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WEEKLY ROUNDUP

Weekly Roundup — Week 12 (Mar 16–22, 2026)

19 March 2026

SUBJECTS COVERED

SCIENCE & TECH

ENVIRONMENT

ECONOMY

HISTORY & CULTURE

POLITY

SECURITY & DEFENCE

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CURATED & WRITTEN BY**Bharat Choudhary**

UPSC Educator & Content Creator •

[linkedin.com/in/epicbharat](https://www.linkedin.com/in/epicbharat)

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WEEK OVERVIEW

A week of space technology, wetland conservation, and naval diplomacy milestones.

ISRO's CE20 cryogenic engine cleared a crucial hot test for LVM3 upgrades.

Deepor Beel wetland faced fresh threats from road construction. **NavIC's IRNSS-1F**

atomic clock failure tested India's navigation resilience. **Sahitya Akademi Awards**

2025 celebrated literary excellence across 24 languages. **World Bank committed**

\$300 million for Uttar Pradesh's clean air programme. **Göbekli Tepe** — humanity's

oldest known monument — came back into focus. The **BHAVYA scheme** outlined

India's Rs 33,660 crore industrial park ambition. And **IOS SAGAR's second edition**

deepened India's Indian Ocean maritime diplomacy.

SCIENCE & TECHNOLOGY

ISRO CE20 Cryogenic Engine — Hot Test and LVM3 Upgrade

ISRO successfully completed a **22-tonne-thrust hot test** of the upgraded **CE20 cryogenic engine** at the **ISRO Propulsion Complex (IPRC), Mahendragiri, Tamil Nadu** — a milestone in the LVM3 rocket's upgrade programme for **Gaganyaan** and commercial heavy-lift missions.

CE20 engine facts:

Propellants: Liquid Hydrogen (LH₂) + Liquid Oxygen (LOX) — cryogenic propellants (stored at -253°C and -183°C respectively)

Thrust: 20 tonnes (baseline) → upgraded to **22 tonnes** with enhanced nozzle and fuel mixing

Role: Upper stage (C25 stage) engine for **LVM3 (Launch Vehicle Mark-3)**, formerly GSLV Mk-III

Heritage: Used in Chandrayaan-2, Chandrayaan-3 (LVM3 missions), and OneWeb commercial launches

Why cryogenic engines matter:

Cryogenic propulsion provides the **highest specific impulse (Isp) among chemical rockets** — ~450 seconds vs. ~280 for solid fuel

Higher Isp = more payload to orbit per kg of fuel — critical for heavy satellites and deep space missions

Only 6 nations/agencies possess indigenous cryogenic engine technology: USA, Russia, EU, China, Japan, India (CE7.5 and CE20)

Gaganyaan connection: CE20 upgrades improve LVM3’s payload capacity — critical for **Gaganyaan human spaceflight mission** targeting 2027.

UPSC Angle — GS-3 / S&T: ISRO’s rocket family (PSLV → GSLV Mk-I/II → LVM3 → NGLV Soorya); specific impulse (Isp) concept; cryogenic vs. liquid vs. solid propulsion; Gaganyaan programme timeline; IPRC Mahendragiri mandate; India’s space economy target (\$44 billion by 2033).

NavIC — IRNSS-1F Atomic Clock Failure

The **IRNSS-1F satellite** (part of India’s **NavIC constellation**) experienced failure of its onboard **atomic clocks** — raising questions about NavIC’s redundancy and India’s navigation sovereignty.

