allows the management of up to five Aadhaar profiles on a single smartphone. This makes it a perfect tool for parents to manage their children's or elderly dependents' digital IDs.

### Selective Data Sharing:

- Users no longer have to share their full digital card. You can choose to share only Photo and Age for a movie ticket or Name and Address for a hospital visit, masking the Aadhaar number entirely.

### Biometric Lock & Unlock:

- A single-click feature allows you to lock your biometrics, ensuring no one can use your fingerprint or iris data without your permission through the app.

### Significance for the Common Man:

- Aligns with the Digital Personal Data Protection (DPDP) Act by ensuring only digitally signed credentials are shared, not the actual Aadhaar number.
- Enables safe and instant verification for service partners and gig workers without exposing sensitive details.

## Judicial Removal — Tough Law with a Loophole

### Context:

In December 2025, 107 Members of Parliament from the INDIA bloc submitted a notice for the removal of Justice G.R. Swaminathan of the Madras High Court, citing alleged bias and acting against secular principles.

## About Judicial Removal — Tough Law with a Loophole:

### What it is?

- Judicial removal is the constitutional process of ousting a judge of the Supreme Court or High Court from office before their tenure ends. While commonly called impeachment, the Constitution specifically uses this term only for the President; for judges, it refers to it as

### Constitutional Articles Associated:

- Article 124(4): Outlines the grounds (proved misbehaviour/incapacity) and the voting threshold for removing a Supreme Court judge.
- Article 124(5): Empowers Parliament to legislate the procedure for investigation and proof of misbehaviour.
- Article 217(1)(b): States that a High Court judge can be removed in the same manner as a Supreme Court judge.
- Article 218: Formally applies the provisions of Article 124(4) and (5) to High Court judges.

### Terms and Conditions:

- Grounds: Removal can only occur on grounds of proved misbehaviour or incapacity.
- Signature Requirement: A notice must be signed by at least 100 members of the Lok Sabha or 50 members of the Rajya Sabha.
- Judicial Standards: Misbehaviour includes corruption, lack of integrity, or wilful abuse of judicial office (M. Krishna Swami v. Union of India).
- Investigative Committee: A three-member committee (SC judge, HC Chief Justice, and a jurist) must verify the charges.
- Special Majority: The motion must be passed by a majority of the total membership and two-thirds of those present and voting in each House.

### Procedure of Removal:

- Submission of Motion: The signed notice is handed to the Speaker (LS) or Chairman (RS).
- Admission: The Presiding Officer decides whether to admit or reject the motion at the threshold.
- Investigation: If admitted, an inquiry committee is formed to investigate the specific charges.
- Parliamentary Debate: If the committee finds the judge guilty, the House takes up the motion for debate.
- Presidential Order: If passed by both Houses with a special majority, the President issues the final removal order.

### Flaws in Judicial Removal:

- Threshold Arbitrariness: The Presiding Officer can reject a motion signed by 100+ MPs without assigning detailed reasons.
    - E.g. In 2018, the Rajya Sabha Chairman rejected the removal motion against CJI Dipak Misra at the threshold, leading to claims of administrative overreach.
- Political Bottleneck: Since the Speaker/Chairman often belongs to the ruling party, removal motions against favourable judges can be blocked.
    - E.g. Critics argue the recent notice against Justice Swaminathan (2025) faces a high risk of rejection because the presiding officer acts as a statutory authority rather than a neutral judge.
- Lack of Definition: Misbehaviour is not defined in the Constitution, leaving room for subjective interpretation by the Inquiry Committee.
    - E.g. The 2015 motion against Justice J.B. Pardiwala for objectionable remarks showed how ideological disagreements can be framed as misbehaviour.
- Procedural Opacity: The preliminary examination by the Speaker happens behind closed doors before any judicial investigation begins.
    - E.g. In the Justice Yashwant Varma case (2025), the Supreme Court noted that the Secretariat's administrative role sometimes improperly drifts into quasi-adjudicatory territory.
- The Lapse Loophole: If a motion is rejected at the start, the entire constitutional mechanism becomes infructuous (useless), regardless of the evidence.

- E.g. Despite 107 MPs signing the 2025 motion against Justice Swaminathan, if the Speaker refuses admission, the charges are never legally investigated.

### Way Ahead:

- Define Admissibility: Amend the Judges (Inquiry) Act to clearly spell out the criteria for admitting a motion to prevent arbitrary rejections.
- Time-bound Investigation: Introduce mandatory timelines for the Presiding Officer to decide on the admission of a motion.
- Judicial Review: Ensure that the decision to reject a removal motion at the threshold is subject to a transparent judicial review by a Constitution Bench.
- Independent Secretariat: Empower an independent body, rather than the Speaker's office, to perform the initial administrative check of the motion's validity.
- Codify Misbehaviour: Formally define the categories of judicial misconduct to separate judicial error (which should be appealed) from misbehaviour (which warrants removal).

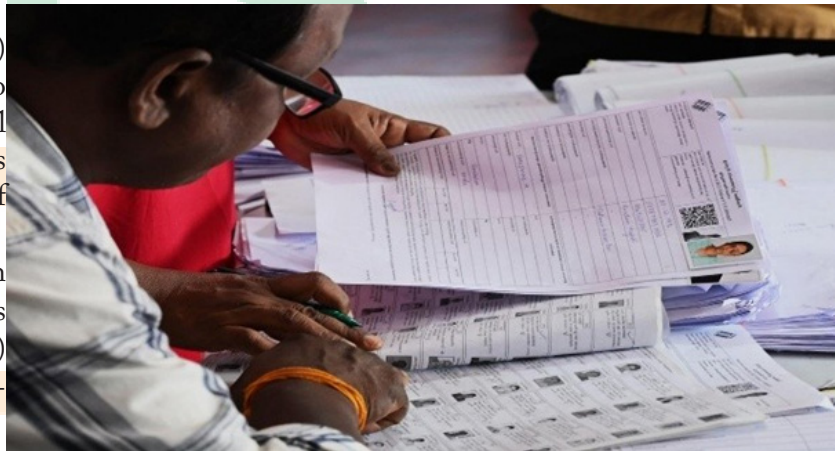
### Conclusion:

The current framework for judicial removal strikes a delicate but flawed balance between judicial independence and accountability. By granting the Speaker absolute discretion to kill a motion at the threshold, the law creates a loophole that can be exploited for political ends. Reforming this statutory stage is essential to ensure that serious charges against the judiciary are tested by evidence rather than blocked by administrative whims.

## Why SIR verification needs to be completely digitised?

### Context:

The ongoing Special Intensive Revision (SIR) 2.0 has sparked nationwide concern due to widespread voter distress, manual procedural delays, and the summoning of eminent citizens to prove residency despite the availability of advanced digital infrastructure.



- It highlights a critical mismatch between the Election Commission's (EC) digital capabilities (ECINet) and the ground-level reliance on error-prone paper-based hearings.

### About Why SIR verification needs to be completely digitised?

### What is SIR Verification Digitization?

- Digitizing SIR verification refers to the transition from manual, paper-based field inquiries and physical hearings to an automated, audit-ready digital workflow.
- It involves using the ECINet platform for backend cross-verification of identity documents, real-time status updates via SMS/Email, and online document uploading to eliminate the need for voters to appear physically before electoral officers.

### Key Features of Special Intensive Revision (SIR):

- Cleaning of Rolls: Aims to remove duplicate, shifted, and deceased voters to ensure one citizen, one vote.
- Inclusion of New Voters: Focuses on registering first-time voters and eligible residents who were previously left out.
- Correction of Legacy Errors: Intended to fix inconsistencies originating from the 2002-04 rolls, such as non-mapped voters.
- Enumeration Forms (EF): Use of specific forms to collect updated demographic and residency data from every household.
- Audit Trails: Built-in digital tracking within ECINet to monitor the progress of applications from submission to final approval.

### Need for Digital Special Intensive Revision:

- Accuracy and Integrity: Manual processes are prone to human error; digital cross-referencing with existing databases (like Aadhaar) ensures higher data sanctity.
- Reducing Citizen Hardship: Digitization removes the need for physical summons and long queues, especially for the elderly, monks, and professionals.
- Addressing the Non-Mapped Crisis: Over 10 million voters in states like UP are flagged as non-mapped; digital uploading can resolve these discrepancies in minutes rather than weeks.
- Preventing Legal Risks: Currently, deleted voters must use Form 6 (meant for first-timers), forcing them to make factually incorrect statements that risk criminal liability under BNS 2023.
- Real-time Transparency: Digital systems allow voters to track their status and receive instant acknowledgments, reducing anxiety and procedural indignity.

### Challenges Associated with SIR 2.0:

- Reliance on Flawed Legacy Data: The 2002-04 rolls, which were manual and lacked third-party checks, still form the foundation of current rolls.
- Data Inconsistencies: Significant gaps exist between different records.
- E.g., the 13-million-voter discrepancy between Panchayat and SIR rolls in UP.
- Digital Divide: Vulnerable sections and rural populations may struggle with online uploads without the active assistance of Booth Level Officers (BLOs).
- Institutional Resistance: A choice in enforcement where authorities prefer coercive manual hearings over streamlined digital workflows.
- Mass Deletions: Allegations of nearly 65 million genuine voters being deleted nationwide without adequate notice or verification.

### Way Forward:

- Notify and Update: The EC must notify every applicant of their form status (accepted/flagged) via SMS and EPIC-linked accounts immediately.
- Backend Integration: Connect ECINet with other government databases for automatic document authentication, similar to Aadhaar-based KYC.
- Hybrid Support Model: Utilize BLOs to assist digitally illiterate voters in uploading documents at their doorstep or nearby kiosks.
- Policy Correction: Amend the process so that restored voters are not forced to file first-time applications (Form 6), thus protecting them from legal jeopardy.
- Real-time Draft Updates: Transition to a system where draft rolls are updated in real-time as digital verification is completed.

### Conclusion:

The sanctity of the electoral roll is the bedrock of a healthy democracy; however, it must be achieved without compromising the dignity of the citizen. By shifting from suspicion-based manual hearings to a trust-based digital infrastructure, the Election Commission can ensure a clean roll that is both inclusive and accurate. Ultimately, technology must be used not just as a tool for administration, but as a safeguard for public trust and democratic participation.

## The perils of integrating AI in police operations

### Context:


In January 2026, the integration of Artificial Intelligence (AI) into Indian law enforcement has reached a critical milestone with the Delhi Police's announcement of the Safe City Project and Maharashtra's statewide rollout of MahaCrime OS AI.

### About The perils of integrating AI in police operations:

### Current AI Integration in India Policing:

- Delhi (Safe City Project): Launching in 2026, it features 10,000 AI cameras equipped with Face Recognition

and Distress Detection (identifying screams or emergency gestures).

- Maharashtra (MahaCrime OS AI): An AI platform for predictive policing, aimed at identifying crime hotspots and processing complex investigative data.
- Surveillance Drones: Deployed for crowd and traffic management, providing a top-down view that replaces dozens of personnel on the ground.
- Data Backends: Systems like the CCTNS (Criminal Tracking Network and Systems) feed decades of historical data into these AI models to train them in pattern recognition.

### Key Ethical and Administrative Concerns:

- Centralisation of Power: Policing is shifting from local beat cops to big data centres. This removes the human touch and makes it difficult for citizens to navigate a system where decisions are made by an invisible algorithm at the top.
- Excessive Policing & Imprisoning Cities: One AI camera is estimated to be as effective as 100 policemen. In cities like Hyderabad, with millions of cameras, the scale of surveillance creates a premise of suspicion where every citizen is a potential suspect.
- Historical Bias & Targeting: AI is trained on historical data. If past policing was biased against certain communities, the AI will learn to target those same groups, institutionalizing discrimination.
- Erosion of Fundamental Rights: AI tools can track protesters with ease, potentially chilling the Right to Dissent.
- Lack of Transparency: There is currently no AI Rulebook or statutory manual comparable to existing Police Manuals, leading to a black box where decisions cannot be easily challenged.

### Challenges in the 2026 Landscape:

- Accuracy vs. Brutality: A tragic 2023 case in Telangana (the Khadeer Khan case) showed that reliance on grainy CCTV and facial recognition can lead to the detention and death of innocent people.
- Legal Vacuum: While the DPDPA (Digital Personal Data Protection Act) 2023 provides some safeguards, it contains broad exemptions for law enforcement, leaving a gap in protecting individual privacy against AI overreach.
- The Guilty until Proven Innocent Shift: Experts argue that AI-led policing flips the constitutional principle of the presumption of innocence by treating every public movement as data to be analyzed for anomalies.

### The Way Ahead:

- Statutory Framework: Enacting specific laws for AI in policing that mandate Safety Tests and public disclosure of algorithmic logic before deployment.
- Human-in-the-Loop: AI must remain an assistive tool. Final decisions regarding arrests or detentions must always be made by a human officer held legally accountable for the action.
- Algorithmic Audits: Regular, third-party audits of police AI to detect and remove caste, religious, or gender-based biases.
- Police Reforms: Reforming acts like the Criminal Procedure (Identification) Act, 2022 to ensure that data collection of non-convicts is strictly limited and proportional.

### Conclusion:

Technology is not a substitute for institutional integrity. To prevent AI from becoming a tool of digital authoritarianism, India must ensure that its march toward a high-tech future remains anchored in Constitutional Values. A safer world is created not by watching every citizen, but by building a society rooted in trust, transparency, and the Rule of Law.

## IICDEM & Adoption of the Delhi Declaration 2026

### Context:

The Election Commission of India concluded the International Conference on Democracy and Election Management (IICDEM) 2026 in New Delhi with the unanimous adoption of the Delhi Declaration 2026 by over 40 Election Management Bodies (EMBs).

## About IICDEM & Adoption of the Delhi Declaration 2026:

### What is the Delhi Declaration 2026?

- The Delhi Declaration 2026 is a consensus-based global framework adopted by EMBs to strengthen democratic processes through cooperation, innovation, and measurable actions, with periodic reviews and a follow-up meet scheduled for 3–5 December 2026 at India International Institute of Democracy and Election Management (IIIDEM), New Delhi.

### Key features of the Delhi Declaration 2026:

- Unanimous global adoption by EMBs, lending high normative legitimacy.
- Five-pillar architecture covering the full electoral cycle.
- Institutional follow-through: periodic reviews and annual engagement.
- Knowledge co-creation: global encyclopaedia and thematic reports.
- Technology with trust: measured adoption to counter misinformation.

### Five pillars of the Delhi Declaration 2026:

#### 1. Purity of Electoral Rolls

- Emphasis on complete, accurate, and law-compliant voter lists.
- Focus on universal photo identity and inclusion of all eligible electors.

#### 2. Conduct of Elections

- Commitment to free, fair, participative, inclusive, and transparent elections.
- Stakeholder-centric election management.

#### 3. Research and Publications

- Co-curation of an Encyclopaedia of Democracies of the World.
- Comprehensive reports on 7 themes led by International Institute for Democracy and Electoral Assistance (International IDEA) and 36 themes led by IIIDEM.

#### 4. Use of Technology

- Harnessing digital tools to facilitate voters and officials while safeguarding integrity.
- Sharing India's experience with ECINET, including co-development for other EMBs in local languages and legal contexts.
- Explicit focus on countering misinformation.

### 5. Training and Capacity Building

- Knowledge-sharing, professional training, and exchange of transparent practices through IIIDEM.
- Building long-term institutional capacity of EMBs.

## Governor's Power to Address the State Legislatures

### Context:

Several States have seen fresh confrontations with Governors over the content and reading of the Governor's Address to the State Legislature, raising questions on constitutional propriety.

### About Governor's Power to Address the State Legislatures:

### What it is?

- The Governor's Address is a constitutional formality at the beginning of the first session of a State Legislature after elections and at the start of the first session of every year.
- It outlines the policies and priorities of the elected State government, not the personal views of the Governor.

### Constitutional articles involved:

- Article 163: Governor acts on the aid and advice of the Council of Ministers, except in constitutionally specified discretionary matters.
- Article 174: Power to summon, prorogue and dissolve the State Legislature (to be exercised on Cabinet advice).
- Article 175: Governor may address or send messages to the House.
- Article 176:
- (1) At the commencement of the first session after each general election to the Legislative Assembly and at the commencement of the first session of each year, the Governor shall address the Legislative Assembly or, in the case of a State having a Legislative Council, both Houses assembled together and inform the Legislature of the causes of its summons.
- (2) Provision shall be made by the rules regulating the procedure of the House or either House for the allotment of time for discussion of the matters referred to in such address.

### Powers of the Governor:

- Mandatory address, not discretionary speech: The Governor is constitutionally required to address the House but cannot alter, omit, or rewrite the speech prepared by the elected government.
- No independent policy authority: The Address reflects the Council of Ministers' agenda, reaffirming democratic accountability.
- Limited discretion in summoning sessions: As clarified by courts, the Governor cannot unilaterally summon or delay sessions contrary to Cabinet advice.
- Symbolic constitutional role: The address is meant to communicate government policy, not act as a veto or critique mechanism.
- Procedural compliance: Rules of the House provide time for discussion on the Address, reinforcing legislative scrutiny rather than gubernatorial control.

### Key court judgements:

- Nabam Rebia v. Deputy Speaker (2016): The Supreme Court held that the Governor cannot exercise discretion in summoning the Assembly under Article 174 and must act on aid and advice.
- Rajasthan High Court (1966): Held that even a partial reading of the Governor's Address satisfies constitutional requirements; it is an irregularity, not illegality.
- Syed Habibullah v. Speaker, West Bengal Assembly (Calcutta HC): Ruled that the Address is mandatory, but defects in delivery do not invalidate legislative proceedings.

### Significance:

- Federal balance: Reinforces that Governors are constitutional heads, not parallel power centres.

- Democratic legitimacy: Protects the authority of elected State governments over policy articulation.
- Institutional harmony: Prevents politicisation of the gubernatorial office.

## NATGRID and the architecture of surveillance

### Context:

Recent reports indicate a major expansion of the National Intelligence Grid (NATGRID), including its integration with the National Population Register (NPR) and wider access for State police, raising fresh debates on privacy, oversight, and the future of surveillance in India.

### About NATGRID and the architecture of surveillance:

### What is NATGRID?

- National Intelligence Grid (NATGRID) is a technology-enabled intelligence-sharing platform conceived after the 26/11 Mumbai attacks to overcome information silos. It allows authorised agencies to query multiple databases in real time through a secure middleware, without directly holding the data.

### Key features:

- Multi-database access: Links 21 categories of datasets—travel, financial records, telecom metadata, identity documents, assets, etc.
- Agency access: Initially limited to select central agencies; now extended to State police (up to SP rank).
- Tiered sensitivity: Queries classified as non-sensitive, sensitive, and highly sensitive.
- Advanced analytics: AI-enabled tools (e.g., entity resolution, facial recognition) to connect fragmented records.

### NATGRID: Success and challenges:

### Success of NATGRID in India:

- NPR integration: Linking National Intelligence Grid with the National Population Register enables family-tree–based identity validation for 119 crore residents, strengthening suspect verification across datasets.
- High operational volume: Processing nearly 45,000 queries per month, NATGRID has shifted intelligence work from episodic requests to continuous, real-time investigative support.
- CCTNS linkage: Integration with the Crime and Criminal Tracking Network allows instant access to FIRs from 14,000+ police stations, improving Centre–State coordination in serious crimes.
- AI deployment (GANDIVA): AI-based entity resolution has reduced suspect-linking time from days to minutes, enhancing efficiency in terror financing and organised crime probes.
- State-level access expansion: Granting secure access to SP-rank officers across all States has dismantled centralised silos and strengthened last-mile policing intelligence.

### Recent expansion of NATGRID:

1. Integration with NPR: Linking National Intelligence Grid with the National Population Register enables population-scale identity verification (~119 crore residents) through household and lineage-based cross-checks.
2. Wider access to States: Access has expanded from central agencies to State police up to SP rank, making NATGRID a routine Centre–State investigative tool beyond counter-terrorism.
3. AI deployment (Gandiva): The AI tool Gandiva links suspects across KYC, vehicle and licence databases, speeding probes but increasing risks of automated errors.

### Challenges and concerns:

- Legislative lacuna: NATGRID continues to operate via executive orders, lacking a statutory framework defining powers, limits, and accountability mechanisms.
- Proportionality risk: Access to sensitive financial and travel data without a registered FIR may violate the necessity and proportionality standards set in Justice K S Puttaswamy v Union of India.

- Algorithmic bias: Internal reviews noting ~15% false positives in facial recognition raise risks of misidentification, especially for marginalised groups.
- DPDP Act exemptions: Exemptions under the DPDP Act, 2023 deny citizens correction and grievance rights, weakening informational self-determination.
- Function creep: Expansion from counter-terrorism to routine financial and civil cases dilutes purpose limitation and normalises mass surveillance.

### Way ahead for NATGRID:

- Parliamentary oversight: Establish a Standing Committee on Intelligence to audit query logs, scope creep, and compliance annually.
- Judicial authorisation: Mandate judicial warrants for access to "highly sensitive" data such as bank records and tax information.
- Sunset and data minimisation: Introduce time-bound data retention with automatic deletion for individuals cleared of suspicion.
- Algorithmic accountability: Adopt bias audits, explain ability standards, and human-in-the-loop safeguards for AI-driven profiling.
- Privacy-preserving global cooperation: Use privacy-preserving data-sharing protocols for cooperation with Interpol and foreign agencies without raw data exposure.

### Conclusion:

NATGRID has strengthened intelligence coordination and investigative efficiency in India. However, its rapid expansion—especially population-scale integration and AI analytics—has outpaced constitutional safeguards. Embedding law-bound oversight, proportionality, and transparency is essential to ensure security without sacrificing democratic freedoms.

## Lokpal of India

### Context:

Lokpal of India observed its Foundation Day on 16 January 2026, marking the day the institution legally came into force in 2014.

### About Lokpal of India:

### What it is?

- A statutory, independent anti-corruption ombudsman at the Union level.
- Designed as a sui generis institution to inquire into and investigate allegations of corruption against specified public functionaries, including those at the highest political and bureaucratic levels.

### Established in:

- Created under the Lokpal and Lokayuktas Act, 2013.
- Came into force on 16 January 2014 through commencement of Section 3 of the Act.

