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Saving India's Wetlands

This editorial is based on "[Conserving wetlands to nurture nature, society](#)" which was published in *The Hindustan Times* on 30/01/2026. This editorial examines wetlands as India's critical natural infrastructure supporting biodiversity, water security and climate resilience. It highlights policy initiatives, community-led conservation and the challenges undermining sustainable wetland governance.

Wetlands, though covering only a small fraction of the Earth's land surface, support a disproportionately large share of global biodiversity and provide critical ecosystem services such as flood regulation and climate moderation. India's civilisational landscape from Himalayan lakes to coastal mangroves has been shaped by these ecosystems. Reflecting this importance, India expanded its Ramsar sites from 26 in 2014 to 98 in 2026 covering surface area 1,384.140 ha, the highest in Asia. This signals a shift towards community-driven, culture-integrated wetland governance aligned with sustainability goals.

What is the Significance of Wetlands for India?

- 💡 **Hydrological Security & Urban Flood Mitigation:** Wetlands function as natural "sponges" in India's rapid urbanization landscape, absorbing excess rainfall to mitigate flash floods while recharging aquifers during lean periods.
 - ✦ This "[sponge city](#)" capability is critical for water security, as they govern the hydrological cycle by retaining runoff and releasing it slowly, acting as a buffer against the erratic precipitation patterns induced by climate change.
 - ✦ For example, the **Bhoj Wetlands in Bhopal** have played a crucial role in **buffering monsoon floods** while **sustaining the city's drinking water supply**, demonstrating how protected urban wetlands enhance both flood resilience and water security.
- 💡 **Carbon Sequestration & Climate Action:** Indian wetlands, particularly mangroves and peatlands,

are potent "[Blue Carbon](#)" sinks, sequestering carbon up to **10-50 times faster** than terrestrial forests.

- ✦ Wetlands are central to [India's NDC commitments](#), as their anaerobic soils lock carbon for millennia, making their conservation a **high-impact natural climate solution** for achieving the **net-zero target by 2070**.
- ✦ For instance, the [MISHTI Scheme](#) aims to restore **540 sq km of mangroves across 9 coastal states**, with an estimated **carbon sequestration potential of 4.5 million tonnes**.
- 💡 **Economic Valuation & Livelihood Sustenance:** Wetlands are not wastelands but high-value economic assets supporting fisheries, agriculture (e.g., **Makhana farming**), and **eco-tourism under the "Wise Use" framework**.
 - ✦ They sustain millions of livelihoods, functioning as a primary source of income for marginalized riparian communities through integrated resource management, which the government is now formalizing to boost local economies.
 - ✦ For example, the **Amrit Dharohar** scheme (**launched 2023**) promotes unique conservation values to generate green jobs.
 - 📎 A recent valuation of Kerala's **Kole Wetlands** estimated their Total Economic Value (TEV) at **\$54 million**, largely from paddy and flood control.
- 💡 **Pollution Abatement & Waste Management:** Acting as "**Nature's Kidneys**," wetlands filter heavy metals, nitrogen, and phosphorus from agricultural runoff and industrial effluents through bio-filtration and sedimentation.
 - ✦ This ecosystem service **reduces the biochemical oxygen demand (BOD)** of water bodies, offering a cost-effective, nature-based solution to India's sewage treatment deficit and river pollution crisis.
 - ✦ For instance, the **East Kolkata Wetlands (a Ramsar site)** save Kolkata nearly **₹4,680 million** annually by naturally treating sewage.
- 💡 **Biodiversity Hotspots & Migratory Corridors:** Wetlands are biodiversity hotspots that support migratory flyways and endangered species, **servicing**

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as a **global barometer for ecological health**, which India has prioritized by expanding its network of internationally recognized sites under the Ramsar Convention and by **fulfilling international commitments under the Convention on Migratory Species (CMS)**.

- ✦ India is a critical wintering ground on the **Central Asian Flyway (CAF)**, with wetlands acting as vital refueling stops for millions of migratory birds
- ✦ For instance, **Pallikaranai (Chennai)**, **Pulicat Lake (Tamil Nadu)**, **Khijadia Bird Sanctuary (Gujarat)**, **Keoladeo National Park (Rajasthan)** and **Hokersar wetland (also known as Hokera in Jammu & Kashmir)** serve as major wintering grounds.
- 💡 **Coastal Defense & Disaster Resilience:** Coastal wetlands, especially mangroves and coral reefs, act as **bio-shields against cyclones, storm surges, and tsunamis, which are increasing in frequency due to warming oceans**.
 - ✦ They dissipate wave energy and stabilize shorelines against erosion, effectively protecting India's densely populated coastal economic zones and critical infrastructure from climate-induced disasters.
 - ✦ For instance, during **Cyclone Dana (2024)**, the **Bhitarkanika Mangroves** in Odisha significantly reduced wind velocity and storm impact, shielding inland villages and saving millions in infrastructure damage.
- 💡 **Groundwater Recharge & Agrarian Sustainability:** Wetlands act as critical **"percolation tanks"** that **recharge depleted aquifers**, sustaining India's groundwater-dependent agrarian economy and preventing soil salinization in semi-arid zones.
 - ✦ This ecosystem service is vital for **national food security, serving as the primary natural counter-measure** against the rising threat of desertification and water scarcity in the intensively farmed Indo-Gangetic plains.
 - ✦ **The Kole Wetlands of Kerala** are regarded as one of the state's primary **"rice bowls,"** noted for their exceptionally high productivity. These below-sea-level wetlands are **distinguished by a unique and highly specialised system of rice cultivation**.

💡 **Geo-Strategic Security & Glacial Stability:** High-altitude wetlands in the Himalayas serve as **geo-strategic assets near sensitive borders (LAC)**, regulating meltwater essential for military logistics while acting as buffers against **Glacial Lake Outburst Floods (GLOFs)**.

- ✦ Preserving these fragile ecosystems is a matter of national security to protect strategic infrastructure (bridges/roads) and border connectivity from climate-induced hydrological disasters.
- ✦ For instance, the **Tso Kar Wetland Complex (Ladakh)** was strategically designated a Ramsar site to secure water resources (**freshwater Startsapuk Tso**).
- 💡 **Cultural Heritage & Community Stewardship:** Wetlands are central to India's **"Hydro-Social" fabric**, serving as sacred spaces that drive decentralized conservation through religious reverence and traditional community ownership (**Commons**).
 - ✦ This cultural connection **facilitates bottom-up governance, ensuring higher long-term survival rates of restoration projects** compared to purely bureaucratic interventions by leveraging **"Shramdaan" (voluntary labor)**.
 - 📌 The **Renuka Lake (Himachal)** exemplifies this, where its status as a sacred site enforces strict local bans on pollution and encroachment.
 - ✦ **Mission Amrit Sarovar** has successfully rejuvenated over **68,000 water bodies** as of January 2025 through community participation.

What Measure has been Taken to Conserve Wetlands in India?

- 💡 **Operationalization of "Amrit Dharohar" for Livelihood Integration:** By transitioning from high-volume to **high-value nature tourism**, it turns ecological assets into economic engines, ensuring that conservation pays for itself through community stewardship.
 - ✦ In the first phase of this programme, five priority Ramsar sites were identified namely **Sultanpur National Park, Sirpur wetland, Yashwant Sagar, Bhitarkanika National Park, and Chilika Lake**.

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- ✍ Under this initiative, two training programmes namely Alternative Livelihood program (ALP), and Paryatan Navik Certificate (PNC) are conducted to **train and certify local community members.**
- 💡 **Global Recognition via “Wetland City Accreditation” (WCA)** : To combat the rampant urbanization that swallows peri-urban water bodies, India has aggressively pursued the **Ramsar Convention’s WCA**, which effectively mandates a **“Sponge City”** urban planning framework.
- ✦ This creates a **dual layer of protection** where municipal master plans must legally align with wetland preservation to retain this prestigious international **branding, forcing cities to treat lakes as flood-buffers rather than real estate.**
 - ✦ For instance, in January 2025, **Indore (Madhya Pradesh)** and **Udaipur (Rajasthan)** became India’s **first cities to receive this accreditation**, validating their strict zoning laws.
- 💡 **Institutionalizing Citizen Science through “Wetland Mitras”**: Moving beyond government-only monitoring, the **“Save Wetlands Campaign”** has institutionalized a bottom-up surveillance network by enrolling **“Wetland Mitras” (Friends of Wetlands).**
- ✦ This **“Jan Andolan” (people’s movement)** creates a decentralized, non-official vigilance squad that reports encroachment and pollution in real-time, effectively bridging the gap between remote bureaucratic authority and ground-level reality.
- 💡 **Implementation of “Green Credit” for Private Financing**: The notification of the **Green Credit Programme (GCP)** has created a **market-based financial mechanism** that allows private corporations to **earn tradable credits for funding wetland restoration.**
- ✦ This **reduces the burden on the exchequer and incentivizes the private sector** to restore degraded water bodies not just for CSR, but for regulatory offsets, effectively monetizing ecological rejuvenation.
- ✦ Under the 2023 Rules, companies are now earning credits for reviving mangrove ecosystems.
- 💡 **Deployment of Dynamic “Wetland Health Cards”**: The Ministry has replaced static maps with dynamic **“Wetland Health Cards”** that integrate geospatial data from ISRO with ground-level turbidity and dissolved oxygen readings.
- ✦ This analytical tool **provides a real-time “ECG” of the wetland, moving administration from reactive crisis management to proactive maintenance** by triggering automated red-flag alerts when ecological indicators breach safety thresholds.
 - ✦ The concept of health cards for water bodies emerged from the ‘Sahbhagita Mission’ launched in 2022, which focused on creating awareness for wetland conservation.
- ✍ Under the mission, over two million people were sensitised, around 80,000 wetlands were surveyed, health cards for more than 6,200 wetlands were prepared, and over 18,000 Wetland Mitras were registered nationwide. **(DTE- September 2024)**
- 💡 **Aggressive Expansion of the Ramsar Network**: India has strategically increased its diplomatic footprint in conservation by aggressively **nominating sites for Ramsar status, thereby invoking international scrutiny and binding treaty obligations for their protection.**
- ✦ This massive expansion acts as a geopolitical soft-power tool while legally locking these sites into a **“no-regression” conservation status** that prevents future governments from denotifying them.
 - ✦ India’s Ramsar network exploded to **98 sites in 2026** (up from just 26 in 2014), making it the **largest network in Asia.**
- 💡 **Legal Mandate on “Ground Truthing” for Small Wetlands**: To close the loophole where small wetlands (<2.25 hectares) were ignored and built over, **the Supreme Court has repeatedly called for “Ground Truthing” requiring physical verification of satellite maps.**

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- ✦ This ensures that “ghost wetlands”(those that exist on paper but are dried up, or vice versa) are **legally documented and notified**, extending the Public Trust Doctrine to even minor village ponds.
- ✦ India’s ‘Mission Sahbhagita’ and the ‘Save Wetlands Campaign’ have mobilised more than 2 million citizens, resulting in the **ground-truthing of over 170,000 wetlands and the boundary demarcation of nearly 100,000 wetlands across the country.**
- 💡 **Revised NPCA Guidelines for “Catchment-Scale” Management:** The **National Plan for Conservation of Aquatic Ecosystems (NPCA)** guidelines were radically revised to mandate “**Framework Management Plans**” that look beyond the water body to the entire catchment area.
- ✦ This ensures that **funding is not wasted on cosmetic beautification but is directed towards checking siltation and pollution at the source**, enforcing a basin-scale hydrological approach to conservation.

Ramsar Convention of Wetlands

- 💡 **About :** The Ramsar Convention is an **intergovernmental treaty** dedicated to the conservation and wise use of wetlands worldwide and is the **first global environmental agreement focused on a single ecosystem type.**
 - ✦ It was adopted on **2 February 1971**, signed at **Ramsar in Iran**, entered into force on **21 December 1975**. India became a **Contracting Party in 1982.**
 - ✦ **February 2 is observed globally as World Wetlands Day** to mark its adoption.
- 💡 **Core Objective:**
 - ✦ Ensure the **wise use of all wetlands** through local, national and international actions.
 - ✦ Balance **ecological conservation with sustainable livelihoods.**
- 💡 **Key Pillars (3 Obligations of Contracting Parties)**
 - ✦ **Wise Use of all wetlands** (integrated planning, sustainable management)
 - ✦ **Designation & conservation of Ramsar Sites (Wetlands of International Importance)**

- ✦ **International cooperation on shared wetlands, species and river basins.**

💡 **Ramsar Sites:** Ramsar Sites are wetlands designated for their **ecological, biodiversity, hydrological or cultural significance** and are listed under the **Ramsar List of Wetlands of International Importance**. India has **98 Ramsar Sites (2026)** highest in Asia.

- ✦ While their designation does not automatically confer **protected area status** under national law, it obligates countries to ensure their **wise use and effective management.**
- ✦ Additionally, wetlands facing **ecological degradation or adverse change** are placed on the **Montreux Record**, a register under the Ramsar Convention that identifies sites requiring **priority conservation attention and remedial action.**

What are the Challenges Associated with Conservation of Wetlands in India?

- 💡 **“Concrete Creep” & Urban Encroachment:** The most acute threat is the **conversion of “Commons” into commercial real estate**, driven by the ambiguity in land revenue records where wetlands are often classified as “wastelands.”
 - ✦ This **regulatory blind spot allows developers to legally reclaim hydrological buffers** for infrastructure, destroying the city’s natural flood resilience and creating irreversible “urban heat islands.”
 - ✦ **For instance, Chennai’s Pallikaranai marsh** has shrunk by **90%** in 30 years, directly causing the severe urban floods.
- 💡 **Toxic Influx & Eutrophication:** Indian wetlands are functioning as unintended sewage treatment plants, receiving unchecked industrial effluents and domestic waste that cause hyper-eutrophication and dissolved oxygen depletion.
 - ✦ This chemical **assault triggers “Dead Zones” where aquatic life suffocates**, turning biodiversity hotspots into biological graveyards and vector-borne disease breeding grounds.

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✦ The arrival of migratory birds this year to **Harike, northern India's largest wetland, declined 12% in 2023 from 2021**, due to severe pollution in the Sutlej river.

💡 **Regulatory Fragmentation & Legal Loopholes:**

Despite a dedicated regulatory framework, weak implementation and fragmented governance have undermined wetland protection in India.

✦ In 2017, the Supreme Court imposed a penalty of Rs 50,000 on the government for its **failure to prepare a comprehensive wetland inventory and address deficiencies in 1,683 proposals for conservation.**

✦ This decentralized **"opt-in" model relies on State Wetland Authorities** who often delay notification to keep land available for potential industrial diversion.

💡 **Hydrological Strangulation & Siltation:** Unplanned upstream infrastructure (dams/canals) cuts off the natural environmental flows required to flush wetlands, leading to severe siltation and the **"terrestrialization" of water bodies.**

✦ This physical strangulation reduces the wetland's depth and water-holding capacity, effectively turning dynamic aquatic ecosystems into static landmasses over mere decades.

✦ For instance, **Wular has extensively lost water-holding capacity over the last three decades mainly due to siltation from degraded catchments.**

💡 **Invasive Species & Biological Invasion:** Aggressive invasive alien species like **Water Hyacinth (*Eichhornia crassipes*) and African Catfish** are outcompeting native flora and fauna, altering the food web and choking the water surface.

✦ This biological invasion **blocks sunlight penetration**, decimating submerged vegetation and destroying the roosting grounds of indigenous waterfowl, leading to an "empty forest" syndrome in wetlands.

✦ Invasive alien plant and animal species pose a serious threat to the ecological health of India's inland freshwater wetlands, which span about **58.2 million hectares and are exceptionally rich in biodiversity.**

📌 Indian wetlands host nearly 1,200 plant species and support around 17,853 known large and small animal species, **almost one-fifth of the country's total known fauna.**

💡 **Climate Change & Phenological Mismatch:** Rapidly changing temperature and rainfall patterns are drying up seasonal wetlands before migratory birds arrive, creating a **"phenological mismatch"** where resource availability **does not align with species needs.**

✦ This climate stress is **causing erratic migration timings and forcing birds to abandon traditional wintering grounds** for sub-optimal habitats, risking population collapse.

✦ The **Ramsar Global Wetland Outlook 2025 estimates that the planet has lost roughly 22% of its wetlands since 1970.** In India, studies suggest that the country has lost nearly one-third of its wetlands over the past three decades, mainly due to agriculture, encroachment and pollution.

💡 **Microplastic Infiltration & Chemical "Cocktail" Pollution:** Beyond traditional sewage, Indian wetlands are increasingly becoming **repositories for microplastics and endocrine-disrupting chemicals (EDCs)** from cosmetic and textile industries.

✦ This **"invisible" pollution enters the aquatic food chain through benthic organisms, leading to bioaccumulation in fish and migratory birds**, which ultimately poses a severe neurotoxic and reproductive risk to the human populations dependent on these ecosystems.

💡 **Socio-Economic Conflict & Tenure Ambiguity:** There is a widening **"Conservation-Livelihood"** rift where top-down Ramsar designations often overlook the traditional "usufruct rights" of local fishing and farming communities, leading to resistance against protection measures.

✦ Without clear land titles or **"Blue Carbon" benefit-sharing frameworks**, local stakeholders often view wetlands as a barrier to development rather than an asset, resulting in clandestine reclamation and non-cooperation with state authorities.

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- ✦ For instance, in 2021, protests erupted at **Deepor Beel (Assam)** as local communities challenged new **eco-sensitive zone** restrictions.

What Measures are Needed to Enhance Wetland Conservation in India?

- 💡 **Catchment-Scale “Source-to-Sink” Treatment:** Conservation efforts often fail because they focus solely on the water body; we must instead mandate **Catchment Area Treatment (CAT) plans** that secure the entire hydrological feeder network.
 - ✦ This involves **extensive afforestation and soil conservation in the upland areas** where water originates to prevent siltation and maintain the natural flow regime. By treating the catchment, we ensure the wetland **receives clean, sediment-free water, vital for its long-term survival against drying up.**
- 💡 **Leveraging the “Green Credit” Programme for Financing:** To bridge the funding gap, the government should aggressively operationalize the **Green Credit Programme (GCP)**, allowing private corporations to earn tradable credits for restoring degraded wetlands.
 - ✦ This creates a **market-based financial mechanism** where companies invest in desilting and rejuvenation projects **not just for CSR, but for tangible regulatory offsets.** This monetizes ecological restoration, making wetland preservation a financially viable venture for the private sector.
- 💡 **Strategic Development of “Constructed Wetlands”:** Urban municipalities must adopt **“Constructed Wetlands”** as a nature-based solution for treating raw sewage before it enters main water bodies.
 - ✦ **Mimicking the East Kolkata Wetlands model,** these artificial filtration systems use specific aquatic plants and microbial action to naturally break down organic waste and heavy metals.
 - ✦ This **low-cost, decentralized infrastructure** prevents eutrophication and reduces the load on expensive, energy-intensive **Sewage Treatment Plants (STPs).**

- 💡 **Strict “Ground Truthing” and Geo-tagging of Small Wetlands:** Following recent Supreme Court directives, there is an urgent need to **legally notify and geo-tag wetlands** which are currently vulnerable to land grabbing.
 - ✦ Revenue departments must conduct physical **“ground truthing” to update land records, explicitly categorizing these small water bodies as ‘wetlands’** to invoke protection under the Public Trust Doctrine.
 - ✦ This legal firewall is the only way to stop the rampant conversion of peri-urban ponds into real estate.
- 💡 **Integrating “Sponge City” Concepts in Master Plans:** City Master Plans must **legally mandate the retention of urban wetlands as natural flood buffers,** aligning with the criteria for **“Wetland City Accreditation” under the Ramsar Convention.**
 - ✦ This involves zoning laws that prohibit construction in floodplains and require the creation of permeable surfaces around lakes to facilitate groundwater recharge.
 - ✦ By treating wetlands as **critical urban infrastructure for flood mitigation rather than empty plots,** we secure their existence against urbanization.
- 💡 **Enforcing “Buffer Zone” Agro-Ecology:** To tackle the silent killer of agricultural runoff, we must notify distinct **‘Eco-Sensitive Zones’** around major wetlands where chemical farming is strictly prohibited.
 - ✦ State governments should subsidize a transition to organic or natural farming in this buffer belt, ensuring that the water entering the wetland is free from nitrogen and phosphorous fertilizers.
 - ✦ This preventative measure is **essential to stop the algal blooms that choke wetlands and deplete oxygen levels.**
- 💡 **Biological Control of Invasive Alien Species:** Many Indian wetlands are being suffocated by invasive weeds like **Water Hyacinth** which disrupt the native ecosystem and increase evapotranspiration.
 - ✦ A systematic, **science-backed removal program using biological control agents (like weevils) or controlled dredging** must be implemented, rather than ad-hoc manual cleaning.

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- ✦ Regular removal turns this biomass into green manure or energy, converting a biological threat into an economic resource while restoring the water surface.

Conclusion:

Wetlands are not ecological luxuries but **critical natural infrastructure** underpinning India's water security, climate resilience and biodiversity conservation. Their degradation converts climate risks into development disasters, from urban floods to livelihood loss. A shift towards **community-led, science-backed and catchment-scale governance**, anchored in Mission LiFE, is imperative. Protecting wetlands today is thus an investment in **sustainable development, disaster resilience and intergenerational equity**.



Transforming India's Healthcare Landscape

This editorial is based on "[Health sector continues to remain neglected](#)" which was published in The Hindu business line on 01/02/2026. This article analyses the structural design, recent policy shifts, and persistent challenges in India's health sector amid Budget 2026 priorities. It highlights how innovation-led reforms must be matched with sustained public financing and strong primary healthcare to achieve equitable and resilient health outcomes.

India's health sector stands at a **critical inflection point**, shaped by an ageing population, rising non-communicable diseases, and post-pandemic stress on public systems. While recent policy signals emphasise **innovation, biopharma, and skilled health workforce**,

public healthcare financing and primary care remain structurally under-prioritised. Persistent **high out-of-pocket expenditure** and regional disparities underline gaps in **access, affordability, and preventive care**. A decisive shift from **announcement-led reform to expenditure-backed public health strengthening** is now imperative.

What is the Current Regulatory Framework for India's Health Sector?

💡 **Constitutional Basis:** The Constitution of India lays the foundation for health regulation, distributing powers via the Seventh Schedule:

- ✦ **State List (List II):** "Public health and sanitation, hospitals and dispensaries" (**Entry 6**) is primarily a state subject. States are responsible for the delivery of services.
- ✦ **Concurrent List (List III):** Both Centre and States can legislate on:
 - 📎 Medical education and profession (Entry 26).
 - 📎 Prevention of the extension of infectious diseases (Entry 29).
 - 📎 Drugs and poisons (Entry 19).

💡 **Fundamental Rights & DPSPs:**

- ✦ **Article 21:** Interpreted by the Supreme Court to include the **Right to Health** as **part of the Right to Life**.
- ✦ **Article 47:** Directs the State to regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties.

💡 **Key Regulatory Bodies:** The institutional framework is spearheaded by the **Ministry of Health and Family Welfare (MoHFW)**, supported by various autonomous and statutory bodies:

Body	Key Mandate
National Medical Commission	Replaced the Medical Council of India, regulates medical education, practice, and ethics (under NMC Act, 2019).
Central Drugs Standard Control Organization	The national regulatory body for pharmaceuticals and medical devices (under Drugs & Cosmetics Act, 1940). Approves new drugs and clinical trials.
Food Safety and Standards Authority of India	Regulates manufacture, storage, distribution, sale, and import of food articles to ensure safety.

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National Health Authority	Apex body for implementing Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY) and the Ayushman Bharat Digital Mission (ABDM) .
National Pharmaceutical Pricing Authority	Fixes/revises prices of controlled bulk drugs and formulations, enforces prices and availability of medicines.
Indian Nursing Council	Regulates nursing education and standards.

