IAS ORIGIN
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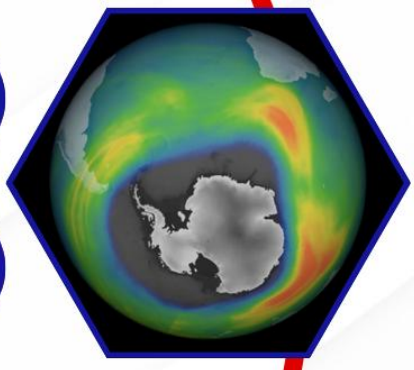
YOUR PATHWAY TO UPSC SUCCESS

WEEKLY CURRENT AFFAIRS

1ST DEC TO 12TH DECEMBER



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News In Short

General Studies-1

01 SWARGADEO CHAOLUNG SUKAPHA

Every year, Assam Day (2 December) is celebrated to honour Chaolung Sukapha. Chaolung Sukapha was the founder of the Ahom Kingdom (1228 AD) and is known as the 'Architect of Greater Assam'.

BACKGROUND & CONTEXT

Chaolung Sukapha was a Tai prince from Mong Mao (present-day Yunnan and Myanmar region) who migrated to the Brahmaputra Valley around 1228 CE with a small group of followers. His migration marked the beginning of large-scale Tai cultural influence in the northeastern region. Sukapha chose Charaideo as his first capital, laying the foundation for the Ahom state, which gradually expanded across Upper Assam.

The Ahoms introduced new administrative systems, wet-rice cultivation, military organisation, and an assimilation-oriented policy with local tribes such as the Bodo-Kachari, Chutiya, Moran, Maran, etc. Over centuries, the Ahom state successfully resisted Mughal invasions, most notably in the Battle of Saraighat (1671). The legacy of Sukapha is central to Assamese identity, regional political discourse, and cultural heritage.

KEY FACTS / KEY FEATURES

ABOUT SWARGADEO CHAOLUNG SUKAPHA

- Born: c. 1189 CE
- Origin: **Tai (Shan) lineage**, State of Mong Mao

- Migrated to Assam in 1228 CE with ~9,000 people
- Established Ahom state → ruled from **1228–1268 CE**
- Title "Swargadeo" = "Lord of Heaven"; "Chaolung" = "Great Lord"

AHOM STATE FORMATION

- Capital: Charaideo (symbolic capital of Ahom kings)
- Adopted Ahom–Tai administrative system blended with tribal customs
- Promoted wet-rice cultivation (Bao dhan, Sali varieties)
- Introduced Paik system (labour and military organisation)

CULTURAL IMPACT

- Syncretic blending of Tai, tribal, and Assamese traditions
- Introduced Ahom script (used in Buranjis)
- Buranjis = historical chronicles written in Ahom & Assamese

ADMINISTRATIVE FEATURES

- Paik system: Every male contributed military/labour service
- Khel system: Occupational guild administration
- Patra-Mantris: Council of Ministers
- Highly decentralised governance with clan-based units

DETAILED MAINS ANALYSIS

CAUSES BEHIND SUKAPHA'S MIGRATION

- Political instability in Mong Mao region
- Need for new agricultural land
- Tai tradition of establishing new settlements
- Strategic search for fertile, riverine plains
- Inter-tribal conflicts in Southeast Asia

RECENT DEVELOPMENTS

- Sukapha Divas recognised by Govt. of Assam to strengthen cultural identity
- Renewed interest in Ahom architecture, archaeology (Charaideo Maidams)
- Proposal sent to UNESCO for World Heritage Site status for Charaideo Maidams

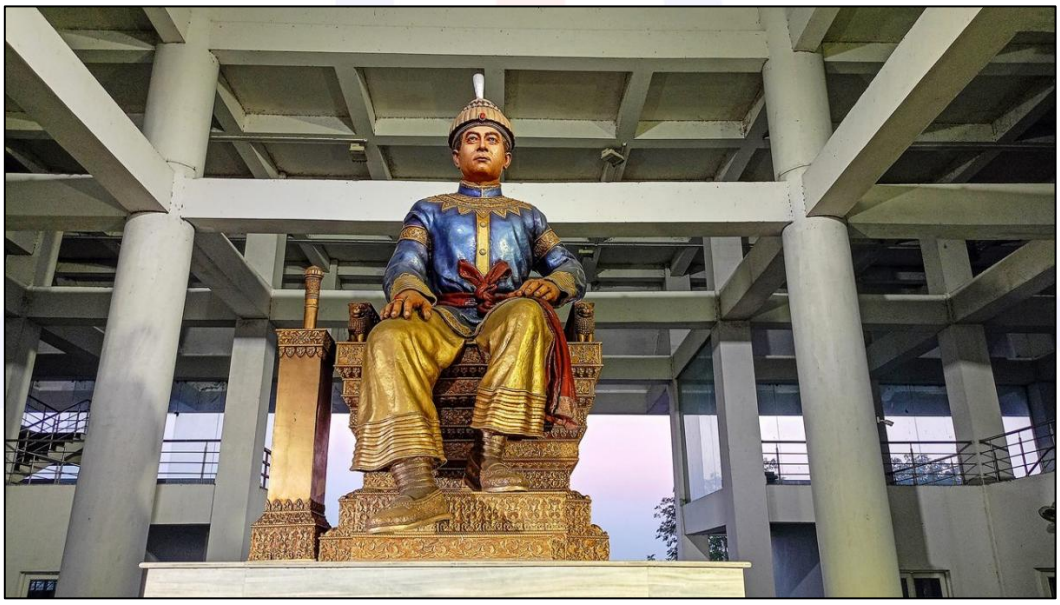
- Academic emphasis on Ahom contributions to statecraft and diplomacy

CHALLENGES (HISTORICAL & CONTEMPORARY)

- Myths and limited original Ahom records → historical reconstruction difficult
- Identity politics around Ahom ancestry
- Preservation challenges of archaeological sites like Maidams
- Loss of Ahom language (now nearly extinct)

IMPACT ON INDIA / ASSAM

- Founded a state that resisted Mughal expansion in the East
- Established Assam's unique multi-ethnic social fabric
- Military innovations strengthened regional defence
- Long Ahom rule stabilised the region's economy, agriculture, and administration
- Contributed to the distinctive cultural identity of modern Assam



INTERNATIONAL RELEVANCE

- Tai-Ahom migration parallels other Tai migrations to Thailand, Laos, Myanmar
- Helps understand broader Southeast Asian cultural exchanges
- Important for Indo-Pacific ethno-cultural history

LEGAL / CONSTITUTIONAL PROVISIONS (CONTEMPORARY RELEVANCE)

- Protection of Ahom cultural sites under Ancient Monuments and Archaeological Sites and Remains Act, 1958

- Assam Accord committees examining ST status for Ahom community
- Sixth Schedule relevance in NE cultural preservation

COMMITTEE RECOMMENDATIONS / EXPERT VIEWS

- UNESCO experts: Charaideo Maidams resemble pyramidal mortuary architecture
- Historians (Sarkar, Baruah): Ahoms succeeded due to inclusive assimilation policy
- Anthropologists: Tai-Ahom system fostered multi-ethnic stability
- Archaeological Survey of India (ASI): Need improved conservation of Maidams

GOVERNMENT & GLOBAL INITIATIVES

INDIAN INITIATIVES

- **Sukapha Divas (Assam Govt.)**
  - Celebrated annually on December 2.
  - Promotes Ahom heritage awareness.
- **Charaideo Maidams Conservation Project**
  - Restoration work funded by state and central governments.
  - Proposal for UNESCO nomination.
- **Tai-Ahom Cultural Research Centres**
  - Document Tai texts, manuscripts, and oral traditions.
- **Archaeological Excavation & Digital Archiving**
  - Conservation of artifacts, Ahom script manuscripts (Buranjis).

GLOBAL / INTERNATIONAL INITIATIVES

- UNESCO World Heritage Programme involvement for safeguarding mortuary architecture.
- Southeast Asian collaborations on Tai linguistic and cultural studies.
- Archaeological comparative research between Thai, Lao, and Ahom mound architecture.

CRITICISMS / CONCERNS

SCHOLARLY CONCERNS

- Over-romanticisation of Sukapha's legacy; need balanced historical study.

- Lack of rigorous archaeological excavation in Ahom sites.

CULTURAL & SOCIAL CONCERNS

- Ahom identity debates linked to politics (ST status demand).
- Potential marginalisation of other tribal histories of Assam.

PRESERVATION CONCERNS

- Rapid urbanisation threatens sites like Charaideo, Garhgaon, Rang Ghar.
- Deterioration of Buranjis and manuscripts due to climate conditions.

WAY FORWARD

- Expedite UNESCO World Heritage recognition for Charaideo Maidams.
- Establish a National Ahom History Museum with digital archives.
- Strengthen ASI conservation of Ahom architecture & inscriptions.
- Promote interdisciplinary research on Ahom polity & administration.
- Include Ahom history in NCERT/NBT publications for national awareness.
- Provide legal protection to remaining Ahom-era structures.
- Encourage language revitalisation of Tai-Ahom script.
- Support community-led cultural conservation projects.
- Promote tourism circuits around Ahom monuments with sustainable policies.
- Prevent politicisation of historical narratives; ensure scholarly neutrality.
- Strengthen international collaborations with Southeast Asian Tai research centres.

- Document oral histories from Ahom descendant communities.

PRELIMS BOOSTER NOTES

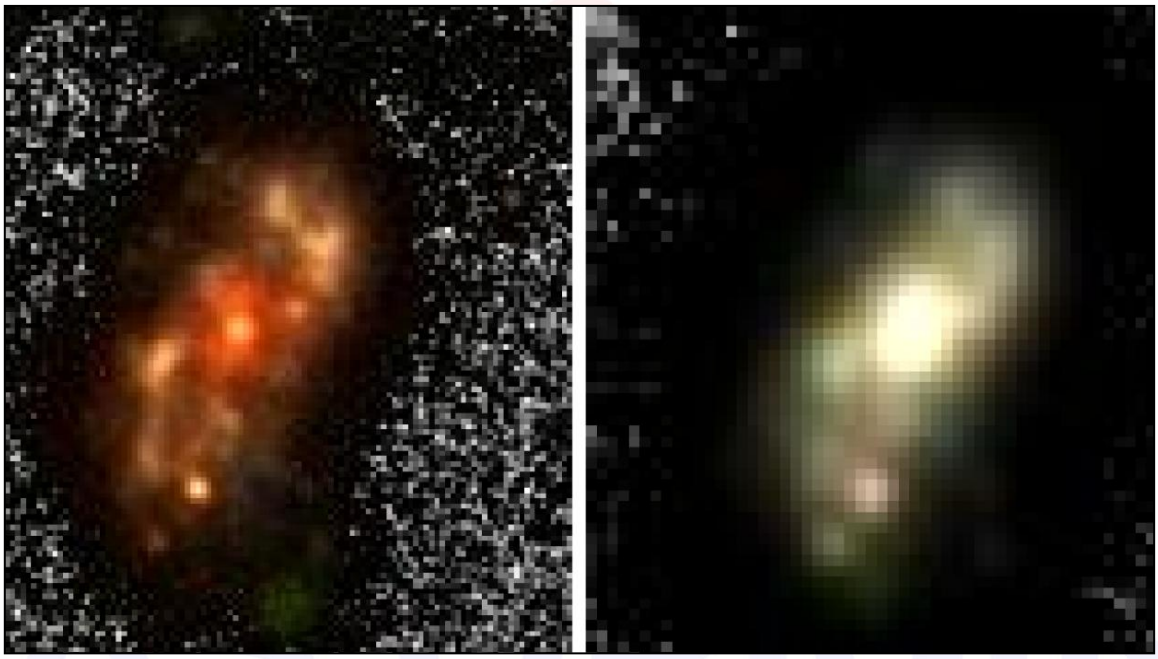
- Founded Ahom kingdom: 1228 CE
- Origin: Tai (Shan) prince from Mong Mao
- Capital: Charaideo
- Title: "Swargadeo" = "Lord of Heaven"
- Ruled for ~600 years until 1826 (Treaty of Yandabo)
- Key Ahom structures: Rang Ghar, Talatal Ghar, Kareng Ghar, Charaideo Maidams
- Ahom Buranjis: Historical chronicles
- Administrative system: Paik & Khel
- Fought off Mughal invasions → Battle of Saraighat (1671) led by Lachit Borphukan
- Tai-Ahom introduced wet-rice cultivation & advanced irrigation
- Assam observes Sukapha Divas on Dec 2
- Important tribes integrated: Moran, Maran, Chutiya, Kachari
- Tai-Ahom language now nearly extinct
- Ahom kingdom fell to British after First Anglo-Burmese War (1824–26)
- UNESCO nomination: Charaideo Maidams (2023 proposal)

02 ALAKNANDA GALAXY DISCOVERED IN THE EARLY UNIVERSE

IN NEWS

Astronomers using the James Webb Space Telescope (JWST) have discovered a galaxy named "Alaknanda", one of the earliest galaxies ever observed, dating back to only ~300 million years after the Big Bang.

The galaxy shows rapid star formation, high luminosity, and unexpectedly mature chemical signatures, challenging standard models of early cosmic evolution.



BACKGROUND & CONTEXT

The discovery of the Alaknanda galaxy is part of JWST's mission to explore the early universe using infrared astronomy. After the Big Bang (~13.8 billion years ago), the universe entered the "Cosmic Dark Ages", lasting until the first stars and galaxies formed during the Epoch of Reionization (~200–500 million years after Big Bang).

JWST's Near-Infrared Spectrograph (NIRSpec) and NIRCam instruments can detect extremely faint, redshifted light from this period. Alaknanda was observed at a very high redshift ($z > 12$), meaning its light took over 13.5 billion years to reach Earth.

India's astronomical community has contributed to theoretical modelling of early galaxy formation, giving cultural relevance to the galaxy's Indian-origin name "Alaknanda", inspired by the Himalayan River. The discovery provides key insights into how the first stars, star clusters, black holes, and galaxies formed, helping refine cosmological models such as ΛCDM (Lambda Cold Dark Matter).

KEY FACTS / KEY FEATURES

ABOUT THE ALAKNANDA GALAXY

- **Age:** Observed as it existed ~300 million years post-Big Bang.
- **Distance:** Light travelled ~13.5 billion years to reach Earth.
- **Redshift**: z > 12 (very high) — one of the earliest ever detected.
- **Brightness:** Surprisingly high for such a young galaxy.
- **Stellar Population:** Contains massive young stars, possibly Population III stars.
- **Size:** Compact but extremely luminous → high star-formation density.
- **Chemical Signatures:** Shows traces of metals (heavier elements), indicating early supernovae.

WHY THE NAME "ALAKNANDA"?

- Named after the Alaknanda River in Uttarakhand, symbolising origin, creation, and cosmic flow.
- Reflects India's participation in astronomy and cosmology.

INSTRUMENTS USED

- JWST NIRCam for imaging.
- JWST NIRSpec for spectroscopic redshift measurement.
- Advanced gravitational lensing from intervening galaxy clusters helped amplification.

SPIRAL GALAXIES

- **Definition:** Spiral galaxies are rotating systems of stars, gas, and dust shaped like a disk with spiral arms winding outward from a central bulge.
- **Structure:** They typically have three major components — a dense central bulge, a flat rotating disk with spiral arms, and an extended halo of stars and dark matter. E.g., Milky Way is a barred spiral galaxy, with a central bar-shaped bulge.

DETAILED MAINS ANALYSIS

CAUSES / SCIENTIFIC MOTIVATION

- Need to understand earliest galaxies that formed after the Dark Ages.
- Testing predictions of ΛCDM cosmology about early star formation.
- Explaining how early galaxies grew so rapidly in mass and brightness.

- Exploring presence of Population III (first-generation metal-free stars).

RECENT DEVELOPMENTS

- JWST has detected several early galaxies like Maisie's Galaxy, GLASS-z12, GN-z11; Alaknanda adds a new benchmark.
- Alaknanda shows high star-formation rate → challenges assumptions about slow early galaxy growth.
- Spectroscopy shows hints of ionised oxygen and carbon, evidence of early supernovae.

CHALLENGES RAISED BY THE DISCOVERY

TOO BRIGHT, TOO EARLY PROBLEM

- Galaxies forming this early shouldn't theoretically be this luminous.
- Suggests revision in models on star-formation efficiency.

CHEMICAL COMPOSITION UNEXPECTED

- Presence of heavier elements (metals) implies rapid stellar evolution.

SPEED OF GALAXY FORMATION

- Models predicted small proto-galaxies; Alaknanda is more evolved.

DARK MATTER DISTRIBUTION

- Early galaxy growth implies a more efficient dark matter halo formation.

NEED TO REVISE REIONIZATION TIMELINE

- Could indicate earlier start of cosmic reionization.

IMPACT ON INDIA

- Encourages Indian participation in next-generation astronomy missions.
- Enhances educational interest in astrophysics, cosmology.
- Indian researchers contribute to modelling of early star formation.
- Promotes India's involvement in projects like Thirty Meter Telescope (TMT) and LIGO-India.

INTERNATIONAL RELEVANCE

- Enhances global understanding of early cosmic structures.
- Helps refine cosmological simulations used worldwide.
- Contributes to gravitational lensing studies.
- Opens avenues for detection of Population III stars and early black holes.

LEGAL / INSTITUTIONAL CONTEXT

- **JWST is an international partnership:** NASA, ESA (Europe), CSA (Canada).
- Data is open-access, allowing global scientific collaboration.
- India's regulations on space science facilitated use by Indian astrophysicists.

EXPERT OPINIONS & COMMITTEE INSIGHTS

- **NASA scientists**: Suggest this challenges ΛCDM predictions of early galaxy mass.
- **Cosmologists:** See potential clues for new physics, e.g., alternate dark matter models.
- **Indian astrophysicists (IUCAA, TIFR):** Propose new models of starburst activity.
- **EPW environmentalists:** Highlight philosophical connection between Indian cosmology and modern science.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES (DETAILED)

A. INDIAN SCIENTIFIC INITIATIVES

- ISRO–IUCAA collaborations on cosmological modelling.
- Indian participation in TMT → ultra-deep observational ability.

- National Large Solar Telescope (NLST) upgrades for cosmic studies.
- AstroSat (India's first space telescope) involved in star and galaxy observations.

B. GLOBAL INITIATIVES

- JWST Early Release Science Programme.
- Hubble Frontier Fields programme using gravitational lensing.
- Square Kilometre Array (SKA) project, India is a partner → will probe dark ages.
- Euclid Mission (ESA) for dark matter & dark energy mapping.
- Nancy Grace Roman Telescope (NASA) for early universe observations.

CRITICISMS / CONCERNS

- **Interpretation Uncertainty**: High-redshift detection requires caution—may be misidentified.
- **Over-Reliance on Gravitational Lensing:** Can distort results.
- **Selection Bias:** JWST may preferentially detect the brightest early galaxies, skewing models.
- **Theoretical Overhauls Needed:** Cosmologists divided on whether ΛCDM needs revision.
- **Large Data Volume:** Requires advanced AI tools for analysis.

WAY FORWARD

- Enhance India's participation in deep space astronomy missions.
- Strengthen funding for astrophysics and cosmology research.
- Promote data-sharing between global observatories and Indian institutions.
- Upgrade computing infrastructure for cosmological simulations.
- Encourage interdisciplinary collaboration between physicists, mathematicians, and AI researchers.
- Increase public outreach on astronomy to inspire STEM talent.
- Support space universities or dedicated astronomy hubs in India.
- Develop indigenous IR detectors for future telescopes.
- Encourage India's private sector to invest in space instrumentation.
- Expand international partnerships (NASA, ESA, CSA, SKA).

- Prioritise observational capacity through optical telescopes on Himalayan peaks.
- Enhance curriculum on cosmology under NEP 2020.

PRELIMS BOOSTER NOTES

- **Galaxy Name:** Alaknanda (named after Himalayan river).
- **Discovery Tool:** James Webb Space Telescope (JWST).
- Redshift: z > 12 → one of the earliest known galaxies.
- **Epoch:** ~300 million years after the Big Bang.
- **Instruments Used:** NIRCam (imaging), NIRSpec (spectroscopy).
- **Key Concept:** Redshift → stretching of light due to cosmic expansion.
- **Big Bang Age:** Universe is ~13.8 billion years old.
- **Epoch of Reionization:** ~200–600 million years post Big Bang.
- **Population III stars:** First stars; metal-free.
- **JWST Location:** Lagrange Point L2.
- **Cosmological Model:** ΛCDM (Lambda Cold Dark Matter).
- **Importance:** Challenges early galaxy formation theories.
- **Indian Institutions:** IUCAA, TIFR, NCRA involved in modelling.

03 KASHI TAMIL SANGAMAM 4.0

IN NEWS

The Government of India launched Kashi Tamil Sangamam 4.0, an annual cultural outreach programme under the Ek Bharat Shreshtha Bharat (EBSB) initiative to celebrate civilisational links between Varanasi (Kashi) and Tamil Nadu.

The fourth edition includes literary seminars, classical performances, academic exchanges, trade and crafts exhibitions, and immersive heritage tours in Varanasi.

BACKGROUND & CONTEXT

The Kashi Tamil Sangamam initiative was launched in 2022 to highlight the deep civilisational, linguistic, spiritual, and cultural ties between the people of Tamil Nadu and Kashi (Varanasi). Historically, Kashi has been a major centre of Sanskrit learning, Shaiva philosophy, Advaita Vedanta, Tamil scholarship, and served as a pilgrimage centre for Tamil saints, rulers, scholars, and traders.

Tamil pilgrims visited Kashi for centuries, leaving behind inscriptions, literature, temples, monasteries, and cultural exchanges. The programme brings together students, scholars, artisans, farmers, temple priests, and various cultural groups from Tamil Nadu for a shared experience of heritage and knowledge systems.

Kashi Tamil Sangamam 4.0 builds on earlier editions by involving more institutions—IIT-Madras, BHU, SASTRA University, Indira Gandhi National Centre for the Arts (IGNCA)—and expanding themes such as traditional crafts, AYUSH, temple architecture, classical music, handloom, and Sangam literature.

It strengthens national integration and supports the government's objective of showcasing Bharatiya civilisational continuity across regions.

KEY FACTS / KEY FEATURES

OBJECTIVES

- Celebrate ancient socio-cultural connections between Tamil Nadu and Kashi.
- Promote civilisational unity, knowledge exchange, and traditional wisdom.
- Showcase Tamil and Banarasi crafts, handlooms, cuisine, and performing arts.
- Build academic collaboration between Tamil & North Indian institutions.
- Foster people-to-people contact under Ek Bharat Shreshtha Bharat.

SECTORS PARTICIPATING

- Classical music & dance (Bharatanatyam, Carnatic music).
- Temple architecture & Agama studies.
- Textiles (Kanchipuram silk, Banarasi sarees).
- Handicrafts, sculpture, bronze works.
- Ayurveda, Siddha, Yoga.
- Literature & ancient manuscripts.
- Higher education & vocational skill exchange.

INSTITUTIONAL PARTNERS

- IIT-Madras, Banaras Hindu University (BHU)
- SASTRA, IGNCA, Ministry of Culture

- Ministry of Education, Railways, Tourism

ACTIVITIES

- Tours to Kashi Vishwanath Temple, Sarnath, Ganga ghats.
- Academic seminars on Shaivism, Tamil literature, Chola architecture.
- Cultural evenings: Nadaswaram, Thevaram hymns, Devadasi traditions.
- Exhibition of Tamil and Banarasi crafts.
- Interaction with weavers, artisans, scholars, students.

HISTORICAL TIES BETWEEN KASHI AND TAMIL NADU

ANCIENT PILGRIMAGE LINKS

- For millennia, Tamil pilgrims journeyed to Kashi for moksha, Ganga snan, Pinda daan.
- Kashi was called “Kasi-kshetram” in Tamil devotional literature.

BHAKTI MOVEMENT CONNECTIONS

- The Nayanmars (Tamil Shaiva saints) visited Kashi.
- Thevaram hymns mention Kashi as a sacred Shaiva centre.
- Tamil Alvars (Vaishnavite saints) highlight Varanasi in their hymns.

CHOLA EMPIRE LINKS

- Chola rulers funded temples and monasteries in Kashi.
- Rajendra Chola I is believed to have made donations to Kashi shrines.
- Chola artisans contributed to temple architecture and sculpture across north India.

ADI SHANKARACHARYA’S INFLUENCE

- Born in Kerala, travelled through Tamil Nadu and Kashi.
- Revived Hindu philosophy through Advaita Vedanta.
- Established the Jyotirmath lineage which influenced Kashi’s philosophical schools.

TAMIL SETTLEMENTS IN KASHI

- Tamil Brahmin agraharams existed in Varanasi for centuries.
- Tamil scholars taught in Sanskrit schools (Tols) in Kashi.

- Tamil inscriptions found near Kashi temples affirm long-term settlements.

MANUSCRIPT TRANSMISSION

- Tamil palm-leaf manuscripts were copied and preserved in Kashi libraries.
- Cross-pollination between Tamil and Sanskrit intellectual traditions.

SHARED SHAIVISM & TEMPLE RITUAL TRADITIONS

- Agama texts governing Shaiva temple rituals share roots across Kashi–Tamil regions.
- Nadaswaram, a Tamil instrument, historically used in Kashi temples.

CULTURAL EXCHANGES

- Banarasi weaving traditions influenced Kanchipuram designs.
- Joint heritage in goldsmithing, bronze casting, and textile dyeing.

MODERN ACADEMIC LINKAGES

- BHU and IIT-Madras continue collaborative research on Sanskrit, Tamil, ancient sciences, and Indology.

DETAILED MAINS ANALYSIS

CAUSES / RATIONALE FOR THE PROGRAMME

- Promote national unity by highlighting ancient civilisational linkages.
- Counter regional linguistic divides by showcasing cultural interdependence.
- Strengthen cultural diplomacy and revive traditional knowledge systems.
- Enhance tourism and heritage economy of Kashi.
- Document and preserve Tamil cultural contributions in North India.

RECENT DEVELOPMENTS

- Expansion to include weaver communities, folk artists, rural artisans.
- Digitisation of ancient Tamil–Sanskrit manuscripts.
- Tourism ministry added special trains for Tamil groups visiting Varanasi.
- Increasing academic collaboration between BHU, IITs, and Tamil universities.

CHALLENGES

- Risk of over-commercialisation of cultural events.

- Limited documentation of Tamil heritage sites in Varanasi.
- Need for accurate historical interpretation → avoid politicisation.
- Requirement for long-term institutional support for continuity.

IMPACT ON INDIA

- Revives Bharat's interconnected civilisational narrative.
- Strengthens cultural unity and national integration.
- Promotes tourism and local crafts in both Tamil Nadu & Varanasi.
- Reinforces India's soft power globally by showcasing cultural continuity.
- Encourages academic & linguistic exchange.

INTERNATIONAL RELEVANCE

- Showcases India's pluralistic heritage to the world.
- Strengthens India's image as a civilisation-state.
- Supports India's cultural diplomacy with Southeast Asian nations (who share Tamil/Indic links).

LEGAL & INSTITUTIONAL CONTEXT

- Operates under Ek Bharat Shreshtha Bharat (EBSB).
- Supported by Ministry of Culture, Ministry of Education.
- Aligned with NEP 2020 which promotes Indian Knowledge Systems (IKS).

EXPERT OPINIONS

- Historians: Programme highlights shared heritage of Sanskrit + Tamil traditions.
- Sociologists: Enhances inter-regional understanding.
- Cultural scholars: Opportunity to revive temple arts and vernacular traditions.
- Economists: Boosts cooperative tourism and handicraft markets.

CRITICISMS / CONCERNS

- Some scholars argue overemphasis on religious aspects may overshadow academic dimensions.
- Risk of projecting a selective narrative without representing wider Tamil diversity.
- Need for long-term institutional rather than event-based approach.
- Travel and participation costs may limit accessibility.

PRELIMS BOOSTER NOTES

- Kashi Tamil Sangamam started in 2022.
- Part of Ek Bharat Shreshtha Bharat.
- Organised by: Ministry of Education, Ministry of Culture, IIT-M, BHU.
- Symbolises ties between Shaiva, Vaishnava, Advaita traditions.
- Tamil saints: Appar, Sundarar, Sambandar, Alvars.
- Chola rulers patronised temples in Kashi.
- Adi Shankaracharya strengthened intellectual links.
- Kanchipuram & Banaras loom traditions share dyeing and brocade similarities.
- NEP 2020 → Indian Knowledge Systems (IKS) wing supports the programme.
- The name “Sangamam” means “confluence”.

04 URBAN DYNAMISM IN CENSUS 2027

IN NEWS

The Government of India announced that the next Census—delayed due to COVID-19—will now be conducted in 2027, making it the world's largest administrative Census with over 1.4 billion people to be enumerated.

The Census 2027 will use a hybrid digital format, GIS mapping, Aadhaar-linked address codes, and real-time data monitoring systems, marking a major transformation in India's statistical architecture.

BACKGROUND & CONTEXT

India conducts a Census every 10 years under the Census Act, 1948. The last Census was in 2011. The 2021 Census was postponed repeatedly due to the COVID-19 pandemic, administrative disruptions, and the need to overhaul the system for digital enumeration.

The 2027 Census will be India's first-ever fully digital, geospatially enabled Census. Enumerator schedules, household questionnaires, and real-time monitoring will be conducted on tablets or mobile applications, backed by National Population Register (NPR) updates, Geo-tagged address databases, and Machine Learning tools for verification.

Globally, India's Census is unmatched in scale—larger than the combined population of all OECD countries. The exercise is fundamental for policy decisions on welfare schemes, subsidies, healthcare, urban planning, migration, political representation (delimitation), education, and infrastructure development.

The 2027 Census is expected to cost over ₹20,000 crore and produce the most comprehensive demographic dataset in Indian history, transforming the governance landscape.

KEY FACTS / KEY FEATURES OF THE 2027 CENSUS

ADMINISTRATIVE STRUCTURE

- Conducted by the Office of the Registrar General & Census Commissioner (ORGI) under the Ministry of Home Affairs (MHA).
- Over 35 lakh enumerators and supervisors will be deployed.

FIRST-EVER DIGITAL CENSUS

- Self-enumeration option via mobile app.
- Enumerators use secure digital tablets.
- Real-time data upload to encrypted servers.
- AI-based consistency checks to reduce errors.

GIS & MAPPING FEATURES

- Every household linked to a 12-digit Unique Address ID.
- Comprehensive GIS-based maps for villages, blocks, towns.
- Satellite data integration to detect missing or new settlements.

HYBRID ENUMERATION

- Digital + paper mode where necessary (remote tribal areas).
- Multilingual digital questionnaires.

KEY DATA AREAS COVERED

- Population, sex ratio, literacy
- Urban–rural classification
- Disability
- SC/ST
- Migration
- Housing conditions
- Amenities (electricity, water, internet)
- Education, employment patterns

- Fertility, household size

LANGUAGE, RELIGION (SUBJECT TO GOVT DECISION)

- Digital access and household assets
- Linkages with Government Platforms
- NPR updation parallel to Census.
- Integration with Socio-Economic Caste Census (SECC) datasets for welfare targeting.
- Use of Aadhaar address data (not Aadhaar numbers) for verification.

INDIA'S 2027 CENSUS: A RECORD-BREAKING EXERCISE

- Covers over 1.40 billion people.
- Nearly 40 million buildings mapped digitally.
- Uses 35+ lakh census workers—bigger than the Indian Army.
- Data collected in over 18 languages, 44 schedules.
- Real-time monitoring across 7,933 towns and 6 lakh villages.
- Digital mapping of every settlement.
- Largest use of GIS in any government survey.

DETAILED MAINS ANALYSIS

CAUSES / WHY CENSUS 2027 IS SIGNIFICANT

- Last complete demographic dataset is from 2011—a 16-year gap.
- India added ~200 million population since then.
- Need updated data for welfare schemes (food, housing, health).
- Critical for planning Smart Cities, metros, digital infrastructure.
- Migration patterns changed drastically after COVID-19.
- Growing interest in age structure → fertility transition, ageing population.
- Essential for parliamentary delimitation expected post-2031.

WHAT'S NEW IN THE 2027 CENSUS?

- **Geo-referencing:** Every structure tagged with latitude/longitude.
- **Digital questionnaires:** Improved accuracy & speed.

- **Dynamic NPR:** Records birth, death, migration continuously.
- **QR-coded forms:** Ensures authenticity.
- **Real-time dashboards:** For administrators to monitor progress.
- **24×7 helpline centres:** For enumeration support.

CHALLENGES AHEAD

DIGITAL DIVIDE

- 30% households lack stable internet connectivity.
- Limited digital skills among rural enumerators.

DATA PRIVACY CONCERNS

- Need strong safeguards under upcoming Data Protection Act.
- Public concerns about NPR–Census linkages.

LOGISTICAL SCALE

- Reaching remote tribal areas, hilly terrain, insurgency zones.

POLITICAL SENSITIVITY

- Religion, language, caste data may generate sensitivities.
- Migration data could influence electoral politics.

ACCURACY ISSUES

- Self-enumeration risks manipulation without proper checks.
- Enumerators must be trained extensively.

IMPACT ON INDIA

GOVERNANCE & WELFARE

Better targeting of schemes like:

- PMAY
- Jal Jeevan Mission
- Ayushman Bharat
- PM Garib Kalyan Anna Yojana
- Digital India
- Ujjwala

ECONOMIC PLANNING

- Labour force distribution
- Urbanisation trends
- Housing demand
- Transport planning
- Climate vulnerability mapping

SOCIAL IMPLICATIONS

- Updated literacy & health indicators.
- Identification of new marginalised pockets.
- Accurate data for women, elderly, disabled.

FUTURE OF DELIMITATION

- Census data determines parliamentary seat redistribution.
- Could shift political power towards high-growth states.

INTERNATIONAL RELEVANCE

- Provides global researchers unparalleled dataset.
- Helps UN projects on population modelling.
- Sets global precedent for hybrid digital Census operations.
- India's methodology may be adopted by African and Asian countries.

LEGAL / CONSTITUTIONAL CONTEXT

- **Census Act, 1948:** Protects confidentiality; data cannot be used for law enforcement.
- **Article 246 (Union List):** Census is Central subject.
- **National Population Register (NPR):** Rules under Citizenship Act, 1955.
- **Census data essential for:**
    - Article 82 → Delimitation
    - Article 275 → Grants to states
    - Finance Commission recommendations

EXPERT & COMMITTEE OPINIONS

- **NITI Aayog:** Accurate Census essential for evidence-based policymaking.
- **Economists:** Emphasise need to integrate Census with dynamic data sources.
- **Sociologists:** Concerned about digital exclusion of vulnerable groups.
- **Data scientists:** Recommend strong encryption & anonymisation.
- **Former Census Commissioners:** Stress need for pilot surveys & long training cycles.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN GOVERNMENT STEPS

- **Digital Census Architecture**
    - CPCB-like dashboards
    - Multi-layer GIS map
    - Cloud-based encrypted data servers
- **Census Monitoring System**
    - GPS tracking of enumerator movement
    - Instant anomaly detection
- **Institutional Support**
    - ORGI upgrade
    - Collaboration with NIC, ISRO, UIDAI
- **Training & Capacity Building**
    - Enumerators undergo digital and soft skills training

    - Multilingual training modules
- **Linking With Smart Governance**
    - Urban planning maps
    - Slum mapping
    - Digital land records

GLOBAL PARALLELS

- US Census uses digital enumeration but on much smaller scale.
- China's Census 2020 used mobile apps but without GIS mapping of individual households.
- UK moved fully digital but population is 20× smaller than India.

CRITICISMS / CONCERNS

- Possibility of undercounting in migrant, nomadic, and tribal populations.
- Gender bias in reporting workforce participation may persist.
- Surveillance concerns if Census–NPR link is not clearly separated.
- Potential misuse of digital data if encryption fails.
- Enumeration fatigue among field workers.

WAY FORWARD

- Ensure strong data privacy laws & independent audits.
- Create offline digital modes for rural/remote areas.
- Strengthen cybersecurity architecture and encryption.
- Conduct pilot studies in diverse geographies.
- Establish grievance redressal system for misclassification.
- Enhance enumerator incentives and training quality.
- Use AI/ML for duplicate detection and error correction.
- Improve awareness campaigns to increase public trust.
- Integrate Census with SDG monitoring frameworks.
- Build state-level data analytics units.
- Develop open-access anonymized datasets for academia.
- Update Census methodology every 5 years for agility.

PRELIMS BOOSTER NOTES

- **First Census in India:** 1872 (non-synchronous).
- First synchronous Census: 1881.
- **Last Census:** 2011.
- Census Act, 1948 governs enumeration & confidentiality.
- Registrar General of India (RGI) under MHA conducts Census.
- Census is NOT a constitutional requirement but mandated by law.
- Data used for: delimitation, reservation, planning, budgeting.
- "Enumerator" = primary field investigator.
- India's Census is the largest peace-time administrative exercise globally.
- NPR is updated alongside Census → collects demographic + demographic-residence data.
- GIS mapping first introduced officially in 2027 Census.
- Address ID system: proposed 12-digit Unique Address ID.
- Census data has restricted access → not shared with courts or police.
- India's population ageing: median age rising, needs updated Census data.

05 RAJYA SABHA PASSES RESOLUTION EXTENDING WATER ACT 2024 TO MANIPUR

IN NEWS

The Rajya Sabha has passed a statutory resolution to extend the provisions of the Water (Prevention and Control of Pollution) Amendment Act, 2024 to the State of Manipur, which was under President's Rule.

This extension modifies the functioning of the Manipur Pollution Control Board, enabling centralised appointments, digital compliance systems, and updated penalties for water pollution violations.

BACKGROUND & CONTEXT

The original Water (Prevention and Control of Pollution) Act, 1974 created the Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs) to regulate and prevent water pollution. Over the decades, increasing industrialisation, untreated sewage discharge, and weak enforcement mechanisms highlighted the need to modernise the Act.

Therefore, the Water Act 2024 Amendment introduced a uniform national regulatory structure, rationalised penalties, encouraged digital monitoring, and allowed the Centre to appoint members to SPCBs in specific conditions.

Manipur has been under Article 356 (President's Rule); hence, Parliament is empowered to legislate for the state. As environmental laws are listed under the Concurrent List, Parliament can extend them either directly or through a statutory resolution.

Manipur faces severe water pollution issues—particularly contamination of the Imphal River, Nambul River, Loktak Lake, and untreated municipal waste. Extending the Water Act 2024 ensures stronger regulatory enforcement, central support, and technology-based water quality monitoring.

KEY FACTS / KEY FEATURES OF THE WATER ACT 2024

A. INSTITUTIONAL REFORMS

- Centre empowered to **appoint Chairpersons & Members** of Manipur Pollution Control Board (MPCB).
- MPCB will follow **CPCB guidelines** for monitoring, inspections, compliance.

B. DIGITAL ENVIRONMENTAL GOVERNANCE

- Mandatory **real-time effluent monitoring** using sensors.
- Online consent mechanisms (CTO/CTE).
- QR-coded certificates for industries.

C. NEW PENALTY STRUCTURE

- Heavy monetary penalties replace lengthy criminal prosecution.
- Penalties linked to:
    - Scale of industry

- Extent of violation
- Duration of pollution

- Repeat violators face **closure notices** and **enhanced fines**.

D. FOCUS AREAS FOR MANIPUR

- Treatment of sewage in Imphal & Thoubal.
- Restoration of **Loktak Lake**, a Ramsar site.
- Industrial effluents from small-scale units.
- Solid and liquid waste entering rivers.

E. ROLE OF CPCB

- Oversight of monitoring, training, and enforcement in Manipur.
- Funding support for laboratory upgrades.

SPECIAL SECTION: WHY PARLIAMENT CAN EXTEND THIS LAW TO MANIPUR

CONSTITUTIONAL BASIS

- Article 356 (President's Rule): Parliament exercises legislative powers of the state legislature.
- Concurrent List (List III): Environment & pollution regulations can be legislated by Parliament.

PROCEDURAL BASIS

- A statutory resolution is passed to apply a Central Act to a state under President's Rule.

PRECEDENTS

- Similar extensions were made in J&K and NE states earlier.

ADMINISTRATIVE NECESSITY

- Strengthening water governance in a conflict-affected state requires central intervention.

DETAILED MAINS ANALYSIS

CAUSES / NEED FOR THE AMENDMENT IN MANIPUR

- Contamination of rivers from
  - Urban waste

    - Medical waste
    - Soil erosion & landslides
- Conflict-related disruption in waste management
- Loktak Lake threatened by eutrophication, siltation, phumdi proliferation.
- Weak enforcement capacity of MPCB.
- Insufficient wastewater treatment plants.
- Rising pollution from small industries and motor workshops.

RECENT DEVELOPMENTS

- Loktak Development Authority (LDA) working with CPCB for lake restoration.
- Imphal River cleaning projects initiated under Swachh Bharat 2.0.
- Digital emissions monitoring being introduced in large industries.
- New ETPs (Effluent Treatment Plants) and STPs planned.

CHALLENGES

ADMINISTRATIVE CHALLENGES

- Limited staff capacity in MPCB.
- Interruptions due to social conflict and law & order issues.

GEOGRAPHIC CHALLENGES

- Hilly terrain makes sewage infrastructure costly.
- Soil erosion from deforestation pollutes rivers.

CULTURAL CHALLENGES

- Local communities depend on rivers & Loktak Lake for fishing, livelihood.
- Need to balance conservation with community rights.

TECHNOLOGICAL CHALLENGES

- Digital monitoring requires stable connectivity.
- Lack of skilled technicians.

IMPACT ON INDIA & MANIPUR

ENVIRONMENTAL IMPACT

- Improved water quality in Imphal River, Nambul River, Thoubal River.

- Better conservation of Loktak Lake (Ramsar site).

ECONOMIC IMPACT

- Tourism boost near Loktak Lake.
- Cleaner water for agriculture & fisheries.

GOVERNANCE IMPACT

- Stronger pollution enforcement.
- Uniform national environmental standards.

SOCIAL IMPACT

- Better health outcomes by reducing waterborne diseases.
- Protection of livelihoods for fishermen & farmers.

INTERNATIONAL RELEVANCE

- Supports India's commitments under:
  - Ramsar Convention
  - SDG 6 (Clean Water)
  - SDG 14 (Life Below Water – for inland aquatic ecosystems)
  - SDG 15 (Life on Land)
- India's digital environmental governance model becomes an international example.

LEGAL CONTEXT

- Water Act 1974 (original).
- Water Act Amendment 2024.
- Environmental Protection Act 1986.
- Loktak Lake (Protection) Act 2006 (Manipur).
- Article 356, Article 249/250 (Parliamentary power over states).

EXPERT OPINIONS

- **CPCB scientists:** Digital monitoring reduces manipulation and improves transparency.
- **Environmental economists:** Penalty-based system is more efficient than jail terms.

- **Legal experts:** Parliament is within its rights under Article 356.
- **Local researchers:** Emphasise integration of indigenous lake management practices.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES SUPPORTING THE EXTENSION

- Namami Gange (adapted framework for NE rivers).
- National River Conservation Programme (NRCP).
- Wetlands (Conservation and Management) Rules 2017.
- Lake Conservation Programmes under MoEFCC.
- Digital India + GIS mapping of water bodies.
- AMRUT 2.0: Urban wastewater treatment.
- Swachh Bharat Mission 2.0: Scientific waste management.

GLOBAL INITIATIVES

- UNEP International Water Quality Programme.
- Global Wetlands Initiative.
- Ramsar Convention monitoring framework.

CRITICISMS / CONCERNS

- Centralisation may reduce state autonomy.
- Digital monitoring costly in hilly, low-connectivity regions.
- Penalty system may burden small traditional industries.
- Potential overlap of roles between LDA and MPCB.
- Environmental NGOs want community involvement in pollution monitoring.

WAY FORWARD

- Establish joint CPCB–MPCB task force for Manipur.
- Build community-based water monitoring networks around Loktak.
- Fast-track STP & ETP projects with transparent contracts.
- Introduce bio-remediation for polluted tributaries.
- Provide digital training for MPCB staff & local workers.

- Develop Loktak conservation master plan with Ramsar experts.
- Promote sustainable tourism with strict waste norms.
- Use drones & IoT sensors for lake and river surveillance.
- Encourage phumdi management with scientific research.
- Strengthen environment courts for faster dispute resolution.
- Periodic public disclosure of water quality data.
- Link water quality outcomes with local body performance grants.

PRELIMS BOOSTER NOTES

- **Water Act first enacted:** 1974.
- **Water Act Amendment:** 2024.
- **Purpose:** Control & prevent water pollution.
- **Loktak Lake:** Ramsar Site, largest freshwater lake in NE India.
- **Article 356:** President's Rule → Parliament legislates for the state.
- CPCB formed under Water Act 1974.
- **Penalties in 2024 Amendment:** Monetary, not imprisonment.
- **Digital monitoring:** Continuous Emission Monitoring Systems (CEMS).
- SPB → State Pollution Control Board; in Manipur: MPCB.
- **Rivers of Manipur:** Imphal, Nambul, Thoubal, Barak.
- Loktak protected under Manipur Loktak Lake Act 2006.

06 SUGAR INDUSTRY IN INDIA

IN NEWS

The sugar industry is in news due to changing production estimates, ethanol-blending targets, export restrictions, and shifts in sugarcane cultivation patterns amidst climate variability (El Niño–like conditions).

Rising debates on sustainability, water usage, FRP issues, distress in sugar mills, and farmers' payment delays further elevate its policy importance.

BACKGROUND & CONTEXT

India is the world's largest consumer and second-largest producer of sugar, contributing nearly 15% of global sugar output. Sugarcane is grown over 5 million hectares across India, supporting 5 crore farmers and 5 lakh mill workers. The industry is highly regulated because it directly affects farmers' income, rural employment, and India's food economy.

Historically, sugarcane cultivation expanded during the Green Revolution, with major production shifting from Bihar–UP belt to Maharashtra–Karnataka belt due to better irrigation, higher recovery rates, and cooperative mill structures. India's sugar policy moved from heavy controls to partial decontrol, but pricing still depends on FRP (Fair and Remunerative Price) and State Advised Prices (SAP).

Recent concerns like water scarcity, groundwater depletion, and climate-induced yield fluctuations have pushed India to diversify sugarcane use into ethanol, aligned with the

Ethanol Blending Programme (EBP). This transition indicates a structural shift from a sugar-surplus to a biofuel-oriented industry.

KEY FACTS / KEY FEATURES

MAJOR SUGARCANE CULTIVATION REGIONS

- **Ganga Plain:** Uttar Pradesh, Uttarakhand, Bihar
- **Southern Peninsula:** Karnataka, Tamil Nadu, Telangana
- **Western India:** Maharashtra, Gujarat
- **Coastal belt:** Andhra Pradesh

MAHARASHTRA + UP + KARNATAKA = 80% OF TOTAL SUGAR OUTPUT

Key Institutions & Policies

- **FRP (Fair and Remunerative Price):** Set by CACP, binding nationwide.
- **SAP (State Advised Price):** Higher state-level price (mostly in UP).
- **Ethanol Blending Policy:** 20% blending target by 2025–26.
- **Sugarcane (Control) Order 1966:** Regulates pricing, supply, and mill operations.

SUGAR PROCESSING STRUCTURE

- Public sector mills
- Private sector mills
- Cooperative mills (dominant in Maharashtra & Karnataka)

RECOVERY RATE

- India's average recovery: 10–11%
- Maharashtra's recovery: 11.5–12% → High efficiency

- UP's recovery: 10–10.5% → Improved due to early maturing varieties (Co-0238)

BY-PRODUCTS

- **Bagasse:** Co-generation of electricity
- **Molasses:** Ethanol production
- **Press mud:** Fertilizer

DETAILED MAINS ANALYSIS

CAUSES BEHIND CURRENT SUGAR INDUSTRY ISSUES

- Increasing water stress in Maharashtra & Karnataka
- Erratic rainfall → decline in cane productivity
- Rising cane arrears due to poor mill liquidity
- Export bans to ensure domestic availability
- Competition between sugar production vs ethanol production

RECENT DEVELOPMENTS

- India temporarily restricted sugar exports due to lower production.
- UP introduced incentives for ethanol production from B-heavy molasses.
- Increased use of high-yielding, early-maturing varieties.
- Maharashtra facing 2–3 years of lower output due to drought-like conditions.
- Ethanol blending crosses 12% nationally, target of 20% by 2025–26.

CHALLENGES FACING INDIA'S SUGAR SECTOR

WATER-INTENSIVE CROP

- Sugarcane uses 70% more water than crops like wheat/pulses.
- Major cause of groundwater depletion in Marathwada, Western UP.