### Historical evolution:

- The idea of an ombudsman-type body was first proposed in 1963.
- The First Administrative Reforms Commission (1966) recommended a two-tier mechanism—Lokpal at the Centre and Lokayuktas in States.
- Multiple Lokpal Bills were introduced and lapsed between 1968 and 2011, reflecting prolonged political and parliamentary debate.
- The Act was finally passed in December 2013 and operationalised in January 2014, responding to sustained public demand for an autonomous anti-corruption authority.

### Composition and members:

- Consists of a Chairperson and up to eight Members.
- Includes an equal balance of Judicial Members and Non-Judicial Members.

- Appointed by the President of India on the recommendation of a statutory Selection Committee.
- Tenure is five years or up to the age of 70, whichever is earlier.

### Eligibility criteria:

- Chairperson must be a former Chief Justice of India or a Judge of the Supreme Court.
- Judicial Members must be former Supreme Court Judges or former Chief Justices of High Courts.
- Non-Judicial Members must be persons of impeccable integrity with at least 25 years of experience in specified fields such as public administration, vigilance, law or finance.

### Jurisdiction and coverage:

- Covers allegations against the Prime Minister, Union Ministers, Members of Parliament, and Central Government officials in Groups A, B, C and D.
- Extends to officials of PSUs, autonomous bodies, trusts and societies established or funded by the Union Government.
- Also covers certain bodies receiving foreign contributions beyond the prescribed threshold.

### Key functions and powers:

- Receives complaints relating to offences under the Prevention of Corruption Act, 1988.
- Orders preliminary inquiries through its Inquiry Wing or other authorised agencies.
- Directs investigations, including referral to agencies such as the CBI, where a prima facie case exists.
- Exercises limited superintendence and direction over the CBI for cases referred by it.
- Possesses powers akin to a civil court for summoning, document production and examination on oath during inquiry.
- Can authorise search, seizure and provisional attachment of assets as per statutory provisions.
- Has exclusive authority to grant sanction for prosecution in cases before it, reducing procedural delays.
- May recommend departmental action, prosecution or closure, and can proceed against complainants filing false or vexatious complaints.

## Central Vigilance Commission (CVC)

### Context:

Shri Praveen Vashista, IPS (Bihar cadre, 1991 batch), has been appointed as Vigilance Commissioner in the Central Vigilance Commission and took oath on 16 January 2026.

### About Central Vigilance Commission (CVC):

### What it is?

- The apex integrity and vigilance institution of the Government of India.
- Mandated to promote integrity, transparency and accountability in public administration and to prevent corruption in Central Government organisations.

### Established in:

- 1964 as an executive resolution of the Government of India.
- Given statutory status by the Central Vigilance Commission Act, 2003.

### Historical background:

- Originated from the recommendations of the Santhanam Committee (1962–64) on Prevention of Corruption.
- Initially functioned without statutory backing, limiting its authority.
- Became a statutory and independent body in 2003, strengthening its supervisory and advisory role in vigilance administration.

### Composition and members:

- Headed by a Central Vigilance Commissioner (Chairperson).
- Assisted by not more than two Vigilance Commissioners (Members).

- Appointed by the President of India on the recommendation of a high-level committee.
- Tenure is four years or up to 65 years of age, whichever is earlier.

## Organisational structure:

- Secretariat headed by a Secretary with supporting officers.
- Chief Technical Examiners' Wing (CTE) to examine technical aspects of works contracts.
- Commissioners for Departmental Inquiries (CDIs) who act as Inquiry Officers in disciplinary proceedings.
- Network of Chief Vigilance Officers (CVOs) in ministries, departments, PSUs and public sector banks, acting as the extended arm of the CVC.

## Jurisdiction:

- Covers All India Services and Group 'A' officers of the Central Government.
- Includes senior officials of Central Public Sector Undertakings, Public Sector Banks, RBI, NABARD, SIDBI, LIC, General Insurance Companies, and specified societies and autonomous bodies controlled by the Union Government.
- Exercises superintendence over CBI investigations relating to offences under the Prevention of Corruption Act, 1988.
- Conducts preliminary inquiries on complaints referred by the Lokpal in respect of Group A, B, C and D officials.

## Key functions:

- Supervises and coordinates the vigilance machinery across Central Government organisations.
- Inquires or causes inquiry/investigation into corruption complaints within its jurisdiction.
- Tenders vigilance advice to ministries, departments and PSUs.
- Exercises superintendence over the CBI for corruption-related investigations.
- Reviews progress of investigations and pendency of prosecution sanctions under the Prevention of Corruption Act.
- Recommends appointments to senior posts in the CBI and Directorate of Enforcement through statutory committees.
- Acts as the authority for complaints under the Public Interest Disclosure and Protection of Informers (PIDPI) Resolution, providing whistle-blower protection.

## Bomb Cyclone

### Context:

A powerful winter storm, Winter Storm Ezra, rapidly intensified into a bomb cyclone over the US, disrupting peak holiday travel with mass flight cancellations, blizzards, power outages, and hurricane-force winds across multiple states.

### About Bomb Cyclone:

### What it is?

- A bomb cyclone is a powerful mid-latitude weather system that undergoes explosive cyclogenesis, marked by an exceptionally rapid fall in central air pressure within 24 hours, resulting in severe and wide-ranging weather impacts.

### How it forms?

- Bomb cyclones form when cold, dense polar air collides with warm, moisture-rich air, typically over oceans where sharp temperature contrasts provide abundant latent heat energy.
- The rapid upward movement of warm air lowers surface pressure sharply, drawing surrounding air inward at high speeds and causing the storm to intensify explosively.

### Key features:

- Rapid pressure fall: A defining characteristic is a pressure drop of 24 millibars or more in 24 hours, reflecting extreme atmospheric instability rather than gradual storm development.
- Extreme weather: The intense pressure gradient generates blizzards, freezing rain, flooding rainfall and hurricane-force winds, often producing life-threatening whiteout conditions.
- Sharp temperature swings: The advancing cold front can cause abrupt temperature drops of 40–50°F within hours, severely stressing human health, transport systems, and energy demand.
- Large spatial impact: Bomb cyclones span hundreds of kilometres, simultaneously disrupting aviation, road transport, shipping routes and electricity networks across multiple regions.

### Significance:

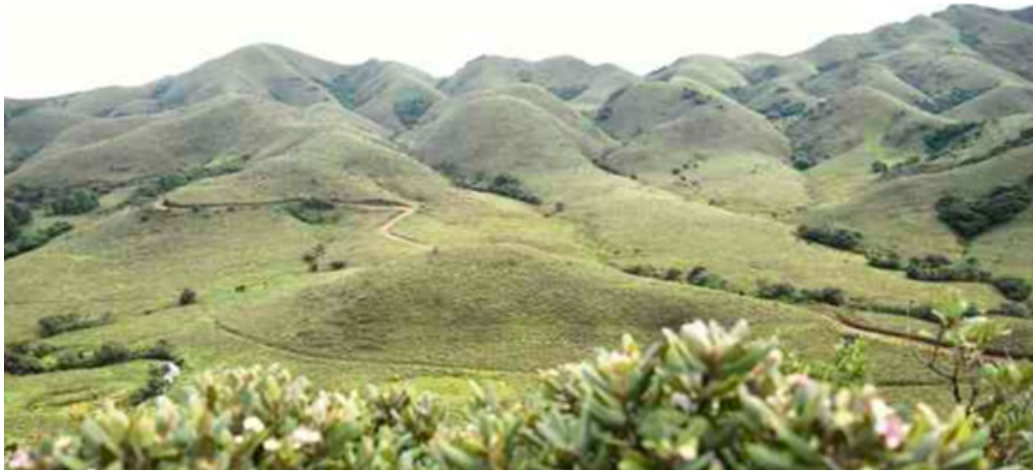
- By combining snowstorms, high winds, flooding rain and ice, bomb cyclones magnify disaster impacts beyond the capacity of single-hazard preparedness systems.
- Airports, power grids, ports and supply chains are highly exposed because rapid storm intensification leaves little time for protective shutdowns or rerouting.

## Grasslands and Climate Change 2026

### Context:

The United Nations has declared 2026 as the International Year for Rangelands and Pastoralists, renewing global attention on grasslands.

- Recent climate negotiations continue to prioritise forests, prompting debate on why grasslands must be integrated into national climate plans and NDCs.



## About Grasslands and Climate Change 2026:

### What are grasslands?

- Grasslands are open ecosystems dominated by grasses, with few or no trees, found across savannahs, steppes, prairies, and rangelands.
- They cover ~40% of Earth's land surface and support pastoral livelihoods, wildlife, and soil-based carbon storage.

### Why grasslands matter in climate action?

- Stable carbon sinks through underground sequestration: Nearly 90% of grassland carbon is stored below ground in deep root systems, protecting it from surface disturbances unlike forest biomass.
  - o E.g. Stanford University (2025) found grassland soil carbon uptake rose by 8% under higher $CO_2$, while forest soils showed no comparable gain.
- Fire resilience and carbon permanence: Forest fires release most stored carbon instantly, whereas grassland fires leave soil carbon intact, allowing rapid ecological recovery.
  - o E.g. Western US prairie studies (2024–25) show grasslands remain net carbon sinks even under frequent fire regimes.
- Natural climate cooling via albedo effect: Grasslands reflect more solar radiation than dark forest canopies, reducing local heat absorption and surface warming.
  - o E.g. IPBES Land Report (2025) highlights grasslands' cooling role in semi-arid climate zones.
- Hydrological regulation and drought buffering: Dense grass roots act as sponges, improving groundwater recharge and reducing runoff during extreme rainfall events.
  - o E.g. Senegal's National Adaptation Plan (2025) restored 2 million hectares of grasslands in the Ferlo Reserve to curb drought–flood cycles.

### Global policy bias: forests over grasslands

- Forest-centric climate finance architecture: Global climate funds disproportionately target forests, sidelining grasslands despite comparable mitigation potential.
  - o E.g. COP30 (Belém, Brazil) focused heavily on forests through the Tropical Forest Forever Facility (TFFF).
- Institutional silos across UN conventions: Climate (UNFCCC), biodiversity (CBD), and desertification (UNCCD) operate separately, fragmenting grassland governance.
  - o E.g. Grasslands receive stronger recognition under UNCCD COP16 (Saudi Arabia) than under UNFCCC negotiations.
- Exclusion from Nationally Determined Contributions (NDCs): Most countries mention forests explicitly in NDCs while ignoring grasslands as carbon sinks.
  - o E.g. India's NDC targets 2.5–3 billion tonnes $CO_2$ sink via forests, omitting grasslands.
- Misclassification as "wastelands": Productive grasslands are officially labelled as degraded land, legitimising conversion.
  - o E.g. India's Wasteland Atlas historically included grazing commons and savannah ecosystems.

### Implications of declining grasslands:

- Accelerated biodiversity loss: Open-habitat species face "extinction by afforestation" when trees replace grasslands.
  - E.g. Brazil's Cerrado loses grassland area twice as fast as the Amazon, threatening endemic fauna.
- Weakened climate resilience: Degraded grasslands increase vulnerability to desertification and flash floods.
  - E.g. Australia's desert rangelands (2024–25) show rising flood–drought volatility due to invasive buffel grass.
- Loss of pollination services: Grasslands support pollinators critical to global food systems.
  - E.g. FAO estimates grassland-dependent pollinators support ~35% of global crop production.
- Displacement of pastoral and indigenous communities: Conversion restricts mobility and traditional livelihoods.
  - E.g. Charanka Solar Park, Gujarat (2025) displaced semi-nomadic herders by fencing grassland commons.

### The way forward:

- Recognise grasslands as Open Natural Ecosystems (ONEs): Shift policy language from "wastelands" to ecologically valuable systems.
  - E.g. India (2026) moving toward ONE classification in land-use planning.
- Integrate grasslands into NDCs: Explicit inclusion unlocks climate finance and policy priority.
  - E.g. Brazilian researchers (2025) urged inclusion of Cerrado grasslands in national NDC updates.
- Adopt ecosystem-based climate planning: Balance forests, grasslands, wetlands, and mangroves in mitigation strategies.
  - E.g. WWF–IUCN report (COP30) recommended cross-biome carbon accounting.
- Secure community land rights and governance: Indigenous stewardship improves ecological outcomes.
  - E.g. Indigenous Desert Alliance (Australia) uses cultural burning to protect desert grasslands.
- Incentivise sustainable grazing and PES models: Reward soil carbon enhancement through pastoral practices.
  - E.g. India's proposed National Rangeland Utilisation Policy (2025–26) aims to restore 120 million hectares.

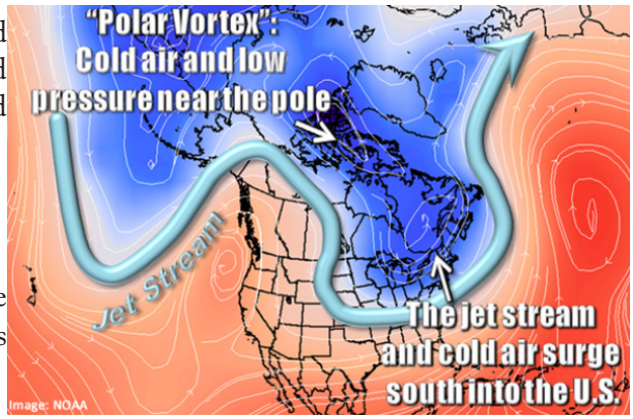
### Conclusion:

Grasslands are not empty lands but climate-critical ecosystems storing carbon, sustaining biodiversity, and supporting livelihoods. A forest-only climate strategy is scientifically incomplete and socially unjust. Integrating grasslands into NDCs and climate finance is essential for credible, resilient, and inclusive climate action.

## Polar Vortex

### Context:

A polar vortex–driven winter storm swept across the United States in January 2026, bringing heavy snow, freezing rain and sub-zero temperatures to nearly 17 states, causing deaths and severe travel disruptions.




### About Polar Vortex:

### What it is?

- The polar vortex is a large, persistent area of low pressure and extremely cold air that circulates around the Earth's polar regions.

### It exists in two forms:

- Tropospheric polar vortex (lower atmosphere, where weather occurs)
- Stratospheric polar vortex (higher atmosphere, strongest in winter)

### How it forms?

- During winter, reduced solar heating at the poles creates intense cold air, generating a strong low-pressure system.
- This system drives fast-moving winds that normally keep Arctic air locked near the poles.

### Factors influencing polar vortex disruptions:

- Jet stream behaviour: A strong vortex keeps the jet stream stable; a weakened vortex makes it wavy, allowing cold air to spill south.
- Sudden Stratospheric Warming (SSW): Rapid warming in the stratosphere can weaken or split the vortex.
- Arctic amplification: Faster warming of the Arctic compared to lower latitudes reduces the temperature gradient, making the vortex more unstable.
- Atmospheric pressure systems: Blocking high-pressure systems can divert cold air toward mid-latitudes.

### Implications:

### Local impacts:

- Extreme cold waves, heavy snowfall, ice storms and wind chill hazards.
- Energy stress, power outages and disruption to transport and daily life.
- Increased risks of hypothermia and frostbite in regions unaccustomed to such cold.

### Global impacts:

- Cold surges in North America, Europe and Asia linked to polar vortex shifts.
- Greater weather volatility, with sharper contrasts between extreme cold spells and warmer periods.
- Raises concerns about how climate change may be reshaping atmospheric circulation, even as average global temperatures rise.

## Solar Radiation Storm

### Context:

The Sun unleashed the largest solar radiation storm in over 20 years, ranked S4 (Severe) by the NOAA Space Weather Prediction Center, causing intense auroras across Europe and disruptions to aviation GPS systems.

### About Solar Radiation Storm:

### What it is?

- A solar radiation storm occurs when the Sun ejects extremely fast, high-energy charged particles—mainly protons—towards Earth following powerful solar eruptions.
- These particles can penetrate Earth's magnetic shield and pose risks to space-based and high-altitude technologies.

### How it forms?

- Triggered by X-class solar flares, the most intense category of solar flares.
- Often accompanied by a Coronal Mass Ejection (CME), where plasma and magnetic fields are expelled from the Sun's corona.
- Charged particles accelerated to near-light speeds reach Earth in minutes to hours, travelling ~150 million km.

### Measurement & classification:

- Classified using the NOAA Space Weather Scale (S1–S5).
- Based on proton flux ≥ 10 MeV, measured by GOES satellites in geosynchronous orbit.
- S4 storms are rare and last occurred during the Halloween Storms of October 2003.

### Implications on Earth:

- Space & astronaut safety: Increased radiation exposure for astronauts aboard the International Space Station.
- Aviation: Radiation risk for polar flights; GPS and HF radio disruptions.
- Satellites: Damage to electronics, navigation errors, orbital drag changes.
- Power grids: Geomagnetic storms linked to transformer damage.
- Auroras: Intense aurora borealis and australis visible far beyond polar regions.

## Government Notifies Coking Coal as Critical & Strategic Minerals

### Context:

The Government of India officially notified Coking Coal as a Critical and Strategic Mineral under the MMDR Act, 1957, a major reform aimed at slashing the country's 95% import dependence.

### About Government Notifies Coking Coal as Critical & Strategic Minerals:

### What is it?

- By notifying Coking Coal as a Critical and Strategic mineral, the government has moved it from the general Coal category into a high-priority bracket (Part D of the First Schedule).
- This grant provides the mineral special legal status, allowing for faster environmental clearances, exemption from public consultations, and the use of degraded forest land for mining.

### Law Governing the Reform:

- Primary Act: Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act).
- Specific Amendment: Exercising powers under Section 11C, the Central Government amended the First Schedule.
- Fiscal Clarity: Under Section 11D(3), all royalties and auction premiums will continue to accrue to the State Governments, even if the Centre conducts the auctions.

### Strategic Objectives:

- India currently imports nearly 58 million tonnes of coking coal annually. The goal is to reduce the massive foreign exchange outflow.
- Ensuring that the National Steel Policy's target of 300 MT production by 2030 is not vulnerable to global price volatility.
- Accelerating the exploration of deep-seated deposits by inviting private sector giants with advanced technology.

### About Coking Coal:

### What it is?

- Coking Coal, also known as Metallurgical Coal, is a specific grade of bituminous coal. Unlike thermal coal, which is burned for electricity, coking coal is essential for steel production.
- When heated in an oxygen-free oven (carbonization), it softens, swells, and re-solidifies into a hard, porous mass called Coke.

### Formation and Characteristics:

- Process: Formed over millions of years through higher pressure and heat compared to thermal coal, resulting in higher carbon content.

### Key Properties:

- Low Ash/Sulphur: High-quality coking coal must have low impurities to maintain the structural integrity of the steel.

- Caking Power: The unique ability to fuse into a solid mass.
- Reducing Agent: In a blast furnace, it strips oxygen from iron ore to produce liquid iron.

### India and Coking Coal:

- India is the world's second-largest steel producer, yet it remains Coking Coal Poor despite having vast resources.
- Domestic Resources: India possesses approximately 37 Billion Tonnes of coking coal resources.

### Geographical Distribution:

- Jharkhand: Holds the lion's share of reserves (Jharia, Bokaro).
- Others: West Bengal, Chhattisgarh, and Madhya Pradesh.
- The Import Paradox: Despite reserves, India meets 95% of its requirements through imports (largely from Australia, Russia, and the USA).
- This is primarily because domestic coal has high ash content and requires advanced Coal Washing (beneficiation) technology.

## Western Disturbance

### Context:

The India Meteorological Department (IMD) has issued an alert for a quick succession of two Western Disturbances (WD) expected to sweep across Northwest and Central India from January 31 to February 3, 2026.


### About Western Disturbance:

### What is a Western Disturbance?

- A Western Disturbance (WD) is an extra-tropical storm (or low-pressure system) that originates in the Mediterranean region.
- It travels eastwards across the Middle East, Iran, Afghanistan, and Pakistan before entering the Indian subcontinent.

### Origin:

- The Mediterranean Sea, often fueled by moisture from the Caspian and Black Seas.

### Formation

- A high-pressure area over Europe (near Ukraine) pushes cold polar air toward the relatively warmer, moist air over the Mediterranean.
- This interaction creates an extratropical depression (a non-tropical storm).
- These storms are then pushed toward India by the Subtropical Westerly Jet Stream, a high-altitude wind current acting as a global conveyor belt.
- Upon hitting the Himalayan barrier, the moisture-laden air is forced to rise, leading to condensation and precipitation.

### Impact of Western Disturbances on India:

### Winter Precipitation:

- WDs are the primary source of non-monsoonal rainfall in India.
- They bring heavy snowfall to the Western Himalayas (J&K, Himachal, Uttarakhand) and light to moderate rain to the plains (Punjab, Haryana, Delhi, UP).

### Agricultural Boon and Bane:

- Boon for Rabi Crops: The winter showers are essential for Wheat, Mustard, and Gram (Chana). It provides natural irrigation during the dry winter months.
- Bane for Farmers: Intense WDs can cause hailstorms and thunderstorms, which damage standing crops. The IMD has recently advised farmers to drain excess water to prevent root rot.

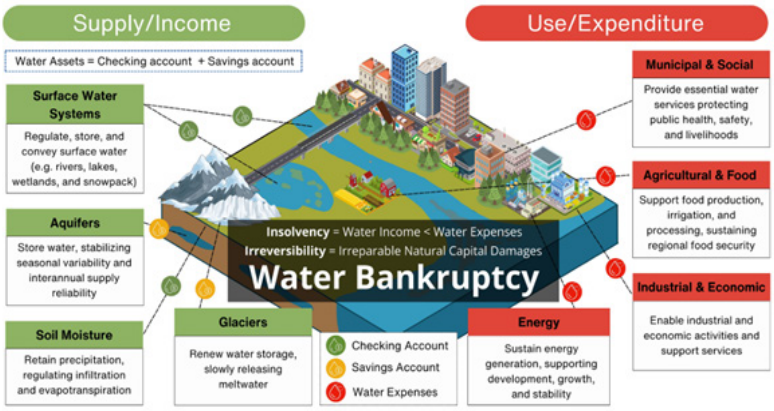
## Temperature & Cold Waves

- Before Arrival: Night temperatures usually rise due to cloud cover trapping heat (greenhouse effect).
- After Departure: As the sky clears, cold northerly winds from the snow-clad mountains rush into the plains, leading to a sharp drop in temperature and dense fog, triggering Cold Wave conditions.
- Water Security: Snowfall from WDs feeds the Himalayan glaciers, which are the source of perennial rivers like the Ganga, Yamuna, and Indus, ensuring water availability during the summer.

