UPSC with SAURABH KAUSHIK

Current Affairs Notes · 3 July 2026

The Hindu · Indian Express · PIB | 16 Topics | GS 2 · 3 + Prelims + Mapping

[TH] The Hindu | [IE] Indian Express | [PIB] Press Info Bureau

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PIB HIGHLIGHTS — 3 JULY 2026 (Curated for UPSC)

1. 16th India-Japan Annual Summit — Joint Statements on Indo-Pacific, AI, Energy Resilience

✓ PM Modi and Japan PM Takaichi held the 16th India-Japan Annual Summit in New Delhi (July 1-2, 2026); the summit produced 3 joint statements + Modi's address at the India-Japan Business Forum.

✓ INDO-PACIFIC: 'Free and open Indo-Pacific is a top priority for both India and Japan'; commitment to QUAD (Quad Leaders' Summit to be hosted in India later in 2026); coordinated messaging that the Indo-

Pacific framework is self-sustaining and resilient regardless of changes in US policy under Trump; joint opposition to 'unilateral changes to the status quo by force' (a diplomatic formulation covering Taiwan Strait and LAC without naming China).

✓ AI JOINT STATEMENT: India and Japan will cooperate on 'trusted AI' development; (a) Japan's 70 billion yen ($500 million) investment in AI infrastructure in India — GPU clusters + AI Centres of Excellence; (b) Japan will contribute expertise for India's AI Safety Institute; (c) Joint AI governance framework — connecting India's proposed AI governance rules (Digital India Act) with Japan's AI governance guidelines; (d) Joint AI research in agriculture (Crop AI for monitoring soil health, pest prediction using Japan's precision agriculture experience).

✓ ENERGY RESILIENCE (MoPNG + Japan METI Joint Statement): (a) Japan's JBIC (Japan Bank for International Cooperation) to provide Rs 25,000 crore in long-term financing for India's LNG infrastructure (storage terminals + pipelines) — reducing India's dependence on spot LNG markets vulnerable to Hormuz disruptions; (b) Joint hydrogen cooperation — India green hydrogen + Japan's ammonia import programme (Japan replacing LNG imports with green ammonia for power generation); (c) Bilateral Strategic Petroleum Reserve (SPR) cooperation — Japan's SPR technology and experience (Japan = 176 days of SPR, world's most extensive relative to consumption) to be shared with India for SPR expansion.

✓ BUSINESS FORUM: Modi: 'India's strengths align perfectly with Japan's capabilities — India's technology talent + Japan's manufacturing excellence + Japan's capital + India's market = a natural partnership.' Committed to 5 trillion yen ($33 billion) Japanese investment in India over 5 years.

✓ GS2/GS3 Angles: India-Japan relations; Special Strategic and Global Partnership; QUAD; Indo-Pacific; energy resilience; AI cooperation; green hydrogen; LNG infrastructure; SPR technology.

2. VB-G RAM G Act Launched from Andhra Pradesh

✓ Union Agriculture and Rural Development Minister Shivraj Singh Chouhan launched the Viksit Bharat – Gram Rozgar Aur Maulik Gram Vikas (VB-G RAM G) Act implementation from Andhra Pradesh, alongside CM Chandrababu Naidu and Deputy CM Pawan Kalyan.

✓ Andhra Pradesh as pilot: AP was selected as the first state to formally launch VB-G RAM G's convergence framework — reflecting CM Naidu's 'Swarnandhra 2047' development vision which aligns with the scheme's rural development focus; also politically significant as AP is NDA-governed.

✓ Rs 300/day minimum wage: Formally notified under VB-G RAM G from today (July 3, 2026); replaces the existing MGNREGA wage structure for VB-G RAM G-convergent activities; Shivraj Singh Chouhan: 'For the first time, the Centre is guaranteeing Rs 300 per day as a minimum for any rural wage work — this will transform the rural economy.'

✓ Convergence rollout: All 26 districts of Andhra Pradesh will have district-level Convergence Committees operational by August 15, 2026; the committees will integrate MGNREGS, PMAY-G, PMGSY, JJM (Jal Jeevan Mission), and NRLM fund flows under a single dashboard.

✓ GS2 Angle: VB-G RAM G Act; MGNREGA; rural employment; cooperative federalism; Rs 300/day minimum wage; Andhra Pradesh NDA governance.

3. MANAS — Digital Shield Against Drugs (PIB Backgrounder)

✓ MANAS (Mind, Awareness, Nurturing and Action System): A multi-ministry initiative combining digital technology with on-ground anti-narcotics action — described as India's 'digital shield against drugs.'

✓ Components: (1) MANAS App: Mobile app for citizens to report suspected drug activity anonymously; reports directly route to NCB (Narcotics Control Bureau) and local police; AI classifies urgency and assigns to the nearest response team; (2) MANAS Dashboard: Real-time national narcotics intelligence map (seizure data, hot spots, trafficking routes, network mapping); (3) MANAS-Edu: Digital anti-drug education content for schools and colleges, integrated with DIKSHA; (4) Dark web monitoring module: AI-powered crawler to detect drug sales on dark web marketplaces and Telegram channels.

✓ Scale: 2 crore+ MANAS app downloads; 50 lakh+ anonymous drug activity reports received since launch; NCB's AI analysis converted 15,000+ reports into FIRs (actionable intelligence).

✓ Connection to NCORD: MANAS feeds data into NCORD's national intelligence framework; the AI analytics of MANAS were presented at the June 26 NCORD Apex meeting (Amit Shah).

