

# UPSC with SAURABH KAUSHIK

Current Affairs Notes · 18 June 2026

The Hindu · Indian Express · PIB Highlights | GS 1 · 2 · 3 + CME + Prelims + Mapping

[TH] The Hindu

[IE] Indian Express

[PIB] PIB Highlights

## PIB HIGHLIGHTS — 18 JUNE 2026 (Press Information Bureau)

### 1. India–UK CETA: Effective July 15, 2026 — India's Most Ambitious Trade Deal

- ✓ PM Modi (at G7 Évian) announced India–UK Comprehensive Economic and Trade Agreement (CETA) will enter into force on 15 July 2026.
- ✓ Signed: July 2025 during PM Modi's UK visit with PM Keir Starmer; takes effect after domestic ratification processes completed.
- ✓ WHAT INDIA GETS: UK offering 99.1% tariff lines with 100% trade value at zero duty. Zero tariffs on: processed food (up to 70% tariff eliminated), marine products (21.5%), engineering goods/auto components (18%), leather/footwear (16%), textiles/clothing (12%), chemicals/pharma (8%).
- ✓ WHAT UK GETS: India opened 137 service sub-sectors (most comprehensive services deal India has ever signed); IT/ITeS, financial services, healthcare, education, engineering, telecoms; enhanced regulatory certainty for UK service providers.
- ✓ Social Security / Double Contribution Convention (DCC): Also effective July 15; Indian professionals on temporary UK assignments exempt from dual social security contributions; exemption extended from 3 years to 5 years; 75,000+ Indian professionals and 900+ companies benefit.
- ✓ Trade target: £25.5 billion annual boost to bilateral trade; current bilateral trade ~£36 billion (2025) expected to grow to £100 billion by 2030.
- ✓ GS 2/3 Angle: Trade Policy, India's FTA strategy, services trade, post-Brexit UK engagement; Social Security Agreement for professional mobility.

### 2. Defence Production Record — Rs 1.78 Lakh Crore in FY 2025-26

- ✓ Ministry of Defence: India's defence production reached Rs 1.78 lakh crore in FY2025-26 — a new all-time record.
- ✓ Growth trajectory: Rs 1.09 lakh crore (FY2023-24) → Rs 1.27 lakh crore (FY2024-25) → Rs 1.78 lakh crore (FY2025-26).
- ✓ Exports: Defence exports crossed Rs 23,500 crore — a 40% increase year-on-year; India now exports defence equipment to 100+ countries.
- ✓ Key drivers: PLI for defence manufacturing; indigenisation through DPP (Defence Procurement Procedure); iDEX (Innovations for Defence Excellence) startups; Operation Sindoor demonstrated effectiveness of indigenously developed systems.
- ✓ DPSUs (Defence PSUs): Hindustan Aeronautics Ltd (HAL), BEL, BEML, BDL, GRSE, MDL — collectively produced over Rs 80,000 crore in goods.
- ✓ Private sector: Tata Advanced Systems, L&T Defence, Adani Defence, Mahindra Defence — combined output doubled in 3 years.
- ✓ GS 3 Angle: Defence industrialisation, Atmanirbhar Bharat, Make in India — UPSC frequently tests defence production data.

### 3. Green Hydrogen Certification Portal — MNRE (Ministry of New and Renewable Energy)

- ✓ MNRE launched the Green Hydrogen Certification Portal to enhance transparency and credibility in India's Green Hydrogen ecosystem.
- ✓ Purpose: Issues Green Hydrogen certificates verifying that hydrogen has been produced using renewable energy, meeting specified emissions thresholds.
- ✓ India's National Green Hydrogen Mission target: 5 MMTPA (Million Metric Tonnes Per Annum) of green hydrogen production by 2030.
- ✓ Green hydrogen: H<sub>2</sub> produced via electrolysis of water using renewable electricity — zero direct carbon emissions at point of production.
- ✓ Certification importance: For India to export green hydrogen (to Japan, South Korea, EU — which have sustainability mandates), the hydrogen must be certified. Without certification, access to premium export markets is impossible.
- ✓ Framework: Based on Greenhouse Gas (GHG) accounting — defines 'green' as H<sub>2</sub> with lifecycle emissions below a specified threshold (expected: 2 kgCO<sub>2</sub>eq/kgH<sub>2</sub>).
- ✓ GS 3 Angle: Green Hydrogen Mission, clean energy transition, international energy trade, industrial decarbonisation.

### 4. Family ID on DigiLocker — Four States' 37 Crore Citizens Get Digital Access

- ✓ MeitY integrated four state Family ID systems with DigiLocker platform: Jan Aadhaar (Rajasthan, 7.5 crore citizens), Mahasarathi (Maharashtra, 14 crore), MP Samagra (MP, 9.5 crore), UP Family ID (UP, 6 crore). Total: ~37 crore citizens.
- ✓ Family ID: A unique household identifier that links all members of a family for welfare scheme delivery — ensures no duplicate or ghost beneficiaries.
- ✓ DigiLocker integration: Citizens can now access their Family ID card on the DigiLocker app, share it digitally for government services, and use it as an e-KYC document.
- ✓ Significance: Reduces physical document burden; speeds up welfare scheme access; enables data interoperability between state and Central databases.
- ✓ GS 2/3 Angle: Digital India, DBT, Jan Dhan-Aadhaar-Mobile (JAM) trinity, e-governance, welfare delivery.

### 5. PM Viksit Bharat Rozgar Yojana — Rs 2,400 Crore to Be Disbursed on June 19

- ✓ PM Modi to disburse Rs 2,400 crore in employment incentives under PM Viksit Bharat Rozgar Yojana (PMVBRY) on June 19, 2026.
- ✓ PMVBRY: Announced in Union Budget 2024-25; a Direct Benefit Transfer (DBT) scheme providing employment-linked incentives to employers and new employees in the formal sector.
- ✓ Three components: (A) First-time formal sector employee incentive (1 month salary DBT to employee's PF account); (B) EPFO contribution support for new hires in manufacturing; (C) Employer incentive for hiring additional employees at scale.
- ✓ Coverage: 3 crore new jobs expected over 2 years; 30 lakh enterprises eligible; targets formal sector job creation.
- ✓ GS 3 Angle: Labour market formalisation, EPFO, employment-linked incentives, manufacturing sector growth.

### 6. Bharat Innovates 2026 Concludes in Nice, France

- ✓ India's tech showcase concluded at Nice, France (June 13-17, 2026) during PM Modi's Europe tour.
- ✓ 200+ Indian deep-tech startups showcased: AI, space-tech, biotech, climate-tech, fintech, defence-tech.

- ✓ Outcomes: 120+ MoUs/agreements signed with European venture capital firms, corporate R&D departments, and universities.
- ✓ India AI Country Partner: India's MANAV AI governance framework presented to European regulators and investors.
- ✓ A Gateway for Startup-Europe Corridor: Showcases India's startup ecosystem (3rd largest globally) to European investors who have been slower to engage with Indian deep-tech vs. consumer tech.
- ✓ Ministry of Education facilitated; NASSCOM, Startup India, iCreate as co-organizers.

## GS PAPER 2 — International Relations · Polity · Governance

### 1. Modi Meets Trump at G7: Raises Safety of Indian Sailors and Bilateral Agenda

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**GS 2:** International Relations: India–US Relations, India's foreign policy interests, maritime safety, bilateral trade (BTA), defence cooperation, G7 sidelines diplomacy.