# Global Water Bankruptcy Report

## Context:

The United Nations University Institute for Water, Environment and Health (UNU-INWEH) released a flagship report titled "Global Water Bankruptcy: Living Beyond Our Hydrological Means in the Post-Crisis Era".

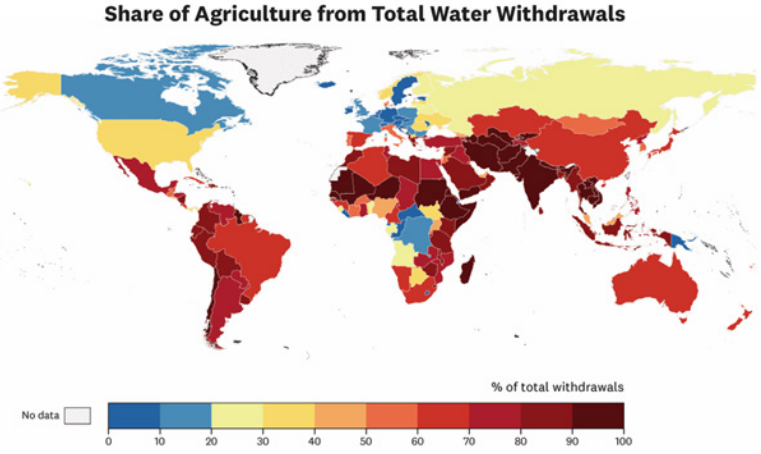



## About Global Water Bankruptcy Report:

## What it is?

- It describes a persistent post-crisis failure state where long-term water use exceeds renewable inflows and safe depletion limits, causing irreversible damage to natural capital.
- It highlights that "water stress" (pressure) and "water crisis" (temporary shock) are no longer adequate terms because the previous "normal" baselines have effectively collapsed in many regions.

## Data and Facts Water Bankruptcy:




- Massive Scale: Nearly 75% of the world's population lives in countries classified as water-insecure or critically water-insecure as of 2026.
- Agricultural Stress: Roughly 70% of global freshwater is used for agriculture; over 170 million hectares of irrigated cropland are under high or very high water stress.
- Groundwater Depletion: Around 70% of the world's major aquifers show long-term declining trends, with some areas sinking by up to 25 cm per year due to land subsidence.
- Wetland Liquidation: The world has lost roughly 410 million hectares of natural wetlands in the last five decades—an area almost the size of the European Union.
- Economic Cost: Human-made anthropogenic droughts now cost the world approximately billion annually, exceeding the GDP of three-quarters of UN Member States.

## Causes of Water Bankruptcy:

- Slow-Onset Depletion: Long-term over-allocation and over-pumping, often driven by weak regulation, gradually erode water storage.
- E.g. Widespread over-extraction in the Indo-Gangetic plain has led to some of the highest rates of groundwater depletion globally.
- Infrastructure-Driven Overshoot: Large-scale dams and diversions allow cities and industries to expand beyond sustainable local hydrological limits.
- E.g. Inter-basin transfers like those supplying Chennai struggle to prevent Day Zero when monsoons fail.
- Ecological Liquidation: Converting wetlands and forests for development removes natural shock absorbers, increasing vulnerability to extremes.
- E.g. The degradation of wetlands in cities like Bengaluru has reduced natural groundwater recharge and increased flash flood risks.

- Climate-Amplified Overshoot: Climate change acts as a catalyst, accelerating glacier melt and altering precipitation patterns that systems were already struggling with.
- E.g. Retreating Himalayan glaciers threaten the long-term reliability of dry-season flows for the Indus and Ganges basins.
- Institutional Inertia and Denial: Policies and water rights remain organized around the assumption that the old normal will return, delaying difficult demand-reduction decisions.
- E.g. Resistance to changing crop patterns in water-scarce regions perpetuates the cycle of insolvency.

## Challenges Associated with Water Bankruptcy:

- Threatened Food Security: Declining water storage in breadbaskets directly erodes yields and increases production risks.
- E.g. Yield losses in major agricultural states are already being linked to severe human-induced land and water degradation.
- Socio-Economic Failure Modes: Water insecurity drives distress migration and displacement, particularly in rural communities.
- E.g. Rural-to-urban migration spikes in regions like Bundelkhand during prolonged periods of anthropogenic drought.
- Urban Day Zero Scenarios: Cities face recurring emergencies where municipal systems are unable to provide piped water to residents.
- E.g. Chennai reached a highly publicized Day Zero in 2019 after main reservoirs ran dry due to years of over-allocation.
- Water Quality Paradox: Even where water is volumetrically present, pollution (sewage, industrial waste) makes it functionally unusable.
- E.g. The Yamuna River in Delhi is often so heavily polluted with untreated waste that it cannot be used safely for most human purposes.
- Rising Conflict and Injustice: The burden of water bankruptcy falls disproportionately on the poor and smallholder farmers, while powerful actors often capture benefits.
- E.g. Protests by farmers over dwindling groundwater and changing market laws highlight deep-seated anxieties about ecological and economic survival.

## Recommendations of the Report:

- Diagnose Honestly: Governments must use bankruptcy diagnostics to identify where systems have crossed irreversible thresholds.
- Prioritize Natural Capital: Shift from protecting only the product (water volume) to protecting the process (the hydrological cycle/ecosystems).
- Transform Agriculture: Phase out water-intensive crops in bankrupt basins and decouple rural prosperity from ever-growing water use.
- Just Transitions: Provide social protection and livelihood diversification for those most affected by reallocations, ensuring a justice lens.
- A New Global Agenda: Use the 2026 and 2028 UN Water Conferences to reset the international agenda, positioning water as a bridge for peace and climate action.

## Conclusion:

The report argues that acknowledging Global Water Bankruptcy is not surrender but a necessary first step toward a realistic, science-based and equitable water governance. Accepting that many systems cannot be restored allows societies to adapt to new hydrological realities, prevent further irreversible damage, and treat water as a unifying strategic resource to address shared global challenges.

Chapter-
4

# ENVIRONMENT

## Amazon's Stingless Bees

### Context:

Amazonian stingless bees have become the first insects in the world to be granted legal rights after Peruvian municipalities passed a landmark ordinance recognising their right to exist and flourish.

### About Amazon's Stingless Bees:

### What they are?

- Stingless bees are a group of bees that either lack stingers or have non-functional stingers, making them harmless to humans. They are crucial pollinators in tropical ecosystems.

### Origin:

- Among the oldest bee species on Earth, existing for nearly 80 million years since the time of dinosaurs.
- Around 500 species globally, with nearly half found in the Amazon.

### Habitat:

- Tropical forests across the world.
- Particularly abundant in the Amazon rainforest, especially in Peru, which hosts over 170 species.

### Key features:

- Primary rainforest pollinators, responsible for pollinating over 80% of Amazonian flora.
- Support globally important crops such as coffee, cacao, avocados and blueberries.
- Deeply embedded in the cultural, medicinal and spiritual traditions of Indigenous communities like the Asháninka and Kukama-Kukamiria.

### About Amazonian stingless bees first insects to get legal rights:

### What it means?

- The legal recognition grants stingless bees inherent rights, including the right to exist, maintain healthy populations, regenerate natural cycles, live in pollution-free habitats, and be legally represented when threatened.

### Significance:

- Global legal first: First time insects have been granted legal rights anywhere in the world
- Strengthens conservation: Provides legal tools to challenge deforestation, pollution and habitat destruction
- Advances Rights of Nature: Shifts environmental law from human-centred protection to ecosystem-centred justice

## Cetacean morbillivirus

### Context:

Scientists have detected cetacean morbillivirus in Arctic waters for the first time by using drones to collect whale breath (blow) samples, a non-invasive technique.

## About Cetacean morbillivirus:

### What it is?

- Cetacean morbillivirus is a highly infectious viral disease affecting marine mammals such as whales, dolphins, porpoises, and pilot whales, closely related to measles and canine distemper viruses.

### Found in:

- It has been widely reported in the North Atlantic, Mediterranean Sea, and Pacific regions, and has now been detected circulating in Arctic waters, particularly among humpback and sperm whales.
- Origin: First identified in 1987, the virus likely evolved from terrestrial morbilliviruses and adapted to marine mammals, spreading through close contact and respiratory droplets.

### Key features:

- Attacks respiratory, immune, and nervous systems.
- Transmitted through direct contact and aerosolised blow.
- Can cross species barriers among cetaceans.
- Often detected post-mortem, making early surveillance difficult.

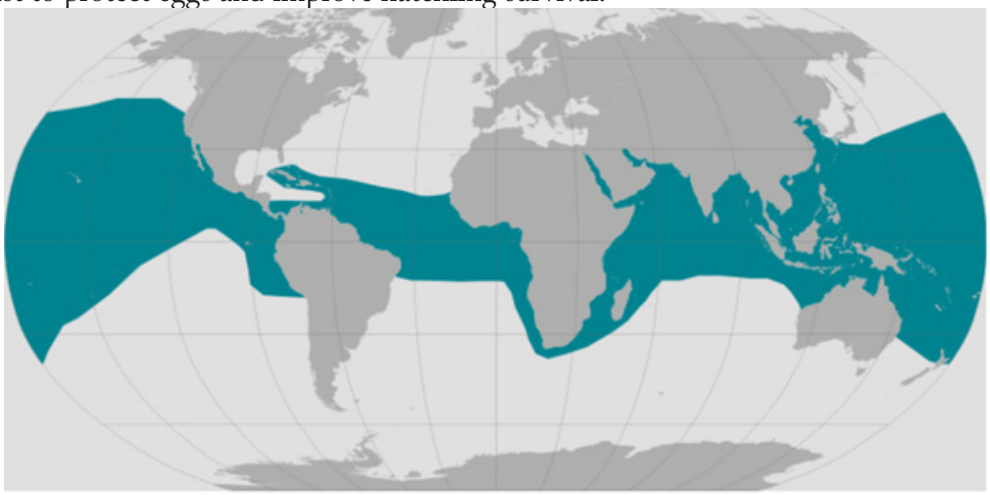
### Implications:

- Linked to mass strandings and large-scale mortality events.
- Signals emerging disease risks in the Arctic, possibly amplified by climate change and shifting whale migration routes.
- Highlights the importance of non-invasive drone-based monitoring for long-term marine conservation and biosecurity.
- Enables authorities to adopt stress-reduction measures to protect infected whales.

## Olive Ridley Sea Turtles

### Context:

With the nesting season underway, wildlife authorities have set up sea turtle hatcheries at multiple locations along the Chennai coast to protect eggs and improve hatchling survival.



*World map providing approximate representation of the olive ridley's range.*

## About Olive Ridley Sea Turtles:

### What it is?

- The Olive Ridley sea turtle is one of the smallest and most abundant sea turtle species, named after its olive-green, heart-shaped shell.
- It is globally known for its unique mass nesting behaviour (arribada), where thousands of females nest synchronously on select beaches.

### Habitat and distribution:

- Global range: Tropical regions of the Indian, Pacific, and Atlantic Oceans.
- Indian context: Major nesting beaches along the Odisha coast (Gahirmatha, Rushikulya, Devi River mouth), solitary nesting also occurs along the Tamil Nadu, Andhra Pradesh, and Andaman coasts.
- Marine habitat: Primarily pelagic (open ocean), but migrates to sandy beaches for nesting.

### IUCN conservation status: Vulnerable

- Legal protection in India: Schedule I species under the Wildlife (Protection) Act, 1972.

### Key characteristics:

### Physical:

- Olive/grey-green carapace with 5–9 pairs of lateral scutes
- Smallest among sea turtles; each flipper has one or two claws

### Social and behavioural:

- Exhibits both solitary nesting and arribada nesting
- Highly migratory; capable of long-distance ocean travel

### Reproductive:

- Females reach maturity around 12–15 years
- Lay about 100 eggs per clutch, 1–3 times per season
- Temperature-dependent sex determination: warmer sand produces more females

### Significance:

- Acts as an indicator species for coastal and ocean health.
- Protecting Olive Ridleys safeguards nesting beaches and associated coastal ecosystems.
- India hosts some of the world's largest arribada sites, making conservation actions internationally significant.

## Remarkable New Species Discovered in India in 2025

### Context:

In December 2025, scientists in India announced several significant new species discoveries, spanning from the high-altitude Eastern Himalayas to the rainforests of the Western Ghats.

## About Remarkable New Species Discovered in India in 2025:

### Bridgeoporus kanadii (A "Colossal" Fungi)

#### What it is?

- A "colossal" new species of macro fungi characterized by thick, leathery, and massive fruiting bodies.
- Found in: The West Kameng district of Arunachal Pradesh, specifically growing on old-growth Abies (fir) trees.
- Features: It is remarkably sturdy and large; the lead researcher noted it was strong enough for a person to sit on while remaining firmly attached to the tree.

### Rhinophis siruvaniensis (Siruvani Shieldtail Snake)

#### What it is?

- A new species of non-venomous, burrowing shieldtail snake belonging to the Uropeltidae family.
- Found in: The Siruvani Hills of the Western Ghats in the Palakkad district of Kerala.
- Features: It is a fossorial (burrowing) snake with a specialized tail shield used for digging and defense in high-rainfall rainforest habitats.

### Neelus sikkimensis (High-Altitude Springtail)

#### What it is?

- A tiny, wingless arthropod known as a "springtail" (Collembola), marking the first record of the genus Neelus in India.
- Found in: The high-altitude, cold-desert soils of Sikkim in the Eastern Himalayas.
- Features: Like other springtails, it possesses a "furcula," a tail-like jumping organ that allows it to spring away from predators.
- Significance: Identified by ZSI scientists, this discovery expands the global count of known Neelus species to just eight.

### Parasynnemellisia khasiana (Bamboo Forest Fungus)

- What it is? A completely new genus and species of fungus that did not fit into any existing biological classification.
- Found in: The dense, humid bamboo forests around Mawsynram in the Khasi Hills, Meghalaya.
- Features: It is uniquely adapted to one of the wettest environments on Earth and grows specifically in association with bamboo ecosystems.

### Dolomedes indicus (The Indian Fishing Spider)

#### What it is?

- The first confirmed instance of a "fishing spider" discovered in India.
- Found in: Streams and rainforests of Wayanad and Lakkidi in Kerala's Western Ghats.
- Features: These spiders are semi-aquatic and capable of "skating" on water surfaces to hunt small fish and aquatic insects.

### Ophiorrhiza mizoramensis (Mizoram Coffee-Family Plant)

#### What it is?

- A new species of flowering shrub belonging to the Rubiaceae (coffee) family.
- Found in: Murlen National Park, Mizoram, near the Indo-Myanmar border.
- Features: It grows up to one meter high and produces striking dark purplish-pink tubular flowers with uniquely structured stigma lobes.
- Significance: Provisionally assessed as "Critically Endangered," with fewer than 200 mature individuals found in the wild.

## World bank's A Breath of Change Report

### Context:

The World Bank's 2025 report, A Breath of Change, highlights that nearly one billion people in the Indo-Gangetic

Plains and Himalayan Foothills (IGP-HF) breathe the world's most polluted air, necessitating urgent transboundary cooperation.

## About World bank's A Breath of Change Report:

### What it is?

- "A Breath of Change" is a strategic solutions book that moves beyond diagnosing air pollution to providing a practical, multi-sectoral roadmap for the IGP-HF airshed, covering 13 jurisdictions across Bangladesh, Bhutan, India, Nepal, and Pakistan.
- It frames solutions around the "4Is" framework: Information, Incentives, Institutions, and Infrastructure.

### Key Trends & Data:

- Health Impact: Air pollution causes approximately one million premature deaths annually in the IGP-HF region.
- Economic Cost: The regional economic damage from pollution is estimated at 10% of GDP annually, due to lost productivity and healthcare costs.
- Life Expectancy: Exposure to $PM_{2.5}$ reduces average life expectancy in the region by more than three years.
- Hazardous Exposure: 81% of public-school students in the region are exposed to hazardous levels of $PM_{2.5}$ (above 35 $\mu g/m^3$).
- Pollution Origin: In many jurisdictions, over 50% of ambient $PM_{2.5}$ originates from outside local administrative boundaries.
- Regional Dominance: The IGP-HF region records the highest levels of air pollution globally, with $PM_{2.5}$ levels 8 to 20 times the WHO guideline.
- Target Goal: The "35 by 35" target aligns with the WHO's first interim target for cleaner air.
- Transboundary Flow: In Nepal's Terai region, an estimated 68% of air pollution originates from other countries.

### Reasons for Transboundary Pollution:

- Geography & Topography: The flat plains are surrounded by the Himalayas, which trap pollutants and lead to frequent smog episodes, especially during winter inversions.
- E.g. Delhi's unique location makes it a sink for pollutants carried from upwind states like Punjab and Haryana.
- Wind Patterns: North-westerly winds during winter carry particulate matter across national borders.
- E.g. Pollution from Pakistan's Punjab can account for up to 30% of air pollution in Indian Punjab.
- Secondary Particle Formation: Precursor gases (such as SO2SO_2SO2 and ammonia) travel long distances and react in the atmosphere to form fine particles far from their source.
- E.g. Coal-fired power plants in one region emit sulfur dioxide that forms secondary $PM_{2.5}$, affecting neighboring jurisdictions.
- Agricultural Practices: Seasonal crop residue burning creates massive smoke plumes that travel across states.
- E.g. Post-harvest fires in India and Pakistan create a seasonal crisis, blanketing the entire IGP-HF region in haze.
- Industrial Clusters: High-stack industries such as thermal power plants release emissions that disperse across vast areas.
- E.g. Clustered MSMEs in peri-urban areas like Kanpur and Dhaka cause intense local exposure that drifts across city limits.

### Initiatives Taken So Far:

- Kathmandu Roadmap (2022): Established a regional framework for science-policy dialogue and shared air quality goals.
- Thimphu Outcome (2024): Endorsed the aspirational "35 by 35" target and emphasized harmonized monitoring and financing.
- Malé Declaration: A long-standing (non-binding) regional platform for joint monitoring and capacity building.
- India's National Clean Air Programme (NCAP): A flagship domestic program targeting $PM_{10}$ reductions in over 130 cities.
- Market-Based Pilots: Gujarat's world-first particulate matter emissions trading system (ETS) in Surat.

### Challenges Associated:

- Institutional Fragmentation: Mandates are often split between environmental, transport, and agricultural ministries, leading to siloed action.
- E.g. In Pakistan, overlapping duties between environmental and industrial ministries delay technology transitions.
- Funding Gaps: Regional mechanisms lack sustained, long-term financing and often rely on fluctuating donor support.
- E.g. Progress on the Malé Declaration slowed significantly after external funding from SIDA ended.
- Weak Enforcement: While standards exist, agencies often lack the technical staff and resources to penalize non-compliance.
- E.g. In India, half of the State Pollution Control Boards are reportedly understaffed.
- Data Gaps: Monitoring networks are concentrated in cities, leaving rural areas "blind" to pollution levels.
- E.g. Pakistan lacks a functional, integrated national air quality monitoring network.
- Economic Barriers: High upfront costs deter small-scale actors (MSMEs and farmers) from adopting cleaner technologies.
- E.g. The cost of retrofitting heavy-duty vehicles in India can exceed 180% of average per capita income.

### Recommended Solutions (The 4Is):

#### 1. Information:

- Expand real-time monitoring networks and use satellite-based tracking (GeoAI) to identify pollution hotspots such as brick kilns.

#### 2. Incentives:

- Reform fossil fuel and fertilizer subsidies, redirecting funds toward clean technologies like electric vehicles and Happy Seeders.

#### 3. Institutions:

- Clarify legal responsibilities through dedicated Clean Air Acts and establish a permanent regional secretariat for coordination.

#### 4. Infrastructure:

- Invest in regional electricity grids, EV charging networks, and centralized common industrial boilers to reduce emissions at scale.

#### 5. Market Instruments:

- Scale up Emissions Trading Systems (ETS) and pollution taxes (such as Nepal's Green Tax) to mobilize private capital.

### Conclusion:

The air pollution crisis in the Indo-Gangetic Plains is a shared regional challenge beyond the capacity of any single nation. Committing to the "35 by 35" goal and institutionalizing transboundary cooperation can turn a public health emergency into resilient, low-carbon growth. What is needed is political courage to move from diagnosis to delivery and ensure a true "breath of change" for nearly one billion people.

## Day Zero

### Context:

The concept of "Day Zero" has re-entered global focus as the United Nations warned that worsening climate change, groundwater depletion, and weak water governance could push many cities—including in India—towards acute water collapse.

### About Day Zero:

### What it is?

- "Day Zero" refers to the point at which a city or region's usable water supply falls below a critical threshold, forcing authorities to shut off regular tap water and supply water only through rationed emergency distribution points.

### Origin of the term:

- The term gained global prominence during Cape Town's near Day Zero crisis in 2018, when reservoir levels dropped to dangerously low levels.
- Since then, UN agencies have adopted the term to describe systemic urban water collapse, not just temporary droughts.

### Key features of Day Zero:

- Suspension of normal water supply to households.
- Water prioritised for essential services such as hospitals, sanitation, and firefighting.
- Rationing of water through public collection points with strict per-person limits.
- Triggered by long-term stressors, not a single bad monsoon or drought year.
- Often linked to over-extraction of groundwater, poor planning, and climate variability.