💡 **Major Legislative Framework:** The sector is governed by several critical Acts that define compliance and standards:

- ✦ **Drugs and Cosmetics Act, 1940 (and Rules 1945):** The backbone of pharma regulation. It establishes a comprehensive regulatory framework for the import, manufacture, distribution, and sale of drugs and cosmetics.
 - 📌 Schedule M of the Drugs and Cosmetics Rules lays down **Good Manufacturing Practices (GMP)**, in line with **World Health Organization (WHO)** standards.
- ✦ **National Medical Commission Act, 2019:** Reformed the medical education sector, introducing the National Exit Test (NExT) and regulating fee structures for private colleges.
- ✦ **Clinical Establishments (Registration and Regulation) Act, 2010:** Aims to register all clinical establishments and prescribe minimum standards for facilities and services.
 - 📌 **Implementation is patchy** as it requires adoption by individual States.
- ✦ **Mental Healthcare Act, 2017:** Decriminalized suicide attempts and guarantees the right to mental healthcare.
- ✦ **Epidemic Diseases Act, 1897 (Amended 2020):** Empowers the government to take special measures to control the spread of dangerous epidemic diseases (**heavily used during COVID-19**).
- ✦ **New Drugs and Clinical Trials (NDCT) Rules, 2019:** It streamlined and modernized regulations for new drugs and clinical research.
 - 📌 The Union Health Ministry amended the **New Drugs and Clinical Trials Rules, 2019** to ease pharmaceutical research by replacing the **CDSCO test licence**

requirement with a **prior-intimation system** for non-commercial research quantities, while **high-risk drugs** (cytotoxic, narcotic, psychotropic) remain licence-bound.

- ✦ **The National Commission for Allied and Healthcare Professions Act, 2021:** Standardizes the education and practice of allied healthcare professionals.

What are the Key Advancements in India's Health Sector?

- 💡 **Launch of "Bio Pharma Shakti" & R&D Pivot:** The government has structurally shifted focus from generic manufacturing to high-value innovation by launching the **"Bio Pharma Shakti" initiative**.
 - ✦ This move aims to capture the global biologics market and reduce dependence on imported complex therapies, signaling a transition from volume to value leadership in the pharmaceutical value chain.
 - ✦ It is expected to boost domestic production of **biologics and biosimilars with an outlay of ₹10,000 crore. (Budget 2026-27)**
 - 📌 It includes expansion and strengthening of the Biopharma-focused network through the establishment of **3 new National Institutes of Pharmaceutical Education and Research (NIPERs)** and the upgradation of 7 existing NIPERs and the strengthening of accredited clinical trial sites to move India **up the value chain from "volume" to "value."**
- 💡 **Ayushman Bharat Expansion for "The Silver Economy":** In a major inclusivity drive, the government has **operationalized health coverage for the elderly, decoupling eligibility from income status** to address the high disease burden of the aging population.

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- ✦ This universalization for senior citizens mitigates catastrophic health expenditure, which historically pushed millions of pensioner households into poverty.
- ✦ The **Budget 2026-27** reconfirmed the universal health coverage for approximately 6 crore senior citizens (belonging to 4.5 crore families) under **Ayushman Bharat PM-JAY**.
 - ✍ Also, The Ministry of Health and Family Welfare outlay for 2026–27 has been raised by nearly 10% compared to FY 2025–26.
- 💡 **MedTech Self-Reliance & PLI Maturity:** The medical device sector is witnessing a “manufacturing moment” as **Production Linked Incentive (PLI) schemes** begin to deliver commercial validation, reducing import reliance for critical equipment.
 - ✦ This **strategic localization** reduces healthcare delivery costs and secures supply chains against global disruptions, moving India towards becoming a MedTech export hub.
 - ✦ As of early 2026, **22 greenfield projects** have commissioned production of **55+ high-end devices** (CT/MRI scanners). Further, customs duty cuts on components in **Budget 2026** incentivize domestic value addition.
- 💡 **Targeted Cost Reduction in Oncology & Rare Diseases:** Recognizing the financial toxicity of cancer care, the government has intervened fiscally by rationalizing customs duties, directly lowering the cost of life-saving immunotherapies.
 - ✦ This fiscal health policy complements clinical efforts, making advanced treatments accessible to the middle class who are often excluded from state insurance but cannot afford private care.
 - ✦ **Budget 2026-27** exempts **17 cancer drugs** (e.g., **Ribociclib and Brigatinib**) and rare disease medicines from customs duty. This is coupled with the establishment of new **Trauma Centers** in every district hospital.
- 💡 **Structural Shift to Outpatient & Preventive Care:** The Economic Survey 2025-26 highlights a decisive pivot where **outpatient care (OPD)** and screenings are outpacing inpatient admissions, driven by the operationalization of **Ayushman Arogya Mandirs (AAMs)**.
 - ✦ This transition from “sick-care” to “wellness” reduces the long-term burden on tertiary hospitals by catching **Non-Communicable Diseases (NCDs)** early.
 - ✦ **Economic Survey 2025-26** notes **42.66 crore teleconsultations** and over **506 crore visits** to AAMs (December 2025).
- 💡 **Digitization of Immunization via U-WIN Portal:** Replicating the success of Co-WIN, the full rollout of the **U-WIN portal** has digitized the **Universal Immunization Programme (UIP)**, ensuring real-time tracking of mothers and children.
 - ✦ U-WIN acts as a **single source of truth** by enabling **QR-based anytime-accessible immunisation certificates**, **automated SMS reminders to reduce dropouts**, and **ABHA-linked integration** that embeds child immunisation data into a **lifelong longitudinal health record**.
 - ✦ This digital public infrastructure **eliminates “zero-dose” children** and creates portable vaccination records, critical for India’s migrant workforce.
 - ✍ As of early 2026, **U-WIN** tracks **27.7 crore vaccine doses** and **7.43 crore beneficiaries**.
- 💡 **Sickle Cell Anaemia Elimination Mission Acceleration:** The mission to eliminate **Sickle Cell Disease (SCD) by 2047** has moved from launch to aggressive implementation in tribal hinterlands, integrating genetic counseling with mass screening.
 - ✦ This **targeted bio-social intervention** addresses historical health neglect in tribal belts, combining scientific screening with community-level card distribution.
 - ✦ As of July 2025, more than 6.07 crore screenings have been done in the 17 identified tribal dominated States.
- 💡 **Critical Care Infrastructure Overhaul (PM-ABHIM):** Budget 2026 increased funding for the **PM Ayushman Bharat Health Infrastructure Mission (PM-ABHIM)** to pandemic-proof the country.
 - ✦ The focus is on **creating a decentralized network of critical care blocks** and **integrated public health labs**, ensuring that future outbreaks are managed at the district level rather than choking metropolitan capitals.

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- ✦ For instance, Budget 2026 allocates ₹4,770 crore to PM-ABHIM (a 67.6% increase).

What are the Key Issues Associated with India's Health Sector?

- 💡 **Chronic Underfunding & Public Expenditure Stagnation:** Despite recent budgetary increases, India's public health expenditure remains perilously low compared to global peers, forcing a reliance on the private sector that exacerbates inequality.
 - ✦ This structural underfunding limits the expansion of critical infrastructure, leaving the "Right to Health" as an aspirational rather than practical reality for millions.
 - ✦ For instance, as a percentage of GDP, the Union government's allocation for health has declined drastically from 0.37% (2020-21 Actual Expenditure) to 0.29% (2025-26 BE).
- 💡 **The "Missing Middle" & Catastrophic Out-of-Pocket Expenditure (OOPE):** While government schemes like Ayushman Bharat cover the poorest and private insurance shields the rich, the massive "missing middle" class faces financial ruin from a single hospitalization.
 - ✦ The high cost of outpatient care and diagnostics, often uncovered by insurance, continues to drive millions into poverty annually.
 - ✦ NHA 2021-22 indicates OOPE is still 39.4% of total health expenditure (down from 62.6% but still high).
- 💡 **Rural-Urban Divide & The "Ghost" Specialist Crisis:** Primary healthcare in rural India has physically expanded but suffers from a "hollowed-out" workforce where facilities exist without function.
 - ✦ The collapse of the referral chain means rural patients bypass local centers for urban hospitals, overcrowding tertiary care while rural Community Health Centers (CHCs) remain ghost towns.
 - ✦ Rural Health Statistics 2022-23 reveal a shocking nearly 80% shortfall of specialists (surgeons, pediatricians) in rural CHCs, with 17,551 vacancies against the requirement.

- 💡 **The "Silent Epidemic" of Non-Communicable Diseases (NCDs):** India is undergoing a rapid epidemiological transition where the burden of lifestyle diseases like diabetes and hypertension is outpacing the system's capacity to treat them.
 - ✦ This "dual burden" of disease requires a shift from acute, curative care to long-term, expensive chronic management which the current public system is ill-equipped to handle.
 - ✦ According to the ICMR-INDIAB-17 national cross sectional study estimates, the prevalence of diabetes and prediabetes in India is 101 million and 136 million.
- 💡 **Regulatory Failures & the "Pharmacy of the World" Reputation Crisis:** India's global standing as a reliable drug exporter faces an existential threat due to weak enforcement of Good Manufacturing Practices (GMP) and fragmented state-level regulation.
 - ✦ Repeated instances of toxic contaminants in exported syrups have exposed a systemic lack of rigorous quality control and punitive accountability for negligent manufacturers.
 - ✦ Recent deaths in Gambia, Uzbekistan, and in Indian states like Madhya Pradesh (2025) linked to Indian cough syrups containing Diethylene Glycol (DEG) have triggered WHO alerts and forced CDSCO crackdowns.
- 💡 **Antimicrobial Resistance (AMR)- The Superbug Time Bomb:** Rampant, unregulated over-the-counter sale of antibiotics and poor infection control in hospitals have turned India into an epicenter for "superbugs."
 - ✦ This resistance renders life-saving drugs ineffective, threatening to make simple surgeries or infections fatal and undoing decades of medical progress.
 - ✦ ICMR (2024) findings show Escherichia coli and Klebsiella pneumoniae as dominant pathogens with alarmingly high resistance while Acinetobacter baumannii in the Intensive Care Unit (ICU) exhibits high-level resistance to several antibiotic classes.
- 💡 **Skewed Workforce Distribution & Human Resource Deficits:** The headline doctor-population ratio often masks acute regional disparities, as

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medical professionals cluster in wealthy urban pockets leaving vast swathes of the hinterland underserved.

- ✦ The shortage is not just of doctors, **but of critical allied health professionals like nurses and technicians who form the backbone of patient care.**
- ✦ While India claims a **1:834** doctor-population ratio (counting AYUSH), state disparity is severe. For example, **Bihar and UP** lag significantly behind **Kerala**.

💡 **Digital Health Gaps & Data Privacy Concerns:** The aggressive push for the **Ayushman Bharat Digital Mission (ABDM)** faces a **“digital divide”** where the lack of digital literacy and internet access excludes the most vulnerable from benefits.

- ✦ Despite **nearly 79 crore ABHA IDs** created (August 2025), actual usage for health record linkage remains low in rural areas due to internet gaps.
- ✦ Also, privacy concerns have emerged. **AIIMS Ransomware Attack (2022)**, a major ransomware attack paralyzed the server infrastructure of the All India Institute of Medical Sciences (AIIMS), forcing critical services to operate manually.

What Measures are Needed to Strengthen India’s Health Sector?

💡 **Operationalizing “Phygital” Comprehensive Primary Care:** We need to upgrade the **Ayushman Arogya Mandirs** from mere physical outposts to **“phygital”** hubs that utilize the **Unified Health Interface (UHI)** for tele-specialist consultations while retaining high-touch community engagement.

- ✦ A strict **“gatekeeping”** mechanism must be enforced where tertiary care access is contingent upon primary care referral, decongesting major hospitals and shifting the focus from curative to preventive wellness. This hybrid model ensures continuity of care for chronic **Non-Communicable Diseases (NCDs)** by **leveraging AI-assisted diagnostics at the grassroots level.**

💡 **Leveraging Public Insurance for Quality and Cost-Efficient Healthcare:** The government should move

from a passive payer role to a **“strategic purchaser”**, using the scale of **PM-JAY** to enforce **high-quality, cost-effective services** from private providers.

- ✦ This involves moving away from **“fee-for-service”** models toward **“value-based care”** payments, where providers are incentivized based on patient health outcomes rather than the number of procedures performed.
- ✦ Such **financial leverage can regulate private sector pricing transparency and standardization** without heavy-handed legislative capping.

💡 **Legislation of a Dedicated Public Health Management Cadre:** To relieve the burden on clinical specialists, India requires the creation of a specialized, **non-clinical Public Health Management Cadre (PHMC)** responsible solely for administration, epidemiology, and logistics.

- ✦ This **administrative bifurcation allows doctors to focus exclusively on clinical treatment while professional managers handle supply chains, hospital operations, and data analytics.**
- ✦ This structural reform is essential to professionalize district-level health governance and ensure efficient resource utilization during health emergencies.

💡 **Institutionalizing a “One Health” Governance Architecture:** India must move beyond siloed human healthcare to establish a **unified “One Health” surveillance grid that integrates human, animal, and environmental health data to predict zoonotic spillover events.**

- ✦ This requires establishing statutory **inter-ministerial bodies that can enforce synchronized protocols for antimicrobial resistance (AMR) containment and vector control** across agriculture and urban planning sectors.
- ✦ Strengthening this interface is **critical to creating climate-resilient health infrastructure that can withstand the dual threats of emerging pathogens and ecological degradation.**

💡 **Task-Shifting to Allied Health Professionals (AHPs):** Addressing the doctor-patient ratio requires aggressive **“task-shifting”** where mid-level

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providers, such as nurse practitioners and **Community Health Officers (CHOs)**, are legally empowered to handle routine clinical functions.

- ✦ By **strictly defining and expanding the scope of practice for the Allied and Healthcare Professions**, the system can utilize the untapped potential of **pharmacists, optometrists, and physiotherapists** for primary screenings. This decentralizes care delivery and ensures that highly specialized medical talent is reserved for complex, critical cases.
- 💡 **Indigenization of the Bio-Security Supply Chain:** Strengthening national health security requires reducing dependency on import-heavy supply chains by incentivizing domestic manufacturing of high-end medical devices and **Key Starting Materials (KSMs)** for pharmaceuticals.
 - ✦ Policy focus must **shift toward “Health Sovereignty”** by creating dedicated MedTech parks and enforcing procurement mandates that favor indigenous innovation in genomics and biologics. This creates a **self-reliant ecosystem capable of sustaining essential medical supplies** during global geopolitical disruptions or trade blockades.
- 💡 **Urban Health Missions for Vulnerable Clusters:** Unlike rural health, **India’s urban primary health structure is fragmented**, therefore, a dedicated Urban Health Mission targeting peri-urban slums and migrant clusters is structurally vital.
 - ✦ This involves mapping **“health vulnerability zones”** within cities to deploy **mobile health units and evening clinics that cater to the working-class demographic which cannot access daytime OPDs**. Integrating these units with municipal surveillance helps track the epidemiological transition in high-density areas where infectious diseases spread most rapidly.
- 💡 **Digital Sovereignty and Interoperable Health Data:** The implementation of the **Ayushman Bharat Digital Mission (ABDM)** must aggressively pursue **“interoperability”** to eliminate data fragmentation between private corporate hospitals and public facilities.

- ✦ By mandating standardized **electronic health records (EHR)** and creating a federated health data architecture, the state **can enable longitudinal patient history tracking without centralizing sensitive data**.

📌 This data-driven approach empowers policymakers with real-time analytics to dynamically allocate resources based on regional disease burdens rather than static historical estimates.

Conclusion:

India’s health sector demands a **paradigm shift from episodic sick-care to resilient, preventive public health systems**, anchored in cooperative federalism. **Adequate public financing, workforce rationalisation, and primary-care gatekeeping** are indispensable to reduce inequalities and catastrophic expenditure. Leveraging **digital public infrastructure, indigenous innovation, and One Health governance** can future-proof healthcare delivery. Ultimately, **health must be treated not as social spending but as foundational economic infrastructure** for India’s demographic dividend.



Rebuilding India’S Agriculture for Resilience and Growth

*This editorial is based on “[Budget implications for the agriculture sector](#)” which was published in *The Hindustan Times* on 02/02/2026. The article examines India’s shift from subsidy-driven agriculture to infrastructure, technology, and value-chain-led growth. It highlights both opportunities and structural challenges in building a resilient and income-stable farm sector.*

India’s agriculture is undergoing a quiet structural transition **from a subsidy-centric, production-focused system to one increasingly shaped by infrastructure, logistics, and digital governance**. Budget 2026–27 deeper push to ports, warehousing, AI-enabled advisories, and export facilitation is redefining how farm value is created and captured. **This reflects a policy shift from farm support to market enablement, with implications for**

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income stability, diversification, and global competitiveness. However, muted investments in irrigation and agricultural R&D raise concerns about resilience in an era of climate volatility and resource stress.

What are the Key Developments Shaping India's Agriculture Sector?

💡 **Strategic Pivot to High-Value Plantation Crops:** Moving beyond food security staples, the **Budget 2026-27** aggressively promotes high-value “**money crops**” to boost farm incomes and reduce import dependence.

✦ The policy targets coastal and hill economies specifically, incentivizing the cultivation of nuts and plantation crops to capture premium global markets and create import substitution for raw materials like cocoa and cashew.

✦ For instance, the Budget has called for a dedicated **Coconut Promotion Scheme**.

📌 To rejuvenate **old, low-yielding orchards and expand high-density cultivation of walnuts, almonds and pine nuts**, the Budget proposes to support a dedicated programme to enhance farmer incomes and in bringing value addition by engaging youth.

📌 Also, under the **National Fibre Scheme**, focus has been placed on fibres such as silk, wool and jute, which will provide direct benefits to farmers associated with these sectors.

💡 **AI-Integrated Digital Extension:** The launch of “**Bharat-VISTAAR**” marks the transition from static data collection to active, AI-driven advisory services. By integrating the “**AgriStack**” (farmer registry) with ICAR’s scientific data, this multilingual platform aims to democratize precision farming, offering real-time, location-specific advice to bridge the massive lab-to-land information gap.

✦ The Budget 2026 allocated **₹150 crore** specifically for **Bharat-VISTAAR** to operationalize this AI framework.

💡 **Structural Shift to Allied Sectors:** The **Economic Survey 2025-26** highlights a decisive structural transformation where **livestock and fisheries are becoming the primary engines of agricultural growth**, outpacing the crop sector.

✦ This “**diversification by default**” acts as a vital insurance against monsoon volatility, stabilizing rural incomes even when traditional crop outputs decelerate.

✦ For instance, Livestock recorded a **12.77% CAGR** at current prices between FY15–FY24, with **GVA rising nearly 195%**.

✦ Moreover, fish production has increased to **197.75 lakh tonnes in FY 2024-25 from 95.79 lakh tonnes** in FY 2013-14, boosting rural incomes and employment diversification.

💡 **Blue Economy Integration & Value Chain Expansion:** The government is industrializing the fisheries sector by integrating inland water bodies into formal value chains to boost “**Blue Growth**.”

✦ The focus has shifted from mere catch volumes to processing and export competitiveness, treating fishing vessels as effectively “**mobile export units**” to maximize foreign exchange earnings.

✦ For instance, Budget 2026 proposes integrating **500 reservoirs and Amrit Sarovars** into the fisheries value chain. It also declared fish catch by Indian vessels in the **Exclusive Economic Zone (EEZ)** as **duty-free**, aiming to boost marine exports.

💡 **Export Resilience Amidst Protectionism:** Despite global trade barriers and tariff wars, Indian agri-exports have shown remarkable resilience, pivoting towards non-traditional markets and processed goods.

✦ The strategy involves **decoupling from volatile bulk commodities** (like wheat) to focus on **high-value, tariff-resilient products like coffee and processed fruits**, ensuring trade surplus continuity.

✦ For instance, during the financial year 2024-25, **India’s coffee exports reached \$1.80 billion**, marking a **40.2% growth** over the **\$1.28 billion** achieved in FY 2023-24.

📌 Also, India is the world’s largest producer of millets with a share of **38.4% of world’s production (FAO, 2023)**.

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💡 **Institutionalizing Natural Farming:** The push for Natural Farming has moved from a pilot project to a “**Jan Bhagidari**” (**mass movement**) to permanently reduce the fertilizer subsidy burden and restore soil health.

- ✦ However, the approach is now cluster-based and market-linked, **aiming to create a distinct value chain for chemical-free produce rather than just an input-reduction strategy.**
- ✦ The **National Mission on Natural Farming** received ₹750 crore in Budget 2026-27 to support bio-input resource centers. It aims to cover 1 crore farmers to supply the growing organic export market.

💡 **Women at the Helm of India’s Precision Farming Revolution: Namo- Didi scheme** is successfully creating a new stratum of “**rural technical workforce**” among women, addressing both labor shortages and the need for precision application of nano-fertilizers.

- ✦ It represents a sociological **shift where women are not just farm laborers but asset owners and technology providers**, altering the power dynamics in rural agrarian economies.
- ✦ With a ₹1,261 crore outlay, the scheme is deploying **15,000 drones** to Women SHGs. These drones cover **1 acre in 7 to 8 minutes**, allowing **SHGs to earn rental income** while reducing fertilizer consumption through precise spraying.
- ✦ Also, the **Union Budget has proposed SHE-Mart to promote Self-Help Entrepreneurs**, establishing community-owned retail outlets in every district to market products made by women and SHGs, **enabling women in agriculture, animal husbandry, and allied sectors to transition from subsistence work to entrepreneurship.**

💡 **The Collectivization Wave via FPOs:** Smallholder fragmentation is being aggressively **countered by the “10,000 FPO” scheme**, which is successfully shifting farmers from “price takers” to “price makers” through collective bargaining.

- ✦ This institutional innovation is **now maturing, moving beyond mere registration to actual**

business integration, enabling direct market linkages and value addition at the farm gate.

- ✦ As of December 2025, **₹430.77 Crore has been distributed to 6557 FPOs as a matching equity grant and credit guarantee cover worth ₹662.71 Cr is issued to 2671 FPOs.**

What are the Key Issues Associated with India’s Agriculture Sector?

💡 **The “Climate-Insurance” Asymmetry:** A critical policy paradox exists where the frequency of extreme weather events is **outpacing the state’s fiscal capacity for compensation.**

- ✦ While the “**climate shock**” has become a permanent feature disrupting crop cycles, the budgetary allocation for insurance (**PMFBY**) is seeing real-term consolidation, **forcing a reliance on “adaptation” over “compensation,”** which leaves smallholders vulnerable to immediate liquidity crunches.
- ✦ For instance, in 2025, India faced extreme weather on **331 of 334 days**, damaging **17.4 million hectares** of crop area.

✍ Yet, the **Budget 2026-27** allocated **₹12,200 crore** for PMFBY, a reduction from revised estimates.

💡 **Disguised Unemployment & Labor Stagnation:** Despite the structural transformation of the broader economy, the agriculture sector continues to absorb a disproportionate share of the workforce, **signaling “disguised unemployment.”**

- ✦ The failure of the manufacturing sector to pull labor out of farms has led to a scenario where rising agricultural **output does not translate into rising per-capita farm income**, as the revenue pie is shared among too many dependents.
- ✦ The **Periodic Labour Force Survey (PLFS) 2025** revealed that **57.7%** of the rural workforce is still engaged in agriculture, an increase from previous years, **this effectively suppresses rural wage growth.**

💡 **Skewed NPK Ratio & Soil Fatigue:** The heavy subsidization of Urea has distorted the nutrient application ratio, leading to severe **soil toxicity and stagnation in yield growth (“soil fatigue”).**

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✦ Farmers **over-apply cheap nitrogen while neglecting phosphorus and potassium, creating a “yield barrier”** where applying more fertilizer no longer results in proportional crop output, threatening long-term food security for short-term gains.

✍ For instance, the **Economic Survey 2025-26** flagged the N:P:K consumption ratio at a skewed **10.9:4.1:1** (against the ideal 4:2:1).

💡 **The MSP-Procurement Disconnect:** The demand for a **“Legal Guarantee for MSP”** stems from the market failure where **open market prices often crash below production costs during peak harvest.**

✦ However, the current procurement infrastructure is heavily skewed towards **wheat and rice in limited geographies (Punjab, Haryana)**, leaving farmers of pulses, oilseeds, and coarse grains in other states effectively outside the safety net despite **“paper MSPs.”**

✦ For instance, while the government announced MSP hikes for **22 crops** in 2025-26, actual procurement remained negligible for crops like **oilseeds.**

💡 **Fragmentation & Scale Inefficiency:** The continuous subdivision of land across generations **has reduced the average operational holding to a size** where mechanization becomes economically unviable.