- ▶ PM Modi and US President Trump held bilateral talks on the sidelines of the G7 Summit at Évian-les-Bains (June 17, 2026) — their first in-person meeting in over 15 months.
- ▶ Core agenda: Indian seafarer safety in the Gulf (after 3 US attacks on ships with Indian crew); India–US BTA finalisation; energy security; defence.
- ▶ Modi raised the Hormuz seafarer issue directly: 'The safety of Indian nationals must be guaranteed in any conflict zone, including in international maritime corridors.'
- ▶ Both sides expressed satisfaction at the conclusion of the US-Iran MoU (June 14) and discussed the 60-day nuclear window.

#### Key Outcomes of the Modi-Trump Meeting

- **Seafarer safety:** Trump acknowledged India's concern about US naval operations affecting Indian crew members; both sides agreed to establish a direct 'early-warning hotline' between India's DG Shipping (Directorate General of Shipping) and US CENTCOM to pre-notify any planned naval operations that could affect civilian vessels.
- **India-US BTA:** Rubio had said the deal was 'on the verge' (May 26); Modi-Trump meeting confirms negotiations in final stages. Both sides set a 90-day target for completing the India-US Bilateral Trade Agreement — by mid-September 2026. US agreed to review the 25% tariff on Indian steel/aluminium as part of the trade deal discussions.
- **US-Iran deal endorsement:** Modi thanked Trump for the US-Iran MoU ('a significant step for global peace and stability'); emphasised India's stake in full implementation of the 60-day nuclear window; offered India's facilitation if needed.
- **Defence cooperation:** Both sides reaffirmed commitment to INDUS-X (India–US Defence Acceleration Ecosystem); discussed potential co-production of GE F414 engines (powering LCA Tejas Mk2) through HAL-GE partnership.
- **Semiconductors and AI:** iCET (Initiative on Critical and Emerging Technologies) progress reviewed; Modi invited US investment in India's Dholera semiconductor park; Trump indicated US tech companies would expand India operations.



#### The Broader Modi-G7 Week Outcomes

- **India-EU FTA:** EU Commission President von der Leyen announced the FTA will be 'signed by end of 2026' — alongside confirmation of the India-UK CETA entering force July 15. Modi's G7 trip thus produced concrete trade architecture outcomes with the UK, EU, and potentially US.

- India-Canada CEPA: Joint statement noted 'satisfaction of both leaders with progress in negotiations' and 'shared objective of concluding in 2026' — Canada-India ties recovering after the Hardeep Singh Nijjar murder allegations crisis of 2023–24.
- India-Germany meeting: Chancellor Friedrich Merz and Modi discussed: green hydrogen cooperation (Germany is a major green hydrogen market), defence (German subs for Indian Navy, Thyssenkrupp JV with MDL), and supply chain reshoring from China.

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- G7 Diplomatic Architecture: Modi's bilateral meetings at G7 (Trump, Starmer, Macron, Merz, Carney, von der Leyen) represent India's most intensive multilateral diplomatic engagement in 2026 — 7 major bilateral outcomes in 3 days.
- iCET (US-India Initiative on Critical and Emerging Technologies): Launched 2022; covers semiconductors, AI, defence innovation, space, clean energy; INDUS-X is its defence innovation component.
- India-US BTA: India seeks improved H-1B access, defence technology transfer, and elimination of tariffs; US wants lower Indian customs duties on goods and greater market access for agriculture and digital services.

-  **iCET** — Initiative on Critical and Emerging Technologies — US-India framework for cooperation in semiconductors, AI, advanced communications, quantum, space, and defence innovation; launched 2022.
-  **INDUS-X** — India-US Defence Acceleration Ecosystem — connects US and Indian defence startups, investors, and government; enables co-development and co-production of defence technology.

## 2. Iran Nuclear Framework: Tehran's Pledge, \$300 Billion US Relief Package

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**GS 2 / GS 3:** International Relations: West Asia; Nuclear Non-Proliferation Treaty; Iran deal architecture; energy security; India's strategic interests.

- ▶ June 14, 2026 (MoU signing at Muscat, Oman): Formal US-Iran MoU signed — officially known as the 'Muscat Accord'.
- ▶ Tehran's nuclear pledge: Iran committed to: (a) halt enrichment above 60% immediately; (b) seal advanced centrifuge banks at Fordow; (c) allow IAEA inspectors within 10 days; (d) negotiate full enrichment cap (target: 3.67%) in the 60-day window.
- ▶ \$300 billion US relief package: Over 10 years — includes: lifting of oil/petrochemical sanctions (\$50bn/year revenue potential), release of \$180bn in frozen assets (staged over 3 years), full removal of OFAC secondary sanctions on Iranian banks.
- ▶ Pakistan and Oman as guarantors; China and Russia as witness states — multilateral architecture gives Iran confidence the deal won't be unilaterally withdrawn.

### The Full Deal Architecture

- **Phase 1 (Immediate, June 14):** Hormuz reopened; US naval blockade of Iranian ports lifted; IAEA allowed to resume inspections at all declared sites (including Fordow); Iran stopped all enrichment above 60%; \$5–7 billion frozen assets released (South Korea tranche). Oil prices fell from \$115+ to \$88–92/barrel.
- **Phase 2 (60 days, August 13 deadline):** Negotiate: full enrichment cap (3.67%); centrifuge limitations; dismantlement timeline for advanced centrifuges; 'Additional Protocol' IAEA inspections at all sites including military; Iran's ballistic missile programme (separate track — US wants limitations; Iran refuses to negotiate missiles). \$50 billion in additional sanctions relief upon Phase 2 deal.
- **Phase 3 (1 year):** Comprehensive Deal — dismantlement of excess enriched uranium stockpile (in exchange for civil nuclear fuel supply from Russia); full IAEA monitoring including 'snap inspections'; removal of all nuclear-related sanctions. \$180 billion assets fully released in tranches.
- **Multilateral architecture:** Unlike JCPOA (which was primarily US + P5+1 deal), the Muscat Accord has Pakistan and Oman as guarantors; China and Russia as witnesses. This architecture is designed to prevent the US from unilaterally withdrawing (as Trump did in 2018) without significant diplomatic cost.

### India's Immediate Economic Gains

- Oil prices: Brent crude fell from \$115+ to \$88 per barrel within 72 hours of MoU signing — saving India ~\$20–25 billion annually at these price levels vs. war-time prices.
- Rupee recovery: INR strengthened from Rs 97 to Rs 91.5 per USD by June 18 — driven by oil price expectations and returning FPI confidence. This represents a 5.7% rupee appreciation in 4 days.
- Fuel prices: Government announced a Rs 5/litre rollback of petrol and diesel prices on June 18 — partially reversing the Rs 7.5 hike cycle of May 2026.
- Chabahar: India's 10-year Chabahar Port Agreement (2024) fully activated; Iranian transit routes to Central Asia and Afghanistan now operable without secondary sanctions risk.
- Fertiliser supply chain: Qatar LNG flows resuming (tanker Disha demonstrated on June 15); Saudi Arabia-origin DAP shipments resuming through Hormuz; Punjab fertiliser shortage expected to ease by late June.

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- Muscat Accord vs. JCPOA: Key upgrade — multilateral guarantors (Pakistan, Oman) + witness states (China, Russia) make unilateral US withdrawal more costly diplomatically; Iran retains enrichment right but capped; no 'sunset clauses' (JCPOA had provisions expiring after 10–15 years).
- India's economic dividend from the deal: Oil price fall → lower import bill → narrower CAD → rupee appreciation → lower imported inflation → potential fuel price rollback → lower food/fertiliser prices → political-economic virtuous cycle for the government.
- August 13 deadline: If Phase 2 nuclear negotiations fail by August 13, Iran may resume enrichment and US may reimpose blockade. India must have contingency energy plans for this scenario.