CLIMATE VULNERABILITY

- Sugarcane is highly sensitive to:
    - Deficient monsoon
    - Extreme heat
    - Unseasonal rains
- Even 1°C rise reduces sugar recovery significantly.

PRICE DISTORTIONS

- SAP > FRP → Increases mill losses
- Mills delay payment → Farmer distress

LAGGING TECHNOLOGY

- Fragmented land holdings reduce efficiency.
- Low adoption of drip irrigation.
- Co-generation plants need modernization.

GLOBAL COMPETITIVENESS

- India's sugar cost is higher → export subsidy disputes at WTO.
- Brazil, Thailand more competitive.

IMPACT ON INDIA

ECONOMIC IMPACT

- Contribution to GDP: 1%
- Employment: 50 million people directly/indirectly
- Rising ethanol reduces crude oil imports

SOCIAL IMPACT

- Supports rural & cooperative-led development
- Prevents migration during agricultural lean periods

ENVIRONMENTAL IMPACT

- High water footprint
- Pollution from sugar mills
- Stubble and waste disposal issues

INTERNATIONAL RELEVANCE

- India is part of the International Sugar Organization (ISO)
- Faces WTO disputes over export subsidies
- India's ethanol policy influences global biofuel markets

LEGAL & INSTITUTIONAL FRAMEWORK

- Essential Commodities Act

- Sugarcane (Control) Order
- National Policy on Biofuels, 2018
- FRP mechanism by CACP
- State cooperative laws
- WTO AoA guidelines on subsidies

GOVERNMENT INITIATIVES & PROGRAMMES

- **FRP Mechanism:** The government sets the Fair and Remunerative Price, the minimum price mills pay farmers for sugarcane. It is linked to sugar recovery rates to ensure stable farmer income.
- **Ethanol Blending:** Ethanol Blending Programme (EBP) under the National Biofuel Policy 2018 promotes ethanol production from sugarcane derivatives to reduce oil imports.
- **Sugar MSP:** The Minimum Selling Price for white sugar covers basic production costs, assisting mills in clearing farmer dues promptly.
- **Export Regulation:** Sugar exports stay in the 'Restricted' category, with mill-specific quotas to guarantee domestic supply and prevent fluctuations.
- **AAY Subsidy:** The government provides subsidised sugar to Antyodaya Anna Yojana families through PDS, ensuring nutritional access for the poorest.

CRITICISMS / CONCERNS

- Sugarcane monoculture → ecological imbalance
- Export bans affect farmer income
- Ethanol-first approach may risk sugar supply
- SAP encourages overproduction
- Subsidies distort markets → WTO issues

WAY FORWARD

- Promote micro-irrigation (drip) to reduce water use by 40–50%.
- Shift cultivation to water-abundant states like Bihar, Assam.
- Adopt cane diversification (sorghum, beet biofuels).
- Rationalize SAP to align with FRP.
- Strengthen ethanol production from C-molasses & non-food feedstock.

- Modernize sugar mills with integrated energy systems.
- Introduce crop insurance for climate impacts on cane yield.
- Expand bio-refineries for co-generation & green hydrogen.
- Encourage Farmer Producer Organizations (FPOs) in cane-growing regions.
- Create a National Sugar Stabilization Fund.
- Improve export competitiveness via technology.
- Strengthen transparent payment systems through FRP-linked digital platforms.

PRELIMS BOOSTER NOTES

- India: 2nd largest sugar producer, 1st largest consumer
- FRP announced by CACP (under Agriculture Ministry)
- SAP fixed by state governments
- Largest producer state: Uttar Pradesh
- Highest recovery: Maharashtra
- Major by-products: Bagasse, Molasses, Press-mud
- Ethanol blending target: 20% by 2025–26
- Sugarcane agro-climatic requirement: Tropical & Subtropical
- Brazil = world's top sugar exporter
- India sugar season: October–September

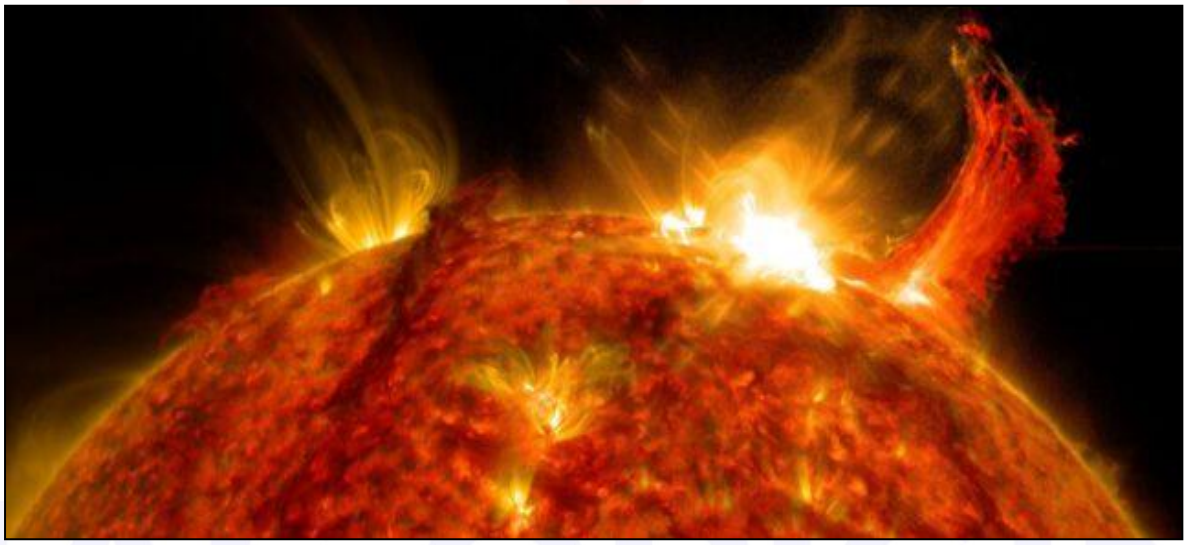
07 STRONG SOLAR FLARE DETECTED

IN NEWS

NASA's Solar Dynamics Observatory (SDO) captured a powerful X1.9-class solar flare on 30 November 2025, one of the strongest flares recorded in the rising phase of Solar Cycle 25.

The flare originated from an active sunspot region and temporarily caused radio blackouts over parts of the Earth-facing hemisphere.

Such events are closely monitored because they can affect satellite operations, GPS accuracy, communication networks, aviation routes, and power grids.



BACKGROUND & CONTEXT

The Sun undergoes an 11-year solar activity cycle, known as the solar cycle, consisting of periods of low and high sunspot activity. Solar Cycle 25 (2020–2031) is currently approaching its maximum phase, leading to more frequent and intense solar events.

Solar flares are sudden bursts of electromagnetic radiation resulting from magnetic energy release in the Sun's atmosphere. They are classified as A, B, C, M, and X-class, with X-class representing the most intense category. An X1.9 flare is considered very strong, capable of producing high-frequency radio blackouts, increased radiation exposure in space, and potential geomagnetic storms if associated with a Coronal Mass Ejection (CME).

NASA's Solar Dynamics Observatory (SDO) constantly monitors the Sun in multiple wavelengths, helping predict space weather events that impact satellites, navigation systems, communication infrastructure, and astronauts. India's ISRO and global agencies use this data to anticipate national risks and prepare mitigation strategies.

WHAT IS A SOLAR FLARE?

- **Nature:** Sudden release of magnetic energy caused by magnetic field line reconnection near sunspots, producing intense radiation across radio, ultraviolet, X-ray and gamma-ray bands.
- **Scale:** Among the largest explosive events in the solar system; X-class flares represent the strongest category, with the number indicating magnitude.
- **Duration:** Appear as bright regions on the Sun and can last minutes to hours, heating surrounding plasma to millions of degrees within minutes.
- **Detection:** Often observed via X-ray and extreme ultraviolet imaging, although occasionally visible in white light.
- **Impact:** Can disrupt radio communications, navigation systems and power grids, affect satellites and pose radiation hazards to astronauts; may trigger auroras during geomagnetic storms.

SOLAR FLARE CLASSIFICATION

Class	Strength	Description
A, B	Weak	No major impact
C	Moderate	Minor Earth impacts
M	Strong	Radio blackouts possible
X	Extreme	Severe space weather impacts

X1.9 = powerful flare equivalent to nearly 2 × X1 energy output.

WHAT DID NASA OBSERVE?

- Detected on 30 November 2025
- Recorded by Solar Dynamics Observatory – Atmospheric Imaging Assembly (AIA)
- Originated from an active sunspot region numbered by NOAA
- Released high-intensity X-ray radiation
- Caused shortwave radio blackouts (R3-level on NOAA scale)

IMPACTS OF X-CLASS FLARES

- HF radio communication disruption
- Increased ionospheric disturbances

- Satellite drag
- GPS signal degradation
- Power grid instabilities
- Radiation risk to astronauts

SOLAR CYCLE 25 STATUS

- Entering peak phase (2025–2026)
- Higher frequency of X-class and M-class flares
- More complex sunspot groups appearing

DETAILED MAINS ANALYSIS

CAUSES OF SOLAR FLARES

- Intense magnetic field twisting around sunspots
- Magnetic reconnection releasing huge energy
- Accelerated plasma ejecting into space

RECENT TRENDS IN SOLAR ACTIVITY

- Solar Cycle 25 has been more active than earlier predictions.
- Increase in M-class and X-class flares.
- Higher risk of geomagnetic storms affecting Earth.

CHALLENGES POSED TO EARTH

COMMUNICATION DISRUPTIONS

- HF radio blackouts affect aviation, shipping, military operations.
- Ionospheric disturbances degrade navigation systems.

SATELLITE VULNERABILITIES

- Increased drag on low-Earth orbit satellites.
- Damage to onboard electronics.
- Temporary shutdown of sensitive instruments.

POWER GRID RISKS

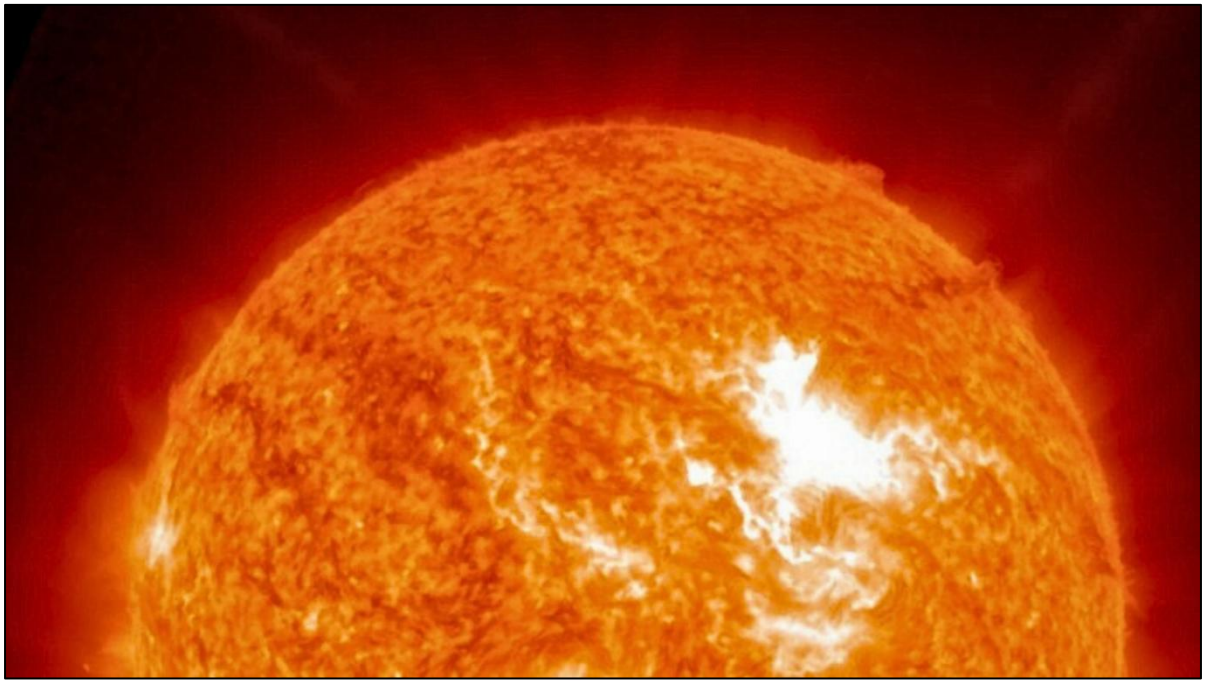
- Strong geomagnetic storms can induce currents in power lines → transformers fail.

AVIATION SAFETY

- Aircraft flying over polar routes exposed to higher radiation.

SPACE MISSION CHALLENGES

- Increased radiation risk for astronauts.
- Threat to ISS & planned lunar missions (Artemis, Gaganyaan).



IMPACT ON INDIA

ISRO & NATIONAL IMPACTS

- Possible disruptions:
    - NavIC navigation signals
    - GSAT communication satellites
    - Remote-sensing data from Cartosat, Oceansat
- Aviation over the Himalayas & polar regions impacted.
- Power grid stability: POSOCO & NTPC monitor geomagnetic indices.

INTERNATIONAL RELEVANCE

- NASA, NOAA, ESA, JAXA, ISRO share space weather data.
- Japan's NOAA-coordinated space weather alerts help nations prepare.
- Solar storms pose global threats → need for international cooperation.

LEGAL / CONTRACTUAL / GOVERNANCE IMPLICATIONS

- Study under the Space Weather Treaty frameworks.
- Forcing upgrades in:
    - Satellite shielding
    - Radiation-hardened components
    - Cybersecurity mechanisms for space assets

GOVERNMENT INITIATIVES & GLOBAL INITIATIVES

INDIAN INITIATIVES

- **ISRO's Aditya-L1 Mission (Launched 2023)**
    - India's first dedicated solar observatory
    - At Lagrange Point L1
    - Provides real-time solar wind & flare data
- **Space Situational Awareness (SSA) Programme**
    - Tracks satellite threats, space debris, solar storm impacts
- **NavIC Hardening Efforts**
    - Upgrading navigation satellites to withstand radiation

CRITICISMS / CONCERNS

- Predictive models still weak → forecasting uncertain
- Countries lack adequate satellite shielding and redundancy
- Aviation sector insufficiently prepared
- No binding global framework on space weather preparedness
- Risk of cyber vulnerabilities during power-grid disturbances

WAY FORWARD

- Build a National Space Weather Forecasting Centre.
- Use AI–ML to improve flare prediction & geomagnetic storm modelling.
- Mandatory solar-storm compliance for telecom & power utilities.
- Shield satellites using radiation-hardened electronics.
- Develop redundancy protocols for NavIC & communication satellites.
- Build India's own space weather index for grid operators.

- Establish global data-sharing agreements under ISA/CDRI.
- Include space weather awareness in aviation training.
- Strengthen coordination among ISRO, IMD, DRDO, NTRO.

PRELIMS BOOSTER

- Solar flares originate from magnetic reconnection.
- Classification: A < B < C < M < X.
- X1.9 is a strong-intensity flare.
- X-ray radiation reaches Earth in 8 minutes.
- CMEs cause geomagnetic storms; flares cause radio blackouts.
- NASA's SDO launched: 2010, monitors Sun 24/7.
- Solar Cycle length: ~11 years.
- Solar Cycle 25 peak: 2025–26.
- Kp-index measures geomagnetic storms (0–9 scale).
- India's solar observatory: Aditya-L1 (at L1).

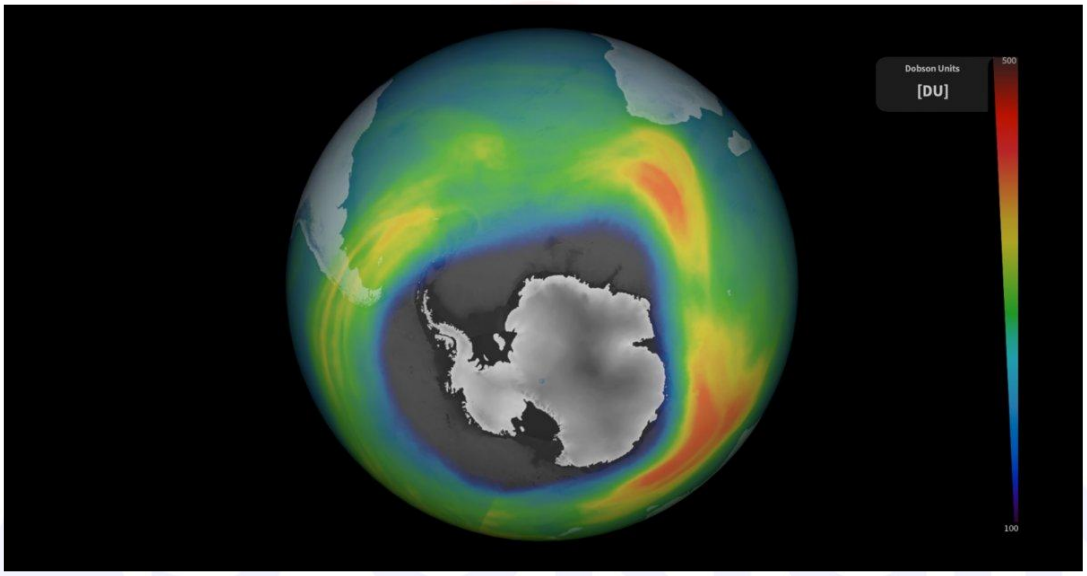
08 ANTARCTIC OZONE HOLE CLOSES EARLY IN 2025

IN NEWS

The Antarctic ozone hole, which typically persists from August to late December, closed earlier than usual in 2025, surprising scientists and raising hopes for ozone layer recovery.

This occurred despite record global temperatures and unprecedented warming events across the globe in 2023–25.

NASA and the European Copernicus program confirmed that stratospheric chlorine levels continue to decline, reflecting the success of the Montreal Protocol, though sporadic extreme weather still influences ozone loss.



BACKGROUND & CONTEXT

The ozone layer, located in the stratosphere (10–40 km altitude), absorbs harmful UV-B radiation and is crucial for life on Earth. Its depletion was dramatically revealed in 1985 when the “ozone hole” over Antarctica was first detected. The cause: chlorofluorocarbons (CFCs) and halons, which release chlorine/bromine radicals that destroy ozone molecules.

In response, the world adopted the Montreal Protocol (1987), considered the most successful environmental treaty, leading to a 99% phase-out of ozone-depleting substances (ODS). As a result, chlorine levels in the stratosphere have been gradually declining since the late 1990s.

The Antarctic ozone hole forms annually during late winter–spring, driven by the polar vortex, extremely cold stratospheric temperatures, and polar stratospheric clouds

(PSCs) that accelerate ozone destruction. In 2025, the hole closed weeks earlier than expected, aligning with long-term projections of recovery by 2050–2065.

However, scientists caution that climate change affects stratospheric temperatures, wind circulation, and PSC formation, making year-to-year variations unpredictable.

- It is a seasonal thinning of the stratospheric ozone layer particularly in the southern polar region — was first discovered in 1985.
- The ozone hole is not technically a "hole" where no ozone is present, but is actually a region of exceptionally depleted ozone in the stratosphere over the Antarctic.
- It happens at the beginning of the Southern Hemisphere spring (August–October).

CAUSES

- **Chlorofluorocarbons (CFCs), halons, and other ozone-depleting substances (ODS):** These chemicals, once widely used in refrigeration, aerosols, and solvents, break down ozone molecules in the stratosphere.
- **Polar stratospheric clouds (PSCs)** formed in extreme cold; they accelerate chemical reactions that destroy ozone.
- **Climate change interactions:** Warming at the surface and cooling in the stratosphere can influence ozone depletion cycles.

IMPACTS

- **Human health:** Increased ultraviolet (UV-B) radiation leads to higher risks of skin cancer, cataracts, and weakened immune systems.
- **Ecosystems:** UV radiation damages phytoplankton, the base of marine food chains, and affects crop yields.
- **Climate linkages:** Ozone depletion alters atmospheric circulation, impacting weather patterns in the Southern Hemisphere.

STEPS TAKEN

- **Montreal Protocol (1987):** It is a landmark global treaty banning ozone-depleting substances (ODS), credited with reducing ozone hole size.
- **Kigali Amendment (2016)** extended controls to hydrofluorocarbons (HFCs), potent greenhouse gases.
- **National efforts:** Countries phased out CFCs in refrigeration and aerosols, promoting safer alternatives.

KEY FACTS / KEY FEATURES

WHAT DOES "OZONE HOLE CLOSED" MEAN?

- It refers to the point when ozone concentration rises above 220 Dobson Units (DU)—the threshold for depletion.
- The 2025 hole closed earlier → indicates reduced chemical ozone destruction.

REASONS FOR EARLY CLOSURE IN 2025

- Decreasing atmospheric chlorine & bromine due to Montreal Protocol compliance.
- Weakened polar vortex and warmer-than-average stratospheric temperatures in spring.
- Lower PSC formation, limiting chlorine-driven reactions.
- Natural year-to-year variability in Antarctic dynamics.

SIZE & DURATION (2025 OBSERVATIONS)

- 2025 hole was smaller earlier, despite being moderately large during September.
- Closed 2–3 weeks earlier than the typical late-December timeframe.
- Ozone levels showed strong positive anomalies in early November.

IMPORTANCE OF OZONE LAYER

- Prevents skin cancer, cataracts
- Protects ecosystems (phytoplankton, crops)
- Regulates climate by absorbing UV radiation

DETAILED MAINS ANALYSIS

RELATIONSHIP BETWEEN THE MONTREAL PROTOCOL AND OZONE RECOVERY

- The Protocol eliminated 99% of ODSs (CFCs, halons).
- Chlorine levels peaked in 1997; now declining at ~1–2% per decade.
- Early closure in 2025 → positive indicator of policy success.

CLIMATE CHANGE & OZONE LAYER INTERACTION

POSITIVE LINK

- Greenhouse gases warm the troposphere but cool the stratosphere, which can increase PSC formation → potentially worsening ozone depletion.

NEGATIVE LINK

Long-term GHG trends may:

- Disturb polar vortex
- Affect vertical wind circulation
- Alter ozone transport

Hence ozone recovery depends on both chemical phase-out and climate stabilization.

WHY EARLY CLOSURE DOES NOT MEAN FULL RECOVERY

- **Short-term dynamics** (winds, temperature anomalies) influence ozone variability.
- **Some years (e.g., 2020 & 2023)** saw unusually large ozone holes due to strong polar vortices.
- **Illegal emissions** (CFC-11 detected in 2018) show vulnerability.

GLOBAL WARMING PARADOX

Even though 2025 had record temperatures, the stratosphere over Antarctica experienced episodic heating, causing:

- Weaker vortex
- Fewer pscs → early ozone recovery for the year.

This indicates complex climate–chemistry interactions.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INTERNATIONAL INITIATIVES

- **Montreal Protocol (1987)**
  - Most successful environmental treaty; universal ratification.
- **Kigali Amendment (2016)**
  - Targets reduction of HFCs (non-ODS but potent GHGs).
- **Vienna Convention (1985)**
  - Framework for ozone protection.
- **Scientific Assessment Panels (WMO–UNEP)**
  - Monitor ozone trends, atmospheric chlorine levels.

INDIA'S INITIATIVES

- Ozone Depleting Substances (Regulation and Control) Rules, 2000
- Phased elimination of CFCs, HCFCs, methyl bromide
- India Cooling Action Plan (ICAP 2019)
- Compliance with the Kigali Amendment (India ratified in 2021)
- Strengthening monitoring of refrigerant use and leakages

CRITICISMS / CONCERNS

- Climate–chemistry uncertainties may slow recovery.
- Potential illegal production of banned ODSs (CFC-11 case).
- Stratospheric cooling due to climate change could create larger ozone holes in some years.
- Increased use of HFCs threatens global warming mitigation.
- Volcanic eruptions and pyroCB events (wildfires injecting smoke into stratosphere) can temporarily worsen ozone depletion.

WAY FORWARD

- Strengthen global monitoring systems for ODS leaks.
- Accelerate transition to low-GWP refrigerants under ICAP.
- Enhance satellite-based ozone observation networks.
- Integrate ozone recovery goals with global climate policy.

- Promote research on climate–ozone feedback mechanisms.
- Enforce strict penalties for illegal refrigerant production.
- Support developing nations with technology transfer and funding.
- Improve wildfire management (pyrocumulonimbus events influence stratosphere).
- Increase public awareness on safe disposal of refrigerants.

PRELIMS BOOSTER NOTES

- **Ozone hole threshold:** <220 Dobson Units (DU)
- **Ozone found in:** Stratosphere (10–40 km)
- **Key ODS:** CFC-11, CFC-12, halons, methyl bromide, carbon tetrachloride
- **Polar Vortex:** Strong winds trapping cold air over Antarctica
- **PSCs:** Form below −78°C; accelerate ozone destruction
- **Montreal Protocol:** 1987 (universal ratification)
- Kigali Amendment: Targets HFC reduction
- **Ozone recovery projection:**
    - **Mid-latitudes:** ~2040
    - **Arctic:** ~2045
    - **Antarctica:** 2050–2065
- **Dobson Unit (DU):** Measures total column ozone
- **India Cooling Action Plan:** First in world with long-term refrigerant strategy

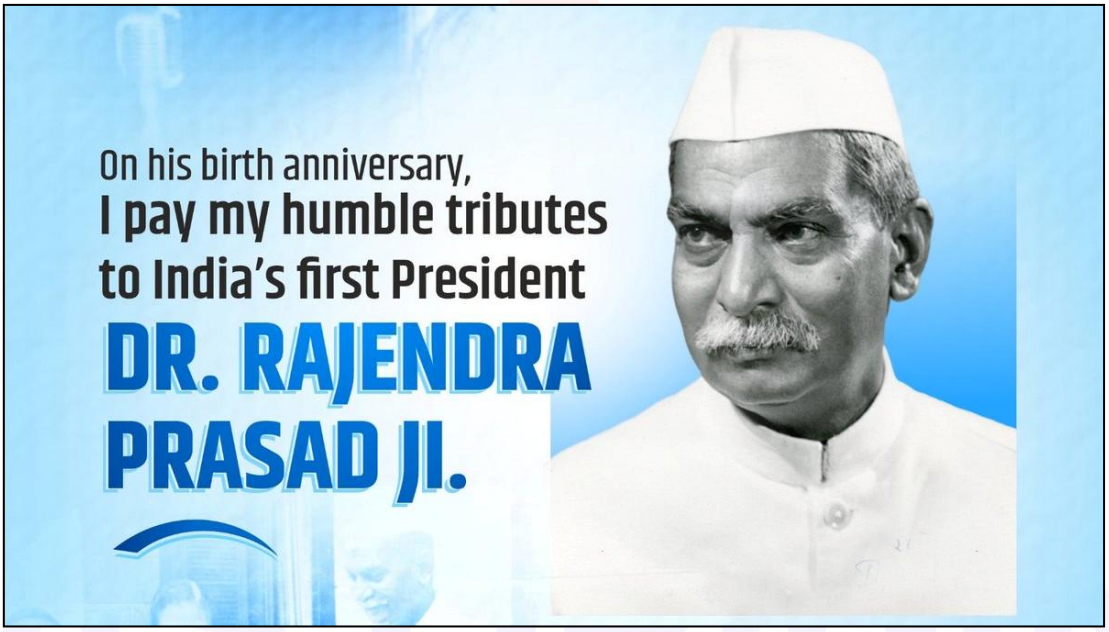
09 TRIBUTES PAID TO DR. RAJENDRA PRASAD ON HIS BIRTH ANNIVERSARY

IN NEWS

The President of India paid tributes to Dr. Rajendra Prasad, India's first President, on his birth anniversary (3 December).

His contributions to the freedom struggle, Constituent Assembly, and nation-building were highlighted.

Dr. Prasad remains the only President to have served two full terms (1950–1962).



BACKGROUND & CONTEXT

Dr. Rajendra Prasad (1884–1963) was a jurist, economist, freedom fighter, and one of the most respected political figures of modern India. A scholar from Bihar, he earned a doctorate in law and taught at various institutions before joining the national movement. Deeply influenced by Mahatma Gandhi, he became an active leader in Non-Cooperation, Salt Satyagraha, Quit India, and the Champaran Movement.

He was elected President of the Constituent Assembly (1946) and played a central role in steering the Constitution-making process with dignity, consensus-building, and statesmanship. Upon adoption of the Constitution, he became the first President of Independent India on 26 January 1950, serving until 13 May 1962—the longest tenure of any Indian President.

His presidency set crucial conventions for parliamentary democracy, Centre–State relations, and executive neutrality. He was awarded the Bharat Ratna in 1962 for his

distinguished service. His birth anniversary is observed to reflect on his contributions to India's democratic foundations.

KEY FACTS / KEY CONTRIBUTIONS

ROLE IN FREEDOM MOVEMENT

- Joined Indian National Congress in 1911
- Key organiser during Champaran Satyagraha (1917)
- Imprisoned multiple times during Non-Cooperation & Quit India movements
- Strong advocate of Swadeshi and nation-building through education

PRESIDENT OF THE CONSTITUENT ASSEMBLY

- Elected unanimously in December 1946
- Oversaw debates, committees, and adoption of Constitution
- Upheld consensus-building and neutrality
- Signed the Constitution on 26 November 1949

FIRST PRESIDENT OF INDIA (1950–1962)

- Served two consecutive terms—longest for any Indian President
- Asserted moral authority while respecting parliamentary democracy
- Guided India through:
    - First General Elections (1951–52)
    - Linguistic reorganisation of States (1956)
    - Consolidation of the Republic
- Known for simplicity, discipline, and fairness

LITERARY WORKS

- An Autobiography
- Atmakatha
- India Divided (analysis of Partition)
- Satyagraha in Champaran

AWARDS

- Bharat Ratna (1962)

DETAILED MAINS ANALYSIS

IMPORTANCE IN CONSTITUTION-MAKING

Dr. Prasad balanced diverse ideological differences and ensured unity among members. His leadership was crucial during sensitive debates on:

- Fundamental Rights
- Language policy
- Citizenship
- Federal structure
- Minority rights

He strengthened the convention that the Chair does not influence the content but facilitates deliberation.

CONTRIBUTION TO DEMOCRATIC CONSOLIDATION

As President, he:

- Established precedents regarding executive powers, ordinances, and role during political crises.
- Upheld neutrality of the office despite personal differences with the Cabinet (e.g., Hindu Code Bill debate).
- Elevated the moral stature of the presidency as a guardian of constitutional values.

LEGACY IN NATIONAL INTEGRATION

His tenure helped stabilize:

- Administrative systems after Independence
- Centre–State relations
- Electoral democracy, especially the first general elections

His commitment to simple living, accountability, and constitutional propriety shaped the ethos of early Indian leadership.

GOVERNMENT INITIATIVES / COMMEMORATIONS

- Annual birth anniversary events by Rashtrapati Bhavan
- Bihar government memorial sites at:
    - Sadaqat Ashram, Patna

- Jiradei, his birthplace
- Commemorative stamps & public institutions named in his memory

- National events under the Ministry of Culture honouring freedom fighters

CRITICISMS / DEBATES

- Some scholars argue he occasionally differed from Nehru's Cabinet (e.g., Hindu Code Bill), raising debates on:
- Activist vs. ceremonial presidency
- Others critique the presidency's limited constitutional role, though Prasad insisted on strengthening conventions rather than altering powers.

WAY FORWARD

- Strengthen public awareness of founding leaders' contributions.
- Introduce educational modules on Constitution-making history.
- Promote research on early presidential practices to refine conventions.
- Preserve historical sites associated with Dr. Prasad.
- Encourage leadership training inspired by his principles: simplicity, ethics, service.

PRELIMS BOOSTER NOTES (HIGH-YIELD FACTS)

- Dr. Rajendra Prasad → Born on 3 December 1884, Bihar
- President of Constituent Assembly → 1946–1950
- India's first President → 26 Jan 1950 – 13 May 1962
- Only President to serve two full terms
- Signed the Constitution on 26 November 1949
- Awarded Bharat Ratna in 1962
- Key book → India Divided (on Partition)
- Role in Champaran Satyagraha significant
- Successor as President → Dr. S. Radhakrishnan

General Studies-2

01 INDIA RE-ELECTED TO IMO COUNCIL (2026–27)

IN NEWS

India has been re-elected to the International Maritime Organization (IMO) Council for the 2026–27 biennium with the highest number of votes among all elected members.

India retained its position in Category B (states with the largest interest in international seaborne trade).

BACKGROUND & CONTEXT

The International Maritime Organization (est. 1948; functional 1959) is a UN specialized agency responsible for regulating shipping safety, maritime security, and marine environmental protection. India has been an active member since 1959 and has served continuously on the IMO Council since 1977, reflecting its growing maritime importance.

India's maritime sector handles about 95% of its trade volume and 65% of trade value, according to Ministry of Shipping. The Indian Ocean additionally hosts major global sea lanes carrying one-third of global bulk cargo and two-thirds of global oil shipments (UNCTAD data).

The re-election comes at a time when IMO is pushing the 2023 GHG Strategy, decarbonisation deadlines, and safer autonomous shipping frameworks all crucial for India's Sagarmala.

KEY FACTS / KEY FEATURES

ABOUT IMO

- UN specialized maritime organisation headquartered in London.

- Mandate: shipping safety, security, environmental protection, pollution prevention, maritime law.
- Flagship conventions:
  - **SOLAS** (Safety of Life at Sea),
  - **MARPOL** (Marine Pollution),
  - **STCW** (Standards of Training, Certification & Watchkeeping).

IMO COUNCIL CATEGORIES

- **Category A:** 10 states with largest interest in international shipping.
- **Category B:** 10 states with largest interest in seaborne trade. (India's category)
- **Category C:** 20 states representing geographic diversity and special maritime interests.

INDIA'S STANDING

- Highest votes in Category B elections (2026–27).
- Member of IMO Council since 1977.
- Major contributor to global seafarers (~10% of world supply).

LEGAL & POLICY LINKAGES

- Merchant Shipping Act, 1958 (India).
- UNCLOS (UN Convention on the Law of the Sea).
- **Indian policies:** Sagarmala, Maritime India Vision 2030, Blue Economy 2047.

STRUCTURE OF IMO

- **Assembly:** It is the highest governing body, composed of all Member States; it meets biennially to approve the budget and elect the IMO Council.
- **Council:** It is the executive body that supervises IMO's work between Assembly sessions and makes decisions on administrative and budgetary issues.
- **Committees:** There are five main technical committees that meet regularly to discuss specific issues.
- **Secretariat:** The UN Secretary-General leads the Secretariat, which implements decisions and manages the daily operations of IMO.

CAUSES FOR INDIA'S RE-ELECTION

India's expanding maritime footprint:

- Largest merchant fleet in South Asia.
- Leading provider of trained seafarers.

India plays a critical role in IMO negotiations on GHG emissions, biofouling, alternative fuels, and Maritime Autonomous Surface Ships (MASS).

Backed by strong diplomatic outreach and strategic partnerships in the Indian Ocean.

RECENT DEVELOPMENTS

- IMO adopted the 2023 GHG Strategy targeting net-zero emissions by 2050.
- India advocating "Common but Differentiated Responsibilities (CBDR)" within shipping decarbonisation.
- New frameworks for digitalisation, maritime cybersecurity, safety of autonomous vessels.
- India pushing for global standards on seafarer welfare post-COVID experience.

CHALLENGES

- High global pressure to decarbonise, but developing countries fear increased shipping costs.
- Global shortage of skilled seafarers.
- IMO regulations tough for small cargo operators in developing countries.
- Maritime security threats: piracy, undersea cables vulnerability, maritime terrorism.

IMPACT ON INDIA

- Helps India shape rules for green shipping corridors, marine fuel transition (methanol, ammonia).
- Strengthens India's logistics competitiveness and port-led development.
- Enhances position in Indo-Pacific maritime governance.
- Boosts India's bid to become a global maritime training hub.

INTERNATIONAL RELEVANCE

- Shipping transports ~90% of global trade (UNCTAD).
- IMO decisions affect global carbon markets, trade supply chains, and marine biodiversity.
- India's presence balances influence of major players like China, US, EU.

LEGAL/CONSTITUTIONAL PROVISIONS

- UNCLOS obligations → freedom of navigation, marine environment protection.
- India's Merchant Shipping Act, Coastal Regulation Zone (CRZ) rules.
- Maritime security mandate overlaps with MHA, Indian Navy, Coast Guard.

EXPERT OPINIONS

- **PRS:** India must push for equitable decarbonisation pathways.
- **ORF:** India should use its position to champion "safer and greener Indian Ocean shipping".
- **World Bank:** Developing countries must prepare for "carbon pricing shocks" in global shipping.
- **IDSA:** IMO seat strengthens India's maritime security posture in IOR.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES

- Maritime India Vision 2030
- National Logistics Policy 2022
- Sagarmala Programme
- Deep Ocean Mission
- Green Ports Initiative
- India-Japan Clean Shipping Corridor

GLOBAL INITIATIVES

- IMO's 2023 GHG Strategy
- Hong Kong Convention (ship recycling)
- MARPOL Annex VI – air pollution from ships
- IMO Data Collection System (DCS) for fuel consumption
- UN Sustainable Development Goal 14 (Life Below Water)

KEY IMO CONVENTIONS AND STRATEGIES

- **SOLAS:** The International Convention for the Safety of Life at Sea 1974 establishes minimum safety standards for ships, including requirements for fire protection and navigation.

- **MARPOL:** The International Convention for the Prevention of Pollution from Ships, 1973, is a key environmental treaty that regulates pollution from ships.
- **STCW:** The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, sets minimum qualification standards globally.
- **BWM Convention:** The Ballast Water Management 2004 tackles the spread of invasive aquatic species.
- **GHG Strategy:** The IMO Greenhouse Gas Strategy, adopted in 2023, aims for net-zero GHG emissions from international shipping by or around 2050.

CRITICISMS / CONCERNS

- **PRS:** IMO climate targets are not binding enough; weak enforcement.
- **World Bank:** Developing nations may face higher costs due to green fuel transition.
- **ORF:** IMO reforms are slow; major powers dominate negotiations.
- Environmental groups: IMO's decarbonisation timeline is "too little, too late".
- **Social concerns:** Seafarer fatigue, poor working conditions, lack of uniform global welfare norms.

WAY FORWARD

- India should champion CBDR principle within IMO's climate framework.
- Enhance green fuel R&D (LNG, methanol, ammonia, hydrogen).
- Upgrade ports to Green & Smart Port Standards.
- Expand maritime training institutes using STCW 2010 standards.
- Strengthen coastal security with Navy–Coast Guard–State synergy.
- Push for IMO reforms to improve developing country representation.
- Build India-led Indo-Pacific Shipping Safety Network.
- Implement National Maritime Single Window for digital logistics.
- Promote offshore renewable energy (wind/solar) for port operations.
- Ensure improved seafarer mental health and welfare protocols.
- Encourage private shipyards via Make in India–Shipbuilding incentives.
- Strengthen compliance with MARPOL/SOLAS through capacity building.

PRELIMS BOOSTER NOTES (10–15 HIGHLY FACTUAL POINTS)

- **IMO HQ:** London
- **Established:** 1948 (came into force 1958)
- **Parent body:** United Nations
- **India's Category:** Category B (interest in international seaborne trade)
- **IMO Council:** Executive body of IMO
- **Key Conventions:** SOLAS, MARPOL, STCW, Ballast Water Convention
- **MARPOL Annexes:** I–VI (oil, noxious liquids, harmful substances, sewage, garbage, air pollution)
- **India's coastline:** ~7,516 km
- **Major chokepoints:** Strait of Malacca, Hormuz, Bab-el-Mandeb
- **India's share of global seafarers:** ~10%
- **UNCTAD:** ~90% of world trade moves by sea
- **UNCLOS:** Legal framework for oceans
- **IMO's 2023 GHG Strategy:** Net-zero emissions "by 2050".
- **Port State Control:** Right to inspect foreign ships for violations.
- **Flag State:** Country under whose laws a ship is registered.

02 PARLIAMENTARY DEADLOCK AND DECLINING LEGISLATIVE EFFECTIVENESS

As Parliament enters yet another session overshadowed by deadlock fears and routine walkouts, raising serious concerns that India's highest democratic forum is losing its voice.

CURRENT STATUS OF PARLIAMENTARY FUNCTIONING

- Lok Sabha functioned 29% and Rajya Sabha 34% of the scheduled time in the Monsoon Session 2025.
- Annual sittings declined from 121 days (1952-70) to ~68 days since 2000.
- Question Hour performance fell to 23% in LS, 6% in RS in Monsoon 2025.
- Only 20% referred to Parliamentary Committees in 16th & 17th Lok Sabhas, down from 60%.
- No Deputy Speaker in the 17th Lok Sabha and still none in the 18th.

REFORMS REQUIRED FOR SMOOTH PARLIAMENTARY FUNCTIONING

- **Institutional Dialogue:** Reinstate structured, periodic meetings between the Leader of the House, Prime Minister, and Leader of Opposition, similar to the UK's parliamentary management conventions.
- **Anti-Defection Reform:** Limit the whip only to confidence motions & money bills, restoring MP autonomy modelled on UK/Canada practice.

- **Revive Committee System:** Mandate 75% Bills to be referred to Standing Committees and also introduce public consultations and expert hearings.
- **Guaranteed Sitting Days:** Introduce a statutory minimum of 100–120 days of sittings annually, on lines of the Australian fixed parliamentary calendar.

SUMMONING OF THE HOUSES OF PARLIAMENT

- Article 85(1) of IC empowers the President to summon each House of Parliament to meet.
- But the maximum gap between two sessions cannot be more than six months.
- It is not necessary that the Lok Sabha and Rajya Sabha should be summoned simultaneously or on the same date.
- The Parliament has no fixed calendar for sittings.
- Normally, three sessions are held in a calendar year, namely: Budget Sessions, Monsoon Sessions and Winter Sessions

03 ST STATUS FOR SIX COMMUNITIES IN ASSAM

IN NEWS

A Group of Ministers (GoM) in Assam has submitted an interim report recommending Scheduled Tribe (ST) status for six OBC communities:
Tai Ahom, Chutia, Moran, Matak, Koch-Rajbongshi and Tea Tribes/Adivasis.

The report proposes a new ST (Valley) category to accommodate them while retaining existing quotas for ST (Plains) and ST (Hills).

The report has been approved by the Assam Cabinet and tabled in the state Assembly, triggering support from these communities and strong protests from several existing tribal groups, especially in Bodoland and Barak Valley.

Their plains tribes) have repeatedly expressed fears that including large, populous communities could dilute reservation benefits and political representation.

Under Article 342 of the Constitution, only Parliament can include or exclude communities from the ST list, after consultation with the Registrar General of India (RGI) and the National Commission for Scheduled Tribes (NCST).

KEY FACTS / KEY FEATURES

THE SIX COMMUNITIES

- **Tai Ahom** – Historically ruling dynasty of Assam, now largely agrarian, listed as OBC; concentrated in upper Assam.
- **Chutia** – Indigenous Assamese community with medieval kingdom legacy; currently OBC.

- **Moran & Matak** – Indigenous tea-growing and agrarian communities in upper Assam.
- **Koch-Rajbongshi** – Large OBC community in lower Assam and North Bengal, also seeking greater autonomy (Kamatapur).
- **Tea Tribes/Adivasis** – Descendants of tribal laborers brought from central & eastern India during colonial times; currently under OBC in Assam but ST in some other states.

All six are presently in OBC lists in Assam and together form about one-fourth of the state population.

CORE GOM RECOMMENDATIONS

Three-tier ST structure for Assam:

- **ST (Hills)** – Existing hill tribes (unchanged).
- **ST (Plains**) – Existing plains tribes (unchanged).
- **ST (Valley)** – New category to accommodate the six demanding communities.

ALLOCATION AMONG CATEGORIES:

- Proposal to place some communities (Ahom, Chutia, Koch-Rajbongshi, Tea Tribes) in ST (Valley) and others (Moran, Matak) partly aligned with plains structure, while ensuring no reduction in the effective reservation share of existing ST (Hills/Plains).
- Separate sub-quotas and separate rosters for ST (Valley) so that existing ST (Plains/Hills) are not pushed out of government jobs and educational seats.

CONSTITUTIONAL & INSTITUTIONAL POINTS

- **Article 342** – President specifies STs for each state; Parliament must enact a law to amend this list.
- Registrar General of India (RGI) and NCST have, according to GoM, already recommended inclusion of these six communities; the Union Cabinet had also approved an earlier proposal.
- Final inclusion still requires a Constitutional amendment Bill and/or amendment to the ST Order by Parliament.

GOM & POLITICAL PROCESS

- **GoM headed by:** Ranoj Pegu (Tribal Affairs – Plains), with Pijush Hazarika (Social Justice & Empowerment) and Keshab Mahanta (Revenue & Disaster Management) as members.

- Assam Cabinet has approved the report; CM has publicly assured that the plan will not dilute existing tribal rights.

PROCEDURE FOR INCLUSION IN THE SCHEDULED TRIBE (ST) LIST

- **State Proposal:** The process begins when a State or UT government submits a formal proposal to the Ministry of Tribal Affairs (MoTA) to add, remove, or modify a community in the ST list.
- **MoTA Review:** The Ministry of Tribal Affairs reviews the proposal and verifies all supporting evidence and documentation.
- **RGI Examination:** MoTA forwards the proposal to the Office of the Registrar General of India (RGI) for ethnographic assessment and formal approval.
- **NCST Scrutiny:** After RGI clearance, the proposal is referred to the National Commission for Scheduled Tribes (NCST) for its recommendations.
- **Cabinet Approval:** Once the NCST recommends the proposal, MoTA prepares a Cabinet note and seeks approval from the Union Cabinet.
- **Parliament & Notification:** After Cabinet approval, the proposal is introduced in Parliament and must be passed by a simple majority.
- **Presidential Notification:** Once Parliament enacts the amendment, the President issues a notification updating the ST list.

DETAILED MAINS ANALYSIS

CAUSES BEHIND THE MOVE

- **Socio-economic Backwardness**
    - GoM cites low literacy, landlessness, poor access to higher education and formal sector jobs among these communities as justification for ST status.
- **Historical Marginalisation & Identity**
    - These groups assert indigenous roots and historical kingdoms (Ahom, Chutia) yet lack the legal recognition and welfare benefits that other tribal groups enjoy.
- **Political Commitments & Electoral Calculus**
    - Granting ST status was a key BJP promise in 2014 and reiterated later; sustained agitations, rallies, and threats of boycott have kept pressure on the state and Centre.
- **Balancing Competing Claims**

- Existing STs fear losing their share; GoM's three-tier formula is an attempt to reconcile long-pending demands with protection of current ST safeguards.

RECENT DEVELOPMENTS

29 Nov 2025: Interim GoM report tabled in Assam Assembly; Cabinet approval announced.

PROTESTS:

- **Bodoland** – Students stormed BTC secretariat in Kokrajhar, demanding withdrawal of consent, fearing erosion of ST benefits.
- **Barak Valley** – Mass rallies by tribal groups opposing inclusion of new STs.
- **Engagement:** Govt holding consultations with tribal organisations (e.g., CCTOA) to explain safeguards.

KEY CHALLENGES

- **Reservation Arithmetic & Zero-Sum Fears**
  - Six communities are large (~27% of population); inclusion without careful sub-quota design could severely crowd out smaller ST groups.
- **Legal & Constitutional Complexity**
  - Requires Parliamentary legislation under Article 342; any misstep could lead to litigation or demands from other communities across India.
- **Defining "Tribe" & Backwardness**
  - Difficult to objectively distinguish ethnic, caste, and class dimensions; may create precedent for more communities (e.g., Kalita, others) to demand ST status.
- **Ethnic Tensions & Social Cohesion**
  - Strong opposition from existing STs (Bodos, hill tribes, Barak Valley tribals) could deepen inter-ethnic mistrust and impact peace accords and autonomy arrangements.

IMPACT ON INDIA / ASSAM

- **On Social Justice & Inclusion**
  - If well-designed, could improve targeted development of historically marginalised communities (tea garden workers, riverine peasants, etc.).
- **On Politics & Federalism**

- Will reshape constituency reservations, power-sharing, and regional party strategies in Assam; may influence demands in other states (J&K Paharis, Jat/Maratha-type movements, etc.).

- **On Centre–State Relations**
  - Assam's recommendation and Cabinet's approval place moral pressure on the Centre to act, but Delhi must weigh nationwide implications of expanding ST lists.

INTERNATIONAL RELEVANCE

- Reflects global debates on indigenous rights and affirmative action similar to quota debates in Latin America, Canada, and Australia (recognition vs resource sharing).
- India's experience in managing ethnic diversity through constitutional mechanisms (Schedules, Autonomous Councils, reservations) continues to be studied as a complex model.