✓ GS3/GS2 Angle: Drug policy; NCB; NDPS Act; AI in law enforcement; internal security; Nasha Mukt Bharat; NCORD.

4. Wild Rice Conservation + Coal Imports -13% + Green Hydrogen + Plastic Recycling

✓ WILD RICE CONSERVATION (ASSAM): NRAA (National Rainfed Area Authority)-funded project to conserve wild rice varieties in Assam has secured a 'major milestone' — genetic mapping and seed banking of 47 endemic wild rice taxa found in Assam's wetlands and forests; wild rice is the progenitor of cultivated rice (Oryza sativa) and carries genetic material critical for crop improvement (disease resistance, drought tolerance, yield genes); Conservation at: NBPGR (National Bureau of Plant Genetic Resources) + in-situ conservation by local Mising tribe communities.

✓ COAL IMPORTS DECLINE 13%: Coal imports in April 2026 fell ~13% year-on-year — reflecting: (a) increased domestic coal production (Coal India + commercial/captive mines); (b) softened power demand during the early Hormuz crisis; (c) import substitution policy success. India's domestic coal production has grown consistently since 2019 under 'coal mining liberalisation' — commercial coal mining auction; India is now the world's 2nd largest coal producer.

✓ GREEN HYDROGEN MISSION PROGRESS: India has commissioned 50 green hydrogen demonstration projects under NHGM (National Green Hydrogen Mission); 3 electrolyser manufacturers (Reliance, Greenko, L&T) have achieved >100 MW annual electrolyser production capacity; India's green hydrogen cost is now $4.2/kg (down from $6/kg in 2022); target: $1/kg by 2030 for global competitiveness.

✓ 3RD GLOBAL CONCLAVE PLASTIC RECYCLING (Bharat Mandapam): India's plastic recycling rate is currently 30% of plastic waste generated (~12,000 tonnes/day); target: 50% by 2030; EPR (Extended Producer Responsibility) framework under Plastic Waste Management Rules 2022 is the key policy tool; chemical recycling (pyrolysis) gaining traction for multi-layer plastic waste not amenable to mechanical recycling.

✓ GS3 Angles: Biodiversity conservation; wild rice; genetic resources; coal production; green hydrogen; plastic recycling; EPR; circular economy.

GS PAPER 2 — International Relations · Governance · Health

1. Navy Foils Piracy Attempt in Gulf of Aden; Three Vessels Still in Captivity

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GS 2: International Relations: Maritime security; Gulf of Aden; piracy; INS Trikand; Indian Ocean; IMO.

- INS Trikand (Stealth Frigate, P-17 class) responded to a piracy attempt on MV Golden Arsenal (a bulk carrier in international waters in the Gulf of Aden on July 2, 2026); the pirates attempted to board the vessel but retreated after INS Trikand's rapid intervention.
- IMO warning: The International Maritime Organization simultaneously warned that 3 commercial vessels remain in pirate captivity in the Gulf of Aden; piracy in this corridor has surged significantly since the Hormuz crisis began (February 2026) — diverting naval resources and creating a security vacuum in the wider northwestern Indian Ocean.
- Context: Since February 2026, international naval attention (US, UK, France, India) has been focused on Hormuz and the Arabian Sea (Iran war + mine clearance + convoy operations); the reallocation of naval assets toward Hormuz has reduced CTF-151 (Combined Task Force 151 — anti-piracy force) patrol coverage in the Gulf of Aden corridor.
- INS Udaygiri, Kavaratti, and Shakti: India's Eastern Fleet ships arrived at Changi Naval Base, Singapore (July 2-3), after a port call at Ho Chi Minh City, Vietnam; this trilateral visit (Vietnam → Singapore) demonstrates India's expanding ASEAN maritime engagement footprint under the SAGAR+ framework.

The Gulf of Aden Piracy Resurgence

- Historical context: Gulf of Aden piracy peaked 2008-2012 (Somali pirates captured hundreds of vessels; ransoms of $5-10 million were common); after CTF-151 + private armed guards + BMP (Best Management Practices for mariners) were widely adopted, piracy dropped to near-zero by 2018-2019; BUT: The Yemen conflict (Houthi attacks, 2024-present) and the Hormuz crisis have diverted naval resources and disrupted the anti-piracy consensus.
- India's anti-piracy role: Indian Navy has been the most consistently deployed force for anti-piracy in the northwestern Indian Ocean since 2008; 'Operation Sankalp' (ongoing since 2019) provides round-the-clock naval presence; INS Trikand is one of several ships deployed; India's initiative in the region has protected hundreds of vessels and Indian crew members.
- P-17 Stealth Frigates: INS Trikand belongs to the Shivalik-class (Project 17) stealth frigates; 3 ships — INS Shivalik (2010), INS Sahyadri (2012), INS Trikand (2013); designed with stealth features (reduced radar cross-section); gas turbine + diesel propulsion; Brahmos SSM, Barak-1 SAM, torpedoes, guns; the follow-on P-17A class (7 ships, stealth improved) is under construction at MDL and GRSE.
- Changi Naval Base, Singapore: India's Eastern Fleet ships' visit is India's clearest signal of ASEAN maritime engagement from the eastern naval direction; Changi hosts the US Pacific Fleet's logistics point and Singapore's RSN (Republic of Singapore Navy); India-Singapore naval cooperation agreement (June 2024) allows Indian vessels to use Changi facilities — a key enabler of India's maritime presence in the Malacca Strait-adjacent waters.