### Implications:

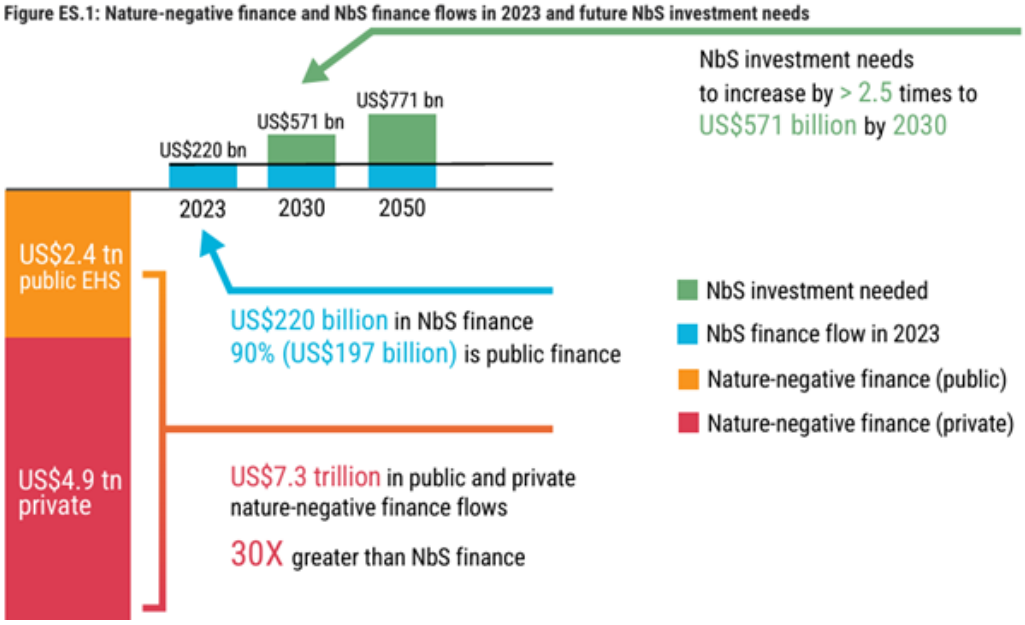
- Public health crises due to lack of safe drinking water and sanitation.
- Urban disruption, including power shortages, food supply stress, and economic losses.
- Social unrest and inequality, with women, children, and informal settlements disproportionately affected.
- Agricultural and food security risks, especially in groundwater-dependent regions.

## State of Finance for Nature 2026

### Context:

The United Nations Environment Programme (UNEP) released the State of Finance for Nature 2026 report, warning that nature-negative finance (US$7.3 trillion) vastly outweighs nature-positive investment (US$220 billion).

Figure ES.1: Nature-negative finance and NbS finance flows in 2023 and future NbS investment needs




### About State of Finance for Nature 2026:

### What it is?

- The State of Finance for Nature (SFN) 2026 is the fourth edition of a flagship report that tracks global capital flows related to nature.
- It provides a financial assessment to help policymakers and businesses transition from an economy that erodes its nature bank account to one that invests in Nature-based Solutions (NbS)—actions that protect, restore, and sustainably manage ecosystems to address societal challenges

### Key Findings in the Report:

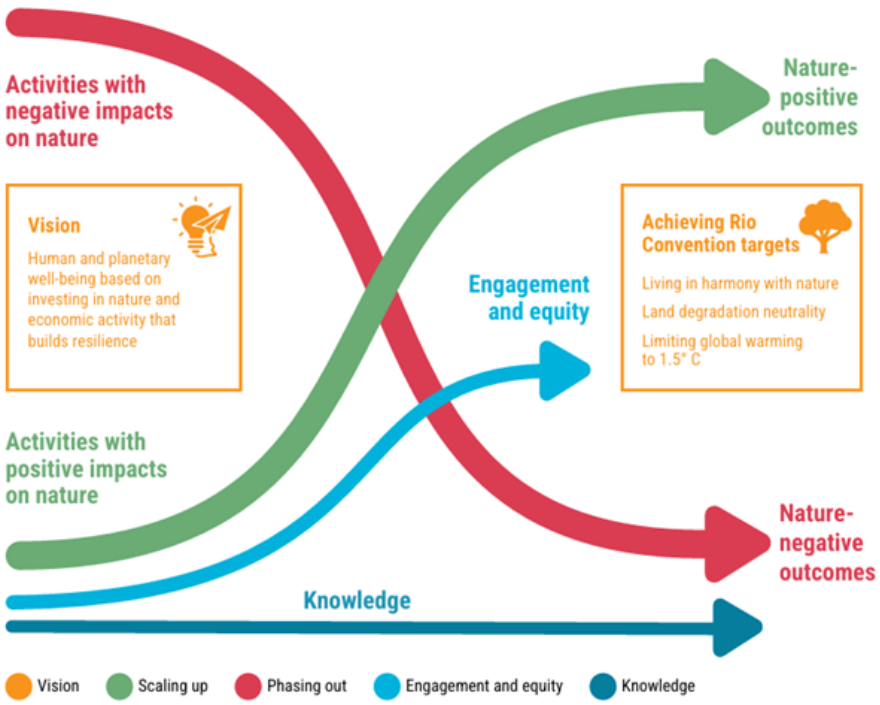
1. Massive Finance Gap: To meet global Rio Convention targets, NbS investment must increase 2.5 times to US$571 billion annually by 2030.

2. Nature-Negative Dominance: Annual finance flows harming nature reached US$7.3 trillion in 2023, representing roughly 7% of global GDP.
3. Public Subsidies: Governments provided US$2.4 trillion in environmentally harmful subsidies (EHS), primarily for fossil fuels (US$1.13 trillion), followed by agriculture and water.
4. Private Sector Impact: Private capital flows to nature-negative sectors totaled US$4.9 trillion, concentrated in utilities, industrials, and energy.
5. Public Finance as Main NbS Driver: Of the US$220 billion in NbS finance, 90% (US$197 billion) comes from public sources, mostly through domestic expenditure.
6. Slow Private NbS Growth: Private investment in NbS is only US$23.4 billion, with biodiversity offsets and certified commodity supply chains being the largest contributors.
7. Interdependence of Risks: At least half of the global economy is moderately or highly dependent on nature, making the nature crisis a direct threat to financial stability.

## Success:

- Debt-for-Nature Swaps (DNS): Restructured debt to unlock conservation funds.
- E.g. Eight agreements from 2021–2024, including deals in Ecuador, Belize, and Gabon, unlocked significant funds for local conservation.
- Sustainable Bonds for Biodiversity: Growth in debt instruments with nature-focused Use of Proceeds.
- E.g. United Utilities (UK) issued a GBP 300 million bond for peatland and riverbank restoration.
- Innovation in Real Economy Sectors: Using nature to replace harmful industrial processes.
- E.g. Use of bacteria-infused self-healing concrete to extend building life and fungi-based leather in apparel.
- Increasing Disclosure Adopters: Global financial institutions are beginning to track nature-related risks.
- E.g. Over 730 organizations have adopted the Taskforce on Nature-related Financial Disclosures (TNFD) framework.

Figure ES.4: Transition pathways to nature-positive outcomes




## Failures:

- Persistence of Harmful Subsidies: Global failure to repurpose trillions in EHS that drive degradation.
- E.g. India continues to provide significant fertilizer and power subsidies for agriculture, which can lead to groundwater depletion and soil degradation if not managed sustainably.
- Biodiversity Offset Implementation Gaps: Offsets often fail to provide genuine net gains due to weak enforcement.
- E.g. India's National Compensatory Afforestation (CAMPA) is one of the world's largest offset markets

(US$0.86 billion), yet it faces challenges in ensuring that new plantations effectively replace the complex biodiversity lost to development.

- Inadequate Private Capital Mobilization: Private NbS finance remains a tiny fraction of what is needed.
- E.g. Despite India's massive renewable energy push, private debt finance for nature-positive restoration projects lags behind traditional infrastructure lending.
- Erosion of Regulatory Standards: Weakening of environmental laws in some jurisdictions creates uncertainty.
- E.g. Recent amendments to forest and environmental clearance rules have been critiqued for potentially easing industrial expansion at the cost of sensitive ecological zones.
- Underfunded International Cooperation (ODF): International public finance for NbS is under heavy pressure.
- E.g. As a nature-rich developing nation, India requires massive concessional international finance to meet 30×30 goals, but ODF flows remain insufficient compared to the country's conservation needs.

### Recommendations:

- Reform Subsidies: Redirect the US$2.4 trillion in harmful public subsidies toward regenerative agriculture and clean energy.
- Mandatory Disclosure: Enact laws requiring all large companies and financial institutions to disclose nature-related risks and impacts.
- Scale Blended Finance: Use public funds to de-risk private investments in NbS through guarantees and co-financing.
- Integrate NbS into Budgets: Embed nature-based infrastructure into national fiscal frameworks and green budgeting.
- Ensure Equity: Protect the rights of Indigenous Peoples and Local Communities, ensuring they are co-creators and beneficiaries of nature finance.

### Conclusion:

The 2026 report serves as a final warning that the global economy is in the red, with a 30:1 bias toward destroying nature rather than protecting it. Achieving a nature-positive future requires an urgent Big Nature Turnaround to repurpose US$7.3 trillion in harmful flows into a trillion-dollar transition economy. Only by embedding nature into every financial and governmental decision can we safeguard the ecosystems that underpin all human well-being and economic growth.

## Asiatic Wild Dog (Dhole)

### Context:

A rare Asiatic Wild Dog (Dhole) has been camera-trapped for the first time in Ratapani Tiger Reserve, Madhya Pradesh, indicating improving habitat and prey conditions.

### About Asiatic Wild Dog (Dhole):

### What is it?

- The Asiatic Wild Dog, commonly called the Dhole (Cuon alpinus), is a wild canid native to South and Southeast Asia. It is a highly social, pack-hunting top predator that plays a key role in regulating herbivore populations.

### Habitat and distribution:

- Preferred habitats: Dense forests, forest-grassland mosaics, and hilly/undulating landscapes with adequate prey.
- India: Found mainly in central Indian forests and the Western/Eastern Ghats, typically within or near large protected landscapes where prey base is strong.
- Ecological requirement: Needs large, connected habitats because packs range widely and depend on continuous prey availability.

## IUCN Red List: Endangered (EN)

### Key characteristics:

- Pack hunter: Typically hunts in cooperative groups, relying on teamwork rather than solitary ambush.
- Prey preference: Medium-to-large ungulates such as chital, sambar, deer, etc.
- Highly social: Lives in clans/packs with cooperative care of young; strong coordination during hunts.
- Distinctive identity: Reddish coat, rounded ears, and specialised dentition adapted for meat-shearing.
- Competition: Coexists with tigers and leopards; overlaps in prey but often differentiates through hunting strategy and pack behaviour.

### Significance:

- Presence suggests good prey base + habitat quality + reduced disturbance.
- Adds another apex/meso-level predator, improving trophic balance and biodiversity stability.

## Environmental Protection Fund

### Context:

The Union Government has notified detailed rules for the utilisation and administration of the Environmental (Protection) Fund, operationalising provisions introduced under the Jan Vishwas Act, 2023.

### About Environmental Protection Fund:

### What it is?

- The Environmental (Protection) Fund is a statutory fund of the Government of India created to utilise penalties imposed for violations of environmental laws for pollution control, environmental restoration, monitoring, research, and capacity building.

### Established in:

- Provided for under the Environment (Protection) Act, 1986
- Operationalised through rules notified in January 2026
- Strengthened by the Jan Vishwas Act, 2023, which decriminalised several environmental offences while retaining monetary penalties

### Nodal authority:

- Administered by the Ministry of Environment, Forest and Climate Change (MoEFCC) or any body notified by the Central Government

Aim: To ensure that pollution penalties are recycled for environmental protection, remediation, clean technology promotion, and strengthening regulatory institutions.

### Key features:

- Source of funds: Penalties under the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, interest from investments, and other prescribed sources.

- Permitted uses (11 activities): Pollution prevention and mitigation, remediation of contaminated sites, environmental monitoring equipment, clean technology research, IT-enabled systems, laboratory infrastructure, and capacity building of regulatory bodies.
- Revenue sharing: 75% of penalty proceeds transferred to the Consolidated Fund of the State/UT, 25% retained by the Centre.
- Governance mechanism: Creation of dedicated Project Management Units at Central and State levels.

### Oversight & transparency:

- Comptroller and Auditor General of India (CAG) to audit the Fund
- Central Pollution Control Board (CPCB) to develop and maintain a centralised online portal for fund implementation

### Significance:

- Strengthens the "polluter pays principle" by directly linking penalties to environmental remediation.
- Converts decriminalisation into deterrence with accountability, avoiding regulatory dilution.
- Enhances Centre–State cooperation in environmental governance through revenue sharing.

## Greenhouse Gases Emission Intensity (GEI) Target (Amendment) Rules, 2025

### Context:

The Union Government has notified the second round of legally binding emission reduction targets for carbon-intensive industries under the Greenhouse Gases Emission Intensity (GEI) Target (Amendment) Rules, 2025.

### About Greenhouse Gases Emission Intensity (GEI) Target (Amendment) Rules, 2025:

### What it is?

- The GEI Target (Amendment) Rules, 2025 are statutory rules notified under the Environment (Protection) Act, 1986 to set mandatory, sector-specific greenhouse gas (GHG) emission-intensity reduction targets for industrial entities, operationalising India's Carbon Credit Trading Scheme (CCTS).

### Came into force:

- Came into force on October 9, 2025, becoming India's first legally binding industrial emission intensity rules
- Builds on the Carbon Credit Trading Scheme (CCTS), 2023.

### Nodal ministry / agencies:

- Ministry of Environment, Forest and Climate Change (MoEFCC) – rule notification
- Bureau of Energy Efficiency (BEE) – issuance and calculation of carbon credits
- Central Pollution Control Board (CPCB) – compliance enforcement and penalties

### Sectors covered (second round):

- Petroleum refineries, Petrochemical units, Textile sector (spinning, processing, fibre, composite units), and Secondary aluminium.
- 208 industrial units added, including PSUs like Indian Oil, BPCL, HPCL, ONGC, Numaligarh Refinery and private players such as Reliance Industries.
- Earlier round – Oct 2025: aluminium, cement, chlor-alkali, pulp & paper were added.

### Key features:

- Emission intensity metric: Targets expressed as $tCO_2e$ per unit of output, covering all greenhouse gases by global warming potential.
- Baseline year: 2023–24; compliance targets set for 2025–26 and 2026–27.
- Carbon market linkage: Covered entities are brought under India's domestic carbon market via the CCTS.

### Incentive mechanism:

- Entities exceeding targets earn carbon credit certificates.
- Credits can be traded or banked for future compliance years.

### Penalty for non-compliance:

- Environmental compensation = twice the average carbon credit price of that compliance year.
- Payable within 90 days, enforced by CPCB.
- Overall reduction ambition: ~3–7% reduction in emission intensity by 2026–27 compared to baseline.

### Significance:

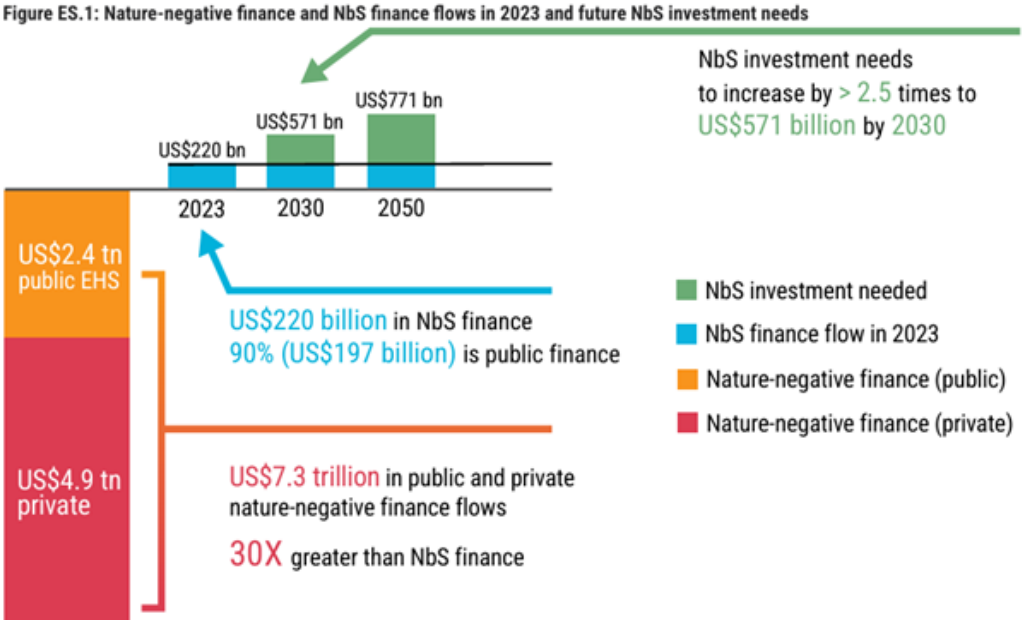
- Marks India's shift from voluntary efficiency measures to legally binding climate compliance.
- Strengthens the Indian Carbon Market (ICM) and price discovery for carbon.
- Supports India's NDC commitment of 45% reduction in GDP emission intensity by 2030 (vs 2005).

## State of Finance for Nature 2026

### Context:

The United Nations Environment Programme (UNEP) released the State of Finance for Nature 2026 report, warning that nature-negative finance (US$7.3 trillion) vastly outweighs nature-positive investment (US$220 billion).

Figure ES.1: Nature-negative finance and NbS finance flows in 2023 and future NbS investment needs




### About State of Finance for Nature 2026:

### What it is?

- The State of Finance for Nature (SFN) 2026 is the fourth edition of a flagship report that tracks global capital flows related to nature.

- It provides a financial assessment to help policymakers and businesses transition from an economy that erodes its nature bank account to one that invests in Nature-based Solutions (NbS)—actions that protect, restore, and sustainably manage ecosystems to address societal challenges

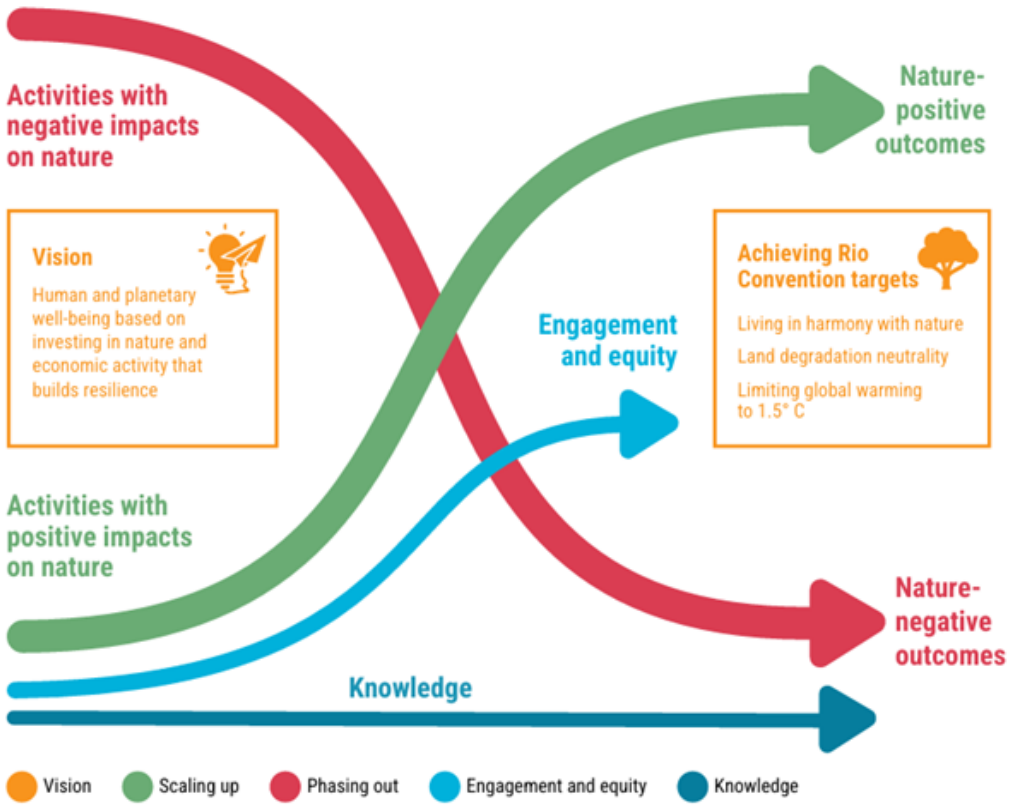
## Key Findings in the Report:

1. Massive Finance Gap: To meet global Rio Convention targets, NbS investment must increase 2.5 times to US$571 billion annually by 2030.
2. Nature-Negative Dominance: Annual finance flows harming nature reached US$7.3 trillion in 2023, representing roughly 7% of global GDP.
3. Public Subsidies: Governments provided US$2.4 trillion in environmentally harmful subsidies (EHS), primarily for fossil fuels (US$1.13 trillion), followed by agriculture and water.
4. Private Sector Impact: Private capital flows to nature-negative sectors totaled US$4.9 trillion, concentrated in utilities, industrials, and energy.
5. Public Finance as Main NbS Driver: Of the US$220 billion in NbS finance, 90% (US$197 billion) comes from public sources, mostly through domestic expenditure.
6. Slow Private NbS Growth: Private investment in NbS is only US$23.4 billion, with biodiversity offsets and certified commodity supply chains being the largest contributors.
7. Interdependence of Risks: At least half of the global economy is moderately or highly dependent on nature, making the nature crisis a direct threat to financial stability.

## Success:

- Debt-for-Nature Swaps (DNS): Restructured debt to unlock conservation funds.
- E.g. Eight agreements from 2021–2024, including deals in Ecuador, Belize, and Gabon, unlocked significant funds for local conservation.
- Sustainable Bonds for Biodiversity: Growth in debt instruments with nature-focused Use of Proceeds.
- E.g. United Utilities (UK) issued a GBP 300 million bond for peatland and riverbank restoration.
- Innovation in Real Economy Sectors: Using nature to replace harmful industrial processes.
- E.g. Use of bacteria-infused self-healing concrete to extend building life and fungi-based leather in apparel.
- Increasing Disclosure Adopters: Global financial institutions are beginning to track nature-related risks.
- E.g. Over 730 organizations have adopted the Taskforce on Nature-related Financial
- Disclosures (TNFD) framework.