LEGAL / CONSTITUTIONAL PROVISIONS

- **Article 342 –** President notifies STs; Parliament alters list.
- **Articles 330 & 332 –** Reservation of seats in Lok Sabha and State Assemblies for SC/ST.
- **Article 275(1) –** Grants for ST-dominated areas (used for tribal development schemes).
- **NCST Act, 2003 –** Advisory role of National Commission for Scheduled Tribes.

COMMITTEE RECOMMENDATIONS (CONTEXT)

- **GoM Interim Report** – Three-tier ST classification + ST (Valley), sub-quotas, separate rosters, assurances to existing STs.
- **RGI & NCST –** Reportedly recommended inclusion based on socio-economic data.
- **Various Expert Panels on North-East / Tribal Affairs** – Repeatedly emphasised targeted tribal development, protection of smaller tribes, and careful design of reservation frameworks.

EXPERT OPINIONS (PRS / THINK-TANK STYLE – INFERENTIAL)

Note: These are thematic, not verbatim quotes. Experts warn that ST inclusion must be transparent and development-focused, or it risks becoming symbolic and destabilising rather than beneficial.

- **PRS-like concerns** – Need for transparent criteria, updated socio-economic surveys, and avoidance of purely political decisions in altering ST lists.
- **ORF / NITI perspectives** – Inclusion must be combined with robust delivery of schemes; otherwise, ST status may become symbolic without improving human development outcomes.
- **World Bank / IMF angle** – Fragmented identity politics in resource-poor regions can distract from core development priorities if not managed sensitively.
- **IDSA / security angle** – Identity-based agitations, if mishandled, can affect stability in the North-East and complicate implementation of peace accords.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

KEY INDIAN SCHEMES / POLICIES FOR STS

- **Development Action Plan for Scheduled Tribes (DAPST)**
  - Cross-ministry budgeting approach: 41 ministries/departments earmark a portion of their schemes for ST-focused components (education, health, roads, irrigation, livelihoods).
  - Ensures that tribal development is mainstreamed across sectors, not confined to one ministry.
- **Grants under Article 275(1) of the Constitution**
  - 100% central grants to states with significant ST population to raise administration levels in Scheduled Areas and fund special tribal welfare projects.
- **Eklavya Model Residential Schools (EMRS)**
  - Central Sector Scheme to provide quality residential education (Class VI–XII) for ST children in remote areas; one EMRS per block with >50% ST population & ≥20,000 ST persons (Census 2011).
- **PM-DevINE (Prime Minister's Development Initiative for North East Region)**
  - Central Sector scheme (outlay ₹6,600 crore for 2022–26) to fund infrastructure and social projects in the NE, focusing on livelihoods for youth and women and filling critical gaps.
  - Important for tribal-dominated NE states, including Assam.
- **Autonomous Councils & Sixth Schedule Framework (Assam, Meghalaya)**
  - Though not a "scheme", autonomous councils (BTAD/BTR, Karbi Anglong, etc.) provide self-governance and targeted development for tribal areas.

GLOBAL NORMS / INITIATIVES

- **UN Declaration on the Rights of Indigenous Peoples (UNDRIP)**
    - Recognises indigenous peoples' rights to identity, land, culture, and self-determination; though non-binding, it shapes global normative standards.
- **ILO Conventions 107 & 169**
    - Convention 169 (India hasn't ratified) advocates for consultation, land rights, and special measures for indigenous and tribal people.
- **SDG Framework (Especially SDG 1, 2, 4, 10)**
    - Calls for reducing inequities and ensuring inclusive development for marginalised groups, including indigenous populations.

India positions its Constitutional and scheme-based system as a relatively advanced framework of indigenous/tribal protection, despite operational gaps.

CRITICISMS / CONCERNS

- **Existing ST Groups' Fears**
    - Bodos and other ST groups argue that adding large communities will dilute their job quotas, educational seats, and political representation.
- **Reservation Dilution & Precedent**
    - Critics warn that this move may open the door for many more communities to seek ST status, undermining the original intent of targeting the most vulnerable.
- **Data & Criteria Issues (PRS-style)**
    - Concerns that decisions are not always based on fresh, transparent socio-economic data, but on political bargaining.
- **Policy Design Concerns (Think-tank views)**
    - Risk of "labelling without development" – ST status may not translate into real improvements unless backed by strong institutions and scheme implementation.
    - Overlap of OBC and ST benefits can complicate targeting and evaluation.
- **Environmental / Social Concerns**
    - Not directly environmental, but tensions among communities could affect co-management of forests, common lands, and resources in tribal areas.

WAY FORWARD

- **Transparent, Nationwide Criteria for ST Inclusion**
    - Use clear parameters (socio-economic, cultural, geographical isolation, discrimination) and publish them to reduce perceptions of arbitrariness.
- **Updated Socio-economic Survey**
    - Commission independent surveys (NSSO-style / NITI-led) to objectively assess backwardness and vulnerability of claimant communities.
- **Sub-categorization & Protection of Smaller Tribes**
    - Legally entrench separate sub-quotas and rosters (ST-Hills, ST-Plains, ST-Valley) and monitor their impact periodically.
- **Phased Implementation & Sunset Reviews**
    - Implement inclusion in a phased manner, with periodic review commissions (every 10–15 years) to assess outcomes.
- **Strengthening Institutions (NCST, ST Commissions)**
    - Enhance powers, staff, and data capacity of NCST and State Tribal Commissions to monitor implementation and handle grievances.
- **Political Representation Safeguards**
    - Revisit delimitation and reservation of constituencies to ensure smaller ST groups retain adequate political voice.
- **Focused Development Packages**
    - Couple ST recognition with time-bound, outcome-based packages under DAPST, PM-DevINE, EMRS, etc., with strong monitoring.
- **Dialogue & Conflict Mitigation**
    - Institutionalize structured dialogue platforms between claimant and existing ST groups to address fears and build trust.
- **Legal Clarity & Judicial Oversight**
    - Ensure all changes are routed through clear Constitutional amendments and are robust enough to withstand judicial scrutiny.
- **Policy Learning from Other Regions**
    - Study experiences like Gujjar–Pahari, Kalita, and other reservation movements to anticipate and mitigate cascading demands.
- **Better Awareness & Communication**

- Use multilingual campaigns to explain what changes, what doesn't, especially regarding existing ST entitlements.

- **Data-driven Evaluation**
  - Mandate impact assessments of ST inclusion on human development indicators and revise strategies based on evidence.

PRELIMS BOOSTER NOTES (HIGH-YIELD FACTS)

- **Six Communities:** Tai Ahom, Chutia, Moran, Matak, Koch-Rajbongshi, Tea Tribes/Adivasis – currently OBC; demand ST status.
- **New Category Proposed:** ST (Valley) – alongside existing ST (Plains) & ST (Hills).
- **Assam ST Share:** ~13% of population; six demanding communities ≈ 27% combined.
- **Constitutional Article:** Article 342 – Specifies STs; only Parliament can amend list.
- **Key Institutions:** RGI, NCST, Ministry of Tribal Affairs, Assam Cabinet, GoM.
- **GoM Head:** Ranoj Pegu, Tribal Affairs (Plains) Minister of Assam.
- **Main Opposition:** Bodos, other existing STs (BTC area, Barak Valley) fearing dilution.
- **DAPST:** Development Action Plan for Scheduled Tribes – cross-ministry budgeting framework.
- **EMRS:** Residential schools for ST students (Class VI–XII) in blocks with >50% ST population and ≥20,000 ST persons.
- **PM-DevINE:** Central Sector scheme (₹6,600 crore, 2022–26) for NE region's holistic development.

04 50TH ANNIVERSARY CONFERENCE OF THE BIOLOGICAL WEAPONS CONVENTION (BWC)

IN NEWS

At a global conference marking 50 years of the Biological Weapons Convention (BWC), India's External Affairs Minister (EAM) warned that bioterrorism is no longer a distant threat, given rapid advancements in biotechnology, synthetic biology, AI-enabled genetic manipulation, and dual-use research.

He emphasized strengthening verification mechanisms, enhancing global cooperation, and building early-warning systems to protect humanity.

BACKGROUND & CONTEXT

The Biological Weapons Convention (1975) is the first multilateral disarmament treaty banning the development, production, and stockpiling of biological and toxin weapons. It now has 183 States Parties (UN data). However, the Convention lacks a verification regime, making compliance difficult to ensure. Over the past decade, the global biosphere has seen exponential growth in synthetic biology, CRISPR-based genome editing, DNA synthesis technologies, and lab automation—creating unprecedented opportunities for both scientific innovation and misuse by state and non-state actors.

According to the World Bank's Global Preparedness Report, pandemics could cost the world over 5% of global GDP annually if preparedness is weak. The COVID-19 pandemic exposed vulnerabilities in health surveillance, supply chains, and biosafety norms. India has repeatedly advocated strengthening global frameworks on pandemics, biosafety,

and early-warning systems. At the BWC's 50th anniversary conference, India underlined the rising risks of bioterrorism, accidental pathogen release, and AI-enabled bioengineering.

KEY FACTS / KEY FEATURES

ABOUT THE BIOLOGICAL WEAPONS CONVENTION (BWC)

- **Came into force:** 26 March 1975
- **Administered by:** UN Office for Disarmament Affairs (UNODA)
- Legally binds States Parties to never develop, produce, stockpile or acquire biological or toxin weapons.
- **Covers agents such as:** bacteria, viruses, fungi, toxins, genetically modified organisms.
- Lacks a verification protocol, unlike Chemical Weapons Convention (CWC).

CORE ARTICLES

- **Article I:** Total prohibition of biological agents "for hostile purposes".
- **Article II:** Destruction or conversion of existing biological weapons.
- **Article V:** Consultation/cooperation to resolve problems.
- **Article X:** Peaceful use of biological science and technology must be facilitated.

INDIA & THE BWC

India is an original signatory and active participant in review conferences.

Advocates:

- Strengthening verification,
- Equitable biotechnology access,
- Biosecurity capacity building,
- Curbing misuse of dual-use research.

WHY BIOTERRORISM RISK IS RISING

- Synthetic biology and CRISPR tools becoming inexpensive.
- AI can design pathogens or optimise biological sequences.
- Black-market DNA synthesis and cyber-biosecurity loopholes.
- Potential misuse by terror outfits or rogue states.

DETAILED MAINS ANALYSIS

CAUSES BEHIND RISING BIOTERRORISM CONCERNS

- **Technological democratisation:** DIY biology, low-cost sequencing and synthesis.
- **Dual-use nature:** Technologies intended for vaccines or research can be misused.
- Weak international verification under BWC.
- **Globalisation & mobility:** Rapid spread of pathogens across borders.
- **Cyber-bio convergence**: AI and machine learning make genetic manipulation easier.
- Insufficient biosafety regulation in many developing countries.

RECENT DEVELOPMENTS

- Multiple labs worldwide reported breaches or accidental exposures in recent years.
- Advances in gene drives, synthetic viruses, autonomous labs, and AI-generated protein folding models.
- Rise of biofoundries and commercial DNA synthesis firms—often without strict screening.
- Global debate around gain-of-function research and its risks.
- India pushing for better pandemic-preparedness mechanisms at G20 and WHO.

CHALLENGES

- No verification or compliance mechanism under BWC.
- Asymmetry in global biotechnology capabilities.
- Divergence among states on permissible biological research.
- Difficulty attributing a biological attack (natural vs artificial outbreak).
- Weak bio-data governance and hacking risks.
- Limited capacity in many nations to detect engineered pathogens.

IMPACT ON INDIA

- India’s large population & dense urban environments → high vulnerability.
- Threat to agriculture and livestock (agro-terrorism risks).

- Economic impact: pandemics can reduce GDP by 3–5% annually (WB estimates).
- Need for stronger public health surveillance, genomic sequencing, and biodefence labs.
- Cybersecurity risks for India's biotech startups and research facilities.

INTERNATIONAL RELEVANCE

- BWC seen as cornerstone of global biosecurity architecture.
- Rise of great-power competition in biotechnology (US–China).
- Global focus on pandemic preparedness after COVID-19.
- Need for universalisation of BWC, cross-border cooperation, early-warning systems.

LEGAL / CONSTITUTIONAL PROVISIONS RELEVANT TO INDIA

- **Disaster Management Act (2005)** – management of biological disasters.
- **National Disaster Management Authority (NDMA)** guidelines on biological threats.
- **Environment Protection Act (1986)** – regulates genetic engineering.
- **Biomedical Waste Rules, Drugs & Cosmetics Act**, and Epidemic Diseases Act for outbreak response.

COMMITTEE RECOMMENDATIONS / POLICY INPUTS

- **NDMA Biological Disaster Guidelines (2008):** need integrated bio-surveillance.
- **Standing Committee on Health:** strengthen biosafety labs & pathogen surveillance.
- **NITI Aayog:** build bio-manufacturing capacity with strong regulation.
- **WHO Joint External Evaluation:** improve India's lab safety and emergency response.
- International scientists emphasize need for BWC verification protocol.

EXPERT OPINIONS (PRS, IDSA, EPW, IMF-STYLE)

- **PRS Legislative Research:** India lacks unified biosafety legislation; regulatory roles are fragmented across ministries.
- **IDSA:** Bioterrorism may become a key internal security threat; India must enhance biodefence and intelligence coordination.

- **EPW:** Ethical concerns around dual-use research and inequitable access to biotech.
- **IMF/World Bank:** Pandemics pose major economic shocks; prevention more cost-effective than response.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES

- **Integrated Disease Surveillance Programme (IDSP)**
  - Tracks outbreaks; now being upgraded with digital platforms and genomic surveillance.
- **National Centre for Disease Control (NCDC) & INSACOG**
  - INSACOG monitors pathogen mutations and pandemics.
  - NCDC leads national response to biological threats.
- **BSL Laboratories Expansion**
  - India now has BSL-2, BSL-3 and BSL-4 labs, including NIV Pune.
  - National Biotechnology Regulatory Framework
  - DBT & GEAC regulate genetic engineering and biosafety norms.
- **Defence Research & DRDO Projects**
  - Development of detection kits, protective gear, and biodefence tools.

GLOBAL INITIATIVES

- **Biological Weapons Convention (BWC)**
  - Global treaty banning biological weapons; India advocates strengthening it.
- **WHO International Health Regulations (IHR 2005)**
  - Framework for global outbreak reporting & response.
- **UNSC Resolution 1540**
  - Requires states to prevent non-state actors from acquiring WMDs, including biological agents.
- **Global Health Security Agenda (GHSA)**
  - Multinational platform to strengthen pandemic preparedness.
- **UN Secretary-General's Mechanism (UNSGM)**
  - Investigates alleged use of biological weapons.

CRITICISMS / CONCERNS

PRS-LIKE INSTITUTIONAL CONCERNS

- Fragmented biosafety regulation in India.
- Absence of a unified national biosecurity law.

ORF & NITI AAYOG CONCERNS

- Overlaps between health security and national security cause coordination gaps.
- Need stronger private-sector compliance in DNA synthesis, biotech labs.

IDSA CONCERNS

- Bioterrorism may exploit India's porous borders and crowded environments.

IMF/WORLD BANK ECONOMIC CONCERNS

- Biological events can trigger severe supply-chain disruptions and long-term fiscal burdens.

ENVIRONMENTAL & SOCIAL CONCERNS

- Unregulated biotechnology could harm biodiversity.
- Ethical issues around gene editing & synthetic organisms.

WAY FORWARD

- Create a National Biosecurity Authority with unified regulatory powers.
- Strengthen BWC Verification Mechanisms through advocacy and diplomatic leadership.
- Mandate DNA synthesis screening to prevent creation of harmful sequences.
- Build a national bio-surveillance grid integrating hospitals, labs, AI monitoring & genomic data.
- Upgrade biosafety labs and ensure strict BSL-3/BSL-4 compliance.
- Develop a national biodefence strategy with clear military–civil coordination.
- Legislate a comprehensive Biosecurity Act covering dual-use research.
- Enhance cybersecurity for biotech labs and genomic databases.
- Scale up public health systems—rapid diagnostics, stockpiles, and trained workforce.

- Promote responsible biotech innovation through ethics committees and oversight.
- Strengthen international cooperation—joint exercises, data sharing, and early-warning systems.
- Educate stakeholders (researchers, industry, academia) about biosafety norms.

PRELIMS BOOSTER NOTES (HIGHLY FACTUAL)

- **BWC:** 1975 treaty banning biological weapons; no verification regime.
- **Administered by:** UN Office for Disarmament Affairs (UNODA).
- **India: Original signatory;** advocates strengthening BWC.
- **Dual-use research:** Research beneficial for society that can also be misused (example: gain-of-function).
- **BSL-4 lab in India:** National Institute of Virology (NIV), Pune.
- **UNSC Resolution 1540:** Prevents WMD proliferation to non-state actors.
- **UNSGM:** Mechanism to investigate biological/chemical attacks.
- **INSACOG:** Indian genomic surveillance consortium.
- **IHR (2005):** Global rules for outbreak reporting & health emergencies.
- **Bioterrorism agents:** Anthrax (Bacillus anthracis), smallpox, botulinum toxin, **engineered pathogens.**
- **Biosecurity vs Biosafety:** Security = preventing misuse; safety = preventing accidents.
- **World Bank pandemic cost estimate**: >5% of global GDP yearly without preparedness.
- **CWC vs BWC:** Chemical Weapons Convention has verification (OPCW); BWC does not.
- **Synthetic biology:** Designing/constructing biological systems; potential for misuse.

05 INDIA RE-ELECTED TO UNESCO EXECUTIVE BOARD

IN NEWS

India has been re-elected to the UNESCO Executive Board for the 2025–29 term, securing strong support in the General Conference elections.

This re-election reflects global confidence in India's role in multilateralism and its contributions to UNESCO's core mandates: education, culture, science, communication and information.

BACKGROUND & CONTEXT

UNESCO (United Nations Educational, Scientific and Cultural Organization) was founded in 1945, with headquarters in Paris, to promote peace through education, science, culture and communication. India is a founding member and has historically used UNESCO as a platform for cultural diplomacy, promotion of World Heritage sites, educational cooperation and South–South collaboration.

UNESCO is governed by three organs: General Conference, Executive Board and Secretariat. The Executive Board (58 Member States) is the key governance and supervisory body responsible for preparing the programme and budget and overseeing implementation.

India has been elected to the Board multiple times; the 2025–29 re-election comes at a time when global debates on AI in education, digital divide, heritage protection in conflict zones, disinformation, and climate-linked cultural loss are intensifying—areas

where India is trying to project itself as a responsible, inclusive voice of the Global South.

KEY FACTS / KEY FEATURES

WHAT IS THE UNESCO EXECUTIVE BOARD?

- One of UNESCO's three constitutional organs (with General Conference & Secretariat).
- **Functions:**
  - Prepares agenda and programme & budget for the General Conference.
  - Supervises implementation of programmes and Medium-Term Strategy.
  - Ensures decisions of General Conference are properly carried out.
- **Composition**
  - 58 Member States, elected by the General Conference, usually for 4-year terms, with equitable geographical distribution.
- **India's 2025–29 Term**
  - Re-elected by the General Conference for 2025–29.
  - India will participate in decision-making on global education norms, cultural heritage policies, science cooperation, media freedom and digital governance.
- **UNESCO Basics (for Prelims)**
  - Founded: 1945 (came into force 1946).
  - HQ: Paris, France.
  - Membership: 194 Member States, 12 Associate Members (2023).

DETAILED MAINS ANALYSIS (GS2, GS3 STYLE)

CAUSES / WHY INDIA'S RE-ELECTION MATTERS

- **Track record in UNESCO**
  - India has UNESCO World Heritage Sites, chairs/participates in several UNESCO committees, and hosts a UNESCO Cluster Office in New Delhi (for South Asia).
- **Soft power & cultural diplomacy**
  - Through yoga, Ayurveda, classical arts, heritage conservation, and promotion of intangible cultural heritage, India has built a strong UNESCO profile.

- **Voice of the Global South**
    - India increasingly positions itself as a bridge between developed and developing countries on issues like digital learning, AI ethics, and knowledge-sharing.

RECENT DEVELOPMENTS

India's re-election comes after an active role in:

- Global education debates (learning loss post-COVID, digital divide).
- Efforts to protect cultural and natural heritage, including inscriptions on UNESCO lists (e.g., more World Heritage/Intangible Heritage nominations).
- Advocating multilingualism and preservation of indigenous languages in global forums.

CHALLENGES

- **Politicisation of multilateral bodies**
    - UNESCO has seen tensions over heritage disputes, Palestine/Israel issues, funding cuts etc.
- **Funding Constraints**
    - Past US funding withdrawal created financial stress; UNESCO must balance ambitious mandates with limited budgets.
- **North–South divide**
    - Disagreements on IP rights, knowledge sharing, and equitable benefits from AI, science and culture.

IMPACT ON INDIA

- **Policy Influence**
    - Agenda-setting power on Education 2030, AI in education, open science, heritage protection and media freedom.
- **Benefits for Education & Culture**
    - Improved access to UNESCO platforms, capacity building, Chair programmes, and funding windows supporting Indian initiatives.
- **Strategic & Soft Power Gains**
    - Enhances India's image as a knowledge and culture power, aligning with its broader foreign policy branding (Vishwaguru / "global good").

INTERNATIONAL RELEVANCE

India's presence helps balance voices from Asia and the Global South in UNESCO governance.

Can shape global norms on:

- Equitable access to education and digital public goods.
- Protection of heritage in conflict and climate-vulnerable zones.
- Ethical frameworks for AI, internet governance, and media pluralism.

LEGAL / INSTITUTIONAL CONTEXT

- UNESCO is a specialized agency of the UN; its Constitution defines:
    - General Conference (legislative),
    - Executive Board (executive/oversight),
    - Secretariat (administrative).
- Executive Board's functions are detailed in Rules of Procedure and UNESCO Constitution – including examining Programme & Budget and supervising its execution.

COMMITTEE / EXPERT PERSPECTIVES (UPSC-STYLE)

(Inferential, based on typical think-tank views on multilateralism)

- **PRS-style view:** India should use such bodies to push for reforms improving transparency, efficiency and accountability in UN agencies.
- **ORF-style view:** Platforms like UNESCO are crucial for narrative-building and soft power in a contested global order.
- **World Bank / IMF-style:** Education, science, and culture are foundational to long-term development, and UNESCO governance needs to better link with SDG financing.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES LINKED TO UNESCO MANDATES

- **National Education Policy (NEP) 2020**
    - Focuses on universal foundational literacy, holistic education, multilingualism and technology integration.
    - Closely aligned with UNESCO's Education 2030 / SDG 4 vision of inclusive, equitable quality education.

- **UNESCO Category-1 Institute: MGIEP (Mahatma Gandhi Institute of Education for Peace and Sustainable Development)**
    - Located in New Delhi; focuses on peace education, global citizenship and digital pedagogies in line with UNESCO's education mandate.
- **Cultural Heritage & Intangible Cultural Heritage (ICH) Nominations**
    - India actively nominates sites/ICH elements to UNESCO (e.g., Kumbh Mela, Yoga, Durga Puja).
    - Strengthens cultural diplomacy and local conservation efforts.
- **Digital Public Infrastructure & Education (DIKSHA, SWAYAM, PM eVIDYA)**
    - India promotes using open digital platforms to bridge the digital divide, a message it can carry into UNESCO's education forums.

GLOBAL / UNESCO INITIATIVES

- **Education 2030 – SDG 4 Framework**
    - UNESCO is the lead UN agency for SDG 4 (Quality Education); coordinates Global Education Monitoring (GEM) Reports.
- **UNESCO World Heritage Convention (1972)**
    - Protects cultural & natural heritage of outstanding universal value; India is an active State Party with multiple sites.
- **Convention for the Safeguarding of Intangible Cultural Heritage (2003)**
    - Protects living heritage; India uses this to promote diverse traditions.
- **UNESCO's Recommendation on the Ethics of AI (2021)**
    - First global normative instrument on ethical AI, where India can contribute as a major digital and AI actor.
- **UNESCO's Media and Information Literacy, Internet Universality (ROAM principles)**
    - Promotes rights-based, open, accessible, multi-stakeholder internet and media ecosystem.

India's presence on the Executive Board gives it direct influence over these initiatives' direction and implementation priorities.

CRITICISMS / CONCERNS (ANALYTICAL)

- **Effectiveness Concerns (PRS-style)**
    - UNESCO's broad mandate vs limited resources can lead to diffused impact; India must ensure that Board work is results-oriented, not just declaratory.

- **Politicisation (Think-tank observations)**
    - Heritage decisions and resolutions sometimes reflect geopolitical alignments, risking UNESCO's perceived neutrality.
- **Global South Concerns (NITI/World Bank-style)**
    - Developing countries worry about insufficient funding for basic education and cultural preservation vis-à-vis high-level normative projects.
- **Implementation Gaps**
    - National follow-through on UNESCO recommendations varies; mere presence on the Board does not automatically ensure on-ground change.

WAY FORWARD

- **Use Board Seat to Champion Global South Priorities**
    - Push for more resources for basic education, digital learning, and heritage protection in developing countries.
- **Strengthen Link between NEP 2020 & UNESCO Platforms**
    - Share India's experiments (DIKSHA, FLN mission, multilingual education) as models, while learning from best practices globally.
- **Drive Reform for Better Focus & Impact**
    - Advocate results-based management, fewer but deeper flagship programmes, and better monitoring of outcomes.
- **Promote Ethical & Inclusive Digital Governance**
    - Use UNESCO's AI and media platforms to argue for open, inclusive, rights-based digital ecosystems.
- **Enhance Cultural Diplomacy**
    - Systematically leverage Board membership to expand World Heritage and ICH engagement, integrating community-based management.
- **Encourage South–South Cooperation under UNESCO**
    - Initiate joint programmes with African, Asian and Latin American countries in education, science and culture.
- **Improve Domestic Coordination**
    - Establish a national UNESCO coordination mechanism (MEITY, MoE, MoC, DST, I&B) for coherent positions and follow-up.
- **Invest in Research & Evidence**

- Support Indian think tanks and universities to generate policy inputs for UNESCO deliberations (education metrics, culture economics, etc.).

- **Engage Civil Society & Youth**
  - Use UNESCO Chair networks and clubs in Indian institutions to create bottom-up inputs.
- **Monitor Deliverables from 2025–29 Term**
  - Set clear objectives (e.g., number of India-led resolutions, initiatives launched, partnerships built) and track them annually.

PRELIMS BOOSTER NOTES

- **UNESCO** – UN specialised agency (education, science, culture, communication). Founded 1945; HQ Paris.
- **Governing Organs:** General Conference, Executive Board, Secretariat.
- **Executive Board:** 58 Member States; prepares programme & budget, oversees implementation. Meets several times each biennium.
- **India:** Founding member; re-elected to Executive Board for 2025–29.
- **UNESCO HQ City:** Paris, France.
- **UNESCO's five programme areas:** Education, Natural Sciences, Social & Human Sciences, Culture, Communication & Information.
- **World Heritage Convention (1972) & ICH Convention (2003)** – key cultural treaties.
- **Global Education Goal:** SDG 4 – "Quality Education for All"; UNESCO is lead agency.
- **India hosts:** UNESCO Category-1 Institute MGIEP in New Delhi.
- **Membership:** 194 Member States + 12 Associate Members (2023).

06 LOW ACCEPTANCE RATE OF THE PM INTERNSHIP SCHEME

The Ministry of Corporate Affairs (MCA) told the Lok Sabha that only 20% of the 1.65 lakh internship offers under the Prime Minister's Internship Scheme were accepted by candidates.

Of the accepted offers, 20% of candidates quit their internships prematurely.

FACTORS BEHIND LOWER ACCEPTANCE RATE

- **Geographical Mismatch:** Opportunities are concentrated in major industrial or urban centres located far from candidates' hometowns.
- **Longer Duration:** The compulsory 12-month duration exceeds typical 3–6-month skill-building programmes that align with academic breaks or short transition periods.
- **Role Mismatch:** A mismatch between candidates' aspirations and tasks assigned resulted in limited interest in the offered roles.
- **Low Stipend:** The ₹5,000 monthly stipend is insufficient to meet living costs, especially for candidates who need to relocate.
- **Job Prospects:** The scheme does not guarantee post-internship employment. Very few participants received full-time job offers during the pilot.

ABOUT PM INTERNSHIP SCHEME

The Prime Minister's Internship Scheme is a central-sector scheme that offers a 12-month paid internship to Indian youth in the top 500 Indian companies.

- **Core Objective:** The scheme aims to bridge the gap between academic learning and industry requirements through hands-on workplace exposure.
- **Target:** It plans to deliver one crore internships over a five-year implementation period (2024-29).
- **Implementing Body:** The Ministry of Corporate Affairs (MCA) administers the scheme through a dedicated Prime Minister's Internship Scheme (PMIS) Cell.
- **Company Selection:** The initial list of top 500 companies was chosen based on their average Corporate Social Responsibility (CSR) expenditure.
- **Duration:** The internship spans 12 months, with at least six months spent in a real job environment.
- **Financial Support:** Interns receive a ₹5,000 monthly stipend, a ₹6,000 one-time joining grant, and insurance coverage under relevant government schemes.

ELIGIBILITY CONDITIONS

- **Eligibility Criteria:** Applicants must be Indian citizens aged 21 to 24 with Class 10/12, ITI, polytechnic diploma, or bachelor's degree qualifications.
- **Work-Income Condition:** Candidates must not be in full-time employment or formal education, and annual family income must be below ₹8 lakh.
- **Ineligibility:** Graduates from premier institutions (IITs, IIMs), higher qualifications (CA, MBBS, MBA), or with immediate family in government service, are not eligible.

07 NEW PMO COMPLEX NAMED SEVA TEERTH

The new complex housing the Prime Minister's Office (PMO) under the Central Vista redevelopment project will be named Seva Teerth.

The complex, earlier called Executive Enclave, includes the Prime Minister's Office, Cabinet Secretariat, National Security Council Secretariat (NSCS) and India House.

The renaming aligns with recent changes, such as Rajpath into Kartavya Path and Race Course Road into Lok Kalyan Marg, reflecting a broader shift toward service-oriented institutional nomenclature.

PRIME MINISTER'S OFFICE (PMO)

- Apex executive support office assisting the Prime Minister in administration; created as PM's Secretariat in 1947 and renamed Prime Minister's Office in 1977.
- **Structure:** Led politically by the Prime Minister and administratively by the Principal Secretary, with Secretaries, Joint Secretaries and other staff drawn mainly from civil services on a tenure basis.
- **Functions:** Coordinate with ministries, states, key constitutional authorities & manage matters requiring the PM's approval.

08 REGULATION OF NON-SCHEDULED DRUG PRICES

IN NEWS

The Parliamentary Standing Committee on Chemicals & Fertilizers has directed the National Pharmaceutical Pricing Authority (NPPA) to take urgent action to curb excessively high trade margins on non-scheduled drugs (drugs not listed under price control).

These margins sometimes reach 200–1000%, resulting in inflated MRPs and reduced affordability for patients.

BACKGROUND & CONTEXT (VERY DETAILED)

India's drug pricing framework is governed by the Drugs (Prices Control) Order – DPCO 2013, issued under the Essential Commodities Act 1955. Only those drugs included in the National List of Essential Medicines (NLEM) are considered Scheduled Drugs and their prices are controlled by NPPA through Ceiling Prices.

However, Non-scheduled drugs, which form 80–85% of the total market, are not price-controlled. Manufacturers can set any MRP and increase it by up to 10% annually. Since these drugs pass through multiple distribution layers—manufacturer → super-stockist → distributor → wholesaler → retailer → hospital pharmacy—the margins multiply at each stage.

Hospitals, particularly private ones, earn massive profits from pharmacy markups (sometimes 50–70% of their revenue). Combined with aggressive brand-promotion incentives, patients often pay prices far above manufacturing cost.

Given this background, the Parliamentary Committee noted an urgent need to regulate the pricing of non-scheduled drugs, as excessive margins were making healthcare unaffordable.

KEY FACTS / KEY FEATURES (EXPANDED)

SCHEDULED VS NON-SCHEDULED DRUGS — FULL SECTION

- **What Are Scheduled Drugs?**
  - Drugs listed under the National List of Essential Medicines (NLEM).
  - Represent medicines considered essential for public health (e.g., paracetamol, ORS, insulin, antibiotics).
  - Price is regulated via Ceiling Price decided by NPPA.
  - Manufacturers cannot sell above the ceiling price.
  - NPPA uses Market-Based Pricing (average of top-selling brands).
  - Annual price increase is limited to change in WPI (typically 0–10%).
- **What Are Non-Scheduled Drugs?**
  - Drugs NOT included in NLEM.
  - Includes 80–85% of medicines in India's market (antibiotics, painkillers, cardiac drugs, dermatology drugs, supplements).
  - No ceiling price → manufacturers free to set MRP.
  - Only regulation: MRP cannot increase by more than 10% annually.
  - Trade margins often reach 200–1500%.
  - High brand competition → heavy incentives → inflated prices.

WHY IS THIS DISTINCTION IMPORTANT?

Feature	Scheduled Drugs	Non-Scheduled Drugs
Price Control	**Yes**	**No**
Governing List	NLEM	Not applicable
Price Increase	WPI-linked	10% per year
Coverage	~384 drugs	~60,000 brands
Margin Control	Tight	Often excessive

Market Share	~15–20%	~80–85%

WHY ARE NON-SCHEDULED DRUGS A PROBLEM?

- Most medicines for lifestyle diseases (BP, diabetes, thyroid, cardiac) fall under non-scheduled category.
- Patients taking long-term treatment face very high monthly expenditure.

WHY IT MATTERS FOR UPSC (EXPANDED)

PRELIMS RELEVANCE

- Difference between Scheduled & Non-scheduled drugs.
- NPPA functions under DPCO 2013.
- Essential Commodities Act basis.
- NLEM 2022 updates.
- Trade Margin formula.

MAINS RELEVANCE (GS2 + GS3)

- Health as a public good.
- Regulatory role of the State.
- Informal monopoly in pharma distribution.
- Reducing OOPE (Out-of-Pocket Expenditure).
- Universal Health Coverage & Ayushman Bharat.
- Ethical issues in drug marketing (GS4).

DETAILED MAINS ANALYSIS

CAUSES BEHIND HIGH MARGINS

- **Opaque pricing structure:** Manufacturers artificially inflate MRPs to offer large commissions.
- **Hospital pharmacies operate as profit hubs:** Markups of 200–500% common in private hospitals.
- **Incentive-driven prescription culture:** Pharmaceuticals offer benefits to push high-priced brands.
- **Consumer inertia:** Patients often unaware of cheaper generics.

- **Weak enforcement by NPPA:** Focus remains on scheduled drugs; limited oversight of others.
- **Fragmented distribution network:** Each intermediary adds its own margin.

RECENT DEVELOPMENTS

- NPPA's TMR pilot in 2019 reduced cancer drug prices by up to 85%.
- SC upheld drug price control as constitutional.
- NLEM expanded in 2022 with 34 new drugs added.
- Government promoting Jan Aushadhi stores to expand generics.
- Parliamentary Committee focusing on chronic disease sustainability.

CHALLENGES TO REFORM

- Pharma industry fears loss of profit & innovation.
- Hospitals object to losing pharmacy revenue.
- Small retailers say margins necessary to survive.
- NPPA lacks statutory enforcement power on non-scheduled drugs.
- Highly fragmented supply chain (over 8.5 lakh pharmacies).

IMPACT ON INDIA

ECONOMIC

- Lower medicine prices → higher disposable income.
- Reduces household debt caused by medical emergencies.

SOCIAL

- Reduces catastrophic health expenditure (17% households).
- Improves treatment adherence for chronic patients.

PUBLIC HEALTH

- Better access to essential medicines.
- Strengthens Universal Health Coverage (UHC).

PHARMA INDUSTRY

- Shifts competition from marketing-driven to quality-driven.

INTERNATIONAL IMPORTANCE

Countries with strict margin controls:

- **UK:** No arbitrary margins; NHS negotiates prices.
- **Australia:** Fixed pharmacy remuneration.
- **Thailand:** Centralized price procurement.
- **South Korea:** Strict markups and transparency.

India's model can influence pricing regulation in other LMICs.

LEGAL / CONSTITUTIONAL CONTEXT (VERY DETAILED)

- NPPA created under Resolution of 1997 by DoP.
- DPCO 2013 issued under Section 3 of Essential Commodities Act 1955.
- Right to Health implicit under Article 21.
- Parliament oversight via Standing Committees ensures democratic accountability.
- Price regulation upheld by SC in GlaxoSmithKline vs Union of India.

EXPERT OPINIONS

- **PHFI:** High trade margins distort rational medicine use.
- **WHO:** India needs "fair pricing" systems.
- **NITI Aayog:** Calls for expanding essential medicines list.
- **Economists:** Advocate value-based pricing.
- **Civil society:** Push for generic prescription enforcement.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES

- **Jan Aushadhi Pariyojana**
  - 10,000+ outlets providing 50–90% cheaper generics.
- **Price Monitoring Resource Units (PMRUs)**
  - State-level units for price surveillance.
- **Trade Margin Rationalisation (TMR)**
  - Implemented for cancer drugs; planned expansion.

- **National Digital Health Mission**
    - Digital prescriptions allow pricing transparency.
- **NLEM 2022 Revision**
    - Expanded scheduled drugs → more price control.

GLOBAL INITIATIVES

- WHO Fair Pricing Forum.
- Canadian PMPRB – reference pricing model.
- Thailand's centralized procurement.
- UK's value-based pricing mechanism.

CRITICISMS / CONCERNS

- Pharma claims margin caps reduce innovation investment.
- Hospitals claim pharmacy revenue subsidises other services.
- Retailers say thin margins may shut small chemists.
- Industry may respond by raising ex-factory prices.
- Risk of shortage of low-profit drugs if companies stop selling.

WAY FORWARD

- Universal TMR across all drugs.
- Expand NLEM to include 60% of commonly used drugs.
- Ceiling price on hospital pharmacy margins.
- Mandatory generic prescription with brand allowed only if justified.
- Create National Drug Pricing Registry for transparency.
- Annual drug MRP audits for top 300 brands.
- AI-based NPPA monitoring of real-time MRPs.
- Strengthen NPPA with quasi-judicial powers.
- Expand Jan Aushadhi stores to 25,000.
- Launch massive public awareness campaigns.
- Anti-kickback regulations to curb unethical marketing.
- Incentivise local API production to reduce cost dependencies.

PRELIMS BOOSTER NOTES

- **NPPA established:** 1997
- **Governs:** DPCO 2013 under Essential Commodities Act 1955
- **Scheduled drugs** → NLEM → Ceiling prices
- **Non-scheduled drugs** → No ceiling price → 10% annual increase
- **Scheduled drugs market share:** ~15%
- **Non-scheduled drugs market share:** ~85%
- **TMR pilot (cancer drugs):** Price drop up to 85%
- **India's OOPE on medicines:** 48–55%
- **Drug brands in India:** ~60,000
- **Retail pharmacies:** 8.5 lakh
- **Jan Aushadhi stores:** 10,000+
- Supreme Court supports drug price control for public interest

09 SANCHAR SAATHI APP

IN NEWS

The Government of India has directed smartphone manufacturers to pre-install the Sanchar Saathi App India's integrated telecom fraud-prevention and device-security platform on all new devices.

The app includes CEIR, TAFCOP, Chakshu, AI-based telecom fraud detection, SIM misuse analytics, and digital KYC verification.

The move is driven by the sharp rise in cyber fraud, SIM swap scams, phone theft, IMEI cloning, identity-based fraud, and financial scams linked to UPI and digital banking.

BACKGROUND & CONTEXT

India is the world's 2nd largest smartphone and telecom market, with 1.2+ billion mobile connections and the highest digital payment volume globally. The ecosystem is expanding rapidly through UPI, Aadhaar-enabled payments, digital health, online banking, and mobile-first commerce.

This has resulted in a parallel explosion in digital fraud:

- Fake KYC calls by impersonators
- SIM swap fraud leading to bank account takeover
- OTP theft
- Fraudulent job-offer calls
- Sextortion and loan app coercion
- Fake government/UPI alerts
- IMEI cloning and black-market resale of stolen phones
- SIM cards issued using forged IDs or collusion with retailers

CERT-In and NCRP reports show that over 55–60% of cyber fraud in India originates via telecom channels: phone calls, SMS, WhatsApp, missed-call scams, and spam URLs.

To curb this, the Department of Telecommunications (DoT) launched Sanchar Saathi in 2023 a national-level digital public infrastructure (DPI) for telecom safety.

Its modules include:

- **CEIR** → Blocks IMEI of stolen devices
- **TAFCOP** → Tracks SIM connections linked to a person
- **Chakshu** → Online portal to report fraud calls/SMS (fraud intelligence system)
- **AI Fraud Analytics** → Detect SIM misuse patterns
- **Digital KYC Verification** → Prevents fake IDs during SIM issuance

However, awareness remained low. Millions of smartphone users (especially rural, elderly, low-digital-literacy citizens) do not know where or how to report telecom fraud.

Thus, to ensure universal access, the Government has decided to pre-install Sanchar Saathi on all new mobile phones, making it a default national telecom-security tool.

KEY FEATURES OF SANCHAR SAATHI

CEIR (CENTRAL EQUIPMENT IDENTITY REGISTER)

PURPOSE:

- Prevent stolen phone misuse.

HOW IT WORKS:

- Stores IMEI numbers of all legitimate mobile devices.
- When a phone is stolen, the IMEI can be blocked nationally, even if:
    - SIM card is changed
    - Firmware is reset
    - Device is used in another state

ADVANCED FUNCTIONS:

Detect IMEI cloning:

- If multiple devices use the same IMEI → automatic alert
- Flag grey-market imports or illegal devices
- Helps police track stolen phones' last active network

- Works with telecom towers, DoT backend, and police cyber labs

IMPACT:

- Over 14 lakh phones blocked/recovered since launch
- Black-market resale of stolen phones severely disrupted

TAFCOP (TELECOM ANALYTICS FOR FRAUD MANAGEMENT & CONSUMER PROTECTION)

PURPOSE:

- Detect SIM misuse and identity fraud.

FUNCTIONS:

- Shows all mobile numbers linked to your Aadhaar/ID
- Helps identify if someone took a SIM using your papers
- Enables users to flag unauthorised numbers
- Telecom operators automatically verify and deactivate suspicious SIMs

ADVANCED ANALYTICS:

- Detects unusual SIM activation patterns
- Tracks fraudulent bulk SIM issuances
- Finds SIMs used for spam / illegal calls

IMPACT:

- Over 10 lakh suspicious connections disconnected in Phase-1

CHAKSHU: FRAUD COMMUNICATION REPORTING SYSTEM

PURPOSE:

- Citizen tool to report suspicious communications.

YOU CAN REPORT:

- Fake bank/KYC update calls
- UPI/OTP fraud attempts
- Extortion & sexual coercion calls
- Loan app harassment
- Job scam calls

- Fake government helpline impersonation
- WhatsApp scam messages
- Phishing SMS with malicious links

WHY CHAKSHU IS CRITICAL:

- Converts citizen complaints → fraud intelligence database
- DoT can block fraudulent numbers/headers quickly
- Alerts telecom operators about scam campaigns
- Enables police tracking of scam networks
- Helps create national fraud heatmaps

INTERNATIONAL BEST PRACTICE:

- Comparable to the UK's 7726 spam reporting system, but far more advanced.

AI-BASED FRAUD DETECTION SYSTEM

Uses machine learning to detect:

- Unusual call patterns
- Abnormal SIM activity
- Mass messaging by fraud networks
- IMEI tampering clusters
- Use of devices associated with cybercafés/fraud hubs

Provides real-time alerts to telecom operators and enforcement agencies.

KYC-BASED SIM VERIFICATION

- **Strengthens SIM issuance norms through:**
  - Aadhaar-based e-KYC
  - Facial match verification
  - Biometric authentication (where required)
  - Digital storage of ID documents
- **Prevents issuance of SIM cards using:**
  - Forged documents
  - Fake Aadhaar

- Identity theft

CONCERNS OVER MANDATORY SANCHAR SAATHI APP

- **Mass Surveillance:** Broad permissions (call logs, location data) raise concerns about mass surveillance without judicial oversight or warrants.
- **Manufactured Consent:** Mandatory pre-installation undermines the fundamental right to privacy by exploiting user inertia.
- **Opt-In Bypass:** Pre-installation bypasses the standard "opt-in model" and effectively converts a public service into bloatware.
- **Security Exposure:** System-level integration creates a "single point of failure", where any breach could grant attackers extensive control over sensitive device data.
- **Proportionality Failure:** Compulsory installation appears disproportionate when less intrusive, more targeted measures (e.g., web portals, SMS checks) are available.
- **Regulatory Vacuum:** The absence of an independent data protection regulator leaves limited oversight over how agencies may use collected data.

DETAILED MAINS ANALYSIS (MOST COMPREHENSIVE SECTION)

WHY FRAUD HAS EXPLODED IN INDIA

- Mobile-first economy → new vectors for fraud
- Low digital literacy in rural areas
- UPI penetration without adequate cyber hygiene
- Easy availability of fake SIMs
- Large migrant population vulnerable to job scams
- Stolen phones used for financial crime
- Anonymous VoIP and international scam syndicates

HOW PRE-INSTALLATION HELPS GOVERNMENT GOALS

- Makes telecom fraud protection default & universal
- Extends citizen safety tools to:
  - Elderly
  - Low-literacy groups
  - Rural households

- First-time smartphone users

- **Supports:**
  - Cyber Surakshit Bharat
  - Digital India
  - Internal Security Modernisation

CHALLENGES & LIMITATIONS

- **Privacy Concerns**
  - Needs strict DPDP compliance
  - Users fear data harvesting by pre-installed apps
  - AI analytics must be transparent
- **IMEI Manipulation Industry**
  - Black market technicians clone IMEIs
  - Need stronger enforcement & criminal penalties
- **Device Manufacturer Resistance**
  - Pre-installed apps increase compliance burden
  - Some call them "bloatware"
- **User Behaviour Challenges**
  - Most users ignore fraud until impacted
  - Need awareness campaigns

IMPACT ASSESSMENT

- **Economic Impact**
  - Reduces financial fraud losses (₹10,000+ crore annually)
  - Boosts trust in digital payments & UPI
- **Governance Impact**
  - Creates one of the world's largest telecom fraud intelligence grids
- **Social Impact**
  - Protects vulnerable groups:
    - Elderly
    - Women

        - Low-income citizens
- **Internal Security Impact**
    - Prevents SIM misuse by:
        - Drug traffickers
        - Extortion networks
        - Terror sleeper cells
        - Deepfake/impersonation gangs

GOVERNMENT INITIATIVES AROUND TELECOM SECURITY

- CERT-In Cyber Regulations (2022)
- Cyber Surakshit Bharat
- National Cyber Crime Reporting Portal
- Digital Personal Data Protection Act 2023
- Interoperability with NPCI & RBI fraud systems

CRITICISMS / CONCERNS

- Data privacy fears
- Overregulation of telecom sector
- Misuse of KYC rules for surveillance
- Avoiding duplication with OEM security apps
- Removing pre-installed apps should be allowed

WAY FORWARD

- Make Sanchar Saathi uninstallable → respect autonomy
- Create telecom fraud heatmaps for public awareness
- Penalise IMEI tampering as a serious criminal offence
- Nationwide digital literacy campaigns
- AI to detect deepfake voice fraud
- Integration with banks/UPI systems for real-time alerts
- Cyber fraud complaints auto-trigger police FIR/docket
- Telecom retailers to undergo mandatory KYC compliance audits

PRELIMS BOOSTER

- **Launched:** 2023
- **Under:** Department of Telecommunications (DoT)
- **Key modules:** CEIR, TAFCOP, CHAKSHU
- **CEIR** = IMEI block/unblock
- **TAFCOP** = ID-linked SIM tracking
- **CHAKSHU** = report suspicious calls/SMS
- **CERT**-In reporting rule = 6 hours
- **DPDP** Act 2023 governs data privacy
- **India** = world's largest digital payments ecosystem
- **IMEI** = 15-digit identifier
- **SIM swap** = major banking fraud vector

10 RUSSIA HAS CAPTURED THE CITY OF POKROVSK

Russia has announced that its forces have fully captured the city of Pokrovsk in eastern Ukraine following a prolonged military campaign.

ABOUT POKROVSK

- Pokrovsk is a major industrial centre and logistics hub located in Ukraine's eastern Donetsk region.
- As a key road and rail intersection, it serves as a primary supply route for Ukrainian forces along the eastern front.
- The city hosts Ukraine's only coking coal mine, which supports the country's steel industry.
- Pokrovsk has historically acted as a buffer protecting the Dnipropetrovsk region to the west.
- It is also gateway to northern Donetsk, including the twin cities of Kramatorsk and Sloviansk.