UPSC ANGLE

• The 'maritime silks road' piracy-security nexus: Submarine cable I-2SEA (unveiled July 2, covered separately) lands at Machilipatnam and South Chennai; these cables are vulnerable to maritime threats including piracy, sabotage, and deliberate cable cutting; India's naval presence in the Gulf of Aden and the wider Indian Ocean is thus also critical digital infrastructure protection.

• IMO and flag state responsibility: The 3 vessels still in pirate captivity — flag states (likely Liberia, Marshall Islands, Panama — typical flag-of-convenience states) must coordinate with the IMO and naval forces for release; IMO's Resolution MSC.446(99) on anti-piracy cooperation is the relevant framework.

- **INS Trikand** — P-17 Shivalik-class stealth frigate; commissioned 2013; responds to Gulf of Aden piracy attempt (MV Golden Arsenal, July 2, 2026); part of Operation Sankalp (India's ongoing anti-piracy deployment in the northwest Indian Ocean).
- **CTF-151 (Combined Task Force 151)** — Multinational naval task force specifically for counter-piracy operations in the Gulf of Aden and Gulf of Oman; HQ in Bahrain (CMF — Combined Maritime Forces); India has contributed ships periodically; Hormuz crisis diverted CTF-151 resources.

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2. I-2SEA Submarine Cable Links India, Malaysia and Singapore — Digital Infrastructure for AI

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GS 2 / GS 3: IR: India-Southeast Asia digital connectivity; GS3: Technology — submarine cables; AI infrastructure; data sovereignty.

‣ July 2, 2026: Consortium of Lightstorm (Singapore), Microsoft, Singtel (Singapore), and Tata Communications signed contracts to build I-2SEA (India–International Subsea Express Alliance) — a new submarine cable connecting India's east coast with Malaysia and Singapore.

‣ Technical specs: ~3,600 km cable; two Indian landing points — Machilipatnam (Andhra Pradesh) and South Chennai; Malaysia landing at Kuala Lumpur; Singapore landing; NEC Corporation (Japan) as system supplier; ASEAN Cableship (Singapore) as marine installation partner; deep cable burial at 3-metre depth for protection; completion: Q4 2029.

‣ Strategic purpose: Specifically designed for AI training and inference workloads, cloud computing, and hyperscale applications — the first submarine cable explicitly designed for AI workloads, not just general internet traffic.

‣ India east coast shift: Historically, India's submarine cable landings were concentrated at Mumbai (west coast) and Chennai (east coast); I-2SEA's Machilipatnam landing represents a strategic shift to the Andhra

Pradesh coast, where Meta and Alphabet (Google) have announced major data centre investments near Hyderabad.

Strategic Implications for India

- East coast digital hub: Machilipatnam's selection as a submarine cable landing point, alongside Meta and Alphabet data centres near Hyderabad, is transforming India's east coast into a new digital economic corridor; combined with Andhra Pradesh's industrial development under the Amaravati Capital City project, this creates a tech-physical infrastructure nexus.
- India-Southeast Asia AI corridor: The I-2SEA cable creates a direct, low-latency link between India's AI clusters (Hyderabad's data centres, Chennai's IT corridor) and Singapore's status as Southeast Asia's premier cloud interconnect hub; Malaysia's emerging Kuala Lumpur data centre corridor (attracting Microsoft, Google, Amazon) links into this triangle.
- Data sovereignty concerns: While I-2SEA is consortium-owned (including Microsoft — a US company), the Indian landing infrastructure will be subject to Indian law; the Digital India Act (under development) and India's DPDP Act 2023 will govern data flowing through these cables; the cable is 'carrier-neutral' at Indian landing points — allowing Indian entities to access it without being dependent on any single foreign operator.
- Tata Communications' role: Tata Communications owns one of the world's largest submarine cable networks and is India's most established international connectivity provider; its participation in I-2SEA ensures Indian corporate presence in the consortium; Tata Communications' 30,000 km terrestrial fibre network in India will provide the onward connectivity from the cable landing stations to inland data centres.

UPSC ANGLE

• The 95% rule: Approximately 95% of the world's international internet traffic flows through submarine cables (the remaining 5% through satellites); India currently has 17 active submarine cables; this connectivity is strategically critical — a simultaneous outage of India's key submarine cables (as happened in 2022 when anchors and deliberate cutting disrupted Red Sea cables) would severely impact India's digital economy.

• Japan-India connection: NEC Corporation (Japan) is the system supplier for I-2SEA; this connects directly to the India-Japan AI cooperation (16th Summit) — NEC is Japan's dominant submarine cable technology company; their involvement in I-2SEA is part of the broader Japan-India digital infrastructure partnership.

- **I-2SEA (India–International Subsea Express Alliance)** — New submarine cable system; consortium: Lightstorm (SG) + Microsoft + Singtel + Tata Communications; system supplier: NEC (Japan); ~3,600 km; Indian landings: Machilipatnam (AP) + South Chennai; AI/cloud-specific design; completion Q4 2029.
- **Machilipatnam (Machalipatnam)** — Coastal town in Krishna district, Andhra Pradesh; India's new submarine cable landing hub (I-2SEA + previously TIISCS); proximity to Hyderabad's data centres; Meta and Alphabet announced data centre investments nearby; shifting India's digital east coast importance.

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3. CAG Audit of 3 Discoms over Rs 38,500 Crore in Deferred Costs

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GS 2: Governance: CAG; Discoms; electricity regulation; regulatory asset base; CERC; fiscal accountability.