**Figure ES.4: Transition pathways to nature-positive outcomes**



### Failures:

- Persistence of Harmful Subsidies: Global failure to repurpose trillions in EHS that drive degradation.
- E.g. India continues to provide significant fertilizer and power subsidies for agriculture, which can lead to groundwater depletion and soil degradation if not managed sustainably.
- Biodiversity Offset Implementation Gaps: Offsets often fail to provide genuine net gains due to weak enforcement.
- E.g. India's National Compensatory Afforestation (CAMPA) is one of the world's largest offset markets (US$0.86 billion), yet it faces challenges in ensuring that new plantations effectively replace the complex biodiversity lost to development.
- Inadequate Private Capital Mobilization: Private NbS finance remains a tiny fraction of what is needed.
- E.g. Despite India's massive renewable energy push, private debt finance for nature-positive restoration projects lags behind traditional infrastructure lending.
- Erosion of Regulatory Standards: Weakening of environmental laws in some jurisdictions creates uncertainty.
- E.g. Recent amendments to forest and environmental clearance rules have been critiqued for potentially easing industrial expansion at the cost of sensitive ecological zones.
- Underfunded International Cooperation (ODF): International public finance for NbS is under heavy pressure.
- E.g. As a nature-rich developing nation, India requires massive concessional international finance to meet 30×30 goals, but ODF flows remain insufficient compared to the country's conservation needs.

### Recommendations:

- Reform Subsidies: Redirect the US$2.4 trillion in harmful public subsidies toward regenerative agriculture and clean energy.
- Mandatory Disclosure: Enact laws requiring all large companies and financial institutions to disclose nature-related risks and impacts.
- Scale Blended Finance: Use public funds to de-risk private investments in NbS through guarantees and co-financing.
- Integrate NbS into Budgets: Embed nature-based infrastructure into national fiscal frameworks and green budgeting.
- Ensure Equity: Protect the rights of Indigenous Peoples and Local Communities, ensuring they are co-creators and beneficiaries of nature finance.

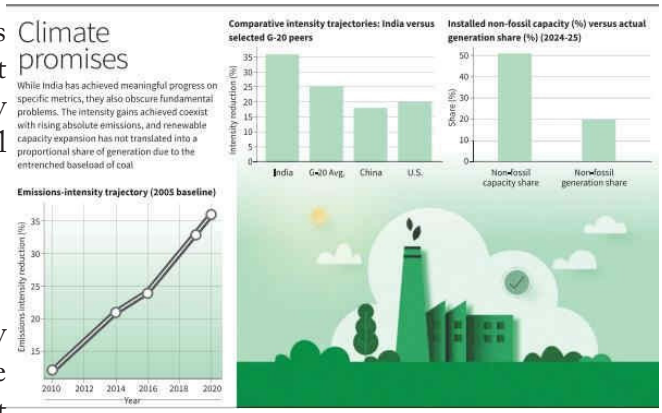
### Conclusion:

The 2026 report serves as a final warning that the global economy is in the red, with a 30:1 bias toward destroying nature rather than protecting it. Achieving a nature-positive future requires an urgent Big Nature Turnaround to repurpose US$7.3 trillion in harmful flows into a trillion-dollar transition economy. Only by embedding nature into every financial and governmental decision can we safeguard the ecosystems that underpin all human well-being and economic growth.

## India's progress on its climate targets

### Context:

Recent analyses and commentaries have reviewed India's performance on its Paris climate commitments, noting that while emissions intensity reduction and renewable capacity targets are largely on track, absolute emissions and coal dependence remain key concerns for the coming decade.




### About India's progress on its climate targets:

### What it is?

- India's climate targets arise from its Nationally Determined Contribution (NDC) under the UNFCCC, guided by the principle of Common but Differentiated Responsibilities (CBDR). These targets aim to balance development needs with climate mitigation and adaptation.

## India's key climate targets

- Emissions intensity reduction: Reduce emissions intensity of GDP by 33–35% by 2030 from the 2005 level (updated to 45% by 2030 in the 2022 NDC).
- Non-fossil power capacity: Achieve 40% (now 50%) of installed power capacity from non-fossil sources by 2030.
- Renewable energy expansion: Initially 175 GW by 2022, later scaled to 500 GW by 2030.
- Forest carbon sink: Create an additional 2.5–3 billion tonnes of $CO_2$-equivalent carbon sink through forests and tree cover by 2030.
- Long-term goal: Achieve net-zero emissions by 2070.

## Current status of targets:

- Emissions intensity: India has reduced emissions intensity by ~36% by 2020, achieving the original Paris target a decade early. However, absolute GHG emissions remain high (around 3 $GtCO_2e$), reflecting only partial decoupling of growth from emissions.
- Power sector transition: Non-fossil capacity crossed 50% of installed capacity by mid-2025, driven mainly by solar and wind. Yet, renewables contribute only ~22% of actual electricity generation, as coal continues to provide over 70% of baseload power.
- Renewable energy capacity: Solar capacity expanded rapidly (from ~3 GW in 2014 to over 110 GW by 2025), while wind growth has been slower. The 175 GW (2022) target was missed, though the 500 GW (2030) goal remains technically feasible.
- Forest and carbon sink target: Official estimates suggest India is close to meeting the forest sink target, but much of this relies on plantations and broad forest-cover definitions, raising concerns about ecological quality and permanence.

## Roadblocks to achieving climate targets:

- Absolute emissions challenge: Despite achieving a 33% reduction in emissions intensity by 2023, India's absolute emissions rose to ~3.35 Gt $CO_2e$ in 2024, driven by rising electricity demand. Rapid GDP growth allows intensity to fall even as total emissions increase, shrinking the national carbon budget.
- Coal-based baseload power lock-in: Coal remains central to energy security, with ~219 GW installed capacity contributing over 65% of electricity output. Planned addition of ~80 GW of coal capacity by 2031–32 risks long-term carbon lock-ins, delaying structural decarbonisation.
- Storage and grid constraints: High renewable capacity is undermined by weak storage and transmission. While solar crossed 110 GW, operational BESS remains under 0.3 GWh against multi-gigawatt needs, and a 42% shortfall in transmission commissioning (FY25) limits renewable evacuation.
- Implementation and forest governance gaps: CAMPA fund utilisation remains poor, with states spending only a fraction of released funds. Afforestation is often plantation-centric, neglecting natural regeneration, making forest carbon sinks ecologically fragile under drought and fire stress.

## Way ahead: Strategic pillars

- Scaling energy storage and grid modernisation: Fast-track the National Electricity Transmission Plan to integrate 500 GW of non-fossil capacity.
- Achieving 74 GW of BESS and 50 GW of pumped hydro by 2032, supported by VGF for storage, is critical to convert capacity into reliable generation.
- Transparent coal transition roadmap: Accelerate retirement of old and inefficient thermal plants, building on the 4.6 GW decommissioned by 2025.
- Repurposing abandoned coal mines for solar and pumped storage can enable a just transition for coal-dependent regions.
- Industrial decarbonisation through green hydrogen: Leverage the National Green Hydrogen Mission ( 19,744 crore) to decarbonise steel, fertilisers, and refining.
- The 5 MMT annual hydrogen target by 2030, backed by the SIGHT incentives, can structurally cut hard-to-abate emissions.
- Reforming forest and carbon policy: Operationalise the Indian Carbon Market (2025) with binding sectoral targets to drive cost-effective mitigation.

- Shift CAMPA focus from plantations to Assisted Natural Regeneration and biodiversity-rich forests for resilient, long-term carbon sinks.

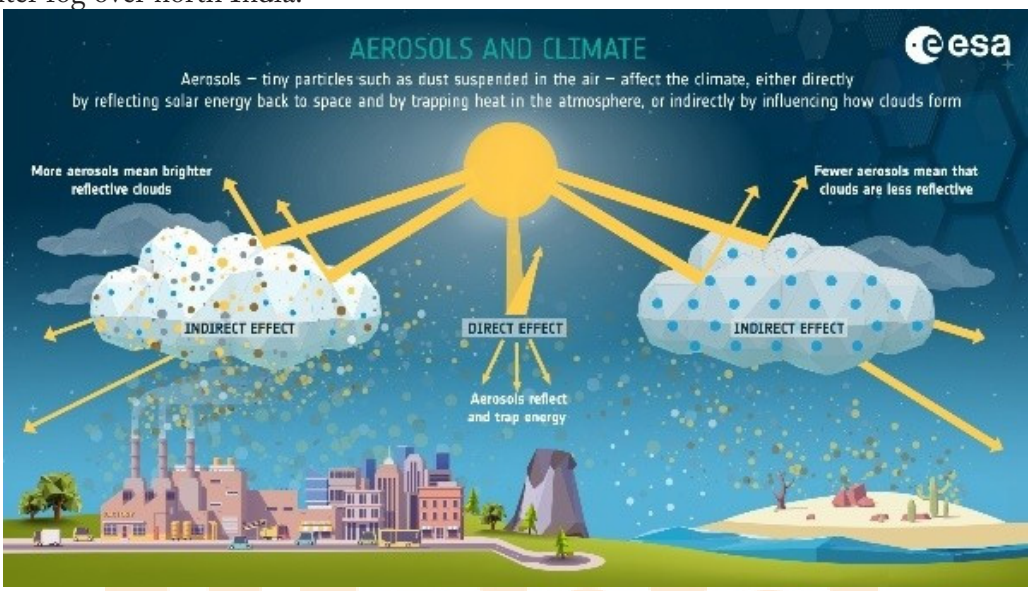
### Conclusion:

India has largely delivered on its headline climate commitments, especially emissions intensity reduction and non-fossil capacity expansion. However, rising absolute emissions, coal reliance, and weak storage and forest governance dilute real climate impact. The next five years are critical to convert targets on paper into durable emissions moderation and ecological resilience.

## Aerosols

### Context:

A new IIT Madras–led study published in Science Advances shows that air pollution aerosols are intensifying and prolonging winter fog over north India.




### About Aerosols:

### What they are?

Aerosols are tiny solid or liquid particles suspended in the atmosphere, often invisible to the naked eye, that strongly influence air quality, weather and climate.

### Origin:

- Natural sources: desert dust, sea spray, volcanic ash, forest fires
- Human sources: vehicle emissions, industrial pollution, biomass burning, coal and diesel use
- They can be primary aerosols (emitted directly) or secondary aerosols (formed from gases like sulphur dioxide and nitrogen oxides in the air).

### Key features:

- Extremely small in size: Their tiny size allows aerosols to enter deep into lungs and stay suspended easily in the air.
- Stay in air for days to weeks: They travel long distances before settling or being washed out by rain.
- Condensation nuclei: Aerosols provide surfaces for water vapour to condense, forming fog and cloud droplets.
- Scatter or absorb sunlight: Some aerosols reflect sunlight, while others like black carbon absorb heat.

### Implications:

- Health: Aerosols worsen asthma, lung infections and heart diseases by penetrating the respiratory system.
- Weather: They make fog thicker and longer-lasting by increasing droplet formation and cooling.
- Climate (cooling): Reflective aerosols send sunlight back to space, lowering surface temperature.
- Climate (warming): Black carbon absorbs solar heat, warming the atmosphere.
- Cloud and rainfall changes: Aerosols make clouds brighter and longer-lived, altering rainfall patterns.

# UN Biodiversity Beyond National Jurisdiction (BBNJ) Treaty

## Context:

The UN Biodiversity Beyond National Jurisdiction (BBNJ) Treaty, also known as the High Seas Treaty, has entered into force after crossing the required 60 ratifications, creating the first legally binding global framework to protect biodiversity in international waters.


## About UN Biodiversity Beyond National Jurisdiction (BBNJ) Treaty:

### What it is?

- The BBNJ Agreement is a legally binding international treaty under the United Nations Convention on the Law of the Sea (UNCLOS) to conserve and sustainably use marine biodiversity in areas beyond national jurisdiction (the High Seas).

### Origin and history:

- Negotiations began in 2008 amid growing concern over unregulated exploitation of the high seas.
- After 15 years of negotiations, the treaty was finalised in March 2023.
- It entered into force 120 days after the 60th ratification, which was achieved in September 2025.

### Targets:

- Achieve the "30 by 30" goal: protect 30% of the global ocean area by 2030.
- Enable large-scale conservation across two-thirds of the ocean, which lies beyond national control.

### Key features:

- Marine Protected Areas (MPAs): Enables creation of a global network of MPAs in international waters to conserve fragile and previously unregulated ecosystems.
- Environmental Impact Assessments (EIAs): Mandates prior assessment of activities that may significantly harm marine ecosystems in the high seas.
- Marine Genetic Resources (MGRs): Establishes fair and equitable sharing of benefits derived from genetic resources used in biotechnology and pharmaceuticals.
- Capacity building and technology transfer: Supports developing countries through training, access to data, scientific cooperation, and marine technologies.
- Ecosystem-based and precautionary approach: Promotes decision-making based on best available science, traditional knowledge, and the precautionary principle.
- No sovereignty claims: Reaffirms that no state can claim sovereign rights over high-seas biological resources.

## Nimesulide

### Context:

The Union Government has banned the manufacture, sale and distribution of oral formulations of Nimesulide above 100 mg with immediate effect under Section 26A of the Drugs and Cosmetics Act, 1940.

### About Nimesulide:

### What it is?

- Nimesulide is a non-steroidal anti-inflammatory drug (NSAID) used for the treatment of acute pain and fever. It acts by inhibiting chemical mediators responsible for pain and inflammation.

### Features of the drug:

- Pharmacological class: NSAID
- Mechanism of action: Inhibits prostaglandin synthesis by blocking inflammatory chemical messengers.
- Therapeutic use: Short-term management of pain and fever.
- Common side effects: Nausea, vomiting, diarrhoea, elevated liver enzymes.
- Known risk: Potential hepatotoxicity, especially at higher doses or prolonged use.

### Reason for the ban:

- Oral formulations above 100 mg pose a risk to human health, particularly liver-related adverse effects.
- Safer alternative analgesics are available in the market.
- The ban was imposed under Section 26A of the Drugs and Cosmetics Act, 1940, which empowers the government to prohibit drugs harmful to public health.

### Significance:

- Strengthens drug safety regulation and pharmacovigilance in India.
- Reduces risk of drug-induced liver injury among patients.
- Encourages rational drug use and adherence to safe dosage norms.

## Battery Pack Aadhaar Number (BPAN)

### Context:

The Ministry of Road Transport and Highways has proposed an Aadhaar-like unique ID for electric vehicle batteries to ensure lifecycle traceability and efficient recycling.


- The draft guidelines introduce the Battery Pack Aadhaar Number (BPAN) to enhance transparency, sustainability, and regulatory compliance in India's growing EV ecosystem.

### About Battery Pack Aadhaar Number (BPAN):

### What it is?

- Battery Pack Aadhaar Number (BPAN) is a 21-character unique identification number proposed for each battery pack introduced in the Indian market, especially electric vehicle batteries.
- It functions like a digital identity for batteries, enabling lifecycle tracking from production to recycling or disposal.

### Proposed under:

- Draft "Guidelines for Implementation of Battery Pack Aadhaar System" issued by the Ministry of Road Transport and Highways (MoRTH).
- To be institutionalised through the Automotive Industry Standard (AIS) route under the Automotive Industry Standards Committee (AISC).

### Aim:

- To ensure end-to-end traceability of batteries across their lifecycle.
- To promote efficient recycling, second-life usage, and safe disposal.
- To enhance transparency, accountability, and environmental sustainability in the battery ecosystem.

### Key features:

- Mandatory unique ID: Every battery producer or importer must assign a BPAN to batteries sold or used internally.
- Lifecycle data capture: Tracks data from raw material sourcing, manufacturing, usage, performance, recycling, repurposing, to final disposal.
- Dynamic updating: Any major change requires issuance of a new BPAN.
- Visible & durable marking: BPAN must be placed where it cannot be easily destroyed or degraded.
- Digital portal integration: Producers/importers must upload battery data on an official BPAN portal.
- Priority to EV batteries: EV batteries (80–90% of India's Li-ion demand) to be covered first; industrial batteries above 2 kWh also recommended.

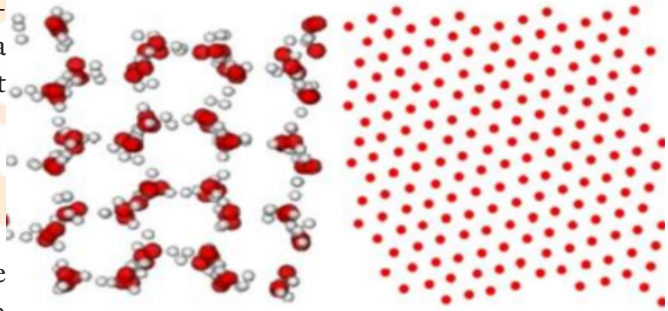
### Significance:

- Enables systematic recycling and second-life applications of batteries.
- Reduces risks from improper disposal of lithium-ion batteries.
- Strengthens enforcement of Extended Producer Responsibility (EPR).

## Mpemba Effect

### Context:

Indian scientists have developed the first supercomputer-powered simulation that successfully captures the Mpemba effect, resolving a long-standing scientific paradox of hot water freezing faster than cold.



### About Mpemba Effect:

### What it is?

- The Mpemba effect refers to the counterintuitive phenomenon where hot water freezes faster than cold water under specific experimental conditions.
- Named after Erasto Mpemba, a Tanzanian student who reported it scientifically in 1969, though it was noted earlier by Aristotle, Bacon, and Descartes.

### How it works?

- The Mpemba effect occurs because water's behaviour is shaped by more than just its temperature. When water is heated, its physical and molecular state changes, which can influence how it freezes later.
- Evaporation: Hot water loses some mass as vapour, so less water remains to freeze, speeding up the process.
- Dissolved gases: Heating drives out dissolved gases, subtly changing the water's freezing characteristics.
- Convection currents: Temperature gradients in hot water create internal circulation that enhances heat loss.
- Supercooling: Hot water may begin freezing at a higher temperature than cold water, allowing it to solidify sooner.
- Environmental effects: Hot containers can alter their surroundings, improving overall cooling efficiency.
- Since these factors vary with conditions, no single mechanism explains the effect universally; different processes dominate in different situations.

### Applications:

- Advances understanding of non-equilibrium physics and phase transitions.
- Improves climate and cryosphere modelling, including ice formation processes.
- Relevant to industrial freezing, food processing, and materials science.
- Demonstrates the power of supercomputing in resolving classical scientific paradoxes.

# Biomaterials India

## Context:

India's focus on Biomanufacturing and Bio-foundry has reached a climax in early 2026 with the operationalization of massive PLA (Polylactic Acid) facilities.

## About Biomaterials India:

### What it is?

- Biomaterials are substances derived wholly or partly from biological sources (plants, fungi, bacteria) or engineered using biological processes (fermentation) to replace or interact with conventional, petroleum-based materials.
- They are designed to be either chemically identical to existing materials or entirely novel with unique biodegradable properties.

### Origin and Production:

- They originate from renewable feedstocks such as sugarcane, maize, agricultural residues, and even waste like temple flowers or seafood shells.
- Microorganisms like bacteria (Xanthomonas) or fungi are often used in fermentation vessels to convert sugars into building blocks like lactic acid, which is then polymerized into solid materials.

### Categories and Types:

### Drop-in Biomaterials:

- These are the plug-and-play versions. They are chemically identical to petroleum-based plastics (like Bio-PET).
- Their biggest advantage is that they can be used in existing manufacturing lines without any machinery upgrades.

### Drop-out Biomaterials:

- These are chemically unique alternatives, such as PLA (Polylactic Acid).
- While they replace traditional plastics, they require separate end-of-life systems, like industrial composting facilities, because they don't mix with standard plastic recycling streams.

### Novel Biomaterials:

- These are the super-materials of the future. They possess properties nature didn't intend for industrial use, such as self-healing composites for construction or 3D-printed bioactive scaffolds that help human bones regrow.

### Key Characteristics:

1. Renewability: They utilize a "current" carbon cycle; crops absorb $CO_2$ while growing, which offsets the carbon released during production.
2. Biocompatibility: Many biomaterials are non-toxic and "immune-silent," allowing them to be used inside the human body for stents or drug delivery without rejection.
3. Tunability: Through genetic engineering of microbes, scientists can "program" the strength, flexibility, or degradation rate of the material.
4. Biodegradability: Unlike microplastics that persist for centuries, many biomaterials can be broken down by bacteria into water and $CO_2$ within months under the right conditions.
5. Composite Potential: They can be combined (like lignin and cellulose in wood) to create high-strength, lightweight materials for the automotive and aerospace industries.

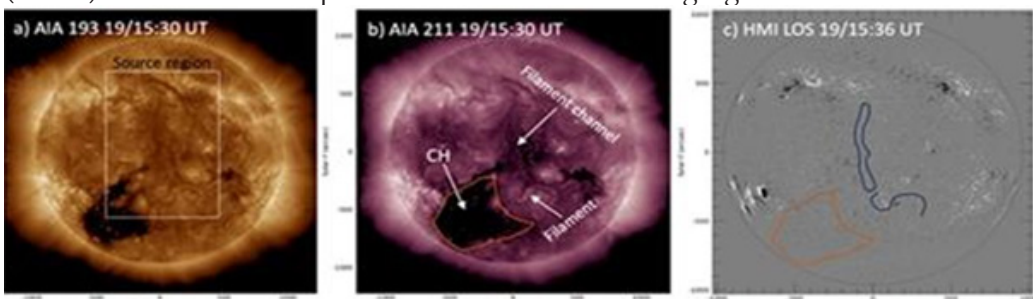
### Applications:

- Packaging: Single-use plastic bans are being met with seaweed-based or corn-starch-based wrappers.
- Agriculture: Mulch films that farmers can simply plow back into the soil after the harvest.
- Healthcare: Dissolvable sutures and tissue engineering.
- Textiles: Vegan leather made from mushroom mycelium.

# Stealth Coronal Mass Ejection (CME)

## Context:

Astronomers have linked an intense geomagnetic storm that struck Earth in March 2023 to a Stealth Coronal Mass Ejection (CME)—a faint solar eruption with no obvious warning signals.




## About Stealth Coronal Mass Ejection (CME):

### What are Stealth CMEs?

- Stealth Coronal Mass Ejections (CMEs) are solar eruptions that lack clear low-coronal signatures, such as solar flares, X-ray bursts, or strong radio emissions.
- Unlike typical CMEs, they appear optically weak or invisible in standard solar observations, yet can still travel to Earth and trigger severe geomagnetic storms.

### Origin of Stealth CMEs:

### Stealth CMEs generally originate from:

- Active regions on the Sun with weak or slowly evolving magnetic fields
- Areas close to coronal holes—regions where the Sun's magnetic field is open
- Unlike explosive eruptions, stealth CMEs emerge from gradual magnetic restructuring, making them difficult to detect in real time.