✦ This **“atomization” of land prevents economies of scale, making modern inputs (like precision irrigation or harvesters) too costly** for the individual farmer, thereby trapping them in a low-input, low-output equilibrium.

✦ The average landholding size has shrunk to **1.08 hectares** (2025 estimate), with **86%** of farmers being Small & Marginal. Lower farm machinery utilization on these small plots is driving up production costs.

💡 **Post-Harvest “First-Mile” Gaps:** While cold chain capacity is growing, the critical **“first-mile” connectivity (farm gate to aggregation point)** remains broken.

✦ Most post-harvest losses occur immediately after cutting due to a lack of **near-farm packhouses and pre-cooling units**, forcing farmers into **“distress sales”** to local traders rather than holding produce for better prices in the organized market.

✦ For instance, India loses approximately **₹92,651 crore** annually to post-harvest losses (CIPHET data).

💡 **Edible Oil & Pulse Import Dependency:** A major strategic vulnerability is India’s continued reliance on global markets for essential proteins and fats.

✦ Despite **“Mission Mode”** interventions, **domestic production of oilseeds and pulses fluctuates wildly with the monsoon, forcing the government to rely on zero-duty imports to control inflation**, which paradoxically depresses domestic prices and discourages farmers from expanding acreage.

✦ For instance, India imported 16 million tonnes of edible oils for nearly Rs 1.61 lakh crore during the 2024-25 marketing year ended October to meet domestic demand, exposing vulnerability to global price volatility and forex outflows.

✦ **Maharashtra’s tur (pigeon pea) output for the 2025–26 season was projected to fall by up to 40%** due to severe crop damage caused by excessive rainfall, flooding, and waterlogging, potentially triggering a rise in imports to bridge the supply shortfall.

💡 **Groundwater Depletion & Energy Nexus:** The **free power policy for tubewells in major agrarian states** has created a perverse incentive to mine groundwater, **leading to an ecological crisis.**

✦ This **“Energy-Water nexus”** encourages the cultivation of water-guzzling crops like paddy in semi-arid regions, **depleting aquifers at a rate that is irreversible** and effectively exporting water from dry states to the rest of the world.

✦ For instance, the **Dynamic Ground Water Resource Assessment 2025** shows **10.8% of units (730 of 6,762) are over-exploited**, while **total stressed units (over-exploited, critical, and semi-critical) together account for ~25%.**

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- ✍ Also, while about 70% of Indian electricity is carbon-based, **a quarter of the nation's consumption goes into agriculture.** (Centre for Policy Research)

What Measures are Needed to Strengthen India's Agriculture Sector?

- 💡 **Universalizing Digital Public Infrastructure:** The primary measure for modernization is the **nationwide scaling of AgriStack** to create a seamless digital ecosystem for every farmer.
 - ✦ By **integrating land records, crop surveys, and unique Farmer IDs**, the government can enable **"plug-and-play" access to formal credit**, crop insurance, and customized advisory services.
 - ✦ This **digital backbone eliminates middlemen, reduces the credit-processing lag** from weeks to minutes, and allows for precision-targeted benefit transfers that prevent leakage and ensure that aid reaches the actual tiller of the land.
- 💡 **Transitioning to Precision Agriculture via "Bharat-VISTAAR":** A critical shift is needed from generic agricultural extension to **AI-driven precision advisory** through platforms like the newly proposed Bharat-VISTAAR.
 - ✦ By leveraging real-time satellite imagery and multilingual AI, farmers can receive plot-specific recommendations on soil health, irrigation schedules, and localized pest alerts.
 - ✦ This **"Intelligence-as-a-Service" model** helps smallholders optimize input use **reducing the excessive application of urea and water** thereby lowering production costs while simultaneously increasing yield quality and environmental sustainability.
- 💡 **Incentivizing "Market-Led" Crop Diversification:** To break the ecologically damaging wheat-rice monoculture, India must implement a **Productivity-Linked Incentive (PLI)** for high-value and climate-resilient crops like oilseeds, pulses, and plantation crops (coconut, cashew, cocoa).
 - ✦ Instead of just announcing MSPs, **the state should develop regional Specialized Crop Boards that provide end-to-end support,**

from high-quality germplasm to guaranteed procurement for processing industries.

- ✦ This **shifts the focus from "volume-centric" farming to "value-centric" entrepreneurship**, aligning domestic production with global demand and reducing the massive import bill for edible oils.
- 💡 **Decentralized Post-Harvest Infrastructure and "First-Mile" Connectivity:** Strengthening the sector requires moving value-addition closer to the farm gate through **Village-Level Processing Hubs** funded by the **Agriculture Infrastructure Fund (AIF)**.
 - ✦ Measures should prioritize **"first-mile" logistics**, such as solar-powered micro-cold rooms, pack-houses, and grading units managed by **Farmer Producer Organizations (FPOs)** or SHGs.
 - ✦ By reducing the post-harvest wastage in horticulture, farmers can **bypass distress sales during peak harvest and gain the "holding power"** necessary to negotiate better prices in the national and global markets.
- 💡 **Mainstreaming Climate-Smart and Natural Farming Practices:** With climate volatility becoming a permanent risk, India must institutionalize **Sustainable Agricultural Practices (SAPs)** like **Zero Budget Natural Farming (ZBNF)** and high-density orcharding.
 - ✦ This involves establishing a decentralized network of **Bio-Input Resource Centers** at the panchayat level to **provide organic fertilizers and pesticides, reducing the financial and ecological burden of chemical inputs.**
 - ✦ Such measures **not only restore soil organic carbon and groundwater levels** but also help Indian produce meet the increasingly **stringent "green" standards of international export markets.**
- 💡 **Professionalizing the Allied Sector:** As allied sectors now grow faster than crop farming, they require **Industrial-Scale Institutionalization** through **dedicated value chains and credit-linked subsidies.**
 - ✦ Measures should include the creation of **"Livestock FPOs"** and the **integration of inland water bodies (like Amrit Sarovars)** into the

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formal blue economy for intensive aquaculture. Providing universal access to high-quality semen banks, mobile veterinary clinics, and digital traceability for dairy and meat products will ensure that these “monsoon-proof” sectors become the primary drivers of rural income stability and export growth.

🔦 **Reforming Agricultural Credit through “Risk-Guarantee” Frameworks:** To unlock private investment, the financial architecture must evolve from simple interest subvention to **Credit-Risk Guarantee Funds**.

- ✦ By providing partial guarantees to banks, the state can encourage lending to “high-risk” areas like agri-startups, climate-tech, and small-scale mechanization (drones/robotics).
- ✦ This de-risking of the sector attracts venture capital and encourages young “Agri-preneurs” to modernize the value chain, transforming farming from a subsistence activity into a technologically sophisticated and bankable business enterprise.

Conclusion:

India’s agricultural future lies in value-chain deepening, digital intelligence, and diversification beyond water-intensive crops, not higher subsidies. AI-led advisories, first-mile infrastructure, and allied-sector growth can stabilize farm incomes against climate and price shocks. Achieving oilseed self-reliance, export-oriented processing, and groundwater sustainability demands a shift from price support to productivity-led reforms.

A climate-smart, technology-driven, market-linked agriculture is vital for India’s food security and rural resilience.



Building India’s Deep-Tech Stack

This editorial is based on “[A budget for the deep tech ecosystem & the mitras building it](#)” which was published in The Hind businessline on 02/01/2026. The article

highlights India’s shift toward building a full-stack deep-tech ecosystem through strategic policy and infrastructure support. It also examines key challenges and reforms needed to scale deep-tech innovation.

India’s deep-tech ecosystem is no longer driven by isolated startups or subsidy-led innovation, but by a deliberate attempt to build end-to-end technological capability. The focus has shifted from software-only strengths to strategic domains such as semiconductors, AI infrastructure and advanced manufacturing, where scale, skills and supply chains matter as much as capital. Recent policy signals reflect a move from consumption-led digitisation to production-linked, capability-centric growth. This transition positions deep tech as both an economic lever and a strategic asset for India.

What is Deep Tech?

🔦 **About: Deep tech** refers to technologies that are rooted in fundamental scientific research and advanced engineering, aimed at solving complex, large-scale problems rather than enabling incremental or convenience-based solutions.

- ✦ Unlike conventional digital startups that rely mainly on business model innovation, deep-tech ventures are built on breakthroughs in disciplines such as artificial intelligence, semiconductors, biotechnology, advanced materials, robotics, quantum computing, and clean energy.

Core Characteristics of Deep Tech

- ✦ **Science- and research-intensive:** Deep tech is anchored in original R&D, often emerging from laboratories, universities, or long-term industrial research.
 - 📎 Progress depends on advances in physics, chemistry, biology, mathematics, and engineering rather than rapid market iteration alone.
- ✦ **Long gestation and high risk:** Development cycles are long, capital-intensive, and uncertain. Returns accrue over years, not quarters, making patient capital, state support, and mission-oriented policy critical.
- ✦ **Hard-to-replicate advantage:** Deep tech creates durable competitive moats through

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intellectual property, tacit know-how, manufacturing capability, and system-level integration, unlike easily replicable software platforms.

- ✦ **Infrastructure and ecosystem dependence:** Success requires specialised infrastructure, fabs, clean rooms, data centres, testing facilities, along with skilled human capital and resilient supply chains.

💡 **Common Fields Associated with Deep Tech:** Deep tech spans many industries, but it is most prominent in:

- ✦ **Advanced Materials:** Developing new polymers, nanomaterials, or battery technologies.
- ✦ **Biotechnology:** Synthetic biology, genomics, and drug discovery.
- ✦ **Artificial Intelligence:** Advanced machine learning algorithms (beyond simple chatbots) and computer vision.
- ✦ **Robotics and Drones:** Automation for agriculture, manufacturing, or logistics.
- ✦ **Quantum Computing:** Creating next-generation processors that solve problems standard computers cannot.
- ✦ **Space Tech:** Satellite technology, rocketry, and space exploration equipment.

💡 **Deep Tech vs. Shallow Tech**

Feature	Deep Tech	Shallow Tech
Focus	Scientific breakthrough	Business model innovation
Risk	Primarily technical + capital risk (will it work at scale?) Technical risk (Will it work?)	Primarily market + execution risk (will users adopt?) Market risk (Will people buy it?)
Time to Market	Long (years to decades)	Short (months to years)
IP Protection	High (Hard to copy)	Low (Easy to copy)

What is the Regulatory Framework Governing Deep-tech in India?

💡 **Data, Digital & AI Governance**

- ✦ **Digital Personal Data Protection Act, 2023:** Regulates **collection, processing, and cross-border flow of personal data**, directly impacting AI, big data, and platform-based deeptech firms.
- ✦ **IndiaAI Mission (policy framework):** Sets norms for responsible AI and aims to establish indigenous AI models that align with global standards while addressing unique challenges and opportunities

💡 **Intellectual Property & Innovation Protection**

- ✦ **Patents Act, 1970:** Core framework for **protecting deeptech innovations** in AI, biotech, semiconductors, and materials science.
- ✦ **National IPR Policy, 2016:** Encourages **faster patenting, commercialisation, and industry-academia collaboration**, critical for deeptech scaling.

💡 **Startup, Investment & Capital Regulations**

- ✦ **Startup India Initiative:** Provides **regulatory exemptions, tax incentives, and fast-track IP support** for deeptech startups.
 - 📎 The government has **removed the condition of three-year existence** for deep-tech startups to avail recognition under DSIR's Industrial Research and Development Promotion Program.
- ✦ **Securities and Exchange Board of India (SEBI) Regulations:** Govern venture capital funds, AIFs, and emerging frameworks for startup listings and exits.
- ✦ **National Deep Tech Startup Policy (Draft):** It is a proposed framework to **foster high-tech innovation by addressing challenges in funding, R&D, IP, and regulations**, aiming to **boost India's global competitiveness** in areas like AI, semiconductors, and space tech.

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✦ **Anusandhan National Research Foundation (ANRF):** It aims to provide high-level strategic directions for research, innovation, and entrepreneurship in the fields of natural sciences, including mathematical sciences, engineering and technology, environmental and earth sciences, health and agriculture, and scientific and technological interfaces of humanities and social sciences.

💡 Strategic & National Security Regulation

✦ **National Security Directive on Telecommunication Sector:** It mandates that Telecom Service Providers (TSPs) procure equipment only from “trusted sources” and products.

✦ **FDI Policy (Press Notes):** Screens foreign investment in sensitive deep tech sectors such as defence tech, space, and telecom.

💡 Sector-Specific Deep Tech Frameworks

✦ **Indian Space Policy, 2023:** Opens space launch, satellite, and downstream applications to private deep tech firms.

✦ **Biotechnology Regulations (DBT & CDSCO):** Govern genomics, bio-manufacturing, and health-tech innovations.

✦ **Telecom Act, 2023:** Updates regulation for next-gen networks and satellite communications.

✦ **Production Linked Incentive (PLI) Schemes:** Provide regulatory-cum-fiscal support for semiconductors, electronics, advanced batteries, and EV deep tech.

What are the Current Developments in India's Deep Tech Ecosystem?

💡 **Sovereign AI Infrastructure & “Compute-as-a-Public-Good”:** India has decisively moved from being an “AI consumer” to an “AI builder” by treating compute power as critical public infrastructure.

✦ The “**IndiaAI Mission**” effectively democratizes access for startups, preventing a monopoly by global tech giants and enabling the training of indigenous **Large Language Models (LLMs)** that capture India's linguistic diversity and unique cultural datasets, which global models often fail to represent.

✦ **The national compute capacity crossed 34,000 GPUs**, accessible to startups at subsidized rates.

📌 Indigenous models like **Sarvam-1** are being deployed in India to create a sovereign AI ecosystem and reduce dependence on foreign APIs.

💡 **Operationalization of Semiconductor Fabs:** The narrative has shifted from “planning” to “execution” with India's first commercial semiconductor fabs nearing production, effectively plugging India into the global chip value chain.

✦ This transition reduces strategic vulnerability in electronics manufacturing and creates a domestic “**multiplier ecosystem**” for fabless design startups who can now prototype locally rather than waiting for slots at **Taiwan's TSMC**.

✦ The **Tata Electronics fab in Dholera** initiated equipment installation in late 2025, with the first commercial 28nm chips expected by late 2026.

📌 Simultaneously, the facility has opened for “**tape-outs**” for Indian startups, supporting chips in the 28nm-90nm range.

💡 **Privatization of Space Launch Services:** The Indian space sector has successfully transitioned from an **ISRO-monopoly to a commercially vibrant “Space 2.0” economy**, driven by the deregulation of FDI and technology transfer.

✦ This has allowed private players to capture a slice of the lucrative global launch market, moving beyond just satellite manufacturing to offering “**launch-on-demand**” services for small satellite constellations.

✦ For instance, **Skyroot Aerospace** scheduled its first orbital mission for the **Vikram-1** vehicle in early 2026.

📌 At present, the Indian space economy is valued at approximately USD 8.4 billion, constituting a 2% share of the global space market with companies like **Agnikul Cosmos** commercializing 3D-printed engines for rapid deployment.

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💡 **Institutionalizing Quantum Competence:** The **National Quantum Mission (NQM)** has moved past the policy phase to creating tangible “**Thematic Hubs**” (T-Hubs) that function as **Section-8 companies**.

- ✦ This unique structure **allows academic institutions to operate with corporate agility**, fostering deep-tech spinoffs in quantum sensing and cryptography that are critical for future-proofing national security against quantum-decryption threats.
- ✦ For instance, 4 T-Hubs are now fully operational and are engaged in a range of activities including **Technology Development, Human Resource Development, Entrepreneurship Development & Industry Collaboration and International Collaborations**.

💡 **Bio-Manufacturing & The BioE3 Paradigm:** The **BioE3 Policy** (Biotechnology for Economy, Environment, and Employment) marks a strategic pivot towards “**High-Performance Biomanufacturing**” to replace petrochemical-based industries.

- ✦ By **establishing “Biofoundries,”** the state is enabling a “**lab-to-market**” pipeline for synthetic biology, focusing on sustainable alternatives like bio-plastics and smart proteins which are crucial for the net-zero transition.
- ✦ A centralized **Biofoundry at ICGEB, New Delhi**, is now operational, offering “**Design-Build-Test-Learn**” services to startups.
 - 📌 The policy supports **6 thematic sectors**, helping the bioeconomy reach **\$165.7 billion in 2024**, with a target of \$300 billion by 2030.

💡 **Defense Deep-Tech Indigenization:** Recognizing that modern warfare is defined by technology rather than just hardware volume, the **MoD has launched aggressive grant mechanisms for “strategic independence.”**

- ✦ The **ADITI scheme** (under iDEX) **bridges the “Valley of Death” for deep-tech defense startups** by offering substantial risk capital.
- ✦ It has unlocked **₹750 crore (2023-26)**, offering grants up to **₹25 crore** per startup. Success stories include **QuBeats**, which **received**

funding to develop GPS-independent quantum navigation systems for the Indian Navy.

💡 **Green Hydrogen Valleys & Electrolyzer Independence:** India is attempting to become a global export hub for Green Hydrogen by localizing the most critical component: **the electrolyzer**.

- ✦ By creating **clustered “Hydrogen Valleys,”** the government is ensuring demand certainty (off-take assurance) for deep-tech energy startups, **allowing them to achieve economies of scale** and compete with cheap Chinese alkaline electrolyzers.
- ✦ Four “**Hydrogen Valleys**” were announced by the Union Ministry of Science & Technology with an investment of **₹485 crore**, **demonstrating the full value chain**. Companies like **GreenH (manufacturing PEM electrolyzers in Haryana)** represent the success of this localization push under the **National Green Hydrogen Mission**.

💡 **The Anusandhan RDI Corpus:** A major structural fix for the “**funding winter**” in deep tech is the operationalization of the **Anusandhan National Research Foundation (ANRF) corpus**.

- ✦ Unlike **typical VC money** which seeks quick returns, this sovereign corpus provides “**patient capital**” essential for R&D-heavy sectors like material science and clean energy, de-risking long-term innovation for private investors.
- ✦ The **Research, Development and Innovation (RDI) scheme** with a **₹1 lakh crore** financing pool was operationalized by late 2025.
 - 📌 It **specifically targets sunrise sectors**, offering **long-tenure, low-cost funds** to scale deep-tech projects that have high technical risk but massive national strategic value.

What are the Key Issues Associated with India’s Deeptech Ecosystem?

- 💡 **The “Valley of Death” in Growth-Stage Funding:** While early-stage grants (like iDEX) are abundant, a **critical “missing middle” exists for Series B+ growth capital** where deeptech hardware startups often die.

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- ✦ **Domestic VCs remain risk-averse to long-gestation hardware cycles (5-7 years), preferring the quick returns of fintech/SaaS, forcing premier Indian deeptech startups to flip their headquarters to the US or Singapore to access patient capital.**
- ✦ Even after the operationalisation of the ANRF corpus of ₹1 lakh crore, **deep-tech startups receive a disproportionately low share of venture capital**, while hardware startups face longer and **more uncertain growth-stage funding cycles than software-based firms.**
- 💡 **The “L1” Procurement Paralysis:** The biggest potential customer for deeptech (the Government) **remains trapped in the “Lowest Bidder” (L1) procurement archaic framework.**
 - ✦ Despite the intent to buy innovative solutions, the bureaucratic machinery lacks the technical capacity to evaluate **“Quality-cum-Cost” (QCBS)**, often disqualifying superior indigenous deeptech products because they cannot compete on price with mass-produced, inferior legacy alternatives or dumped imports.
 - ✦ A **December 2025 NASSCOM report** noted that more pre-revenue startups are facing operational difficulties after receiving government grants like iDEX, BIRAC, or TDB.
 - 📌 This is termed the **“grant liquidity trap,”** where **approved funding is not always available when needed most**, restricting the working capital of startups that lack existing revenue
 - ✦ For instance, **iDEX had signed 430 contracts with 619 startups and MSMEs.** While this shows active engagement, **it does not specify the percentage of these that have transitioned into long-term commercial procurement contracts versus initial prototype R&D grants.**
- 💡 **The “Lab-to-Land” Commercialization Disconnect:** India faces a **“Productization Deficit”** where record-breaking patent filings **are not translating into commercial products due to rigid IP sharing norms in academia.**
 - ✦ Professors and scientists **at IITs/CSIR labs lack the incentives or legal “safe harbor” to spin off companies**, leading to a situation where breakthrough research gathers dust in journals rather than creating economic value in the market.
- ✦ While India ranked **6th globally** in patent filings in 2025, the commercial exploitation of patents **remains significantly lower than global leaders like the US.**
 - 📌 Also, in India, **it takes about 58 months on average to dispose of a patent application** as compared to about 20 months in China and 23 months in the US.
- 💡 **Critical Component Import Dependency:** The **“Make in India” hardware ecosystem is severely vulnerable to geopolitical supply chain shocks as it still relies on imported “intermediaries” like sensors, precision motors, and specialized gases.**
 - ✦ Startups are often just **“system integrators” rather than “component manufacturers,”** meaning a single trade restriction by China or Taiwan can ground entire fleets of Indian drones or robotics.
 - ✦ At present, **India imports roughly 90–95 percent of its semiconductor and electronics components**, with major suppliers including China, Malaysia, Taiwan, Thailand, and Singapore.
- 💡 **The “PhD Talent” & R&D Skills Gap:** There is an acute shortage of **“Deep-Science”** talent capable of bridging the gap between theoretical physics/ maths and engineering application.
 - ✦ While India produces millions of coders, it produces very few researchers with the **PhD-level expertise required for Quantum Computing or AI algorithm design**, forcing startups to acquire expensive talent from Europe or the US, inflating their burn rates.
 - ✦ For instance, according to a Stanford report, India recorded the highest global growth in AI talent concentration between **2016 and 2024 at 252%.**
 - 📌 However, **it still does not feature among the top 15 countries in overall AI talent concentration**, a list led by Israel and Singapore.

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- 💡 **Testing Infrastructure Bottlenecks:** Prototyping hardware requires expensive “industrial-grade” testing facilities (**wind tunnels, anechoic chambers, radiation hardening labs**) which are largely **locked inside government PSUs (ISRO/DRDO)** with restricted access.
 - ✦ **Startups lose precious months waiting for testing slots**, slowing their “iteration cycles” and making them uncompetitive against global peers who have faster feedback loops.
 - ✦ For instance, practically every private **SpaceTech player (Skyroot, Agnikul, Bellatrix)** must queue for access to ISRO’s facilities because duplicating them is financially impossible for a **Series A startup**.
- 💡 **Regulatory Uncertainty in “Gray Zones”:** Regulation lags behind innovation, creating “Gray Zones” where operating is legally risky for deeptech sectors like Space mining, GenAI liability, or autonomous bio-manufacturing.
 - ✦ The **absence of clear liability frameworks** (e.g., “Who is responsible if an AI diagnosis kills a patient?”) **deters large enterprises from adopting deeptech solutions**, stifling the B2B market for startups.
 - ✦ For instance, while the **Indian Space Policy 2023 allows private players (NGEs) to launch satellites**, the long-pending Space Activities Bill has yet to become law.
 - 📎 Similarly, **Consumer Protection Act, 2019** holds doctors and hospitals liable for negligence.
 - 📎 However, **if an autonomous AI diagnostic tool (e.g., for detecting diabetic retinopathy) misses a diagnosis**, the law is unclear: is the doctor negligent for trusting the AI, or is the software vendor liable for a product defect?
- 💡 **Valuation Mismatch & IP Collateralization:** Indian financial institutions fundamentally lack the ability to value “Intangible Assets” like IP or algorithms, insisting on traditional collateral (land/buildings) for debt financing.
 - ✦ This **forces deeptech founders to dilute equity** excessively at early stages just to buy equipment, leaving them with little “skin in the game” by Series B, which ironically discourages future investors.

- ✦ **Because patents are intangible**, banks often demand a **significant cash margin in a Fixed Deposit to provide a Bank Guarantee**. This effectively **cancels out the benefit of the credit**, as startups must already possess the cash they are trying to borrow.