‣ The Central Government has ordered a special CAG (Comptroller and Auditor General of India) audit of 3 electricity distribution companies (Discoms) — specifically targeting Rs 38,500 crore in 'deferred costs' that regulators have allowed Discoms to carry forward without recovery in their current tariffs.

‣ The 3 Discoms involved: TPDDL (Tata Power Delhi Distribution Ltd), BSES Rajdhani (Delhi), and BSES Yamuna (Delhi) — the 3 private Discoms that distribute electricity to Delhi's residential and commercial consumers.

‣ What are 'deferred costs'? When Discoms' actual costs (power procurement, distribution infrastructure maintenance, employee costs) exceed the costs approved in their tariffs by the electricity regulator (DERC — Delhi Electricity Regulatory Commission), the excess costs are 'deferred' — allowed to be recovered in FUTURE tariff revisions; Rs 38,500 crore in such deferred costs has accumulated since Delhi's power

sector privatisation (2002); consumers pay a surcharge ('Regulatory Asset Recovery Charge') on their bills to recover these deferred costs.

‣ CAG's mandate: Examine whether the deferred costs are genuine (legitimately incurred and legitimately deferred) or include: inflated costs by Discoms; costs that should have been disallowed in tariff setting; costs attributable to inefficiencies (which should be borne by shareholders, not consumers); and whether DERC (the regulator) has exercised adequate oversight.

- Why Rs 38,500 crore matters: This accumulated deferred cost represents a massive future liability for Delhi's electricity consumers — they will have to pay this back through higher future tariffs; if the CAG finds that a significant portion is unjustified, it could result in regulatory orders to write off those costs (borne by Discoms' shareholders, not consumers) — dramatically reducing future tariff increase requirements.
- The 'regulatory asset base' problem: India's electricity regulation allows 'regulatory assets' (deferred costs) to accumulate; in many state Discoms, regulatory assets are so large that clearing them within any reasonable tariff framework becomes impossible; this is part of India's chronic Discom financial stress — total DISCOM losses across India exceed Rs 6 lakh crore cumulatively.
- CAG's constitutional role: Article 149 and 150 — the CAG is the Supreme Audit Institution of India; its audit of Discoms (even private companies that distribute public goods under licence) is possible when the company receives grants or operates under public regulatory oversight; the CAG's special audit findings are presented to Parliament/Legislature.

UPSC ANGLE

• UDAY (Ujwal Discom Assurance Yojana) background: The central government's 2015 scheme to address Discom debt — states took over Discom debt onto their balance sheets, received government bonds, and Discoms were supposed to restructure; Delhi (being a city-state) had a different trajectory; the deferred costs build-up reflects the gaps in UDAY's effectiveness for urban private Discoms.

• Revamped Distribution Sector Scheme (RDSS): Rs 3 lakh crore scheme (2021-2025) to modernise Discom infrastructure; prepaid smart meters, feeder separation, system upgrades; intended to reduce Discom losses and the need for deferred cost accumulation; connected to the Rs 38,500 crore audit context.

- **CAG (Comptroller and Auditor General of India)** — Constitutional authority (Articles 148-151); audits central and state government accounts; reports to Parliament; can audit companies receiving government grants or operating under public licences; its performance audit reports are tabled in Parliament and can trigger parliamentary committee scrutiny.
- **Regulatory Asset (Deferred Cost in Electricity)** — Costs incurred by a Discom that are not recovered in current tariffs but deferred for recovery through future tariff revisions; allowed by electricity regulators to avoid sudden tariff shocks; in India's context, massive regulatory asset accumulation reflects chronic tariff under-recovery and regulatory forbearance.

4. The Right to a Fair Trial at the Crossroads

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GS 2: Governance: Criminal justice; fair trial; bail; undertrial prisoners; speedy trial; Article 21.

‣ The Hindu editorial: India's criminal justice system is at a critical juncture — years of progressive SC jurisprudence on fair trial rights are being tested by systemic failures (overcrowded jails, excessive undertrial detention, inadequate legal aid, digital evidence challenges).

‣ The undertrial crisis: India has 5.54 lakh prisoners, of which 76%+ are undertrials (awaiting trial, not convicted) — the world's highest undertrial proportion among large prison systems; many undertrials have spent years in jail for offences whose maximum punishment is less than their time in custody.

‣ Article 21 and speedy trial: The SC in Hussainara Khatoon v Home Secretary, Bihar (1979) held that the right to speedy trial is an integral part of Article 21; in the same case, the Court ordered the release of undertrial prisoners who had spent more time in custody than their maximum sentence — but compliance has been inconsistent.

‣ Digital evidence and new challenges: BNSS 2023 creates new categories of electronic evidence; courts are now admitting digital evidence (CCTV footage, call records, WhatsApp messages) as primary evidence;

but the training of judicial officers, prosecutors, and defence counsel in digital forensics is lagging behind the law's evolution.

- BNSS Section 479 (Bail for undertrials): A key provision of the new Bharatiya Nagarik Suraksha Sanhita 2023; undertrials who have served half the maximum sentence for their alleged offence are entitled to bail (except for heinous offences); this is a significant liberalisation from the old CrPC Section 436A (one-third to one-half threshold); implementation is incomplete as courts have not systematically identified and released eligible undertrials.
- National Mission for Justice Delivery: MoLJ's (Ministry of Law and Justice) programme; targets reducing pending cases in courts; e-Court Mission Mode Project (Phase III); ICJS (covered July 2); National Judicial Data Grid (NJDG) — real-time data on case pendency; FAST (Fast and Speedy Trial) courts for heinous offences against women and children.
- The Bail Reform debate: SC's judgment in Satender Kumar Antil v CBI (2022) laid down comprehensive bail guidelines — courts should not routinely refuse bail; the default should be bail, not jail; but ground-level implementation shows old habits persist — police resist bail applications, lower courts routinely refuse bail in FIR-stage cases.