### How do Stealth CMEs form?

### The formation of stealth CMEs involves a subtle sequence of processes:

1. Magnetic flux rope buildup: A twisted magnetic structure forms in the Sun's corona without producing flares.
2. Low-energy magnetic reconnection: Weak reconnection releases plasma slowly, leaving minimal electromagnetic signatures.
3. Acceleration via coronal holes: Nearby coronal holes emit high-speed solar wind, which can accelerate the CME and guide it toward Earth.
4. Interplanetary evolution: As the CME travels through space, it may expand, rotate its magnetic field, and align in a way that strongly interacts with Earth's magnetosphere—especially if the magnetic field turns southward.

### Why are Stealth CMEs geoeffective?

### Despite being slow and faint, stealth CMEs can cause intense geomagnetic storms because:

- They may travel behind high-speed solar wind streams, increasing impact energy
- Their magnetic clouds can expand significantly en route to Earth
- A southward-oriented magnetic field enhances magnetic reconnection with Earth's magnetosphere.

### Implications of Stealth CMEs:

- Space weather forecasting challenge: Current early-warning systems rely on visible solar flares and radio bursts, which stealth CMEs often lack.

### Risks to modern infrastructure:

### They can disrupt:

- Satellites and GPS systems
- Radio communications

- Power grids and aviation routes
- Need for multi-point observation: The study used data from NASA Solar Dynamics Observatory, Solar Orbiter, STEREO-A, and WIND, showing that multi-spacecraft monitoring is essential.
- Strategic importance for India: As India expands space assets, navigation systems, and digital infrastructure, accurate space weather prediction becomes a national resilience issue.

## India becomes first country to commercially produce bio-bitumen

### Context:

India has become the first country to commercially produce bio-bitumen for road construction, marking a global milestone in green infrastructure.

### About India becomes first country to commercially produce bio-bitumen:

### What is bio-bitumen?

- Bio-bitumen is a bio-based alternative to conventional petroleum bitumen, used as a binder in road construction.
- It is produced from agricultural residues (especially rice straw) and can partially replace fossil-fuel-derived bitumen without compromising road performance.

### Organisations involved:

- Council of Scientific and Industrial Research (CSIR)
- CSIR-Central Road Research Institute (CSIR-CRRI), New Delhi
- CSIR-Indian Institute of Petroleum (CSIR-IIP), Dehradun

### Key features of bio-bitumen:

- Partial fossil replacement: 20–30% of conventional bitumen can be safely replaced with bio-bitumen.
- Performance assured: Successfully tested for rutting, cracking, moisture damage, rheology, and durability.
- Environment-friendly: Reduces emissions from crop residue burning and lowers lifecycle carbon footprint.
- Cost-efficient: Roads built using bio-bitumen have lower construction cost and longer service life.
- Field validated: A 100-metre trial stretch laid on the Jorabat–Shillong Expressway (NH-40), Meghalaya, proved real-world feasibility.

### Manufacturing process (Bio-bitumen via pyrolysis):

- Collection of farm residue: Post-harvest rice straw is collected from fields and pelletised to ensure uniform size, easy handling, and efficient thermal processing.
- Pyrolysis: The biomass pellets are heated at high temperatures in the absence of oxygen, breaking them down into bio-oil, combustible gases, and bio-char without burning.
- Bio-oil extraction: The bio-oil fraction, which possesses strong adhesive and binding characteristics, is separated and refined for use as a road binder component.
- Blending: The extracted bio-oil is blended with conventional petroleum bitumen (typically 20–30%), producing bio-bitumen suitable for asphalt applications.
- Quality validation: The final product undergoes physical, chemical, rheological, and mechanical tests—including rutting, cracking, and moisture resistance—to ensure it meets national highway performance standards.

### Significance:

- Supports clean and green highways by reducing fossil fuel dependence and air pollution.
- Converts agricultural waste into high-value infrastructure material, addressing stubble burning.
- Potential to replace 25,000–30,000 crore worth of imported bitumen annually.

# Earth Observation Satellite EOS-N1 (Anvesha)

## Context:

Indian Space Research Organisation (ISRO) will begin 2026 with the PSLV-C62 mission, launching the advanced surveillance satellite EOS-N1 (Anvesha) along with 18 co-passenger payloads.

## About Earth Observation Satellite EOS-N1 (Anvesha):

### What it is?

- EOS-N1 (codenamed 'Anvesha') is an advanced hyperspectral Earth observation satellite developed primarily to support India's strategic and civilian remote-sensing needs.
- To be launched in: January 2026, aboard PSLV-C62 from Sriharikota.

### Aim:

- To enhance space-based surveillance and reconnaissance capabilities while supporting civil applications such as agriculture, urban planning, and environmental monitoring.

### Key functions:

- Hyperspectral imaging: Captures data across hundreds of spectral bands, enabling precise identification of materials and surface features.
- Strategic surveillance: Assists in border monitoring, terrain analysis, and threat detection, strengthening national security.
- Agriculture support: Enables crop health assessment, soil moisture analysis, and yield estimation.
- Urban and infrastructure mapping: Supports land-use planning, infrastructure monitoring, and disaster preparedness.
- Environmental monitoring: Tracks ecosystem changes, pollution patterns, and climate-related impacts.

### Significance:

- Acts as a high-priority space asset for surveillance, developed in close alignment with requirements of Defence Research and Development Organisation (DRDO).
- Demonstrates India's maturity in hyperspectral remote sensing, a capability possessed by only a few nations.
- Simultaneously serves defence, agriculture, disaster management, and environmental governance.

# White dwarf system

## Context:

NASA's Imaging X-ray Polarization Explorer (IXPE) has, for the first time, probed the internal structure of a white dwarf system, revealing unexpected details about gas flows and X-ray behaviour in the binary system EX Hydrae.

## About White dwarf system:

### What it is?

- A white dwarf system typically consists of a white dwarf—the dense, Earth-sized remnant of a Sun-like star—often paired with a companion star in a binary arrangement.

### Discovered / studied by:

- White dwarfs as a class were identified in the early 20th century through stellar spectroscopy.
- The current breakthrough comes from NASA's IXPE mission, which studied EX Hydrae, about 200 light-years away in the constellation Hydra, by analysing X-ray polarisation, not just brightness.

### How it forms?

- A star like the Sun exhausts its nuclear fuel, sheds its outer layers as a planetary nebula, and leaves behind a hot, compact core—the white dwarf.
- In a binary system, the white dwarf's gravity pulls gas from its companion star.
- In systems like EX Hydrae, known as intermediate polars, the white dwarf's moderate magnetic field partially disrupts the accretion disc and channels gas along magnetic field lines onto its surface.

### Key characteristics:

- Extreme density: Mass comparable to the Sun, size similar to Earth.
- Degenerate matter: Supported by electron degeneracy pressure (Pauli Exclusion Principle), not nuclear fusion.
- High-energy emissions: Infalling matter heats to tens of millions of degrees, emitting X-rays.
- Magnetic influence: In intermediate polars, gas forms columns rising thousands of kilometres above the surface.
- Chandrasekhar limit: Maximum mass ~1.4 times the Sun, beyond which collapse or explosion occurs.

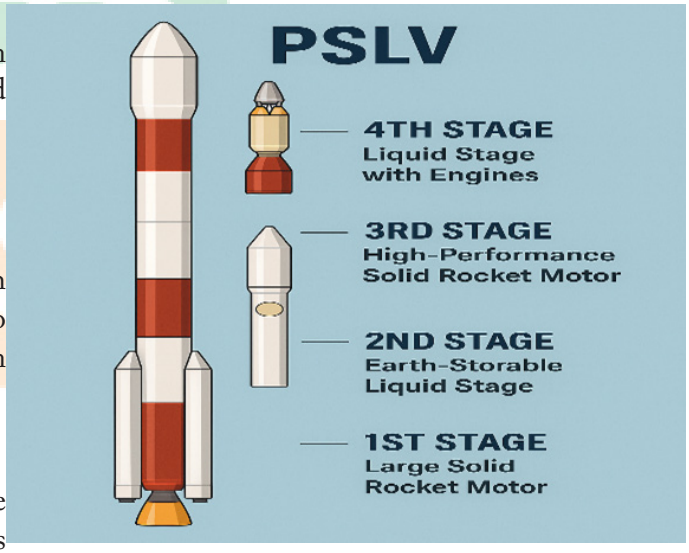
### Significance:

- IXPE's polarisation data allowed scientists to estimate the height of hot gas columns and detect X-rays reflecting off the white dwarf's surface—details previously inaccessible.
- Enables direct testing of theories about accretion, magnetism, and extreme matter.

## Polar Satellite Launch Vehicle (PSLV)

### Context:

ISRO's PSLV-C62 mission suffered a failure due to an anomaly in its third stage (PS3), marking the second consecutive PSLV failure after PSLV-C61 in May 2025.




### About Polar Satellite Launch Vehicle (PSLV):

### What it is?

- PSLV is India's third-generation orbital launch vehicle, designed primarily to place satellites into Polar and Sun-Synchronous Orbits, and known globally as ISRO's workhorse rocket.

### Developed by:

- It is developed and operated by the Indian Space Research Organisation (ISRO) through its various centres including Vikram Sarabhai Space Centre and Liquid Propulsion Systems Centre.

### PSLV: Key Stages:

#### 1. PS1: First Stage (Powerful liftoff stage):

- Uses a large solid rocket motor (S139) and strap-on boosters
- Fuel: HTPB (solid fuel)
- Its job is to lift the heavy rocket off the ground and push it through the thickest part of the atmosphere
- Strap-on boosters give extra push, like turbo engines during takeoff

#### 2. PS2: Second Stage (Control and stability stage):

- Uses the Vikas liquid engine
- Fuel: UDMH + Nitrogen Tetroxide
- This stage gives smooth, controlled thrust after PS1 burns out
- It helps the rocket stay stable and on the right path while climbing higher

### 3. PS3: Third Stage (High-speed booster):

- Uses a solid motor (S7)
- Fuel: HTPB
- This stage provides a big speed boost needed to reach near-orbital velocity
- Think of it as the final sprint before the satellite is placed in orbit

### 4. PS4: Fourth Stage (Precision stage):

- Uses two liquid engines (PS4)
- Fuel: MMH + MON
- This stage acts like a fine-tuning engine
- It precisely places satellites into the correct orbit and can make small adjustments

### Functions of PSLV:

- Launches Earth observation, navigation and communication satellites.
- Places satellites in Low Earth Orbit, Polar Orbit and GTO.
- Supports India's strategic, commercial and scientific missions.
- Backbone of India's space commercialisation through NSIL.

## Nipah Virus

### Context:

Two nurses in West Bengal have tested positive for the Nipah virus, with one in coma and another on ventilator support, triggering emergency contact tracing and isolation of over 120 people.

### About Nipah Virus:

### What it is?

- Nipah virus (NiV) is a zoonotic virus (animal-to-human) that can also spread between humans, causing illnesses ranging from mild fever to fatal encephalitis and severe respiratory disease.

### Natural Host:

- Primary reservoir: Fruit bats (Pteropus species – flying foxes)
- Intermediate hosts: Pigs, horses, goats, dogs (can infect humans)

### Human transmission:

- Contact with bat-contaminated food (e.g., fruits, date-palm sap)
- Contact with infected animals
- Human-to-human via respiratory droplets, body fluids, or close care

### Symptoms:

- Early symptoms: Fever, headache, muscle pain, sore throat, vomiting
- Progressive symptoms: Dizziness, drowsiness, confusion

### Severe disease:

- Acute respiratory distress
- Encephalitis (brain inflammation)
- Seizures and coma within 24–48 hours

### Key Features:

- Case fatality rate: 40%–75% (very high)
- Incubation period: 4–14 days (can extend up to 45 days)
- WHO Priority Pathogen: Listed under WHO R&D Blueprint for urgent vaccine and drug research.

### Treatment:

- No specific antiviral drug or vaccine available.

### Supportive care is the mainstay:

- Oxygen and ventilator support
- Intensive care for brain and lung complications
- Symptom-based management
- Early isolation, contact tracing, and infection control are critical to stop outbreaks.

## Coconut root wilt disease

### Context:

Coconut Root Wilt Disease is in the news due to its rapid spread across major coconut-growing regions of Kerala, Tamil Nadu and Karnataka, affecting lakhs of palms.

### About Coconut root wilt disease:

### What it is?

- A debilitating, non-fatal disease of coconut caused by a phytoplasma (phloem-limited pathogen), leading to chronic decline and major yield loss.
- Infected palms often remain alive but become long-term inoculum sources, enabling continued spread through vectors.

### Origin and spread:

- First reported over 150 years ago from Erattupetta (Kerala) and has remained a persistent endemic problem.
- Spread is vector-borne, and is accelerated by continuous coconut belts, wind-assisted vector movement, and rising abiotic stress (temperature extremes) plus biotic stress (new sucking pests like whiteflies) that increase palm susceptibility.

### Vector:

- Transmitted through sap-sucking insect vectors; commonly cited vectors in endemic areas include Stephanitis typica and Proutista moesta.

### Key symptoms:

- Leaves look weak and droopy: The small leaf strips lose stiffness and hang down instead of standing firm — this is usually the first visible sign.
- Leaves turn yellow from the tips: Yellowing starts at the ends of leaves and slowly spreads inward; in later stages, parts of the leaves dry up and die.
- Leaves curl and cup inward: The leaf strips bend inward, making the whole leaf look ribbed or cup-shaped.
- Poor flowering and nut fall: The tree produces fewer flowers, nuts fall prematurely, and overall yield drops sharply.
- Tree slowly weakens: Roots start decaying, growth becomes poor, and in some cases the top of the trunk becomes thin and tapered.

### Solutions and management:

- Select and multiply tolerant palms: Palms that continue to yield well despite disease pressure should be identified in farmers' fields, scientifically confirmed, and multiplied through local nurseries.
- Good field and crop management: Remove badly affected, low-yielding palms to reduce disease spread. Improve soil health using green manure crops, ensure regular irrigation, proper drainage, and follow suitable intercropping to reduce stress on coconut palms.
- Strengthen palms with organic nutrition: Apply farmyard manure or green manure along with neem cake every year. Healthy soil and strong roots help palms tolerate disease better even if infection occurs.

# India's Focus on AI and Its Environmental Impact

## Context:


India is set to host the AI Impact Summit 2026 in New Delhi, where it will champion the "Planet Sutra"—a global mandate to ensure AI development aligns with resource efficiency and climate resilience.

## About India's Focus on AI and Its Environmental Impact:

- India is currently at a technological crossroads. While the IndiaAI Mission (2024) and the development of homegrown models like BharatGen (launched June 2025) aim for digital sovereignty, the physical infrastructure—data centers—is straining the nation's resources.

## Key Data & Facts:

- Energy Demand: Global ICT is responsible for up to 3.9% of global greenhouse gas emissions. In India, data centre capacity is projected to reach 2,073 MW by 2027, an 85% increase from 2025 levels.
- Carbon Footprint: Training a single large AI model can emit over 626,000 pounds of CO2, equivalent to the lifetime emissions of five cars.
- Resource Intensity: A ChatGPT query consumes 10 times more electricity than a standard Google search.
- India's Status: India has a 59% AI adoption rate, yet 50% of its data centers are located in extremely water-stressed regions like Bengaluru and Mumbai.

## How AI Impacts the Environment?

- Massive Electricity Consumption: AI models require continuous high-density power for training and inference.
- E.g. In Mumbai, the surge in AI-driven data centres has led to concerns over the city's reliance on coal-based power to meet the 1,100+ MW load.
- Severe Water Scarcity: Cooling systems in data centres drink billions of liters of water to prevent hardware from melting.
- E.g. In Bengaluru, data centres consume over 26 million liters of water annually, even as the city faced its worst water crisis in April 2024.
- Electronic Waste (E-waste) Explosion: The rapid obsolescence of AI-specific hardware (like GPUs) accelerates the toxic waste stream.
- E.g. India generated 1.6 million metric tons of e-waste in 2024, with only a small fraction being formally recycled through pioneers like Attero.
- Carbon Emissions from Training: The computational brute force needed to train Large Language Models (LLMs) has a massive carbon price tag.
- E.g. The development of sovereign LLMs in 2025 using thousands of GPUs has increased the Scope 2 emissions of Indian tech hubs.
- Natural Resource Depletion: Manufacturing AI chips requires rare earth minerals and ultrapure water.
- E.g. India's push for semiconductor fabrication (India Semiconductor Mission) in 2025 is raising concerns about groundwater depletion in manufacturing zones.

## Challenges to Countering the Environmental Impact of AI:

- The Data-opaque problem: Because firms are not legally required to publish AI-model-wise energy and water use, sustainability reports hide the true ecological cost, preventing regulators and citizens from holding data centres accountable.
- The infrastructure–cooling paradox: In India's hot climate, cooling high-performance GPUs consumes nearly as much power as computing itself, so expanding AI capacity actually multiplies electricity and water demand instead of just adding it.
- Fragmented regulatory frameworks: India's EIA system is built for factories and mines, not for cloud-based

AI firms, allowing massive GPU clusters to operate without environmental clearance despite their heavy digital carbon footprint.

- Hardware lifecycle & e-waste gap: AI chips become obsolete in 2–3 years, but India lacks advanced recycling plants to extract rare minerals, pushing toxic AI hardware into informal scrapyards that pollute soil and water.
- Energy-grid dependency: AI data centres need 24×7 stable power, but since India's base-load electricity still comes mostly from coal and diesel backups, their green claims collapse whenever renewable supply fluctuates.

### Solutions: The Way Forward

### Global Context

- Legislative Action: The US AI Environmental Impacts Act of 2024 and the EU's CSRD framework now mandate that tech giants disclose water and energy usage.
- UNESCO Recommendations: Over 190 countries have adopted non-binding ethics that emphasize AI's "negative impacts on the environment."

### India's Strategy

- Expanding EIA Scope: The Environmental Impact Assessment (EIA) Notification 2006 should be amended to mandate clearances for data centres exceeding 5 MW.
- ESG Disclosures: The Ministry of Corporate Affairs and SEBI can mandate Carbon Usage Effectiveness (CUE) reporting for AI companies.
- Adopting "Green AI": Shifting from Red AI (resource-heavy) to Green AI, which prioritizes energy-efficient, pre-trained models.
- Renewable Integration: Incentivizing data centres to use 100% renewable energy, similar to the Haryana Water Resource Atlas (2025) approach for resource mapping.
- Standardized Metrics: Establishing national standards for Power Usage Effectiveness (PUE) to move toward water-positive data centres.

### Conclusion:

India must move beyond viewing AI only as a tool for economic growth and recognize it as a resource-intensive industry that requires strict regulation. By integrating environmental audits into the IndiaAI Mission, the country can lead the global south in sustainable innovation. Ultimately, the goal is Green AI—where technological progress does not come at the cost of the planet's vital resources.

## Havana Syndrome

### Context:

Havana Syndrome is back in focus after the US Pentagon began testing a covertly acquired device emitting pulsed radio-frequency waves, which investigators believe could explain some unexplained illnesses.

### About Havana Syndrome:

### What it is?

- Havana Syndrome, officially termed Anomalous Health Incidents (AHIs), refers to a set of unexplained neurological and physical symptoms first reported in 2016 by US diplomats in Havana, Cuba, and later by intelligence and military personnel across the world.

## Symptoms:

- Severe headaches and migraines
- Dizziness, vertigo and nausea
- Ringing in ears (tinnitus)
- Memory loss and cognitive difficulties
- Balance problems and visual disturbances
- In some cases, symptoms similar to mild traumatic brain injury

## Key Features:

- Global spread: Cases reported in Cuba, China, Europe, Russia, and the US.
- No visible injuries: Many affected showed brain-like trauma without physical impact.
- Possible directed energy link: Some scientific and intelligence assessments suggest pulsed radio-frequency or microwave energy as a possible cause.
- Uncertain attribution: US intelligence says a foreign attack is unlikely in most cases, though not fully ruled out.
- Ongoing investigation: A backpack-sized radio-wave emitting device is now being tested by the Pentagon.

## Implications:

- Raises concerns about new-age warfare using invisible directed-energy weapons.
- Highlights vulnerabilities of diplomats and intelligence officers abroad.
- Complicates US–Russia and US–China relations, due to suspicions of foreign involvement.
- Has led to compensation laws, medical monitoring, and congressional inquiries in the US.
- Signals the emergence of non-traditional, deniable weapons in global security.

Chapter-
6

# ECONOMY

## India becomes world's largest rice producer

### Context:

Union Agriculture Minister said India has become the world's largest rice producer, with output at 150.18 million tonnes, overtaking China at 145.28 million tonnes.

**Table 1.18: Production of Important Crops in three Largest Producing States in 2023-24**

(Production in Million Tonnes)

| | Crops/Groups of Crops | States | Production | Per cent Share of Production to All India | Cumulative per cent Share of Production |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| I. | **Foodgrains** | | | | |
| | Rice | Telangana | 16.87 | 12.24 | 12.24 |
| | | Uttar Pradesh | 15.99 | 11.60 | 23.84 |
| | | West Bengal | 15.69 | 11.38 | 35.22 |
| | Wheat | Uttar Pradesh | 35.34 | 31.19 | 31.19 |
| | | Madhya Pradesh | 22.58 | 19.93 | 51.12 |
| | | Punjab | 17.74 | 15.66 | 66.78 |
| | Maize | Karnataka | 5.71 | 15.16 | 15.16 |
| | | Bihar | 5.63 | 14.95 | 30.11 |
| | | Madhya Pradesh | 4.34 | 11.52 | 41.63 |

### About India becomes world's largest rice producer:

### What it is?

- India has overtaken China to become the No. 1 rice-producing country globally, as per the minister's statement (2024–25 output: 150.18 MT).

### India's status:

- Global ranking
- India – world's largest producer.
- China – second.

### State-wise ranking:

- As per Economic Survey (Statistical Appendix) for 2023–24, the three largest rice-producing states were:
- Telangana – 16.63 MT (≈ 12.17% share)
- Uttar Pradesh – 15.72 MT (≈ 11.50% share)
- West Bengal – 15.12 MT (≈ 11.06% share)
- (Other consistently major rice producers include Andhra Pradesh, Punjab, Odisha, Bihar, Chhattisgarh, Tamil Nadu, Assam)

### Geographical features of rice production in India:

- Climate belt: Rice thrives in hot, humid conditions—hence concentration in eastern, southern, and north-eastern India.
- Water geography: Strong presence in river deltas and floodplains (Ganga–Brahmaputra plains; Krishna–Godavari–Cauvery deltas) where water availability and alluvium support paddy.
- Irrigation-driven expansion: In lower rainfall zones, rice is sustained via canals/tube-wells, enabling high yields but raising water-stress concerns.
- Terrain adaptation: In hilly regions, rice is grown via terraced cultivation with controlled water flow.