NavIC (Navigation with Indian Constellation) — key facts:

Feature	Detail
Full name	NavIC (NavIC = Navigation with Indian Constellation); also IRNSS (Indian Regional Navigation Satellite System)
Constellation	8 satellites (7 operational + 1 spare)
Coverage	India + 1,500 km surrounding region
Accuracy	~5 metres (standard); <1 m (restricted military service)
Frequency bands	L5 + S band
Controlling body	ISRO (Space Applications Centre, Ahmedabad)
Use cases	Navigation, timing, disaster management, fisheries (Matsya Sampada Yojana)

Atomic clock — what failed:

Each IRNSS satellite carries **3 atomic clocks** (Rubidium + Caesium backup)

Atomic clocks provide nanosecond-level timing accuracy — essential for GPS/navigation (1 nanosecond error = 30 cm position error)

IRNSS-1F lost multiple clocks; remaining satellites compensate but redundancy is reduced

India's response: ISRO fast-tracking **NVS (NavIC Velocity Spectrum) series** replacement satellites with L1 frequency band (compatible with commercial chipsets — a key limitation of current NavIC which lacks L1).

UPSC Angle — GS-3 / S&T: NavIC vs. GPS vs. GLONASS vs. Galileo vs. BeiDou comparison; GPS denial scenarios (strategic importance of indigenous navigation); Matsya Sampada Yojana (NavIC-enabled fishing vessel alerts); NavIC-enabled mobile phones (BIS mandate since 2023); atomic clock technology (Rubidium vs. Caesium vs. optical lattice clocks).

MXene Catalyst — IIT Guwahati's Hydrogen and Desalination Breakthrough

Researchers at **IIT Guwahati** developed a novel **MXene-based photocatalyst** capable of simultaneously generating **hydrogen fuel** via water splitting and **desalinating seawater** using solar energy — a dual-function clean energy breakthrough.

What are MXenes?

MXenes (pronounced “max-eens”) are a family of **2D transition metal carbides/nitrides** — discovered in 2011 by Drexel University (USA)

Formula: $M_{n+1}X_nT_x$ where M = early transition metal (Ti, V, Nb), X = C or N, T = surface functional groups

IIT Guwahati's material: Ti_3C_2 (Titanium Carbide MXene) — modified with photocatalytic nanoparticles

Why this matters:

Green hydrogen via photocatalytic water splitting uses sunlight (not electricity) — potentially the cheapest pathway to clean hydrogen

Simultaneously using the same energy to drive **solar desalination** addresses two crises with one material

India targets **5 MMT green hydrogen production by 2030** (National Green Hydrogen Mission, Rs 19,744 crore)

UPSC Angle — GS-3 / S&T + Environment: National Green Hydrogen Mission 2023; photocatalysis vs. electrolysis (PEM + Alkaline); 2D materials (graphene → MXenes evolution); India's water stress (170 million lack clean water access); solar-powered desalination potential in coastal states; hydrogen storage challenges.

ENVIRONMENT & ECOLOGY

Deepor Beel – Guwahati’s Ramsar Wetland Under Threat

Deepor Beel – Guwahati’s only **Ramsar Wetland** – faced fresh threats from illegal earth cutting at the adjacent **Kalshila area** to facilitate a **NHIDCL road project**, sparking protests from conservation groups and a National Green Tribunal (NGT) intervention.

Deepor Beel – key facts:

Feature	Detail
Location	Southwest Guwahati, Assam
Area	~40 sq km (shrinking due to encroachment)
Ramsar designation	2002 (India’s 19th Ramsar site at the time)
Unique status	Only Ramsar site in Assam; Important Bird Area (IBA)
Wildlife	219+ bird species (Great Adjutant Stork, Spot-billed Pelican, Asian Openbill); Asian Elephant corridor
Threats	Encroachment, railway line, road projects, solid waste dumping, sewage, invasive weeds

The Kalshila crisis:

NHIDCL (National Highways and Infrastructure Development Corporation Ltd) project requires earth from Kalshila hill (adjacent to beel)

Earth cutting destabilises the watershed, increases silt load into the beel, and destroys elephant corridor

NGT has issued notices; Green Guwahati Campaign and conservation NGOs seek stay

UPSC Angle – GS-3 / Environment: Ramsar site conservation obligations; NGT’s original jurisdiction under NGT Act 2010; Wetland Rules 2017; Montreux Record (wetlands under threat) process; NHIDCL (Ministry of Development of North Eastern Region, MDoNER + MoRTH); Northeast India’s rich wetland biodiversity; Great Adjutant Stork (IUCN Endangered, found primarily in Assam + Cambodia).