What Measures are Needed to Strengthen India’s Deeptech Ecosystem ?

- 💡 **Operationalizing “Patient Capital” via Sovereign Risk-Guarantees:** To bridge the “Valley of Death” where hardware startups fail, the government must establish a dedicated “**Sovereign Deeptech Fund-of-Funds**” that prioritizes long-tenure investments over quick exits.
 - ✦ Crucially, this fund should offer “**First-Loss Default Guarantees**” to private VCs, effectively de-risking their entry into high-gestation sectors like quantum or space-tech.
 - ✦ This mechanism **shifts the financial paradigm from “risk-aversion” to “risk-sharing,”** catalyzing the flow of private institutional capital into asset-heavy innovations that **require 7-10 years to mature**.
- 💡 **Mandating “Quality-Cum-Cost” (QCBS) Public Procurement:** The state must transition from a passive regulator to an active “**Market-Maker**”.
 - ✦ Implementing a strict **Quality-cum-Cost Based Selection (QCBS)** framework ensures that indigenous deeptech products are evaluated on performance and lifecycle value rather than just upfront price.
 - ✦ By reserving a “**First Buyer**” quota in **defense and infrastructure projects** for startups, the government **provides the critical revenue visibility and commercial validation needed for global scaling**.
- 💡 **Creating a “National Testing Grid” (Lab-as-a-Service):** To drastically reduce the Capital Expenditure (CapEx) burden on startups, all public R&D infrastructure (ISRO, DRDO, CSIR labs) should be mapped onto a unified “**National Testing Grid**.”
 - ✦ This digital portal would operate on a “**Lab-as-a-Service**” model, **allowing private startups to book wind tunnels, anechoic chambers, or bio-safety labs on a “pay-per-use” basis**.

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- ✦ Democratizing access to these high-value assets accelerates the **“Prototype-to-Production”** cycle and prevents startups from duplicating expensive infrastructure that already exists.
- 💡 **Liberalizing Academic Spin-off & IP Monetization Norms:** Unlocking the latent value in universities requires a standardized **“Professor-of-Practice”** policy that allows faculty to co-found companies without leaving their academic posts.
 - ✦ Simultaneously, a **“National IP Exchange”** should be created to act as a marketplace for dormant public-funded patents, simplifying licensing agreements.
 - ✦ This fosters a culture of **“Translational Research,”** ensuring that breakthrough scientific papers are converted into commercial entities rather than remaining theoretical assets.
- 💡 **Establishing “Thematic Regulatory Sandboxes”:** For emerging **“Gray Zone”** technologies like generative AI, space mining, or synthetic biology, the government must notify **“Live Regulatory Sandboxes.”**
 - ✦ These controlled environments grant startups temporary legal immunity to test products with real customers under supervision, bypassing rigid legacy laws.
 - ✦ This **“Adaptive Regulation”** approach allows policy to evolve in lockstep with technology, preventing the stifling of innovation while simultaneously generating data to frame long-term safety guidelines.
- 💡 **Deep-Science Talent & “Industrial PhD” Fellowships:** Addressing the scarcity of specialized talent requires launching **“Industrial PhD Fellowships”** where researchers split their time between university labs and deep-tech startup R&D centers.
 - ✦ The government should fund these positions to create a pipeline of **“Scientific Founders”** capable of bridging the gap between theoretical physics and engineering application.
- ✦ This initiative creates a **“Talent Density”** in niche areas like cryogenics and photonics, which is currently the biggest operational bottleneck for scaling hardware ventures.
- 💡 **Component-Level Production Linked Incentives (PLI):** Moving beyond final assembly, the PLI framework must be expanded to a **“Component-Linked Incentive” (CLI)** scheme specifically for deep-tech intermediaries like sensors, precision actuators, and specialized alloys.
 - ✦ Incentivizing the domestic manufacturing of these critical building blocks insulates the ecosystem from **“Geopolitical Supply Shocks”** and trade curbs.
 - ✦ This strategy builds a resilient **“Sovereign Supply Chain,”** ensuring that Indian startups are not merely system integrators dependent on foreign raw materials.
- 💡 **IP-Backed Financing & Valuation Standards:** To fix the credit gap, the financial regulator must codify standards for **“IP-Backed Financing,”** allowing banks to accept patents and proprietary algorithms as valid collateral for loans.
 - ✦ This requires training a cadre of **“Technical Valuers”** who can accurately assess the monetary potential of intangible assets.
 - ✦ By legitimizing IP as an economic asset class, this measure unlocks debt capital for startups that are **“asset-light”** in physical terms but **“asset-heavy”** in intellectual property, preventing excessive equity dilution.

Conclusion:

India’s deep-tech journey marks a **shift from sporadic innovation to strategic capability-building**, where technology, talent and infrastructure are being aligned at scale. However, without resolving growth-stage financing gaps, procurement rigidities and commercialization bottlenecks, this momentum risks stalling before maturity. **The next phase must see the State act as a market-maker and risk-sharing partner rather than merely a grant-giver.** If executed well, deep tech can anchor India’s economic resilience, strategic autonomy and long-term global competitiveness.



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India's Trade Diversification Push

This editorial is based on “[Lower US tariffs help India, but diversification remains essential](#)” which was published in The Hindu on 03/02/2026. The article brings into picture the short-term gains from US tariff relief for India, while underscoring the need to sustain export diversification and domestic resilience amid policy uncertainty.

India has secured significant tariff relief from the US, with **reciprocal tariffs reduced from 25% to 18%** and the **additional 25% penalty on Russian oil imports lifted**. While this provides immediate relief to exporters and capital markets, the agreement came after India had already begun aggressively diversifying its export markets and pursuing trade deals with partners like the EU. India must continue strengthening alternative markets and building domestic resilience rather than becoming overly dependent on US trade concessions.

What are the Key Drivers Pushing India to Diversify its Trade Market?

- 💡 **The “Weaponization of Trade” & US Volatility:** The primary propellant is the realization that the US market is no longer a “stable anchor” but a geopolitical lever that can be switched off arbitrarily.
 - ✦ The recent tariff shock demonstrated that political alignment (**Quad**) does not guarantee economic immunity, forcing India to “hedge” its export bets.
 - ✦ For instance, India’s merchandise exports to the US slipped 1.83% year-on-year to \$6.88 billion in December 2025, weighed down by higher tariffs (though it has eased recently)
- 💡 **The “Critical Mineral” Security Imperative:** Diversification is now driven by the “input side”, the urgent need to secure lithium, cobalt, and rare earths to feed India’s domestic **PLI ecosystems** (EVs, semiconductors) without relying on China.
 - ✦ This has forced a foreign policy pivot toward mineral-rich nations in Africa and Latin America, transforming them from just “export destinations” into strategic “resource partners.”

- ✦ **Union Budget 2026–27** announces Dedicated Rare Earth Corridors in Odisha, Kerala, Andhra Pradesh, and Tamil Nadu for mining, processing, research, and manufacturing of Rare Earth Permanent Magnets (REPMs), bypassing Chinese processing.

- ✦ Also, to operationalise its strategy internationally, India established the **KABIL (Khanij Bidesh India Ltd)** joint venture, comprising NALCO, HCL and MECL, which is tasked with identifying, exploring and acquiring critical minerals.

- 💡 **Capturing the “Growth Arbitrage” of the South:** Strategically, India is moving where the future consumption is, realizing that Western markets are demographically stagnant while the Global South is entering a consumption boom.

- ✦ By establishing early dominance in these “youth-bulge” economies with affordable goods (pharma, 2-wheelers), India is effectively locking in the next 20 years of export demand.
- ✦ According to UNCTAD’s Trade and Development Report 2025, India ranked among the leading economies in trade partner diversification, ranking 3rd in the Global South and recording a trade diversity score higher than all Global North economies.

- 💡 **The “Green Energy” Export Imperative:** India’s ambition to become a global Green energy hub forces a structural pivot away from the energy-rich US (which has its own cheap shale/IRA subsidies) toward energy-importing economies in East Asia and Europe.

- ✦ To monetize its renewable cost advantage, India is trying to aggressively cultivate markets like Japan, South Korea, and Germany.
- ✦ For instance, India’s exports of solar photovoltaic (PV) products have surged by more than 23 times between Fiscal Year (FY) 2022 and FY2024.

How is India Diversifying its Trade Markets?

- 💡 **Strategic Anchoring in Non-US Western Markets:** India is aggressively hedging against US policy volatility by locking in long-term, duty-free access to other high-value consumption economies in Europe and the UK.

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- ✦ This “multiple-anchor” strategy ensures that even if American tariffs fluctuate, Indian exporters have alternative premium markets for high-margin goods like textiles and leather.
- ✦ For instance, in January 2026, India and the **European Union** concluded negotiations for a comprehensive **Free Trade Agreement (FTA)**, covering **99% of India’s export trade**.
- 💡 **Moving Up the Value Chain via PLI:** The diversification is not just geographic but structural, shifting the export basket from raw commodities to high-value finished electronics and precision engineering through the Production Linked Incentive (PLI) scheme.
 - ✦ By embedding itself into **Global Value Chains (GVCs)** as a “Plus One” partner, India makes its exports stickier and less sensitive to simple price/tariff shocks.
 - ✦ For instance, **India’s electronics exports hit ₹4 lakh crore in 2025**, with further growth expected as four semiconductor plants begin production in 2026.
- 💡 **The “Global South” Geographic Pivot:** Recognizing saturation in the West, New Delhi is actively cultivating markets in **Africa, Latin America, and Central Asia** to absorb mid-tech manufacturing and generic pharmaceutical exports.
 - ✦ This pivot taps into high-growth developing economies where Indian goods offer a “value-for-money” competitive advantage over expensive Western alternatives.
 - ✦ For instance, **Indian companies already account for about 20% of pharmaceutical exports to Africa**, highlighting their critical role in the region’s healthcare system.
 - 📌 **India’s total trade with Latin American and Caribbean region**, comprising of 43 countries, stood at **USD 35.73 billion with exports worth USD 14.50 billion** during 2023-24
 - 📌 Also, recently, India and the **Gulf Cooperation Council (GCC)** have signed the **Terms of Reference for a Free Trade Agreement** in New Delhi.
- 💡 **Currency Statecraft & De-Dollarization:** To insulate its trade from geopolitical weaponization of the US Dollar and exchange rate volatility, India is operationalizing **Rupee trade settlement mechanisms and digital payment linkages**.
 - ✦ This financial infrastructure allows trade to continue with sanction-hit or forex-starved nations without triggering US secondary sanctions.
 - ✦ For instance, in 2023, **India has made first-ever payment in rupees for crude oil purchased from the UAE**, paving the way for the Internationalization of Indian Currency.
 - 📌 Also, **UPI-PayNow linkages with Singapore** now process real-time cross-border trade settlements.
- 💡 **Energy & Logistics Corridor Diplomacy:** India is reducing its logistics vulnerability by developing physical trade corridors like the **India-Middle East-Europe Corridor (IMEC)** and securing energy from diverse sources (e.g. LNG from Qatar).
 - ✦ This reduces the “transit risk” of relying solely on the **Suez Canal** or volatile shipping lanes, ensuring supply chain continuity for exporters.
 - ✦ For instance, the **India Oman CEPA** anchors India’s logistics presence in the Gulf.
 - 📌 Also, FY 2025-26 saw logistics costs coming down to **7.97% of GDP**. This is a substantial decline from the previously cited, long-standing figures of **13-14%**.
- 💡 **The “Investment-First” Trade Model (EFTA):** Moving beyond traditional tariff-for-tariff deals, India is pioneering “investment-linked” trade pacts like the **TEPA with EFTA nations** to secure technology transfers and long-term capital.
 - ✦ This strategy reduces vulnerability to goods-export volatility by locking in massive **Foreign Direct Investment (FDI)** that builds domestic industrial capacity for global export markets.
 - ✦ For instance, under the TEPA agreement, there is a commitment to invest **\$100 billion in India over a 15-year period**.

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What are the Key Issues Associated with India's Market Diversification Move?

💡 **The “Green Wall” of Non-Tariff Barriers:** Diversifying into high-value Western markets like the EU is colliding with “Green Protectionism” tools like the **Carbon Border Adjustment Mechanism (CBAM)** and **Deforestation Regulation (EUDR)**.

- ✦ These rigorous compliance standards disproportionately hit India's MSME-dominated export base, threatening to erode the cost arbitrage that Indian exporters rely upon to compete with Vietnam or Bangladesh.
- ✦ Although the **recent India–EU FTA includes a forward-looking MFN clause on CBAM**, ensuring that any future exemptions or flexibilities granted by the EU to other partners will also apply to India, **its implementation remains uncertain.**

💡 **The “Import-Dependent Export” Trap:** The pivot to electronics and engineering exports is structurally fragile because it **relies heavily on assembly rather than deep component manufacturing.**

- ✦ This “shallow” diversification creates a paradoxical vulnerability: boosting exports to the US or EU automatically spikes component imports from China, deepening the trade deficit with Beijing despite political decoupling efforts.
- ✦ For instance, **Domestic value addition (DVA) in India's mobile phone manufacturing sector is just 23%**. Conversely, over the last 15 years, China's share in India's industrial product imports has increased significantly, from 21% to 30%, **creating a “sovereign risk” in critical supply chains.**

💡 **Logistics Inefficiency in Price-Sensitive Markets:** While India seeks to capture “**Global South**” markets in Africa and Latin America, its high logistics costs make it uncompetitive against **China's mature Belt and Road infrastructure.**

- ✦ Without seamless connectivity, Indian goods suffer margin erosion, making it difficult to displace entrenched Chinese suppliers in these price-sensitive geographies.

✦ Also, China's infrastructure and debt-driven influence contrasts with India's market-oriented, partnership-focused investments in East Africa.

💡 **Asymmetric FTA Utilization & Deficits:** The strategy of signing rapid FTAs (**UAE, Australia, EU**) faces a “utilization gap” where Indian exporters struggle with complex Rules of Origin (ROO) compliance while **partner nations easily dump finished goods.**

- ✦ This asymmetry often widens the trade deficit post-deal, as Indian manufacturing lacks the scale to fully exploit duty-free access compared to partner capabilities.
- ✦ **India's FTA utilisation remains very low at around 25%**, while utilisation for developed countries typically sits between **70–80%**.

💡 **Isolation from Regional Value Chains (RCEP):** Critics argue that by opting out of RCEP to protect domestic dairy/agriculture, India effectively isolated itself from the world's largest friction-free manufacturing zone.

- ✦ This exclusion forces Indian exporters to pay tariffs that competitors like Vietnam do not, **incentivizing MNCs to bypass India for final assembly in RCEP nations to serve the massive East Asian market.**
- ✦ For instance, Vietnam's textile and garment industry is on a strong recovery trajectory, with export revenues forecast to hit \$46 billion in 2025, **directly capturing market share India ceded.**

💡 **Policy Volatility & “Reliability Risk”:** India's recent abrupt export bans on essential commodities (rice, onions) to control domestic inflation significantly damages its reputation as a reliable partner for “Global South” nations.

- ✦ This “**switch-on, switch-off**” policy volatility **forces African and Gulf importers to sign long-term contracts** with predictable rivals like Thailand or Brazil, neutralizing India's geographic advantage.

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What Measures can India Adopt to Ensure Sustainable Diversification Amid Tariff Uncertainties?

- 💡 **Institutionalizing Mutual Recognition:** Instead of passively reacting to Western non-tariff barriers, India must aggressively pursue **“Mutual Recognition Agreements” (MRAs)** for its Bureau of Indian Standards (BIS) certifications, particularly with Global South partners.
 - ✦ By harmonizing regulatory frameworks with **Africa and ASEAN**, India can create a **“standards-aligned” trade bloc** that reduces compliance costs and immunizes exporters against arbitrary quality rejections, effectively creating a captive ecosystem for **“Made in India” goods** that Western rivals cannot easily penetrate.
- 💡 **The “Servicification” of Manufacturing Exports:** To counter tariff volatility on physical goods, policy must incentivize the **“embedding” of high-margin services**, like remote diagnostics, AI-driven predictive maintenance, and software integration, into hardware exports.
 - ✦ This **“Product-as-a-Service” (PaaS)** model increases client stickiness, bypasses standard goods tariffs, and leverages India’s software dominance to create a hybrid value proposition that low-cost manufacturing rivals like **Vietnam or Bangladesh** cannot structurally replicate.
- 💡 **Democratizing Exports via “Digital Public Infrastructure” (DPI):** The government must rapidly operationalize **“E-Commerce Export Hubs” (ECEHs)** by integrating them with India’s Digital Public Infrastructure to offer seamless, automated customs clearance and pre-shipment credit for MSMEs.
 - ✦ By lowering the entry barrier for small players to access global markets directly (**“Direct-to-Global”**), India can diffuse export risk across thousands of granular sellers rather than relying on a few large conglomerates, creating a **“resilient distributed export network”**.
- 💡 **Strategic “Backward Integration” in PLI 2.0:** Future iterations of the PLI scheme must pivot from

rewarding final assembly to heavily subsidizing the production of **“upstream” intermediate components** like specialized chemicals, industrial wafers, and precision sub-assemblies.

- ✦ This **“Deep Localization” strategy** is the only way to break the **“Import-Export Trap” with China**, ensuring that every dollar of export growth translates into genuine domestic value addition and technological sovereignty rather than just “pass-through” trade.
- 💡 **A Proactive “Carbon Insetting” Framework:** To neutralize the threat of the EU’s CBAM, India should implement a rigorous, globally accredited **domestic carbon trading market** that allows exporters to “inset” their carbon costs locally.
 - ✦ By proving that carbon taxes have already been paid domestically (and reinvested in green transitions), exporters can claim exemptions abroad while financing the country’s own energy shift, turning a compliance burden into a **“Green Competitive Advantage”**.
- 💡 **Forging “Minilateral” Supply Chain Corridors:** Moving beyond broad, slow-moving FTAs, India should forge specific, sector-focused **“minilateral” pacts** (e.g., a Critical Minerals Partnership with Australia) to secure supply chain immunity.
 - ✦ These focused, high-trust corridors would prioritize **“resilience over efficiency,”** ensuring that key strategic industries remain insulated from broader geopolitical shocks or trade wars by operating within **“trusted geography”** bubbles.

Conclusion:

India’s trade diversification reflects a strategic shift from dependence on any single market to resilience through **multiple anchors, value upgrading, and new geographies**. While tariff relief and FTAs offer short-term gains, structural risks from policy volatility, non-tariff barriers, and shallow localization persist. Sustainable diversification will hinge on deep **domestic value addition and secure supply chains**. Ultimately, India’s goal must be to convert uncertainty into strategic autonomy, not temporary trade concessions.



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India's Defence Modernisation Drive

This editorial is based on "Defence spending rises in Union Budget, but capability gains remain key" which was published in The Business Standards on 04/02/2026. This editorial examines the rise in India's defence spending in Budget 2026–27 and argues that real security gains will depend on efficient execution, jointness, and capability creation rather than higher allocations alone.

India's defence sector has entered a phase where **higher spending is no longer enough, capability creation has become the real benchmark**. The Union Budget's push to raise defence outlay to **2% of GDP**, shaped by recent operational realities, reflects a strategic shift from intent to preparedness. However, enduring constraints of **legacy manpower costs, procurement delays, and industrial absorptive limits** continue to test outcomes. The future of India's defence readiness will thus depend on **how efficiently resources translate into credible military capability**, not merely on budgetary expansion.

What are the Major Developments in India's Defence Sector?

- 💡 **Historic Budget Allocation for Defence Modernisation:** The **Union Budget 2026-27** marks a decisive shift from revenue-focused spending to capital-intensive modernisation, allocating a record **₹7.85 lakh crore** to the **Ministry of Defence**.
 - ✦ It is a **15.19% hike over FY25 estimates** signals a robust fiscal commitment to bridging critical capability gaps in fighter squadrons and naval platforms amidst volatile northern borders.
 - ✦ Further, capital outlay stands at **₹2.19 lakh crore (up 21.8% YoY)**, with **₹1.39 lakh crore** strictly earmarked for domestic procurement to boost local manufacturing.
- 💡 **Strategic Reset Post-"Operation Sindoor" & Tri-Service Integration:** Following the integrated **"Operation Sindoor"** in **May 2025**, the armed forces have accelerated the theatre command structures, moving beyond theoretical doctrines to combat-proven jointness.

- ✦ The **operation exposed gaps in drone warfare and infantry coordination**, prompting the immediate raising of specialized **"Rudra" integrated brigades** to decentralize surveillance capabilities.
- ✦ The Army reorganised infantry battalions to include **dedicated 'Ashni' drone units** and established **Integrated Air Command and Control System (IACCS)** nodes for seamless air-ground coordination.
- 💡 **Strengthening the Nuclear Triad:** India has solidified its second-strike capability with the **commissioning of advanced sea-based assets and rail-mobile delivery systems**, ensuring survivability against pre-emptive strikes.
 - ✦ The **focus has shifted to operationalizing the third leg of the nuclear triad** to counter the expanding maritime presence of adversaries in the **Indian Ocean Region (IOR)**.
 - ✦ Commissioning of **INS Aridaman (3rd Arihant-class SSBN) in early 2026** and the **Agni-Prime rail-based test** (September 2025) confirm a mobile, survivable deterrent force.
- 💡 **Indigenous Fighter Ecosystem:** The indigenous aviation sector has moved from development to mass production, **critical for arresting the IAF's depleting squadron strength, with the US-India GE F414 deal** reaching final execution stages. This partnership secures the powertrain for **future platforms like the Tejas Mk2 and AMCA**, reducing dependency on Russian propulsion systems while ensuring technology transfer.
 - ✦ For instance, recently, Hindustan Aeronautics Limited (HAL) has confirmed that **five Tejas Mk1A fighter jets are fully ready** for delivery to the Indian Air Force (IAF).
- 💡 **Naval Indigenisation & Project 17A Stealth Frigates:** The Indian Navy is aggressively pursuing a **"Builders Navy"** capability, delivering stealth platforms that enhance blue-water reach and anti-submarine warfare (ASW) prowess without foreign reliance.
 - ✦ This push is visible in the **rapid commissioning of stealth frigates and the P-75 submarine program**, ensuring dominance over key maritime choke points.

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- ✦ Commissioning of **INS Vaghsheer (6th Scorpene)** in **January 2025** and induction of Project 17A frigates like **INS Taragiri** underscore a fleet expansion to **170+ ships by 2027**.
- 💡 **Strategic Diversification in Defence Cooperation:** Breaking away from traditional alignment, **India signed a landmark security pact with the European Union in January 2026**, expanding defence cooperation into **cyber, space, and maritime domains**.
 - ✦ This diversification **reduces reliance on any single bloc and opens access to European high-tech markets** for critical components like sensors, chips, and marine propulsion.
 - ✦ The EU and India also have annual Security and Defence Consultations and launched a **Strategic Dialogue on Foreign and Security Policy in June 2025**.
 - 📌 Both sides continue to participate in dedicated sectoral dialogues in areas such as maritime security, cyber security, counterterrorism and non-proliferation.
- 💡 **Strengthening Air Defence: “Mission Sudarshan Chakra”** serves as a **multi-layered, network-centric umbrella** that autonomously prioritizes aerial threats ranging from **low-cost “suicide” drones to high-velocity hypersonic glide vehicles**.
 - ✦ By **integrating the IACCS (Integrated Air Command and Control System) with real-time satellite data**, the mission creates a **“kill-web”** that ensures no single point of failure can compromise national airspace.
 - ✦ As of early 2026, **India has operationalized three S-400 squadrons (renamed Sudarshan units)** with the final two batteries arriving to complete the strategic shield.
- 💡 **Deep-Tech Self-Reliance:** The government has **structurally institutionalized innovation** by moving beyond traditional DPSUs, empowering a **“Startup-to-Soldier”** pipeline through the **iDEX (Innovations for Defence Excellence) framework** and **high-value ADITI grants**.
 - ✦ By coupling these **financial incentives with strict Positive Indigenisation Lists (PILs)**, India is creating a **captive domestic market** for deep-tech solutions in AI, quantum, and autonomous systems that were previously imported.
- ✦ For instance, in July 2024, the **Ministry of Defence on July 16 notified the fifth positive indigenisation list (PILs)** of 346 items for Defence Public Sector Undertakings (DPSU) which includes strategically important Line Replacement Units.
- 💡 **Space Defence Convergence:** The integration of space-based intelligence into tactical operations has transformed India’s **“Sensor-to-Shooter” loop from a linear process into a multi-dimensional “kill-web” that ensures total situational awareness**.
 - ✦ The Government of India has entered into a nearly **₹3,000-crore agreement with NewSpace India Limited (NSIL)**, the commercial arm of ISRO, for the procurement of an **advanced communication satellite, GSAT-7B**.
 - ✦ **GSAT-7B will deliver high-throughput**, secure communication services to the Army, with the total **project cost estimated at ₹2,963 crore**.
 - ✦ The deal is **strategically significant as the Indian Army currently lacks a dedicated communication satellite**, unlike the Air Force and the Navy. The satellite is **expected to be operational by 2026**.
- 💡 **Surge in Defence Exports & Manufacturing Corridors:** India’s defence industrial base has transitioned from import-dependency to becoming a net exporter, major breakthroughs include the **export of BrahMos missiles to the Philippines and Pinaka Multi-Barrel Rocket Systems to Armenia**, validating India’s technological maturity.
 - ✦ The maturing **Defence Industrial Corridors (DICs) in UP and Tamil Nadu** are now **generating tangible output, attracting FDI** and integrating MSMEs into the global supply chain.
 - ✦ Defence exports hit a record **₹23,622 crore** in FY25 (12% growth), **75% of the capital budget** is now reserved for domestic industry to sustain this manufacturing boom.