- ✂ **Muscat Accord** — The US-Iran MoU signed June 14, 2026 in Muscat, Oman; mediated by Pakistan and Oman; witnessed by China and Russia; establishes 60-day nuclear negotiation window and immediate Hormuz reopening.
- ✂ **OFAC** — US Treasury's Office of Foreign Assets Control — administers US economic sanctions; its licences determine which Iranian transactions are permitted; sanctions relief under the Muscat Accord requires specific OFAC waivers.
- ✂ **Additional Protocol (IAEA)** — A comprehensive nuclear inspections protocol (in addition to standard NPT safeguards) allowing IAEA unannounced 'snap inspections' of any declared or undeclared site; Iran suspended compliance in 2021; Phase 2 seeks its restoration.

### 3. 'Indo-Pacific' No More? US Pacific Command Restored — What It Means

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**GS 2:** International Relations: US Indo-Pacific strategy; Quad; India-US relations; US military commands and their implications for India.

- The Trump administration has renamed US Indo-Pacific Command (USINDOPACOM) back to US Pacific Command (USPACOM) — reverting to the pre-2018 name.
- The 'Indo' was added in 2018 under Trump's first term to signal America's commitment to the broader Indian Ocean region (including India and Indian Ocean).
- The reversion signals a strategic narrowing of US focus toward the Pacific (China Taiwan deterrence) and away from the broader Indian Ocean.
- Implications for India: India joined USPACOM's predecessor as a 'partner nation' partly because of the 'Indo' in the name — the name change has symbolic and potentially substantive significance.

#### Historical Context: The Name Change

- US Pacific Command (USPACOM): Established 1947; responsible for the Pacific Ocean, South Asia, and East Asia. In June 2018 (Trump's first term), Secretary of Defense Mattis renamed it USINDOPACOM — signalling the strategic pivot toward the Indian Ocean as equally important to the Pacific, and explicitly including India as a strategic partner in the command's area of focus.
- Why 'USPACOM' again now: The Trump 2.0 administration sees the primary military challenge as Taiwan deterrence and China containment in the Western Pacific — specifically the First and Second Island Chains. The 'Indo' expansion is seen as diluting focus and resources. The decision also reflects Trump's

bilateral-over-multilateral preference — the US-China bilateral dynamic is more important to Trump than the broader 'Free and Open Indo-Pacific' framing.

- The 'Indo-Pacific' concept: Originally coined by Japan's PM Abe Shinzo in 2007 and revived in 2016; explicitly connects the Indian Ocean and Pacific Ocean as a unified strategic space; places India at the geographical and strategic centre. The removal of 'Indo' from the US military command's name is a subtle but significant signal.

## Implications for India

- Quad: The Quad's entire conceptual basis is the 'Indo-Pacific' framing; if the US is de-emphasising the Indian Ocean dimension, the Quad's relevance from a US perspective narrows. India must assess whether the Quad remains a genuine priority for the Trump administration.
- India's place in US strategy: Being 'Indo' in USINDOPACOM gave India a structural role in US regional military planning. USPACOM's area of responsibility traditionally focused on the Pacific — India and the Indian Ocean were at the geographic margin. India must engage the new USPACOM directly to maintain its position in US strategic planning.
- Indian Ocean as strategic space: India's own military doctrine centres on the Indian Ocean Region (IOR) — the SAGAR (Security and Growth for All in the Region) framework. Losing the US 'Indo' commitment at the command level signals India must invest more independently in Indian Ocean security rather than relying on US cover.

### ★ UPSC ANGLE

• Quad's future under Trump: USPACOM reversion + no Leaders' Summit confirmed for 2026 + Trump's bilateral-over-multilateral style = a Quad under pressure; India should prepare for a Quad that is maintained but operates at lower political temperature under Trump.

• Island Chain Strategy: First Island Chain (Japan-Taiwan-Philippines) and Second Island Chain (Mariana Islands-Guam) are US strategic baselines for China deterrence; these are Pacific-centric, not Indian Ocean-centric.

• India's response: Deepen bilateral defence cooperation with the US regardless of command name; enhance India's own Indian Ocean naval capabilities; accelerate IFC-IOR's role as a regional maritime intelligence hub.

- 🗝️ **USINDOPACOM / USPACOM** — US military command for the Pacific and Indian Ocean regions; area of responsibility: ~3.7 billion people, 36 nations; renamed from USPACOM to USINDOPACOM in 2018; reverted to USPACOM under Trump 2.0 in 2026.
- 🗝️ **First and Second Island Chain** — US strategic concept for containing Chinese naval expansion; First Chain: Japan → Ryukyu Islands → Taiwan → Philippines; Second Chain: Mariana Islands → Guam → Indonesia. Both are Pacific, not Indian Ocean, constructs.
- 🗝️ **SAGAR (Security and Growth for All in the Region)** — India's Indian Ocean strategy articulated by PM Modi in 2015; focuses on security cooperation, freedom of navigation, sustainable development, and rules-based order in the IOR.

## 4. What Does the India–Russia Logistics Agreement Allow?

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**GS 2 / GS 3:** International Relations: India–Russia relations; defence cooperation; bilateral agreements; logistics and supply chains; India's strategic autonomy.

▶ India and Russia signed a Reciprocal Logistics Support Agreement (RLSA) in June 2026 — allowing each country's military to use the other's facilities for fuel, supplies, and maintenance.

▶ The RLSA is modelled on India's similar agreements with the US (LEMOA — 2016), France (2018), Japan (2020), Australia (2020), UK (2020) — now extended to Russia.

▶ Significance: Enables Indian Navy vessels to dock and replenish at Russian Far East ports; Russian vessels can use Indian Navy ports (Visakhapatnam, Karwar, Mumbai).

▶ Context: India-Russia relations are being redefined post-Ukraine war — military-strategic ties remain strong (S-400, BrahMos, Mig/Sukhoi supply chains) even as Western pressure mounts.

## What the RLSA Allows

- **Logistics access:** Indian Navy and Air Force can access fuel, stores, spare parts, and maintenance from Russian military facilities in: Vladivostok, Murmansk, and naval facilities in the Arctic region. Russian Navy can access Indian facilities in: Mumbai, Karwar, Kochi, Visakhapatnam.
- **Strategic positioning:** Indian Navy can now project power into the northern Pacific and Arctic waters using Russian fuel stops — relevant for India's growing presence in the Arctic (Svalbard research station) and Indo-Pacific.
- **Humanitarian and non-combat use:** The RLSA is not a mutual defence treaty; it provides logistical support only for peacetime and non-combat operations; it does not obligate India to defend Russia militarily.
- **Ammunition and equipment supply:** Like LEMOA (India-US MLSA), the RLSA also covers supply of ammunition, defence equipment, and services — useful during joint exercises and humanitarian operations.

## India's Strategic Calculation

- Russia as a logistics partner: India's S-400 air defence system, Mig-29K carrier aircraft, Sukhoi-30MKI fighters, and nuclear submarine lease (INS Chakra 3) all depend on Russian technical support. The RLSA ensures India can service these systems even if Western sanctions complicate Russia's export capabilities.
- Multi-alignment operationalised: India has logistics agreements with: USA (LEMOA, 2016), France (MLSA, 2018), Japan (ACSA, 2020), Australia (MLSA, 2020), UK (MoU, 2020), South Korea, Singapore — and now Russia (2026). This creates a global logistics network enabling Indian Navy operations across all major oceans.
- Western reaction: The US and NATO may view the India-Russia RLSA as legitimising Russia's naval posture; India must carefully communicate that this is bilateral logistics, not an alliance commitment.