11 PROPOSED REPEAL OF THE INDIAN STATISTICAL INSTITUTE (ISI) ACT, 1959

IN NEWS

The Union Government has introduced a Bill to repeal the Indian Statistical Institute (ISI) Act, 1959, which grants statutory autonomy to the ISI headquartered in Kolkata.

Over 1,500 academics, including ISI faculty, alumni, researchers, and globally renowned statisticians, have protested, arguing that repealing the Act threatens the institute's academic independence and national scientific capability.

The move is part of the government's broader plan to rationalise or repeal outdated laws, but critics say the ISI Act is not obsolete and remains essential for safeguarding the institute's governance.

BACKGROUND & CONTEXT

The Indian Statistical Institute (ISI) was founded in 1931 by Prasanta Chandra Mahalanobis, a pioneer of modern statistics and architect of India's national statistical system. Recognizing its importance, the Parliament enacted the ISI Act, 1959, granting the institute statutory status, academic autonomy, financial independence, and governance through a Council comprising eminent statisticians.

ISI has been crucial to India's scientific and policy ecosystem:

- Developed the National Sample Survey (NSS)
- Contributed to Five-Year Plans, large-scale surveys, and economic modelling

- Houses globally renowned departments in mathematics, computer science, machine learning, and statistical quality control

The government now seeks to repeal the ISI Act, allegedly to make the law "redundancy-free." However, academicians argue that repealing the Act without a replacement framework may turn ISI into an ordinary institute governed by standard executive rules, undermining its autonomy, recruitment freedom, research excellence, and international reputation.

This has sparked debates over academic freedom, governance reform, and future of India's statistical framework.

KEY FACTS / KEY FEATURES

WHAT THE ISI ACT, 1959 PROVIDED

- Legal recognition as an Institution of National Importance
- Autonomous governance through a Council, not government departments
- Power to award degrees and diplomas
- Financial independence through grants, endowments, and research funding
- Freedom to recruit faculty & researchers
- Separation from government bureaucracy
- Ability to collaborate internationally

WHY THE GOVERNMENT PROPOSES REPEAL

- Part of "Repealing and Amending" legislative exercise
- Claim: Certain provisions outdated
- Aim: Rationalise governance of autonomous institutions
- Bring ISI under standard central regulations

(No detailed justification released publicly.)

WHY ACADEMICS ARE PROTESTING

- Fearing loss of academic autonomy
- Concern over bureaucratic control replacing Council governance
- Potential impact on quality of statistical research
- Risk of dilution of national data independence
- Reputational damage among global research institutions

STAKEHOLDERS INVOLVED

- ISI faculty and staff
- Research community
- Ministry of Statistics and Programme Implementation (MoSPI)
- NSSO, CSO, national data agencies
- Global academic partners

DETAILED MAINS ANALYSIS

WHY THE ISI ACT IS CONSIDERED IMPORTANT

- Ensures insulation from political influence, especially in data-related research
- Protects freedom of methodology and research direction
- Governs appointment of internationally reputed statisticians
- Allows flexible research collaborations without bureaucratic hurdles
- Safeguards national statistical integrity

ARGUMENTS SUPPORTING THE GOVERNMENT'S DECISION

- Need to update archaic laws
- Desire to streamline governance under a unified higher-education framework
- Modern legislation may grant better accountability
- Possibility of alignment with NEP 2020 norms

ARGUMENTS AGAINST THE REPEAL

THREAT TO ACADEMIC AUTONOMY

Repealing the Act may place ISI under:

- MoSPI rules
- General Financial Rules
- Administrative controls restricting free research

RISK TO INDIA'S STATISTICAL INDEPENDENCE

ISI played a foundational role in:

- National Sample Surveys
- Data quality audits

- Input to economic planning
- Weakening institutional autonomy may erode trust.

GOVERNANCE DILUTION

- The current ISI Council includes eminent statisticians; replacing it with government appointees may reduce quality and independence.

IMPACT ON INTERNATIONAL REPUTATION

- ISI is globally ranked alongside leading statistical institutions. Loss of statutory status could weaken collaborations.

BROADER IMPLICATIONS FOR INDIA

SCIENTIFIC RESEARCH ECOSYSTEM

- Autonomy is key to innovation and scientific breakthroughs
- Loss of independence may discourage top talent

ECONOMIC POLICY CREDIBILITY

- India's economic decisions depend on credible statistical systems; weakening ISI may affect investor confidence.

DATA GOVERNANCE & DEMOCRACY

Strong, autonomous statistical bodies are key to:

- Transparency
- Public trust
- Policy evaluation

INTERNATIONAL COMPARISON

Major statistical and research institutions globally — like the US National Academies, Max Planck Institutes, and UK statistical bodies — operate with strong legal autonomy. Repealing the ISI Act may move India opposite to international best practices.

INDIAN STATISTICAL INSTITUTE (ISI)

- Founded in 1931, with headquarters in Kolkata, by P.C. Mahalanobis, a pioneer of India's statistical systems and planning.
- Declared an Institution of National Importance under the Indian Statistical Institute (ISI) Act, 1959.

GOVERNMENT & GLOBAL INITIATIVES

- **Indian Initiatives Relevant to This Issue**
  - NEP 2020 proposes standardized governance of higher education institutions
  - National Statistical Office (NSO) reform discussions
  - Repealing 1,500+ outdated laws as part of ease-of-governance campaign
  - Draft legislation to strengthen national data systems
- **Global Context**
  - OECD guidelines emphasize independent national statistics systems
  - UN Fundamental Principles of Official Statistics require professional autonomy

CRITICISMS / CONCERNS

- Could undermine scientific independence
- Lack of transparency in repeal proposal
- Fear of centralization of control
- No alternative statutory framework proposed
- May adversely impact long-term research quality
- Risk of politicisation of official statistics

WAY FORWARD

- Stakeholder consultations with faculty, alumni, statisticians, and policymakers.
- Introduce a new modern legislation instead of outright repeal.
- Strengthen, not weaken, ISI's statutory autonomy.
- Adopt NEP 2020-compatible governance while retaining academic independence.
- Increase funding for advanced research in AI, data science, and machine learning.
- Protect official statistics under a National Statistics Independence Act (as suggested by experts).
- Form a Joint Parliamentary Committee to evaluate implications of repeal.
- Preserve the current Council model with academic majority representation.

PRELIMS BOOSTER NOTES

- ISI founded in 1931 by P.C. Mahalanobis
- **ISI Act enacted:** 1959
- **ISI HQ:** Kolkata, centres in Bengaluru, Delhi, Chennai, Tezpur
- **Under administrative control of:** MoSPI
- **Developed:** NSS (National Sample Survey), ASI (Annual Survey of Industries)
- **Awards:** B.Stat, M.Stat, M.Tech, PhD
- **Indian Statistical System includes:**
    - NSO (merger of NSSO + CSO)
    - ISI
    - MoSPI
    - State statistical bureaus

12 INDIA–RUSSIA 23RD ANNUAL SUMMIT (2025)

IN NEWS

India and Russia held their 23rd Annual Bilateral Summit, commemorating 25 years of the 2000 Declaration on Strategic Partnership.

The summit reaffirmed cooperation in defence, nuclear energy, space, trade, connectivity, hydrocarbons, Arctic cooperation, and global geopolitics.

The leaders reviewed progress under the Special & Privileged Strategic Partnership (upgraded in 2010) and discussed Ukraine conflict implications, Indo-Pacific stability, and multilateral reform.

BACKGROUND & CONTEXT

India–Russia relations deepened significantly with the 2000 Declaration on Strategic Partnership, establishing annual summits, defence cooperation, and collaborative scientific projects. In 2010, the relationship was upgraded to a "Special and Privileged Strategic Partnership."

The 23rd Annual Summit (2025) marks an important milestone because it comes amidst major transitions: the Russia–Ukraine conflict, global sanctions restructuring, rising China influence, Indo-Pacific challenges, and India's push for strategic autonomy.

Against this backdrop, both nations adopted "Program 2030", a multi-sector blueprint aimed at expanding economic, technological, and strategic cooperation over the next

five years. It outlines concrete targets in energy, nuclear collaboration, connectivity, manufacturing, digital innovation, and rupee-based trade mechanisms.

The summit reaffirmed that India and Russia continue to see each other as long-term, trusted, strategic partners, despite shifting global alignments.

KEY OUTCOMES OF THE 23RD SUMMIT (INCLUDING PROGRAM 2030)

CORE FOCUS AREAS OF PROGRAM 2030

- Trade & Investment Expansion
- Target: $100 billion annual trade by 2030.
- Push for Indian exports in pharma, IT, agriculture, textiles, engineering goods.

ENERGY PARTNERSHIP

- Long-term contracts for crude oil, LNG, coking coal.
- Indian public & private participation in Arctic LNG, Vostok Oil projects.
- Cooperation in green hydrogen, nuclear fuel cycle, rare earth minerals.

CONNECTIVITY & LOGISTICS

Faster implementation of:

- International North–South Transport Corridor (INSTC)
- Chennai–Vladivostok Maritime Corridor
- Digital tracking & customs harmonisation for secure cargo movement.

HIGH-TECHNOLOGY & DIGITAL ECONOMY COOPERATION IN:

- AI
- Quantum computing
- Cybersecurity
- FinTech
- Digital public goods
- Joint centres of innovation.

DEFENCE MANUFACTURING & LOCALISATION

- Expansion of Make in India–based joint production.
- Localisation of spares for Su-30MKI, T-90, S-400, naval systems.
- Upgradation of BrahMos variants.

NUCLEAR ENERGY

- Kudankulam Units 5 & 6 progress.
- New nuclear power plant site exploration.
- Collaboration in small modular reactors (SMRs).
- Payments & Currency Cooperation
- Push for rupee–ruble settlements.
- Direct digital payment platforms between India's UPI & Russia's SPFS/Mir systems.

WHY PROGRAM 2030 IS CRUCIAL?

- Moves partnership beyond defence into economic & high-tech domains.
- Provides a clear roadmap till 2030, unlike previous ad-hoc agreements.
- Reduces India's supply-chain dependency on the West & China.
- Helps Russia diversify its economy during sanctions.

DETAILED KEY FEATURES OF THE SUMMIT (OTHER THAN PROGRAM 2030)

DEFENCE & STRATEGIC COOPERATION

- Review of S-400 deployment schedule.
- Plan for joint aero-engine development, helicopter components, naval systems.
- Next-generation BrahMos upgrades and export cooperation.

- Strengthening of military-to-military contacts, joint exercises (INDRA series).

NUCLEAR ENERGY

- Kudankulam Phase 3 progress.
- Expansion into SMRs & nuclear fuel supply diversification.

SPACE COOPERATION

Enhanced partnership for:

- Gaganyaan training
- Satellite navigation (GLONASS–NavIC interoperability)
- Joint lunar missions

TRADE & INFRASTRUCTURE

- Emphasis on EAEU–India Free Trade Agreement negotiations.
- Multimodal corridors linking India to Eurasia.

DETAILED MAINS ANALYSIS

WHY THIS SUMMIT MATTERS STRATEGICALLY?

- Reaffirms India's strategic autonomy.
- Helps diversify India's energy basket.
- Offers access to critical technologies (nuclear, aerospace).
- Provides leverage against China's rise.
- Strengthens India's logistics supply-lines to Central Asia & beyond.

CONCERNS & CHALLENGES

- Russia–China growing closeness
- May limit technology transfer to India.
- Ukraine Conflict & Sanctions
- Payment crisis, shipping insurance issues.
- Trade imbalance
- Russia sells crude; India exports little.
- US Pressure (CAATSA)
- Potential sanctions for major defence purchases.

IMPORTANCE OF PROGRAM 2030

- Provides predictability and continuity till 2030.
- Focuses on emerging technologies, unlike earlier defence-heavy agreements.
- Institutionalises new sectors: Arctic energy, cyber, AI, green hydrogen.

GOVERNMENT & GLOBAL INITIATIVES LINKED TO THE SUMMIT

- India–Russia Institutional Mechanisms
- Annual Summit (since 2000)
- Inter-Governmental Commissions (IGC-TEC, IGC-MTC)
- BRICS, SCO, G20 platforms
- Global Context
- Russia's 'Pivot to Asia'
- BRICS expansion & de-dollarisation
- Eurasian Economic Union (EAEU)

CRITICISMS / CONCERNS

- Risk of overdependence on Russian hydrocarbons.
- Russia may prioritise China for energy & defence tech during sanctions.
- Payment bottlenecks due to SWIFT restrictions.
- Some Program 2030 goals may face resource constraints.

WAY FORWARD

- Align Program 2030 with India's Make in India defence roadmap.
- Resolve payment challenges through Rupee–Ruble digital mechanisms.
- Speed up INSTC implementation.
- Expand cooperation in Arctic science, minerals, and hydrocarbons.
- Build supply-chain resilience in crude, LNG, fertilisers.
- Joint research labs for AI, space robotics, quantum computing.
- Encourage private-sector investments in Russia's Far East.
- Maintain balance between India–Russia and India–US partnerships.

PRELIMS BOOSTER (HIGH-YIELD)

- **Strategic Partnership:** 2000
- **Special & Privileged Strategic Partnership:** 2010
- **Program 2030** = Full-spectrum cooperation roadmap till 2030
- **INSTC:** Mumbai–Iran–Azerbaijan–Russia
- **Vladivostok–Chennai corridor:** 12–14-day shipping
- **Kudankulam reactors:** VVER technology
- **BrahMos** = India–Russia supersonic cruise missile
- Russia supports India's UNSC bid
- Russia largest crude oil supplier to India (2023–25)

13 70TH MAHAPARINIRVAN DIWAS

IN NEWS

India observed the 70th Mahaparinirvan Diwas on 6 December 2025, marking the death anniversary of Dr. Bhimrao Ramji Ambedkar, the principal architect of the Indian Constitution and a global icon of social justice.

Nationwide tributes were led by the President, Prime Minister, Parliament, and Dalit rights groups, with major events at Chaitya Bhoomi (Mumbai).

The day highlights Ambedkar's contributions to the Constitution, social equality, labour rights, federalism, gender justice, economic planning, and his global influence on anti-discrimination movements.

BACKGROUND & CONTEXT

Dr. B. R. Ambedkar (1891–1956) was born into a Mahar family facing severe caste discrimination. His academic rise was historic—earning degrees from Columbia University (MA, PhD), London School of Economics (MSc, DSc), and becoming a Barrister-at-Law from Gray's Inn. He transformed Indian public life through scholarship and activism.

He chaired the Drafting Committee of the Constituent Assembly (from 29 August 1947) and played a central role in shaping the Constitution as a social revolution document, embedding equality, liberty, fraternity, and dignity.

Ambedkar was also India's first Law Minister, an influential economist, labour policy architect, and a powerful critique of caste and orthodoxy.

On 14 October 1956, Ambedkar embraced Navayana Buddhism at Deekshabhoomi, Nagpur, along with lakhs of followers, initiating the largest modern Buddhist movement. He died on 6 December 1956, a date commemorated as Mahaparinirvan Diwas.

His ideas remain foundational for India's debates on reservations, social justice, federalism, labour reforms, women's rights, agrarian policy, and democratic ethics.

KEY FACTS / KEY FEATURES

SOCIAL JUSTICE

- Aggressively opposed caste hierarchy, describing it as a system of graded inequality.
- Advocated equal citizenship through Articles 14, 15, 16, and 17.

CONSTITUTIONALISM

- Concept of constitutional morality—obedience to the spirit, not just the text.
- Centrality of Article 32—right to constitutional remedies.

ECONOMIC THOUGHT

Ambedkar was among India's earliest economists advocating:

- State planning
- Agricultural productivity reform
- Industrialisation
- Irrigation & river valley projects
- Monetary stability

His book "The Problem of the Rupee" (1923) influenced the creation of the Reserve Bank of India (1934).

MOVEMENTS

- **Mahad Satyagraha (1927):** Fought for Dalits' right to use public water tanks → a turning point in Dalit assertion.
- Temple Entry Movement (Nashik, 1930): **Challenged religious-based exclusion at** Kalaram Temple.
- **Poona Pact (1932):** Resulted in reserved seats for SCs in general electorates rather than separate electorates.

- **Labour Reforms (1942–46):** As Member of Viceroy's Executive Council:
  - Reduced working hours from 12–14 to 8 hours
  - Strengthened Maternity Benefit laws
  - Advocated minimum wage and workers' insurance
  - Set up labour tribunals

WORKS

- **Annihilation of Caste (1936):** A radical critique of caste; challenged Hindu orthodoxy.
- **States and Minorities (1947):** Proposed constitutional safeguards for SCs, including separate settlements (not accepted).
- **Who Were the Shudras? / The Untouchables:** Historical analysis of caste origins.
- **The Buddha and His Dhamma (1957):** Canonical text for Navayana Buddhism; focuses on rationality and ethics.
- **Thoughts on Linguistic States (1955):** Opposed premature linguistic reorganisation of states; prioritised national unity.

DETAILED MAINS ANALYSIS

AMBEDKAR'S VISION OF SOCIAL DEMOCRACY

Ambedkar believed political democracy must rest on social democracy, built on:

- Liberty
- Equality
- Fraternity

He warned that without social equality, India risked: "Contradiction between political equality and social inequality."

AMBEDKAR'S CONCEPT OF FRATERNITY

Fraternity was essential for:

- Inter-caste harmony
- National unity
- Collective responsibility

He saw fraternity as India's most fragile constitutional value.

AMBEDKAR'S ECONOMIC BLUEPRINT FOR INDIA

- **Land reforms** → opposed small, fragmented holdings; advocated collectivisation.
- **Industrialisation** → reduce caste-based labour dependency.
- **Irrigation & River Basin Projects**
    - Laid foundations for what became Central Water Commission.
    - Proposed Damodar Valley & Hirakud-type development early on.
- **Fiscal Federalism**
    - Significant influence on early Finance Commission debates.

AMBEDKAR'S LABOUR WELFARE MODEL

- Recognized worker exploitation as structural.
- Advocated the 8-hour workday long before global norms.
- Helped shape laws on factory safety, work conditions, and social insurance.

CONTRIBUTION TO WOMEN'S RIGHTS

Ambedkar's most radical reform attempt was the Hindu Code Bill, which sought gender equality in:

- Property rights
- Marriage
- Divorce
- Adoption

Opposition forced Ambedkar to resign in 1951—a turning point in India's feminist struggle.

BUDDHISM AS SOCIAL REVOLUTION

- Ambedkar saw Buddhism as:
    - Rational
    - Ethical
    - Non-hierarchical
    - Anti-caste
- Navayana Buddhism emphasised:
    - Social equality over rituals

- Humanism over metaphysics

GOVERNMENT INITIATIVES

INFRASTRUCTURAL & COMMEMORATIVE

- Ambedkar National Memorial (New Delhi)
- Ambedkar International Centre (New Delhi)
- Chaitya Bhoomi (Mumbai) → cremation site
- Deekshabhoomi (Nagpur) → conversion site

SOCIAL & ECONOMIC SCHEMES

- Vanchit Bharat / SC-ST Welfare Schemes
- Ambedkar Social Innovation & Incubation Mission (ASIIM) – encourage SC/ST startups
- Stand-Up India Scheme – entrepreneurship for SC/ST & women
- PM-AJAY (Adarsh Gram Yojana) – development of SC-majority villages

INTERNATIONAL INITIATIVES

- Ambedkar Chairs in foreign universities
- Global conferences on caste equity and constitutionalism

CRITICISMS / CONCERNS

- Persistent caste-based violence (NCRB shows rising crimes in several states).
- High dropout rates among SC students in higher education.
- Digital divide exacerbating caste marginalisation.
- Labour informality undermining Ambedkar's worker rights vision.
- Underrepresentation of SC/ST in higher judiciary & academia.
- Ambedkar's warnings on majoritarianism often inadequately addressed.

WAY FORWARD

- Strengthen implementation of PoA Act (1989) & fast-track courts.
- Promote caste-neutral universal social security along with targeted support.
- Expand scholarships, hostels, digital access for SC/ST youth.
- Legally enforce anti-discrimination in private sector recruitment.

- Promote inter-caste interactions through urban planning & mixed housing.
- Introduce nationwide curriculum on constitutional morality.
- Strengthen Ambedkar Chairs in global universities.
- Bring labour reforms closer to Ambedkar's worker protection model.
- Reform ASIIM and SC/ST entrepreneurship schemes for scalability.
- Build caste-disaggregated national databases for health, education & labour.
- Ensure inclusive hiring in institutions like IITs/IIMs/Judiciary.
- Promote Ambedkar's Buddhist philosophy of equality & rationality.

PRELIMS BOOSTER

- **Mahaparinirvan Diwas** → 6 December
- **Birth:** 14 April 1891, Mhow (Dr. Ambedkar Nagar)
- **Death:** 6 December 1956, Delhi
- **Conversion:** 14 October 1956, Nagpur (Deekshabhoomi)
- **Cremation**: Chaitya Bhoomi, Mumbai
- **Chaired Drafting Committee from** → 29 August 1947
- **Resigned as Law Minister** → October 1951
- **Major works** → Annihilation of Caste, Problem of the Rupee, Buddha and His Dhamma
- **Movements** → Mahad Satyagraha 1927, Kalaram Temple 1930
- **Poona Pact** → 24 September 1932
- **Buddhist term "Mahaparinirvana"** → final nirvana of an enlightened being

14 ARTIFICIAL INTELLIGENCE (AI) IN INDIAN JUDICIARY

IN NEWS

While hearing a Public Interest Litigation (PIL) seeking guidelines to prevent misuse of Artificial Intelligence (AI) in courts, the Chief Justice of India (CJI) recently remarked that judges are currently "over-conscious" of the risks associated with AI.

The CJI stated that the judiciary must engage with AI cautiously but proactively, especially given rising concerns around AI-generated deepfakes, misinformation, privacy violations, and the possibility of AI influencing evidence or judicial outcomes.

The petition requested the Supreme Court to frame national-level guidelines to prevent harmful uses of AI in judicial processes, evidence production, and public perception of the judiciary.

BACKGROUND & CONTEXT

AI adoption in courts is growing globally, ranging from transcription services, case management, and predictive analytics, to legal research automation. The Supreme Court of India has already launched the SUPACE (Supreme Court Portal for Assistance in Courts Efficiency) for AI-assisted research and SUVAS (Supreme Court Vidhik Anuvaad Software) for translation.

However, rapid expansion of generative AI, capable of creating deepfakes, false evidence, synthetic documents, and biased outputs, has raised serious concerns.

Several countries—including the EU, US, China, and UK—have begun drafting laws around ethical AI, AI risk categorisation, and platform accountability.

In India, AI remains largely unregulated, though NITI Aayog's "Responsible AI for All" and the Digital India Act (draft) discuss ethical principles. The PIL before the Supreme Court argues that AI-generated content is increasingly influencing public opinion and could distort judicial processes if not checked.

The CJI's observation reflects a delicate balance: courts should embrace AI to improve efficiency, but must simultaneously avoid misuse that threatens fairness, accuracy, and judicial independence.

KEY FACTS / KEY FEATURES

WHAT THE PIL DEMANDS

- **National guidelines to prevent:**
  - AI-generated deepfakes used as evidence
  - AI-generated misinformation about judges or court proceedings
  - Unauthorized AI tools influencing legal submissions
  - Use of AI for judicial decision-making without checks
- **Creation of:**
  - A framework for validating digital evidence
  - A protocol for AI-assisted court tools

CJI'S KEY OBSERVATIONS

- Judges today are "over-conscious" about AI risks—suggesting caution before using AI tools in judicial reasoning.
- AI must assist, not replace, human judges.
- Judiciary cannot ignore AI, but must adopt it responsibly.
- Courts need safeguards against false evidence or manipulation.

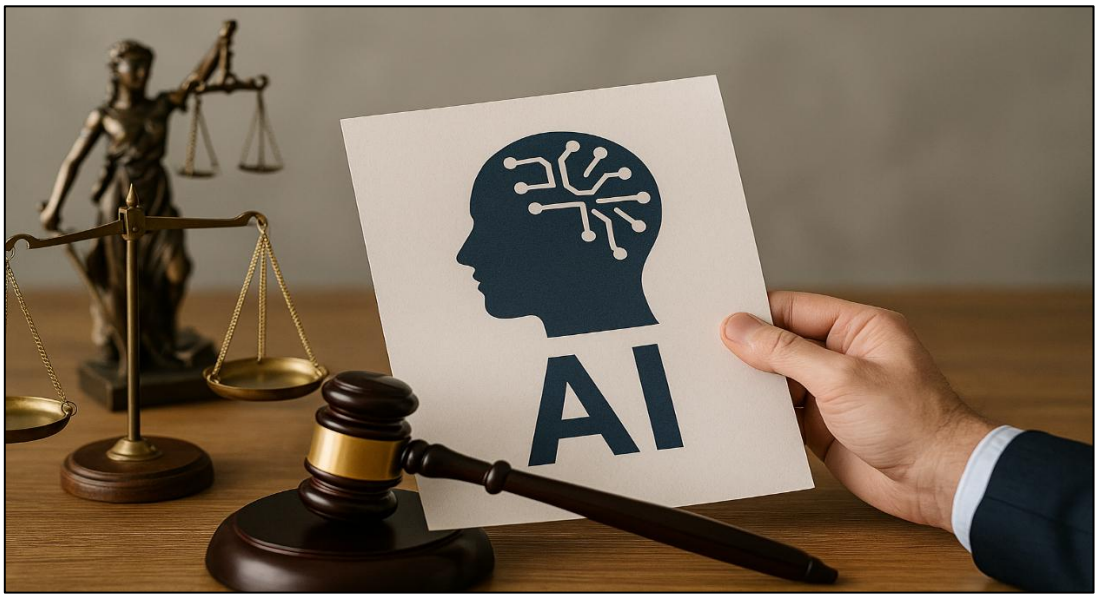
CURRENT USE OF AI IN INDIAN JUDICIARY

- **SUPACE:** AI-powered legal research assistance
- **SUVAS:** Translation into multiple Indian languages
- **e-Courts Phase III:** Automation, digital records, virtual hearings
- AI-based transcription in Constitution Bench cases

DETAILED MAINS ANALYSIS

WHY AI POSES RISKS TO THE JUDICIARY

- **Deepfakes & Fabricated Evidence**
    - Hyper-realistic audio/video can create:
        - False confessions
        - Fake witness statements
        - Manipulated CCTV evidence
- **Algorithmic Bias**
    - AI trained on biased datasets may lead to discriminatory suggestions—violating Article 14 (Equality).
- **Lack of Transparency**
    - Many AI systems are "black boxes," making judicial accountability difficult.
- **Undermining Public Trust**
    - Viral AI-generated misinformation can damage the judiciary's credibility.
- **Data Privacy Issues**
    - AI tools may handle sensitive case files and personal data, requiring robust security.
- **Risk to Judicial Independence**
    - AI tools developed by private entities may influence outcomes through flawed algorithms.



WHY COURTS MUST STILL USE AI

DESPITE RISKS, AI OFFERS MAJOR ADVANTAGES:

- Faster research → reduces judicial backlog
- Automated transcription → saves judges' time
- Translation → improves access to justice
- Case categorisation → smoother listing
- Predictive analytics → faster dispute resolution (if used cautiously)
- The challenge is regulating AI, not rejecting it.

CONSTITUTIONAL & LEGAL ANGLE

- **Article 21:** Right to fair trial → AI-generated evidence must meet authenticity standards.
- **Article 19:** Freedom of speech → deepfake limits?
- **Article 32 / 226:** Courts' responsibility to develop procedural safeguards.
- **Evidence Act, 1872 (Sections 65A & 65B):** Need amendments to include synthetic data, deepfakes.

INTERNATIONAL EXAMPLES

- **EU AI Act:** Classifies AI systems based on risk.
- **UK Judiciary:** Ethical AI guidelines for courts.
- **US:** State laws on deepfake evidence admissibility.
- **China:** Mandatory watermarking for AI-generated content.

India currently lacks similar binding regulations.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES

- **NITI Aayog – Responsible AI for All (2021)**
  - Principles: Safety, Accountability, Equity, Inclusivity.
- **Draft Digital India Act (2023–25)**
  - Regulates deepfakes, intermediary liability, algorithmic transparency.
- **Personal Data Protection Act (2023)**
  - Protects sensitive judicial data from misuse.

- **CERT-In Guidelines**
    - Managing cyber-security incidents involving AI.

KEY AI TOOLS, INITIATIVES AND AI ADOPTION

- **National Judicial Data Grid (NJDG):** It was launched under Digital India that uses analytics to track case pendency and disposal rates across courts.
- **Supreme Court Portal for Assistance in Court Efficiency (SUPACE):** It processes facts and manages large volumes of case data to 'assist' judges, acting as a force multiplier without taking decisions.
- **Supreme Court Vidhik Anuvaad Software (SUVAS):** It translates judicial documents from English to vernacular languages (and vice-versa) to improve access to justice for non-English speakers.
- **Legal Research Analysis Assistant (LegRAA):** A new tool in the pilot phase designed to aid judges specifically in legal research and document analysis.
- **Digital Courts 2.1:** Unified Judicial Platform is a single-window platform for judges that integrates:
    - **ASR-SHRUTI:** AI voice-to-text for dictating orders.
    - **PANINI:** Translation functionality to assist in drafting orders.
- **Digital Transformation of Justice Report:** It outlines a roadmap for integrating AI across police, forensics, jails, and courts to create a unified justice delivery ecosystem.

GLOBAL STANDARDS

- OECD AI Principles
- UNESCO Ethics of AI 2021
- EU Draft AI Act 2024–25
- G7 – Hiroshima AI Process

India is aligned with global discussions but lacks India-specific AI judicial guidelines.

CRITICISMS / CONCERNS

- Courts are adopting AI without formal oversight regulations.
- Risk of tech companies influencing judicial processes.
- Under-prepared lower courts might rely excessively on AI.
- Fear that AI could widen digital divide in access to justice.

- Threat to privacy due to handling of confidential case data.
- Lack of clarity on admissibility standards for synthetic evidence.

WAY FORWARD

SUPREME COURT GUIDELINES

- Mandatory watermarking of AI-generated files
- Protocols for verifying authenticity of digital evidence
- Standards for AI tools used by courts or lawyers

AMENDMENT TO THE EVIDENCE ACT

Introduce provisions for:

- Deepfake detection
- AI-generated documents
- Synthetic media admissibility

CREATE AN "AI ETHICS BOARD FOR JUDICIARY"

- Judges + technologists + ethicists
- Approve court AI tools

MANDATORY TRANSPARENCY & EXPLAINABILITY

- AI tools must be explainable and auditable.

JUDICIAL TRAINING

- Judges trained to recognise AI manipulation.

COLLABORATION WITH IITS / IIITS

- For technical expertise in deepfake detection.

PRIVACY & DATA SECURITY FRAMEWORK

- Encryption
- Data localisation
- Strict access-control layers

PUBLIC AWARENESS

- Campaigns against AI-based misinformation about the judiciary.

PRELIMS BOOSTER NOTES

- **SUPACE:** AI research tool used by SC (launched 2021).
- **SUVAS:** AI-driven translation for SC documents.
- **Deepfake:** AI-generated synthetic media using GAN models.
- **Section 65A/65B Evidence Act:** Governs electronic evidence.
- **Digital India Act (Draft):** India's upcoming main digital law.
- **OECD AI Principles:** Transparency, accountability, fairness.
- **UNESCO AI Ethics:** First global ethical framework.
- **G7 Hiroshima Process:** Global rules for generative AI.

15 KARNATAKA'S HATE SPEECH AND HATE CRIMES (PREVENTION) BILL

IN NEWS

The Karnataka State Cabinet has approved the Karnataka Hate Speech and Hate Crimes (Prevention) Bill, 2025, a new law aimed at curbing, preventing, and penalising hate speech, hate crimes, and dissemination of hateful or inflammatory content, both offline and online.

The Bill seeks to address rising communal tensions, targeted violence, fake news, and social-media-driven disharmony in the State.

It proposes legal definitions, punishments, monitoring mechanisms, and enforcement powers to strengthen action against hate-fuelled offences.

BACKGROUND & CONTEXT

Hate speech and hate crimes in India have increased due to communal tensions, political polarisation, misinformation, identity-based targeting, and widespread social media influence. Karnataka has witnessed several incidents in recent years involving mob violence, provocative speeches, circulation of inflammatory videos, communal clashes, and targeted harassment.

Currently, hate speech offences are addressed through general laws under the IPC, such as Sections 153A, 295A, 298, and 505, but these are often criticised as inadequate, ambiguous, and poorly enforced. The Supreme Court (in Pravasi Bhalai Sangathan and Shreya Singhal) urged governments to frame clear guidelines or legislation to define hate speech and prevent its misuse.

In this backdrop, Karnataka's Bill seeks to provide comprehensive definitions, dedicated offences, special procedures, and institutional mechanisms to check hate speech and hate crimes. This comes at a time when multiple democracies are strengthening regulations against online extremism, hate propaganda, and targeted violence.

The Bill, once passed by the Assembly and assented by the Governor, would become the first of its kind among Indian states to comprehensively define and regulate hate crimes across multiple mediums.

KEY FEATURES OF THE BILL

- **Purpose and Scope:** It seeks to prevent dissemination, publication, and promotion of hate speech and hate crimes.
    - It aims to curb actions causing injury, disharmony, enmity, or hatred against individuals, groups, or organisations.
    - It is applicable to both persons and institutions.
- **Hate speech** includes any expression which is made, published, or circulated in words, either spoken or written, or by signs or by visible representations or through electronic communication in public view, with an intention to cause injury, disharmony, or feelings of enmity or hatred or ill-will against a person alive or dead, a class or group of persons, or a community to meet any prejudicial interest.
    - The prejudicial interest includes religion, race, caste or community, sex, gender, sexual orientation, place of birth, residence, language, disability or tribe.
    - The punishment for hate crime includes imprisonment from one to seven years and a fine of ₹50,000.

- The offences are cognisable, non-bailable, and triable by the Judicial Magistrate First Class.
- **Alignment with Central Laws:** The Bill incorporates provisions of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023 for procedural uniformity.
- The designated officer of the State government would be empowered to direct any service provider, intermediaries, person or entity to block or remove the hate crime materials from its domain including electronic media.

IMPACT OF HATE SPEECH

- **Social issues:** Hate speech deepens divisions between communities and disrupts long-standing social cohesion. Repeated hateful narratives escalate into mob violence, riots, and targeted attacks.
- **Erosion of Constitutional Values:** Hate speech challenges the principles of equality, fraternity, and dignity enshrined in the Constitution.
    - It undermines secularism, a core pillar of India's constitutional morality.
- **Psychological Harm:** Individuals facing hate speech suffer anxiety, trauma, and long-term mental stress.

CONSTITUTIONAL PROVISIONS

- Article 19(2) of the Indian Constitution deals with the reasonable restrictions that can be placed on the fundamental right to freedom of speech and expression under Article 19(1)(a).
- Conditions under which speech can be restricted by the state: Security of the State, Public Order, Decency or Morality, Contempt of Court, Defamation, Incitement to Offense.

STEPS TAKEN ADDRESS HATE SPEECH

- **Indian Penal Code (IPC) / Bharatiya Nyaya Sanhita (BNS), 2023:** Specific sections like Section 153A, Section 295A, etc in penal codes criminalize promoting enmity between groups (religion, race, language), outraging religious feelings, or inciting public fear/disorder.
- **Representation of the People Act, 1951**: Sec. 123(3), 123(3A): Prohibit political speech that promotes hatred or appeals to religion, caste, community during elections.
    - The Supreme Court, in the case of Pravasi Bhalai Sangathan v. Union of India (2014), acknowledged the lack of specific legislation on hate speech

and recommended that the Parliament enact a comprehensive law to address this issue

- In the case of Amish Devgan v. Union of India (2020) the Supreme Court of India addressed the balance between freedom of speech and expression (Article 19) and the need to restrict hate speech to maintain public order and communal harmony.

CHALLENGES IN ADDRESSING HATE SPEECH

RAPID DIGITAL AMPLIFICATION:

- Social media platforms enable hate speech to spread rapidly and reach large audiences without fact-checking.
- Encrypted messaging services complicate monitoring and evidence collection.

DIFFICULTY IN PROVING INTENT:

- Many hate speech offences require proving mens rea (intent), which is hard to establish.
- Establishing a direct link between speech and subsequent violence is legally complex.

ABSENCE OF A LEGAL DEFINITION:

- India lacks a precise statutory definition of hate speech, resulting in broad interpretation and inconsistent enforcement across states.
- Ambiguous terms like enmity, insult, or ill-will lead to subjective application.

WAY AHEAD

A sustainable response to hate speech requires a balanced framework that protects free expression while curbing harm.

India should adopt a clear and comprehensive legal definition of hate speech to ensure uniform and objective enforcement, supported by stronger accountability mechanisms for digital platforms to swiftly remove harmful content.

An independent oversight mechanism for online harms, combined with better data collection and research, can help design evidence-based interventions and strengthen India's commitment to equality, dignity, and social cohesion.

16 IBC HIT BY SYSTEMIC CHALLENGES: COMMITTEE

Recently, the Parliamentary Standing Committee on Finance, in its report 'Review of Working of Insolvency and Bankruptcy Code and Emerging Issues', warned that systemic inefficiencies and structural delays are undermining India's Insolvency and Bankruptcy Code (IBC) effectiveness.

ABOUT INSOLVENCY AND BANKRUPTCY CODE (IBC)

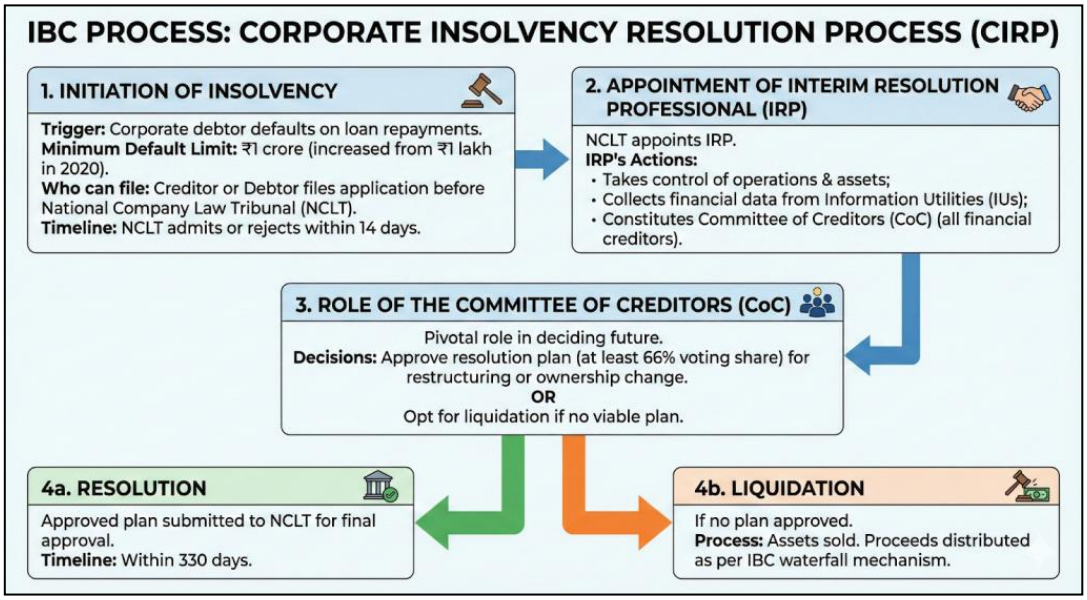
It was enacted in 2016, at a time when mounting non-performing assets (NPAs) and ineffective recovery mechanisms — such as SARFAESI, Lok Adalats, and Debt Recovery Tribunals — were weakening the banking system.

It replaced the older debtor-in-possession model like the Sick Industrial Companies Act (SICA) with a creditor-in-control approach, ensuring that financial creditors lead the resolution process.

PURPOSE AND OBJECTIVES OF THE IBC

The IBC serves as a time-bound mechanism to resolve insolvency and bankruptcy cases in a structured manner. Its key objectives, as outlined by the Insolvency and Bankruptcy Board of India (IBBI), are:

- **Resolution:** Revive viable businesses through restructuring or ownership change.
- **Maximization of Asset Value:** Prevent further value erosion.
- **Promotion of Entrepreneurship and Credit Flow:** Encourage risk-taking by providing an efficient exit mechanism.



IBC'S ACHIEVEMENTS SINCE ITS ENACTMENT

IBC has resolved 1,194 companies through the Corporate Insolvency Resolution Process (CIRP).

Creditors have recovered over 170% of the liquidation value and 93% of the fair value of these companies, reflecting the Code's impact on financial discipline and creditor confidence.

- **Pre-Packaged Insolvency for MSMEs:** The IBC was amended in 2021 to introduce the Pre-Packaged Insolvency Resolution Process (PIRP), specifically for Micro, Small, and Medium Enterprises (MSMEs).
- It allows out-of-court settlements between debtors and creditors.
- The debtor retains control of business operations.
- Applicable to defaults not exceeding ₹1 crore.

ISSUES HIGHLIGHTED IN PARLIAMENTARY STANDING COMMITTEE'S REPORT

- **Slow Processes and Delayed Resolutions:** The report underscored that slow admission of insolvency applications has become a major barrier to quick value realization, resulting in asset deterioration.
    - The average duration for completing CIRP stands at 713 days, more than double the mandated 330 days under the Code.
- **Key Reasons Behind the Delays:** The Committee attributed the delay in resolution to several structural issues:
    - Shortage of NCLT benches and vacant judicial positions.
    - Administrative staff gaps hampering tribunal efficiency.
    - Frequent and frivolous litigation, often initiated by promoters or unsuccessful bidders, eroding asset value.
- **Concerns Over Low Recovery Rates:** The overall recovery remains at 32.8% of admitted claims, revealing a substantial shortfall, while creditors recover about 170% of liquidation value.
    - According to the Insolvency and Bankruptcy Board of India (IBBI), the average recovery rate has dropped to around 32% from over 43% in 2019.
    - It is largely due to companies entering the IBC process too late, when their assets are already heavily stressed.
- **Issues in Asset Valuation and Resolution:** The Committee found that asset valuation often reflects liquidation potential rather than enterprise value, leading to lower recovery.

    - It cited concerns about a limited pool of quality resolution applicants and a lack of transparency and accountability in the valuation process.

- **Excessive Haircuts:** Creditors face massive losses in many cases. Average haircut is 80% of claims in over 70% of cases.
- **Example:** Videocon Group resolution saw a 95.3% haircut, meaning creditors recovered less than 5% of their dues.
- **Capacity Constraints:** The NCLT and the IBBI are under-resourced. The committee emphasized the need for more benches, better infrastructure, and enhanced training for insolvency professionals.

RECOMMENDATIONS TO IMPROVE EFFICIENCY

- Expedite establishment of additional NCLT benches to reduce case backlogs.
- NCLT should admit insolvency cases within 30 days.
- Accelerate operationalisation of the Integrated Technology Platform (iPIE) for centralised digital case management.
- Introduce deterrents for frivolous appeals, including:
    - Mandatory upfront deposits by unsuccessful resolution applicants filing appeals.
    - Substantially increased penalties for vexatious or frivolous applications.
    - Strengthening Institutional and Judicial Capacity: Expanding the NCLT's bench strength and improving case management systems to expedite admissions and hearings.
    - Address 50% vacancy in NCLT benches and recruit proactively.
- **Pre-Pack Framework for All Sectors:** Encouraging the use of pre-packaged insolvency resolutions beyond MSMEs to reduce litigation and improve efficiency.
- **Improved Monitoring and Transparency:** Enhancing oversight of resolution professionals and Committee of Creditors (CoC) to ensure fair and transparent decision-making.
    - Specialized IBC Benches can handle insolvency cases efficiently.
- **Revised Haircut Metrics:** IBBI suggests measuring haircuts based on actual asset value at entry, not on the original loan value, to present a more realistic picture of recoveries.
- **Data-Driven Oversight:** Leveraging technology and data analytics to monitor delays, identify bottlenecks, and improve accountability.

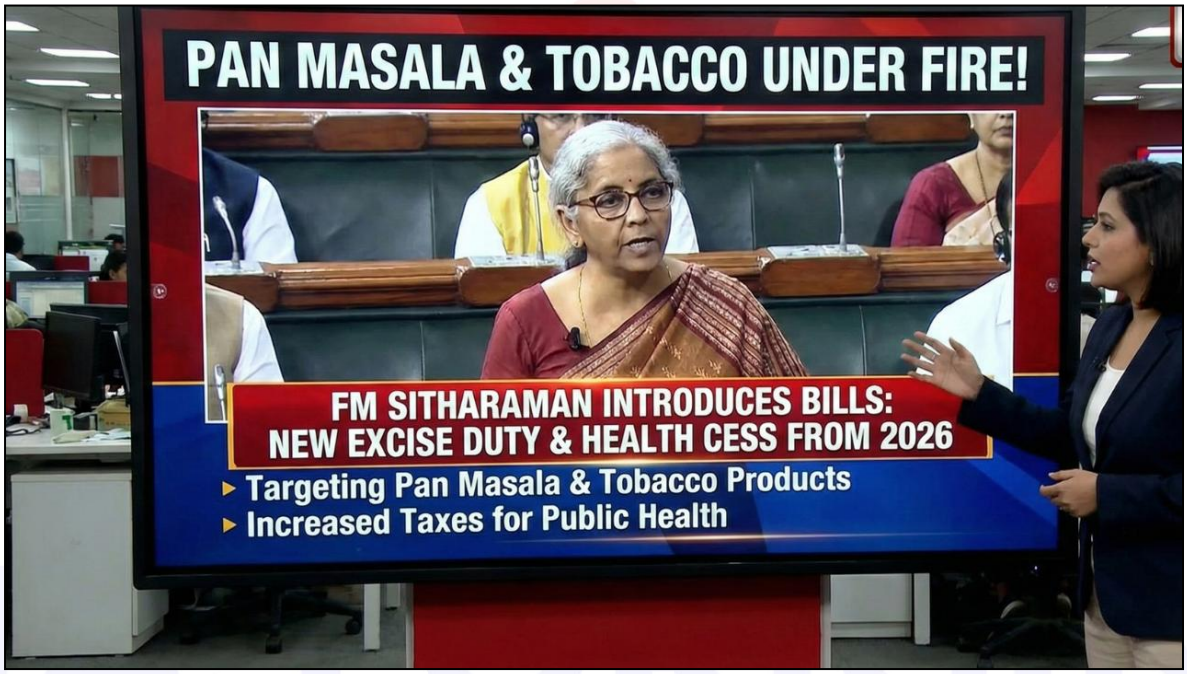
General Studies-3

01 TWO CENTRAL BILLS TO RAISE SIN TAX ON TOBACCO AND PAN MASALA

IN NEWS

The Union Government has introduced two new Central Bills proposing to increase sin taxes on tobacco and pan masala, aiming to curb consumption, reduce public health burden, and boost revenue.

The proposed revision affects GST Compensation Cess, Customs duties, and specific excise components.



BACKGROUND & CONTEXT

India faces one of the world's highest burdens of tobacco-related mortality: 1.35 million deaths annually (WHO Global Tobacco Report). Nearly 29% of adults consume tobacco (GATS-2). Tobacco causes major non-communicable diseases (NCDs) cancers, cardiovascular disease, COPD and imposes an economic cost exceeding ₹1.8 lakh crore, almost 1% of GDP (Indian Council of Medical Research).

Historically, India has used excise duties, GST cess, and customs duties to discourage consumption. However, taxes on tobacco products have not increased significantly since the introduction of GST in 2017, creating a gap relative to WHO's recommendation that tobacco taxes should constitute at least 75% of retail price.

The rising consumption of pan masala and areca nut (supari) classified as Group 1 carcinogens by IARC has intensified public health concerns, prompting the Centre to introduce two bills raising sin taxes to realign with global best practices.

KEY FACTS / KEY FEATURES

THE TWO CENTRAL BILLS

- Bill 1: Amendment to increase Excise Duty and GST Compensation Cess on tobacco products (cigarettes, bidis, chewing tobacco).
- Bill 2: Amendment increasing Basic Customs Duty (BCD) and special cess on pan masala and allied products.

KEY COMPONENTS

- Higher specific excise duty on cigarettes per mm slab.
- Increase in ad valorem cess on pan masala containing tobacco and areca nut.
- Revised cess structure under GST (Compensation to States) Act, 2017.