### Significance:

- Reinforces India's position as a high-buffer food grain economy (recent official estimates also show record rice output in earlier years).
- Higher production supports exports and stabilises global rice markets, especially for importing countries.

# Indian Railways becomes the biggest electrified rail system globally

## Context:

Indian Railways has become the largest electrified rail network in the world, with about 99.2% of its broad-gauge network electrified by November 2025.

## About Indian Railways becomes the biggest electrified rail system globally:

### What it is?

- Indian Railways is India's national transporter, operating one of the world's largest rail networks.
- It has now achieved near-complete electrification of its broad-gauge routes, surpassing other major global railway systems.

### Initiative under: Mission 100% Railway Electrification

### Launched in:

- The electrification drive began historically in 1925, but Mission-mode acceleration was undertaken post-2014.

### Aim:

- Eliminate diesel traction and shift to cleaner electric traction.
- Reduce carbon emissions, fuel import dependence, and operating costs.
- Improve speed, reliability, and efficiency of train operations.

### Key features:

- 99.2% electrification of ~70,000 route km broad-gauge network (as of Nov 2025).
- Electrification pace increased from 1.42 km/day (2004–14) to 15+ km/day (2019–25).
- 25 States/UTs fully electrified; only ~0.8% network pending.
- Massive renewable integration: Solar capacity expanded from 3.68 MW (2014) to 898 MW (2025).
- Adoption of modern technologies like Automatic Wiring Trains and mechanised OHE foundations.

### Significance:

- Major reduction in greenhouse gas emissions and air pollution.
- Electric traction is ~70% cheaper than diesel, lowering operating costs.
- Reduced dependence on imported fossil fuels; increased use of renewables.

## Market Access Support (MAS) Intervention

### Context:

The Government of India has launched the Market Access Support (MAS) Intervention under the Export Promotion Mission to strengthen global market access for Indian exporters, especially MSMEs and first-time exporters.

### About Market Access Support (MAS) Intervention:

### What it is?

- The Market Access Support (MAS) Intervention is a government-backed programme that provides financial and institutional assistance to Indian exporters for accessing and expanding in international markets through curated trade and buyer-engagement activities.

### Initiative under:

- Implemented under the NIRYAT DISHA sub-scheme
- Part of the Export Promotion Mission (EPM)
- Jointly implemented by: The Department of Commerce, Ministry of MSME, and Ministry of Finance.

### Aim:

- Strengthen global market access for Indian exporters
- Support MSMEs, first-time exporters and priority sectors
- Promote export diversification into new and emerging markets
- Enable predictable and outcome-driven export promotion

### Key features:

- Market access activities: Support for Buyer-Seller Meets (BSMs), Mega Reverse BSMs, international trade fairs, exhibitions and trade delegations.
- Advance planning: A 3–5 year rolling calendar of approved market access events to ensure continuity and predictability.
- MSME focus: Mandatory minimum 35% MSME participation in supported events, with prioritisation of smaller and new exporters.
- Financial rationalisation: Revised cost-sharing norms, event-wise financial ceilings and partial airfare support for exporters with turnover up to  75 lakh.
- Digital governance: End-to-end online processes via trade.gov.in, including approvals, fund release, monitoring and feedback.
- Outcome tracking: Mandatory online feedback on buyer quality, leads generated and market relevance, with data-driven refinement of guidelines.
- Technology push: Upcoming component for Proof-of-Concepts and product demonstrations in tech-intensive and sunrise sectors.

### Significance:

- Enhances global competitiveness of Indian exports by improving buyer access and market intelligence.
- Reduces entry barriers for MSMEs and first-time exporters into international markets.
- Supports India's goal of export diversification beyond traditional markets and products.

# Pro-Active Governance and Timely Implementation (PRAGATI)

## Context:

Land acquisition has emerged as the single largest bottleneck in infrastructure development, accounting for 35% of project delays, the Cabinet Secretary said after the 50th PRAGATI meeting.


## About Pro-Active Governance and Timely Implementation (PRAGATI):

### What it is?

- PRAGATI is a centralised, ICT-enabled governance platform for grievance redressal, programme implementation, and project monitoring, enabling real-time review of projects of national importance.
- Established in: Launched on 25 March 2015 by the Government of India, under the Prime Minister's leadership.

### Aim:

- Ensure timely implementation of infrastructure and development projects.
- Resolve inter-ministerial and Centre–State coordination issues.
- Promote e-transparency, accountability, and outcome-based governance.

### Key features:

- Three-tier architecture: Links PMO, Union Secretaries, and State Chief Secretaries on one platform, enabling direct coordination, faster decisions, and clear accountability across governance levels.
- Monthly PM-chaired reviews: Provides high-level political oversight through regular video-conference meetings, ensuring time-bound resolution of critical project delays.
- Digital–GIS integration: Uses real-time data, geo-spatial mapping, and live visuals to objectively track project progress and identify ground-level bottlenecks.
- Unified data sourcing: Integrates CPGRAMS, PMG, and MoSPI databases to create a single monitoring dashboard, reducing silos and improving policy coordination.
- Escalation framework: Allows unresolved issues to move from ministries to higher institutional and PM-level review, ensuring decisive inter-ministerial action.
- Digital follow-up: Tracks all directions electronically until closure, ensuring sustained monitoring, accountability, and outcome delivery.

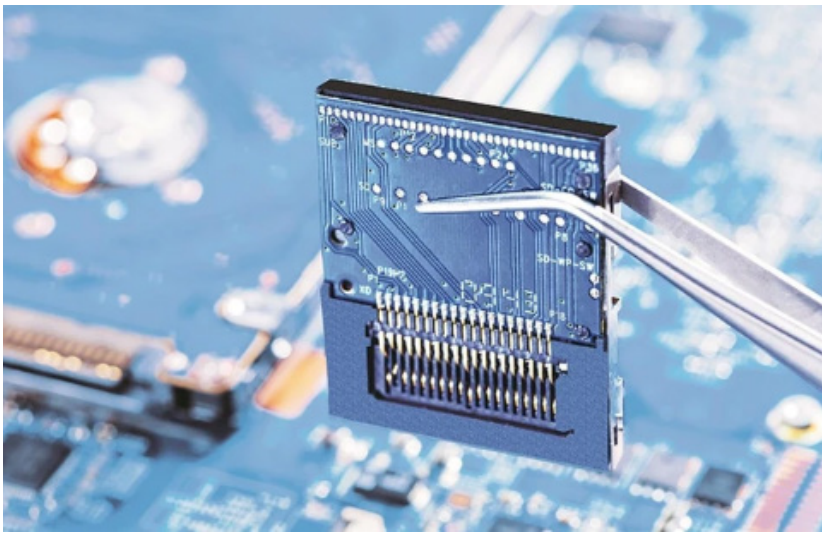
### Significance:

- Reviewed 3,300+ projects worth  85 lakh crore with 7,156 issues resolved so far.
- Accelerated completion of legacy projects pending since the 1990s.
- Strengthens cooperative federalism by bringing Centre, States, and local governments onto one platform.

# Electronics Components Manufacturing Scheme (ECMS)

## Context:

The Ministry of Electronics and Information Technology (MeitY) approved 22 additional projects under the Electronics Components Manufacturing Scheme (ECMS) involving  41,863 crore of investment.



## About Electronics Components Manufacturing Scheme (ECMS):

### What it is?

- ECMS is a flagship incentive scheme to promote domestic manufacturing of electronic components, sub-assemblies, and capital equipment, reducing import dependence in India's electronics sector.
- Ministry: Implemented by the Ministry of Electronics and Information Technology (MeitY).
- Launched in: Approved by the Union Cabinet in 2024 with a total outlay of  22,919 crore.

### Tenure:

- Turnover-linked incentive: 6 years (including 1-year gestation period)
- Capex incentive: 5 years

### Key features:

- Incentive structure: Turnover-linked, capex-based, and hybrid incentives to offset cost disabilities
- Target segments: PCBs, Camera Modules, Copper-Clad Laminates, Polypropylene Films, and electronics capital equipment
- Performance-based payouts: Incentives linked to incremental production and employment, rewarding early movers
- Strategic targets: 100% domestic demand for Copper-Clad Laminates, 20% for PCBs, 15% for Camera Modules
- Ecosystem approach: Complements PLI for Electronics and India Semiconductor Mission

### Significance:

- Strengthens component-level manufacturing, the weakest link in India's electronics value chain.
- Enhances Domestic Value Addition (DVA) and integration with Global Value Chains (GVCs).
- Expected to generate ~91,600 direct jobs and boost indigenous R&D.

## Bureau of Indian Standards (BIS)

### Context:

The 79th Foundation Day of the Bureau of Indian Standards (BIS) was celebrated, where Union Minister highlighted BIS's shift from a regulatory to a facilitative approach, aligned with ease of doing business and quality culture.

### About Bureau of Indian Standards (BIS):

### What it is?

- BIS is India's National Standards Body, responsible for standardisation, certification, hallmarking, and quality assurance of goods and services to protect consumers and enhance global competitiveness.

## Established in:

- 1987 (came into force on 1 April 1987)
- Currently governed under the BIS Act, 2016

## Headquarters: New Delhi

## History:

- 1947: Indian Standards Institution (ISI) established (origin traced to a 1946 memorandum).
- 1952–56: ISI Certification Marks Scheme launched (ISI mark).
- 1987: ISI transformed into BIS with wider powers.
- 2016: BIS Act, 2016 strengthened mandate, consumer participation, and global alignment.

## Core functions:

- Standards formulation (over 23,300 Indian Standards across traditional & emerging sectors).
- Product certification (including fast-track licensing).
- Compulsory Registration Scheme & Foreign Manufacturers Certification Scheme.
- Hallmarking of precious metals.
- Laboratory services & recognition; testing infrastructure.
- Consumer awareness & training; sale of Indian Standards; information services.

## New initiatives launched:

1. Beta launch of BIS Standardisation Portal: End-to-end digital lifecycle for standards (proposal publication), with dashboards, role-based access, faster timelines, and transparency.
2. SHINE – Standards Help Inform & Nurture Empowered Women: Women-centric capacity building via SHGs/NGOs, positioning women as quality ambassadors in communities.
3. BIS–SAKSHAM (Annual Excellence Recognition Scheme): Institutional recognition of knowledge, skills, and high-impact merit.

Chapter-
8

# INTERNATIONAL RELATION

## WHO Pharmacovigilance

### Context:

Union Health Minister announced that India has risen to 8th position globally in contributions to the WHO pharmacovigilance database, from 123rd a decade ago.

### About WHO Pharmacovigilance:

### What it is?

- WHO pharmacovigilance refers to the global system for monitoring, detecting, assessing, and preventing adverse effects of medicines and vaccines, coordinated through international data-sharing mechanisms.

### Organisation involved: World Health Organization (WHO)

### Aim:

- Ensure patient safety by early identification of medicine- and vaccine-related risks.
- Strengthen regulatory decision-making through real-world safety data.
- Promote safe, rational, and effective use of medicines worldwide.

### Key functions:

- ADR collection and analysis: Systematically gathers reports of adverse drug and vaccine reactions from hospitals, manufacturers, and regulators, and analyses them to identify safety patterns across diverse populations.
- Signal detection: Identifies new, rare, or unexpected side effects by detecting statistical signals in large datasets that may not appear during pre-marketing clinical trials.
- Risk–benefit assessment: Continuously evaluates whether the therapeutic benefits of a medicine or vaccine outweigh its risks, especially when used long-term or in vulnerable groups.
- Regulatory support: Provides evidence-based inputs for regulatory actions such as safety warnings, label modifications, usage restrictions, or market withdrawal of unsafe products.
- Capacity-building and data sharing: Strengthens national pharmacovigilance systems through training and technical support, while enabling global exchange of safety data among WHO member countries.

### Significance:

- Protects public health beyond clinical trials by capturing long-term and population-wide effects
- Strengthens trust in immunisation and drug programmes
- Supports national initiatives like Universal Immunisation Programme, National TB Elimination Programme, and Anaemia Mukt Bharat

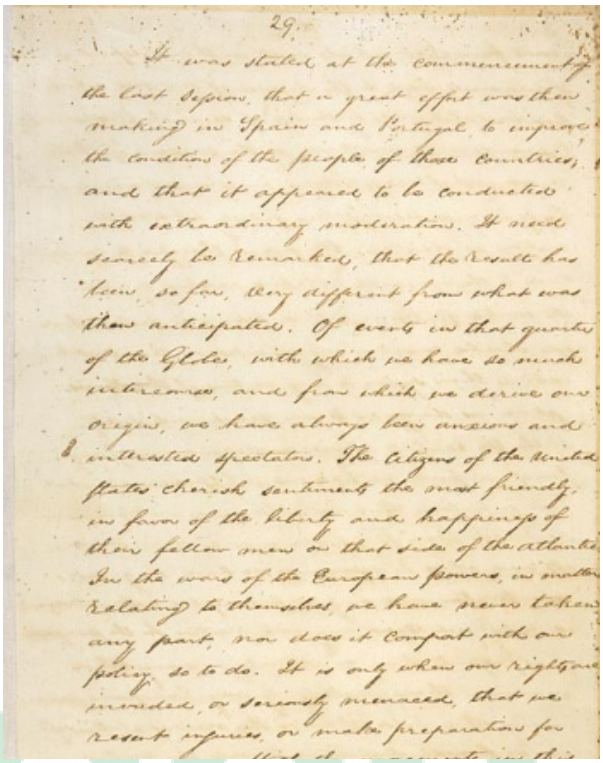
### India's rank:

- 2009–2014: 123rd globally.
- 2025: 8th globally in WHO pharmacovigilance contributions.
- Recognition of Indian Pharmacopoeia standards in 19 Global South countries.

## Monroe Doctrine

### Context:

The U.S. action against Venezuela and the capture of its president has been justified by Donald Trump by invoking the Monroe Doctrine, a 19th-century U.S. policy.



29.

It was stated at the commencement of the last Session, that a great effort was then making in Spain and Portugal to improve the condition of the people of those Countries, and that it appeared to be conducted with extraordinary moderation. It need scarcely be remarked, that the result has been, so far, very different from what was then anticipated. Of events in that quarter of the Globe, with which we have so much intercourse, and from which we derive our origin, we have always been anxious and interested spectators. The citizens of the United States cherish sentiments the most friendly, in favor of the liberty and happiness of their fellow men on that side of the Atlantic. In the wars of the European powers, in matters relating to themselves we have never taken any part, nor does it comport with our policy so to do. It is only when our rights are invaded, or seriously menaced, that we resent injuries, or make preparations for

## About Monroe Doctrine:

### What it is?

- The Monroe Doctrine is a U.S. foreign policy principle asserting that the Western Hemisphere is the exclusive sphere of influence of the United States, and that any external (especially European) interference would be treated as a hostile act against the U.S.

### Established in:

- Proclaimed on December 2, 1823 by James Monroe, the 5th President of the United States.
- Announced during his State of the Union address to the U.S. Congress.

### Core features of the doctrine:

1. No new European colonisation: European powers should not establish new colonies in North or South America.
2. Non-interference warning: Any European intervention in the Americas would be viewed as a threat to U.S. security.
3. Reciprocal restraint: The U.S. promised not to interfere in existing European colonies or in European internal affairs.
4. Separate spheres: The political systems of Europe and the Americas were to remain distinct.

### Expansion through the Roosevelt Corollary:

- In 1904, President Theodore Roosevelt added the Roosevelt Corollary, claiming a U.S. right to intervene in Latin American countries to prevent instability or European involvement—especially over debt crises.
- This transformed the doctrine from a defensive warning into a tool of active intervention.

### Link to the recent Venezuela issue:

- In January 2026, after U.S. forces captured Venezuelan President Nicolás Maduro, President Trump described the operation as a modern update of the Monroe Doctrine.
- The U.S. argued that instability in Venezuela and the presence of rival global powers justified American control during a "transition period".
- Critics argue this represents neo-imperialism, reviving a doctrine historically used to justify U.S. interventions in Cuba, Nicaragua, Haiti, the Dominican Republic, and now Venezuela.

Chapter-
9

# SOCIAL ISSUES

## Farmer suicides in India

### Context:

A 28-year analysis of NCRB data (1995–2023) shows that farmer and agricultural labourer suicides remain structurally entrenched in India, with a sharp resurgence in 2023.

### About Farmer suicides in India:

### What it is?

- Farmer suicides refer to deaths by suicide among cultivators and agricultural labourers, recorded annually by the National Crime Records Bureau (NCRB).
- It is a key indicator of agrarian distress, reflecting failures in income security, credit access, crop stability, and rural livelihoods.

### Trends (1995–2023):

- Scale of crisis: Around 3.94 lakh farmers and agricultural labourers died by suicide over 28 years—about 13,600 deaths annually.
- Regional concentration: Southern and western India account for ~72.5% of all cases; Maharashtra and Karnataka are persistent epicentres.
- Peak years: The crisis intensified post-1995 (WTO entry), peaking between 2000–2009; 2002 was the deadliest year.
- Crop-linked distress: Expansion of Bt cotton in rain-fed regions raised input costs and risk, aggravating indebtedness amid weak price support.
- Temporary relief phase: Suicides declined after 2010, coinciding with MGNREGA, expanded insurance, and debt relief—lowest during 2015–2019.
- Recent reversal: 2023 saw a ~75% rise over 2022, partly due to delayed Covid-era reporting but also renewed shocks (droughts, price crashes).

## Transforming a Waste-Ridden Urban India

### Context:

Urban waste management has gained renewed global focus after COP30 (Belém, 2025) placed waste and circularity at the core of climate action, committing funds to cut methane emissions through initiatives like No Organic Waste (NOW).

### About Transforming a Waste-Ridden Urban India:

### What it is?

- It refers to India's shift from a linear "collect–dump" model of urban waste management to a circular economy framework, where waste is minimised, segregated, recycled, and reused as a resource to reduce pollution, emissions, and health risks in rapidly expanding cities.

## Trends / data in urban waste:

1. Rising waste generation: Urban India is projected to generate 165 million tonnes of municipal solid waste annually by 2030, reflecting rapid urbanisation.
2. Future burden: By 2050, waste generation could rise to 436 million tonnes as the urban population approaches 814 million.
3. Climate impact: Urban waste is estimated to emit over 41 million tonnes of greenhouse gases, mainly methane from organic waste.
4. Construction debris: Cities generate about 12 million tonnes of construction and demolition (C&D) waste annually, a major contributor to urban pollution.

## Organic Waste: An Opportunity

- Composting at scale: Large volumes of urban wet waste can be converted into nutrient-rich manure, reducing landfill pressure and closing the soil–nutrient loop.
  - E.g. Under the Market Development Assistance (MDA) scheme, 2025, 1,500/tonne subsidy enabled cities like Varanasi to supply Fermented Organic Manure (FOM) to regional farmers.
- Bio-methanation & CBG: Anaerobic digestion of organic waste produces Compressed Biogas (CBG), linking waste management with clean energy and mobility.
  - E.g. By 2025, GOBARdhan facilitated ~750 CBG projects, with Indore's 550 TPD plant fueling city buses and setting a national benchmark.
- Methane reduction: Diverting wet waste from dumpsites prevents anaerobic decay, significantly cutting methane—a potent short-lived climate pollutant.
  - E.g. Alappuzha's decentralised composting, cited in the India Zero Waste Alliance (2025) report, showed measurable GHG reductions aligned with India's NDCs.
- Decentralised solutions: On-site waste processing eliminates transport costs, emissions, and secondary pollution from centralised dumping.
  - E.g. Under SBM-U 2.0's Swachh Campus (2025) norms, hotels in Srinagar and Pattan achieved 100% in-situ food waste processing.
- Livelihood generation: Circular waste systems formalise informal labour, creating dignified green jobs and local economic value.
  - E.g. The SafaiMitra Suraksha Programme (2025) integrated SHGs like Green Roing (Arunachal Pradesh) into composting and MRF operations.

## Role of Swachh Bharat Mission (Urban) 2.0:

- Garbage Free Cities (GFC) framework: A star-rating system institutionalises scientific waste processing and zero-dumping as measurable governance outcomes.
  - E.g. In Swachh Survekshan 2025, Navi Mumbai and Surat achieved 7-Star GFC status through 100% processing and legacy waste clearance.
- Dump-site remediation: Bio-mining reclaims land by segregating legacy waste into soil enricher, RDF, and recyclables.
  - E.g. MCD (Aug 2025) reported 25,000 MT/day bio-mining across Ghazipur, Bhalswa, and Okhla landfills.
- Source segregation push: Mandatory three-bin segregation improves recycling purity and processing efficiency across the waste value chain.
  - E.g. Mizoram's Adopt-a-Dustbin Scheme (2025) ensured near-100% segregation in Aizawl's commercial hubs through community monitoring.
- Integration with climate goals: SBM-U embeds circular economy principles to reduce urban emissions, especially methane.
  - E.g. MoEFCC's 2025 Conclave linked SBM-U grants with reduction of Short-Lived Climate Pollutants (SLCPs).
- Behavioural change: Jan Andolan strategies make waste segregation a social norm through peer learning and nudges.

- E.g. Swachh Shehar Jodi (2025) paired cities like Ambikapur with laggards using gamified waste-tracking apps.

### Challenges Associated:

- Poor segregation at source: Mixed waste contaminates recyclables, damages machinery, and undermines waste-to-energy viability.
  - E.g. Supreme Court (Feb 2025) flagged NCR cities like Gurgaon for <20% segregation, leading to WtE plant failures.
- Plastic waste complexity: Multi-layered plastics lack viable recycling markets, causing leakage despite EPR norms.
  - E.g. CPCB EPR Portal (2025) showed shortages of food-grade recycled resin despite mandatory recycled-content rules.
- C&D waste enforcement gaps: Illegal dumping of debris clogs drains and worsens PM10 pollution in cities.
  - E.g. CAG Audit (2025) found over 70% of ULBs lacked designated C&D waste collection points.
- Municipal capacity constraints: ULBs face shortages of funds, skilled staff, and technical oversight to run processing plants.
  - E.g. NITI Aayog (2025) noted Tier-3 cities in UP lack sanitary inspectors to operate bio-methanation units.
- Market & quality issues: Poor compost quality reduces farmer trust and commercial uptake.
  - E.g. India Zero Waste Alliance (2025) reported high rejection of city compost due to weak BIS enforcement and contamination.