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- LEMOA (Logistics Exchange Memorandum of Agreement): India-US logistics pact (2016); one of the 'foundational agreements' in India-US defence cooperation (alongside COMCASA and BECA); enables each military to use the other's bases for refuelling and supplies.
- Russia's Arctic strategy: The Arctic is increasingly strategic — sea ice retreat opens new shipping routes (Northern Sea Route); Russia's Arctic ports are becoming more commercially and militarily significant. India's access to Russian Arctic facilities has potential long-term energy and shipping route implications.
- Multi-alignment through logistics: India's global logistics network is the most comprehensive of any non-allied nation — it has defence agreements with both NATO (US, France, UK, Japan) and non-NATO (Russia, Singapore) powers simultaneously.

- ✂ **RLSA (Reciprocal Logistics Support Agreement)** — Bilateral agreement enabling each country's military to use the other's facilities (fuel, stores, maintenance) during peacetime and non-combat operations; not a mutual defence treaty.
- ✂ **LEMOA (Logistics Exchange Memorandum of Agreement)** — India-US logistics pact (2016); foundational agreement alongside COMCASA (secure communications) and BECA (geospatial intelligence); enables Indian military to access US facilities globally and vice versa.
- ✂ **Northern Sea Route** — An Arctic shipping lane along Russia's northern coast; 40% shorter than Suez Canal route for India-Europe trade; viable as climate change melts Arctic ice; India-Russia RLSA's Arctic port access has long-term implications here.

## 5. Every Fifth Seafarer Is Now Indian — But Why Is the Officer Share Shrinking?

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**GS 2 / GS 3:** International Relations: Maritime sector; Indian diaspora; India's maritime economy; GS 3: Economy; Blue Economy; labour market.

- India now supplies 1 in every 5 seafarers globally — approximately 230,000 active Indian seafarers serving internationally (2026 data, BIMCO/ICS manpower report).
- India is the world's 2nd largest seafaring nation after the Philippines (~450,000).

- ▶ **KEY CONCERN:** India's share of maritime officers (captain, chief engineer, navigation officers) is declining — while its share of ratings (deck hands, engine crew, catering staff) is growing.
- ▶ This matters: Officers earn 5–10x more than ratings; officer shortage limits India's maritime economy contribution.

## The Numbers Behind the Headline

- Total Indian seafarers: 230,000 active (on vessels at any time); ~600,000 total in the workforce including those ashore between voyages; India has 620 maritime training institutes, most of which focus on ratings (lower-skill) training.
- Officer share declining: India's officer share in the global fleet has fallen from ~11% (2015) to ~9% (2026); while total numbers have grown, the mix has shifted toward ratings. In contrast, Philippines has maintained a higher officer proportion.
- Why officer numbers matter: A Captain (Master Mariner) earns \$8,000–15,000/month; a Chief Engineer \$7,000–12,000/month; an Ordinary Seaman \$1,500–2,500/month. India's aggregate seafarer income would be significantly higher if the officer-to-rating ratio improved.

## Root Causes of Declining Officer Share

- **Shore-based alternatives:** Highly qualified maritime graduates (who would have become officers) are now choosing shore-based careers in logistics, digital shipping, supply chain management, LNG trading — all higher-growth sectors than shipboard service.
- **Quality of training institutes:** 620 institutes but standards vary enormously; IMO's STCW (Standards of Training, Certification and Watchkeeping) compliance is inconsistent; DGCS (Directorate General of Civil Shipping) has struggled with enforcement.
- **Cadet training pipeline:** Pre-sea training for officers requires companies to sponsor cadets for onboard training; many global shipping companies have reduced cadet sponsorships amid fleet automation; Indian companies (SCI, Cochin Shipyard) have limited officer cadet programmes.
- **Wellness and lifestyle:** Long periods at sea (6–9 months away from family); poor mental health support; Hormuz conflict in 2026 increased risk perception; many young maritime professionals prefer shore-based careers.

## What India Needs to Do

- Maritime India Vision 2030 (Ministry of Ports, Shipping and Waterways): Should include officer supply-chain targets — aim to increase India's officer share from 9% to 12% by 2030.
- Green shipping transition: The global fleet is transitioning to LNG, methanol, and ammonia fuels; Indian maritime institutes must train officers in alternative fuel management — a major skills gap that India can fill first.
- DG Shipping quality enforcement: Mandatory accreditation for pre-sea training institutes with automatic closure for non-compliant ones; stricter STCW enforcement.
- Tax incentives: Seafarer income is exempt from Indian income tax — this should be communicated better and extended to shore-based maritime careers; a 'Maritime Rozgar Yojana' for officer training sponsorship.

### ★ UPSC ANGLE

- Maritime Labour Convention (MLC) 2006: India ratified 2015; sets minimum standards for seafarers' welfare; India's DGCS enforces MLC compliance; the Hormuz crisis highlighted gaps in MLC's protection in conflict zones.
- Blue Economy Opportunity: India's seafarer export is already ~\$6 billion in annual remittances; doubling officer share would add \$3–4 billion/year in additional remittances — comparable to a major export sector.
- STCW Convention: IMO's Standards of Training, Certification and Watchkeeping; the global minimum standard for maritime officer certification; India's DG Shipping issues STCW certificates; white-listing by flag states (Paris MoU) determines which Indian certificates are globally accepted.
- **🔗 Master Mariner (Captain)** — The highest rank on a merchant vessel; requires Certificate of Competency (COC) at master level; 5–8 years training and sea service; highest paid maritime role.
- **🔗 STCW (Standards of Training, Certification and Watchkeeping)** — IMO Convention setting minimum qualification standards for seafarers; regularly updated; 2010 Manila Amendments tightened standards globally; India's maritime institutes must comply for certificates to be recognised internationally.

- **DGCS (Directorate General of Civil Shipping)** — India's maritime regulatory authority; certifies seafarers; approves training institutes; issues Certificate of Competency; under Ministry of Ports, Shipping and Waterways.

## 6. Dhaka's Padma Barrage Will Reshape Water Power in the Region

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**GS 2 / GS 3:** International Relations: India–Bangladesh relations, transboundary rivers, Ganges Water Sharing Treaty; GS 3: Environment, river ecology, water governance.

- Bangladesh's ECNEC approved the Padma Barrage Project in Rajbari district (May 13, 2026); cost: Tk 34,497 crore (~\$280 million for Phase 1); fully Bangladesh-funded; target completion: 2033.
- Location: On the Padma River (= Ganga after it enters Bangladesh) at Pangsha, Rajbari — approximately 180 km downstream from India's Farakka Barrage.
- Specifications: 2.1 km long, 78 spillway gates, navigation locks, fish passages, 113 MW hydropower, 2.9 billion cubic metres impoundment.
- Context: Ganges Water Sharing Treaty (1996) expires December 2026 — the barrage is Bangladesh's strategic bargaining chip and domestic adaptation measure.

### Why Bangladesh Is Building This

- **Farakka impact:** India's Farakka Barrage (commissioned 1975, West Bengal) diverts Ganga water toward the Bhagirathi-Hooghly system to maintain Kolkata Port navigability. Bangladesh argues Farakka has reduced dry-season flows into the Padma, causing: silting of rivers in southwest Bangladesh; salinity intrusion (affecting agriculture); decline in fisheries; desertification in parts of Rajshahi and Khulna divisions.
- **Water security:** Bangladesh's southwest region (Rajshahi, Khulna, Barishal, Dhaka divisions — 37% of territory) suffers acute water scarcity in March–May. The barrage would impound monsoon flows and redistribute water through the dry season.
- **Agriculture:** Target: Irrigate 2.88 million hectares of farmland in southwestern Bangladesh — a region dependent on groundwater irrigation (costly due to electric pump energy costs); surface water storage from the barrage would dramatically reduce irrigation costs.
- **Strategic positioning:** Bangladesh Water Resources Minister explicitly stated the barrage aims to 'negate the negative impact of Farakka' and is 'Bangladesh's national interest requiring no discussion with India' — a provocative assertion of hydrological self-determination.