LEGAL & POLICY LINKAGES

- Cigarettes and Other Tobacco Products Act (COTPA), 2003.
- Article 47 of Directive Principles: State's duty to curb intoxicating substances.
- WHO Framework Convention on Tobacco Control (FCTC).
- GST Council decisions under Article 279A.
- Finance Act provisions on excise rates.

INSTITUTIONAL INVOLVEMENT

- Ministry of Finance, Ministry of Health & Family Welfare, NITI Aayog.
- National Cancer Registry Programme (ICMR data).

DETAILED MAINS ANALYSIS

CAUSES BEHIND THE NEW BILLS

- Rising tobacco-related disease burden and productivity loss.
- Stagnant tax rates since GST rollout → reduced real taxes due to inflation.
- Increased affordability of cigarettes for youth.
- WHO's urging India to raise taxes to meet FCTC obligations.
- Fiscal need to widen revenue base post-GST compensation phase-out.

RECENT DEVELOPMENTS

- Centre formalised two bills to modify the GST Cess Schedule and Excise Tariff.

- Consultations with the GST Council on optimal tax–cess mix.
- NITI Aayog's recommendation aligning with India@2047 health targets.
- New cancer registries highlighting alarming rise in oral and throat cancers, especially from smokeless tobacco and pan masala.

CHALLENGES

- High prevalence of bidi consumption in low-income groups; taxation may trigger political pushback.
- Risk of illicit tobacco trade increasing due to price differentials.
- Fragmented regulation between Centre (taxation) and states (sale, enforcement).
- Influence of tobacco lobby groups and insufficient enforcement of COTPA.

IMPACT ON INDIA

- **Health:** Reduced consumption → reduction in NCD burden, premature mortality.
- **Economy:** Higher revenue can be channelled to health programmes; potential short-term impact on small-scale bidi sector.
- **Social:** Decline in youth addiction; better public health outcomes in poor states.
- **Budgetary:** Boosts fiscal space without increasing broad-based taxes.

INTERNATIONAL RELEVANCE

- Aligns India with WHO-FCTC Article 6 on tax measures.
- Helps India contribute to SDG 3 (Good Health & Wellbeing).
- Strengthens India's global health diplomacy position.

LEGAL / CONSTITUTIONAL PROVISIONS

- **Article 47:** State should reduce consumption of intoxicating substances.
- **Seventh Schedule:** Union power over excise and customs.
- **Article 279A:** GST Council recommendations on cess.
- **COTPA 2003:** Legal framework for tobacco control.
- **Food Safety & Standards Act (FSSAI):** Regulation of flavoured pan masala.

COMMITTEE RECOMMENDATIONS

- **NITI Aayog:** annual inflation-indexed tax increases.

- **WHO Technical Manual on Tobacco Taxation:** adopt specific excise > 75% of retail price.
- **Finance Commission experts:** sin taxes essential for behavioural change.

EXPERT OPINIONS

- **PRS Legislative Research:** supports higher taxes but warns of illicit trade risk; calls for stronger enforcement.
- **EPW Editorials:** stress need for cess revenue to be earmarked for cancer care.
- **World Bank:** tobacco taxation is the most cost-effective public health tool.
- **IDSA:** highlights link between illicit tobacco networks and organised crime.

GST COMPENSATION CESS

- The GST compensation cess was an additional levy under the GST (Compensation to States) Act, 2017, to compensate for state revenue loss following GST implementation.
- **Annual Growth:** It assured states a 14% annual revenue growth, with the cess financing any shortfall.
- **Revenue source:** The cess was levied on luxury cars, aerated drinks, tobacco products, and coal to build a dedicated compensation fund.
- **Timeframe:** It was initially implemented from July 2017 to June 2022 and was later extended to 31 March 2026 to repay central loans taken for pandemic-related compensation.
- **Recent Change:** Following the 56th GST Council meeting in September 2025, the cess was largely discontinued and absorbed into new GST rate structures.
- **Tobacco Exception:** It continues on tobacco products until all compensation-related loans are fully repaid.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES

- National Tobacco Control Programme (NTCP).
- mCessation Programme (digital quitting support).
- Ayushman Bharat – Health & Wellness Centres for NCD screening.
- FSSAI restrictions on flavoured pan masala.
- Cancer Screening Mission under NPCDCS.

GLOBAL INITIATIVES

- WHO Framework Convention on Tobacco Control (FCTC) – India is a party.
- WHO MPOWER strategy (Monitor, Protect, Offer help, Warn, Enforce bans, Raise taxes).
- UN SDG 3.4 (reduce premature mortality from NCDs).
- World Bank Tobacco Taxation Guidelines.

HEALTH SECURITY SE NATIONAL SECURITY CESS

- The Health Security se National Security Cess is a proposed levy to replace the GST compensation cess on specified "sin goods ".
- **Tax Neutrality:** It keeps the overall tax burden on demerit goods unchanged after the GST compensation cess ends.
- **Twin Objectives:** The cess aims to mobilise resources for (1) public health programmes and (2) national security-related expenditures.
- **Target Goods:** The levy initially applies to pan masala manufacturers and may extend to other notified sin goods.
- **Levy Method:** It is calculated on the production capacity of manufacturing machines, rather than on actual output volume.
- **Fund Channel:** The proceeds are credited to the Consolidated Fund of India and are not shared with state governments.

THE CENTRAL EXCISE (AMENDMENT) BILL, 2025

- The Central Excise (Amendment) Bill, 2025, replaces the outgoing GST compensation cess on tobacco products with a permanent central excise duty.
- **Tax Objective:** It maintains the existing high tax burden on tobacco and other sin goods after the cess regime ends.
- **Fiscal Space:** The Bill empowers the Union government to revise tobacco excise duty rates without needing GST Council approval.
- **Product Scope:** The duty applies to cigarettes, cigars, cheroots, chewing tobacco, hookah tobacco, zarda, scented tobacco, and pipe-smoking mixtures.
- **GST Position:** Tobacco products are expected to fall under the 40% GST slab, with new excise filling the gap to preserve the overall taxation.

Feature	Health Security se National Security Cess	Central Excise (Amendment) Bill	GST Compensation Cess
Nature of Levy	New cess on specified sin goods	Permanent central excise duty on tobacco	Additional cess under the GST Act, 2017
Purpose	Mobilise funds for health + national security	Maintain a high tax burden on tobacco after the cess ends	Compensate states for GST revenue loss
Tax Base	Production capacity of machines	Specific excise duty on tobacco items	Applied on the consumption of luxury/demerit goods
Covered Goods	Initially pan masala, expandable to others	Cigarettes, cigars, cheroots, chewing/ hookah/ scented tobacco, zarda	Luxury cars, aerated drinks, tobacco, coal
Revenue Destination	Consolidated Fund of India (no state share)	Consolidated Fund of India	Compensation Fund for states

Timeframe	New, permanent policy measure	Permanent duty structure	July 2017-June 2022; extended to March 2026
State Involvement	No revenue sharing	No GST Council approval needed for rate changes	Directly compensates states for revenue loss
Policy Goal	Maintain tax neutrality + fund health/security	Preserve tobacco tax levels post-GST cess	Guarantee 14% annual revenue growth to states

CRITICISMS / CONCERNS

ACCORDING TO PRS

- High taxation may increase illicit tobacco trade, lowering expected revenues.
- Need clarity on revenue earmarking for health.

ORF & NITI AAYOG

- Must balance health goals with livelihood impacts on farmers & bidi workers.

WORLD BANK / IMF

- Regressive taxation concerns for low-income consumers; urges compensatory welfare measures.

HEALTH ADVOCATES

- Say taxes alone are insufficient without strict enforcement of advertising bans, point-of-sale restrictions, and flavoured product regulation.

WAY FORWARD

- Annual inflation-indexed increases in tobacco taxes.
- Shift to high specific excise duties rather than ad valorem.
- Strict crackdown on illicit trade using digital tax stamps and track-and-trace systems.
- Earmark a portion of sin tax revenue for cancer care and NCD programmes.

- Strengthen COTPA by raising minimum legal age for purchase.
- Ban flavoured additives that appeal to youth.
- Provide skill transition support to workers in bidi/tobacco-processing sectors.
- Promote alternative crops for tobacco farmers.
- Enforce FSSAI norms on pan masala; restrict areca nut marketing.
- Expand mCessation and school-level awareness under Fit India.
- Collaboration with WHO FCTC Secretariat for technical support.
- State-level de-addiction centres under National Health Mission.

PRELIMS BOOSTER NOTES (HIGHLY FACTUAL)

- **Sin Tax:** Tax imposed on harmful products (alcohol, tobacco, pan masala).
- **COTPA 2003:** Governs smoking bans, advertising, packaging warnings.
- **GST on Tobacco:** Tobacco products attract GST + Compensation Cess + Excise Duty.
- **WHO FCTC:** First global public health treaty on tobacco control.
- **Pan Masala Classification:** Contains areca nut → Group 1 carcinogen (IARC).
- **Article 47 (DPSP):** State to reduce consumption of injurious substances.
- **India's Tobacco Users:** ~29% adults (GATS-2).
- **Tobacco-related deaths:** 1.35 million annually.
- **Economic burden:** >₹1.8 lakh crore.
- **Largest producing states:** Gujarat (cigarettes), Karnataka/Andhra (tobacco leaves).
- **NTCP:** Implemented in all states; aims at behavioural change.
- **Track-and-Trace Systems:** Recommended globally to curb illicit trade.
- **WHO MPOWER:** Global tobacco control strategy.
- **GST Compensation Cess:** Levied on luxury/sin goods to aid stat.

02 INDIA'S SHIFT FROM GM TO GENOME-EDITED CROPS

IN NEWS

India has signaled a major policy shift from Genetically Modified (GM) crops to Genome -Edited (GE) crops, with regulatory relaxations for certain gene-editing categories and approval pathways under the Environment Protection Act being simplified.

This shift aims to promote climate-resilient, high-yield, nutrient-enriched crops without the controversy surrounding GMOs.

BACKGROUND & CONTEXT

India's agricultural biotechnology has long been dominated by debates around Genetically Modified (GM) crops such as Bt cotton and GM mustard. GM crops involve insertion of foreign DNA, triggering biosafety concerns and stringent regulatory scrutiny under the Environment Protection Act (EPA) 1986, monitored by GEAC (Genetic Engineering Appraisal Committee).

Globally, however, newer tools like CRISPR-Cas9 gene editing enable precise, targeted changes without introducing foreign genes, making them closer to natural mutations. Countries like the US, Japan, Argentina, Australia, and the EU (limited relaxation) have moved toward lighter regulation for genome-edited crops.

NITI Aayog and ICAR note that India needs climate-resilient, pest-resistant, and nutrient-rich crops to meet SDGs and feed a projected population of 1.65 billion by 2050 (UN). Hence, India is creating a regulatory environment that distinguishes GMOs from Genome-Edited Organisms (GEOs).

WHAT IS GENE EDITING?

- Gene editing modifies the plant's existing native genes by making precise cuts at targeted DNA sites using a protein (scissors) and a guide RNA (navigator).
- It does not introduce foreign DNA; instead, it creates mutations similar to natural variations, making the technology more precise, faster, and easier to regulate.

KEY DIFFERENCES WITH GENETICALLY MODIFIED ORGANISMS (GMOS)

- **Foreign vs Native DNA:** GMOs introduce foreign genes from other species; gene editing modifies only the plant's own genes without adding external DNA.
- **Regulatory Burden:** GMOs face stringent, expensive regulation; gene-edited crops often pass through simpler, faster approval pathways.
- **Technology Approach:** GMOs rely on transgenic insertion; gene editing uses CRISPR/TnpB to achieve precise site-specific edits.
- **Commercial Landscape:** GMO deployment dominated by large corporations; gene editing enables public-sector and small research institutions to create new varieties.

INDIA'S PROGRESS IN GENOME EDITING (GE)

- **GE Rice Lines:** GE Samba Mahsuri for higher yield, GE MTU-1010 for alkalinity tolerance.
- **GE Mustard Line:** Low-pungency, canola-quality mustard developed by gene editing.
- **Technologies Used:**

- **CRISPR–Cas9:** Editing drought- & salinity-tolerance genes.
- **CRISPR–Cas12a:** Editing Gn1a gene for spikelet proliferation and higher yields.
- **Indigenous GE Tool:** TnpB-based miniature editor, which is cheaper, patent-free and highly precise.

REASONS FOR THE SUCCESS OF GENOME EDITING (GE) IN INDIA

- **Regulatory Simplicity:** GE crops skip GEAC and need only IBC approval, making clearances faster.
- **High Public Acceptability:** GE crops carry no foreign DNA, reducing GMO-related opposition.
- **Low R&D Costs:** CRISPR tools make edits quick, cheap, and efficient for Indian labs.
- **Indigenous Innovation:** Indian tools like the TnpB-based editor cut import dependence.
- **Government Funding Push:** ₹500 crore (2023–24) earmarked explicitly for GE research.
- **Export-Friendly:** Japan and Australia already allow the import of GE foods without GM labelling.

03 HEAT STRESS THREATENS INDIA'S FOOD SECURITY

IN NEWS

Multiple scientific assessments, including IMD's 2025 projections, IPCC AR6, and ICAR's crop-weather simulations, warn that increasing heat stress is severely threatening India's food security, especially wheat, rice, pulses, and horticultural crops.

Extreme heat events in 2024–25 broke historical temperature records across Northwest, Central, and East India, causing yield losses and farm income decline.

BACKGROUND & CONTEXT

India is extremely vulnerable to global warming due to its tropical climate, high population density, and dependence on climate-sensitive agriculture. According to the IPCC AR6 Report, South Asia is a global hotspot of compound heat extremes, with heatwaves projected to increase by 4–10 times even under moderate-emission scenarios.

India's agriculture employs about 42% of the workforce (PLFS), contributes 16% of GDP, and supports 1.42 billion people—making food security highly climate-sensitive. IMD and ICAR studies show that every 1°C rise in temperature reduces wheat yield by 3–5%, rice by 3–4%, and pulses by 2–3%. Heat stress also affects animals, fisheries, groundwater recharge, and labour productivity.

FAO and World Bank warn that climate-induced yield decline could push millions into hunger, increasing India's vulnerability to food inflation, malnutrition, and rural distress.

KEY FINDINGS OF THE UN ESCAP REPORT

- India is among the top 5 high-risk nations where agriculture faces consistently high heat stress alongside Afghanistan, Pakistan, Nepal, and Bangladesh.
- Heat stress persists under both low-emission (SSP1-2.6) and high-emission (SSP5-8.5) climate scenarios.
- Agriculture absorbed 25% of global climate disaster losses (2008–2018), highlighting systemic fragility.
- Farm labour productivity may drop by up to 27% threatening rural livelihoods.

ESCAP RECOMMENDATIONS AGAINST HEAT STRESS IN AGRICULTURE

- **Heat Planning:** Integrate heat-stress risk into cropping calendars to avoid peak-heat sowing windows. E.g. Australia's Heat-Ready Cropping Guides align sowing dates with heatwave forecasts.
- **Early Warnings:** Deploy micro-climate heat alerts for farmers, livestock managers, and extension workers. E.g. Japan's Heat Alert System issues granular farm-level warnings.
- **Climate-Smart Practices:** Promote heat-tolerant varieties, mulching, micro-irrigation, and shade-nets. E.g. Israel's precision irrigation and shade-net farming in arid zones.
- **Labour Protocols:** Enforce water–shade–rest cycles and safe working-hour norms during extreme heat. E.g. Thailand's Heat Stress Prevention Guidelines mandate rest breaks for farm labourers.

WHAT IS HEAT STRESS?

- A condition where high temperature + humidity exceed the body's or a crop's cooling capacity.
- Measured using:
    - Heat Index,
    - Wet Bulb Temperature (WBT),
    - Temperature Humidity Index (THI) for livestock.

HOW HEAT STRESS AFFECTS CROPS

- Accelerates evaporation → soil moisture depletion.
- Reduces photosynthesis, grain filling duration, pollination efficiency.
- Increases pest–disease outbreaks.

- Leads to forced ripening → low grain weight.

MOST VULNERABLE REGIONS

- Indo-Gangetic Plains (IGP) – wheat, rice.
- Central India – pulses, oilseeds.
- South India – horticulture, spices.
- Western India – coarse cereals, cotton.

LEGAL & POLICY LINKAGES

- National Food Security Act (NFSA), 2013.
- National Mission for Sustainable Agriculture (NMSA).
- Disaster Management Act, 2005.
- Article 47 – nutritional levels, public health.
- SDG 2 – Zero Hunger.

DETAILED MAINS ANALYSIS

CAUSES

- Rising global temperatures due to anthropogenic greenhouse gases.
- Strong El Niño cycles altering monsoon patterns.
- Urban heat island effects in peri-urban farms.
- Unsustainable irrigation → groundwater depletion → reduced heat resilience.
- Shift to high-input crops (paddy, sugarcane) in unsuitable regions.

RECENT DEVELOPMENTS

- 2024–25 witnessed record-breaking early summer temperatures across North India.
- ICAR simulations show significant yield drop in wheat (Punjab, Haryana, UP), basmati quality decline due to nighttime heat, and tea quality deterioration in Assam.
- FAO's 2025 Climate–Food Risk Map places India in the "Very High Risk" category.
- NDMA issued new guidelines integrating heatwave management with food security planning.

CHALLENGES

- Heavy dependence on monsoon rainfall; limited micro-irrigation coverage.
- Low adoption of heat-tolerant crop varieties.
- Fragmented landholdings reduce technological adoption.
- Crop insurance gaps (delayed claim settlement).
- Public distribution system (PDS) vulnerable to climate shocks.
- Livestock heat stress → lower milk yields (15–20% decline during severe heat).
- Fisheries impacted by rising sea-surface temperatures (SST).

IMPACT ON INDIA

- **Agriculture:** Declining yields → lower farm incomes → rising rural distress.
- **Economy:** Food inflation; increased subsidy burden in procurement & PDS.
- **Health:** Malnutrition risk among children & pregnant women.
- **Social Stability:** Migration from climate-stressed districts (Bundelkhand, Marathwada).
- **Nutrition:** Reduced protein availability (pulses), micronutrient deficiency.
- **Livestock:** Decreased fertility; mortality during heatwaves.

INTERNATIONAL RELEVANCE

- India's food systems are globally connected → food deficit or export bans affect global markets.
- Climate-induced food instability may hinder SDG progress.
- Lessons from India inform Global Stocktake under the UNFCCC.

LEGAL / CONSTITUTIONAL PROVISIONS

- NFSA 2013 ensures food security regardless of climate shocks.
- Article 21 (Right to life) includes right to food and nutrition (SC judgments).
- DM Act 2005 mandates heatwaves as notified disasters in some states.
- Agricultural support under Article 246 (Union–State powers).

COMMITTEE RECOMMENDATIONS

- **Ashok Dalwai Committee (Doubling Farmers' Income):** Climate-smart agriculture.
- **NITI Aayog Report on Climate Adaptation (2023):** Diversification & micro-irrigation.
- **ICAR Expert Panel:** Promote heat-tolerant wheat (HD-3226, HD-3086), rice varieties.
- **FAO Climate Report:** Heat-resilient seed systems.

EXPERT OPINIONS

- **PRS:** Need climate-linked crop insurance premium adjustment.
- **EPW:** PDS must diversify beyond rice–wheat to climate-resilient millets.
- **World Bank:** India could lose 2–2.5% of GDP from heat stress by 2030.
- **IDSA:** Heat-induced food insecurity could trigger internal migration & conflict risks.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES

- **National Mission for Sustainable Agriculture (NMSA)**
  - Under NAPCC; promotes climate-resilient agriculture, soil health, and water-use efficiency.
- **PMKSY – Micro-Irrigation**
  - Expands drip & sprinkler systems → reduces heat stress by maintaining soil moisture.
- **ICAR's Climate-Smart Agriculture Programme**
  - Development of heat-tolerant wheat, rice, pulses, maize, sugarcane.
  - Establishes Krishi Vigyan Kendras (KVKs) for farmer advisories.

- **National Food Security Act (NFSA) 2013**
  - Provides buffer against climate-induced food shortages.
  - 5 kg grain per person/month at subsidised rates.
- **NDMA's Heatwave Action Plans**
  - Heat early-warning systems, public advisories, and emergency responses.
- **PMFBY (Crop Insurance Scheme)**
  - Provides compensation for crop losses due to extreme temperatures.
- **Atmanirbhar Bharat – Agri-Infrastructure Fund**
  - Improves storage and logistics to reduce climate-induced post-harvest losses.

GLOBAL INITIATIVES

- **UNFCCC & Paris Agreement**
  - Encourages climate-resilient agriculture through adaptation funding.
- **IPCC Assessments (AR6)**
  - Identifies South Asia as a global heat hotspot.
  - Provides scientific basis for national adaptation strategies.
- **FAO Climate-Smart Agriculture Programme**
  - Supports countries in sustainable, resilient farming.
- **Global Heat Health Information Network (GHHIN)**
  - Facilitates heatwave impact monitoring & data exchange.
- Global Stocktake Framework
  - Monitors progress of nations toward adaptation commitments.

CRITICISMS / CONCERNS

PRS LEGISLATIVE RESEARCH

- Lack of unified national framework on heatwave governance.
- PMFBY excludes several types of extreme heat-related crop losses.

ORF

- Over-dependence on rice–wheat farming makes India highly heat-vulnerable.
- Need shift to diversified food systems.

NITI AAYOG

- Irrigation efficiency remains low despite funding.
- Poor adoption of climate-smart technologies by small farmers.

WORLD BANK / IMF

- Heat stress may widen inequality in rural India.
- Climate finance disbursement too slow for adaptation needs.

ENVIRONMENTAL CONCERNS

- Heat-driven change in cropping patterns could harm biodiversity.
- Excess groundwater extraction to counter heat stress worsens depletion.

WAY FORWARD

- Establish National Heat Resilience Authority under NDMA.
- Scale up heat-tolerant crop varieties nationwide through seed hubs.
- Promote millets, pulses, sorghum as climate-resilient staples.
- Expand micro-irrigation coverage from current ~25% to 50% by 2030.
- Introduce index-based heat insurance for crops & livestock.
- Invest in AI-based heat early-warning systems integrated with KVKs.
- Reform PDS to include nutrient-rich, climate-resilient crops.
- Strengthen cold chain infrastructure to reduce heat-related spoilage.
- Promote agroforestry and tree-based farming to lower field temperatures.

- Encourage private R&D in climate-smart genomics & varieties.
- Implement community-led water budgeting in heat-prone districts.
- Mandate heat action plans for all states under DM Act rules.

PRELIMS BOOSTER NOTES (HIGHLY FACTUAL)

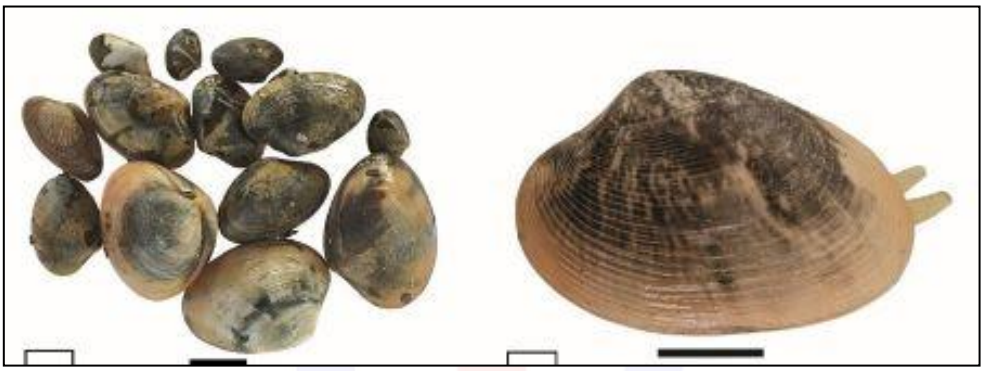
- **Heat Stress:** Condition when temp + humidity exceed body's/crop's cooling capacity.
- **Wet Bulb Temperature Safe Limit:** 35°C threshold for survivability.
- **IPCC AR6:** South Asia = Heat hotspot.
- **India's Agriculture:** 42% workforce; 16% GDP.
- **Food Security Act:** NFSA 2013 provides subsidised grains.
- **Heat Impact on Crops:** Wheat yield ↓ 3–5% per 1°C increase.
- **Institutions:** IMD, ICAR, NDMA, FAO, IPCC.
- **Schemes:** NMSA, PMFBY, PMKSY-MI, AIF.
- **SDGs:** SDG 2 (Zero Hunger), SDG 13 (Climate Action).
- **Heatwave Definition (IMD):** Temp ≥ 40°C (plains), 30°C (hills), deviation ≥ 4.5°C.
- **Livestock THI:** Above 80 → severe heat stress.
- **Crop Hotspots:** IGP, Bundelkhand, Marathwada.
- **Global Heat Network:** GHHIN.
- **UNFCCC:** Climate adaptation finance for agriculture.
- **FAO:** Climate-Smart Agriculture Framework.

04 SHORT-NECKED CLAM (PAPHIA MALABARICA)

IN NEWS

The short-neck clam (Paphia malabarica) population in Kerala's Ashtamudi Lake, a Ramsar site, is showing early signs of recovery after ICAR–CMFRI implemented a scientific stock enhancement programme.

The species, which had declined due to overharvesting and habitat degradation, is critical for local livelihoods, export earnings, and lake ecology.



BACKGROUND & CONTEXT (100–150 WORDS)

Ashtamudi Lake, Kerala's second-largest estuarine system and a designated Ramsar Site (2014), supports one of India's largest estuarine clam fisheries, historically contributing significantly to export earnings. However, over the past decade, overexploitation, sand mining, pollution, salinity changes, and climate-driven temperature variations led to a severe decline in short-neck clam stocks, threatening both biodiversity and livelihoods.

India's marine sector employs 14 million people (FAO), and molluscan fisheries form a vital portion of coastal incomes. According to ICAR, clam populations fell to dangerously low levels by 2020–22, affecting nearly 3,000 fisher families dependent on Ashtamudi's clam harvest.

In response, ICAR–CMFRI launched a stock enhancement programme using broodstock selection, cage culture, habitat restoration, and community-based management—leading to early but promising recovery signs.

KEY FACTS / KEY FEATURES

ABOUT THE SHORT-NECK CLAM (PAPHIA MALABARICA)

The short-neck clam is a commercially important bivalve mollusc native to the Indo-Pacific region.

- **Appearance:** It has a triangular-to-oval glossy outer shell with a variable yellowish-brown colour often marked by darker radial bands.
- **Life Span:** The species grows rapidly and typically survives for up to three years.
- **Habitat:** It inhabits shallow marine and estuarine sandy–mud flats at depths reaching four metres.
- **Distribution:** It's range spans from the Gulf of Oman to Japan, including India, China, Sumatra, and the Philippines.
- **Indian Range:** Populations occur along both coasts, with dense clusters in Ashtamudi Lake, Kerala.
- **Bioindicator:** The species serves as a bioindicator of heavy-metal and petroleum–hydrocarbon pollution due to high accumulation and low detoxification.
- **Diet:** As a benthic filter feeder, it consumes phytoplankton and partially degraded organic matter.
- **Major threats:** Pollution, invasive Charru mussels, over-exploitation, and shifts in salinity or temperature.
- **Human Use:** It is harvested for food and to manufacture cement, calcium carbide, and sand-lime bricks.

ABOUT ASHTAMUDI LAKE

Ashtamudi Lake is a large palm-shaped wetland in Kerala's Kollam district, often called the "gateway to the backwaters of Kerala."

- **Etymology:** Its Malayalam name, meaning "eight braids", refers to its octopus-shaped topography with eight major branches.
- **Hydrology:** It is a brackish-water estuary fed by the Kallada and Pallichal rivers. It connects to the Arabian Sea through the Neendakara estuary.
- **Historical Role:** The lake served as a major trading port in the 14th century and appears in the travel accounts of Moroccan explorer Ibn Battuta.
- **Ramsar Site:** Ashtamudi Lake was designated a Ramsar Wetland of International Importance in 2002.
- **Clam Fishery:** The short-neck clam fishery in the lake is India's first Marine Stewardship Council (MSC) certified sustainable fishery.
- **Marine Stewardship Council:** The MSC is an international non-profit organization that certifies sustainable wild-capture fisheries and verifies traceable seafood supply chains.

STOCK ENHANCEMENT PROGRAMME – ICAR–CMFRI

- Broodstock collection → hatchery seed production → release into the lake.
- Creation of clam sanctuaries and no-take zones.
- Water quality monitoring & benthic habitat restoration.
- Community participation via co-management.

LEGAL & POLICY LINKAGES

- Wetland (Conservation and Management) Rules, 2017.
- Coastal Regulation Zone (CRZ) norms.
- National Fisheries Policy 2020 (draft).
- Ramsar Convention obligations.
- Disaster Management Act (for climate resilience).

DETAILED MAINS ANALYSIS

CAUSES OF CLAM DECLINE

- Overharvesting due to high export demand.
- Pollution from households, industries, coir retting, tourism.
- Habitat degradation: sand mining, dredging, loss of benthic substrates.
- Hydrological changes: altered salinity & siltation patterns.
- Climate change: Higher water temperature lowering reproductive success.
- Invasive species and predation pressures.

RECENT DEVELOPMENTS

- CMFRI's enhancement programme has released millions of clam juveniles.
- Scientific seeding improved survival and growth rates.
- Local self-governments and fishing cooperatives adopted closed seasons.
- Early signs detected: improved density, increased juvenile recruitment, healthier benthic communities.

CHALLENGES

- Pollution control remains weak.
- Need for long-term hydrological monitoring.

- Risk of illegal harvesting in no-take zones.
- Lack of region-specific fisheries legislation for molluscs.
- Salinity fluctuations from climate-induced changes.
- Competing demands (tourism, houseboats, transport).

IMPACT ON INDIA

- Strengthens coastal livelihood security (especially women who dominate clam processing).
- Supports India's export earnings from molluscan fisheries.
- Enhances estuarine ecosystem health—clams act as natural filters.
- Contributes to nutritional security and blue economy targets.
- Demonstrates scalable model for habitat-based fisheries restoration.

INTERNATIONAL RELEVANCE

- Aligns with FAO guidelines for sustainable small-scale fisheries.
- Supports SDG 14 (Life Below Water) through sustainable use of aquatic resources.
- Enhances India's standing in global wetland management under the Ramsar Convention.

LEGAL / CONSTITUTIONAL PROVISIONS

- **Article 48A:** Protect the environment.
- **Article 51A(g):** Duty to protect natural environment.
- Wetland Rules 2017 mandate catchment protection.
- CRZ Notification governs estuarine human activity.
- **Biodiversity Act 2002** – promotes community participation in conservation.

COMMITTEE RECOMMENDATIONS

- **MS Swaminathan Committee:** Promote sustainable aquaculture and restrict overfishing.
- **NITI Aayog Blue Economy Task Force:** Restore estuarine ecosystems for livelihood resilience.
- **ICAR Expert Panels:** Encourage hatchery-based replenishment for depleted molluscan stocks.

EXPERT OPINIONS

- **PRS:** Wetland governance suffers due to overlapping authorities and poor enforcement.
- **EPW:** Community co-management essential for sustainable fisheries.
- **World Bank:** Restoration of estuaries offers high ecological return on investment.
- **IDSA:** Ecological degradation of wetlands can worsen climate vulnerabilities of coastal populations.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES

- **ICAR–CMFRI Stock Enhancement Programme**
  - Scientific broodstock management and seed production.
  - Large-scale juvenile release with habitat suitability analysis.
  - Regular monitoring using GIS mapping & hydrography.
- **National Plan for Conservation of Aquatic Ecosystems (NPCA)**
  - Protects wetlands with funding for pollution control & biodiversity restoration.
  - Ashtamudi is prioritized due to its Ramsar status.
- **Blue Revolution Scheme**
  - Promotes sustainable fisheries and aquaculture, including molluscan species.
- **Pradhan Mantri Matsya Sampada Yojana (PMMSY)**
  - Provides funding for sustainable fisheries development, modernisation, livelihood support.

- Includes molluscan culture infrastructure.

- **Coastal Regulation Zone (CRZ) Rules**
  - Restricts ecologically harmful activities around wetlands/estuaries.
- **Wetland Rules 2017**
  - Committees at state level → inventory, monitoring, and wise use principles.

GLOBAL INITIATIVES

- **Ramsar Convention (1971)**
  - Framework for wetland conservation and 'wise use'.
  - Requires periodic ecological character monitoring.
- **FAO Small-Scale Fisheries Guidelines**
  - Emphasise ecosystem-based resource management.
- **UN Decade on Ecosystem Restoration (2021–2030)**
  - Encourages large-scale wetland rehabilitation.
- **Global Coral & Mangrove Restoration Networks**
  - Provide tools relevant for estuarine shellfish restoration.

CRITICISMS / CONCERNS

- **PRS Legislative Research**
  - Wetland Rules lack strong enforcement; state committees often inactive.
  - No species-specific legal protection for many molluscs.

- **NITI Aayog**
  - Tourism pressure and waste mismanagement undermine restoration.
- **ORF**
  - Community participation still limited; need for co-management rights.
- **IDSA**
  - Estuarine degradation increases vulnerability to climate disasters.
- **Environmental Concerns**
  - Hatchery-based releases must avoid genetic bottlenecks.
  - Risk of disease transmission if broodstock not screened.

WAY FORWARD

- Legal protection for key molluscan species under Wildlife (Protection) Act schedules.
- Expand community-based fisheries management (rights-based access, monitoring).
- Develop Integrated Lake Management Plan for Ashtamudi.
- Strengthen pollution regulation—industrial effluent control, sewage treatment.
- Introduce catch quotas & closed seasons using scientific stock assessments.
- Set up clam sanctuary zones with no-harvest restrictions.
- Promote benthic habitat restoration via artificial reefs & sediment recovery.
- Create climate-resilient management models for estuarine ecosystems.
- Build GIS-based monitoring of clam density, water quality, salinity patterns.

- Provide livelihood diversification—processing units, value addition, eco-tourism.
- Encourage public–private partnerships in sustainable aquaculture.
- Integrate Ashtamudi restoration into Kerala's coastal climate adaptation plan.

PRELIMS BOOSTER NOTES

- **Species:** Paphia malabarica (Short-neck clam).
- **Habitat:** Estuarine, brackish water; burrows in sandy-mud beds.
- **Ashtamudi Lake:** Ramsar Site; located in Kollam, Kerala.
- **Ramsar Criteria:** Supports fishery livelihoods, rich biodiversity.
- **CMFRI:** Central Marine Fisheries Research Institute (ICAR).
- **Wetland Rules 2017:** "Wise use" principle; prohibits reclamation.
- **CRZ:** Classifies coastal zones; regulates developmental activity.
- **FAO:** Reports on sustainable molluscan fisheries.
- **Livelihoods:** ~3,000 families dependent on Ashtamudi clam fishery.
- **Threats:** Overfishing, pollution, salinity shift, habitat loss.
- **Bivalves:** Natural biofilters improving water quality.
- **Export:** India exports processed clam meat mainly to Southeast Asia & Europe.
- **UN SDG 14:** Sustainable use of marine ecosystems.
- **Hydrology:** Fed by Kallada River; connected to Arabian Sea.
- **ICAR Role:** Seed production, stock enhancement, ecological monitoring.

05 AFRICAN FOREST ELEPHANT COUNT HIGHER THAN EARLIER ESTIMATED

A recent study using DNA extracted from elephant dung found the African forest elephant population to be larger than earlier estimates. The new DNA-based method estimated the 2024 population at around 1,35,690, representing a 16% increase since 2016.

AFRICAN FOREST ELEPHANT (LOXODONTA CYCLOTIS)

The African forest elephant is the smallest living elephant species native to West and Central Africa.

- **Appearance:** It has a nearly straight back, rounder ears, and thin, straight tusks that point downward.
- **Ivory:** The ivory has a pinkish hue and is denser and harder than the savanna elephant ivory.
- **Habitat Range:** It primarily inhabits dense tropical rainforests across West and Central Africa.
- **Population Share:** Central Africa contains about 95% of forest elephants, while Gabon has the largest population.
- **Social Structure:** They form small, highly social family groups of up to 20 individuals led by a matriarch.
- Adult males remain mostly solitary and join family groups only during mating periods.
- **Ecological Role:** They serve as keystone species and ecosystem engineers by dispersing seeds over long distances.
- **Major Threats:** Poaching, habitat loss, fragmentation, human-elephant conflict, slow reproduction, climate change, etc.
- **Conservation Status:** IUCN: Critically Endangered; CITES: Appendix I.

06 HANSA-3 (NG) TRAINER AIRCRAFT

IN NEWS

The Union Minister for Science and Technology, Dr. Jitendra Singh, unveiled the production-standard Hansa-3 (NG) trainer aircraft at CSIR–National Aerospace Laboratories (CSIR–NAL), Bengaluru.

The aircraft is an indigenously designed, next-generation two-seat flying trainer meant for Indian flying clubs and aviation academies, aimed at reducing dependence on imported basic trainer aircraft.

BACKGROUND & CONTEXT

India faces a growing shortage of trained pilots as domestic civil aviation expands rapidly; the DGCA has highlighted the need for substantial scaling up of flying training capacity in the country. Presently, many flying clubs rely heavily on imported trainer aircraft, increasing costs and creating maintenance and spares vulnerabilities.

The original Hansa-3, designed by CSIR–NAL, was India's first indigenously produced, all-composite two-seat trainer aircraft, certified in 2000 and used in flying clubs across India. CSIR With rising demand and ageing fleets, CSIR–NAL developed the Hansa-3 (NG – Next Generation), featuring modern avionics, better fuel efficiency, and digital systems to match global standards. The unveiling of the production version marks an important milestone in Atmanirbhar Bharat in civil aviation and complements other indigenous platforms like SARAS Mk-2 light transport aircraft and CSIR–NAL's high-altitude platforms.

KEY FACTS / KEY FEATURES

- **Developer & Manufacturer**
  - Designed and developed by CSIR–NAL, Bengaluru under CSIR.
  - Production in partnership with Pioneer Clean AMPS Pvt. Ltd., with a facility at Kuppam, Andhra Pradesh (100 aircraft/year capacity).
- **Aircraft Type & Role**
  - Two-seat, all-composite, low-wing trainer aircraft for ab-initio flying training.
  - Intended for flying clubs, FTOs, universities, and potentially basic training roles.
- **Technical Features (Hansa-3 NG)**
  - All-composite airframe: lightweight, corrosion-resistant.
  - Modern glass cockpit with digital avionics (multi-function displays etc.).
  - Fuel-efficient engine (Rotax 912iSc-type, fuel injected) and improved aerodynamics for better endurance and lower operating cost.
  - Electrically operated flaps, improved ergonomics, larger canopy for better visibility.
- **Regulatory & Policy Linkages**
  - Certification under DGCA norms (FAR-23 equivalent).
  - Supports National Civil Aviation Policy, Atmanirbhar Bharat, and pilot training ecosystem for UDAN-driven regional connectivity.

DETAILED MAINS ANALYSIS

CAUSES / RATIONALE

- **Pilot Shortage & Training Capacity**
  - Rapid growth in Indian aviation → increased demand for commercial pilots.
  - Limited number of Flying Training Organizations (FTOs) and heavy dependence on imported trainer aircraft raise training costs.
- **Strategic Indigenization**
  - Need to reduce reliance on foreign OEMs for spares & upgrades.
  - Build a domestic aviation industrial base in small aircraft segment.
- **Technology Upgradation**

- Original Hansa trainer needed upgrades to match global tech (glass cockpit, fuel-efficient engines, lower emissions).

RECENT DEVELOPMENTS

- Unveiling of Production-standard Hansa-3 (NG) at CSIR–NAL campus, Bengaluru by Union S&T Minister.
- Parallel inauguration of facilities like SARAS Mk-2 iron bird test facility, high altitude platform (HAP) airframe fabrication, showing a broader ecosystem push.
- Technology licence agreement with Pioneer Clean AMPS and establishment of a dedicated production line in Andhra Pradesh.

CHALLENGES

- **Certification & Safety**
  - Meeting stringent DGCA and ICAO training standards consistently.
  - Need for robust after-sales support and spares network.
- **Market Acceptance**
  - Flying clubs accustomed to imported trainers may initially hesitate.
  - Need to demonstrate reliability, low life-cycle cost, and performance.
- **Scale & Ecosystem Constraints**
  - Ensuring sufficient orders to keep production viable.
  - Building adequate MRO, training, and simulator ecosystems around Hansa-3 (NG).

IMPACT ON INDIA

- **Civil Aviation & Training**
  - Cheaper indigenous trainers reduce cost of pilot training, enabling more domestic pilots.
- **Industrial Capability**
  - Boosts design–development–manufacturing chain for small aircraft, complementing platforms like SARAS Mk-2 and future regional aircraft.
- **Employment & Regional Development**
  - Production facility at Kuppam (AP) creates skilled jobs and supports aerospace clusters.

INTERNATIONAL RELEVANCE

- Demonstrates India's capability to design and manufacture certified civil aircraft.
- Hansa-3 (NG) can be marketed to developing countries seeking affordable training solutions.
- Adds to India's narrative as an emerging aviation and aerospace hub, alongside programmes like LCA Tejas (defence), SARAS, and HAP platforms.

LEGAL / INSTITUTIONAL PROVISIONS

- **DGCA:** Certification and operation norms for civil trainer aircraft.
- **CSIR Act:** Mandate for CSIR–NAL to develop strategic technologies.
- **National Civil Aviation Policy:** Encourages indigenous manufacturing and FTO expansion.

COMMITTEE / POLICY RECOMMENDATIONS (CONTEXTUAL)

- Various civil aviation task forces have recommended boosting indigenous aircraft and training infrastructure to meet fleet and pilot growth.
- NITI Aayog has repeatedly flagged the need to develop domestic aviation manufacturing as part of Make in India and Atmanirbhar Bharat.

EXPERT OPINIONS (DERIVED/CONTEXTUAL)

- Policy analysts & think tanks highlight that small aircraft manufacturing (trainers, regional transport) is a realistic entry point for India into the global civil aerospace market.
- Aviation experts note that if lifecycle costs and reliability match promises, Hansa-3 (NG) could become a benchmark "Indian Cessna-type" trainer for local and export markets.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN SCHEMES & POLICIES

- **Atmanirbhar Bharat Abhiyan**
  - Pushes self-reliance in strategic sectors including aerospace.
  - Hansa-3 (NG) fits as an import-substitution trainer aircraft.
- **Make in India & Production-linked Push in Aerospace**
  - Encourages domestic manufacturing, technology partnerships, and FDI in aerospace.
  - CSIR–NAL's tie-up with private industry (Pioneer Clean AMPS) is a practical example.
- **National Civil Aviation Policy (NCAP)**
  - Promotes creation of more FTOs and regional connectivity.
  - Indigenous trainers can lower training costs aligned with NCAP goals.
- **UDAN (Regional Connectivity Scheme)**
  - While Hansa-3 (NG) is a trainer, a stronger domestic training ecosystem indirectly supports UDAN by addressing pilot and operational requirements.
- **CSIR–NAL Research Programmes**
  - Development of Hansa, Hansa-NG, SARAS Mk-2, High Altitude Platform (HAP) demonstrates a continuum of indigenous aerospace projects.

GLOBAL CONTEXT / NORMS

- ICAO Standards & Recommended Practices (SARPs) for pilot training aircraft.
- International trend of light sport and trainer aircraft using composite materials and glass cockpits — Hansa-3 (NG) aligns with this.

CRITICISMS / CONCERNS

(None are majorly reported yet; below are logical policy-level concerns)

- **PRS-style concerns:** Need clarity on long-term procurement commitment by government-supported FTOs to sustain economies of scale.
- **NITI / ORF-style concerns:** Risk that indigenous projects may face delays, cost overruns if not supported by stable funding and timely certification.
- **World Bank / IMF perspective (generic):** For industrial strategies to succeed, India must ensure competitive ecosystems (skill, infrastructure, regulation), not just one-off projects.
- **Environmental angle:** While trainers are small, aviation overall contributes to emissions; long-term innovation will require greener fuels and propulsion.

WAY FORWARD

- Bulk Orders & Assured Offtake from FTOs and government academies to stabilise production.
- Creation of an "Indian Pilot Training Ecosystem": Hansa-3 (NG) + simulators + DGCA-approved curricula.
- Include Hansa-3 (NG) in state-sponsored aviation universities & skill missions.
- Develop export strategy for friendly developing countries needing low-cost trainers.
- Ensure robust after-sales and MRO network to build user confidence.
- Integrate digital monitoring and predictive maintenance systems in the fleet.
- Strengthen R&D for future variants (IFR capability, night flying, upgraded engines).
- Use the Hansa programme as a stepping stone to more complex civil aircraft (4–6-seater GA planes).
- Encourage public–private partnerships in aerospace clusters (Bengaluru, Hyderabad, Nashik, Kuppam).

- Align with National Skill Development Mission by training technicians and engineers for light aircraft manufacturing.
- Promote joint certification pathways with global regulators (EASA/FAA-type alignment) to ease exports.
- Continuously benchmark operational safety & reliability with global trainer aircraft.

PRELIMS BOOSTER NOTES

- **Hansa-3 (NG):** Next-Generation, two-seat, all-composite trainer aircraft developed by CSIR–NAL.
- **Unveiled at:** CSIR–NAL, Bengaluru, by Union Science & Technology Minister Dr. Jitendra Singh.
- **Role:** Ab-initio flying training for flying clubs/FTOs.
- **Key Features:** Glass cockpit, fuel-efficient engine, composite airframe, electrically operated flaps.
- **Original Hansa-3:** Certified by DGCA in 2000 as India's first indigenously produced composite trainer aircraft. CSIR
- **Production Partner:** Pioneer Clean AMPS Pvt. Ltd.; plant at Kuppam, Andhra Pradesh (capacity ~100 aircraft/year).
- **CSIR–NAL:** Premier civil aerospace R&D lab under CSIR, based in Bengaluru.
- **Other CSIR–NAL Projects:** SARAS Mk-2 (19-seater), High Altitude Platform (HAP) UAV.
- **Policy Linkages:** Atmanirbhar Bharat, Make in India, National Civil Aviation Policy, UDAN (indirect).
- **Regulator:** DGCA – certifies civil aircraft in India.

07 NORTHERN CITIES ARE MORE POLLUTED THAN SOUTHERN AND WESTERN CITIES

Analysis of CPCB data (2015–2025) from 11 urban centres shows persistent nationwide air pollution, with northern cities being more affected than southern and western ones.

	Ahmedabad	Bengaluru	Chandigarh	Chennai	Delhi	Kolkata	Lucknow	Mumbai	Pune	Varanasi	Visakhapatnam
2015	116.74	70.48		113.61	229.55		182.01	110.22	163.60	197.71	
2016	163.31	91.43		115.03	256.37	94.94	227.85	93.84	142.02	226.27	97.65
2017	197.27	68.82		94.70	227.48	103.90	225.25	107.46	93.28	218.58	114.30
2018	158.13	80.29		99.17	225.41	133.96	217.33	112.37	96.42	211.83	119.54
2019	152.55	81.88	138.14	87.72	214.62	136.50	188.86	102.66	109.17	214.79	112.38
2020	117.93	64.54	75.05	68.52	185.14	111.22	171.94	94.68	85.44	154.25	95.52
2021	122.59	69.58	103.71	66.21	208.58	123.65	159.54	112.18	95.68	143.93	106.28
2022	117.68	78.12	133.84	71.60	209.19	112.98	139.78	120.52	116.62	94.84	110.31
2023	110.13	72.59	138.81	78.08	203.63	105.05	127.20	119.82	123.93	64.48	129.38
2024	114.45	73.94	151.76	71.85	208.93	100.86	125.78	91.28	96.58	55.51	110.27
2025	100.73	71.98	108.63	74.67	180.67	84.93	118.25	83.20	94.17	60.94	113.47

CPCB: The Central Pollution Control Board, established in 1974 under the MoEFCC, is India's apex body for setting, monitoring, and enforcing standards to prevent and control air and water pollution.

KEY FINDINGS

- **Unsafe Air:** None of the major Indian cities achieved 'good' or safe AQI (0–50) during the decade.
- **Most Polluted:** Delhi remained the most polluted city over the decade, with annual mean AQI above 250 during peak years like 2016.
- **Least Polluted:** Bengaluru had the lowest AQI (65–90), indicating cleaner but still unhealthy air.
- **Regional Disparities:** Northern cities like Lucknow, Varanasi, & Ahmedabad had prolonged high AQI readings, unlike southern and western cities like Chennai, Mumbai, & Visakhapatnam (AQI 80–140).

MAJOR CAUSES OF REGIONAL DISPARITY IN AIR POLLUTION

GEOGRAPHICAL AND METEOROLOGICAL FACTORS

- **Landlocked Geography:** Northern cities are in the Indo-Gangetic Plain (IGP), where the flat, landlocked region and Himalayan barrier trap pollutants, preventing their dispersion.