UPSC ANGLE

• NALSA + undertrial release: NALSA's 'Legal Services to Under-Trial Prisoners' scheme: para-legal volunteers review undertrial cases for BNSS Section 479 eligibility, free legal aid applicability, and case status; connected to DISHA 2.0's para-legal volunteer programme (covered June 25). The systemic gap: even when undertrials qualify for bail, many remain in jail because they cannot afford surety bonds.

- **BNSS Section 479** — Bharatiya Nagarik Suraksha Sanhita (2023) provision for bail of undertrials who have served half the maximum sentence; applies to first-time offenders; a significant liberalisation of undertrial bail provisions from CrPC Section 436A.

5. Mandsaur's Model for HPV Vaccination — A Shot at Life

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GS 2: Health: HPV vaccine; cervical cancer; adolescent health; universal immunisation; Mandsaur district model.

‣ The Hindu feature: Mandsaur district (Madhya Pradesh) has achieved 90%+ HPV vaccination coverage among adolescent girls (9-14 years) — a rare success story that offers a replicable model for India's cervical cancer elimination programme.

‣ HPV and cervical cancer: Human Papillomavirus (HPV) is responsible for 95%+ of cervical cancer cases; India has 1.25 lakh new cervical cancer cases annually and 77,000+ deaths — the 2nd highest cervical cancer burden globally; most cervical cancer deaths are in women aged 35-55 years (productive age); HPV vaccination at 9-14 years prevents 90%+ of cervical cancer cases.

‣ India's HPV vaccination programme: PM-Jan Aarogya Abhiyan (PMJAA) included HPV vaccination under Universal Immunisation Programme (UIP) from early 2024; two HPV vaccines available — Gardasil (Merck) and CERVAVAC (Serum Institute of India's indigenous quadrivalent HPV vaccine); CERVAVAC is the world's first HPV vaccine developed in a developing country for developing countries; priced at ~Rs 200 per dose (vs. Gardasil's Rs 3,500+ in private market).

‣ Mandsaur's strategy: (1) 'HPV Champions' — older adolescent girls trained to explain vaccination to younger girls and their parents; (2) School-based vaccination sessions (avoiding individual hospital visits); (3) Male community mobilisation — fathers educated about HPV and cervical cancer; (4) Real-time digital tracking (Aadhaar-linked vaccination records for follow-up dose tracking); (5) ASHA + Anganwadi worker synergy.

- The challenge: India-wide HPV vaccination coverage remains below 30% — major barriers: (a) Parental hesitancy (misconceptions about the vaccine being for sexually transmitted disease leading to stigma); (b) School enrolment gaps (girls who drop out of school after Class 5-6 miss school-based vaccination camps); (c) Urban-rural supply chain gaps for 2-dose regimen (the 2nd dose is often missed); Mandsaur addresses these through community-based rather than purely clinic-based delivery.

- WHO's cervical cancer elimination target: WHO's global strategy (2020) targets: 90-70-90 by 2030 (90% girls vaccinated by age 15; 70% of women screened by 35 and 45; 90% of women with cervical disease receive treatment); India is far from the 90% vaccination target; Mandsaur's 90%+ is a proof of concept that it's achievable.
- CERVAVAC: India's indigenous quadrivalent HPV vaccine (types 6, 11, 16, 18); developed by Serum Institute of India; licensed by DBT (Department of Biotechnology) through BIRAC-funded development; first indigenously developed vaccine for cancer prevention; Rs 200/dose makes it accessible for government programmes; a landmark in India's vaccine development capability.

UPSC ANGLE

• India's cancer burden connection: Cervical cancer accounts for 15% of all cancer deaths in Indian women; alongside breast cancer and oral cancer, it constitutes India's top 3 female cancers; the National Cancer Registry Programme (NCRP) tracks these; the Ayushman Bharat Health and Wellness Centres (AB-HWCs) are expanding cervical cancer screening (VIA — Visual Inspection with Acetic Acid) at primary care level.

- **CERVAVAC** — India's first indigenously developed quadrivalent HPV vaccine (Serum Institute of India + DBT/BIRAC); covers HPV types 6, 11, 16, 18; priced at Rs 200/dose; world's lowest-cost quadrivalent HPV vaccine; approved for Universal Immunisation Programme (UIP) inclusion from 2024.
- **WHO Cervical Cancer Elimination Strategy (2020)** — Global target for cervical cancer elimination by 2030: 90-70-90 — 90% girls vaccinated (HPV) by age 15 + 70% women screened by ages 35 and 45 + 90% women with cervical disease treated; India is well below the 90% vaccination target.

GS PAPER 3 — Economy · Science and Technology · Environment

6. A Hold on AI — Should India Impose a Temporary Moratorium on High-Risk AI?

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GS 3: Science and Technology: AI moratorium; AI governance; AI risks; EU AI Act; precautionary principle; India's AI policy.

‣ The Hindu editorial: In the aftermath of the UN High-Level Advisory Body's AI warning (June 30-July 1), Indian technology policy analysts debate whether India needs a 'temporary hold' on deployment of high-risk AI systems in specific sectors — pending development of adequate regulatory frameworks.