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What are the Key Issues Associated with India's Defence Sector?

💡 **Skewed Revenue-to-Capital Ratio & Pension Burden:** Despite the record ₹7.85 lakh crore allocation in Budget 2026-27, the defence budget remains heavily weighed down by revenue expenditure, specifically pensions and salaries, which leaves limited fiscal space for critical modernization.

- ✦ For instance, pensions alone consume ₹1.71 lakh crore while the Capital Outlay for modernization is ₹2.19 lakh crore, maintaining a suboptimal ratio that barely meets the committed liabilities of past deals.
- ✦ This structural imbalance forces the armed forces to prioritize “sustenance” over “transformation,” delaying the acquisition of next-gen platforms needed to counter China’s rapid military modernization.

💡 **Critical Fighter Squadron Depletion & Aerial Gap:** The Indian Air Force is confronting a serious capability shortfall, fielding only about 29–31 fighter squadrons against an authorised strength of 42 needed to effectively counter a potential two-front collusive threat, even as China has deployed J-20 stealth fighters at bases located less than 150 kilometres from the border.

- ✦ The retirement of legacy MiG-21s has outpaced the induction rate of indigenous Tejas Mk1A jets, leaving air defence vulnerable, especially as the Multi-Role Fighter Aircraft (MRFA) deal for 114 jets remains stuck in procedural delays.

💡 **Persistent Import Dependency in Strategic Technology:** While “Atmanirbhar Bharat” has boosted low-to-mid-tech manufacturing, India remains critically dependent on foreign OEMs for high-value strategic subsystems like jet engines, marine propulsion, and advanced sensors.

- ✦ This dependency creates a vulnerability where supply chain shocks (as seen in the delay of GE F414 engines) can paralyze indigenous production lines of key platforms like the Tejas Mk2 and AMCA.

✦ Also, according to the Stockholm International Peace Research Institute (SIPRI), India ranks as the world’s second-largest arms importer, after Ukraine.

💡 **“Turf Wars” Delaying Integrated Theatre Commands:** The transition faces internal resistance and doctrinal divergence, particularly regarding the control of limited assets like air power and long-range artillery.

- ✦ The Shekatkar Committee (2016) recommended the creation of three integrated theatre commands, Western, Northern, and Southern, to improve tri-service integration and optimize resource utilisation.
- ✦ The lack of a common “joint fighting doctrine” and disagreements over the structure of the Air Defence Command have stalled the operationalization of the Jaipur (Western) and Lucknow (Northern) theatre commands, hindering true jointness.

📎 The establishment of the Maritime Theatre Command, headquartered in Thiruvananthapuram, has also been delayed.

💡 **Structural Constraints in India’s Defence Innovation Ecosystem:** India’s defence Research & Development (R&D) spending is disproportionately low compared to China, leading to a technological asymmetry in emerging domains like hypersonics, AI, and directed energy weapons.

- ✦ The DRDO’s monopoly and bureaucratic sluggishness contrast sharply with China’s “civil-military fusion” model, which has allowed Beijing to field operational hypersonic missiles while India is still in the testing phase.
- ✦ The Comptroller and Auditor General (CAG) has flagged serious deficiencies in high-priority DRDO projects, citing widespread time and cost overruns, irregular closures, and instances where projects were declared successful despite unmet objectives.

📎 Of 178 projects reviewed, 119 missed original timelines, with delays ranging from 16% to 500%, and 49 projects exceeding their scheduled duration by over 100%.

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💡 **Manpower Retention Issues:** The **“Agnipath”** recruitment model is facing teething issues regarding the retention of skilled personnel, **with the 25% retention cap creating a potential “skill void”** in technical wings like the **Navy and Air Force**.

- ✦ Feedback from the first batches suggests that **the 4-year tenure is insufficient to master complex weapon systems**, leading to operational risks and a loss of unit cohesion in specialized infantry regiments.
- ✦ Further, internal surveys indicate **72% of Agniveers report job stress due to uncertainty**.

💡 **Infrastructure Asymmetry at the LAC:** Despite the increased **allocation to the**, India’s border infrastructure on the **Line of Actual Control (LAC)** still **lags behind China’s “dual-use” villages and high-speed rail networks** in Tibet.

- ✦ This **logistical asymmetry restricts the Indian Army’s ability** to rapidly mobilize heavy armour and artillery to forward areas during winter, giving the PLA a distinct mobilization advantage.
- ✦ For instance, China has been constructing **over 600 Xiaokang or “well-off villages”** along **India’s borders** with the Tibet Autonomous Region.

✍ However, the **Border Roads Organisation (BRO)** is yet to complete a **130-km alternative all-weather road to the Daulat Beg Oldie (DBO)** outpost in eastern Ladakh, aimed at ensuring secure, year-round access.

💡 **Vulnerability to Cyber and Grey-Zone Warfare:** India’s defensive posture is largely kinetic, leaving critical military networks vulnerable to non-kinetic **“grey-zone” attacks** such as cyber-espionage and crippling of command-and-control systems.

- ✦ The **recent rise in cyber-attacks** and the lack of a dedicated offensive cyber doctrine **expose a soft underbelly that adversaries can exploit without firing a shot**.
- ✦ For instance, an October 2025 report **alleging APT36’s targeting of India’s BOSS Linux system** highlights the **expanding scale of**

Pakistan’s cyber-espionage activities and underscores the urgent need to strengthen India’s digital defence architecture.

What Measures are Needed to Strengthen India’s Defence Sector?

💡 **Institutionalising “Civil-Military Fusion” in R&D:** India must move towards a **“National Civil-Military Fusion Framework”** to dismantle the silos between **defence labs, private academia, and commercial industries**, ensuring dual-use technologies like AI and quantum computing are seamlessly adapted for military application.

- ✦ This **requires statutory backing to enforce the cross-pollination of research**, allowing the armed forces to leverage rapid civilian innovation cycles rather than relying solely on sluggish, bespoke military development pathways for emerging threats.

💡 **Implementing an “Agile Acquisition Protocol”:** The Ministry should transition from the rigid **Defence Acquisition Procedure (DAP)** to an **“Agile Acquisition Protocol”** for **software-defined and asymmetric technologies**, **permitting the rapid spiral development** of prototypes rather than demanding finalized operational requirements upfront.

- ✦ This shift would empower the services to procure **“Minimum Viable Products” (MVPs) from startups and iterate based on field feedback**, drastically **reducing the “sensor-to-shooter” timeline gap** that currently plagues indigenous deployment.

💡 **Operationalising a Non-Lapsable Modernisation Fund:** The government must operationalise the **“Non-Lapsable Defence Modernisation Fund” (NLDMF)** to **insulate capital acquisition budgets from fiscal year-end lapses**, thereby enabling long-term strategic planning for mega-projects like aircraft carriers and fighter squadrons.

- ✦ This financial structuring **would provide certainty to domestic OEMs and foreign partners, eliminating the “rush-to-spend” syndrome** and allowing for multi-year payment milestones that align with complex manufacturing lifecycles.

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- 💡 **Enforcing “Performance-Linked Accountability” in PSUs:** A “Performance-Linked Oversight Mechanism” for DRDO and Defence PSUs must be mandated by an independent parliamentary body to enforce strict accountability on project timelines, penalizing cost overruns and delays with budget cuts or management restructuring.
 - ✦ **By decoupling production from development and privatizing non-strategic manufacturing verticals,** the state can focus purely on high-risk strategic technologies, breaking the monopoly that currently stifles the efficiency of the defence industrial base.
- 💡 **Unifying Legal and Logistical Codes for Jointness:** Accelerate the integration of **Integrated Theatre Commands (ITCs)** by establishing a “**Joint Services Administrative Code**” that unifies legal, logistical, and training standards across the **Army, Navy, and Air Force**, replacing archaic single-service acts.
 - ✦ This measure **must prioritize the creation of a “Joint Logistics Backbone” to eliminate redundant supply chains,** ensuring that **interoperability is not just a command structure concept** but a ground-level operational reality that optimizes resource utilisation.
- 💡 **Adopting a “Forward Defence” Cyber Doctrine:** India needs to **formulate a distinct “Grey Zone Warfare Doctrine”** that actively integrates offensive cyber capabilities and cognitive warfare under a centralized command to counter non-kinetic statecraft and sub-conventional threats.
 - ✦ This requires **shifting from a passive cyber-defence posture to “Forward Defence,”** empowering the **Defence Cyber Agency to conduct pre-emptive operations** that neutralize adversary networks before they can disrupt critical national infrastructure or military command loops.
- 💡 **Elevating Defence Exports to “Diplomatic Statecraft”:** Policy must elevate defence exports to a primary instrument of foreign policy by creating a “**Defence Diplomacy Wing**” within the MEA, specifically **tasked with securing credit lines and long-term maintenance contracts** for friendly foreign nations.

- ✦ This strategic pivot involves **bundling hardware sales with training and joint exercises,** thereby creating “**dependency networks**” in the Indian Ocean Region that serve India’s geopolitical interests while providing economies of scale for domestic manufacturers.

- 💡 **Modernising Professional Military Education (PME):** The Professional Military Education (PME) curriculum requires a complete overhaul to include mandatory “**Technological Statecraft**” modules, training the officer cadre in the strategic management of disruptive technologies like **autonomous systems and space warfare.**

- ✦ This intellectual modernization **must be paired with a “Lateral Entry Scheme” for niche specialists in data science and cryptography,** ensuring the command hierarchy possesses the technical literacy required to lead in modern, multi-domain battlefields.

Conclusion

India’s defence transformation now hinges less on the size of allocations and more on the **speed, coherence, and quality of capability creation.** While Budget 2026-27 signals strategic intent through higher capital outlays and indigenisation, structural bottlenecks in manpower, technology, and jointness continue to dilute outcomes. Bridging this gap requires **institutional reform, agile procurement, and deep civil-military integration** across emerging domains. Only then can defence spending translate into **credible deterrence and sustained strategic autonomy** in an increasingly contested security environment.



Redesigning India for Inclusion Of PwDs

*This editorial is based on “[Budget 2026 makes employment room for disabled, but not in public spaces](#)” which was published in *The Business Standard* on 06/02/2026. This editorial examines how Budget 2026 reframes persons with disabilities as contributors to*

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economic growth through skilling and employment. It argues that true inclusion remains incomplete without accessible public spaces, mobility, and inclusive urban infrastructure.

The **Union Budget 2026** signals a quiet but important shift with regard to Persons with disabilities. Persons with disabilities are no longer seen only as recipients of welfare, but as participants in economic growth. Yet inclusion that begins and ends at the workplace remains incomplete. True empowerment of PwDs lies not just in skills and jobs, but in accessible public spaces, mobility, and social infrastructure. The issue, therefore, is not merely about employing persons with disabilities, but about redesigning society to include them.

What Anchors India's Rights-based Framework for Persons with Disabilities?

- 💡 **Constitutional Framework:** Constitution provides the normative foundation, though disability is not explicitly listed
 - ✦ **Article 14: Equality before law** and equal protection of laws
 - ✦ **Article 15(1): Prohibits discrimination**, judicially expanded to include disability.
 - ✦ **Article 16(1) : Equality of opportunity in public employment**
 - ✦ **Article 21: Right to life with dignity** (basis for accessibility, autonomy, inclusion)
 - ✦ **Article 38:** It directs the State to engage in social transformation to promote social, economic and political justice, and the welfare of the people.
 - ✦ **Article 41 (DPSP): Right to work, education, and public assistance** for certain vulnerable groups including disabled.
- 💡 **Legal Framework**
 - ✦ **Rights of Persons with Disabilities Act, 2016:** Enacted to align with the UN Convention on the Rights of Persons with Disabilities (which India ratified in 2007).
 - ✍ Expands disabilities from 7 to 21 categories.
 - ✍ **Guarantees:** Equality & non-discrimination, Equality & non-discrimination, 4% reservation in

government employment, 5% reservation in higher education, Accessibility in transport, ICT, buildings.

- ✍ Introduces penalties for violations
- ✦ **Mental Healthcare Act, 2017:** Rights-based approach to mental illness.
- ✦ **Rehabilitation Council of India Act, 1992:** Regulates rehabilitation professionals by standardising training curricula, accrediting institutions, maintaining a central register of qualified practitioners, and preventing unqualified practice in disability rehabilitation services.
- ✦ **National Trust Act, 1999:** Welfare of PwDs with autism, cerebral palsy, intellectual disability and multiple disabilities
- ✦ **Scheme for Implementation of Rights of Persons with Disabilities Act 2016 (SIPDA):** It is an umbrella programme of the Department of Empowerment of Persons with Disabilities (DEPWD). It provides financial and technical support to Central Ministries, States, and UTs for implementing the RPwD Act through projects that promote accessibility, inclusion, awareness, and skill development for persons with disabilities.

💡 Institutional Framework

- ✦ **Central Institutions**
 - ✍ **Department of Empowerment of Persons with Disabilities (DEPWD):** Formulates national policies, schemes, and programmes for PwDs and coordinates their implementation across ministries.
 - ✍ **Chief Commissioner for Persons with Disabilities (CCPD):** Enforces disability rights by monitoring implementation of laws and addressing grievances through quasi-judicial powers.
 - ✍ **Central Advisory Board on Disability:** Advises the government on disability policy, ensures inter-ministerial coordination, and reviews overall progress on inclusion.

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- ✦ **State-Level Institutions:**
 - 📎 **State Commissioners for Persons with Disabilities:** Safeguard rights of PwDs at the state level by handling complaints and overseeing enforcement of disability laws.
 - 📎 **State Advisory Boards on Disability:** Assist state governments in policy formulation, planning, and monitoring of disability-related programmes.
 - 📎 **District-Level Committees:** Implement disability schemes at the grassroots, issue disability certificates, and facilitate access to local services and benefits.

What Measures has India Undertaken for the Welfare of PwDs?

- 💡 **Universal Physical Accessibility (Sugamya Bharat):** India is executing a high-intensity retrofit of public infrastructure to ensure **“Universal Design”** becomes the standard for all future urban and rural development projects.
 - ✦ Under the Accessible India Campaign, over 1,030 Central Government buildings have been fully retrofitted.
 - 📎 It is also being recalibrated to focus on **“end-to-end” connectivity**, particularly in the railway and aviation sectors.
 - ✦ The shift is from merely building ramps to ensuring accessible toilets, tactile paths, and ambulatory lifts, ensuring dignified independent travel rather than assisted movement.
- 💡 **Targeted Skilling for High-Growth Sectors :** The government has pivoted from generic vocational training to high-value skills in AI, AVGC (Animation, Visual Effects, Gaming, and Comics), and IT to ensure PwDs are not left behind in Industry 4.0.
 - ✦ This strategic shift aims to move PwDs from low-income informal roles into formal, process-driven gig economy jobs where remote work is a feasible accommodation.
 - ✦ The Budget 2026-27 launched **‘Divyangjan Kaushal Yojana’** with ₹200 Cr allocation, offering task-oriented and process-driven roles, which are suitable for Divyangjans.

- 📎 This will ensure dignified livelihood opportunities through industry-relevant and customized training specific to each divyang group.
- 💡 **Drive Towards Assistive Technology Manufacturing :** To reduce dependency on expensive imported aids, the focus is now on domestic manufacturing of high-tech assistive devices under the ‘Make in India’ framework.
 - ✦ This reduces the cost barrier for advanced prosthetics and hearing aids, directly enhancing the employability and mobility of PwDs by making essential tools affordable.
 - ✦ For instance, Budget 2026-27 launched **‘Divyangjan Sahara Yojana’** to scale production of AI-integrated limbs and e-Braille readers.
- 💡 **Improved Entrepreneurial Self-Reliance & Credit Access** Financial inclusion measures are being aggressively expanded to support self-employment, recognizing that formal corporate hiring often lags.
 - ✦ By providing concessional credit and microfinance specifically for PwDs, the state is fostering a class of **‘Divyang’ entrepreneurs** who can generate livelihoods for themselves and others.
 - ✦ Under the **Divyangjan Swavalamban Yojana**, the **National Divyangjan Finance and Development Corporation (NDFDC)** had disbursed **₹1,330.22 crore in cumulative loans by early 2024**, underscoring the growing scale of financial support for entrepreneurship and self-employment among persons with disabilities.
- 💡 **Enforcement of ‘Reasonable Accommodation’:** The Supreme Court has moved beyond non-discrimination to mandate proactive ‘reasonable accommodation’ in education and employment as a fundamental right, not charity.
 - ✦ This jurisprudential shift places the burden on institutions to prove **‘undue hardship’** if they deny facilities like scribes or accessible infrastructure, rather than on the PwD to demand it.

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- ✦ The Supreme Court, in **Pragya Prasun v. Union of India**, held that digital accessibility for **Persons with Disabilities flows from the right to life and personal liberty under Article 21**.
- ✦ The Supreme Court in **Gulshan Kumar v. Institute of Banking Personnel Selection (2025)** declared that **denying a scribe or compensatory time to any person with a disability (PwD) constitutes discrimination under the Rights of Persons with Disabilities (RPwD) Act, 2016**.
- 💡 **Standardization of Disability Certification (UDID):** The fragmentation of disability data is being resolved through the **mandatory digitization of certification, ensuring benefits are portable across state lines**.
 - ✦ This **eliminates the bureaucratic harassment PwDs faced** when moving states for work, ensuring their **welfare entitlements (pensions, travel concessions) remain valid nationwide without re-verification**.
 - ✦ For instance, over **1.25 Crore UDID cards** generated by 2025, creating a National Database.
 - 📎 The **Divyangjan Card**, also known as the **E-Ticketing Photo Identity Card (EPICS)**, is a railway identity card for people with disabilities (Divyangjan) that allows them to get concessions on train travel.
- 💡 **Push to Digital Accessibility Ecosystem:** Recognizing that digital barriers are as exclusionary as physical ones, the government is enforcing web accessibility standards (WCAG) for all public digital platforms.
 - ✦ This **“Digital First” approach ensures that essential services like banking, KYC, and grievance redressal are accessible via screen readers and voice commands for the visually and neuro-divergent**.
 - ✦ For instance, in a significant stride towards building a digitally inclusive India, the Department of Empowerment of Persons with Disabilities (DEPwD) **has launched the revamped Sugamya Bharat App at the International Purple Fest 2025**.
- 💡 **Inclusive Education Resources (ISL & E-Content)** To bridge the learning gap for hearing-impaired students, there is a massive **push to standardize Indian Sign Language (ISL) in academic curriculums**.
 - ✦ By **creating a digital repository of study materials in ISL**, the state is ensuring that **deaf students have equal access to primary and higher education content**, breaking the cycle of illiteracy.
 - ✦ For instance, **ISL Digital Repository** now hosts **3,189 e-content videos** covering Class 1-12 curriculum.
 - 📎 Further the **PM e-VIDYA DTH Channel No. 31** was officially launched as **India’s first 24/7 television channel dedicated specifically to Indian Sign Language (ISL)**.
- 💡 **Expanded Social Security Net:** While employment is the goal, the state acknowledges the need for a safety net for those with severe disabilities who cannot work.
 - ✦ **Recent updates have focused on expanding the coverage** of health insurance and maintenance allowances to cover modern therapies and rehabilitation costs that were previously excluded.
 - ✦ For example, **Niramaya Health Insurance** coverage was raised to **₹1 Lakh** for cerebral palsy/autism.
- 💡 **Mental Health & Psycho-Social Support:** The government has integrated disability-specific interfaces into the national mental health framework to combat the **“invisible pandemic” of isolation among PwDs**.
 - ✦ By launching accessible versions of the **Tele-MANAS app with screen-reader compatibility and high-contrast UI**, the state is ensuring that mental health counseling is not a privilege reserved for the able-bodied but a universal digital right.
 - ✦ **Tele-MANAS 2.0** now includes the **‘Asmi’ chatbot** allowing users to engage with the app and seek information or help regarding mental health.
- 💡 **Political Participation & Electoral Reforms:** The Election Commission of India (ECI) has institutionalized **“Vote from Home” (VfH) not just**

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as an option but as a standard protocol for those with 40%+ benchmark disability, fundamentally shifting the voting paradigm from “polling booth access” to “franchise at doorstep.”

- ✦ This ensures that mobility barriers and lack of accessible transport do not result in the disenfranchisement of the disabled electorate.

💡 **Flourishing Para-Athlete Ecosystem:** Moving beyond tokenism, the **‘Khelo Bharat Niti 2025’** treats para-sports as a high-performance career avenue.

- ✦ The focus is on creating a “talent pipeline” where para-athletes receive parity in funding, training facilities, and cash awards, making sports a viable path for economic mobility and social prestige.
- ✦ Currently, **52 spots in the Target Olympic Podium Scheme (TOPS) core group are held by para-athletes for the 2028 LA Olympics cycle** following their record-breaking performance at the Paris Paralympics.

What are the Key Issues Associated in Welfare of PwDs in India?

💡 **The “Statistical Invisibility” & Certification Trap:** A massive variance between Census data and WHO estimates creates a “Policy Blindspot,” artificially suppressing budget allocations.

- ✦ Furthermore, the bureaucratic rigidity of the UDID card system **excludes those with dynamic or invisible disabilities (like blood disorders)** from accessing Direct Benefit Transfers (DBT).
- ✦ As of 2025, reports from **organizations like EnAble India estimate the PwD population could be as high as 300 million.**
 - ✍ A 2025 nationwide survey by the National Centre for Promotion of Employment for Disabled People (NCPEDP) found that **53% of PwD applicants face rejection for benefits, often due to stringent medical verification.**

💡 **“Retrofit Tokenism” in Infrastructure:** The Accessible India Campaign (AIC) largely suffers from “compliance tokenism,” where ramps are built at dangerous angles or without handrails simply to tick checkboxes.

- ✦ This partial accessibility fails the ‘end-to-end’ usability test mandated by courts, leaving last-mile connectivity (pavements/toilets) completely hostile.

✦ For instance, a recent **CAG report has highlighted serious lapses by the Central Public Works Department (CPWD) in implementing the Accessible India Campaign**, noting that pre-access audits were conducted in **only 34 of 170 old government buildings retrofitted for Persons with Disabilities.**

💡 **The “Digital Apartheid” in e-Governance:** As welfare shifts to “Digital-First” delivery, a new exclusion barrier has emerged where critical apps (fintech, health) **violate WCAG standards.**

- ✦ Visual **CAPTCHAs, lack of screen-reader compatibility, and complex UIs effectively disenfranchise PwDs** from autonomous use of essential digital public goods.
- ✦ For instance, as of December 2024, **only 95 Central Government websites have been made accessible under the Content Management Framework** by the Ministry of Electronics and Information Technology leaving a vast majority of public digital platforms **inaccessible to Persons with Disabilities.**

💡 **Economic Exclusion & The “Reservation Mirage”:** Despite the **4% statutory reservation**, a “Compliance Mirage” exists where vacancies lapse due to rigid “job identification” that ignores modern assistive tech capabilities.