- **Winter Temperature Inversion:** Cold, dense winter air in North India gets trapped beneath warmer air, creating an "atmospheric lid" that prevents vertical mixing and intensifies smog buildup.
- **Coastal Advantage:** Southern and western cities benefit from sea breezes and maritime winds that effectively disperse pollutants, ensuring better air circulation throughout the year.
- **Seasonal Wind Pattern:** Prevailing winter winds in North India carry industrial and agricultural emissions towards urban centres like Delhi, contributing to the haze.

ANTHROPOGENIC AND REGIONAL FACTORS

- **Stubble Burning:** Smoke from post-monsoon crop residue burning in Punjab and Haryana is carried by prevailing winds into major northern cities, causing a severe seasonal pollution spike.
- **Industrial Concentration:** The IGP hosts dense industry, many thermal plants, and heavy vehicular loads, with frequent non-compliance worsening regional air quality.
- Transportation accounts for 39% of Delhi's PM2.5 pollution; thermal plants contribute 11%, and industries account for 3%.
- **Dust Contribution:** Poorly regulated construction and demolition activities sustain road dust, which accounts for about 18% of Delhi's PM2.5 levels.

08 BAMBOO SHRIMP (ATYOPSIS SPINIPES)

Scientists have rediscovered the bamboo shrimp Atyopsis spinipes) in Karnataka and Odisha after a 72-year absence, confirming its presence in mainland India.

BAMBOO SHRIMP (ATYOPSIS SPINIPES)

The bamboo shrimp, also known as the Soldier Brush Shrimp, is a filter-feeding freshwater shrimp native to Southeast Asia.

- **Appearance:** Its colour ranges from brown to reddish-brown, often with a light longitudinal stripe along the back.
- **Color Change:** The body color varies with environmental conditions; brighter hues signify good health, while fading coloration indicates physiological stress.
- **Habitat Preference:** The species prefers clean, well-oxygenated, fast-flowing freshwater streams and rivers with a coarse, rocky substrate.
- **Global Distribution:** It is widely distributed across Southeast Asia and the Pacific islands, including Indonesia, the Philippines, Thailand, Sri Lanka, and Samoa.
- **Diet:** The shrimp is a detritivore that feeds on drifting organic detritus, microorganisms, and algae.
- **Feeding Adaptation:** It uses unique fan-like appendages to capture tiny food particles from fast-flowing water.
- **Life Cycle:** The species is amphidromous, with larvae developing in brackish or marine water before returning to freshwater as juveniles.

- **Ecological Role:** It supports nutrient cycling by filtering detrital particles and microorganisms from the water column.
- **Major Threats:** Habitat degradation, water pollution, overexploitation for aquarium trade, etc.
- **Conservation Status:** IUCN: Least Concerned.

09 HERON MK II UAV

IN NEWS

India has formally inducted and operationalised the Heron Mk II UAV, an upgraded Medium Altitude Long Endurance (MALE) drone system procured from Israel to enhance intelligence, surveillance and reconnaissance (ISR) along the LAC and international borders.

The platform offers satellite-based communication (SATCOM), extended endurance, multi-payload capability, and enhanced operations during day/night and adverse weather.

BACKGROUND & CONTEXT

India's need for advanced UAVs intensified after the Galwan clash (2020), rising Chinese deployment of surveillance drones along the LAC, and Pakistan's growing use of UAVs for smuggling, surveillance and terror-support activities. Globally, the UAV market has shifted toward MALE and HALE systems with improved AI, SATCOM and multi-sensor integration.

Israel Aerospace Industries (IAI)'s Heron UAV family has been used by the Indian armed forces for two decades. However, the original Heron variants lacked SATCOM and had limited endurance. The Heron Mk II, with its long-range communication and upgraded avionics, allows India to conduct real-time ISR over hundreds of kilometres, crucial for Ladakh, Arunachal, the desert sector, and the Indian Ocean Region (IOR).

India is simultaneously developing indigenous UAVs like Rustom-II / Tapas BH, but procurement from Israel fills an urgent operational gap.

HERON MK II UAV

- **Category:** A Medium Altitude Long Endurance (MALE) platform capable of 24+ hours continuous flight for persistent surveillance.
- **SATCOM Control:** Equipped with Satellite Communication (SATCOM) links to conduct missions beyond line-of-sight without ground radio dependence.
- **ELINT Systems:** Carries Electronic Intelligence (ELINT) payloads to detect, analyse and geolocate enemy radar and electronic emissions at stand-off distances.
- **COMINT Capability:** Features Communications Intelligence (COMINT) receivers to intercept and collect radio communications for actionable intelligence.
- **SAR Imaging:** Uses Synthetic Aperture Radar (SAR) to generate high-resolution ground imagery even in fog, rain or night conditions.
- **Automated Flight:** Fully automatic take-off and landing (ATOL) system boosts safety and reduces manpower at forward operating bases.
- **Heavy Payload:** Can carry ~500 kg of mission equipment, including electro-optical cameras.

ROLE OF UAV IN NATIONAL SECURITY

- **Persistent Surveillance:** Drones provide real-time reconnaissance across border regions and infiltration routes where foot patrols are risky; e.g. Herons monitor Line of Actual Control (LAC) and desert sectors.
- **Precision Strike:** Armed UAVs can neutralise terror hideouts with minimum collateral risk.
- **Logistics Lifeline:** The Indian Army is testing drone convoys to replace mules and helicopters for ammunition, rations and fuel delivery at high-altitude posts.

10 SOFTWARE DEFINED RADIOS

IN NEWS

The Indian Army has signed a major contract to procure its first batch of indigenously designed and manufactured Software Defined Radios (SDRs).

These SDRs were designed by DRDO's Defence Electronics Application Laboratory (DEAL) and are being produced by Bharat Electronics Limited (BEL) under the "Make in India" / Atmanirbhar Bharat initiative.

The contract aims to replace legacy communication systems with secure, encrypted, network-enabled, high-bandwidth battlefield communication, crucial for modern joint warfare.

BACKGROUND & CONTEXT

Communication has emerged as the backbone of modern network-centric warfare. The Indian Army currently uses a mix of legacy analog radios, vulnerable to interception, jamming, and cyber-attack. The need for secure, jam-resistant, encrypted, multi-band communication gained urgency after rising cross-border terrorism, LAC tensions with China, and electronic warfare threats from adversaries.

A Software Defined Radio (SDR) uses software to modify frequency, waveforms, encryption, wave modulation, and networking functions—making it flexible, upgradable, and resistant to electronic countermeasures. DRDO's DEAL laboratory began developing indigenous SDRs to meet the Army, Navy, and Air Force's future communication architecture. BEL, a premier defence PSU, undertook mass production.

The Army's first procurement marks a major leap toward indigenous Tactical Communication Systems (TCS) and reduces dependence on foreign radios. It aligns

with India's long-term goals under Atmanirbhar Bharat, Defence Acquisition Procedure (DAP) and 5G/6G-enabled military communications roadmap.

KEY FACTS / KEY FEATURES

WHAT IS AN SDR?

A radio communication system where software replaces hardware components, enabling:

- Dynamic frequency switching
- Programmable encryption
- Upgradable waveforms
- Enhanced anti-jamming and resilience

TECHNICAL FEATURES OF THE INDIAN SDR (ARMY VERSION)

- Multi-band, multi-mode, multi-role capability
- High data-rate communication for voice, video, and data
- End-to-end encryption compliant with military standards
- Network-enabled (supports MANET – Mobile Ad Hoc Networking)
- Interoperability across Army–Air Force–Navy units
- **Resistant to:**
    - Electronic Warfare (EW)
    - Jamming
    - Cyber intrusion
    - Over-the-Air Rekeying (OTAR) – secure key updates
- Upgradable via software patches – no hardware change needed

DRDO & BEL ROLES

- **DRDO-DEAL:** Research, design, prototype development, waveform architecture.
- **BEL:** Production, quality assurance, life-cycle support, integration with Army networks.

STRATEGIC LINKAGES

- Replacement for Army's outdated Very/Ultra High Frequency (VHF/UHF) analog radios.

- Forms the backbone of India's Battlefield Management System (BMS) and Tactical Communication Network (TCN).

DETAILED MAINS ANALYSIS

CAUSES BEHIND PROCUREMENT

- Rising threats from adversaries' electronic warfare & cyber tools.
- Need for secure digital communication during counter-terrorism operations and high-altitude deployments.
- Army's shift toward network-centric warfare → requires high-bandwidth battlefield communication.
- Long-standing gaps in the TCS program needed a technological substitute.
- Strategic requirement to reduce foreign dependence for defence electronics.

RECENT DEVELOPMENTS

- Army placed its first large-scale order with BEL for SDRs.
- Navy and Air Force already inducted variants of SDR earlier; Army's variant is optimised for rugged terrain.
- Multi-service trials in deserts, mountains, high-altitude areas completed successfully.
- Integration with Army Radio Engineered Network (AREN) and future Unified Network underway.
- DRDO & BEL working on additional variants: handheld SDR, manpack SDR, vehicular SDR.

CHALLENGES

- Need for extensive user training for digital systems.
- Cybersecurity hardening required to prevent complex hacking attempts.
- Ensuring interoperability across Army's diverse platforms.
- Upgrading existing command-and-control systems to fully exploit SDR's capabilities.
- BEL's production must match Army's long-term fleet requirements.

IMPACT ON INDIA

- Enhances operational readiness along borders (LAC, LoC).

- Strengthens counter-insurgency operations through real-time communication.
- Boosts India's indigenous defence electronics ecosystem.
- Acts as a stepping stone for future AI-enabled communication networks.
- Enhances jointness under future Theatre Commands.

INTERNATIONAL RELEVANCE

- SDRs are standard in advanced militaries (US, NATO, Israel).
- India joins the group of countries with indigenous military SDR capability.
- Enhances India's prospects for defence exports to friendly nations.
- Strategic signalling of India's move toward self-reliant digital military architecture.

LEGAL / CONSTITUTIONAL PROVISIONS

- Defence procurement governed by Union List (Entry 1, 2).
- Guided by Defence Acquisition Procedure (DAP).
- Cyber and digital communications oversight under:
    - IT Act 2000
    - National Cyber Security Policy
    - Defence Cyber Agency regulations.

COMMITTEE RECOMMENDATIONS | EXPERT VIEWS

- Parliamentary Standing Committee on Defence: Push for indigenisation of communication systems.
- **IDSA:** SDRs essential for joint operations & tactical mobility.
- **NITI Aayog:** Defence digitalisation is a catalyst for India's electronics manufacturing.
- **Military experts:** SDRs are the foundation for AI, UAV control, and real-time battlefield awareness.
- **EPW:** Emphasises ethical and secure handling of battlefield data.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN INITIATIVES

- **Atmanirbhar Bharat (Defence Manufacturing)**
  - SDRs part of the larger push toward indigenous electronics & communication systems.
- **Defence Acquisition Procedure (DAP) – Indigenisation Categories**
  - SDR procurement falls under 'Buy (Indian)' category → boosts domestic capability.
- **DRDO's Spectrum & Communication Roadmap**
  - Includes secure waveform development, quantum-safe communication research, SDR-based tri-service communication.

- **BEL's Defence Communication Portfolio**
    - Already supplies radars, electronic warfare systems, naval communication → SDR integrates seamlessly into ecosystem.
- **Tri-Service Network Modernisation**
    - SDR will be integrated into:
        - AFNET (IAF)
        - Naval Communication Network
        - Army's TCS & BMS

GLOBAL / INTERNATIONAL INITIATIVES

- **NATO SDR Standards (JTRS / SCA)**
    - Software Communications Architecture (SCA) sets global standards for military SDRs.
- **Wassenaar Arrangement**
    - Controls export of advanced military electronics; India's indigenisation reduces vulnerability.
- **International Cybersecurity Frameworks**
    - SDRs help armies meet modern cybersecurity criteria for encrypted, secure data flow.
- **U.S. & European SDR Programs (JTRS, ESSOR)**
    - India's SDR ecosystem comparable with global efforts toward interoperability and encrypted tactical comms.

CRITICISMS / CONCERNS

GOVERNANCE & POLICY CONCERNS

- Need for long-term life-cycle support arrangements.
- SDR adoption requires organisational and doctrinal changes.

ECONOMIC CONCERNS (NITI/WORLD BANK)

- High capital expenditure vs. stretched defence budget.
- Need for domestic component manufacturing to cut imports.

SECURITY CONCERNS (IDSA/ORF)

- SDRs must be hardened against cyber intrusions and EW attacks.

- Enemy jamming and spoofing technologies evolve rapidly.

OPERATIONAL CONCERNS

- Training soldiers for advanced digital systems is critical.
- Interoperability with existing analog radios may be limited initially.

WAY FORWARD

- Establish a National Military Communication Grid integrating SDRs, satellites, & secure fibre networks.
- Accelerate development of indigenous waveforms, encryption protocols & anti-jamming capability.
- Enhance cyber-hardening of SDRs with AI-based intrusion detection.
- Scale production capabilities of BEL for fast delivery to all formations.
- Inter-service standardisation to ensure tri-service interoperability.
- Implement robust training modules for soldiers, signal corps, and communication engineers.
- Adopt lifecycle support contracts for repairs, upgrades, and software patches.
- Expand DRDO–private sector collaboration to develop SDR components in India.
- Integrate SDRs with drones, artillery, tanks, and infantry systems for real-time networked warfare.
- Develop Quantum-resistant encryption for future-proof security.

- Strengthen battlefield data governance policies to protect operational secrecy.
- Encourage exports to friendly nations through India's defence diplomacy.

PRELIMS BOOSTER NOTES

- **SDR** = Software Defined Radio → radio functions controlled by software, not hardware.
- **Developer:** DRDO's Defence Electronics Application Laboratory (DEAL).
- **Manufacturer:** Bharat Electronics Limited (BEL).
- **Advantages:** Multi-band, multi-mode, anti-jamming, encrypted comms, upgradable.
- **BEL:** A Defence PSU under Ministry of Defence.
- **DRDO:** Premier R&D agency; under Ministry of Defence (1958).
- **MANET:** Mobile Ad Hoc Network used in battlefield tactical communication.
- **Project 75, AFNET, TCS:** Major communication-modernisation backdrops.
- **DAP:** Defence Acquisition Procedure guiding procurement categories.
- **Old Systems Being Replaced:** Analog VHF/UHF radios.
- **Application:** Infantry, armoured units, artillery, UAV control, maritime ops.
- **JTRS:** US Joint Tactical Radio System (global SDR benchmark).
- **Wassenaar Arrangement:** Controls export of defence electronics; India is a member.

11 WHO RELEASES GUIDELINE ON GLP-1 USE FOR OBESITY TREATMENT

IN NEWS

On 1 December 2025, WHO issued its first-ever global guideline recommending the use of GLP-1 therapies for long-term treatment of obesity in adults.

The guideline covers commonly used GLP-1 agents — Semaglutide, Liraglutide, and Tirzepatide — allowing their conditional use, alongside lifestyle and behavioral therapy.

BACKGROUND & CONTEXT (100–150 WORDS)

Obesity affects over 1 billion people worldwide, and in 2024 alone caused around 3.7 million deaths globally, contributing to a rising burden of non-communicable diseases (NCDs). Until now, who's guidance for GLP-1 receptor agonists was limited to type 2 diabetes; in 2025, WHO added GLP-1 therapies to its Essential Medicines List for high-risk diabetes patients. Hindustan Times+1

Given the growing global obesity epidemic — expected to worsen unless addressed — and evidence from clinical trials showing substantial weight-loss and metabolic benefits with GLP-1 drugs, WHO responded to member state requests by issuing a new, comprehensive guideline on their use in obesity management.

The guideline also frames obesity as a chronic, relapsing disease requiring lifelong management — a shift from seeing it as merely a lifestyle issue.

KEY FACTS / KEY FEATURES

- **Definition:** Obesity defined as BMI ≥ 30 kg/m^2 in adults.
- **GLP-1 Therapies Covered:** Semaglutide, Liraglutide, Tirzepatide (also includes GLP-1/GIP dual agonists).

RECOMMENDATIONS:

- Conditional long-term treatment with GLP-1 therapies for adults with obesity (excluding pregnant women).
- **Weight-loss Impact:** Clinical evidence shows GLP-1 therapies may lead to 15–20% weight loss over a year — comparable to bariatric surgery outcomes.
- **Health Benefits Beyond Weight Loss:** Reduced risks for cardiovascular disease, kidney disease, metabolic disorders, sleep apnea, etc.
- **WHO's View:** Obesity is a chronic relapsing disease requiring long-term, comprehensive care — not a one-time intervention.
- **Conditional Grading:** WHO classifies the recommendations as conditional, citing limited long-term data, high cost, equity concerns, and health system readiness.

DETAILED MAINS ANALYSIS

CAUSES / DRIVERS FOR WHO'S GUIDELINE

- **Rapid rise in global obesity** — over 1 billion affected, rising NCD burden.
- **Strong clinical evidence:** GLP-1 therapies not only reduce weight but also improve metabolic parameters, lowering risk of diabetes, cardiovascular & kidney disease.
- **Need for global standardised care:** To help member states integrate obesity care into public health systems, especially low- and middle-income countries where obesity and NCDs are rising rapidly.
- Recognition of obesity as a chronic, relapsing disease rather than a lifestyle choice — shifts focus from blame to care and health-system response.

RECENT DEVELOPMENTS

- **December 2025:** WHO issues new GLP-1 guideline for obesity in adults.
- **Earlier in 2025:** GLP-1 therapies added to WHO Essential Medicines List (EML) for high-risk diabetes — paved the way for obesity recommendation.
- Growing global interest and demand for GLP-1 medicines; associated surge in prescription, media coverage, and policy debates around affordability, access, and equity.

CHALLENGES / RISKS

- **Equity & Access:** GLP-1 drugs are expensive; current global production capacity is inadequate. WHO estimates less than 10% of eligible individuals may be able to access them by 2030.
- **Health System Readiness:** Many countries (especially low-middle income) lack capacity for long-term obesity management — including follow-up, counseling, behavioral therapy, monitoring, affordability.
- **Limited Long-Term Data:** Long-term safety, maintenance, and outcomes of GLP-1 use in non-diabetic obese populations are still uncertain.
- **Cost—Benefit & Priorities:** For governments with constrained health budgets, deploying costly pharmacotherapy over population-level preventive measures may be difficult.
- **Risk of Over-Medicalization:** Treatment approach may overshadow need for primary prevention, social determinants, healthy food systems, urban planning, physical activity, etc.
- **Potential Side Effects:** Gastrointestinal issues, possibly rare but serious — long-term effects still being evaluated.

IMPACT ON INDIA – AND GLOBALLY

- **Public Health Implication:** India faces rising prevalence of obesity, diabetes and cardiovascular disease — WHO guideline gives India a template to integrate pharmacotherapy into NCD management.
- **NCD burden reduction:** If used judiciously, GLP-1 therapies can help reduce complications — diabetes, hypertension, heart disease — thereby reducing morbidity, mortality and healthcare burden.
- **Health System Strengthening Opportunity:** India can leverage its manufacturing base (pharma, generics) to produce affordable GLP-1 or generics — improving access.

- **Holistic Obesity Management Approach:** Moves policy attention from only lifestyle counselling to a comprehensive "lifelong obesity-care ecosystem" combining prevention, treatment, counselling, chronic-care follow-up.
- **Global Trendsetter:** WHO's endorsement may prompt other countries (especially LMICs) to adopt similar guidelines; could lead to broader framing of obesity as a chronic disease rather than moral/lifestyle failure.

INTERNATIONAL RELEVANCE

- **For global health governance** — this guideline signals a shift: obesity enters clinical treatment protocols globally, not just prevention.
- Increases demand for GLP-1 therapies worldwide → affects supply, generics, patent negotiations, global access & equity debates.
- Encourages international cooperation on obesity, NCDs, and equitable access to essential medicine — especially in low- and middle-income countries.
- May influence insurance, public-health funding, and global health policy — e.g., inclusion of obesity treatment in Universal Health Coverage (UHC) schemes.

LEGAL / INSTITUTIONAL / POLICY CONTEXT

- **WHO guideline is advisory** — adoption depends on national health policies, regulatory approvals (drugs), public health financing, supply chain, and health-system readiness.
- Countries will need to design obesity-care frameworks embedding GLP-1 therapy along with diet, lifestyle support, NCD management — similar to chronic disease management models (e.g., for diabetes, hypertension).
- **Intellectual property, pricing, generics, access**: Given high cost, India & other developing countries may need to invoke TRIPS flexibilities, generic production, pooled procurement.
- Ethical & equity concerns around access must be addressed, to avoid creating a treatment divide between rich and poor.

EXPERT / THINK TANK PERSPECTIVES & RECOMMENDATIONS

- **Global public health experts** — view guideline as "game-changer", but caution medication alone won't solve obesity; structural and social determinants must be addressed. Health economists / equity advocates — stress the need for affordable pricing, generic production, pooled procurement so as not to exacerbate health inequities.

- **Clinical researchers** — call for more longitudinal studies on long-term safety, maintenance, and effects on comorbidities (kidney, cardiovascular, mental health).
- **Public health policy experts** — recommend embedding GLP-1 therapy within comprehensive obesity-management programmes (prevention, behavioral therapy, follow-up), not as standalone solution.

GOVERNMENT & GLOBAL INITIATIVES / RESPONSES

GLOBAL / WHO-LED

- The new guideline represents a global standard of care for obesity treatment — encourages countries to integrate pharmacotherapy into national obesity & NCD programmes.
- WHO recommends a comprehensive "obesity-care ecosystem": screening, early diagnosis, behavioural therapy, pharmacotherapy, management of comorbidities, long-term follow-up.

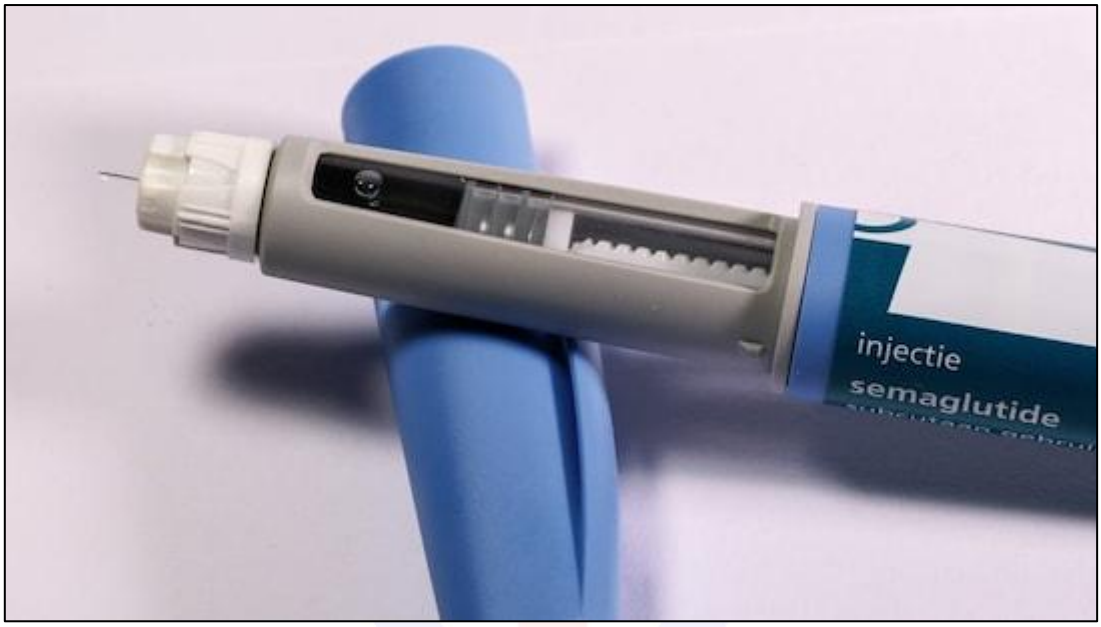
POTENTIAL IMPLICATION FOR INDIA

- **India** — with its large burden of obesity, diabetes, hypertension — may consider integrating GLP-1 therapies into public health/NCD programmes, especially for high-risk individuals.
- Could enable domestic manufacturing / generics production, leveraging India's pharma strengths — enabling affordable access.
- Need to develop guidelines at national level (ICMR / Ministry of Health) for prescription, monitoring, lifestyle counselling, and long-term follow-up.
- Opportunity to mainstream obesity as a public health priority (beyond just sugar/diabetes control), with budgetary focus and public awareness campaigns.

CRITICISMS / CONCERNS

- **Equity Concern:** As WHO itself notes, ≤ 10% of eligible global population might have access by 2030 — risk of widening health inequities.
- **Health-system Constraint:** Many countries, especially LMICs like India, may lack infrastructure for regular follow-up, behavioural therapy, side-effect monitoring — could lead to misuse or suboptimal outcomes.
- **Cost-Benefit & Sustainability:** High cost of drugs + lifelong need vs uncertain long-term benefits. Public health budgets are limited — risk of diverting resources from preventive measures.

- **Medicalization Risk:** Overemphasis on pharmacotherapy may overshadow need for dietary changes, food policy, urban planning, public health interventions addressing obesity's root social determinants.
- **Safety & Long-Term Data Gaps:** Evidence of long-term efficacy, safety, maintenance, discontinuation effects, and rare adverse events remains limited.



WAY FORWARD

- **Adopt National Obesity Strategy:** Recognise obesity as chronic disease and integrate into NCD programmes with multi-pronged care, including GLP-1 therapy.
- **Ensure Affordable Access:** Promote generic production, pooled procurement, price regulation, and subsidies for lower-income patients.
- **Strengthen Health Systems:** Build capacity for long-term obesity care — screening, behavioral therapy, follow-up, side-effect monitoring.
- **Complement with Preventive Measures:** Invest in public health infrastructure — healthy food policies, urban design for physical activity, public awareness.
- **Monitoring & Research**: Establish registries to track long-term outcomes, side-effects, cost-effectiveness of GLP-1 therapy in real-world settings.
- **Equitable Distribution:** Prioritise access for high-risk and vulnerable populations; avoid widening health inequality.
- **Public Education:** Campaign to frame obesity not as moral failure but chronic disease — reduce stigma and encourage treatment.

- **Regulatory Oversight:** Ensure strict clinical guidelines, avoid over-the-counter misuse, regulate marketing and off-label use.
- **Insurance & Public Financing:** Include obesity care (medication + support) under national health insurance / Ayushman Bharat / universal coverage schemes.
- **Intersectoral Approach:** Collaborate across sectors — health, urban planning, food & agriculture, education — for holistic obesity control.
- **Global Collaboration:** Engage in patent pooling, technology transfer, manufacturing capacity building to scale up global access.
- **Periodic Guideline Revision:** As new evidence emerges, update national protocols — adapt to safety, effectiveness, equity data.

PRELIMS BOOSTER NOTES

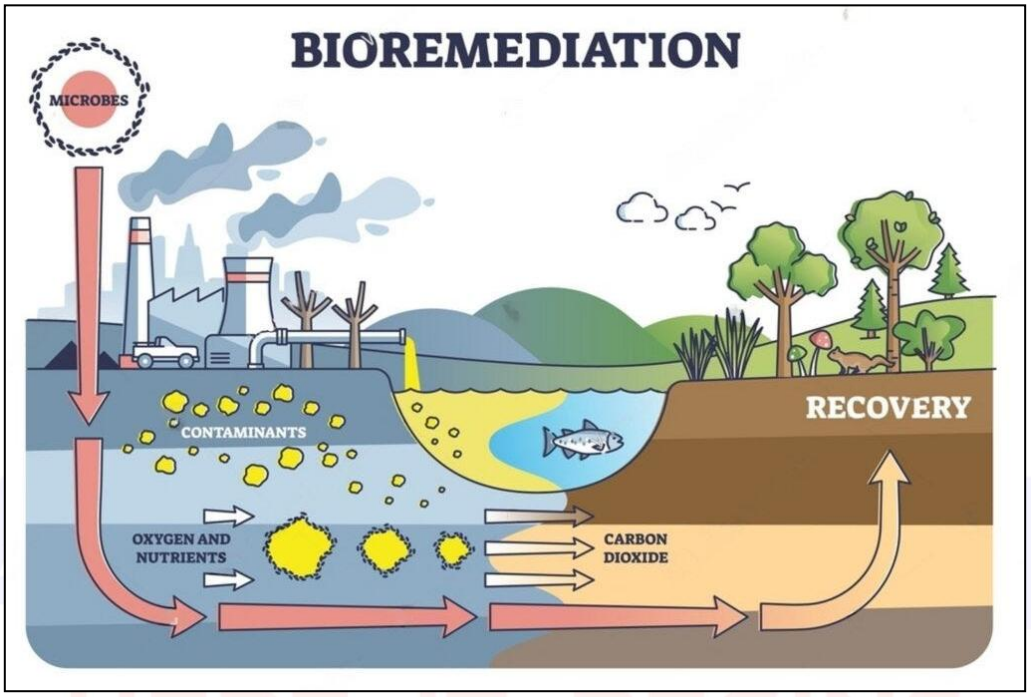
- **Obesity Global Burden:** > 1 billion people obese worldwide; ~3.7 million deaths in 2024.
- **BMI Threshold (Adults):** ≥ 30 kg/m^2 defines obesity (WHO guideline) for GLP-1 therapy.
- **GLP-1 receptor agonists covered:** Semaglutide, Liraglutide, Tirzepatide (and GLP-1/GIP dual agonists).
- **Weight-loss efficacy:** 15–20% weight reduction, comparable to bariatric surgery outcomes.
- **Recommendation type:** Conditional long-term use + lifestyle/behavioural therapy.
- **Access Challenge:** WHO estimates < 10% of eligible individuals may access therapy by 2030.
- **Comprehensive care recommended:** Obesity defined as chronic, relapsing disease — need lifelong care, comorbidity management, multimodal interventions.
- **Not a standalone solution:** Medication must be combined with behavioral therapy (diet, exercise, counseling).
- **Beyond weight loss:** GLP-1 therapies may reduce risks of heart disease, kidney disease, metabolic disorders, sleep apnea.
- **Drugs previously for Type 2 Diabetes:** GLP-1 drugs first used as glucose-lowering agents; weight-loss benefit observed later.

12 BIOREMEDIATION IN INDIA

IN NEWS

Bioremediation has become central to India's environmental strategy as several polluted rivers, lakes, and landfills are being treated using microbial consortia, phytoremediation, fungal technologies, and enzyme-based degradation under programs such as Namami Gange, Swachh Bharat Mission 2.0, NMCG, and urban lake rejuvenation projects in Bengaluru, Hyderabad, Delhi, and Lucknow.

Major scientific breakthroughs by CSIR-NEERI, DBT, IIT Bombay, IIT Delhi, TERI, NBRI have been deployed on-ground to clean drains, treat industrial effluents, reduce landfill leachate, degrade plastics, and detoxify mining sites.



BACKGROUND & CONTEXT

India faces enormous pollution pressure due to rapid urbanization, industrialization, and poor waste treatment systems. According to CPCB (2023):

- 351 polluted river stretches exist in India.
- India generates over 72,000 MLD of sewage, but over 65% remains untreated.
- 321 contaminated sites identified under the National Clean Energy Fund (NCEF).
- Plastic waste increased 3x in the last decade.
- Mining states like Jharkhand, Odisha, Rajasthan face severe heavy metal contamination (As, Pb, Hg, Cr(VI)).

Traditional remediation methods—land excavation, incineration, chemical oxidation, physical filtration—are expensive, energy-intensive, and produce secondary pollution. Bioremediation offers a sustainable alternative by using microbes, fungi, algae, plants, and enzymes to break down toxic pollutants into harmless products (CO_2, water, biomass).

India's scientific institutions (CSIR, DBT, TERI, IITs, ICAR) have developed advanced indigenous bioremediation systems that are now being deployed in real polluted ecosystems — a major shift toward Nature-Based Solutions (NbS).

KEY FACTS / KEY FEATURES OF BIOREMEDIATION

WHAT IS BIOREMEDIATION?

A process that uses living organisms to degrade, detoxify, transform or immobilize pollutants:

- **Bacteria** – Pseudomonas, Bacillus, Acinetobacter
- **Fungi –** Aspergillus, Penicillium, White-rot fungi
- **Algae** – Cyanobacteria, microalgae
- **Plants** – Vetiver grass, water hyacinth, duckweed
- **Enzymes** – Laccase, peroxidase

TYPES OF BIOREMEDIATIONS

BIOAUGMENTATION

- Adding specific strains of pollutant-degrading microbes.
- Used by NEERI in drain remediation in Kanpur, Varanasi, Nagpur.

BIOSTIMULATION

- Adding nutrients like nitrogen/phosphorus to stimulate existing microbes.

BIOVENTING

- Controlled oxygen supply used for petroleum hydrocarbon spills in soil.

BIOLEACHING

Microbes remove heavy metals; used in mining belts of:

- Jharkhand (chromium)
- Rajasthan (lead)
- Goa (iron ore tailings)

PHYTOREMEDIATION

Plants absorb pollutants; examples:

- Vetiver grass for heavy metals
- Water hyacinth for nitrates & phosphates
- Duckweed for ammoniacal nitrogen
- Sunflower used for radionuclide removal (Chernobyl case)

MYCOREMEDIATION (FUNGAL REMEDIATION)

- White-rot fungi degrade pesticides, plastics, dyes.

BIODEGRADATION OF PLASTICS

India is researching:

- Ideonella sakaiensis enzymes
- Mealworm gut bacteria
- PETase enzymes (IIT Roorkee)

KEY INDIAN INSTITUTIONS & INNOVATIONS

Institution	Innovations
CSIR-NEERI	Phytoremediation, biofilters, microbial consortia
CSIR-IITR	Heavy metal detoxification

DBT	Ganga River Bio-clusters
TERI	Oil spill microbial remediation
IIT Delhi	Algal bioreactors
NBRI	Phytoremediation using bamboo & vetiver
ICAR	Soil bioremediation for agricultural pollution

DETAILED MAINS ANALYSIS

CAUSES BEHIND RISING BIOREMEDIATION DEMAND

- **Toxic Rivers:** Daily discharge of untreated sewage and industrial effluents. E.g., CPCB 2024 reports ~72% of India's river stretches are polluted.
- **Industrial Legacy Waste:** Oil spills, chemical dumps, pesticide residues contaminate soil and groundwater. E.g., 1,700+ contaminated sites identified by CPCB (2023).
- **Heavy Metal Hotspots:** Chromium, arsenic and lead levels exceeding safe limits in many industrial clusters. E.g. Kanpur tannery belt groundwater exceeds WHO chromium limits by 100–250x.
- **Low-cost Alternative:** Cheaper than physical clean-up or chemical neutralisation. E.g., Costs drop by 60–70% vs conventional remediation (MoEFCC estimate).

RECENT DEVELOPMENTS IN INDIA

- Namami Gange uses 250+ bioremediation projects to treat small drains before they reach the Ganga.
- Bengaluru lakes (Bellandur, Varthur) treated using floating islands with microbial roots.
- IIT-Madras developed enzyme-based plastic digesters.
- CSIR-NEERI's phyco-remediation using algae for sewage reduces BOD by 80–90%.
- Delhi uses bioremediation for Yamuna floodplain wetlands.
- Goa uses fungal strains for hydrocarbon degradation at oil-handling facilities.
- Indian Railways uses bio-toilets developed by DRDO using anaerobic bacteria.

CHALLENGES

- Slower process vs chemical treatment.
- Effectiveness depends on temperature, pH, pollutant concentration.
- Difficult for mixed industrial pollutants.
- Requires long-term monitoring by trained teams.
- Public agencies prefer quick-fix engineering solutions.
- Risk of invasive species in phytoremediation (e.g., uncontrolled water hyacinth).
- Lack of regulatory standards for microbial agents.
- Limited public awareness & institutional capacity.

IMPACT ON INDIA

- Reduces pollution load significantly in urban & industrial zones.
- Lower-cost alternative compared to physical or chemical remediation.
- Helps India meet Paris Agreement commitments by reducing methane & CO_2 emissions from dumpsites.
- Supports circular economy: wastewater → biomass → biofuel.
- Provides livelihood opportunities (wetland restoration, eco-startups).
- Enhances climate resilience through restored ecosystems.

INTERNATIONAL RELEVANCE

- Matches global shift to Nature-Based Solutions (NbS) endorsed by UNEA, UNFCCC.
- Many countries use similar models:
  - **USA** – oil spill bioremediation
  - **Japan** – river algae systems
  - **Australia** – wetland restoration
- India emerging as a leader in tropical phytoremediation.

LEGAL & POLICY FRAMEWORK

- Environment (Protection) Act, 1986
- Water Act, 1974
- Solid Waste Management Rules, 2016
- Plastic Waste Rules, 2016
- National Green Tribunal (NGT) directives on river cleaning & landfill remediation
- Biodiversity Act, 2002 – regulates use of biological resources

COMMITTEE RECOMMENDATIONS & EXPERT OPINIONS

NITI Aayog: promote decentralized wastewater treatment using bioreactors.

- **CPCB:** adopt microbial consortia for polluted river stretches.
- **EPW Scholars:** stress on regulating genetic and microbial interventions.
- **IDSA:** warns about security implications of uncontrolled bio-agents.
- **UNEP:** recommends ecosystem-based remediation for climate resilience.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIAN GOVERNMENT INITIATIVES

- **Namami Gange Mission**
  - Uses 50+ bio-remediation projects per state
  - Microbial action reduces BOD, COD, coliform levels
- **Swachh Bharat Mission 2.0**
  - Promotes bioremediation for dumpsite reclamation
  - Bio-mining widely implemented at Ghazipur, Deonar, Indore
- **NMCG – Drain Treatment**
  - Uses floating wetlands, algae, biofilms to treat drains
  - Prevents sewage flow into Ganga and Yamuna
- **DBT's "Microbial Prospecting Program"**
  - Develops microbes for heavy metals and pesticide degradation
- **Atal Mission for Rejuvenation of Urban Transformations (AMRUT 2.0)**
  - Encourages nature-based sewage treatment
- **State Government Projects**
  - Telangana – Musi River clean-up using bioremediation
  - Karnataka – Lake rejuvenation using floating treatment wetlands

GLOBAL INITIATIVES

- UNEP Nature-Based Solutions guidelines
- UNFCCC Carbon-Sinks Promotion
- Global Phytotechnology Network collaborations
- International Phytoremediation Society

CRITICISMS / CONCERNS

- Bioremediation effectiveness varies; may fail for toxic industrial waste.
- Some microbes/plants may have unintended ecological impacts.
- Public agencies may misuse the term "bioremediation" to cover poor management.
- Lack of uniform national standards for deploying microbial formulations.

- Potential for antibiotic resistance transfer in microbial systems.
- Enforcement gaps allow industries to substitute cheap, inadequate biological treatment systems.

WAY FORWARD

- Create National Bioremediation Standards under CPCB.
- Expand microbial culture banks in CSIR, DBT labs.
- Promote public–private partnerships for large-scale river/lake cleaning.
- Strengthen environmental monitoring using remote sensing & AI.
- Introduce mandatory ecological impact assessment for bioremediation projects.
- Incentivise startups under Waste-to-Wealth Mission.
- Adopt wetland-based sewage treatment in all Class-I cities.
- Deploy phytoremediation belts around industrial zones.
- Use bioremediation in mining reclamation under DMF funds.
- Integrate bioremediation into National Climate Adaptation Policy.
- Encourage community participation in wetland maintenance.
- Promote bio-mining of legacy waste in every municipality.

PRELIMS BOOSTER NOTES

- Bioremediation = using living organisms to detoxify pollutants.
- In situ vs ex situ bioremediation — in situ preferred for rivers/soils.

- Key microbes: Pseudomonas, Bacillus, Aspergillus, white-rot fungi.
- Bioleaching removes metals like As, Cr, Pb.
- Phytoremediation species: vetiver, water hyacinth, bamboo.
- CSIR-NEERI = leader in bioremediation research.
- Namami Gange = largest river bioremediation programme in world.
- DRDO bio-digesters used in Indian Railways.
- Bio-mining reduces methane emissions from landfills.
- Mycoremediation: fungal degradation of pesticides and dyes.
- PETase enzyme – plastic degradation; discovered in Japan.
- Water Act 1974 governs water pollution control.
- NGT plays key role in enforcing bioremediation projects.
- CPCB identifies polluted river stretches.

SDGs related: SDG-6 (clean water), SDG-11 (sustainable cities), SDG-13 (climate action), SDG-15 (life on land).

13 ROCK EAGLE-OWL

Telangana Forest Department halted quarrying activities after discovering a Rock eagle-owl nest containing five eggs on a cliff.

ROCK EAGLE-OWL (BUBO BENGALENSIS)

The Rock eagle-owl, also known as the Indian or Bengal eagle-owl, is a large horned owl species endemic to the Indian Subcontinent.

- **Appearance:** It is characterized by brown-grey plumage, a distinct white throat patch, deep orange-yellow eyes, and prominent horn-like ear tufts.
- **Habitat Preference:** The owl inhabits rocky outcrops, scrub forests, ravines, and semi-arid landscapes. It strictly avoids humid evergreen forests and extremely arid regions.
- **Distribution:** The range spans the Indian Subcontinent, including India, Nepal, Bangladesh, & Pakistan.
- **Ecological Role:** As an apex predator, it regulates rodent populations and acts as a natural pest controller in agricultural landscapes.
- **Nesting Behaviour:** It does not build nests; instead, it lays eggs in scrapes on bare soil, natural ledges, or rocky cliffs.
- **Threats:** Habitat loss, electrocution on powerlines, illegal trade, superstition-driven persecution, etc.
- **Conservation Status:** IUCN: Least Concerned, CITES: Appendix II, WPA: Schedule I

14 INDIA'S NEW CLIMATE STRATEGY

IN NEWS

India has initiated the process of drafting and finalising its next Nationally Determined Contribution (NDC) under the Paris Agreement, which will outline India's climate targets up to 2035.

The NDC will be submitted to the UNFCCC before 2025 and will replace or update existing commitments (set for 2030).

The process involves consultations with MoEFCC, NITI Aayog, state governments, scientific institutions, and industry bodies.

BACKGROUND & CONTEXT

The Paris Agreement (2015) requires all Parties to submit progressively ambitious Nationally Determined Contributions (NDCs) every 5 years. India submitted its first NDC for 2021–2030 and updated it in 2022, emphasising renewable energy, emissions intensity reduction, and carbon sinks.

India is the world's 3rd largest emitter, but with very low per-capita emissions, and has committed to achieving Net Zero by 2070. The next NDC (2025–2035) will define India's climate pathway through the next decade, a period marked by rapid urbanisation, energy demand growth, and industrial expansion.

This NDC must integrate new developments:

- Green Hydrogen Mission, Battery Storage Policy, Renewable Energy Capacity expansion,
- India's stand on climate finance, loss & damage,
- COP28 decisions on Global Stocktake (GST) and tripling renewable energy globally.

The upcoming NDC will balance environmental sustainability, developmental needs, energy security, and geopolitical expectations on climate ambition.

SEVEN-PILLAR PLAN TO STRENGTHEN INDIA'S DECARBONISATION PATHWAY

- **Emission Intensity Reduction:** Aim to cut emissions intensity of GDP by 65% from 2005 levels by 2035, giving India a clear peaking year and political credibility in global climate negotiations.
- **Massive Renewable Expansion:** Raise non-fossil capacity share to ~80% of total power by 2035, with 1,200 GW of solar and wind supported by 170 GW energy storage.
- **Managed Coal Transition:** Stop commissioning new unabated coal plants after 2030, gradually reducing coal capacity while ensuring just transition for mining states.
- **Electrification of Transport:** Shift rail traction to near-100% electric, target 50% electric buses in urban fleets, and accelerate full conversion of three-wheelers to EVs.
- **Carbon Credit Trading System Rollout:** Operationalize the Carbon Credit Trading Scheme (CCTS) from April 2026 and gradually expand coverage to power and medium-scale industries.
- **Grid & Price Reforms:** Move away from fixed Power Purchase Agreements to exchange-based dynamic pricing and adopt time-of-day tariffs to handle renewable variability.
- **$62 Billion Annual Climate Investment:** Mobilise ~$62 billion/year (0.84% of GDP) for 2026–2035, with 80% from domestic capital and 20% from international green finance support.

INDIA'S PANCHAMRIT GOALS AT COP26 UNFCCC

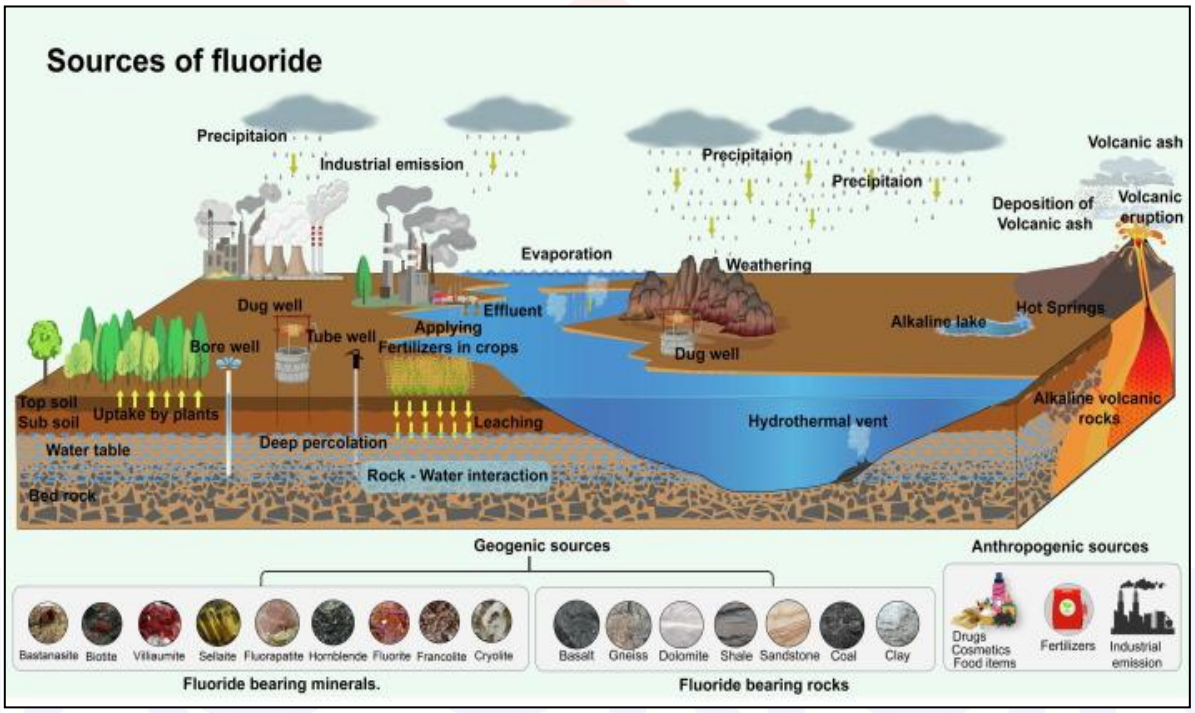
- India will reach 500 gigawatts of installed non-fossil electricity capacity by 2030.
- 50% of India's total energy requirements will come from renewable energy sources by 2030.
- India will reduce 1 billion tonnes of cumulative projected carbon emissions between 2021–2030.
- India will reduce emissions intensity of GDP by 45% from 2005 levels by 2030.
- India will achieve net-zero greenhouse gas emissions by 2070.

15 FLUORIDE CONTAMINATION

IN NEWS

Multiple states including Rajasthan, Telangana, Andhra Pradesh, Karnataka, Gujarat, Assam, Odisha have recently reported rising fluoride levels in groundwater, crossing the permissible limit of 1.5 mg/L set by BIS and WHO.

New findings from CGWB, state water boards, and public health institutions warn of growing cases of dental and skeletal fluorosis, especially in rural areas with dependence on borewells.



BACKGROUND & CONTEXT (150–180 WORDS)

Fluoride is a naturally occurring element found in rocks, soils, and groundwater. At low concentrations (0.5–1 mg/L), it is beneficial for dental health. However, excess fluoride (>1.5 mg/L) leads to fluorosis, a chronic public health problem in India.

Geogenic contamination occurs when fluoride-bearing minerals such as fluorite, apatite, cryolite dissolve into groundwater under alkaline, hard, and high-temperature conditions. Anthropogenic factors like industrial emissions, phosphate fertilizers, and coal burning can aggravate the problem.

India is among the world's worst-affected countries, with over 20 states reporting fluoride contamination and nearly 11 million people exposed to health risks. Dependence on deep borewells, declining groundwater levels, and limited piped drinking water supply in rural areas worsen the crisis.