### The Ganges Treaty Expiry Crisis

- The 1996 Ganges Water Sharing Treaty expires December 2026 — simultaneously with the barrage being a live issue. The treaty regulates dry-season (January–May) water sharing at Farakka — each country receives minimum 35,000 cusecs in alternating 10-day periods.
- Bangladesh's dissatisfaction: Actual flows have been inadequate in severe dry years; treaty has no 'guarantee clause' (unlike the 1977 agreement it replaced); climate change is reducing monsoon flows, making the treaty's fixed-sharing formula obsolete.
- India's concerns about the barrage: The barrage will alter downstream sedimentation patterns — potentially trapping monsoon sediment that currently reaches the Sundarbans; impound upstream water that India would argue reduces downstream flow for treaty purposes.
- China's shadow: Bangladesh PM's office has discussed the barrage with China (which is financing the Brahmaputra mega-dam); China constructing a dam on the Yarlung Tsangpo (Brahmaputra) could reduce flows into both India and Bangladesh — a trilateral river basin problem India must engage proactively.

#### ★ UPSC ANGLE

- Ganges Water Sharing Treaty (1996): India-Bangladesh 30-year treaty for Ganga dry-season flows at Farakka; expires December 2026; both sides confirmed renegotiation underway; a successor treaty must be broader in scope (basin-wide, year-round, climate-sensitive).

- Sundarbans and sediment: The Sundarbans (UNESCO World Heritage Site, shared by India and Bangladesh) depend on sediment-laden freshwater flows from the Ganga-Brahmaputra-Meghna system. Multiple dams (Farakka, proposed Padma Barrage, Chinese Yarlung Tsangpo dam) reduce this sediment flow — threatening Sundarbans' ecological and land-building functions.
- India's negotiating leverage: India holds upstream leverage (Farakka, Teesta dam, Sikkim's Teesta hydro project); Bangladesh holds the strategic card of the Padma Barrage + Chinese partnership. Renewed treaty must be basin-wide and include Nepal; India must engage before the treaty expires in December 2026.

- **✂ Farakka Barrage** — India's barrage on the Ganga in Murshidabad-Malda districts, West Bengal; commissioned 1975; diverts water into Bhagirathi-Hooghly to maintain Kolkata Port navigability; source of India-Bangladesh water tension for 50 years.
- **✂ Ganges Water Sharing Treaty (1996)** — 30-year India-Bangladesh treaty for Ganga dry-season water sharing at Farakka; allocates minimum 35,000 cusecs to each country in alternating 10-day intervals; expires December 2026.
- **✂ Sundarbans** — World's largest mangrove delta; UNESCO World Heritage Site; straddles India (West Bengal) and Bangladesh; critically threatened by sea level rise, cyclones, and reduced freshwater flows from upstream dams.

## 7. What Is BGP Hijacking? — Telegram CEO's Claims During India Block

[IE] Page 4

**GS 3:** Science and Technology: Cybersecurity, Internet infrastructure, BGP protocol, platform regulation; **GS 2:** Governance — Section 69A, internet shutdowns.

- Telegram CEO Pavel Durov alleged that India's blocking of Telegram was achieved through 'BGP hijacking' — routing manipulations that affected global Telegram traffic, not just Indian users.
- Durov: 'This is not a traditional website block. It's BGP-level interference that caused a global routing incident affecting Telegram users outside India.'
- India's IT Ministry (MeitY) denied BGP hijacking; stated the block was implemented via standard Section 69A DNS and IP blocking instructions to ISPs.
- The allegation raises questions about the collateral damage of India's internet blocking infrastructure.

### What Is BGP and Why Does It Matter?

- BGP (Border Gateway Protocol): The 'routing protocol of the internet' — the system by which networks (ISPs, data centres, cloud providers) tell each other how to reach IP addresses. Think of BGP as the internet's postal address book: it tells data packets which route to take.
- How BGP works: Each autonomous system (AS) — a network operated by an ISP, company, or government — announces via BGP which IP prefixes (blocks of IP addresses) it can reach. Other networks use these announcements to route traffic.
- BGP Hijacking: When a malicious or misconfigured network falsely announces that it can route traffic to an IP prefix that belongs to another network — causing global traffic to be misdirected to the attacker. Victims' traffic goes to the wrong destination; can cause interception, blackholing, or surveillance.

### Why Durov's Claim Matters

- If India used BGP-level manipulation to block Telegram: It would represent a more sophisticated (and potentially more harmful globally) form of internet censorship than DNS/IP blocking. BGP announcements propagate globally — a misconfigured or intentional BGP hijack can affect users worldwide, not just in the targeted country.
- India's actual method: MeitY's Section 69A orders go to ISPs (Jio, Airtel, BSNL, etc.) directing them to block Telegram's IP addresses and domain names — technically DNS blocking and IP blocking, not BGP-level. This is standard practice.
- DNS blocking: When you type 'telegram.org' your phone queries a DNS server (phone book of the internet) — the ISP's DNS server can be instructed to return no result for Telegram, effectively blocking access. VPNs bypass this easily.

- Durov's motivation: Telegram has been under pressure from multiple governments; Durov may be using the BGP hijacking claim to frame India's block as internationally harmful, building sympathy among global internet freedom advocates.

### Broader Internet Governance Implications

- BGP is fundamentally untrustworthy: There are no authentication mechanisms built into BGP; major BGP hijacking incidents include: Pakistan Telecom accidentally hijacking YouTube (2008); China Telecom reportedly hijacking US government traffic (2010, 2018); Russian SovAm Telecom hijacking Google traffic.
- RPKI (Resource Public Key Infrastructure): The current solution for BGP security — allows IP address owners to cryptographically sign their routing announcements; India's RIR (APNIC) has been promoting RPKI adoption; full implementation would prevent BGP hijacking.

#### ★ UPSC ANGLE

- Internet governance for UPSC: The internet governance ecosystem involves: ICANN (domain names), IANA (IP addresses), IETF (technical standards including BGP), APNIC (Asia-Pacific IP registry), ITU (UN telecoms body), and domestic regulators (MeitY in India).
- Section 69A and ISPs: India's ISPs receive blocking orders and implement them by: DNS blocking; IP blocking; URL blocking (for HTTPS traffic, requires deep packet inspection). BGP-level manipulation is not a standard tool and Durov's claim remains disputed.
- Telegram's legal status in India: Telegram has no Indian legal entity; no India office; this makes enforcement difficult — India cannot fine Telegram or arrest employees; blocking is the only lever available.

- ✂ **BGP (Border Gateway Protocol)** — The foundational routing protocol of the internet; determines how data travels between networks; vulnerabilities allow 'hijacking' where traffic is misdirected; no built-in authentication; RPKI is the emerging security solution.
- ✂ **DNS Blocking** — An internet censorship method where DNS servers are instructed to return no or false results for blocked domain names; easily bypassed by VPNs or alternative DNS servers; India's primary method for Section 69A website blocking.
- ✂ **RPKI (Resource Public Key Infrastructure)** — A cryptographic framework to secure BGP routing; allows IP address owners to sign routing announcements; prevents BGP hijacking; APNIC promotes RPKI adoption in Asia-Pacific.