World Bank \$300 Million UP Clean Air Programme

The **World Bank** committed **USD 300 million (~Rs 25,790 crore)** for Uttar Pradesh’s **Clean Air Programme** – targeting PM 2.5 reduction in **20 districts** including **5 major cities**: Lucknow, Agra, Kanpur, Varanasi, and Prayagraj.

The crisis: Uttar Pradesh has the **world's worst PM 2.5 pollution levels** consistently. The Indo-Gangetic Plain is trapped in a pollution bowl by the Himalayas and Aravalli hills — preventing airshed dispersal.

Programme components:

Source apportionment studies — map contribution of each pollution sector (transport, industry, crop burning, brick kilns, construction)

e-Bus fleet + EV infrastructure for urban transport

Industrial stack monitoring — real-time CEMS (Continuous Emission Monitoring Systems) mandatory

Agricultural residue management (Punjab/Haryana stubble burning drifts to UP)

Biomass cook-stove replacement in rural UP

National Clean Air Programme (NCAP):

Launched 2019; target: **40% reduction in PM 2.5/PM 10 by 2026** (base year 2017)

131 cities designated Non-Attainment Cities; UP has the most

City Action Plans (CAPs) prepared; implementation lagging

UPSC Angle — GS-3 / Environment: NCAP targets; PM 2.5 vs. PM 10 distinction; WHO air quality guidelines (5 µg/m³ annual PM 2.5 vs. India's 15 µg/m³ standard); World Bank IBRD loan modality; Air (Prevention and Control of Pollution) Act 1981; SAFAR (System of Air Quality and Weather Forecasting and Research); crop residue burning and Article 48A (DPSP); Indo-Gangetic Plain as a climatic trap.

ECONOMY & DEVELOPMENT

BHAVYA Scheme — Rs 33,660 Crore Plug-and-Play Industrial Parks

The government launched the **BHAVYA (Bharatiya Hastasheela, Vikas, Yojana for Artisans)** scheme — actually a **Rs 33,660 crore, 10-year industrial park development programme** under DPIIT — creating **plug-and-play manufacturing ecosystems** across 20+ states to reduce India's industrial land/infrastructure barrier to manufacturing.

What “plug-and-play” means:

Industrial parks where all utilities (power, water, gas, broadband, effluent treatment) are pre-built before tenants arrive

Investors need only bring machinery and workers — no 3–5 year land+utility development wait

Targeted at **electronics, textiles, chemicals, pharmaceuticals, food processing** — sectors needing rapid ramp-up

Scale and targets:

Rs 33,660 crore central outlay; State governments provide land and co-invest

100 parks planned; each 500–2,000 acres

Target: **Rs 1 lakh crore additional GVA** and **20 lakh new jobs** by 2033

UPSC Angle — GS-3 / Economy: PM GatiShakti National Master Plan; National Industrial Corridor Development Programme (NICDP — Delhi-Mumbai, Amritsar-Kolkata, etc.); NIMZ (National Investment and Manufacturing Zones); PLI scheme synergy; Special Economic Zones (SEZ) Act 2005 vs. industrial parks; land acquisition and state consent challenges.

ITDC Tribal Homestay — Tourism for Tribal Livelihoods

The **Ministry of Tourism** launched an **ITDC (India Tourism Development Corporation) Tribal Homestay Capacity Building Programme** — training tribal communities across India to offer **quality homestay experiences** to domestic and international tourists, generating supplemental income without displacement.

Key features:

Training in hospitality, hygiene, local cuisine presentation, English communication, digital payments

Integration with **Incredible India's tribal tourism circuit** (e.g., Chhattisgarh's Bastar, Odisha's Koraput, Nagaland's Hornbill Festival, Rajasthan's Bhil areas)

ITDC provides **QR code + PCI DSS-compliant payment infrastructure** to tribal homestays

Policy context: Tribal tourism is part of India's **Swadesh Darshan 2.0** scheme's "Sustainable and Responsible Tourism" theme. Key tribal areas — ecologically fragile; tourism must avoid resource depletion.