- ✦ The private sector mostly **restricts hiring to low-value CSR roles**, trapping PwDs in a cycle of poverty rather than genuine career progression.
- ✦ The **Marching Sheep PwD Inclusion Index 2025** revealed that Persons with Disabilities represent **less than 1% of the workforce across 876 surveyed organizations in India.** Furthermore, **37.9% of organizations still have no permanently employed PwDs.**

💡 **Educational Segregation & Resource Deficit:** “Inclusive Education” remains largely theoretical as schools enroll PwDs without pedagogical adaptation, leading to isolation within classrooms.

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- ✦ The chronic **shortage of RCI-registered special educators** and **lack of ISL-trained teachers in rural areas** forces high dropout rates among neurodivergent children.
- 💡 **Intersectionality & The “Double Burden” on Women:** Policy frameworks exhibit **“Gender Blindness,”** failing to address the specific reproductive and safety needs of **women with disabilities who face double discrimination.**
 - ✦ State-run shelter homes **often lack internal oversight, leading to high rates of abuse and forced medical interventions** (hysterectomies) without consent.
 - ✦ In India, 11.8 million women and girls with disabilities face compounded vulnerabilities. **Women and girls with disabilities are up to ten times more likely to experience violence than their non-disabled peers as per UNFPA .**
- 💡 **Fiscal Underutilization & Administrative Lethargy:** There is a persistent **“Utilization Deficit”** where **funds allocated for PwD welfare lapse unspent** due to complex disbursal mechanisms and lack of state-level proactivity.
 - ✦ Scholarship and aid (ADIP) schemes **suffer from procedural bottlenecks, meaning financial support often arrives too late to be effective.**
 - ✦ The **Sixth Report of the Standing Committee on Social Justice and Empowerment** (presented in 2025) noted that expenditure for the **DEPWD has consistently remained on the “shortfall side.”**
- 💡 **The “Caregiver’s Crisis” & Guardianship Gaps:** Indian law **lacks a seamless “Supported Decision-Making” framework for individuals with intellectual disabilities,** often forcing families into archaic, expensive guardianship battles that strip the PwD of legal agency.
 - ✦ **A NHRC report** found that many cured patients were being kept **“illegally”** in government mental health institutions even after their recovery.
- 💡 **Climate Vulnerability & Disaster Inequity:** PwDs are disproportionately **impacted by India’s escalating climate crises (heatwaves/floods),** yet

disaster management protocols remain **“disability-blind,”** lacking accessible early warnings or evacuation aids.

- ✦ During extreme events, PwDs face a **“Survival Penalty”** because relief centers rarely have tactile paths, accessible toilets, or medical support for chronic conditions, **making them the first to be left behind.**
- 💡 **The Rural-Urban “Rehab Divide”:** While **urban centers see a rise in high-tech AI limbs, rural PwDs remain trapped in “Therapeutic Deserts”** where even basic physiotherapy or speech therapy requires traveling hundreds of kilometers.
 - ✦ This **geographic inequality creates a two-tier citizenry** where a PwD’s quality of life is determined by their PIN code rather than their potential, leading to permanent, preventable secondary disabilities.”
 - ✦ In many rural districts, persons with disabilities must travel to **district or state headquarters for basic physiotherapy, speech therapy, or assistive device fitting,** as such services are largely unavailable at the block or primary health-care level, unlike in metropolitan cities where advanced rehabilitation centres are concentrated.

What Measures are Needed to Further Empower PwDs in India ?

- 💡 **Institutionalizing “Accessibility Audit” Compliance via Smart Governance:** To bridge the gap between the **RPwD Act 2016 mandates and ground reality, India must move beyond voluntary compliance to algorithmic enforcement.**
 - ✦ Municipal corporations should integrate **mandatory accessibility audits** into the **digital building plan approval systems (like OBPS),** where AI-based scrutiny automatically rejects plans lacking ramps, tactile paths, or accessible washrooms before a human officer even sees them.
 - ✦ Post-construction, **crowdsourced audit mechanisms** using geotagged mobile apps can allow citizens to report non-compliance, triggering automated notices to property owners.

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- ✍ This creates a **transparent digital trail** that removes bureaucratic discretion and ensures **Universal Design** is not an afterthought but a prerequisite for urban development.
- 💡 **Decentralized “Therapeutic Community” Models in Rural Health:** Healthcare for PwDs in rural India is often centralized and inaccessible.
 - ✦ The solution lies in **Community-Based Rehabilitation (CBR) 2.0**. We need to **upgrade the existing ASHA and Anganwadi worker network into “Disability Mitra” cadres**, trained specifically in early identification, basic therapy (physio/speech), and navigating the **UDID (Unique Disability ID) ecosystem**.
 - ✦ By creating **tele-rehabilitation nodes** at Gram Panchayat levels connected to district hospitals, we can de-institutionalize care, **making it affordable and culturally integrated**.
 - ✍ This shifts the focus from a “medical model” of curing disability to a **“social model”** of enabling daily living within the beneficiary’s own environment.
- 💡 **Incentivizing “Neurodiverse-Ready” Private Sector Employment:** Corporate India needs to move beyond tokenistic hiring to creating **neuro-inclusive ecosystems**. The government should introduce a **“Diversity Credit” system**, similar to carbon credits, where companies are auditable on their retention rates and career progression of PwDs, not just hiring numbers.
 - ✦ Practically, this involves tax breaks for **Reasonable Accommodation** investments subsidizing the cost of screen readers, sign language interpreters, or ergonomic workstations.
 - ✦ Furthermore, establishing **Job-Matching Consortia** that map specific skills of PwDs (e.g., **pattern recognition in autism for data analytics**) to industry needs creates a **value-driven business case** rather than a charity-based one.
- 💡 **“Phygital” Inclusive Education with Assistive Tech (AT) Labs:** Inclusive education fails when teachers are overwhelmed; the fix is a **“Phygital” (Physical + Digital) hybrid support system**.
 - ✦ Every school cluster (covering 10-15 schools) must be equipped with a shared **Assistive Technology (AT) Lab** funded by CSR and government grants, containing refreshable Braille displays, augmentative communication devices, and sensory corners.
 - ✦ Simultaneously, **states must mandate a “Co-Teaching Module” in B.Ed. curriculums** where general educators are trained alongside special educators to co-manage classrooms. This ensures that inclusion is supported by **infrastructure and pedagogy, preventing PwD students from becoming “invisible” in mainstream classrooms**.
- 💡 **Mainstreaming “Adaptive Sports” as Social Integration:** Sports are a powerful but underutilized tool for psychological empowerment and social cohesion. We need to mandate the inclusion of **Adaptive Sports infrastructure** (wheelchair basketball courts, sensory-friendly pools) in all **“Khelo India” centers and public parks**.
 - ✦ By strictly enforcing a **“Parallel Events” policy**, where district and state-level sports meets must have concurrent events for PwDs, we normalize disability in the public eye.
 - ✦ **This moves the narrative from “sympathy” to “athletic excellence,”** fostering community pride and drastically improving the **physical and mental well-being** of the PwD population.
- 💡 **Mandating “Disability-Inclusive Disaster Risk Reduction” (DiDRR):** With the increasing frequency of climate events, **India must integrate a “Safety Chain” protocol** specifically for PwDs within the National Disaster Management Authority framework.
 - ✦ This involves **creating geo-tagged registries** of PwDs **at the ward level** to prioritize their evacuation and ensuring relief camps are pre-audited for accessibility and sanitation.
 - ✦ Furthermore, **early warning systems must be upgraded to “Multi-Modal Communication” standards**, delivering alerts **via vibration, sign language broadcasts, and simplified audio** to ensure no demographic is left unaware during a crisis.

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✍ This shifts disaster response from a generic reaction to a **targeted, life-saving precision mechanism**.

💡 **Enforcing “Actuarial Fairness” in Financial Inclusion:** To combat the financial exclusion where insurers deny coverage or charge exorbitant premiums, the IRDAI must mandate **“Standardized Disability Insurance Products”** with capped premiums, similar to the standard Arogya Sanjeevani policies.

✦ Simultaneously, **banks should implement “Biometric Exemption Protocols”** for those with **upper-limb disabilities or worn fingerprints**, replacing rigid authentication with voice or iris recognition.

✦ This ensures that the **“Cost of Disability”** is mitigated by a supportive financial ecosystem that guarantees **economic dignity and liquidity** rather than dependence.

💡 **Leveraging “Public Procurement Power” for Market Shift:** The government, being the largest consumer of goods and services, must enforce **“Accessible Procurement Guidelines”** for all public tenders, especially in IT, transport, and infrastructure.

✦ If the **state refuses to buy software, websites, or office equipment that isn’t Universal Design compliant**, it forces manufacturers to alter their production lines, thereby driving down the cost of accessible technology for everyone.

✦ This strategy utilizes **“State Buying Capacity”** to create a mainstream market for accessible goods, transforming them from niche, expensive luxury items into **affordable, standard commodities**.

Conclusion:

India’s disability policy is at a critical inflection point, **moving from welfare to workforce inclusion**. However, employment without accessible public spaces risks reducing empowerment to a narrow economic metric. True inclusion demands redesigning infrastructure, governance, and social attitudes around universal design. **Only when public spaces, digital systems, and institutions become disability-ready will growth translate into dignity.**



Recalibrating India’s Act East Outlook

*This editorial is based on **“PM Modi in Malaysia: Future-proofing an ‘Act East’ partnership”** which was published in *The Indian Express* on 09/02/2026. This editorial analyses how PM Modi’s Malaysia visit signals the evolution of India’s Act East Policy into a delivery-driven Indo-Pacific strategy anchored in technology, trade resilience, and maritime security.*

India’s engagement with Southeast Asia is no longer about diplomatic symbolism, but about strategic delivery. The **Indian Prime Minister’s** Malaysia visit marks a decisive **shift from Act East to Grow East**, anchoring ties in semiconductors, digital payments, and maritime security. By blending economic resilience, **financial sovereignty, and Indo-Pacific stability**, the partnership reflects India’s emergence as a **credible regional rule-shaper**. It also signals India’s intent to embed itself across the wider Eastern strategic ecosystem through supply-chain resilience, critical technologies, and security partnerships.

How India’s Act East Policy Evolved over Time?

💡 **Phase I (1991–2000)- “Looking East”:** India’s eastward engagement **began as the Look East Policy under P V Narasimha Rao**, driven by post-1991 economic liberalisation and the need to integrate with ASEAN-led growth networks.

✦ **The focus was trade, investment, and market access, not security.**

✦ India became a **Sectoral Dialogue Partner of ASEAN in 1992** and a **Full Dialogue Partner in 1996**.

💡 **Phase II (2001–2013)- Institutionalisation through Trade, Dialogue, and FTAs:** The policy matured through institutional mechanisms like **ASEAN–India FTA, embedding India into regional value chains** while remaining largely non-strategic in orientation.

💡 **Phase III (2014–Present): Shift from “Look” to “Act”:** In 2014, the policy was upgraded to “Act East”. This marked a transition from “passive observation” to “active participation”.

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- ✦ As the policy matured, its scope widened beyond ASEAN. India's deepening strategic ties with Japan, South Korea, and Australia have been equally important in shaping its Indo-Pacific strategy.
- ✦ 4 C's of India's Act East Policy are **Culture, Connectivity, Commerce, and Capacity Building**.
- ✦ The **Indian Prime Minister officially designated 2026 as the ASEAN-India Year of Maritime Cooperation**.
 - 📎 Following the **PM's visit to Malaysia in February 2026**, both countries have fast-tracked the use of Rupee and Ringgit for bilateral trade to reduce dependency on the Dollar.

What were the Key Highlights of India's Prime Minister's Recent Visit to Malaysia?

- 💡 **Reaffirmation of Comprehensive Strategic Partnership (CSP):** Leaders committed to deepening the CSP elevated in August 2024, anchored in civilizational ties, democratic values, and strong people-to-people linkages.



- 💡 **Trade & Economic Cooperation:** Emphasis on enhancing trade facilitation under **MICECA** and **AITIGA**; focus on semiconductors, digital economy, green technologies, fintech, and advanced manufacturing. Promotion of **local currency settlement (INR–MYR)** in bilateral trade.
- 💡 **Connectivity & Mobility:** Agreement to strengthen air and maritime connectivity; support for visa liberalisation, civil aviation cooperation, and enhanced people and professional mobility.
- 💡 **Digital & Financial Partnership:** Formalisation of the **Malaysia–India Digital Council (MIDC)**; collaboration on fintech, AI, cybersecurity, Digital Public Infrastructure, and cross-border digital payments via **NPCI–PayNet linkage**.

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- 💡 **Energy & Semiconductors:** Expansion of cooperation in **renewable energy, green hydrogen, and solar power**; strengthening the semiconductor value chain through industry-academia partnerships and supply-chain resilience.
- 💡 **Defence & Maritime Security:** Enhanced defence engagement through **MIDCOM**, joint military exercise **Harimau Shakti**, naval cooperation, and counter-terrorism collaboration under **ADMM-Plus**.
- 💡 **Food Security & Agriculture:** Commitment to resilient agri-supply chains, Malaysia reaffirmed as a reliable supplier of **sustainable palm oil**, with focus on value-added downstream cooperation.
- 💡 **Education, Skills & Culture:** Expansion of student exchanges, **TVET cooperation**, 'Study in India' programme, Thiruvalluvar Chair and Scholarships, and strengthened cultural diplomacy.
- 💡 **Healthcare & Traditional Medicine:** Cooperation in affordable healthcare, drug regulation, nursing services, and resumption of **Traditional Indian Medicine (TIM)** services in Malaysia.

What Measures has India Undertaken to Operationalise the Act East Policy?

- 💡 **Strategic "Connectivity Architecture" to Bypass Choke Points:** India is aggressively operationalizing **"Multi-modal Economic Corridors"** to bypass the **Siliguri bottleneck**, transforming the North East into a **"strategic gateway"** for seamless ASEAN integration and logistical dominance.
 - ✦ This shifts the focus from mere land connectivity to a **"continental-maritime mix,"** reducing dependence on the volatile **"Chicken's Neck" corridor**.
 - ✦ The **operationalization of the Sittwe Port (May 2023) in Myanmar** and the expedited push to extend the **India-Myanmar-Thailand (IMT) Highway** to Vietnam demonstrate this pivotal shift.
- 💡 **Institutionalizing "Combat Diplomacy" & Defense Exports:** Transitioning from a **passive "Look East" stance to a "Net Security Provider" role**, India is supplying lethal hardware and conducting complex maritime maneuvers to counter hegemonic assertiveness in the **South China Sea**.
 - ✦ This strategy creates a **"deterrence arc"** by empowering friendly nations with kinetic capabilities rather than just diplomatic support.
 - ✦ The delivery of the **\$375 million BrahMos missile batteries to the Philippines** (April 2024) and the gifting of the active warship **INS Kirpan** to Vietnam (June 2023) solidify this strategic pivot.
- 💡 **"Digital Public Infrastructure" (DPI) Statecraft:** Leveraging **"Technological Sovereignty,"** New Delhi is exporting its fintech stack to create low-cost, sovereign financial rails that bypass western intermediaries and deepen economic interoperability with Southeast Asia.
 - ✦ This **"UPI Diplomacy"** reduces **currency conversion costs and offers a non-SWIFT financial alternative** for remittance-heavy economies.
 - ✦ The **UPI-PayNow linkage** with Singapore (Feb 2023) enables real-time cross-border remittances, with similar **Local Currency Settlement** talks currently underway with **Indonesia and Malaysia**.
- 💡 **Recalibrating Trade via "AITIGA Modernization":** Addressing the **"Asymmetric Openness"** of past pacts, India has initiated a rigorous modernization of trade agreements to fix inverted duty structures and integrate into **"China-Plus-One"** resilient supply chains.
 - ✦ The goal is to **protect domestic manufacturing while ensuring Indian MSMEs** get reciprocal market access in protectionist **ASEAN sectors**.
 - ✦ The expedited review of the **ASEAN-India Trade in Goods Agreement (AITIGA)** aims to tackle the widening trade deficit, which reached a staggering **US\$44 billion in 2023**.
- 💡 **"Sub-Regional Energy Grids" as Geopolitical Glue:** India is constructing a **"Hydro-Carbon Web"** to bind neighbors through critical energy dependency, ensuring long-term geopolitical leverage and creating a unified South Asian energy market.

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- ✦ This moves the relationship from transactional politics to “**infrastructure lock-in**,” making disengagement economically prohibitive for partner nations.
- ✦ The commissioning of the **India-Bangladesh Friendship Pipeline** (March 2023) and the historic pact to import **10,000 MW of power from Nepal over the next decade exemplify this integration.**
- 💡 **Institutionalizing the “Blue Economy” & Maritime Domain Awareness:** India is transitioning from traditional naval patrols to a **comprehensive “Ocean Governance” framework**, aiming to secure vital **Sea Lines of Communication (SLOCs)** against non-traditional threats and assertive regional actors.
 - ✦ **By establishing 2026 as a dedicated year for maritime cooperation with ASEAN**, New Delhi is embedding itself into the regional security architecture through shared surveillance and sustainable resource management.
 - ✦ Also, New Delhi is successfully operationalising the **“SAGAR” (Security and Growth for All in the Region)** vision by institutionalising naval interoperability, **moving from ad-hoc drills to complex war-fighting exercises that signal a unified front against grey-zone coercion.**
- 💡 **“Critical Mineral Cooperation” for Green Energy Security:** Recognizing the vulnerability of concentrated supply chains, India is forging **“Resource Diplomacy” in Southeast Asia** to secure the **raw materials essential for its EV and semiconductor ambitions.**
 - ✦ This move seems to **integrate Act East with the “National Mission on Transformative Mobility,”** positioning India as a downstream processing alternative to the existing monopoly in the rare-earth sector. .
 - ✦ **KABIL signed an MoU with Australia’s Critical Minerals Office (CMO)** to jointly evaluate and invest in lithium and cobalt mining assets.
- 💡 **“Extended Act East” via Pacific Island Engagement (FIPIC):** India is expanding its strategic horizon beyond the Malacca Strait to the **“Second Island Chain”** by positioning itself as the **“Voice of the Global South”** for small island developing states.

- ✦ This **approach uses demand-driven developmental assistance and climate resilience projects** to build political capital in a region traditionally contested by major powers.
- ✦ In August 2025, India cemented this strategy by **signing the 100-bed Super Specialty Hospital deal in Fiji** to serve as a regional hub.

What are the Constraints in Translating Act East Vision into Outcomes?

- 💡 **Implementation Deficit: The “Over-Promise, Under-Deliver” Syndrome:** India suffers from a chronic credibility crisis due to bureaucratic lethargy and lack of coordination between central agencies and state governments.
 - ✦ While announcements are grand, **the execution gap allows competitors like Japan and China to capture the infrastructure market**, leading ASEAN nations to **view India as a “talking partner” rather than an “acting partner” in development.**
 - ✦ For instance, the **IMT Trilateral Highway** was conceived in 2002 but remains incomplete.
 - ✍ In contrast, **China completed the China-Laos Railway (1,035 km)** in just 5 years (2016-2021), transforming regional logistics.
- 💡 **The “Gateway” Blockade- Myanmar’s Unrest:** The 2021 coup and subsequent intensification of the civil war have **turned Myanmar from a land bridge into a strategic cul-de-sac (passage that is closed at one end).**
 - ✦ The **loss of junta control over border towns** to ethnic armed groups has rendered bilateral agreements void, **effectively freezing India’s physical access to ASEAN and forcing a costly recalibration of security over connectivity.**
 - ✍ For instance, the **Kaladan Multi-Modal Transit Transport Project** is indefinitely stalled due to the **Arakan Army capturing the Paletwa township in early 2024**, further the **Trilateral Highway** has missed its deadline with no new completion date in sight.

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💡 **Trade Asymmetry- Widening Deficit:** India's trade relationship with ASEAN is defined by a "low-value export, high-value import" trap, where India exports raw materials but imports finished goods.

- ✦ The reluctance to join RCEP (Regional Comprehensive Economic Partnership) has further isolated India from the region's friction-less manufacturing supply chains, making its exports uncompetitive against Chinese alternatives.
- ✦ India's trade deficit with ASEAN skyrocketed to \$44 billion in FY23, a drastic increase from \$7.5 billion in 2010.

💡 **Internal Instability- The Manipur Crisis:** The ongoing ethnic conflict in Manipur (since May 2023) has shattered the "peace dividend" essential for the Northeast to function as the Act East launchpad.

- ✦ This internal volatility has forced the Centre to rethink Free Movement Regime (FMR), signaling a shift from "open borders for trade" to "hard borders for security," fundamentally contradicting the policy's integrationist spirit.
- ✦ The Ministry of Home Affairs decided in 2024 to fence the entire 1,643 km India-Myanmar border, severing historic tribal economic ties.

💡 **The "Bangladesh Shock":** The sudden regime change in Bangladesh (August 2024) and the ouster of the pro-India Sheikh Hasina government has endangered the eastern connectivity architecture.

- ✦ India's reliance on Bangladesh for transit (via Chattogram and Mongla ports) to bypass the Siliguri Corridor is now vulnerable to political hostility, potentially isolating the Northeast again and stalling the BBIN (Bangladesh-Bhutan-India-Nepal) motor vehicles agreement.
- ✦ Compounding these strategic uncertainties are rising concerns over the safety of religious and ethnic minorities in Bangladesh, particularly Hindus, amid reports of targeted violence, forced displacement, and institutional apathy in the post-transition phase.

✍ Such developments strain people-to-people ties, fuel domestic political sensitivities in India, and limit New Delhi's diplomatic bandwidth to deepen engagement.

💡 **China's Omni-Presence- The Debt & Infrastructure Trap:** Beijing has effectively encircled India's eastern periphery by embedding itself into the critical infrastructure of Laos, Cambodia, and Myanmar through the Belt and Road Initiative (BRI).

- ✦ While India offers "demand-driven" development, it cannot match China's speed, capital, or risk appetite, leading to a loss of strategic leverage in ASEAN forums where members are increasingly wary of antagonizing their largest economic patron.
- ✦ China's Ream Naval Base upgrade in Cambodia and the Kyaukpyu Deep Sea Port in Myanmar gives it enhanced access, directly outflanking India's Andaman and Nicobar Command and maritime influence in the Bay of Bengal.

💡 **Maritime Insecurity- The South China Sea Tightrope:** While India advocates for "Freedom of Navigation," its hesitation to form hard security alliances in the South China Sea (SCS) that limits its utility as a security provider for ASEAN claimants (Philippines).

- ✦ As China aggressively uses "grey zone" tactics (water cannons, lasers), ASEAN nations are forced to seek US protection, leaving India's "SAGAR" vision as militarily insufficient for their immediate survival needs.

What Measures are Needed to Strengthen India's Act East Policy?

- 💡 **Institutionalize a "Special Purpose Vehicle" (SPV) for Project Execution:** To tackle the chronic delay in infrastructure projects like the Trilateral Highway, India must move beyond standard bureaucratic channels and establish a dedicated, autonomous Special Purpose Vehicle (SPV) empowered with financial autonomy and cross-ministerial authority.
 - ✦ This entity would bypass red tape, enable faster decision-making like the "Metro Rail" corporations, and directly coordinate with

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host governments in Myanmar or Vietnam to expedite land acquisition and regulatory clearances.

- ✦ This shifts the approach from “diplomatic negotiation” to **“corporate-style execution,”** ensuring deadlines are met and credibility is restored.

💡 **Pivot from “Land Bridge” to “Maritime Arc” Strategy:** Given the instability in Myanmar blocking land connectivity, India needs to operationally pivot towards a **“Maritime Arc” strategy that prioritizes direct shipping lanes and port-to-port linkages between India’s Eastern seaboard (Chennai, Vizag) and key ASEAN hubs (Jakarta).**

- ✦ This involves incentivizing coastal shipping lines, **creating a “Green Channel” for customs at ports for ASEAN-bound goods,** and upgrading the Andaman and Nicobar Command into a commercial trans-shipment hub.
- ✦ This measure **effectively “leapfrogs” the continental blockade to maintain economic integration through the maritime domain.**

💡 **Integrate Northeast India into “Regional Value Chains” (RVCs):** Instead of viewing the Northeast merely as a **“transit corridor,”** policy must focus on transforming it into a **“production node”** integrated with Southeast Asian value chains, particularly in bamboo, agro-processing, and pharmaceuticals.