## 8. The RBI and Its Growing Fiscal Role

[TH] Page 10

**GS 3:** Indian Economy: RBI, Monetary Policy, Fiscal Policy, Central Bank independence, RBI surplus transfer, bond purchases.

- The Hindu op-ed analyses how the RBI's role has expanded from purely monetary management to a quasi-fiscal support function for the government.
- Evidence: Record Rs 2.86 lakh crore dividend transfer (June 2026); Rs 9 lakh crore in bond purchases to inject liquidity; Rs 20–30 billion in forex market intervention to defend the rupee.
- The article raises the question: Is RBI increasingly subordinate to fiscal priorities?
- Historical context: In 2019, the Bimal Jalan Committee recommended the Economic Capital Framework — an attempt to clarify the boundary between RBI's own capital needs and transferable surplus.

### The RBI's Expanded Functions

- **Monetary authority:** Traditional: Setting repo rate; CRR; SLR; money supply management. RBI does this through MPC (Monetary Policy Committee) — rate decisions are independent.
- **Fiscal transfer mechanism:** Record dividend: Rs 2.86 lakh crore in FY26 — government's most important non-tax revenue source; used to fund fiscal deficit and capital expenditure. The dividend depends on RBI's income from forex operations and bond purchases — both of which RBI conducts partly to support the government's macro objectives.

- **Quasi-fiscal bond purchases:** RBI bought Rs 9 lakh crore in Government Securities in FY26 — injecting liquidity but also directly financing government spending (by keeping G-Sec yields from rising too sharply, which would increase government borrowing costs).
- **Forex intervention:** RBI sold \$20–30 billion in forex reserves to support the rupee during the Hormuz crisis — a macro-economic stabilisation function that directly affects the fiscal situation (weaker rupee = higher import bill = higher subsidy burden).

## The Independence Question

- Central bank independence: A key principle of modern monetary governance — the central bank should be independent of fiscal pressures to maintain inflation credibility. If a government can pressure the RBI to print money or transfer surpluses, inflation control is compromised.
- RBI's position: Governor Sanjay Malhotra has maintained that the record dividend is 'the result of the RBI's own income-generating activities, not monetisation of the deficit'; the CRB (Contingent Risk Buffer) was maintained at 6.5% to protect the institution's financial strength.
- The article's concern: Even if each individual action is defensible, the cumulative pattern — largest-ever dividend, record OMOs, massive forex intervention — suggests the RBI is increasingly a fiscal backstop for government spending, not just a monetary authority.
- International parallel: The US Federal Reserve's quantitative easing (QE) programmes post-2008 and post-COVID faced similar critiques; the Bank of Japan's 'yield curve control' is the extreme end of this spectrum.

### ★ UPSC ANGLE

- Fiscal dominance vs. Monetary dominance: When fiscal needs override monetary policy independence, central banks tend to tolerate higher inflation to avoid government funding costs rising; India's RBI has maintained its inflation mandate even as fiscal pressures grew — but the tension is real.
- CRB (Contingent Risk Buffer): RBI's own capital buffer (4.5–7.5% of balance sheet); maintaining it at 6.5% in FY26 signals that even with record transfer, RBI's balance sheet is protected; this is the ECF framework operationalized.
- GS 3 Essay: 'Central Bank Independence in an Era of Fiscal Dominance' — a potential UPSC essay topic; India's RBI-government relationship is a case study.

- **Fiscal Dominance** — A situation where the central bank's monetary policy is subordinated to the fiscal requirements of the government — e.g., keeping interest rates low to reduce debt costs, or transferring large surpluses to fund deficits.
- **OMO (Open Market Operations)** — RBI purchase or sale of government bonds to inject or absorb liquidity; when RBI buys bonds (OMO purchases), it injects money into the banking system and supports bond prices (keeps yields lower for government).
- **Economic Capital Framework (ECF)** — RBI's framework (Bimal Jalan Committee, 2019) for determining how much capital RBI should retain vs. transfer to government; CRB range set at 4.5–7.5% of balance sheet.

## 9. Elon Musk's Grok AI Was Used in Strikes Against Iran — US Confirms

[TH] Page 14

**GS 3:** Science and Technology: Artificial Intelligence, AI in defence, autonomous weapons; **GS 2:** International Relations: AI governance, laws of war, India's AI strategy.

- ▶ The US Defense Advanced Research Projects Agency (DARPA) confirmed that xAI's Grok AI (Elon Musk's AI system) was used in planning targeting sequences for US strikes on Iranian air defence systems.
- ▶ Specifically: Grok AI was deployed to analyse Iranian military radar signatures, identify optimal strike sequences, and reduce collateral damage calculations for the February–April 2026 Iran strikes.
- ▶ This marks the first confirmed use of a commercial AI system in active US military strike planning.
- ▶ Elon Musk's dual role: CEO of xAI (maker of Grok) and head of DOGE (Department of Government Efficiency) — raises questions about conflicts of interest in awarding defence AI contracts.

## AI in Military Targeting: What Grok Did

- **Targeting sequence analysis:** Grok processed satellite imagery, radar signal data, electronic intelligence (ELINT) feeds, and historical military databases to identify the optimal sequence of strikes on Iranian air defence nodes — to degrade Iran's air defences with minimum strikes.
- **Collateral damage estimation:** Grok was used to calculate civilian casualty estimates and propose munition types and strike angles to minimise collateral damage — a legal requirement under the Laws of Armed Conflict (Distinction and Proportionality principles).
- **Pattern of Life analysis:** AI analysed movement patterns at Iranian military facilities to identify optimal strike timing — when targets are occupied by military personnel (not civilians).
- **Limitations: Human in the loop:** US confirmed that all strike decisions were made by human commanders; Grok provided analysis and recommendations — final approval was human. This meets the current US DOD policy on AI: 'Human being in the loop for lethal autonomous weapon decisions.'




## Ethical and Legal Dimensions

- The Laws of Armed Conflict (LOAC) / International Humanitarian Law (IHL): Requires: Distinction (between combatants and civilians); Proportionality (civilian harm not excessive vs. military advantage); Precaution (all feasible precautions to avoid civilian harm). AI can assist in computing these calculations — but who is accountable if AI calculations are wrong?
- Commercial AI in defence: Using a commercial AI (Grok) for military targeting raises concerns about: Intellectual property (US DOD gave xAI access to classified military data — what are the terms?); Corporate conflict of interest (Musk owns both the AI and has access to government through DOGE); Security vulnerabilities (commercial AI systems may have been trained on data that adversaries can probe).
- Autonomous weapons and the 'killer robot' debate: The UN Group of Governmental Experts (GGE) on Lethal Autonomous Weapon Systems (LAWS) has been debating a treaty to regulate AI in weapons since 2017. The Grok-Iran case makes this urgency concrete.

## India's AI Governance Position

- India's MANAV framework (presented at G7 and VivaTech) calls for responsible AI governance including in military applications; India supports human oversight of AI in lethal decisions.
- India's own AI in defence: DRDO is developing AI applications for: ISTAR (Intelligence, Surveillance, Target Acquisition, Reconnaissance); missile guidance; submarine sonar; satellite imagery analysis. India has not adopted a formal LAWS policy.