UPSC Angle — GS-2 / Social Issues + Economy: ITDC's mandate (under Ministry of Tourism); Swadesh Darshan 2.0 (thematic circuits); tribal welfare provisions (5th/6th Schedule); TRIFED (Tribal Cooperative Marketing Development Federation); Van Dhan Vikas Kendras; ecotourism as alternative livelihood for forest communities; PESA Act 1996 (Panchayats Extension to Scheduled Areas).

POLITY & GOVERNANCE

Jan Vishwas Amendment Bill 2025 — Withdrawn from Lok Sabha

The **Jan Vishwas (Amendment of Provisions) Bill, 2025** — which would have decriminalised an additional **67 provisions across 18 Acts** — was **withdrawn from Lok Sabha** following concerns raised by a Parliamentary Standing Committee about inadequate stakeholder consultation and potential environmental compliance weakening.

Parent Act — Jan Vishwas (Amendment of Provisions) Act, 2023:

Decriminalised **183 provisions across 42 Acts** — converting jail terms into monetary fines for minor/technical violations

Goal: reduce regulatory over-criminalisation that deters businesses and professionals

Key decriminalised areas: food adulteration (minor), press/publication offences, agricultural market violations, professional registration delays

Why the 2025 Amendment was controversial:

Proposed decriminalising penalties under **Environment Protection Act 1986** and **Air/Water Pollution Acts** — converting criminal penalties to civil fines

Critics argued: criminal liability for pollution is a key deterrent; converting to fines may incentivise payment over compliance

Standing Committee recommended further study; government chose withdrawal over confrontation

UPSC Angle — GS-2 / Polity: Regulatory reform in India; ease of doing business rankings (India: 63rd in 2020 World Bank EODB before discontinuation); decriminalisation vs. deregulation distinction; Parliamentary Standing Committees (composition, mandate); MCA's (Ministry of Corporate Affairs) regulatory simplification track; WTO commitments and regulatory standards.

HISTORY, ART & CULTURE

Göbekli Tepe — The Monument That Rewrote Civilisation

Göbekli Tepe (meaning “Potbelly Hill” in Turkish) in **southeastern Turkey (Şanlıurfa province)** — the world’s oldest known monumental structure — came back into academic focus with new findings challenging the timeline of organised human social complexity.

Key facts:

Age: ~9,600–8,200 BCE (approximately **11,600–11,800 years old**)

UNESCO World Heritage Site: Inscribed 2018

Architecture: Massive T-shaped limestone pillars (up to 5.5 metres tall, weighing 10–20 tonnes) arranged in circular enclosures; carved with animal reliefs (fox, boar, crane, snake)

Why it rewrites history:

Previously: “Neolithic Revolution” (agriculture → settled society → monument building) was considered linear

Göbekli Tepe was built by **hunter-gatherers**, 1,000–2,000 years **before** widespread agriculture in the region

Implies: **social organisation and religious/ritual complexity preceded agriculture**, not the other way around — possibly religion drove the need to settle and farm, not vice versa

Current interpretations: Ritual gathering site for hunter-gatherer communities from a wide region; the effort to build and maintain it may have accelerated the development of agriculture (to feed large gatherings).

India connection: India's own Mesolithic/Neolithic sites (Bhimbetka, Lahuradewa — oldest rice cultivation site in UP, ~7,000 BCE; Mehrgarh, Pakistan — ~7,000 BCE Neolithic) fit into this revised global understanding of gradual, parallel social complexity development.

UPSC Angle — GS-1 / History: Neolithic Revolution and its debate; Fertile Crescent (Turkey-Iraq-Syria-Israel-Jordan arc) as agriculture's cradle; Mehrgarh and early South Asian Neolithic; Bhimbetka's rock art; India's Mesolithic sites (Adamgarh, MP; Mirzapur, UP); UPSC trend of asking about world archaeological sites in GS-1 prelims.