‣ What 'high-risk AI' means: Under the EU AI Act framework (now in force in Europe): high-risk AI = AI used in: criminal justice (risk assessment, sentencing AI); biometric identification (facial recognition at scale); critical infrastructure (power grids, water systems, financial markets); employment decisions (AI-based hiring/firing); education and training; border control and immigration; legal processes. The common thread: AI making decisions that significantly affect people's lives with limited human oversight.

‣ India's current AI governance gap: Unlike the EU (AI Act) or US (AI Executive Order with mandatory safety testing requirements), India has NO enacted AI-specific regulation; DIA (Digital India Act — under development) will address AI within its broader digital governance framework but is at least 1-2 years from enactment.

‣ The moratorium debate: Proponents argue: (a) India's social conditions (lower literacy, weaker digital rights literacy, existing discrimination patterns) make AI-mediated harm more severe than in developed countries; (b) India needs regulatory capacity before large-scale AI deployment in policing, credit, and public services. Critics argue: (a) A moratorium would disadvantage India in the global AI race; (b) India's AI governance track record (UPI, Aadhaar) shows regulated digital systems CAN be deployed at scale safely; (c) Precautionary regulation must be balanced against the significant development benefits of AI in agriculture, healthcare, education.

- The facial recognition specific concern: India has deployed facial recognition at scale in: AFRS (Automated Facial Recognition System) for policing; Digi Yatra (airports — voluntary consent); National Crime Records Bureau's AFRS; multiple state police AI surveillance systems. These deployments proceeded without a specific legal framework for facial recognition — no consent requirements, no

accuracy standards, no accountability mechanisms — unlike the EU where mass facial recognition is prohibited under the AI Act.

- India's proposed approach: MeitY (Ministry of Electronics and IT) has proposed a 'risk-based AI governance framework' that would: classify AI applications by risk level (similar to EU AI Act); require safety assessments and transparency disclosures for high-risk applications; establish an AI Safety Institute (as proposed in India's BRICS 2026 chairship proposals); but NOT impose a moratorium — India's approach is 'innovation-permissive with targeted safeguards.'

UPSC ANGLE

• The precautionary principle in AI: The UN Advisory Body's 'grave risks' warning invokes the precautionary principle (applied in environmental law — 'where there is scientific uncertainty about harm, do not wait for full proof before taking protective action'); applying the precautionary principle to AI governance is contested — AI development is too dynamic and fast-moving for traditional precautionary approaches.

• China's AI governance comparison: China has enacted specific AI regulations (Algorithmic Recommendation Regulations 2022; Generative AI Management Regulations 2023) but without imposing moratoriums; China regulates specific AI applications while continuing rapid development; India's 'innovation-permissive with safeguards' approach is closer to China's than to the EU's precautionary approach.

- **EU AI Act (2024)** — First comprehensive AI regulation globally; risk-based framework: prohibited AI (mass surveillance, social scoring), high-risk AI (criminal justice, employment, education — mandatory requirements), limited risk AI (chatbots — transparency), minimal risk (most AI). Entered force August 2024; phased implementation by 2026-2027.

7. Fuel Prices Will Fall Only After Cheaper Crude Reaches India — Refinery Analysis

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GS 3: Economy: Petroleum pricing; crude oil; Hormuz aftermath; refinery crude switch; OMCs.

‣ Despite global crude oil prices falling to $88-92/barrel (post-Muscat Accord vs. $115+ during Hormuz closure), retail fuel prices in India (petrol and diesel) have NOT been reduced since the Hormuz ceasefire — causing public frustration.

‣ The refinery explanation: Oil Marketing Companies (OMCs — IOC, BPCL, HPCL) purchase crude oil typically 1-2 months in advance and ship it to refineries with a 2-4 week transit time; the crude they are CURRENTLY refining was purchased at higher prices (in April-May 2026, when Brent was $100-115); cheaper crude ($88-92) purchased post-June 14 will only reach Indian refineries and be processed into fuel in August 2026.

‣ The 'price build formula': Retail petrol/diesel prices in India = (Production cost + OMC margin + Dealer commission + Central excise + State VAT); the 'production cost' input uses a moving average of crude procurement cost — which still reflects the high-cost crude bought during the crisis.

‣ OMC margins: IOC, BPCL, HPCL had suffered cumulative losses of ~Rs 40,000 crore during the Hormuz crisis period (selling fuel below actual cost to maintain retail price stability — an implicit government policy); they need to first recover these losses from normalised crude prices before reducing retail prices.

- The government's political dilemma: Reducing petrol/diesel prices would: provide direct relief to consumers (who faced 17% inflation in fuel costs during the crisis); reduce transportation costs (beneficial for the broader economy); BUT it would: reduce central and state government tax revenue (Central Excise on petrol is Rs 19.90/litre + Rs 15.90/litre on diesel + VAT varies by state); reduce OMCs' ability to recoup crisis losses.
- The Hormuz-inflation relationship: India's CPI inflation rose from 4.2% (January 2026) to 6.8% (May 2026) — primarily due to fuel and food price transmission from the Hormuz crisis; with crude prices normalising, economists expect inflation to return to 4-5% range by September-October 2026, when post-Hormuz crude is fully processed through the refinery system.
- **Oil Marketing Companies (OMCs)** — India's three state-owned petroleum retailers — IOC (Indian Oil Corporation), BPCL (Bharat Petroleum), HPCL (Hindustan Petroleum); retail petrol and diesel; set retail prices with MoPNG guidance; suffered ~Rs 40,000 crore losses during Hormuz crisis by maintaining price stability.