### ★ UPSC ANGLE

- LAWS (Lethal Autonomous Weapons Systems): Sometimes called 'killer robots'; AI-driven weapons that can select and engage targets without human decision in the loop; a growing area of international law debate; India has been broadly supportive of regulation.
  - DARPA (Defence Advanced Research Projects Agency): US defence research agency that has pioneered AI in defence — DARPA created the internet (ARPANET); GPS; now funding AI targeting systems. xAI-DARPA collaboration is an unprecedented commercial-government AI-defence partnership.
  - Laws of Armed Conflict (LOAC): The body of international law governing conduct in war — mainly Geneva Conventions + Additional Protocols; the principles of Distinction, Proportionality, and Precaution are central to any AI targeting system's legality.
-  **LOAC (Laws of Armed Conflict)** — The body of international law governing warfare; includes Geneva Conventions; principles of Distinction (combatants vs. civilians), Proportionality (military advantage vs. civilian harm), and Precaution (minimising civilian harm) are directly relevant to AI targeting.
  -  **LAWS (Lethal Autonomous Weapons Systems)** — AI-powered weapons that can independently select and engage targets without human decision; subject of ongoing UN GGE discussions; no international treaty yet; India supports regulation.
  -  **ELINT (Electronic Intelligence)** — Intelligence gathered through electronic signals — radar emissions, communications intercepts, weapon system signatures; one of the data types fed to Grok for Iranian air defence analysis.

## 1. SC Has Given an Economic Value to Unpaid Domestic Work — What's Next?

[TH] Page 8

**GS 1 / GS 3:** Women and Society; GS 3: Economy — GDP measurement, national accounts, unpaid care work; Social Justice: homemakers' rights.

- ▶ Following the SC's Rs 30,000 notional income judgment for homemakers (June 11, 2026), the editorial analyses whether India should take the next step: formally measure and include unpaid care work in the GDP.
- ▶ If India adds unpaid care work to GDP, the economy's size would increase by an estimated 15–25% — adding \$600 billion–\$1 trillion to India's GDP.
- ▶ The Time-Use Survey (TUS 2019) showed women perform 7.5 hours/day of unpaid work vs. 2.5 hours for men — quantifiable and measurable.
- ▶ Both the ILO and the United Nations System of National Accounts (SNA 2025 revision) support the inclusion of care work 'satellite accounts'.



### Why GDP Misses Unpaid Work

- The 1953 UN System of National Accounts (SNA) excluded household production from GDP — the 'production boundary' was drawn to exclude non-market activities. Cooking at home doesn't appear in GDP; hiring a cook does. This has led to a systematic undervaluation of women's economic contribution.
- Pigou's paradox: English economist A.C. Pigou noted in 1920 that if a man marries his housekeeper, GDP falls — because the same work moves from market to non-market. The SC referenced this in its homemakers judgment.
- Scale of invisible work: NITI Aayog estimates India's unpaid care economy is worth Rs 70–90 lakh crore annually (15–25% of GDP); the SRS 2023 time-use data confirms it; women perform ~3x more unpaid work than men.

### The Satellite Account Approach

- Instead of changing the core GDP measurement, the UN (SNA 2025) recommends a 'satellite account' — a supplementary account that values unpaid household production and care work separately, to be published alongside but not within the main national accounts.
- How it's calculated: Hours of unpaid work × imputed wage rate (either market wage for equivalent service, or general wage rate, or opportunity cost of the worker's time) = monetary value. MoSPI (which runs the TUS) has the data; NSSO can calculate this.
- India's step: Parliament could direct MoSPI to produce an annual Care Economy Satellite Account — making India only the third developing country (after South Africa and Mexico) to do so. This would be a landmark statistical reform.

#### ★ UPSC ANGLE

- The SC judgment (Rs 30,000 notional income) is the judicial recognition of care work value; the statistical recognition would be the policy response. Together they constitute a paradigm shift in how India values women's economic contribution.
- SDG 5.4: 'Recognise and value unpaid care and domestic work through the provision of public services, infrastructure, and social protection policies' — the Sustainable Development Goal specifically addressing this issue.
- Time-Use Survey (TUS 2019): India's first national TUS; conducted by MoSPI; measured hours spent on paid work, unpaid care, leisure, and other activities by gender; the foundational data for care economy valuation.
-  **Unpaid Care Work** — Productive economic activities (cooking, cleaning, childcare, elder care, community care) performed within the household without monetary compensation; predominantly performed by women; excluded from GDP under current national accounts frameworks.
-  **Satellite Account** — A supplementary national accounting framework that measures economic activity outside the core GDP boundary (e.g., care economy, natural capital, volunteer work) without changing the main national accounts.

- **SNA (System of National Accounts)** — The international standard framework for measuring GDP and national economic activity; developed by the UN, IMF, World Bank, OECD, and Eurostat; 2025 revision recommends care economy satellite accounts.

## 2. India Must Realise the Importance of Innovating Up to the Frontier

[TH] Page 8

**GS 3:** Economy: Technology and Economic Development; Innovation Ecosystem; R&D Investment; India's S&T Policy; STEM Education.

- ▶ The Hindu editorial argues that India's technology strategy relies too much on adopting and adapting existing global technology rather than creating frontier innovations.
- ▶ 'Imitation-based growth' has limits — as India approaches middle-income status, continued growth requires indigenous innovation at the technological frontier.
- ▶ India's R&D spending: Only 0.64% of GDP (2025) — vs. China (2.55%), US (3.5%), South Korea (4.93%). This is the fundamental constraint.
- ▶ India's context: Memflation (AI driving up chip prices), Hormuz energy crisis, semiconductor dependence on China — all highlight the cost of not being at the frontier.

### The Innovation Deficit

- India's technology paradox: India produces ~2.5 million STEM graduates annually (2nd globally) and supplies 30%+ of global AI/ML engineers — but most of this talent works for US companies; India's own R&D ecosystem is thin.
- Patent gap: India filed ~23,000 patents globally in 2025 (vs. China: 1.6 million; US: 600,000; South Korea: 290,000). Low patent filing reflects shallow R&D depth — India is a technology user, not a technology creator, at the frontier.
- R&D funding: India's total R&D expenditure (0.64% of GDP) is dominated by the public sector (DRDO, DAE, ISRO, CSIR — ~60% of total R&D). Private sector R&D in India is chronically low; unlike South Korea (where Samsung and Hyundai spend massively on R&D) or China (where Huawei and CATL do), Indian corporates spend minimally on R&D.

### Why India Must Move to the Frontier

- **Middle-income trap risk:** Countries that grow rapidly by adopting existing technology but fail to create frontier innovation tend to stall at middle-income levels. South Korea and Taiwan avoided this trap by investing in R&D and innovation at the frontier; Malaysia, Brazil, Mexico did not.
- **AI and deep tech transformation:** The next wave of productivity growth — AI, quantum computing, biotech, clean energy — will favour countries that create the technology, not those that import it. India imports every component of AI infrastructure (Nvidia chips, Microsoft/Google cloud, ARM chips) — creating massive technology dependence.
- **Defence and strategic sectors:** DRDO's missile and space successes (LCA Tejas, BrahMos, Chandrayaan) demonstrate frontier innovation is possible; the question is whether this can be extended to commercial sectors.

### What Needs to Change

- R&D tax incentives: Restore the weighted deduction for R&D expenditure (removed in 2016 Union Budget); provide 200% weighted deduction for private sector R&D in priority areas (deep-tech, clean energy, biotech, semiconductors).
- India's Anusandhan National Research Foundation (ANRF): Launched 2024; Rs 50,000 crore over 5 years; must fund frontier basic and applied research (unlike earlier DST/DBT schemes that focused on incremental work).
- Technology frontier participation: India should join the 10-15 global frontier technology platforms (CERN, SKA — Square Kilometre Array, Iter fusion, quantum internet) — these generate frontier knowledge and train researchers at the global leading edge.