### Way Ahead:

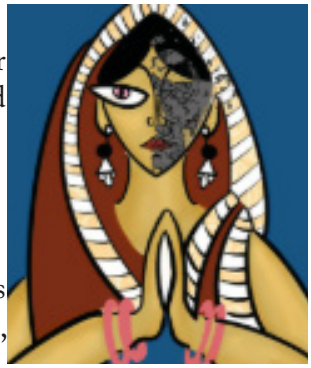
- Strengthen circular economy laws: Effective implementation of Environment (C&D) Waste Management Rules, 2025 from April 2026 can fix accountability gaps.
- Scale EPR beyond plastics: Extending EPR to textiles, e-waste fractions, and packaging can shift the burden to producers.
- Urban wastewater reuse: Cities must accelerate reuse under AMRUT, as seen in treated wastewater supply to industries in Nagpur.
- City-to-city knowledge sharing: India's Cities Coalition for Circularity (C-3) can diffuse best practices across Asia-Pacific urban centres.
- Citizen incentives: Linking segregation and recycling to user-fee rebates or carbon credits can convert citizens into stakeholders.

### Conclusion:

India's urban waste crisis is no longer an aesthetic issue but a climate, health, and economic challenge. By embedding circularity, decentralised solutions, and citizen participation into urban governance, waste can become a resource. A decisive shift today will determine whether India's cities remain swamps of waste or engines of sustainable growth.

## Acid attacks in India

### Context:



The acquittal of the main accused in the 2009 Delhi acid attack case involving survivor and activist Shaheen Malik has renewed focus on India's weak conviction record in acid attack cases.

### About Acid attacks in India:

### What it is?

- An acid attack involves throwing or administering corrosive substances (commonly sulphuric, hydrochloric, or nitric acid) with intent to disfigure, maim, or permanently harm a person.
- These attacks cause severe burns, blindness, long-term disability, psychological trauma, and social exclusion, and are overwhelmingly gendered crimes against women.

### Trends in India:

- Reported cases (NCRB 2023):
- 207 acid attack cases reported (up from 202 in 2022 and 176 in 2021).
- 65 cases of attempted acid attacks.

### Judicial outcomes (2023):

- 703 cases pending in courts.
- Only 16 convictions and 27 acquittals recorded during the year.

### State-wise concentration (2023):

- West Bengal (57), Uttar Pradesh (31), Gujarat (15) reported the highest cases.

### Under-reporting:

- NGOs like Acid Survivors Trust International estimate ~1,000 attacks annually, indicating large-scale under-reporting due to stigma and fear.

### Causes of acid attacks:

- Rejection and coercive control: Acid attacks are retaliatory acts to reassert male dominance when women refuse marriage or sexual advances, reflecting entitlement over consent. Courts view them as outcomes of structural power imbalance, not sudden rage.
- Domestic and family disputes: Dowry conflicts, marital discord, and suspicion of infidelity escalate into acid violence because disfigurement is intended as lifelong punishment, exposing how private patriarchy spills into public criminality.
- Patriarchal punishment for autonomy: Acid attacks aim to erase a woman's identity and mobility for asserting independence. In Laxmi v. Union of India (2014), the Supreme Court held acid violence to be a permanent violation of Article 21 (life with dignity).
- Easy availability of acid: Weak enforcement of ID-based sales and stock registers allows cheap, anonymous access to acid, diluting the preventive intent of judicial guidelines.
- Low deterrence in criminal justice: Delayed investigation and prolonged trials reduce perceived risk for offenders. In Parivartan Kendra v. Union of India (2016), the Court noted that punishment without swift justice fails to deter calculated cruelty.

### Government measures and legal framework:

### Criminal Law (Amendment) Act, 2013:

- Introduced Sections 326A & 326B IPC (now Section 124, Bharatiya Nyaya Sanhita):
- Minimum 10 years to life imprisonment for acid attacks.
- 5–7 years for attempt.

### Victim compensation:

- Sections 357A–C CrPC mandate State Victim Compensation Schemes and free medical treatment in all hospitals.
- Supreme Court (Laxmi v. Union of India) mandated minimum 3 lakh compensation.
- Regulation of acid sales (SC guidelines, 2013): Photo ID for buyers, register maintenance, SDM oversight.
- Advisories by MHA (2013, 2015): Regulation of sale, fast-tracking of trials, rehabilitation support

### Challenges in prevention and justice

- Poor enforcement of acid sale rules: Despite Supreme Court directions, SDMs and local authorities are rarely penalised for illegal acid sales, creating regulatory impunity. Bangladesh's experience shows that administrative accountability, not just criminal law, is crucial for prevention.
- Investigative lapses and evidentiary failure: Weak forensic linkage, poor motive reconstruction, and delayed charge-sheets cripple prosecutions. Courts have stressed that acid attack cases demand higher investigative standards due to the irreversible nature of harm.
- Judicial delays eroding survivor confidence: Trials extending over a decade convert justice into a second trauma for survivors. The Supreme Court has repeatedly held that inordinate delay itself violates Article 21, especially in gender-based violence cases.

- Abysmally low conviction rates: Negligible convictions despite stringent laws indicate enforcement failure rather than legislative inadequacy.
- Inadequate and delayed rehabilitation: Though compensation is legally mandated, survivors often receive it years later after litigation. In Parivartan Kendra, the Court noted that 3 lakh is grossly insufficient for lifelong medical and psychological care.

### Way ahead:

- Comprehensive ban on retail acid sale: Adopting a Bangladesh-style regime—licensed sale, criminal liability for sellers, and shop sealing—would convert Supreme Court guidelines into enforceable administrative law.
- Fast-track courts and time-bound trials: Acid attack cases must be tried within fixed timelines, aligning with MHA advisories and Article 21 jurisprudence on speedy justice.
- National lifelong rehabilitation fund: Implementing the Justice J.S. Verma Committee recommendation would ensure comprehensive support covering lifelong medical, psychological, educational, and livelihood needs.
- Strengthen deterrence through legal harmonisation: Reducing the moral and punitive gap between acid attack and attempt reflects the Court's view that intent and potential harm are equally culpable.

### Conclusion:

Acid attacks represent a brutal intersection of gender violence, weak enforcement, and judicial delay in India. Despite strong laws on paper, poor implementation and low conviction rates have blunted deterrence. A survivor-centric justice system—combining strict prevention, swift trials, and lifelong rehabilitation—is essential to end this crime.

## Open Network for Digital Commerce (ONDC)

### Context:

Online ticket booking for 170+ centrally protected monuments and museums has been enabled by the Archaeological Survey of India (ASI) on the Open Network for Digital Commerce (ONDC) platform.

### About Open Network for Digital Commerce (ONDC):

### What it is?

- ONDC is an open, interoperable digital network that enables buying and selling of goods and services across platforms using open protocols, without platform monopolies.

### Launched in: April 2022

### Ministry:

- Department for Promotion of Industry and Internal Trade (DPIIT)
- Ministry of Commerce and Industry

### Aim:

- Democratise digital commerce by breaking platform silos.
- Create a level playing field for sellers (especially MSMEs), buyers, and service providers.
- Promote inclusivity, competition, innovation, and cost efficiency in e-commerce.

## How ONDC works?

- ONDC functions as a decentralised digital network, not a central marketplace. It does not own listings, control sellers, or process orders; instead, it connects independent platforms through common digital rules.
- Using open protocols and standardised APIs, any buyer app can discover products or services listed on any seller app across the network, regardless of the company that built the app. Once a buyer places an order, different specialised participants handle each part of the transaction.
- Buyer Applications provide the customer interface for search, price comparison, and ordering.
- Seller Applications manage product catalogues, inventory, pricing, and order confirmation.
- Logistics Providers handle pickup, delivery, and tracking across regions.
- Technology Enablers supply the digital infrastructure, integrations, and tools.
- Because all participants follow the same open standards, any ONDC-compliant app can seamlessly discover, connect, and transact with any other, ensuring interoperability, competition, and freedom of choice for users.

## Domains covered so far:

| Category Group | Category Group | Category Group |
|---|---|---|
| Food & Beverage | Beauty & Personal Care | Mobility (auto, cabs, flights, metro) |
| Grocery | Health & Wellness | |
| Financial Services (credit, insurance, investments) | | |
| Fashion & Footwear | Gift Cards | Services (skilled & subscription-based) |
| Home & Kitchen | Electronics | Agriculture (inputs, outputs, services) |
| ONEST – Education & Training | — | — |

Chapter-
10

# DEFENCE

## Pralay Missile

### Context:

DRDO has successfully conducted a salvo launch of two Pralay missiles in quick succession from the same launcher off the Odisha coast, marking a key milestone in user evaluation trials.

### About Pralay Missile:

### What it is?

- Pralay is an indigenously developed solid-propellant, quasi-ballistic surface-to-surface missile designed for high-precision conventional strikes against a wide range of targets.

### Aim:

- Provide the Indian Army and Indian Air Force with a rapid-response, high-accuracy conventional strike capability
- Strengthen tactical deterrence and battlefield dominance through precision strikes

### Key features:

- Quasi-ballistic trajectory: Makes interception difficult for enemy air defence systems.
- Range: ~150 km to 500 km
- Type: Quasi-ballistic surface-to-surface missile
- Solid propellant: Ensures quick launch readiness and high reliability.
- Advanced guidance and navigation: Delivers high precision against diverse targets.
- Multiple warhead capability: Can carry different types of warheads for varied mission requirements.
- Salvo launch capability: Ability to fire multiple missiles in quick succession from the same launcher, enhancing saturation attack potential.

### Significance:

- Boosts indigenous missile capability under Atmanirbhar Bharat in defence.
- Enhances India's conventional deterrence without escalating to strategic nuclear use.
- Improves operational readiness and survivability through rapid, accurate strikes.

## Suryastra rocket system

### Context:

The Indian Army has signed a 293-crore emergency procurement contract with NIBE Ltd., in collaboration with Elbit Systems, to induct the Suryastra rocket system, a long-range universal launcher with strike ranges up to 300 km.

## About Suryastra rocket system:

### What it is?

- Suryastra is India's first indigenous universal multi-calibre long-range rocket launcher system, capable of conducting precision surface-to-surface strikes at 150 km and 300 km ranges. It is designed to integrate multiple rocket and missile types on a single launch platform.

### Manufacturer: NIBE Ltd. (India)

### Technology partner: Elbit Systems

- Technology base: Israeli PULS (Precise & Universal Launching System), adapted for Indian requirements under a Technology Collaboration Agreement (July 2025).

### Aim:

- To enhance deep-strike and stand-off firepower of the Indian Army.
- To provide a single, flexible rocket artillery platform capable of both area saturation and high-precision strikes.
- To advance Make in India and reduce dependence on imported long-range artillery systems.

### Key features:

- Range: 150 km and 300 km (tactical deep-strike capability).
- Universal launcher: Can fire multiple calibres (122 mm, 160 mm, 306 mm) and compatible tactical missiles.
- High precision: Circular Error Probable (CEP) of < 5 metres in trials.
- Multi-target engagement: Simultaneous strikes at different ranges.
- Mobility: Adaptable to 4×4, 6×6, and 8×8 wheeled chassis.
- Emergency procurement: Acquired under EP powers for rapid induction without prolonged approvals.

### Significance:

- Major leap over Pinaka: Surpasses existing indigenous rocket systems in range and precision.
- Deterrence enhancement: Strengthens India's conventional deterrence against China and Pakistan through long-range precision fires.
- Joint firepower: Improves integration across Army strike formations and joint operations.

## Army set to deploy ramjet-powered shells for 155 mm artillery guns

### Context:

The Indian Army is set to become the first armed force in the world to operationally deploy ramjet-powered artillery shells for its 155 mm guns.

## About Army set to deploy ramjet-powered shells for 155 mm artillery guns:

### What it is?

- Ramjet-powered artillery shells are advanced 155 mm projectiles fitted with an air-breathing ramjet propulsion module, allowing them to sustain thrust after being fired from a conventional artillery gun.

### Key features:

- Extended range: Enhances the reach of standard 155 mm shells by 30–50% without increasing gun barrel length.
- Compatibility: Can be retrofitted onto existing 155 mm shells, making them usable across the Army's current artillery inventory, including the M777 ultra-light howitzer.
- High efficiency: Uses air-breathing propulsion, providing a higher specific impulse (>4000 Ns/kg) compared to solid rocket-assisted projectiles.
- Operational flexibility: Enables deeper precision strikes while retaining the destructive power of conventional artillery ammunition.
- Indigenous innovation: Developed jointly by IIT Madras with support from the Army Technology Board (ATB).

## About Ramjet technology:

### What it is?

- A ramjet is a type of air-breathing jet engine with no moving parts, designed to operate efficiently at supersonic speeds. Unlike rockets, it does not carry its own oxidiser and instead uses atmospheric oxygen for combustion.

### How it works?

- The shell is first launched from an artillery gun at ~Mach 2.
- At this speed, incoming air is naturally compressed (ram compression) as it enters the intake.
- Fuel injected into the compressed air ignites, producing thrust.
- The continuous thrust allows the shell to maintain velocity and extend range far beyond conventional ballistic limits.

### Significance:

- First-ever practical application of ramjet propulsion in artillery shells.
- Achieves long-range capability without developing entirely new missile systems.
- Enhances India's deep-strike and counter-battery firepower against adversaries.

## Gender Budgeting & Legislative Measures for Social Equality

### Context:

Women form more than 48 per cent of India's 145 crore population. The sheer numbers underline the need for strong tenets of gender equality in health, education, employment, decision¬ making, etc. A foundational plank needed to ensure gender equality is provided by an appropriate legal framework, backed by the Indian Constitution, which was promulgated almost 76 years ago. In this context, this article assesses some initiatives taken to achieve gender inclusivity throughout India's growth trajectory.

### Enabling Legal Provisions

### Democracy and Gender Equality

- Democracy sets the foundation for gender equality.
- Many countries gave women voting rights later than men.
- India established universal adult suffrage from democratic inception.

### Indian Constitution Provisions

### Articles promoting equality:

- Article 14: Right to Equality
- Article 15: Prohibition of Discrimination
- Article 16: Equality of Opportunity in Public Employment
- Article 21: Protection of Life and Personal Liberty
- Article 23: Prohibition of Human Trafficking and Forced Labour
- Article 39: Means of Livelihood
- Article 42: Just and Humane Work Conditions
- Article 51A: Renounce Practices Against Women's Dignity
- Article 243: Reservation of Seats in Panchayati Raj and Municipalities
- Article 325: Inclusion in Electoral Rolls

### Reservation for Women

- 33% reservation for women in Panchayati Raj Institutions and urban local bodies.
- 106th amendment reserves seats in Lok Sabha and State Assemblies for women, with a focus on Scheduled Castes and Scheduled Tribes.

### Legislative Measures

- Sexual Harassment at Workplace Act (2013) promotes safety in workplaces.
- SHe-Box launched in 2024 for online complaint registration.
- Protection of Women from Domestic Violence Act (2005) safeguards rights at home and outside.
- Dowry Prohibition Act (1961) strengthens women's legal rights against dowry.
- Indecent Representation of Women Act (1986) prohibits indecent portrayal of women.
- Commission of Sati (Prevention) Act (1987) punishes the glorification of Sati.

### Labour Codes

- Four Labour Codes effective from November 21, 2025, consolidate 29 labour laws.
- Aims include reducing definitions and authority multiplicity, enhancing implementation, and promoting technology use.
- Legal measures support productivity, inclusive growth, and gender equality for Viksit Bharat@2047.

## Way Ahead

- The nation is committed to remaining steadfast in its development path by focusing on strategic investments in public welfare schemes with empowering impacts. Women play a critical role in that development. Higher female literacy and increased women's participation in workforce and leadership in sectors like science, education, business, health and governance contribute directly to economic growth and social advancement. For the country to become Viksit Bharat by 2047, it is imperative that during the Amrit Kaal (2025-2047), women be socially, economically and politically empowered, breaking systemic stereotypes, and the country become a republic of equals.

Chapter-
12

KURUKSHETRA FEBRUARY 2026

## Empowering Farmers through Agri Startups

### Context:

Agri startups are changing India's entrepreneurial scene by combining new ideas with traditional agriculture. They are important for developing sustainable business models. India is now one of the top five startup hubs globally, supported by initiatives like Startup India, making it the third-largest unicorn hub

Growth of Agricultural Startups in India

India's startup ecosystem has grown rapidly, becoming the third fastest-growing hub for entrepreneurs after the USA and China. As of April 2023, a report lists India ranks tenth in the Business Environment Ranking among 82 countries. To achieve the goal of a $5 trillion economy by 2024-2025, startups are seen as key contributors to development and innovation for socio-economic improvement.

Proactive Government Policies & Supportive Agri- Startup Ecosystems

### Startup Environment in India

- India has developed an innovation-driven startup landscape.
- Government policies aim to turn job seekers into job creators.

### Make in India Initiative

- Launched in 2014 to make India a global manufacturing hub.
- Focuses on investments, skill development, intellectual property, and infrastructure.
- Spurs technology-led innovations, including in agri-tech.

### Startup India Initiative

- Initiated in 2016 with a 19-point action plan to expand the startup ecosystem.

### Atal Innovation Mission (AIM)

- Nurtures startups through incubators and support systems for national challenges.

### Agri-Entrepreneurship Development Programme

- Launched in 2018-19 to support agri-startups with incubation and grants.
- Supported over 1,100 agri-startups and trained 3,500 entrepreneurs.

### Incubators and Accelerators

- Numerous institutions offer support from ideation to commercialization.
- Over 100 agriculture-focused incubators nurtured by various government bodies.

### Innovation Platforms

- Agri India Hackathon connects startups with scientists and industry leaders.
- Startups develop diverse agri-tech solutions to address agricultural challenges.

### Functional Domains of Agricultural Start-ups in India

### Agri-Startups Overview

- Agri-startups focus on crops, livestock, and fisheries.
- Classified into agri-tech, fisheries, dairy farming, animal husbandry, food processing, and organic agriculture.
- Development stages: Ideation, Validation, Early Traction, and Scaling.

### Key Areas of Impact

- Precision Agriculture: Uses IoT, drones, and satellite imaging (Examples: Fasal, Cropln).
- Supply Chain and Logistics: Optimizes farm-to-fork delivery (Examples: DeHaat, Ninjacart).
- Input Retailing and Advisory: App-based agri-inputs and crop advisory (Examples: Agro Wave, Agri Bazaar).
- Fintech and Insurance: Provides access to credit and weather-based insurance (Examples: Samunnati, Gram Cover).

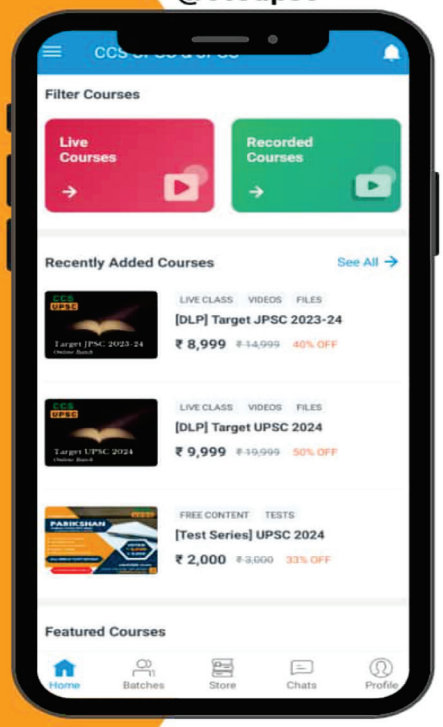
### Conclusion

Agri-startups in India are innovating in agriculture, improving rural livelihoods, and supporting sustainability goals. They can drive growth and resilience in farming with policy support, investment, and capacity-building.

# CCS UPSC & JPSC

@ccsupsc

CCS UPSC




## अब करें तैयारी UPSC/JPSC/BPSC की कहीं से!

- Live + Recorded क्लास
- विशेष रूप से तैयार समग्र पाठ्यसमग्री
- अखिल भारतीय टेस्ट सीरीज
- नि:शुल्क पाठ्यसमग्री
- नि:शुल्क टेस्ट सीरीज
- करेंट अफेयर्स
- 24*7 डाउट समाधान
- बेहद किफायती फीस
- उच्च गुणवत्ता की तैयारी

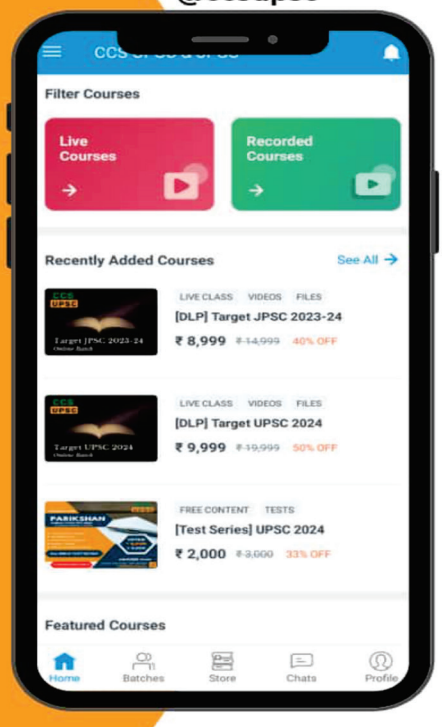
GET IT ON Google Play

**Download: ccsupsc.com/get-app**


# CCS UPSC & JPSC

@ccsupsc

CCS UPSC


## Now prepare for UPSC/JPSC/BPSC from Anywhere!

- Live + Recorded Classes
- Study Materials
- All India Test Series
- Free Study Materials
- Free Test Series
- Current Affairs
- 24*7 Doubt Support
- Highly Affordable Fee
- Highly Effective Prepration


GET IT ON Google Play

**Download: ccsupsc.com/get-app**