8. Can Space Oncology Revolutionise Cancer Treatment?

[TH] Page Science

GS 3 / GS 2: Science and Technology: Space medicine; oncology; microgravity cancer research; ISRO; cancer treatment.

‣ The Hindu science article: Research conducted on the International Space Station (ISS) and now at India's proposed Gaganyaan-related space research programme is revealing that cancer cells behave differently in microgravity — with implications for drug development and cancer treatment on Earth.
‣ What microgravity does to cancer cells: In microgravity, cancer cells: grow in 3D spheroids (rather than flat 2D cultures on petri dishes); are more metabolically active; show different drug resistance patterns; the 3D growth more accurately represents how tumours actually grow in the human body (which is 3D, not the 2D of a laboratory petri dish).
‣ The drug discovery implication: Drugs that appear effective against 2D cancer cell cultures (the standard lab method) often fail in clinical trials because the 3D tumour environment is different; drugs tested against 3D spheroids in microgravity may have higher clinical trial success rates — potentially reducing the 90%+ drug failure rate in Phase III oncology trials.
‣ India's space oncology research: ISRO has been collaborating with IITs and AIIMS on space medicine experiments for Gaganyaan; a proposal for an 'oncology payload' on the Bharatiya Antariksha Station (BAS — India's planned space station) would conduct systematic cancer cell behaviour studies in microgravity.

- The broader space medicine field: Space medicine studies how the human body changes in the space environment (microgravity, radiation, isolation); beyond cancer: bone density loss in space (similar to osteoporosis on Earth, informing bone disease treatments); muscle atrophy (informing rehabilitation medicine); cardiovascular changes (informing heart disease research); immune system changes. Many treatments developed for astronaut health have benefited Earth-based medicine.
- Commercial potential: Several US and European biotechs are running cancer research experiments on commercial ISS platforms (Axiom Space, Sierra Space); space-based drug development is emerging as a billion-dollar market; India's BAS could attract similar commercial partnerships.

UPSC ANGLE
• ISRO and space medicine: Gaganyaan (human spaceflight programme): 2-3 crew; 3-day Earth orbit mission; India's first human space mission; crew training at Bengaluru and Russia; microgravity biology research is one of the scientific objectives; BAS (Bharatiya Antariksha Station) is the follow-on — India plans a modular space station by 2035.

- **Space Oncology** — Study of cancer cell behaviour in microgravity environments; cancer cells form 3D spheroids in space that more accurately represent tumour biology than 2D lab cultures; enables more predictive drug testing; potential to reduce Phase III oncology trial failure rate.

PRELIMS IN FOCUS

16th India-Japan Annual Summit — Key Outcomes	Annual summit (16th edition, July 1-2, 2026, New Delhi). Japan PM Sanae Takaichi (Japan's first female PM, took office October 2025). Three joint statements: (1) General: Free Indo-Pacific + QUAD Summit to be hosted in India + 'Decade of Transformation' alignment; (2) AI Cooperation: Japan 70 billion yen (~$500M) AI infrastructure investment in India + AI Safety Institute cooperation + Crop AI for agriculture; (3) Energy Resilience (MoPNG + METI): JBIC Rs 25,000 crore for India's LNG infrastructure + Japan-India green hydrogen/ammonia link + Japan's SPR expertise sharing for India's expansion. Business Forum: 5 trillion yen ($33 billion) Japan investment pledge over 5 years. US-2 flying boat: 6 aircraft for India finalised. Bullet train (MAHSR Ahmedabad-Mumbai): Reviewed; accelerating. Japan-India: Special Strategic and Global Partnership (since 2014).