The government has initiated several programmes, including the National Programme for Prevention and Control of Fluorosis (NPPCF) and Jal Jeevan Mission, to ensure safe drinking water. Despite this, fluorosis remains deeply entrenched due to socio-economic vulnerabilities and inadequate water-quality monitoring.

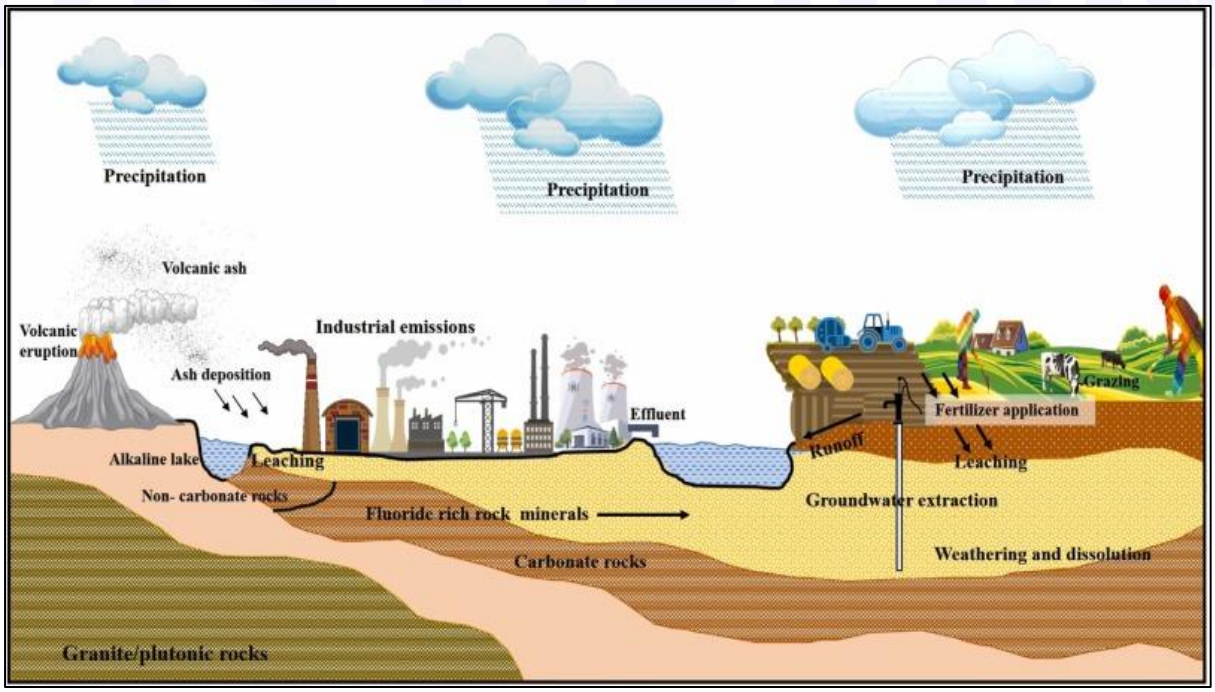
FLUORIDE

- Fluoride is a naturally occurring mineral found in soil, water, plants, and living organisms
- It offers dental health benefits in trace amounts, but excessive intake results in fluorosis.
- Safe Limits: WHO prescribes 1.5 mg/L; the Bureau of Indian Standards sets 1.0 mg/L as desirable and 1.5 mg/L as the maximum permissible limit in drinking water.
- Source of Contamination: Groundwater leaching of fluoride-bearing minerals like fluorspar, cryolite, fluorapatite, and granite.

KEY FACTS / KEY FEATURES (SOURCES OF FLUORIDE CONTAMINATION)

GEOGENIC (NATURAL) SOURCES

- Fluoride-rich rocks: granite, basalt, gneiss
- Weathering of minerals: fluorite (CaF_2), apatite, cryolite
- Groundwater from deep aquifers
- High alkalinity & temperature accelerate dissolution



ANTHROPOGENIC SOURCES

- Brick kilns
- Aluminum smelting
- Phosphate fertilizers
- Industrial effluents

FLUORIDE LIMITS

- BIS & WHO Permissible Limit: 1.5 mg/L
- Desirable Limit: 1 mg/L
- Above 3–5 mg/L → crippling skeletal fluorosis

MOST AFFECTED STATES

- Rajasthan (worst affected)
- Telangana
- Andhra Pradesh
- Karnataka
- Gujarat
- Haryana
- Madhya Pradesh
- Odisha
- Assam
- Uttar Pradesh
- Nearly 150+ districts are affected.

DISEASES CAUSED

DENTAL FLUOROSIS

- Yellow/brown stains
- Pitting of enamel
- Common among children

SKELETAL FLUOROSIS

- Stiff joints
- Bone deformities

- Limited mobility
- Permanent disability

NON-SKELETAL FLUOROSIS

- Gastrointestinal problems
- Kidney issues
- Anemia
- Neurological symptoms

DETAILED MAINS ANALYSIS

CAUSES BEHIND RISING FLUORIDE CONTAMINATION

- **Over-extraction of groundwater:** lowering water table increases concentration.
- **Climate change:** increased evaporation → higher fluoride concentration.
- **Geological factors:** prevalence of fluoride-bearing minerals.
- Lack of safe drinking water infrastructure in rural belt.
- Poor water governance by PRIs, boards, and state agencies.
- Lack of awareness & health-seeking behavior.

RECENT DEVELOPMENTS

- CGWB flagged over 5% of India's groundwater samples as unsafe for fluoride.
- Jal Jeevan Mission targeting 100% tap water in rural areas has identified fluoride hotspots.

- Rajasthan launched Fluoride Mitigation Projects using Nalgonda technique.
- NEERI developed newer adsorption and membrane-based defluoridation systems.
- AIIMS & ICMR documenting newer cases of early skeletal fluorosis among children.

CHALLENGES IN MITIGATION

HYDROLOGICAL CHALLENGES

- Deep aquifers continuously release fluoride.
- Rainwater recharge insufficient due to hard rock regions.

SOCIO-ECONOMIC CHALLENGES

- Rural poor depend on handpumps → high exposure
- Lack of medical detection in early stages
- Women & children disproportionately affected

GOVERNANCE CHALLENGES

- Fragmented water governance
- Limited lab-testing & monitoring
- Poor coordination between Health–Water–Rural Development ministries

TECHNICAL CHALLENGES

- Defluoridation plants require maintenance & skilled personnel
- Many plants become non-functional within months

IMPACT ON INDIA

PUBLIC HEALTH IMPACT

- Permanent disability in severe fluorosis cases
- High burden in rural and tribal areas
- Reduced quality of life and productivity

ECONOMIC IMPACT

- Loss of workforce productivity
- High medical cost

- Impact on agriculture & livestock health

SOCIAL IMPACT

- Stigmatization in communities
- Reduced school attendance among affected children

INTERNATIONAL RELEVANCE

- Fluorosis is prevalent in East Africa, China, Sri Lanka, Mexico.
- WHO recognizes fluorosis as a major neglected public health issue.

LEGAL / POLICY FRAMEWORK

- Bureau of Indian Standards (IS:10500) drinking water standards
- Jal Jeevan Mission
- National Rural Drinking Water Programme
- NPPCF (National Programme for Prevention and Control of Fluorosis)
- CGWB groundwater guidelines
- Swachh Bharat Mission for sanitation–water linkage

GOVERNMENT & GLOBAL INITIATIVES

INDIAN GOVERNMENT INITIATIVES

- **NPPCF (2008):** Monitoring + treatment + defluoridation.
- **Jal Jeevan Mission (2019):** Piped water to all households.
- Nalgonda Technique (popular defluoridation method):
    - Uses alum + lime
    - Cost-effective
- ICMR & AIIMS Fluorosis Surveillance
- CGWB Aquifer Mapping Programme
- Fluoride Mapping through Bhuvan Portal (ISRO)
- National Water Quality Sub-Mission

GLOBAL INITIATIVES

- WHO Water Quality Guidelines
- UNICEF Water Safety Plans

- Defluoridation using activated alumina, bone char, and reverse osmosis.

CRITICISMS / CONCERNS

- NPPCF underfunded & uneven implementation
- Poor maintenance of village defluoridation units
- Community participation minimal
- Overemphasis on treatment rather than prevention
- Lack of coordinated multi-sectoral approach
- Climate change exacerbating groundwater crisis

WAY FORWARD

- Accelerate Jal Jeevan Mission in fluoride-affected districts.
- Promote rainwater harvesting & aquifer recharge.
- Use solar-powered defluoridation plants for sustainability.
- Increase real-time water quality monitoring using IoT sensors.
- Strengthen NPPCF with dedicated funding.
- Promote alternative safe water sources (surface water supply).
- Conduct mass awareness campaigns about early fluorosis signs.
- Training ASHAs & ANMs for early detection.
- Integrate fluoride mitigation into school health programmes.
- Encourage low-fluoride crop strains in affected regions.
- Scientific fluoride mapping at village-level using GIS.

- Create a National Fluorosis Eradication Strategy.

PRELIMS BOOSTER

- Fluorosis = irreversible disease due to excess fluoride exposure
- Limit: 1.5 mg/L (WHO & BIS)
- Worst affected: Rajasthan
- Nalgonda Technique = inexpensive defluoridation method
- Fluoride-bearing minerals: Fluorite, Apatite, Cryolite
- NPPCF implemented by: Ministry of Health & Family Welfare
- Jal Jeevan Mission implemented by: Jal Shakti Ministry
- Fluoride is more soluble in alkaline groundwater
- Bone char and activated alumina widely used for defluoridation
- NEERI developed low-cost electrocoagulation fluoride removal unit

16 HEALTH AND NATIONAL SECURITY CESS ON DEMERIT GOODS

The Union Finance Minister introduced the Health Security Se National Security Cess Bill, 2025, proposing a cess on demerit goods such as pan masala.

HEALTH SECURITY SE NATIONAL SECURITY CESS BILL, 2025

- The Cess is a proposed levy to replace the GST compensation cess on specified "sin goods ".
- It keeps the overall tax burden on demerit goods unchanged after the GST compensation cess ends.
- The cess aims to mobilise resources for (1) public health programmes and (2) national security.
- It is calculated on the production capacity of manufacturing machines, rather than on output volume.
- The proceeds are credited to the Consolidated Fund of India and are not shared with States.

ARGUMENTS CITED FOR INTRODUCING THE BILL

- **Dedicated Funding Stream:** Creates a predictable, ring-fenced source for national security infrastructure and health-related programmes.
- **Public Health Deterrence:** Higher rates on harmful products are expected to discourage consumption of demerit goods (similar to tobacco taxation logic).

- **Transparency Assurance:** Government claims this is the first legislation where the use of each rupee collected is explicitly earmarked for two public priorities.
- **Plugging Tax Evasion:** Machine-linked and capacity-based cess may reduce producer under-reporting in the pan masala sector (which is traditionally cash-intensive and informal).

ISSUES RAISED AGAINST THE PROPOSED BILL

- **Cessification Concerns:** Critics call it "cessification of governance", arguing India increasingly relies on cesses that are not shared equitably with States per the Constitution's tax-sharing mechanism.
- **MSME Burden:** Capacity-based taxation may hit small manufacturers disproportionately because liability depends on installed machines, not actual sales volume.
- **Inspector Raj Risk:** Capacity verification may revive bureaucratic discretion, raids, and harassment, undermining ease of doing business.
- **Revenue Utilisation Ambiguity:** Over ₹1.25 lakh crore collected under various cesses between 2010–2020 remained either unspent or diverted, as flagged by CAG audits.
- **Behavioural Effect Doubts:** MPs questioned whether taxing pan masala has a meaningful impact on reducing consumption, suggesting stricter controls or bans instead.

17 S-500 PROMETHEUS AIR DEFENCE SYSTEM

IN NEWS

Russia has accelerated deployment and international showcasing of the S-500 "Prometheus" Air Defence System, its most advanced long-range, multi-layered missile defence system.

The system is seen as a successor to the S-400 and is designed to counter stealth aircraft, hypersonic missiles, ballistic missiles, UAVs, and low-orbit satellites.

Global attention has increased due to potential exports (including reported interest from India, China, and Middle Eastern states) and its implications for global strategic stability.

Ahead of President Vladimir Putin's visit, India is exploring possible procurement and co-production of Russia's next-generation S-500 Prometheus air and missile defence system.

BACKGROUND & CONTEXT

Russia has led global development in long-range integrated air defence systems (IADS), beginning with the S-75, evolving through S-200, S-300, and S-400. The S-500 "Prometheus" represents the next leap, designed for missile defence + space-target interception.

It is part of Russia's effort to build a multi-layered anti-access/area denial (A2/AD) shield to counter emerging threats from:

- Hypersonic glide vehicles
- ICBMs

- Low-observable (stealth) aircraft
- Satellite reconnaissance

The system was tested extensively after 2018, with Russia announcing early deployments near Moscow as part of its national missile defence. It is also intended to complement the A-135 and upcoming A-235 strategic defence systems.

The S-500 gains geopolitical attention because India already operates S-400 batteries, and any move toward S-500 acquisition would deepen India–Russia defence cooperation while attracting scrutiny from the West (CAATSA). Its capabilities also influence the global arms race in hypersonic missile defence.

KEY FACTS / KEY FEATURES OF S-500 "PROMETHEUS"

SYSTEM TYPE

- Next-generation long-range air and missile defence system
- Designed for air-breathing + ballistic + hypersonic + space targets

INTERCEPTION CAPABILITIES

Target Type	S-500 Capability
Ballistic Missiles	Intercepts at up to 600 km
Hypersonic Targets	Capable of tracking speeds > Mach 10–15
Stealth Aircraft	Advanced radar for F-35, B-2 class targets
Low-Orbit Satellites	Can hit targets in near space (~180–200 km altitude)
Cruise Missiles / UAVs	Yes (multi-layered coverage)

RANGE & ALTITUDE

- Max Interception Range: ~ 500–600 km
- Max Engagement Altitude: ~180–200 km (near-space)
- Detection Range: > 1,000 km (for large targets)

MISSILE TYPES

- 77N6-N — Anti-ballistic missile interceptor
- 77N6-N1 — Anti-hypersonic interceptor (hit-to-kill kinetic kill vehicle)
- 40N6M — Extended range surface-to-air missile

- Integration with S-400 missile family for layered defence

RADAR SYSTEMS

- Uses Nebo-M series radars, AESA arrays
- Tracks 10+ ballistic targets simultaneously
- Anti-stealth optimized frequency bands
- Multi-band detection: L-band, X-band, S-band

MOBILITY

- Mounted on 8×8 mobile launch vehicles
- High survivability, rapid redeployment

COMPARISON WITH EARLIER SYSTEMS

System	Max Range	Anti-Ballistic Capability	Anti-Hypersonic
S-300	~200 km	Limited	No
S-400	400 km	Moderate	Limited
S-500	500–600 km	Strong	Yes

DETAILED MAINS ANALYSIS

WHY S-500 MATTERS GEOPOLITICALLY

- Represents Russia's entry into next-gen missile defence, competing with:
  - US THAAD
  - Israel Arrow-3
  - China HQ-19
- Provides Russia strategic deterrence against US hypersonic weapons.
- Strengthens Russia's military export portfolio.

STRATEGIC SIGNIFICANCE FOR INDIA

India has long-term cooperation with Russia on missile systems (BrahMos, S-400).
The S-500 could help India:

COUNTER CHINA'S HYPERSONIC MISSILES

- China tested DF-17, DF-ZF HGVs.
- India lacks hypersonic interceptors → S-500 could fill this gap.

ENHANCE NATIONAL MISSILE DEFENCE

- India's BMD Phases I & II are under development.
- S-500 could integrate with India's indigenous systems.

PROTECT SPACE ASSETS (NAVIC, GSAT, ISR SATELLITES)

- S-500's anti-satellite (ASAT) capability could supplement India's space security.

ADDRESS PAKISTAN'S CRUISE MISSILES

- Babur, Ra'ad, and Nasr missiles pose threats; S-500 gives layered protection.

CHALLENGES FOR INDIA

CAATSA SANCTIONS

- US may impose penalties for major defence purchases from Russia.

HIGH COST

- Estimated price: $2–3 billion per unit.

INTEGRATION WITH INDIGENOUS BMD

- India must ensure compatibility with:
  - PAD/AAD interceptors
  - Prithvi Defence Vehicle (PDV)
  - AD-1 & AD-2 interceptors

GEOPOLITICAL BALANCE

- Tightrope between US & Russia defence relations.

IMPACT ON GLOBAL STRATEGIC STABILITY

- Raises competition in missile defence technology.
- May push other nations to accelerate offensive missile development.
- Could weaken deterrence stability if one state gains overwhelming defensive advantage.

GOVERNMENT & GLOBAL INITIATIVES RELATED TO MISSILE DEFENCE

- **India**
  - Ballistic Missile Defence Programme (DRDO)
  - AD-1 & AD-2 Interceptors tested recently
  - KALI (directed energy research)
  - S-400 deployment underway
- **Global**
  - US: THAAD, Aegis, GMD
  - Israel: Iron Dome, David's Sling, Arrow-3/4
  - China: HQ-19, HQ-26
  - NATO: Ballistic Missile Defence Shield

CRITICISMS / CONCERNS

- **Arms Race Acceleration:** Hypersonic vs anti-hypersonic race intensifies globally.
- **High Deployment Cost:** Countries may spend disproportionately on missile defence over welfare.
- **Strategic Instability:** Missile defence can reduce enemy confidence in mutually assured destruction (MAD).
- **Overstated Capabilities:** Many features untested under real combat conditions.

WAY FORWARD

- India should prioritize indigenous BMD while selectively adopting foreign systems.
- Strengthen cooperation with Russia on hypersonic defence R&D.
- Maintain strategic autonomy while balancing relations with US.
- Integrate missile defence with space situational awareness (SSA) systems.
- Develop multi-layered defence:
  - Short-range → Akash-NG
  - Medium-range → MR-SAM
  - Long-range → S-400/S-500
  - Exo-atmospheric → AD-2 / PDV Mk-II

- Invest in early-warning radars (similar to Russia's Voronezh-M).
- Build joint India–Russia centre for hypersonic threat modelling.

PRELIMS BOOSTER

- S-500 = "Prometheus"
- Max range: ~600 km
- Intercepts targets at ~200 km altitude
- Can destroy ICBMs in terminal phase
- Has anti-satellite (ASAT) potential
- Successor to S-400 Triumf
- Developed by Almaz-Antey Corporation
- Part of Russia's A2/AD strategy
- Radar system: Nebo-M series
- Interceptor missile: 77N6-N / N1

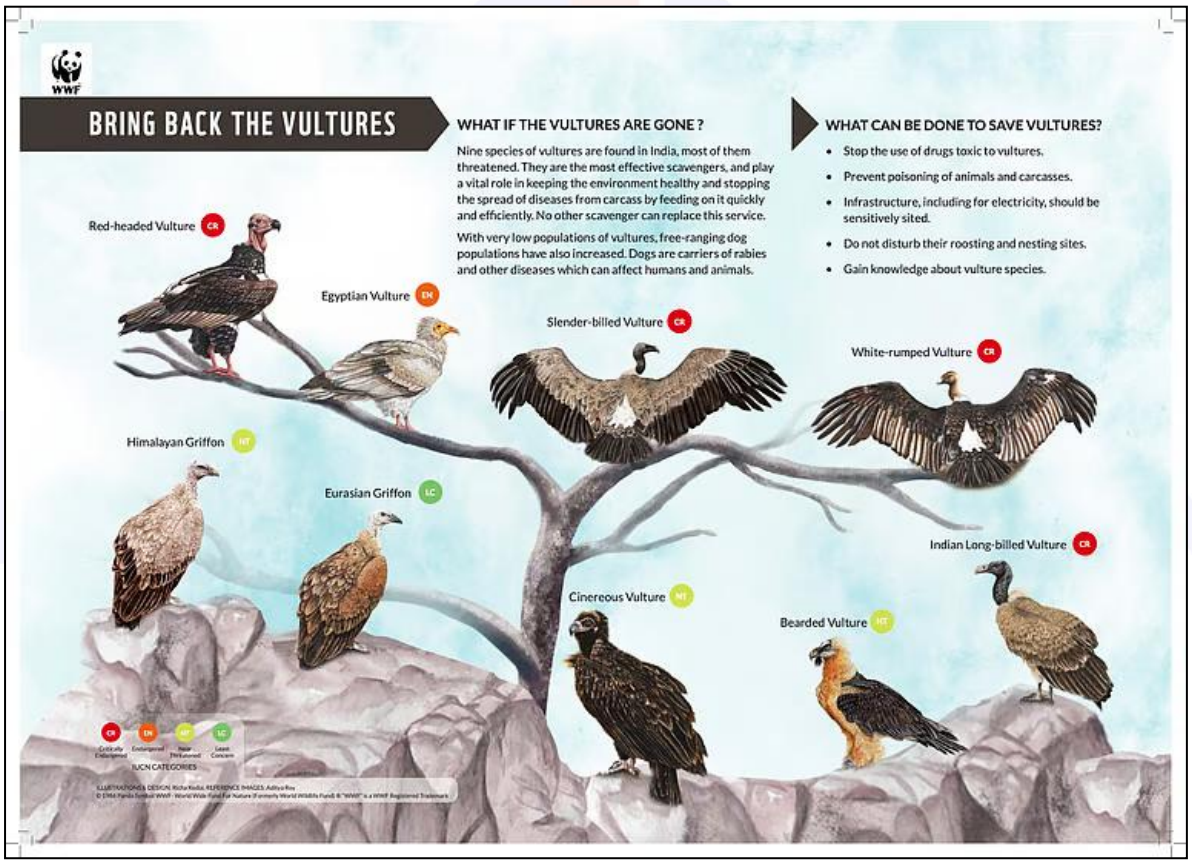
18 BNHS TO REINTRODUCE TWO VULTURE SPECIES IN ASSAM

IN NEWS

The Bombay Natural History Society (BNHS) has announced a major conservation initiative to reintroduce two critically endangered vulture species—the Slender-billed Vulture (Gyps tenuirostris) and the White-rumped Vulture (Gyps bengalensis)—into Assam.

Assam, once a stronghold of vulture populations, witnessed a massive collapse (>95%) during the 1990s–2000s due to veterinary drug poisoning (diclofenac).

The reintroduction is part of the Vulture Conservation Breeding Programme under the National Action Plan for Vulture Conservation (2020–2025).



BACKGROUND & CONTEXT

India once hosted one of the world's largest populations of Gyps vultures. However, between the 1990s and early 2000s, populations of Slender-billed, White-rumped, and Long-billed vultures declined by over 97%, primarily due to ingestion of livestock carcasses treated with diclofenac, a non-steroidal anti-inflammatory drug (NSAID). Even small doses were fatal, causing renal failure (visceral gout) in vultures.

To address this crisis, India launched the Vulture Conservation Breeding Programme (2006), led by BNHS and the Central Zoo Authority, creating specialized breeding centres in Assam (Rani), Haryana (Pinjore), West Bengal, Madhya Pradesh, and Tamil Nadu. Parallel efforts included the 2006 ban on diclofenac for veterinary use, later extended to restrict multi-dose vials.

The 2025 reintroduction in Assam marks a critical milestone, as the Rani Vulture Breeding Centre has successfully bred second-generation vultures. Releasing them into the wild aims to restore ecological balance in Northeast India, where vultures play essential roles in carcass disposal and disease control.

KEY FACTS / KEY FEATURES (TARGET SPECIES)

SLENDER-BILLED VULTURE (GYPS TENUIROSTRIS)

- **IUCN Status:** Critically Endangered
- **Range:** Assam, Arunachal Pradesh, Cambodia
- **Habitat:** Lowland forests, riverine habitats
- **Traits:** Distinct long neck, narrow bill

WHITE-RUMPED VULTURE (GYPS BENGALENSIS)

- **IUCN Status:** Critically Endangered
- **Range:** Across Indian subcontinent
- **Traits:** Smallest Gyps vulture; rapid decline during diclofenac era
- Once the most abundant vulture globally

BREEDING & REINTRODUCTION PLAN

- Implemented by BNHS in collaboration with Assam Forest Department & Central Zoo Authority
- Release from Assam State Zoo and Rani Breeding Centre
- Marked individuals for monitoring using:
    - GPS transmitters
    - Wing tags
    - Satellite collars

CONSERVATION TECHNIQUES USED

- Soft-release & acclimatization aviaries
- Pre-release health checks & flight conditioning

- Foraging training
- Post-release tracking for survival, breeding, movement
- Establishment of carcass provisioning sites ('vulture restaurants)

POLICY FRAMEWORK

- Guided by the National Action Plan for Vulture Conservation (2020–2025)
- Supported under:
    - Wildlife Protection Act, 1972
    - Convention on Migratory Species (CMS)
    - India's SAVE (Saving Asia's Vultures from Extinction) partnership

DETAILED MAINS ANALYSIS

WHY VULTURE CONSERVATION MATTERS

- **Ecological Role:** Vultures are nature's sanitation workers; they dispose of carrion rapidly, preventing disease spread (anthrax, rabies).
- **Public Health & Economy:** Declining vultures → increase in feral dogs → more rabies cases → public health burden.
  A study (Markandya et al.) estimated losses worth ₹11,000 crore after vulture collapse.
- **Cultural Importance:** In Zoroastrian communities, vultures are essential for the "Towers of Silence".

CHALLENGES FOR RECOVERY

- Residual illegal use of diclofenac, ketoprofen, aceclofenac, nimesulide
- Slow breeding rate (1 chick/pair/year)
- Habitat loss & electrocution from power lines
- Carcass contamination
- Lack of safe food availability
- Climate stress in Northeast breeding habitats

WHY ASSAM IS IDEAL FOR REINTRODUCTION

- Historically a stronghold of Slender-billed Vultures
- Dense forest cover and riverine landscapes
- High prey availability (natural carcasses)

- Functional breeding infrastructure (Rani centre)
- Strong Forest Department–BNHS collaboration

BOMBAY NATURAL HISTORY SOCIETY (BNHS)

- BNHS is one of the largest and oldest non-governmental organizations in India dedicated to nature conservation and biodiversity research.
- Founded on September 15, 1883, in Mumbai, its mission is to conserve nature through action based on research, education, and public awareness.

GOVERNMENT INITIATIVES / GLOBAL INITIATIVES

INDIA'S INITIATIVES

- Ban on diclofenac (2006); single-dose vial rule (2015)
- Vulture Safe Zones (100 km radius where harmful drugs banned)
- National Vulture Task Force
- Veterinary drug substitution: meloxicam, tolfenamic acid
- Establishment of 8+ breeding centres across India

GLOBAL INITIATIVES

- SAVE (Saving Asia's Vultures from Extinction) partnership
- Cambodia's vulture conservation model (parallel recovery site)
- CMS Raptors MoU
- IUCN SSC Vulture Specialist Group guidance

CRITICISMS / CONCERNS

- Enforcement against illegal veterinary drugs remains weak
- India still reports traces of diclofenac in field samples
- Reintroduction may fail if safe zones are not effectively implemented
- Need greater funding and community engagement
- Slow breeding → recovery takes decades
- Potential human–vulture conflict if carcass dumping practices change

WAY FORWARD

- Strict enforcement of diclofenac, ketoprofen, and aceclofenac bans.

- Expand Vulture Safe Zones across Northeast and Indo-Gangetic belt.
- Mandatory veterinary drug labelling on vulture toxicity.
- Strengthen GPS-based monitoring for post-release survival studies.
- Collaborate with local communities for safe carcass disposal.
- Modify power line designs; install bird diverters in high-risk zones.
- Increase funding for breeding centres; create regional hubs.
- Integrate vulture recovery with One Health frameworks.
- Expand research on avian toxicology & climate resilience.

PRELIMS BOOSTER NOTES

- Slender-billed & White-rumped Vultures → Critically Endangered (IUCN)
- Diclofenac impact → Renal failure (visceral gout)
- India banned diclofenac for veterinary use in 2006
- SAFE drugs → meloxicam, tolfenamic acid
- Assam breeding centre → Rani Vulture Conservation Breeding Centre
- BNHS founded → 1883, Mumbai
- National Action Plan for Vulture Conservation → 2020–2025
- Vulture Safe Zones → 100 km radius
- White-rumped Vulture once the most abundant raptor in the world
- Vultures produce no infectious waste → vital for sanitation

19 BANKING LAWS (AMENDMENT) ACT, 2025

IN NEWS

The Banking Laws (Amendment) Act, 2025 has been introduced to strengthen governance, improve oversight, modernise capital frameworks, and enhance operational resilience in India's banking system.

It aligns Indian banking laws with global best practices, Basel norms, and the changing technological and risk landscape.

The amendments update key provisions in the Banking Regulation Act, 1949, Banking Companies (Acquisition and Transfer of Undertakings) Acts, and Reserve Bank of India Act.

BACKGROUND & CONTEXT

India's banking sector has undergone a major transformation over the past decade due to structural reforms, digitalisation, improved supervision, and better capitalisation. Key milestones include:

- IBC (2016) enabling time-bound NPA resolution
- PSB consolidation (2019–20)
- Asset quality improvement and capital infusion
- Strengthening of RBI's supervisory architecture
- Rise of fintech & digital banking ecosystems

Despite improvements, challenges remain in governance standards, board accountability, fraud risk, cybersecurity, capital adequacy, and fit-and-proper criteria for leadership.

The Banking Laws (Amendment) Act, 2025 seeks to modernise outdated provisions, harmonise banking standards with international norms, and ensure that Indian banks are equipped to manage emerging risks such as:

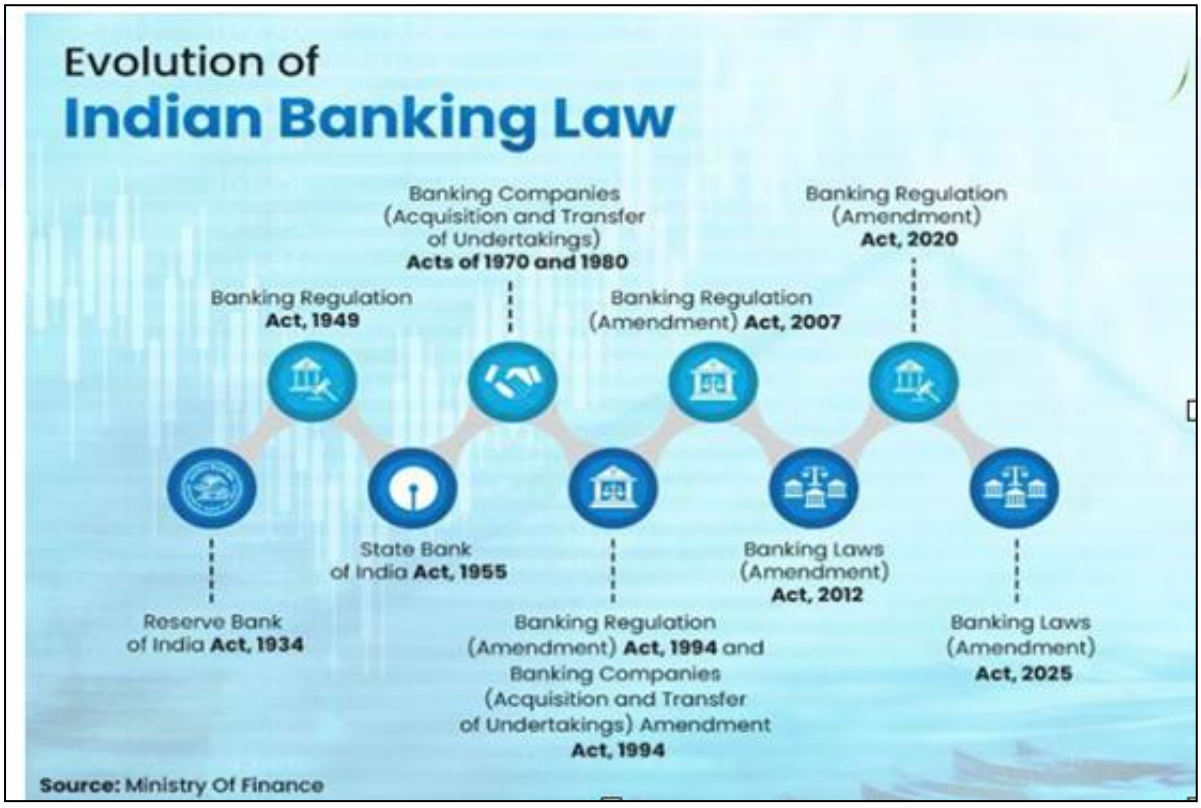
- Digital fraud
- Algorithmic credit models
- Climate-related financial risks
- Complex corporate structures
- Related-party transactions

This legislative update reinforces India's long-term goal of a safe, resilient, transparent, and globally competitive banking system.

BANKING LAWS (AMENDMENT) ACT, 2025

It contains a total of 19 amendments across five legislations;

- The Reserve Bank of India Act, 1934,
- Banking Regulation Act, 1949,
- State Bank of India Act, 1955 and
- Banking Companies (Acquisition and Transfer of Undertakings) Act, 1970 and 1980.



NEED FOR THE BANKING AMENDMENT ACT, 2025

- **Rising Unclaimed Deposits:** A substantial amount in banks remains unclaimed due to the absence of nominees. The Act addresses this challenge by establishing a structured, seamless succession mechanism.
- **Expanding Financial Inclusion:** As more households enter the formal banking system, the complexity of services rises.
    - Modern frameworks are needed to handle the scale, technology adoption, and increased transaction volumes.
- **Clarity and Uniformity in Banking Operations:** Establishes uniform terminology for smoother integration with emerging technologies.
    - Reduces disputes between banks and depositors by formalising asset succession rules.

KEY REFORMS UNDER BANKING LAWS (AMENDMENT) ACT, 2025

- **Modernised Nomination Framework (Sections 10 – 13):** Depositors can nominate up to four persons for their bank accounts via either simultaneous or successive nominations
    - Simultaneous nominations allow percentage-wise allocation totalling to 100%.
    - Successive nominations ensure seamless succession in case of a nominee's death for articles in safe custody and safety lockers
- **Redefinition of 'Substantial Interest' (Section 3):** Threshold increased from ₹ 5 lakh (1968 limit) to ₹ 2 crore. This regulatory change is designed to revamp governance standards.

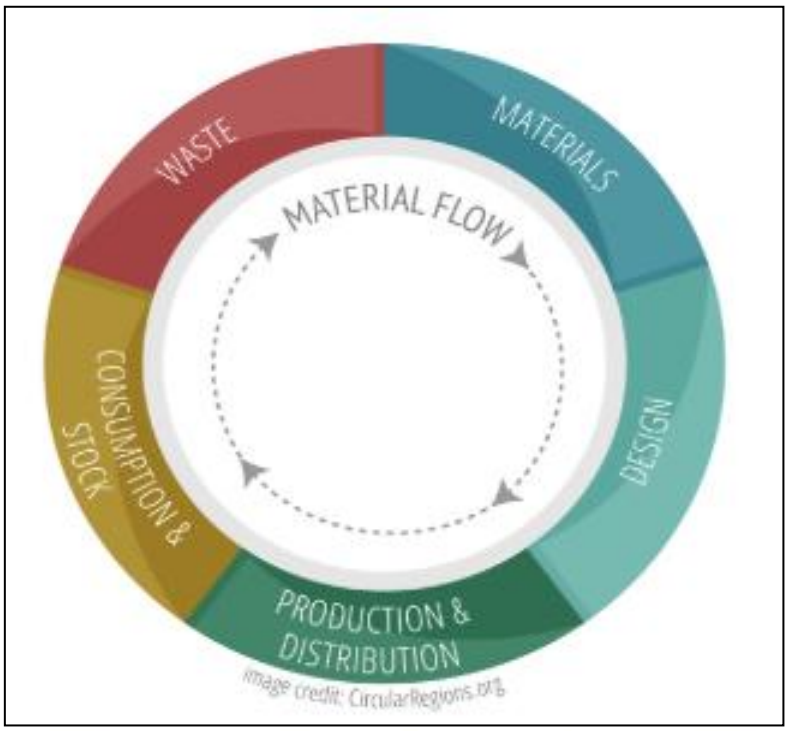
- **Governance in Co-operative Banks (Section 4 & 14):** Align director tenures in cooperative banks with the 97th Constitutional Amendment by increasing the maximum tenure from 8 years to 10 years (excluding the chairperson and whole-time director). Tenure for directors in other banking companies remains unchanged.
- **Audit Reforms in PSBs (Sections 15-20):** Empower PSBs to fix the auditors remuneration.
    - PSBs will now be permitted to transfer unclaimed shares, interest, and bond redemption amounts to the Investor Education and Protection Fund (IEPF), bringing them in line with practices followed by companies under the Companies Act.

IMPACT OF THE BANKING REFORMS WITH NATIONAL VISION

- **Depositor-centric:** The Act includes robust measures to safeguard public trust in banking institutions by simplified claim settlement for their families.
- **Improved Financial Transparency:** Transfer to the Investor Education and Protection Fund aims at creating a more transparent system for fund management.
- **Enhanced Audit Quality:** The PSBs will now be able to attract more qualified professionals and improve audit quality by paying better auditor remuneration.
- **Improved Operational Efficiency:** The Act simplifies certain procedures, such as updating certain operational definitions.

20 FINLAND TO HOLD ROAD SHOWS ON CIRCULAR ECONOMY IN INDIA

Ahead of India hosting the World Circular Economy Forum 2026, Finland will conduct roadshows in major Indian cities to promote circular economy awareness and explore business opportunities.



WHAT IS CIRCULAR ECONOMY?

- The circular economy (CE) is a model of production that prioritises waste reduction or elimination at all stages of the product life cycle, from raw materials extraction and manufacturing to disposal and reuse.
- India's circular economy is expected to have a market value of $2 trillion and create 10 million jobs by the year 2050.

SIGNIFICANCE OF CIRCULAR ECONOMY

- **Economic Opportunities:** The UNDP estimates that a global switch to circular economy models could generate $4.5 trillion in economic benefits by 2030, while also reducing emissions and creating stable green jobs.
- **Job Creation:** Expands employment opportunities in recycling, refurbishment, remanufacturing, and sustainable product design.
- **Competitive Advantage:** Businesses adopting circular models gain a market edge as consumers increasingly prefer sustainable products.

INDIA'S LEADERSHIP IN CIRCULAR ECONOMY

- **Swachh Bharat Mission (SBM-U):** Strengthening urban waste management with 3R (Reduce, Reuse, and Recycle) principles.
- **GOBAR-Dhan Scheme:** Promoting waste-to-wealth initiatives through biogas and organic waste processing.
    - This scheme currently covers 67.8% of the total number of districts in India, with 1008 biogas plants being fully operational as of February 2025.
- **E-Waste Management Rules (2022):** Strengthening circular economy practices in electronic waste disposal.
- **Extended Producer Responsibility (EPR) for Plastic:** Encouraging industries to take accountability for plastic waste.
    - India banned single use plastic in 2022.
    - The 12th Regional 3R and Circular Economy Forum in Asia and the Pacific was held in Jaipur, India, in March 2025, marking a significant milestone in regional cooperation for sustainable waste management and circular economy initiatives.

CHALLENGES IN IMPLEMENTING CIRCULAR ECONOMY

- **Technical expertise:** Many businesses, municipalities, and citizens are unfamiliar with circular economy principles and lack the technical knowledge to implement them effectively.
- **High initial investment costs:** Setting up circular systems, such as recycling infrastructure or sustainable product design, requires significant upfront capital.
- **Uneven corporate Adoption:** SMEs, which form a large part of India's economy, are largely not onboard, making the transition non-uniform across sectors.
- **Insufficient enforcement policy:** While policies exist, weak enforcement and limited incentives slow down adoption.

WAY AHEAD

- There is a need for a trickle-down effect where circular economy concepts reach all levels of industry, beyond large corporations.
- Promote repair and reuse of products to extend their lifecycle and reduce resource consumption.
- Improve recycling processes to prevent accumulation and environmental pollution through Extended Producer Responsibility (EPR) initiatives.

News In Short

01 TECHNOLOGY DEVELOPMENT FUND SCHEME

News: Defence Research and Development Organisation (DRDO) has handed over seven technologies developed under the Technology Development Fund (TDF) scheme to the three Services.

TECHNOLOGY DEVELOPMENT FUND (TDF) SCHEME

- It is a flagship programme of the Ministry of Defence executed by DRDO under 'Make in India' initiative.
- It extends financial support and expertise to upgrade existing products/ systems, processes and its applications by reducing production costs, improving functionality and quality by promoting Make in India, and the development of futuristic technologies with defence applications.

02 DRDO'S NEW ROCKET-SLED EJECTION TEST

News: The Defence Research and Development Organisation (DRDO) conducted a successful high-speed rocket-sled test of a fighter aircraft escape system at controlled velocity.

HIGH-SPEED ROCKET-SLED TEST

- It was conducted in collaboration with the Aeronautical Development Agency (ADA) of the Ministry of Defence and public sector entity Hindustan Aeronautics Limited (HAL).
- It was carried out at the Rail Track Rocket Sled (RTRS) facility of the Terminal Ballistics Research Laboratory (TBRL), a key DRDO facility in Chandigarh.
- Using a rocket-propelled dual-sled system, the aircraft forebody was accelerated to 800 km/h to replicate real flight conditions and assess complex, millisecond-precise mechanisms like canopy severance and ejection sequencing.
- Sensor-equipped dummies measured the extreme forces pilots face during emergencies, ensuring the system meets global safety standards.

03 EXERCISE HARIMAU SHAKTI

WHAT HAPPENED?

- India and Malaysia have begun the 5th edition of the bilateral exercise “Harimau Shakti 2025”.
- Location: Mahajan Field Firing Range (MFFR), Rajasthan, a major Indian Army desert warfare training area.
- Duration: 14 days (two-week joint field engagement).

PARTICIPATING ARMIES

- **Indian Army:** Troops from the Mechanised Infantry Regiment.
- **Malaysian Army:** Personnel from the Royal Malay Regiment (RMR).

AIM OF THE EXERCISE

Enhance interoperability in:

- Counter-insurgency (CI) and counter-terrorism (CT) operations
- Desert warfare & high-temperature combat
- Joint tactical planning
- Semi-urban and conventional operations
- Strengthen defence ties under India's Act East Policy and Malaysia’s Look East Policy.

KEY FEATURES OF HARIMAU SHAKTI 2025

- Integrated battle drills in desert terrain.
- Live-fire exercises at MFFR.
- Heliborne operations, room intervention, and close-quarter battle (CQB).
- IED detection & neutralisation training.
- Use of advanced simulation systems for real-time battlefield scenarios.
- Exercises conducted in accordance with UN peacekeeping mandates.

04 FINFLUENCERS

SEBI has taken regulatory action against unregistered financial influencers ("finfluencers") who provide stock market advice, trading strategies, and research content through social media.

SEBI GUIDELINES ON FINFLUENCERS

- Anyone offering investment advice or research analysis must be registered under SEBI Regulations, 2013.
- Finfluencers cannot promise guaranteed returns, promote unverified "success stories", give misleading profit screenshots etc.
- Brokers and mutual fund distributors are barred from partnering with unregistered finfluencers.

ABOUT SEBI

- **Establishment:** Statutory body established in 1992 through the SEBI Act.
- **Aim:** regulate the securities market and protect investors.

05 INFRASTRUCTURE INVESTMENT TRUSTS (INVITS)

The Securities and Exchange Board of India (SEBI) has granted in-principal approval for the registration of the Raajmarg Infra Investment Trust (RIIT) as a Public Infrastructure Investment Trust (InvIT).

WHAT HAPPENED?

- SEBI has given in-principle approval for registering Raajmarg Infra Investment Trust (RIIT) as a Public Infrastructure Investment Trust (InvIT).

WHO OWNS RIIT?

- RIIT is sponsored by NHAI (National Highways Authority of India).
- Earlier, NHAI created NHAI InvIT (2020); RIIT is an additional InvIT vehicle to monetize highway assets.

WHAT IS AN INVIT?

- An Infrastructure Investment Trust is a SEBI-regulated investment vehicle that pools money from investors to own, operate, and manage revenue-generating infrastructure assets.
- Similar to REITs (Real Estate Investment Trusts), but focused on infrastructure (roads, power transmission, pipelines, etc.).

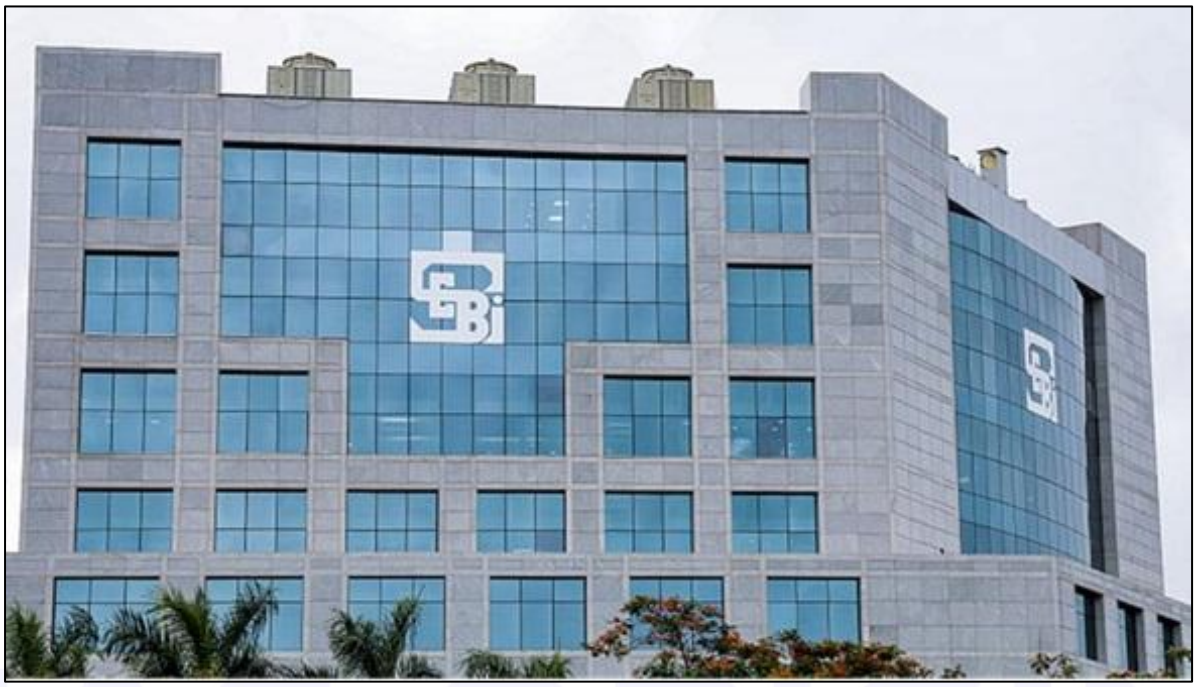
WHY RIIT IS IMPORTANT?

- Helps NHAI raise long-term funds for highway construction without increasing government borrowing.
- Supports National Monetisation Pipeline (NMP) goals.

- Allows private and institutional investors to participate in India's highway sector.

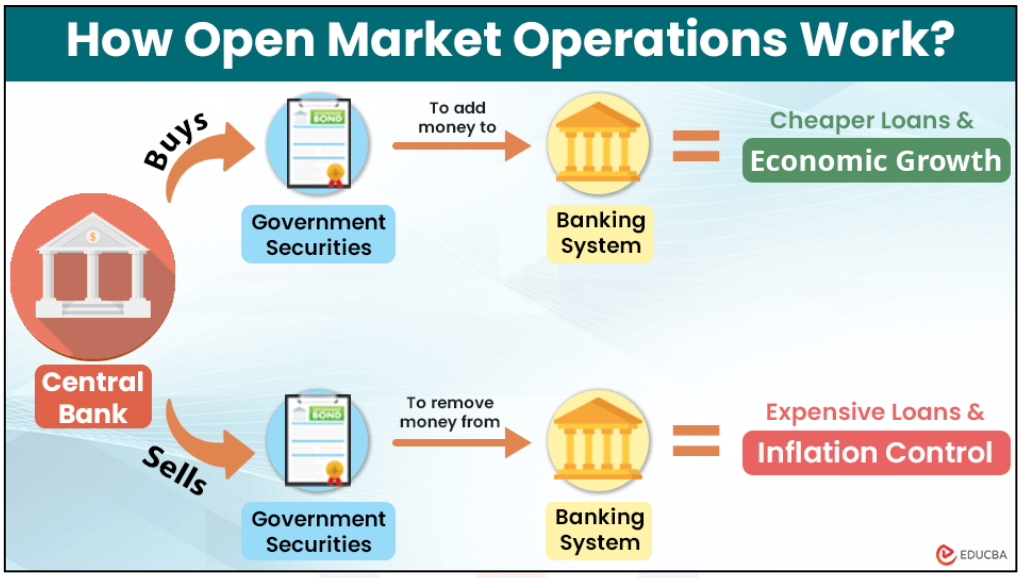
KEY FEATURES OF RIIT

- Will house operational national highway stretches with stable toll/annuity revenue.
- Investors receive regular distributions (like dividends) from toll income.
- Backed by NHAI's strong creditworthiness, attracting pension, insurance, and sovereign wealth funds.