INTERNATIONAL RELATIONS

IOS SAGAR — Indian Navy's Second Edition Maritime Diplomacy Mission

The **Indian Navy's IOS (Indian Ocean Ship) SAGAR** embarked on its **second edition** — a naval diplomacy mission to **Indian Ocean Region (IOR) island and coastal states** including Mozambique, Tanzania, and Seychelles, conducting Humanitarian Assistance and Disaster Relief (HADR) training, medical camps, and maritime patrol coordination.

IOS SAGAR context:

SAGAR: India's Indian Ocean doctrine — **Security and Growth for All in the Region** (PM Modi, March 2015, Mauritius)

MAHASAGAR (2025 upgrade): **Mutual and Holistic Advancement for Security And Growth Across Regions** — specifically India's IOR island and littoral state engagement

IOS SAGAR ship conducts: port calls, joint exercises, capacity building, medical camps, and hydrographic surveys for coastal states lacking such capability

What IOS SAGAR does:

Medical diplomacy: Ship's hospital team conducts eye camps, gynaecology, general medicine in host country

Technical capacity building: Shares navigation safety, SAR (Search and Rescue), counter-piracy training

Hydrographic survey: Charts shallow-water areas for host-country maritime safety

Strategic context:

India's island diplomacy competes with China's **“String of Pearls”** (Chinese port investment: Hambantota Sri Lanka, Gwadar Pakistan, Djibouti military base)

India's counter: maritime assistance without debt-trap conditionality

UPSC Angle — GS-2 / IR: SAGAR doctrine; MAHASAGAR framework; India-Africa maritime cooperation; CSC (Colombo Security Conclave) + IOS SAGAR complementarity; India's First Responder mandate in IOR; Indian Navy's deployment under Mission-Based Deployments (MBDs); HADR role in maritime diplomacy.

★ FACTS CORNER — WEEK 12 KNOWLEDGEPEDIA (MAR 16–19, 2026)
ISRO CE20 CRYOGENIC ENGINE:

Thrust upgraded: 20 → 22 tonnes; tested at IPRC Mahendragiri, Tamil Nadu
 Propellants: Liquid Hydrogen (LH₂, -253°C) + Liquid Oxygen (LOX, -183°C)
 Used in: LVM3 upper stage (C25 stage); Chandrayaan-2, Chandrayaan-3, OneWeb missions
 Specific impulse (Isp): ~450 s (cryogenic) vs. ~280 s (solid) — higher Isp = more payload per fuel kg
 Nations with cryogenic engine tech: USA, Russia, EU, China, Japan, India (6 total)

NAVIC IRNSS-1F:

NavIC: 8 satellites (7 operational + 1 spare); regional coverage: India + 1,500 km; accuracy ~5 m
 Frequencies: L5 + S band; limitation: no L1 (NVS series will add L1 for chipset compatibility)
 IRNSS-1F: atomic clock failures (Rubidium + Caesium); 3 clocks per satellite
 Atomic clock accuracy: nanoseconds; 1 ns error = 30 cm position error
 NVS series (NavIC Velocity Spectrum): replacement series with L1 band; under development

DEEPOR BEEL:

Location: SW Guwahati, Assam; ~40 sq km; Ramsar site since 2002; only Ramsar site in Assam
 Status: IBA (Important Bird Area); 219+ bird species; Great Adjutant Stork (IUCN Endangered)
 Threat: NHIDCL road project; earth cutting at Kalshila; NGT intervention sought
 NHIDCL: National Highways and Infrastructure Development Corporation Ltd; MoRTH + MDoNER

WORLD BANK UP CLEAN AIR (\$300M):

Loan: USD 300M (IBRD); Rs 25,790 crore; 20 districts; 5 cities: Lucknow, Agra, Kanpur, Varanasi, Prayagraj
 UP = world's worst PM 2.5 consistently; Indo-Gangetic Plain = airshed trap (Himalayas + Aravalli)
 NCAP: National Clean Air Programme, 2019; target 40% PM 2.5/PM 10 reduction by 2026 (base 2017)
 131 Non-Attainment Cities; India's standard: 15 µg/m³ PM 2.5 annual; WHO guideline: 5 µg/m³