## ★ UPSC ANGLE

- ANRF (Anusandhan National Research Foundation): Established by the Anusandhan National Research Foundation Act 2023; Rs 50,000 crore over 5 years; aims to grow India's R&D from 0.64% to 2% of GDP by 2047; governs funding of research across STEM and social sciences.
- Middle-income trap: UPSC essay topic — countries that grow to ~\$5,000–10,000 per capita income but fail to transition to innovation-led growth stall; India at ~\$3,000 per capita must begin this transition now.
- R&D to GDP ratio comparison: India 0.64% → China 2.55% → US 3.5% → South Korea 4.93%; Israel tops at 6.0%; the correlation between R&D intensity and economic frontier leadership is well-established.

-  **ANRF (Anusandhan National Research Foundation)** — India's apex research funding body (2023 Act); Rs 50,000 crore over 5 years; covers science, technology, engineering, mathematics, and social sciences; aims to drive India's R&D intensity from 0.64% to 2% of GDP by 2047.
-  **Middle-Income Trap** — The tendency for developing countries to grow rapidly from low to middle income using cheap labour and technology adoption, but then stall — unable to transition to innovation-led growth needed for high-income status.
-  **R&D Intensity** — R&D expenditure as a % of GDP; a key indicator of an economy's innovation capacity; India at 0.64% is far below peer economies.

## PRELIMS IN FOCUS

### India–UK CETA (Comprehensive Economic and Trade Agreement)

Signed: July 2025 during PM Modi's UK visit. Enters force: July 15, 2026. Key numbers: UK offers 99.1% tariff lines at zero duty for India; £25.5 billion annual trade boost; \$100 billion trade target by 2030; 137 UK service sub-sectors opened for India. Social Security Agreement (Double Contribution Convention, DCC): Indian professionals on temporary UK assignments exempt from dual contributions for 5 years (up from 3). Sensitive sectors protected by India: dairy, cereals, millets, edible oils, apples. India's 15th FTA; first with UK post-Brexit.

### India Defence Production — Rs 1.78 Lakh Crore FY2025-26

India's defence production in FY2025-26: Rs 1.78 lakh crore (all-time record). Previous year: Rs 1.27 lakh crore. Defence exports: Rs 23,500 crore+ (100+ countries). Key DPSUs: HAL (aircraft), BEL (electronics), BDL (missiles), BEML (combat vehicles), MDL and GRSE (ships). Private sector: Tata Advanced Systems, L&T Defence, Adani Defence. Driven by: DPP-2020, iDEX, DRDO commercialisation, Make in India in Defence. India's target: Rs 3 lakh crore defence production by 2029.

### Muscat Accord (US-Iran MoU, June 14, 2026)

Signed in Muscat, Oman. US and Iran agreed to: Hormuz reopening + lift US naval blockade; IAEA inspections resume; Iran halts enrichment above 60%; \$5–7 billion frozen assets released immediately. Guarantors: Pakistan + Oman. Witnesses: China + Russia. 60-day Phase 2 nuclear talks window: August 13, 2026 deadline. Key distinction from JCPOA (2015): Multilateral guarantors; no sunset clauses on enrichment; nuclear question deferred (not resolved upfront).

### PM Viksit Bharat Rozgar Yojana (PMVBRY)

Announced: Union Budget 2024-25 (FM Nirmala Sitharaman). Three components: (A) First-time formal employee — 1 month salary DBT to EPFO account; (B) EPFO contribution support for manufacturing sector new hires; (C) Employer incentive for large-scale hiring. Scale: 3 crore new jobs over 2 years; 30 lakh enterprises eligible. Rs 2,400 crore disbursed on June 19, 2026. Eligibility: New employees earning below Rs 1 lakh/month joining EPFO for the first time. Ministry: Labour and Employment + EPFO.

### Green Hydrogen Certification Portal (MNRE)

Launched: June 2026 by Ministry of New and Renewable Energy. Purpose: Certifies hydrogen produced using renewable energy (Green Hydrogen) against GHG emission thresholds. Why needed: Green hydrogen export to EU, Japan, South Korea requires third-party certification of sustainability. National Green Hydrogen Mission target: 5 MMTPA by 2030. Definition of 'green': Lifecycle emissions below specified threshold (likely 2

kgCO<sub>2</sub>eq/kgH<sub>2</sub>). India's competitive advantage: Solar and wind energy costs among world's lowest; enables cheap green hydrogen production.

**RLSA (Reciprocal Logistics Support Agreement) — India-Russia (2026)**

India and Russia signed RLSA in June 2026 — allows each military to use the other's facilities for fuel, maintenance, spare parts during peacetime. India's existing MLAs: US (LEMOA, 2016), France (MLSA, 2018), Japan (ACSA, 2020), Australia (MLSA, 2020), UK (MoU, 2020). Strategic significance: Indian Navy can access Russian Far East and Arctic ports; Russia can access Visakhapatnam, Karwar, Mumbai. Not a mutual defence treaty — logistics only. Supports S-400, BrahMos, Sukhoi-30 supply chain maintenance.

## MAPPING — PLACES IN NEWS

Place	Why in News / Location / Key Facts
<b>Muscat, Oman</b>	US-Iran Muscat Accord signed June 14, 2026 — the defining diplomatic event of 2026. Muscat is Oman's capital on the Gulf of Oman coast. Oman is positioned outside the Strait of Hormuz — physically removed from the conflict zone. Oman is the world's most experienced mediator between the US and Iran (previous backchannel roles: 2011 US-Iran prisoner exchange; 2013 nuclear talks groundwork; 2023 prisoner swaps).
<b>Pangsha, Rajbari, Bangladesh</b>	Site of proposed Padma Barrage — 2.1 km long; on the Padma River (= Ganga after entering Bangladesh); Rajbari district, approximately 180 km downstream from India's Farakka Barrage. The barrage will affect 37% of Bangladesh's land area.
<b>Farakka, West Bengal, India</b>	Site of India's Farakka Barrage on the Ganga; Murshidabad and Malda districts; commissioned 1975; diverts water into Bhagirathi-Hooghly for Kolkata Port; 30-year Ganges Water Sharing Treaty (1996, expiring December 2026) regulates downstream flow to Bangladesh.
<b>Vladivostok, Russia</b>	India's primary access point under the India-Russia Logistics Support Agreement (RLSA, 2026); Russian Far East naval and commercial port; gateway to the Northern Sea Route; Russia's main Pacific fleet base; connected to Moscow by Trans-Siberian Railway.
<b>Sundarbans (India-Bangladesh)</b>	World's largest mangrove forest; UNESCO World Heritage Site (Indian side since 1987); shared by West Bengal (India) and Khulna/Barisal (Bangladesh); threatened by Padma Barrage's sediment trapping; also threatened by sea level rise, cyclones, and Farakka-reduced freshwater flows.
<b>Évian-les-Bains, France (G7)</b>	52nd G7 Summit venue (June 15-17, 2026); Modi-Trump bilateral, Modi-Macron talks, India-UK CETA announcement all took place here. Located on Lake Geneva's south shore; Haute-Savoie département, southeastern France.
<b>Fordow, Qom Province, Iran</b>	Iran's secondary uranium enrichment facility; built inside a mountain (hardened against air strikes); near Qom (a major Shia holy city, ~160 km south of Tehran); IAEA inspection access restored under the Muscat Accord.
<b>Dahej, Gujarat, India</b>	India's largest LNG terminal (10 MMTPA); operated by Petronet LNG; LNG tanker Disha arrived here on June 18 after crossing Hormuz on June 15 — the first Qatari LNG cargo to reach India in ~4 months.