06 OPEN MARKET OPERATIONS (OMO)

The Reserve Bank of India (RBI) announced measures to inject durable liquidity into the system, including ₹1,00,000 crore worth of government securities purchases through Open Market Operations (OMO) and a $5 billion USD/INR buy-sell swap.



OMO PURCHASE – MEANING & IMPACT

- RBI buys G-Secs from the market → injects rupees into the banking system.
- "Durable liquidity" means the liquidity impact is long-lasting, unlike overnight repo operations.

WHY NEEDED?

Banking system liquidity had turned deficit due to:

- High currency leakage during festivals
- Advance tax outflows
- Elevated government cash balances
- Tight global financial conditions

$5 BILLION USD/INR BUY–SELL SWAP – MEANING

- RBI buys USD now and sells USD later (forward market).
- When RBI buys dollars → releases INR into the market, increasing liquidity.
- Swap involves a defined reversal date, so the liquidity impact is temporary but large.

OBJECTIVE

- Smooth volatility in the forex market.
- Add rupee liquidity without permanently altering forex reserves.

OVERALL IMPACT ON ECONOMY

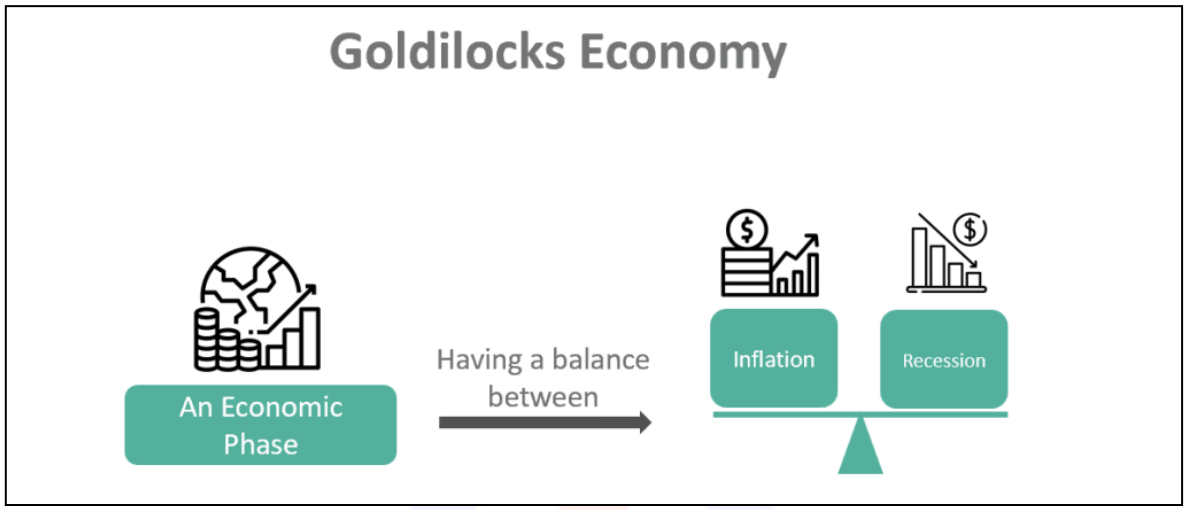
- Lower short-term interest rates and ease pressure in money markets.
- Support bank lending to NBFCs, MSMEs, and corporates.
- Stabilize government bond yields.
- Improve transmission of monetary policy.

OPERATION TWIST

- Operation Twist is a monetary policy of the central banks used to bring down interest rates and control investments in a country.
- RBI deployed this policy in India in 2019 and 2020. Under this operation, the RBI twisted the yield of government securities to bring liquidity into the markets.
- This is done by simultaneous buying and selling government securities—both short-term and long-term—through Open Market Operations (OMOs).
- Operation Twist was first used by the United States Federal Reserves in 1961 to stimulate the US economy. The mechanism worked by reviving the US Economy through increased short-term rates.

07 GOLDILOCKS ECONOMY

RBI trims repo rate to 5.25% as the governor highlights a rare Goldilocks moment for India's economy.



WHAT HAPPENED?

- The RBI Monetary Policy Committee (MPC) has reduced the repo rate from 5.50% to 5.25% (a 25-bps cut).
- This is the first rate cut after a long pause, signalling a shift toward supporting economic growth.

WHAT IS GOLDILOCKS ECONOMY PHASE?

A Goldilocks economy describes an ideal economic state that is "just right", neither overheating with high inflation nor cooling into recession, but featuring steady growth, low inflation, and low unemployment.

WHY DOES THE RBI CALL IT A GOLDILOCKS PHASE?

- Retail inflation has dropped well below the 4% target and is hovering near the lower end of the 2–6% band.
- At the same time, real GDP growth has stayed robust at about 8%, even amid weak global conditions and external headwinds such as higher tariffs and currency pressures.

WHY DID RBI CUT THE RATE?

- Liquidity pressures have eased after recent RBI interventions.
- Inflation is moderating within the target band (4% ± 2%).

- Growth indicators remain strong, enabling a calibrated rate cut.

GOVERNOR'S REMARK: "A RARE GOLDILOCKS MOMENT"

The RBI Governor described India's macroeconomic situation as a Goldilocks moment—meaning:

INFLATION IS UNDER CONTROL

- Headline CPI is softening.
- Core inflation remains stable.
- Food inflation volatility manageable.

GROWTH REMAINS STRONG

- India continues to be the fastest-growing major economy.
- Robust domestic demand, manufacturing expansion, and strong investment cycle.

EXTERNAL SECTOR STABLE

- Comfortable forex reserves
- Stable rupee
- Healthy remittances and services exports

This combination—low inflation + strong growth + stable external sector—is what economists call a Goldilocks economy (neither too hot nor too cold).

08 MAHAD SATYAGRAHA

Mahad marks the birthplace of one of India's first human rights movements initiated by Dr. B. R. Ambedkar.

ABOUT MAHAD SATYAGRAHA (1927)

- Mahad Satyagraha, launched by Dr. B.R. Ambedkar on 20 March 1927 at Chavdar Tale, Mahad (Maharashtra), was the first major civil rights movement of Dalits.
- Its objective was to secure the right of untouchables to access public drinking water denied due to caste discrimination.
- Ambedkar, along with key associates such as Anandrao Chitre, Bapu Sahastrabuddhe, Sambhaji Gaikwad and Ramchandra More, led thousands to drink water from the public tank, asserting that essential resources cannot be monopolised by upper castes.
- The movement conveyed a powerful ideological message that water is a basic human right, not a caste privilege, challenging the social exclusion embedded in untouchability.
- On 25 December 1927, Ambedkar publicly burned the Manusmriti, symbolically rejecting caste-based hierarchies.
- In 1937, the Bombay High Court affirmed that the tank was public, validating the satyagraha.

09 TURKIYE'S "STONE HILLS" PROJECT

Recent archaeological discoveries on Turkiye's southeastern hills reveal life 11,000 years ago, during the emergence of early settled communities.

ABOUT

- Findings are part of the "Stone Hills" project (launched 2020), covering 12 sites in Sanliurfa province—described as the world's Neolithic capital.
- It includes Göbekli Tepe, a UNESCO World Heritage Site and oldest known megalithic structures in Upper Mesopotamia.
- In India the Neolithic settlements have been found in the North-Western part (Such as Kashmir), Southern part (Karnataka, Tamil Nadu, and Andhra Pradesh), North East (Meghalaya), and Eastern part (Bihar and Odisha) of India.
- Some of the important Neolithic settlements are Burzahom (Kashmir), Gufkral (Kashmir), Chirand (Bihar), and Utnur (Andhra Pradesh).

STONE AGE

- It is a prehistoric period marked by the use of stone tools, divided into three major periods: Paleolithic, Mesolithic, and Neolithic.
- **Paleolithic Age:** Also known as the Old Stone Age.
    - Began around 2.6 million years ago and lasted until around 10,000 BCE.
    - Humans were hunter-gatherers, using stone tools for hunting, butchering, and food processing.

- **Mesolithic Age:** Occurred between 10,000 BCE and 5,000 BCE (varies by region).
    - Characterized by specialized tools, environmental adaptations, and the early domestication of plants and animals.
- **Neolithic Age:** Began around 12,000 years ago and ended between 4500 BCE and 2000 BCE.
    - Marked by the adoption of agriculture, animal domestication, and settled communities.
    - Led to the development of pottery, weaving, and complex social structures.
    - Agriculture revolutionized human societies and led to the rise of civilizations.

10 RELOS AGREEMENT

Russia's lower house of parliament has ratified the Reciprocal Exchange of Logistic Support (Relos) Agreement with India. Relos is similar to logistics agreements India has signed with countries like the US, UK, Japan, Australia, France, Singapore, South Korea, and Vietnam.

INDIA–RUSSIA RECIPROCAL EXCHANGE OF LOGISTICS SUPPORT AGREEMENT

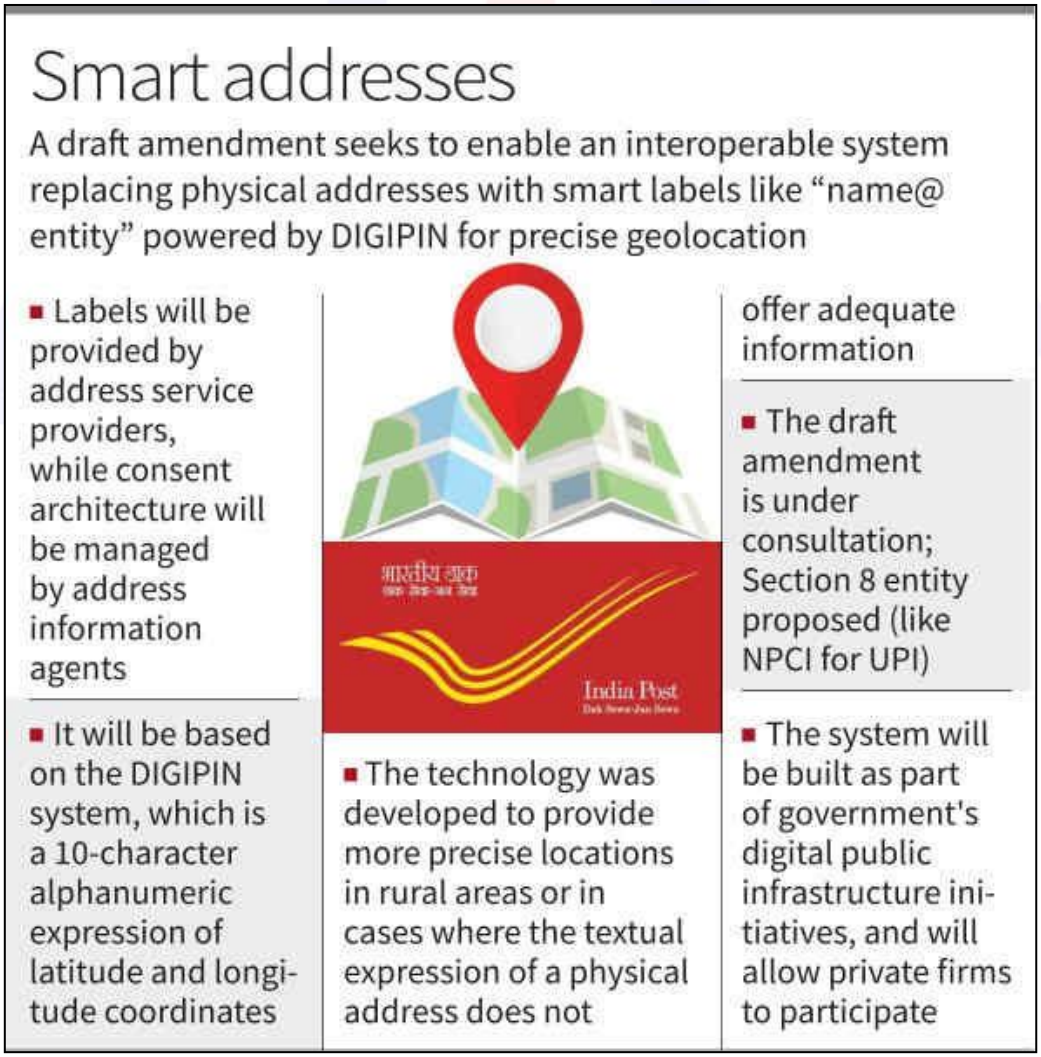
- It is a bilateral military logistics pact that enables both countries' military aircraft, ships, and personnel to use each other's bases for refueling, maintenance, spare parts, training, joint exercises, humanitarian missions, and disaster relief.
- It streamlines logistics by reducing paperwork, ensuring quicker support, and allowing rolling settlement of costs.
- It also grants mutual access to each other's airspace and ports, which will provide India with strategic entry to the Arctic region along the Northern Sea Route, where Russia has an extensive military presence.
- For Russia, Relos offers access to Indian Ocean facilities, helping it maintain global reach despite Western sanctions and allowing power projection in Asia without costly overseas bases.

11 DIGITAL HUB FOR REFERENCE AND UNIQUE VIRTUAL ADDRESS (DHRUVA)

The Department of Posts (DoP) under the Ministry of Communications has proposed Digital Hub for Reference and Unique Virtual Address (DHRUVA), an interoperable, standardized and user-centric Digital Address System for India.

WHAT IS DHRUVA?

- A national framework to create virtual, UPI-like address labels such as "name@entity" that serve as proxies for physical locations.
- The system is built as a part of its Digital Public Infrastructure initiatives and will allow private firms to participate.
- At its core is the concept of Address-as-a-Service (AaaS) — the array of services associated with address data management to support secure, consent-driven sharing of location information.



12 LEPROSY

The Supreme Court has directed the NHRC to address discrimination against persons affected by leprosy.

LEPROSY IN INDIA

- India continues to report about 57 % of leprosy cases worldwide, with genetic predisposition and living in unsanitary conditions raising the susceptibility.
- The five states in India with the highest prevalence of leprosy are Bihar, Chhattisgarh, Jharkhand, Maharashtra, and Odisha.
- The Union Health Ministry launched the National Strategic Plan (NSP) and Roadmap for Leprosy (2023-27) in 2023, to achieve zero transmission of leprosy by 2027.
- The Sustainable Development Goal (SDG) 3.3 aims to end leprosy by 2030.

DO YOU KNOW?

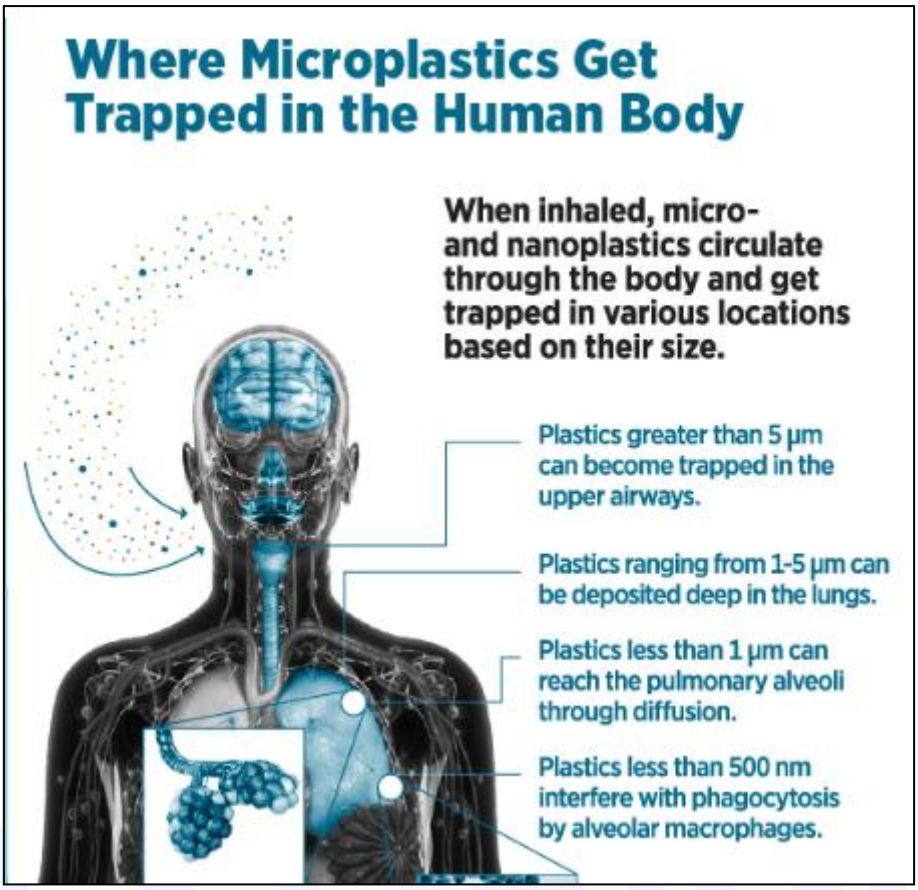
The World Health Organization (WHO) declared Jordan as the first country in the world to eliminate leprosy in 2024.

LEPROSY

- Leprosy is also known as Hansen's disease, it is a chronic infectious disease caused by a type of bacteria, Mycobacterium leprae.
- It is known to occur at all ages ranging from early childhood to old age.
- **Symptoms:** The disease predominantly affects the skin and peripheral nerves.
- Loss of sensation in affected areas.
- Left untreated, the disease may cause progressive and permanent disabilities.
- **Transmission:** Through droplets from the nose and mouth.
- The disease is not spread through casual contact with an infected person.
- **Treatment:** Leprosy is a curable disease through the multi-drug therapy (MDT).

13 INHALABLE MICROPLASTICS (IMPS)

Recent study has revealed the presence of inhalable microplastics (iMPs) in the air of major Indian markets, marking them as a new class of pollutants comparable to PM2.5 and PM10.



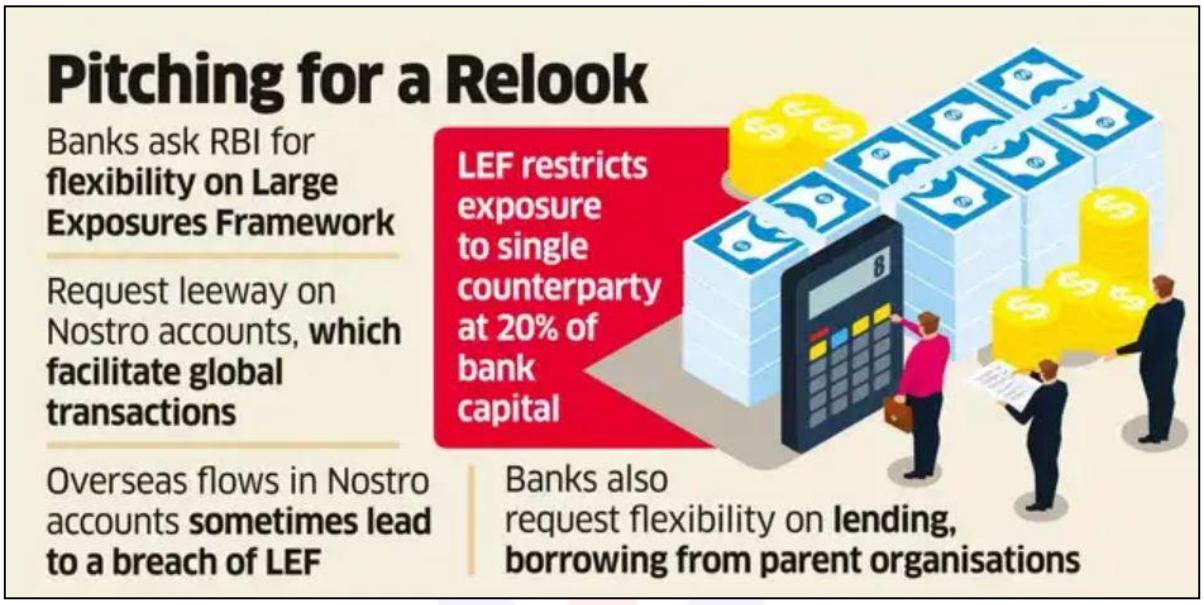
INHALABLE MICROPLASTICS (IMPS)

- They are plastic particles less than 10 micrometres (microns) in size, as compared to microplastics (less than 5 millimetres), and can thus enter human lungs through the nose.
- It found the highest concentrations in Kolkata and Delhi, with iMPs contributing up to 5% of urban particulate matter, largely from synthetic clothing, packaging, tyre wear, and footwear.
- Inhalable microplastics (iMPs) can penetrate deep into the lungs, enter the bloodstream, and act as carriers for toxic chemicals like diethyl phthalate and heavy metals such as lead, as well as pathogenic microbes including antibiotic-resistant strains, posing risks of cancer, respiratory, hormonal, and neurological disorders.

14 LARGE EXPOSURES FRAMEWORK

RBI tightened Large Exposures Framework (LEF rules) for foreign banks, ensuring:

- Their exposure to their own head office or overseas branches is strictly capped.
- All overseas-related exposures must be counted under LEF.



WHAT IS LARGE EXPOSURES FRAMEWORK (LEF)?

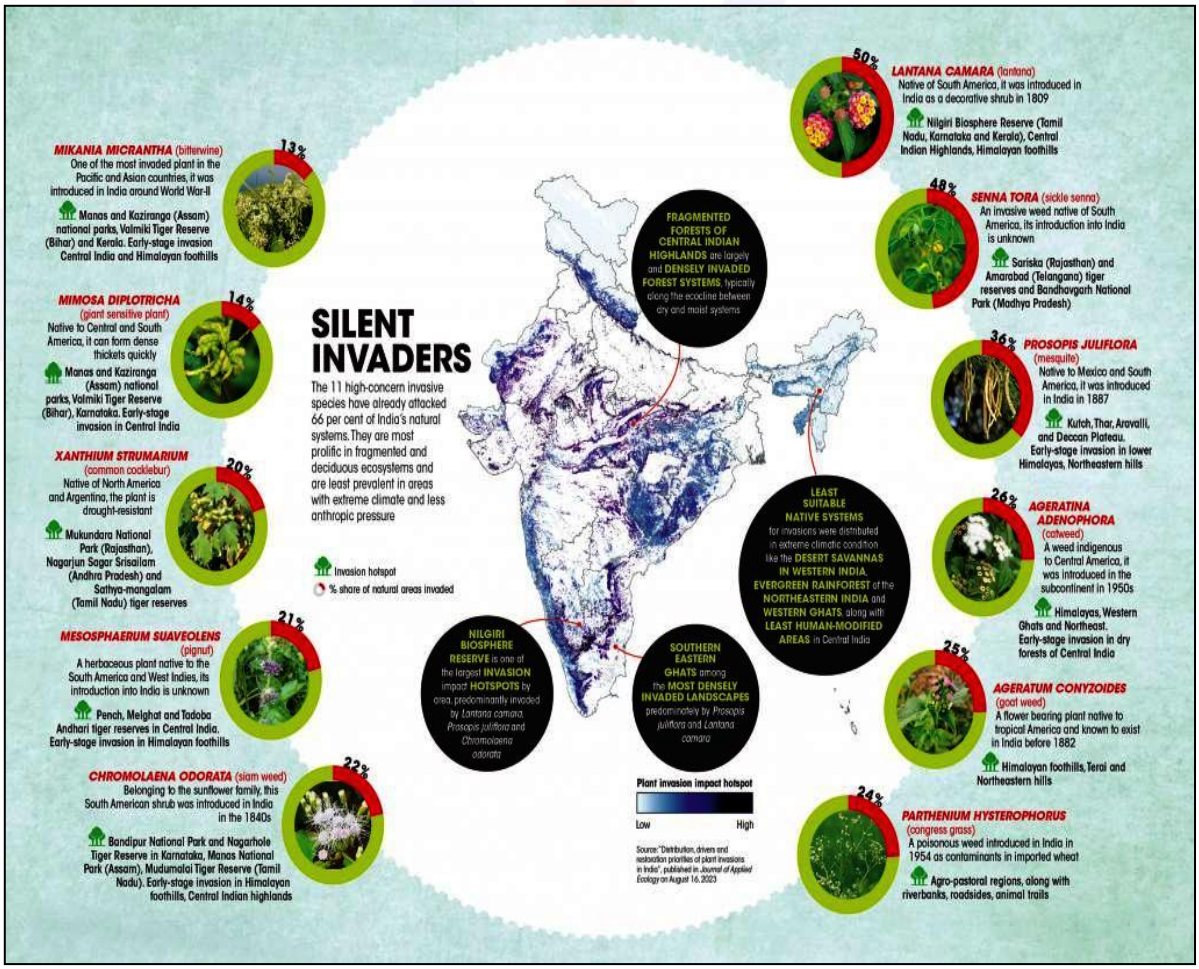
- Large Exposures Framework (LEF) is an RBI rule that prevents banks from giving too much money or exposure to any single borrower or group of connected borrowers.
- Banks sometimes lend huge amounts to large corporations. If that company defaults, the bank can face heavy losses. LEF limits this risk by capping how much exposure is allowed.
- Typically, a bank's exposure to a single borrower must not exceed 20 % of its eligible capital base (Tier-1 capital), though in some cases an additional 5 % cushion may be allowed.
- Exposure to a group of related borrowers (connected counterparties) must not exceed 25 % of capital base.

15 INVASIVE ALIEN PLANTS IN INDIA

Invasive alien plants are rapidly transforming India's ecosystems, nearly doubling their range in sensitive regions like the Western Ghats, Himalayas, and the north-east, driven by climate change, land-use shifts, and biodiversity loss.

ABOUT

- Invasive alien species are plants, animals, pathogens and other organisms that are non-native to an ecosystem, and which may cause economic or environmental harm or adversely affect human health.
- The recent study warns that by 2022, 144 million people, 2.79 million livestock, and 200,000 sq km of farmland will be exposed to new invasions, with species such as Lantana camara, Chromolaena odorata, and Prosopis juliflora dominating landscapes.
- Chromolaena is expanding fastest, while Prosopis has displaced native vegetation across dry regions, and many species are now spreading into Himalayan and wet evergreen forests.



ENVIRONMENTAL IMPACTS

- Invasive species alter fire regimes, soil moisture, and native vegetation, with wet-biome invaders thriving in warming temperatures and frequent fires, while dry-biome invaders benefit from higher rainfall and reduced fires.
- Entire ecosystems could shift from native to invasive dominance within a generation. Vulnerable areas include the Shivalik-Terai belt, Duars, Aravalli ranges, Dandakaranya forests, and Nilgiri region.

SOCIOE-CONOMIC IMPACTS

- Invasions reduce fodder, fuelwood, soil fertility, and access to pasture and water, forcing rural and pastoral communities to migrate or travel longer distances.
- Economic losses in India from invasive species between 1960 and 2020 are estimated at $127.3 billion.
- Invasive plants also pose health risks, including respiratory issues.

RECOMMENDATIONS

- India currently lacks a national mechanism or database for managing invasive species.
- Therefore, researchers recommend creating a National Invasive Species Mission to integrate monitoring, management, quarantine, and funding, linking control efforts to climate adaptation, poverty alleviation, and ecological restoration.

16 WORLD SOIL DAY

World Soil Day is observed annually on December 5 to raise awareness about the importance of healthy soil and to advocate for sustainable management.

WORLD SOIL DAY

- The initiative is endorsed by the FAO and the UN General Assembly, following a proposal by the International Union of Soil Sciences (IUSS) in 2002.
- The FAO Conference unanimously endorsed World Soil Day in 2013 and requested its official adoption at the 68th UN General Assembly.
- In December 2013, the UN General Assembly responded by designating 5 December 2014 as the first official World Soil Day.
- Theme for World Soil Day 2025: "Healthy Soils for Healthy Cities".

INITIATIVES FOR SOIL CONSERVATION

Soil Health Card Scheme: It provides farmers with soil nutrient status reports to encourage balanced fertilizer use and improve productivity.
Promotion of Organic Farming: Initiatives like Paramparagat Krishi Vikas Yojana (PKVY) encourage organic farming practices to maintain soil health.

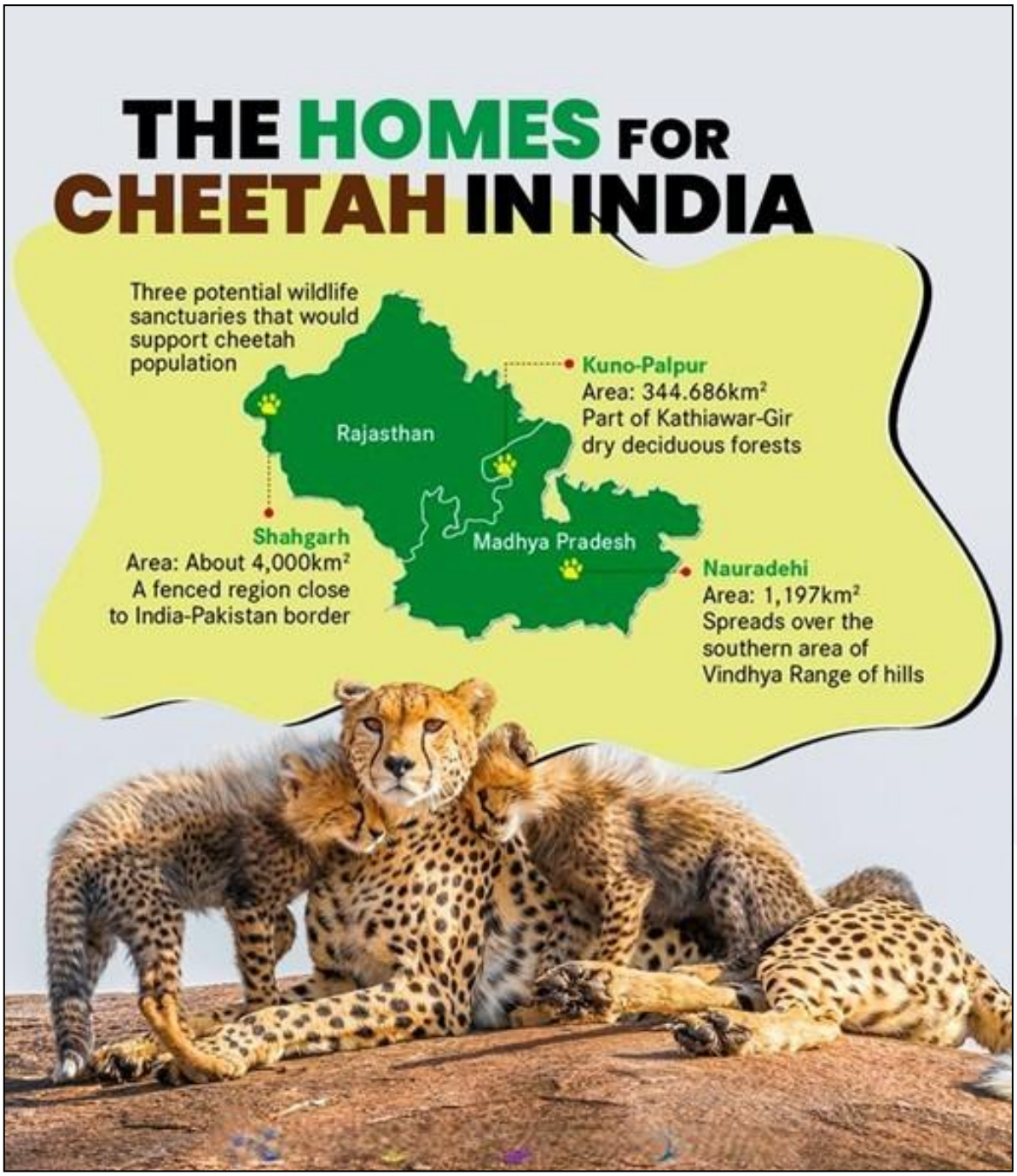
Global Initiatives

- Global Soil Partnership (GSP): It is an FAO-led initiative to improve global soil governance and promote sustainable soil management.

- United Nations Convention to Combat Desertification (UNCCD): It works to prevent land degradation and promote sustainable land management globally. It has a pledge for land degradation neutrality (LDN) by 2030.

17 KUNO NATIONAL PARK (KNP)

On International Cheetah Day (December 4), the Madhya Pradesh Chief Minister released three cheetahs into the wild at Kuno National Park.



ABOUT

- Located in Sheopur district, Madhya Pradesh, in central India.
- Named after the Kuno River, a perennial tributary of the Chambal that flows through the park.

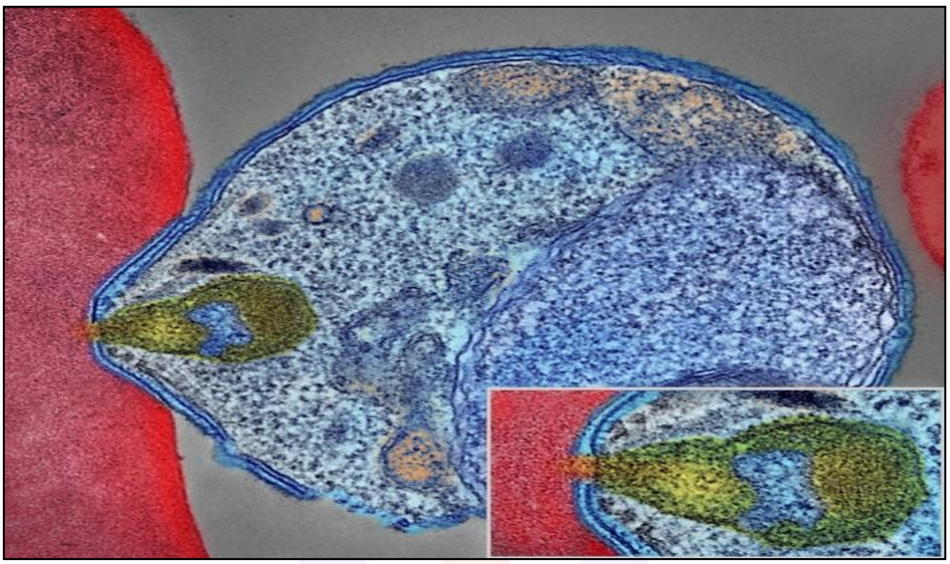
- Notified as Kuno Wildlife Sanctuary in 1981; also known as Kuno Palpur due to the 7th-century Palpur fort of the Scindia rulers. In 2018, it was given the status of a national park.
- **Forest type:** Northern Tropical Dry Deciduous, with Kardhai, Khair, Dhawa, Salai and savannah woodland.

DO YOU KNOW?

- Twelve years after the Supreme Court's 2013 order to shift some Asiatic lions from Gujarat to Madhya Pradesh's Kuno as a second home, the translocation still hasn't materialized.

18 MALARIA PARASITES CORKSCREW THEIR WAY THROUGH SKIN

A recent Nature Physics study reveals that malaria sporozoites, the infectious forms injected by mosquitoes, move through human skin using right-handed helical (corkscrew) paths.



WHAT IS MALARIA?

Malaria is a life-threatening disease spread to humans by some types of mosquitoes. It is mostly found in tropical countries.

- **Transmission:** It is caused by plasmodium protozoa. The plasmodium parasites spread through the bites of infected female Anopheles mosquitoes. Blood transfusion and contaminated needles may also transmit malaria.
- **Types of parasites:** There are 5 Plasmodium parasite species that cause malaria in humans and 2 of these species – P. falciparum and P. vivax – pose the greatest threat. The other malaria species which can infect humans are P. malariae, P. ovale and P. knowlesi.
- P. falciparum is the deadliest malaria parasite and the most prevalent on the African continent. P. vivax is the dominant malaria parasite in most countries outside of sub-Saharan Africa.
- **Symptoms:** Fever and flu-like illness, including chills, headache, muscle ache and fatigue.

19 PM INTERNSHIP SCHEME

The PM Internship Scheme's pilot project has exceeded its target of providing 1.25 lakh internship opportunities in a year but only one in five candidates accepted PM Internship Scheme offers, and 20% of them quit early. Candidates cited locations, roles, and duration as reasons for declining offers.

PM INTERNSHIP SCHEME

- **Announced in:** Union Budget 2024-25.
- **Aim:** To provide 12-month internships for one crore candidates in the age group of 21 to 24 years, for five years.
- To provide real-life work experience to job seekers in top companies.
- **Implementing Agency:** Ministry of Corporate Affairs.
- **Vacancies:** 1,25,000 positions in 500 top companies for FY – 2024-25.
    - The top companies have been identified based on the average Corporate Social Responsibility expenditure of the last three years.
    - Participation of the companies in the scheme is voluntary.
- **Eligibility:**
    - Do not have a family member earning over ₹8 lakh per annum.
    - 18 to 24 years (relaxation for OBC/SC/ST).
- **ITI:** Matriculation + ITI in relevant trade.
- **Diploma:** Intermediate + AICTE-recognized diploma.

- **Degree:** Bachelor's degree from UGC/AICTE-recognized university.
- **Stipened:**
    - ₹5,000 monthly stipend.
    - One-time payment of ₹6,000.

20 NUMALIGARH REFINERY LIMITED (NRL) GETS NAVRATNA STATUS

Numaligarh Refinery Ltd (NRL) has been accorded **'Navratna' status.** It becomes the **27th Central Public Sector Enterprise (CPSE)** to be accorded the status.

ABOUT

- The 3 million metric tonnes per annum (MMTPA) capacity petroleum refinery is situated at Numaligarh in Golaghat district of Assam.
- It had an annual turnover of ₹25,147 crores, housing net profits of ₹1,608 crores for FY 2024-25.
- India's central public sector enterprises (CPSEs) are classified into three major categories – Miniratna, Navratna and Maharatna CPSEs.
- The main aim of assigning the "ratna" statuses was to give operational freedom and decision-making power to the state-run entities.

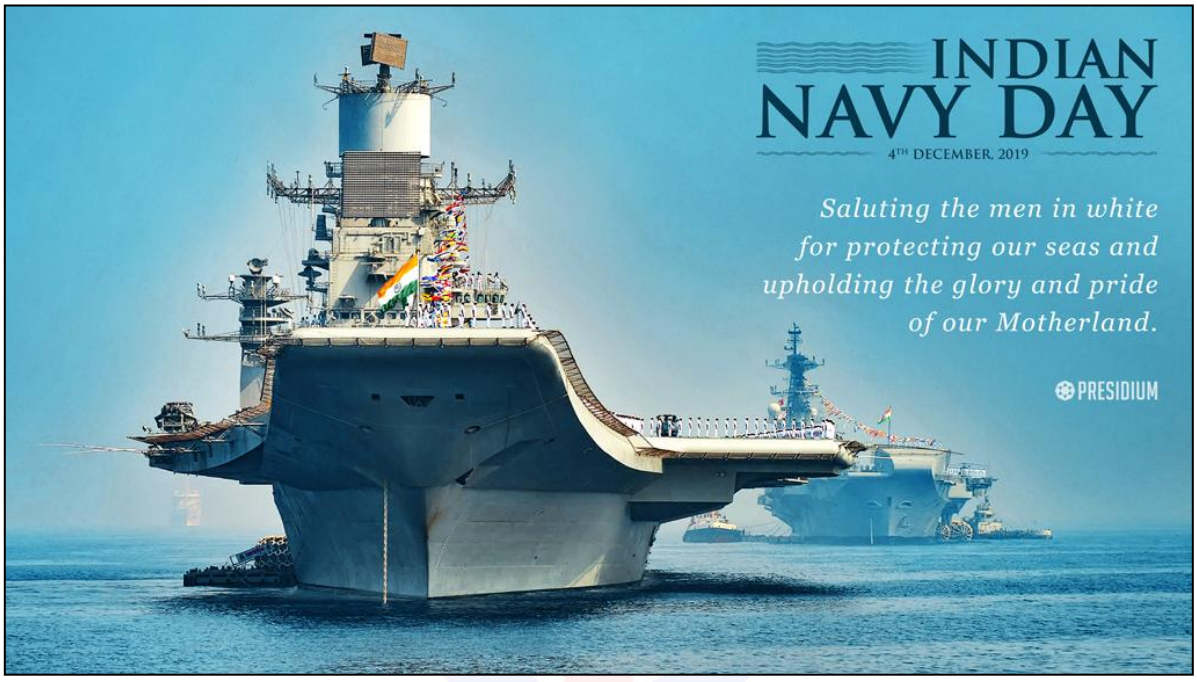
CLASSIFICATION

- **Miniratna Status:** CPSEs are put in two sub-categories under the Miniratna status – Miniratna-I and Miniratna – II.
- **Category-I status:** CPSEs which reported profits in three consecutive years, have a pre-tax profit of ₹30 crore or more in at least one of the three years, and have a positive net worth are classified as a Miniratna-I PSU.

- **Category-II status:** PSUs with a profit for the last three successive years and have a positive net worth are classified as Miniratna-II companies.
- **Navratna status:** PSUs that have a Miniratna-I status and have obtained an "Excellent" or "Very Good" MoU rating in three out of the last five years and have a composite score of 60 or more in six selected performance indicators are eligible.
- **Maharatna status:** A PSU is eligible for being granted a "Maharatna" status, in case it meets the following criteria:
    - Should have a "Navratna" status
    - Should be listed on the Indian stock exchanges
    - Should be compliant with minimum shareholding norms
    - Average annual turnover of more than ₹25,000 crore and average annual net worth of over ₹15,000 crore in the last three years
- Average annual net profit of over ₹5,000 crore in the last three years along with significant global presence.
- BHEL, BPCL, Coal India, GAIL, HPCL, Indian Oil, NTPC, ONGC are some of the Maharatna PSUs.

21 INDIAN NAVY DAY

Navy Day is celebrated on the 4th of December every year to recognise the achievements and role of the Indian Navy.



ABOUT

- It was on this day in 1971, during Operation Trident, that the Indian Navy sank four Pakistani vessels, including PNS Khaibar.
- This year, the Navy Day is being celebrated with a spectacular Operational Demonstration at Shangumugham beach in Thiruvananthapuram, Kerala.

DO YOU KNOW?

- The Indian Navy operates as a modern blue-water force with over 67,000 personnel and about 150 ships and submarines.
- Before 1972, Navy Day shifted multiple times, first observed on the Royal Navy's Trafalgar Day (October 21), then on 1 December, and later on 15 December.

22 STATE OF GLOBAL LAND & WATER RESOURCES (SOLAW 2025)

The Food and Agriculture Organization (FAO) of the United Nations recently released The State of the World's Land and Water Resources for Food and Agriculture (SOLAW 2025).

SOLAW: LAND & WATER FOR FOOD

- It is FAO's flagship report on land and water management, aimed at promoting sustainable use to achieve food security and rural development.
- First published in 2011, it bridges scientific knowledge with communication and outreach to guide coherent national and international policymaking.
- By examining trends in sustainable land, soil, and water management at the landscape level, SOLAW strengthens FAO's work on natural resource management.

LATEST FINDINGS

- The report warns that agriculture must produce 50% more food by 2050 to meet global demand, but this will intensify pressure on already strained land, soil, and water resources.
- Since 1964, production has tripled mainly through intensification—higher-yield crops, irrigation, and technology—while farmland expanded only 8%.
- Agriculture now covers one-third of Earth's land and uses 72% of global freshwater, leading to water scarcity, groundwater overuse, and degradation of over 1.6 billion hectares of land, much of it farmland.

- This cycle of degraded soils, declining water, and deforestation is undermining agriculture's foundations and weakening food system resilience.

SUGGESTIONS

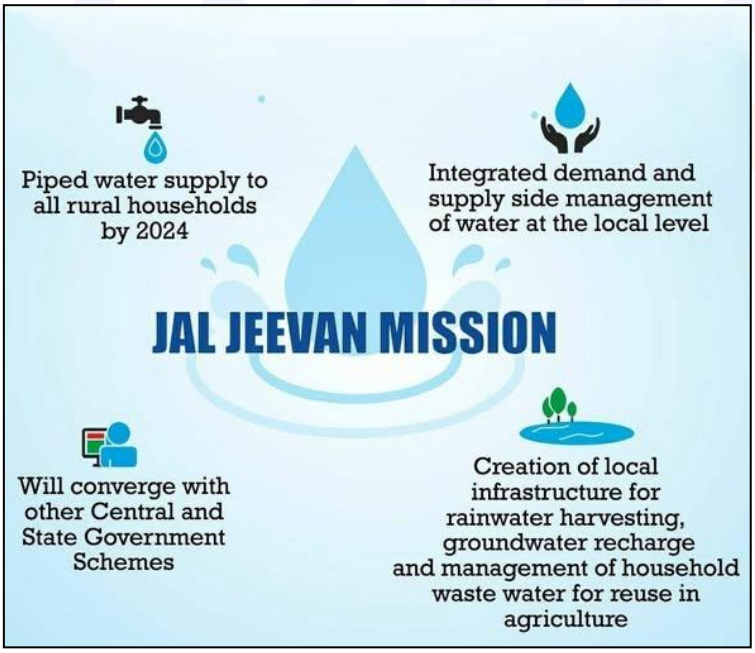
- The report stresses that expansion is no longer viable; future gains must come from sustainable intensification—closing yield gaps, diversifying into resilient crops, and adopting resource-efficient, locally tailored practices.
- Integrated systems such as agroforestry, rotational grazing, forage improvement, and rice-fish farming are highlighted as pathways to feed up to 10.3 billion people by 2085 while safeguarding ecosystems.

23 U.P. REPORTED MAXIMUM COMPLAINTS OVER JAL JEEVAN MISSION PROJECTS

Uttar Pradesh reported the highest number of complaints and constituted about 84% of the total complaints received over financial irregularities and poor quality of work under the Jal Jeevan Mission.

JAL JEEVAN MISSION (JJM)

- **Launch Year:** 2019
- **Type:** Centrally Sponsored Scheme
- **Nodal Ministry:** Department of Drinking Water & Sanitation (DDWS), Ministry of Jal Shakti
- **Background:** The National Rural Drinking Water Programme (NRDWP) was restructured and subsumed into JJM.
- **Objective:** Ensure Functional Household Tap Connection (FHTC) to every rural household with 55 litres per capita per day (lpcd) of potable water.
- **Funding Pattern:** 90:10 (Himalayan States (Uttarakhand, Himachal Pradesh) & North-Eastern States)
- 100% (Union Territories) & 50:50 (other states)
- **Progress:** Tap water access in rural India has expanded rapidly, rising from 3.23 crore households (16.7%) to an additional 12.48 crore households connected since then.



24 DOMESTIC SYSTEMICALLY IMPORTANT BANKS (D-SIBS)

RBI's 2025 list confirms that State Bank of India, HDFC Bank, and ICICI Bank continue as Domestic Systemically Important Banks (D-SIBs).

ABOUT D-SIBS

- D-SIBs are banks considered "too big to fail."
- Their collapse can trigger system-wide financial instability, so they are placed under special regulation and higher supervision.
- Concept introduced globally after the 2008 Global Financial Crisis.
- Based on Basel-III guidelines, RBI released the D-SIB framework in 2014, it identifies banks based on: Size (Total exposures), interconnectedness, substitutability (difficulty of replacing services) & complexity.
- Banks are placed in different buckets (0 to 4) depending on systemic importance.
- Higher the bucket means higher additional Common Equity Tier 1 (CET-1) capital requirement.

25 NAVY'S NEW CATEGORY IN INDIAN MARITIME DOCTRINE 2025

The Indian Navy's Maritime Doctrine 2025, released by Chief of Naval Staff Admiral Dinesh Tripathi.

INDIAN MARITIME DOCTRINE

- It is the Navy's apex guidance document, laying down the principles that govern its strategy, roles and employment across the full spectrum of conflict.
- It was First released in 2004, revised in 2009 and amended in 2015.

FEATURES OF 2025 EDITION

- It reflects major shifts in India's maritime environment and strategic outlook over the past decade.
- It formally recognises "no-war, no-peace" as a distinct operational category for the first time, reflecting modern grey-zone maritime challenges like coercion and hybrid tactics.
- It prioritises jointmanship by aligning with tri-service joint doctrines towards ensuring interoperability across the armed forces.

RELEVANCE

- The updated doctrine incorporates major shifts in India's maritime environment since 2015.
- It aligns with national visions such as Viksit Bharat 2047, Sagarmala, PM Gati Shakti, Maritime India Vision 2030, Maritime Amrit Kaal Vision 2047 and MAHASAGAR.

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