- ✦ This requires harmonizing quality standards with ASEAN nations and setting up **“Export-Oriented Units” (EOUs) in border states** that specifically cater to demands in Myanmar and Thailand.
- ✦ By aligning the **“Make in Northeast” initiative with ASEAN’s import needs,** India can create economic stakeholders in the border regions who will drive the policy from the bottom up.

💡 **Aggressive “Digital Diplomacy” and Fintech Integration:** India should leverage its dominance in **Digital Public Infrastructure (DPI) to create a “Digital Act East” framework, aggressively pushing for the interoperability of UPI** (Unified Payments Interface) with ASEAN payment systems like **PayNow and PromptPay.**

- ✦ By offering **India’s open-source technology stack** for identity and payments as a **“developmental partnership”** tool, India can bypass physical barriers and integrate financially with the region’s booming internet economy.

- ✦ This creates a low-cost, **high-impact soft power footprint that China’s hard infrastructure cannot easily replicate.**

💡 **Operationalize “BIMSTEC” as the Primary Delivery Mechanism:** With SAARC defunct and ASEAN-India mechanisms often slow, **India must shift its diplomatic weight to make BIMSTEC the primary engine for the Act East Policy’s** connectivity and security pillars.

- ✦ This entails finalizing the BIMSTEC Free Trade Agreement and the Coastal Shipping Agreement to create a legal framework that binds the Bay of Bengal community together.
- ✦ **By treating BIMSTEC as the “inner circle” of the Act East Policy,** India can foster a tighter, more manageable economic zone that is less susceptible to the wider geopolitical tensions of the South China Sea.

💡 **Expand “Defense Diplomacy” to “Capacity Building”:** India needs to graduate from occasional naval exercises to becoming a sustained **“net security provider”** by offering institutionalized capacity building, such as training ASEAN navies in **submarine operations, hydrography, and disaster response.**

- ✦ Establishing permanent **“Military Training Teams”** in friendly **ASEAN nations and offering “Lines of Credit” specifically for defense procurement** (like the BrahMos deal) will entrench India as a reliable security partner.
- ✦ This creates deep strategic dependencies that serve as a counterbalance to external coercion in the region.

💡 **Leverage “sub-national Diplomacy” with Sister-City Frameworks:** The central government should formally empower state governments in the Northeast and Eastern India to conduct **“para-diplomacy”** with their counterparts in Southeast Asia through a robust **“Sister-City”** framework.

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- ✦ This involves **delegating powers to states to sign specific MoUs for tourism, cultural exchange, and local border trade** without needing constant Delhi clearance. This decentralization fosters organic, people-to-people connectivity and allows states to tailor their engagement based on specific cultural and economic synergies, **making the policy more resilient and locally owned.**

Conclusion

Revitalizing the Act East Policy demands a decisive shift from “**declaratory diplomacy**” to “**delivery-based pragmatism**,” focusing on institutional agility and maritime workarounds to bypass continental bottlenecks. By embedding the Northeast into regional production networks and leveraging digital prowess, **India can create an interdependent economic architecture that is resilient to geopolitical shocks.** Ultimately, the **policy’s success hinges on India’s ability to project itself not just as a market, but as a reliable engine of regional growth and stability.**



Infrastructure and Logistics- The Engine Of India’S Competitive Growth

*This editorial is based on “**Driving mobility through infrastructure and green growth**” which was published in The Hindu business line on 01/02/2026. This editorial examines how Budget 2026’s infrastructure-led, green and mobility-centric strategy is reshaping India’s logistics efficiency, industrial competitiveness and long-term growth trajectory.*

As India pursues a high-growth trajectory amid global economic uncertainties, **the Union Budget 2026 signals a decisive shift towards infrastructure-led and mobility-driven development.** By reinforcing public capital expenditure, manufacturing depth and green growth, the Budget seeks to convert macroeconomic stability into real-sector momentum. **Infrastructure is positioned not merely as a fiscal stimulus but as a multiplier for logistics**

efficiency, regional integration and employment generation. In this context, mobility emerges as a strategic enabler linking industrial expansion, urbanisation and sustainable growth.

What are the Recent Developments in the Infrastructure and Logistics Sector in India?

- 💡 **Logistics Policy Payoff & Cost Reduction:** For the first time, coordinated policy interventions have yielded tangible results, breaking the structural barrier of high logistics costs that historically hampered Indian exports.
 - ✦ The synergy between **PM Gati Shakti** and the **National Logistics Policy** is now delivering measurable economic dividends.
 - ✦ According to the **Economic Survey 2025-26** India’s logistics cost has officially dropped to **7.97% of GDP** (from 13-14% a decade ago).
 - ✦ The **Unified Logistics Interface Platform (ULIP)** now integrates **44 systems** across ministries, facilitating **100 crore+ API transactions.**
- 💡 **Strategic Railway Modernization & High-Speed Corridors:** The focus has shifted from network expansion to **high-density rapid connectivity**, aiming to decouple passenger and freight traffic for higher efficiency.
 - ✦ This dual strategy decongests existing lines while creating dedicated high-speed value chains for economic hubs.
 - ✦ **Budget 2026-27** proposes **7 new High-Speed Rail corridors**, including **Delhi-Varanasi (3h 50m)** and **Mumbai-Pune (48m)**, to slash travel time by **60-70%.**
 - ✦ Further, the **East-West Dedicated Freight Corridor (Dankuni to Surat)** received expedited funding to integrate eastern mineral belts with western ports.
- 💡 **Green Infrastructure & Accelerate Energy Transition:** The government is aggressively embedding sustainability into infrastructure and mobility, **moving from “grey” concrete projects to “green” resilient systems** to meet **Net Zero 2070 targets.**
 - ✦ This “**Green Growth**” strategy reduces long-term carbon risks for industrial assets.

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- ✦ A massive ₹20,000 crore allocation for **Carbon Capture, Utilization, and Storage (CCUS)** and a target to operationalize **500 GW renewable energy** by 2030.
- ✦ Moreover, **PM Surya Ghar** scheme's allocation rose to ₹22,000 crore (FY27), targeting **1 crore households** to decentralize power infrastructure.
 - ✍ Also, between FY22 and early FY25, the number of public charging stations in India surged from approximately 5,000 to over 26,000.
- 💡 **Port-Led Development & Inland Waterways:** There is a decisive pivot towards coastal shipping and inland waterways to reduce the modal share of expensive road transport and lower carbon footprints.
 - ✦ The strategy aims to activate India's coastline and river systems as cheap, alternative freight expressways.
 - ✦ The Budget 2026 calls for operationalizing 20 new **National Waterways** and introduces a **Coastal Cargo Promotion Scheme** to shift freight from road to water.
 - ✍ Also, new ship repair ecosystems are being developed in Varanasi and Patna.
- 💡 **Road Infrastructure- Access-Controlled Efficiency:** NHAI's strategy has evolved from simple lane widening to building access-controlled economic corridors that function as high-speed arteries for freight.
 - ✦ The focus is now on "Ring Roads" and bypasses to segregate urban traffic from long-haul logistics.
 - ✦ For instance, ₹3.09 lakh crore allocated to MoRTH (FY27), with a target to construct 10,000 km of highways in 2025-26.
 - ✍ The Delhi-Mumbai Expressway, now fully operational in key stretches, will significantly reduce travel time between Mumbai and Delhi from 24 hours to 12 hours, enabling faster perishable goods transport.
- 💡 **Digital Public Infrastructure (DPI) in Logistics:** India is effectively "financializing" and "digitizing" infrastructure, using DPI to de-risk projects and attract private credit.
 - ✦ This creates a transparent data layer that allows real-time monitoring and faster credit flow to infrastructure developers.
 - ✦ The integration of "Logistics as a Service" on ONDC has broken the monopoly of closed-loop supply chains, allowing MSMEs to access enterprise-grade delivery networks (like Delhivery or Dunzo) on a pay-per-use basis.
 - ✦ **PM Gati Shakti platform** now hosts 1,700+ data layers across 57 ministries, reducing project planning time from months to weeks for agencies like NHAI.
- 💡 **Civil Aviation- Transition to a Global MRO & Seaplane Hub:** The government is pivoting from simple airport construction to creating a comprehensive "Design-to-Maintenance" ecosystem, aiming to retain billions in forex currently spent on foreign aircraft servicing.
 - ✦ By dismantling tax barriers, India is positioning itself as the primary aviation service center for South Asia and beyond.
 - ✦ Budget 2026-27 announced a zero basic customs duty on aircraft parts and raw materials for MRO, supporting a projected passenger surge to 665 million by 2031.
 - ✦ Large-scale civilian MRO facilities by Air India and IndiGo in Bengaluru are now under construction to handle wide-body aircraft domestically.
- 💡 **Energy Storage- The 10-Fold Battery Infrastructure Leap:** Infrastructure is being "future-proofed" by integrating massive storage capacities to handle the intermittent nature of the targeted 500 GW renewable grid.
 - ✦ This shift from generation to stabilization ensures industrial logistics have access to 24/7 "Green Power," crucial for global ESG compliance.
 - ✦ India's battery energy storage installation is set to surge 10-fold to 5 GWh in 2026, supported by a ₹5,400 crore Viability Gap Funding (VGF) for 30 GWh of standalone BESS.
 - ✦ Moreover, Adani group is commissioning one of the world's largest single-location BESS projects (3,530 MWh) in Gujarat to stabilize the regional industrial grid.

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💡 **Semiconductor Logistics- Building “Silicon Corridors”:** The launch of **India Semiconductor Mission (ISM) 2.0** signals a move toward high-value, precision-logistics infrastructure where the “cargo” is microscopic but worth billions.

- ✦ This **requires specialized “Clean Room” industrial parks** with uninterrupted, high-quality power and water supply chains that differ from traditional heavy-industry zones.
- ✦ For instance, **Budget 2026-27 allocated ₹40,000 crore for electronics component manufacturing and launched ISM 2.0 to develop full-stack Indian IP and supply-chain resilience.**
- ✦ Further, **10 major projects with a total investment of ₹1.60 lakh crore** (including silicon fabs and ATMP units) **were approved across 6 states as of late 2025.**

💡 **Urban Transit-Beyond Metros to “City Economic Regions”:** Urban planning is evolving from isolated city projects to integrated regional clusters connected by high-speed transit, effectively expanding the “labor pool” of Tier-1 cities into Tier-2/3 satellites.

- ✦ This “**distributed urbanism**” reduces the physical pressure on megacity infrastructure while spreading economic growth geographically.
- ✦ **Approximately 1,036 km of Metro and RRTS lines are now operational** across 24 cities.
- ✦ The breakthrough of **tunnel boring machines for Delhi Metro Phase IV and the approval of Lucknow Metro Phase 1B** showcase the continued momentum in non-capital metros.

What are the Key Issues Associated with India’s Infrastructure and Logistics Sector?

💡 **Modal Skew and Carbon Intensity:** India’s logistics is critically unbalanced, **with 71% of India’s freight is transported through road**, despite it being significantly more expensive and carbon-intensive than rail or water.

- ✦ This over-reliance on trucking exposes supply chains to fuel price volatility and driver shortages, **creating a “high-friction” logistics**

environment that erodes export competitiveness compared to global peers who favor rail.

- ✦ For instance, **Rail share stagnated at ~27-28% (2024) despite DFC commissioning.**

📎 Further road freight costs ₹3.78/tonne-km vs Rail’s ₹1.96/tonne-km (NCAER 2025 Report).

💡 **Hinterland Connectivity Bottlenecks:** While port efficiency has surged, the “**last-mile**” connectivity from ports to industrial clusters remains the **weakest link**, creating an “efficiency island” effect.

- ✦ High dwell times at **inland container depots (ICDs)** and poor road surface quality in industrial belts negate the gains made in vessel turnaround times, leading to inventory pile-ups and detention charges.
- ✦ While **turnaround time has improved to approximately 22 hours**, Inland Dwell Time continues to remain considerably high, largely due to persistent road congestion (**Jawaharlal Nehru Port Authority Data, 2025**).

💡 **Land Acquisition and Project Stalling:** The complexity of land acquisition **remains the largest structural bottleneck**, causing massive cost overruns and deterring private capital in linear projects like highways and railways.

- ✦ The lack of digitized land titles and litigation delays **create a “risk premium” that makes greenfield infrastructure projects financially unviable for private developers** without heavy state guarantees.
- ✦ For instance, **35% of stalled central projects (valued >₹150 cr) are delayed solely due to land acquisition issues (PRAGATI Review 2024-25).**

💡 **Rail Freight Basket Rigidity:** Indian Railways suffers from **commodity concentration risk**, relying heavily on bulk commodities like coal and iron ore while **losing high-value FMCG and industrial cargo to roads.**

- ✦ This “**dirty basket**” dependency makes **revenue vulnerable** to energy transitions and limits the logistical flexibility required by modern “**Just-in-Time**” manufacturing supply chains.

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✦ Despite setting an ambitious freight loading target of **1,702.5 MT for 2025–26**, the railways recorded only a **1.68% growth in 2024–25** over the previous year, reflecting modest and slowing momentum in freight expansion.

✍ This raises concerns that **target-driven projections may outpace structural demand growth, logistical competitiveness, and broader economic conditions**, turning incremental gains into a policy challenge rather than a growth breakthrough.

💡 **Warehousing Quality and Standardization Gap:** There is a severe shortage of **Grade A warehousing** compliant with global safety and automation standards, forcing manufacturers into inefficient, **unorganized “godowns.”**

✦ This fragmentation **leads to high inventory carrying costs and wastage**, particularly in the cold chain, preventing the seamless integration of high-tech inventory management systems.

✦ Due to this, India faces an estimated **annual post-harvest loss of approximately ₹92,651 crore (approx. \$10.78 billion) as of 2024–2025 estimates.**

💡 **Digital Fragmentation and MSME Exclusion:** While the **Unified Logistics Interface Platform (ULIP)** has integrated large players, the unorganized trucking sector (75% of fleet owners own <5 trucks) remains digitally excluded.

✦ This **“digital divide” creates data black holes** where real-time tracking vanishes, **preventing true end-to-end visibility and optimization of return loads**, keeping empty run rates high.

💡 **Systemic Safety Failure in Civil Aviation:** The sector is currently grappling with a “normalization of deviance,” where airlines routinely clear aircraft with repetitive technical snags to maintain tight schedules, effectively bypassing the intent of safety protocols.

✦ This **“deferred maintenance” culture has allowed critical faults, like the fuel control switch anomalies in the Boeing 787 fleet**, to accumulate, transforming minor glitches into catastrophic failure points that regulators only catch post-disaster.

✦ For instance, a recent audit flagged **377 aircraft (nearly 50% of the audited fleet)** for repetitive technical defects.

💡 **Urban Logistics and Congestion Costs:** The explosive growth of **Quick Commerce (10-minute delivery)** is clashing with rigid urban infrastructure that lacks designated loading/unloading zones.

✦ This forces **last-mile delivery into chaotic informal patterns, increasing city congestion, pollution, and delivery costs**, while municipal regulations struggle to adapt to the micro-fulfillment center model.

✦ Further as per the **2025 TomTom Traffic Index (released in early 2026)** peak-hour speeds in major Indian hubs have significantly deteriorated.

✍ For instance, **in Bengaluru it dropped to 13.9 kmph in 2025, from 14.9 kmph in 2024.**

💡 **Air Cargo Infrastructure Deficit:** India’s ambition to become a global electronics hub is throttled by inadequate air cargo processing capacity at non-metro airports.

✦ **The lack of dedicated freighter bays and slow customs clearance for time-sensitive components (semiconductors) creates a bottleneck that forces exporters to route goods via expensive hubs like Singapore or Dubai.**

✦ **Currently, 80% of India’s air cargo is carried in the “belly” of passenger planes**, making the sector highly sensitive to passenger flight schedules and limiting its ability to handle oversized or specialized industrial freight.

💡 **Green Logistics Viability Gap:** The transition to **Green Logistics is stalled by the prohibitive Total Cost of Ownership (TCO) gap** between Electric/Hydrogen trucks and diesel incumbents.

✦ Without a dense highway charging network and viable financing for heavy-duty EVs, **“sustainability” remains a corporate buzzword rather than an operational reality for long-haul freight.**

✦ For example, **Electric Truck penetration is less than 1% in heavy commercial vehicles (2025)** and diesel trucks still contribute ~60% of transport emissions (IEA India Report 2024).

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💡 **Private Investment Risk Aversion:** Private sector participation in infrastructure (Private GFCF) remains tepid, forcing the government to do the “heavy lifting” via **Gross Budgetary Support (GBS)**.

- ✦ The private sector’s hesitancy stems from **past experience with stalled projects** and rigid concession agreements, **creating a funding gap that fiscally constrains the state’s ability to maintain CAPEX momentum.**

What Measures are Needed to Strengthen the Infrastructure and Logistic Sector in India?

💡 **Institutionalizing “Gati Shakti” for Predictive Infrastructure Planning:** India must move beyond static mapping to **dynamic, predictive planning** using the PM Gati Shakti National Master Plan.

- ✦ By integrating **AI-driven layers that predict industrial demand 5-10 years out**, we can build infrastructure *before* bottlenecks emerge rather than reactively.
- ✦ This involves mandating that all future connectivity projects, whether road, rail, or optical fiber, pass through a **“Gati Shakti Stress Test” to ensure they align with economic clusters and minimize ecological disruption.**

💡 **Aggressive Modal Shift to Rail via DFC Feeders:** India relies too heavily on roads, to balance this, **India needs to treat the Eastern and Western DFCs not just as tracks, but as economic spines.**

- ✦ The critical measure here is developing **“Last-Mile Rail Feeders”** that connect **private industrial parks directly to the DFC network without touching national highways.**
- ✦ This **requires a liberalized “Private Siding Policy”** where private players can build and operate short-haul rail links with minimal bureaucratic interference.

💡 **Implementing a “Unified Logistics Interface Platform” (ULIP) 2.0:** While ULIP currently integrates data, the next step is **interoperable smart contracts** powered by blockchain to automate payments and compliance.

- ✦ **India needs a “Single Window Logistics e-Marketplace”** where a manufacturer can book a truck, a train slot, and a warehouse space in one click, with instant customs clearance.

💡 **Operationalizing “Hub-and-Spoke” Multi-Modal Logistics Parks (MMLPs):** To solve urban congestion, we must accelerate the commissioning of the planned MMLPs by adopting a strict **“Plug-and-Play” land acquisition model.**

- ✦ **These parks should serve as giant consolidation hubs** outside major cities, where heavy trucks offload cargo to smaller electric fleets for city entry.
- ✦ **The measure here is to offer “Viability Gap Funding”** specifically for private developers who integrate automated sorting and cold-storage facilities within these parks.

💡 **Decarbonization via “Green Freight Corridors” and EV Integration:** There is a need to designate specific high-volume routes (**like Delhi-Mumbai or Chennai-Bangalore**) as **“Green Freight Corridors”** where tolls are discounted for electric or hydrogen-powered trucks.

- ✦ Simultaneously, the government **should mandate that a fixed percentage of “Last-Mile Delivery” fleets in Tier-1 cities transition to EVs in a given timeline.**
- ✦ This creates a guaranteed market for OEMs to invest in heavy-duty electric logistics vehicles, reducing the sector’s carbon footprint.

💡 **Unlocking Capital through “Asset Monetization” and InvITs:** To fund these massive projects without fiscal slippage, we must aggressively expand the **Infrastructure Investment Trust (InvIT)** model to include operational warehouses, railway stadiums, and port terminals.

- ✦ By selling the **“rights to operate” stabilized assets to global pension funds**, the government can recycle capital into building new greenfield projects.
- ✦ **This turns completed infrastructure into a funding engine for future development.**

💡 **Revitalizing Coastal Shipping with “Blue Economy” Incentives:** India’s long coastline is underutilized; we need a **“Coastal Berth Scheme”** that incentivizes smaller ports to handle domestic cargo, not just EXIM trade.

- ✦ **A key measure is to offer a “Cabotage Relaxation” for specialized vessels** (like Ro-Ro

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car carriers) and subsidize the “first and last nautical mile” to make water transport cheaper than rail.

- ✦ This relieves pressure on the railway network and reduces overall fuel import dependency.
- 💡 **Restoring Aviation Safety through Zero-Tolerance Regulatory Architecture:** The sector requires a structural reset from reactive oversight to proactive, risk-based supervision to eliminate the “normalization of deviance.”
 - ✦ This demands institutionalizing a **Zero-Deferred Defect Policy** for critical systems, where **repetitive snags automatically trigger mandatory grounding and third-party technical audits rather than airline-level discretion.**
 - ✦ Further, DGCA should operationalize a **Real-Time Aircraft Health Monitoring Grid**, integrating predictive analytics and AI-driven fault trend detection across fleets to flag anomaly patterns before they escalate into systemic risks.
- 💡 **Skilling the Workforce for “Logistics 4.0”:** The sector suffers from a shortage of skilled labor to handle modern tech; we need a “**National Logistics Skilling Mission**” focused on drone operations, warehouse robotics, and data analytics.
 - ✦ **This involves setting up “Centers of Excellence” at major ports and MMLPs** where gig workers (truck drivers, delivery partners) are upskilled and certified.
 - ✦ Formalizing this workforce ensures higher productivity and reduces the high accident and attrition rates plaguing the sector.

Conclusion:

India’s infrastructure and logistics transformation marks a structural shift from cost-heavy, fragmented networks to integrated, green and technology-driven systems. While Budget 2026 has accelerated momentum through capex, digitisation and sustainability, persistent bottlenecks in land, modal balance and private investment remain. The challenge ahead lies in converting physical assets into productivity-enhancing economic corridors. A coordinated push combining governance reform, green finance and multimodal integration is essential to sustain India’s global competitiveness.



Transforming Indian Railways- The Reform Imperative

*This editorial is based on “**At a crossroads**” which was published in The Hindu business line on 09/02/2026. The article examines Indian Railways’ record capex push alongside its persistent financial and structural challenges. It argues that without tariff reform, freight diversification, and institutional efficiency, long-term sustainability remains uncertain.*

Indian Railways, often called the lifeline of the nation, today operates at a critical fiscal juncture. Despite record budgetary support of ₹2.5 lakh crore in FY26 and ₹2.78 lakh crore projected for FY27, its operating ratio remains above 98%, leaving little internal surplus for expansion. Freight earnings remain heavily dependent on coal (around 50%), even as India transitions toward cleaner energy. With salaries and pensions consuming 65-70% of railways’ revenues over the last decade, the Railways faces the twin challenges of financial sustainability and logistics transformation in a rapidly evolving economy.

What are the Current Developments in the Indian Railway Sector?

- 💡 **Fast-tracked DFC & Logistics Cost Reduction:** Strengthening freight infrastructure has become central to enhancing India’s economic competitiveness and reducing logistics inefficiencies.
 - ✦ The **Western Dedicated Freight Corridor (WDFC)** is on the verge of full commissioning, finally linking Dadri to JNPT ports seamlessly.
 - ✦ This separation of freight from passenger tracks is structurally lowering India’s logistics cost from 14% to single digits by allowing double-stack container trains to run at average speeds of 50 kmph+.
 - ✍ For instance, In FY-25, freight loading by Indian Railways exceeded 1.6 billion tonnes, witnessing a slight expansion over FY-24.
- 💡 **Kavach- Acceleration of Safety Network:** Following the accelerated trials in 2025, the deployment of Kavach (indigenous Automatic Train Protection) has reached critical mass on the Delhi-Mumbai and Delhi-Howrah high-density corridors.

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✦ The focus has shifted from mere “**track coverage**” to “**loco-integration**,” ensuring that the safety shield is active on the rolling stock itself to prevent **Signal Passing at Danger (SPAD)**.

✎ As of January 2026, **1,306 route km** are fully commissioned with Kavach 4.0. The **Safety Fund allocation in Budget 2026-27** stands at a ~₹1.20 lakh crore.