SAHITYA AKADEMI AWARDS 2025:

India's highest literary honour; awarded annually in 24 languages
 Sahitya Akademi: est. 1954; autonomous body; Ministry of Culture; HQ New Delhi (Rabindra Bhavan)
 Not a Padma Award; separate from Jnanpith Award (literary award by Bharatiya Jnanpith, private)
 24 languages recognised by Sahitya Akademi (includes some not in 8th Schedule)

GÖBEKLI TEPE:

Location: Şanlıurfa province, southeastern Turkey; UNESCO WHS 2018
 Age: ~9,600–8,200 BCE (~11,600–11,800 years old); T-shaped limestone pillars (up to 5.5 m, 20 tonnes)
 Built by: hunter-gatherers (predates agriculture by 1,000–2,000 years in the region)
 Significance: religion/ritual complexity preceded agriculture — rewrites Neolithic Revolution model
 India analogue: Bhimbetka Rock Shelters (MP, UNESCO 2003, 30,000+ years); Mehrgarh (Pakistan, 7,000 BCE)

BHAVYA SCHEME:

Rs 33,660 crore; 10 years; DPIIT; 20+ states; 100 industrial parks planned; 500–2,000 acres each
 Plug-and-play: power + water + gas + broadband + ETP pre-built before investor arrives

Target sectors: electronics, textiles, chemicals, pharma, food processing

Jobs target: 20 lakh by 2033; GVA target: Rs 1 lakh crore additional

MXENE CATALYST (IIT GUWAHATI):

Material: Ti_3C_2 (Titanium Carbide MXene); 2D transition metal carbide; discovered 2011 (Drexel Univ., USA)

Function: photocatalytic water splitting (green hydrogen) + solar desalination — simultaneous

National Green Hydrogen Mission 2023: Rs 19,744 crore; target 5 MMT green hydrogen by 2030

Green hydrogen pathways: photocatalysis (sunlight) + electrolysis (PEM + Alkaline)

IOS SAGAR:

SAGAR: Security and Growth for All in the Region (PM Modi, March 2015, Mauritius)

MAHASAGAR: 2025 upgrade framework for IOR island/coastal engagement

2nd edition: Mozambique, Tanzania, Seychelles; medical camps, SAR training, hydrographic survey

India's counter to China's String of Pearls: soft power maritime presence without debt conditionality

JAN VISHWAS AMENDMENT BILL 2025:

Withdrawn from Lok Sabha; reason: Standing Committee concern over environmental penalty weakening

Parent act: Jan Vishwas (Amendment) Act 2023; decriminalised 183 provisions in 42 Acts

Withdrawal mechanism: government introduces withdrawal motion; vote not required if Lok Sabha approves

ITDC TRIBAL HOMESTAY:

Ministry of Tourism; ITDC (India Tourism Development Corporation; under MoT); tribal community capacity building

Swadesh Darshan 2.0: sustainable + responsible tourism theme; tribal circuit integration

TRIFED: Tribal Cooperative Marketing; Van Dhan Vikas Kendras (tribal enterprise hubs)

OTHER RELEVANT FACTS:

IRNSS = Indian Regional Navigation Satellite System; NavIC branding used from 2016; 7+1 satellite constellation

INS SAGAR ship (different from IOS SAGAR designation): the vessel name may vary; the programme is IOS SAGAR

IIRC Mahendragiri (Tamil Nadu): ISRO's main propulsion testing centre; liquid + cryogenic engine hot-fire tests

Şanlıurfa/Urfa: ancient Mesopotamian city; near ancient Harran (Abraham's settlement in some traditions); key for Biblical/Quranic archaeology

Sources: PIB, The Hindu, Indian Express, ISRO

CURATED & WRITTEN BY

Bharat Choudhary

UPSC Educator & Content Creator

 linkedin.com/in/epicbharat

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