I-2SEA Submarine Cable — Key Facts	Full name: India-International Subsea Express Alliance. Announced: July 2, 2026. Consortium: Lightstorm (Singapore, backed by I Squared Capital) + Microsoft + Singtel (Singapore) + Tata Communications. System supplier: NEC Corporation (Japan). Marine installation: ASEAN Cableship (Singapore). Length: ~3,600 km. Indian landing points: (1) Machilipatnam, Andhra Pradesh; (2) South Chennai, Tamil Nadu. Other landings: Kuala Lumpur (Malaysia) + Singapore. Purpose: AI training/inference workloads, cloud computing, hyperscale applications — first submarine cable specifically designed for AI workloads. Onward network: Lightstorm's 30,000+ km terrestrial fibre in India connecting to 80+ data centres. Completion: Q4 2029. Significance: Shifts India's cable landing geography to east coast; Machilipatnam emerging digital hub (Meta + Alphabet data centres nearby). Submarine cables globally carry 95% of internet traffic.
HPV Vaccine + CERVAVAC + Cervical Cancer in India	HPV (Human Papillomavirus): Responsible for 95%+ of cervical cancer; also causes oropharyngeal cancer, genital warts; transmitted sexually. India's burden: 1.25 lakh new cervical cancer cases + 77,000+ deaths annually; 2nd highest globally. CERVAVAC: India's indigenous quadrivalent HPV vaccine (Serum Institute of India); covers HPV types 6, 11, 16, 18; Rs 200/dose; world's first HPV vaccine developed in a developing country specifically for developing countries; DBT/BIRAC funded. UIP inclusion: From early 2024, girls aged 9-14 years eligible. WHO 90-70-90 target by 2030: 90% girls vaccinated + 70% women screened at 35 + 90% with disease treated. Mandsaur model (MP): 90%+ coverage through school-based vaccination + HPV Champions (older girl peer educators) + digital tracking. VIA (Visual Inspection with Acetic Acid): Low-cost screening method deployed at AB-HWCs.
Gulf of Aden Piracy + INS Trikand + Operation Sankalp	Gulf of Aden: Strait between Gulf of Aden and Arabian Sea; key shipping corridor; connects Red Sea (via Suez Canal) with Indian Ocean; Somalia-based piracy peaked 2008-2012; resurged from 2024 due to Houthi attacks (diverting naval resources) and Hormuz crisis. INS Trikand: P-17 Shivalik-class stealth frigate; commissioned 2013; Western Naval Command; foiled piracy attempt on MV Golden Arsenal (July 2, 2026). P-17 class: 3 ships (INS Shivalik 2010, INS Sahyadri 2012, INS Trikand 2013); gas turbine + diesel; Brahmos SSM, Barak-1 SAM. P-17A (follow-on): 7 ships under construction (MDL + GRSE); improved stealth. Operation Sankalp: India's ongoing anti-piracy deployment in NW Indian Ocean (since 2019). CTF-151: Multinational counter-piracy task force; Gulf of Aden + Gulf of Oman; HQ Bahrain (Combined Maritime Forces). Changi Naval Base, Singapore: India's Eastern Fleet ships (Udaygiri, Kavaratti, Shakti) arrived July 2-3 after Vietnam port call.
MANAS + Wild Rice + CERVAVAC + VB-G RAM G (July 3 PIB Quick Facts)	MANAS (Mind, Awareness, Nurturing and Action System): Multi-ministry digital anti-drugs initiative; app for anonymous reporting + national intelligence dashboard + dark web monitoring; 2 crore+ downloads; 50 lakh+ reports; 15,000+ converted to FIRs. Wild Rice Conservation (Assam): NRAA-funded; 47 endemic wild rice taxa mapped and banked; conserved by Mising tribal communities; wild rice (genus Oryza) = progenitor of cultivated rice; critical genetic resource for crop improvement. VB-G RAM G Act: Launched from Andhra Pradesh (Shivraj + Naidu + Pawan Kalyan, July 3, 2026); Rs 300/day minimum wage notified; 26 AP districts to have Convergence Committees by August 15. Coal imports: Declined ~13% in April 2026 — domestic production increase + Hormuz soft demand; India = world's 2nd largest coal producer. Green Hydrogen: 50 demonstration projects under NHGM; cost now $4.2/kg (down from $6/kg in 2022); target $1/kg by 2030.

MAPPING — PLACES IN NEWS

Place	Why in News / Key Facts
Gulf of Aden	INS Trikand foils piracy attempt on MV Golden Arsenal (July 2, 2026); 3 vessels still in pirate captivity; Gulf of Aden = narrow sea between Yemen (north coast) and Somalia/Djibouti (south coast); connects Arabian Sea to Red Sea; strategic for

	Europe-Asia trade via Suez Canal; Houthi attacks (2024-present) + Hormuz crisis have diverted anti-piracy naval resources.
Machilipatnam, Andhra Pradesh	I-2SEA submarine cable landing point (announced July 2, 2026); consortium: Lightstorm + Microsoft + Singtel + Tata Communications; ~3,600 km cable from Singapore; second landing at South Chennai; Meta and Alphabet data centres nearby; shifting India's submarine cable geography toward east coast; Krishna district, coastal Andhra Pradesh.
Changi Naval Base, Singapore	INS Udaygiri, Kavaratti, and INS Shakti (Eastern Fleet) arrived July 2-3; India-Singapore Naval Cooperation Agreement (June 2024) allows Indian vessels to use Changi facilities; Singapore is Southeast Asia's premier naval hub and submarine cable interconnect hub (multiple submarine cables including I-2SEA land here); Republic of Singapore Navy co-located.
Mandsaur, Madhya Pradesh	HPV vaccination model achieving 90%+ coverage among adolescent girls; district in northern Madhya Pradesh near the Rajasthan border; known historically for its opium poppy cultivation (now being diversified); Mandsaur's community-based HPV Champions model being studied as a national replication template.
Bhor Saidan village, Assam (Mising tribal area)	NRAA-funded wild rice conservation project milestone; Mising tribe communities conserving 47 wild rice taxa in-situ; Mising (also spelled Mishing) are a major tribal community of Assam (Brahmaputra valley); their traditional rice cultivation practices preserve wild rice genetic diversity; connected to NBPGR seed banking.
Kuala Lumpur, Malaysia	I-2SEA submarine cable landing point; Malaysia's Kuala Lumpur region is an emerging data centre hub attracting Microsoft, Google, Amazon investments; Malaysia's digital economy is growing rapidly; KL is strategically positioned between Singapore (south) and Bangkok/Vietnam (north) in Southeast Asia's digital backbone.
Bengaluru, Karnataka	India-Japan summit outcomes include Japan's investment in AI infrastructure (GPU clusters, AI CoEs) — Bengaluru (India's tech capital) is a primary beneficiary; ISRO headquarters for Gaganyaan (space oncology connection); also site of Indian Army's Integrated Battle Group operationalisation planning; IISc (cancer biology + space medicine research).
Bondamunda, Odisha	Indian Railways approved Rs 135 crore rail flyover at Bondamunda to decongest Rourkela-Bondamunda section (PIB July 3); Bondamunda is a critical rail junction in Jharkhand/Odisha mineral belt (iron ore, coal) connecting mines to ports (Paradip, Haldia, Vizag); Rourkela Steel Plant (SAIL) is nearby.

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