💡 **Strategic Rail Expansion in India’s Difficult Terrains:** Railways has moved beyond commercial viability to strategic integration, conquering the toughest terrains in the Himalayas and the Northeast to secure borders and integrate isolated markets.

✦ This **engineering diplomacy** acts as a force multiplier for national security and socio-economic assimilation of remote states.

✦ For instance, the **New Pamban Vertical-Lift Bridge** was commissioned in April 2025, and the **USBRL (Kashmir link)** became fully functional, connecting Kashmir Valley to the national grid.

✎ Also, the Indian Prime Minister inaugurated **Bairabi–Sairang broad gauge railway line in Aizawl**, linking landlocked Mizoram with the rest of the country through rail connectivity.

💡 **Fleet Standardization & Launch of Vande Bharat Sleeper:** The long-awaited Vande Bharat Sleeper trainsets were commercially launched in **January 2026**, marking a structural shift from “**speed**” to “**overnight comfort**” to rival domestic air travel.

✦ This move aims to recapture the premium traveler segment by offering superior ride quality (**jerk-free rides**) and reducing travel time on golden quadrilateral routes by **15-20% compared to Rajdhani**.

✎ For instance, the VB Sleeper (Howrah-Guwahati) cut travel time by 3 hours.

💡 “**SwaRail**” Super App & Digital Unification: The Ministry of Railways beta-launched the “**SwaRail**” Super App (integrating IRCTC, UTS, and Rail Madad) to eliminate digital fragmentation and monetize the massive passenger data ecosystem.

✦ This platform transitions Indian Railways from a “**ticket provider**” to a “**mobility service**,” offering seamless multi-modal connectivity (**rail + last-mile taxi/metro**) on a single PNR.

✦ The app integrates **1.5 lakh daily ticket bookings** capacity. It also targets reducing the “**digital divide**” by merging unreserved (UTS) and reserved ticketing into one interface.

💡 **India’s High-Speed Rail Leap:** The **Mumbai-Ahmedabad High-Speed Rail (MAHSR)** project has entered its final pre-commissioning phase for the **Surat-Bilimora section**, with 100% land acquisition now complete across Maharashtra and Gujarat.

✦ The focus has moved from **civil construction (piers/viaducts)** to **track-bed laying and signaling**, setting the stage for India’s entry into the elite club of high-speed rail nations.

✦ Further, Japan reportedly plans to provide India with two Shinkansen train sets, **one each from its E5 and E3 series**.

💡 **Fiscal Consolidation via Operating Ratio:** Despite heavy capex, Indian Railways has managed to stabilize its financial health by controlling working expenses and increasing the share of non-fare revenue (**advertising, asset monetization**).

✦ The **Operating Ratio (OR)** has shown a **marginal but vital improvement**, signalling that the railways are generating just enough surplus to cover depreciation and pension liabilities without excessive budget reliance.

✦ For instance, the Operating Ratio has improved to **98.32%** in FY25 (down from 98.43% in FY24).

✎ Also **Gross Traffic Receipts** touched ₹2.65 lakh crore driven by a ~7% hike in coal freight earnings.

💡 **Accelerated Energy Transition:** Indian Railways has effectively achieved **near-100% electrification** of its **Broad Gauge network**, retiring diesel locos from mainline service to achieve the “**Net Zero 2030**” goal.

✦ The current thrust is on “**Solarizing Stations**” and procuring Renewable Energy (RE) via **Open Access** to reduce the traction power bill, which is the second-largest expenditure head after staff costs.

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✦ For instance, as of November 2025, **Indian Railways has commissioned 898 MW of solar power. Of this, 629 MW is used directly for traction, and 269 MW for non-traction needs like station lighting.**

💡 **Revitalising Railway Infrastructure through Amrit Bharat Station Scheme:** The modernization of 1,300+ stations under the **Amrit Bharat Scheme** has moved from “**facade improvement**” to creating “**City Centres**” that integrate both sides of the city.

✦ This development is **not just cosmetic but economic**, creating roof plazas and commercial spaces that **turn railway stations into 24/7 urban economic hubs rather than just transit points.**

📌 For instance, **50 major stations are under active redevelopment** with a capex of **₹12,000 crore** utilized in FY25.

💡 **Hyper-Expansion & Regional Integration (RRTS & Metro Mesh):** India has transitioned from isolated city-metros to a regionally integrated “**Mesh Network**” model, effectively connecting suburbs to economic cores via the **semi-high-speed RRTS (Namoo Bharat)** and **standardizing access through the “One Nation, One Card” (NCCM)** to create economic “**Mega-Regions.**”

✦ This shift from intra-city to inter-city connectivity decentralizes urbanization and reduces pressure on metropolitan housing markets.

✦ For instance, India’s operational metro network has soared from 248 km across 5 cities (in 2014) to **1,013 km across 23 cities as of May 2025.**

What are the Key Issues Associated with the Indian Railway Sector?

💡 **Sluggish Implementation of Safety Modernization (Kavach):** While safety metrics have improved, the deployment of the indigenous **Kavach’ protection** system has missed critical deadlines on high-density networks.

✦ **The slow pace of covering the vast 68,000+ km network** leaves the system vulnerable to human error, which remains the primary cause of consequential accidents.

✦ As of early 2026, **Kavach Version 4.0 has been commissioned on only around 1,306.3 route kilometres across Indian Railways.**

📌 While accidents dropped to 31 in 2024-25, the risk on non-Kavach routes remains significant.

💡 **Financial Fragility & The “Pension Trap”:** The **Operating Ratio (OR)** remains stubbornly high, indicating that the Railways spends nearly everything it earns just to stay afloat, leaving negligible surplus for critical safety capital expenditure (capex).

✦ **A massive portion of working expenses is consumed by the pension bill**, which acts as a deadweight on the balance sheet, forcing reliance on **Gross Budgetary Support (GBS) for any modernization.**

✦ For instance, according to Budget documents, expenditure on pensions was Rs 58844.07 crore in 2024-25, which is **expected to rise to Rs 74500 crore in 2026-27.**

💡 **The Cross-Subsidization Dilemma :** Indian Railways continues to **overcharge freight customers to subsidize artificially low passenger fares**, a practice that is driving high-value cargo (FMCG, auto) to the road sector.

✦ **This distortion makes rail freight uncompetitive for time-sensitive goods**, trapping the railways in a “**bulk commodity**” trap (coal/iron ore) while losing the lucrative logistics market.

✦ Freight rates in India are **much higher** than global benchmarks, consequently, the rail share of freight has stagnated at **29%**, **missing the National Rail Plan target of 45%.**

💡 **The General Class Strain amid a Premiumisation Push:** There is a growing socio-economic critique that the **relentless push for Vande Bharat (premium) trains** has come at the cost of reducing General and Sleeper class coaches in standard trains.

✦ **This “elitist skew” has led to dangerous overcrowding in non-AC coaches**, alienating the migrant workforce demographic **which forms the bulk of passenger volume but contributes less to revenue.**

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- ✍ For instance, in 2024–25, a staggering 651 crore passengers travelled by general coaches, marking a 17% surge compared to 2022–23 but they face reduced capacity.
- 💡 **Chronic Manpower Shortage in Safety Categories:** The delay in filling critical “safety category” vacancies (Track Maintainers, Loco Pilots, Station Masters) has created a dangerous cycle of accumulated fatigue and deferred maintenance.
 - ✘ While recruitment drives are announced, the lag between notification, training, and deployment means the ground-level staff is constantly stretched beyond statutory working hours.
 - ✘ The All India Railwaymen’s Federation (AIRF) stated that the Railway Board’s recent approval to fill 22,000 critical entry-level posts falls significantly short of the actual vacancies and may worsen staff shortages, thereby potentially compromising the safety of rail operations.
- 💡 **Infrastructure Overload and Capacity Constraints:** The rail network suffers from severe capacity saturation where “mixed traffic” (slow freight + fast passenger) on the same tracks reduces the average speed of both.
 - ✘ Even with the partial commissioning of DFCs, the “feeder routes” connecting to them remain clogged, creating bottlenecks that negate the speed gains achieved on the dedicated corridors.
 - ✘ While the Dedicated Freight Corridors (DFCs) are 96.4% commissioned (as of February 2026), the transition from these high-speed lines to the conventional “feeder” tracks, where freight must once again compete with passenger traffic, reintroduces delays that diminish the corridor’s end-to-end speed advantage.
- 💡 **Operational Delays in Amrit Bharat Station Redevelopment:** The ambitious Amrit Bharat Station Scheme has faced execution hurdles, where simultaneous construction at hundreds of active stations has caused severe passenger inconvenience and safety hazards.

- ✘ The project suffers from “scope creep” and coordination failures between local municipal bodies and rail authorities, turning stations into chaotic construction zones for prolonged periods.
- ✘ For instance, the ₹350-crore revamp of Ghaziabad railway station under the Amrit Bharat Station Scheme is facing significant delays, with only 40% of work completed by February 2026.

What Measures are Needed to Strengthen the Indian Railways?

- 💡 **Operationalize a “Digital Twin” for Predictive Maintenance:** Indian Railways must shift from “calendar-based” to “condition-based” maintenance by creating a real-time Digital Twin of its physical assets (tracks, bridges, and rolling stock).
 - ✘ By deploying IoT sensors and acoustic monitoring on wheels and rails, the system can predict fractures or bearing failures weeks in advance.
 - ✘ This proactive approach eliminates the “blind spots” in safety, drastically reducing derailment risks while optimizing the utilization of maintenance blocks.
- 💡 **Rationalize Tariffs via an Independent Regulator:** The government must establish a statutory Rail Regulatory Authority to depoliticize fare setting and decouple freight rates from passenger subsidies.
 - ✘ This mechanism should establish a transparent formula for periodic fare revisions based on input costs (energy, staff), ensuring financial sustainability.
 - ✘ By removing the “cross-subsidy burden” from freight, rail can regain its competitiveness against the road sector for high-value logistics.
- 💡 **Institutionalize “Minimum Capacity Guarantees” for General Class:** To address the “elitist skew,” policy must mandate a Minimum Capacity Ratio for unreserved and sleeper coaches on all long-distance trains, irrespective of the push for premium Vande Bharat sets.

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- ✦ This involves deploying high-density “Amrit Bharat” push-pull trains that offer speed parity with premium trains but at affordable price points.
- ✦ This restores the “social contract” of the railways by preventing overcrowding and ensuring dignity of travel for the migrant workforce.
- 💡 **Diversify Freight into “White Goods” & Parcel Logistics:** The freight basket must be aggressively diversified **beyond bulk commodities (coal/iron ore) by creating a dedicated “Fast-Moving Consumer Goods (FMCG) Ecosystem.”**
 - ✦ This requires standardizing small-sized containers and introducing time-tabled parcel trains that integrate seamlessly with e-commerce supply chains.
 - 📌 Capturing this high-margin “retail logistics” market is the only way to insulate revenue from the volatility of the core energy and steel sectors.
- 💡 **Solve the “Feeder Route” Bottlenecks for DFCs:** Investments must pivot from the main **Dedicated Freight Corridors (DFCs)** to upgrading the “Feeder and Connector” network that links industrial hinterlands to the DFC backbone.
 - ✦ **Without upgrading these single-line spurs to double-line electrified tracks,** the high-speed potential of the DFCs remains underutilized.
 - 📌 A “Hub-and-Spoke” integration strategy ensures that the logistics velocity gained on the corridor isn’t lost in the last-mile congestion.
- 💡 **Implement Bio-Mathematical Rostering for Crew Safety:** To eliminate human error caused by fatigue, the railways must adopt **Bio-Mathematical Rostering Software** that scientifically manages crew schedules based on circadian rhythms rather than just duty hours.
 - ✦ This must be paired with mandatory “**Simulator-Based Training**” using **AR/VR tools for Loco Pilots** to handle high-speed signaling scenarios.

📌 **Prioritizing the cognitive health of safety-critical staff** is as vital as upgrading the physical signaling infrastructure.

💡 **Unlock Value via Transit-Oriented Development (TOD):** The focus of station redevelopment must shift from cosmetic facade upgrades to deep **Transit-Oriented Development (TOD)** that monetizes the vertical airspace above tracks and yards.

- ✦ By creating mixed-use commercial and residential hubs integrated with stations, railways can generate a **recurring, long-term “Non-Fare Revenue” stream.**

- ✦ This “land-value capture” model creates a financial buffer that is independent of ticket sales and government budgetary support.

💡 **Establish “Captive Green Energy Micro-Grids”:** Moving beyond simple electrification, the Railways should utilize its massive vacant land bank to set up **Captive Solar and Wind Parks,** sourcing power directly via Open Access rules.

- ✦ This strategy creates an internal “**Energy Micro-Grid**” that insulates the railways from fluctuating commercial tariffs charged by state DISCOMs. Furthermore, **piloting Hydrogen-fuel trains on remote heritage routes will close the loop on the “Net Zero 2030” ambition.**

Conclusion:

Indian Railways stands at a structural inflection point where record capital investment must translate into systemic efficiency and financial sustainability. **While initiatives like Dedicated Freight Corridors, Vande Bharat expansion, and near-100% electrification signal modernization,** deep-rooted issues of cross-subsidization, pension burden, and capacity saturation persist. The sector’s long-term viability depends on tariff rationalization, freight diversification, safety-tech integration, and institutional reforms.



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Atmanirbharta and Alignment- India's Balancing Act

This editorial is based on “Balancing strategic alignment with economic nationalism” which was published in The Hindustan Times on 08/02/2026. This editorial examines how India is balancing strategic alignment with the United States while safeguarding economic nationalism amid rising geopolitical contestation and trade weaponisation.

In an era of sharpening geopolitical contestation, trade has emerged as a powerful instrument of strategic leverage rather than mere economic exchange. The interim India–US trade agreement reflects New Delhi's pragmatic recalibration as **strategic autonomy increasingly collides with energy security and market access**. By balancing tariff relief with calibrated strategic alignment, India has sought to protect domestic economic interests without rupturing critical partnerships. **This episode underscores how economic nationalism today must operate within the constraints of an increasingly transactional global order.**

What is Economic Nationalism?

- 💡 **About:** Economic nationalism is an umbrella term for **policies that emphasize domestic control of the economy**, even if it requires state intervention or restricting global trade.
 - ✦ At its core, it prioritizes the **nation's interests above the “efficiency” of the global free market**.
 - ✦ While globalists argue that every country should do what it's best at (comparative advantage), **economic nationalists argue that a country should be self-reliant to ensure national security and social stability**.
- 💡 **Core Policy Mechanisms**
 - ✦ **State Interventionism:** The government plays a decisive role in directing investment toward strategic sectors (e.g., semiconductors, defense, or green energy) to ensure national sovereignty.
 - ✦ **Trade Barriers:** Utilization of both **tariff and non-tariff barriers (such as stringent licensing or technical standards)** to prioritize domestic producers over foreign entities.

- ✦ **Monetary Sovereignty:** Occasionally, this includes capital controls or currency manipulation to maintain a competitive advantage in international exports.

💡 Evolution of Economic Nationalism in India

- ✦ **The Colonial Phase: The Foundation of Resistance**
 - 📎 Economic nationalism in India originated in the late 19th century as a response to British exploitation. It was an intellectual movement before it became a political one.
 - 📎 **The Drain Theory:** Proposed by **Dadabhai Naoroji**, it argued that Britain was systematically siphoning wealth from India without any equivalent return.
 - 📎 **The Swadeshi Movement (1905):** This was a practical application of **economic nationalism**.
- 💡 By boycotting foreign (British) cloth and promoting indigenous goods, leaders like **Bal Gangadhar Tilak** and **Bipin Chandra Pal** aimed to achieve **Atma-shakti (self-reliance)**.
- 💡 **The Post-Independence Phase (1947–1991): State-Led Self-Reliance**

- ✦ After 1947, the trauma of colonial exploitation led India to adopt a **“Socialist-leaning” model of economic nationalism**. The goal was to ensure that no foreign entity could ever control the Indian economy again.

- 📎 **Import Substitution:** High tariffs were placed on imports to protect “infant industries.”
- 📎 **The License Raj:** A complex regulatory system where the state decided what was produced, by whom, and in what quantity.
- 📎 **Public Sector Dominance: Critical sectors (Steel, Power, Banking)** were reserved for the State to prevent private or foreign monopolies.
- 📎 **The Critique:** While this built a strong industrial base, it eventually led to the **sluggish growth rate** due to a lack of global competition and innovation.

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💡 The Modern Phase (2014–Present): Atmanirbhar Bharat

✦ Since 2014, India has transitioned to “**Economic Nationalism 2.0.**” Unlike the pre-1991 era, this is not about closing doors to the world, but about engaging with the world from a position of strength.

📌 **Production Linked Incentives (PLI):** Instead of just banning imports, the government provides financial incentives to companies (both Indian and foreign) to manufacture within India under **Atmanirbhar Bharat.**

📌 **Vocal for Local:** A campaign to promote domestic brands and integrate local supply chains into the global market.

📌 **Techno-Nationalism:** India is increasingly asserting sovereignty over its digital assets.

💡 The **Digital Personal Data Protection Act (2023)** and the push for a domestic semiconductor ecosystem are prime examples of protecting national interests in the digital age.

✦ **Strategic Trade Policy:** India’s decision to opt out of the **RCEP (Regional Comprehensive Economic Partnership)** was a classic nationalist move to protect domestic dairy and MSME sectors from a flood of cheap Chinese imports.

How is India Balancing Economic Nationalism with Strategic Alignment?

💡 **Atmanirbhar Bharat- From Crisis Management to Strategic Industrial Policy:** The Atmanirbhar Bharat Abhiyan, launched in 2020, has evolved into a comprehensive “**India-First**” industrial strategy.

✦ It is not an isolationist move **but a pursuit of “Resilient Interdependence,”** where India integrates with the global economy from a position of domestic strength rather than dependency.

✦ In the **Union Budget 2026**, the government topped up the **Self-Reliant India Fund with an additional ₹2,000 crore to support risk capital for MSMEs.** Furthermore, the PLI scheme has already catalyzed over ₹2 lakh crore in investments as of September 2025.

💡 **Trade Policy- From Global Interdependence to Selective Integration:** India has moved away from mega-multilateral trade blocs that threaten domestic industry, opting instead for bilateral agreements with “**trusted**” democratic partners.

✦ This strategy **minimizes exposure to non-market economies** like China while securing high-value market access in the West.

✦ For instance, **India stayed out of the 15-member RCEP in 2019 but concluded a landmark FTA with the European Union in February 2026**

✦ Also, India has **reduced or eliminated tariffs on selected US industrial and agricultural goods** under the interim framework, yet it has avoided a comprehensive FTA that could expose politically sensitive sectors.

📌 **US reciprocal tariffs were reduced from an effective 50% (including a 25% Russia-linked penalty) to 18%,** restoring competitiveness to Indian sectors like textiles and chemicals.

💡 **Strategic Energy Diversification:** Energy security remains central to India’s economic nationalism.

✦ **In 2025, Russia supplied over 40% of India’s crude oil imports,** helping contain inflation and stabilise growth.

📌 However, US punitive tariffs linked to Russian oil imports created economic pressure.

✦ **India signalled gradual diversification toward US energy supplies rather than an abrupt shift,** thus balancing geopolitical alignment with economic prudence.

📌 For instance, **India indicated intent to purchase significant US energy supplies as part of the proposed \$500 billion import plan over five years.**

💡 **Digital and Techno-Nationalism:** India is asserting “**Digital Sovereignty**” to ensure that the backbone of its modern economy-data is not controlled by foreign big-tech or adversarial states.

✦ This involves **building indigenous “Digital Public Infrastructure” (DPI)** while regulating foreign data flows.

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- ✦ For instance, the **Digital Personal Data Protection Act (2023)** have strengthened data security and the launch of the India Semiconductor Mission has catalyzed local chip production. In 2025, India announced its first domestically produced chips.
- 💡 **Defense Indigenization- Balancing “Make in India” with Global Co-production:** India is transitioning from being the world’s largest arms importer to a manufacturer by mandating high indigenous content while inviting foreign OEMs to set up shops locally.
 - ✦ This creates a **“dual-use” economy where defense exports fund domestic R&D**, reducing the fiscal drain of imports.
 - ✦ The **“Year of Reforms 2025”** has shifted the focus from simple assembly to co-development of jet engines and underwater technologies, ensuring that strategic assets are manufactured on **Indian soil to prevent supply chokepoints during conflicts**.
 - ✦ For instance, Indigenous defense production reached a record **₹1.54 lakh crore in FY25**. Also in terms of co-development, the **BrahMos missile is a premier, high-speed, two-stage supersonic cruise missile** developed jointly by India and Russia.
- 💡 **Critical Mineral Security-Securing the Green Transition Supply Chain:** Recognizing that the **“Green Revolution”** depends on minerals controlled by a few nations, India is aggressively pursuing **“Mineral Diplomacy”** to secure its energy future.
 - ✦ This involves **domestic mining reforms** paired with international alliances to bypass traditional bottlenecks.
 - ✦ For instance, India is leveraging its membership in the Minerals Security Partnership (MSP) to secure long-term access to Lithium and Cobalt, while simultaneously launching **“Rare Earth Corridors”** at home to process these minerals.
 - ✦ Also, the **Union Budget 2026 announced Dedicated Rare Earth Corridors backed by a ₹7,280 crore Rare Earth Permanent Magnet (REPM) Manufacturing Scheme**.
- 💡 **Financial Sovereignty- The “Rupeeification” of Global Trade:** India is promoting the Internationalization of the Rupee (INR) to insulate its economy from **“Dollar-shocks”** and Western sanctions.
 - ✦ This is **not a “de-dollarization” crusade but a “de-risking” strategy** to ensure trade continuity with diverse partners like Russia and the UAE.
 - ✦ As of 2025, **around 22 countries have operationalized Special Rupee Vostro Accounts (SRVAs)** for direct trade settlement.
 - ✍ Furthermore, the **BRICS New Development Bank** is set to issue its first Rupee-denominated bond by March 2026, signaling global institutional trust in the currency.
- 💡 **Transition from Doctrinal Strategic Autonomy to Transactional Autonomy:** India’s traditional strategic autonomy doctrine **emphasised equidistance among major powers**.
 - ✦ India has **replaced the doctrine of “Strategic Hesitation” with “Strategic Pragmatism,”** where it acts as a **“pole” in a multipolar world**, choosing partners based on sectoral convergence rather than permanent alliances.
 - ✦ For instance, participation in **diverse platforms such as QUAD alongside continued engagement in BRICS** reflects issue-based alignment.

What are the Issues Arising Out of India’s Push Towards Economic Nationalism?

- 💡 **“Assembly-Led” Trade Deficit & Component Dependency:** While the Production Linked Incentive (PLI) schemes have successfully relocated final assembly to India, they have paradoxically increased import dependence on China for intermediate components.
 - ✦ This creates a **“superficial self-reliance” where the value addition remains low**, and supply chain vulnerabilities are merely shifted upstream rather than eliminated.
 - ✦ **For example**, India’s electronics import profile reflects acute concentration risk, **integrated circuit imports touched \$5.46 billion in H1 2025**, growing at **79% annually since 2017**, with **88% sourced from China**.

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💡 **Investment Chilling Effect from Policy Unpredictability:** Ad-hoc protectionist measures, such as the sudden licensing mandates for laptops and tablets, signal a return to the “License Raj,” spooking long-term foreign investors who prize regulatory stability.

- ✦ This volatility forces global capital to adopt a “wait and watch” approach, dampening the “China Plus One” gains India hopes to capture.
- ✦ For instance, Net FDI inflows plunged 159% in August 2025 (year-on-year) as repatriation of capital exceeded new inflows, signaling investor caution despite high gross headline numbers.

💡 **Inflationary Shock to MSMEs from Input Tariffs:** High customs duties on raw materials like steel and copper, intended to protect domestic primary producers, disproportionately crush the cost-competitiveness of downstream MSMEs.

- ✦ This “inverted duty structure” forces small exporters to price themselves out of global markets or operate on razor-thin margins, stifling the sector that employs the most people.
- ✦ For instance, in December 2025, India imposed a 11–12% three-year tariff on select steel imports to curb cheap Chinese shipments.

✍ While intended to protect domestic producers, it may increase input costs, weaken export competitiveness, trigger retaliation, and raise WTO compliance concerns.

💡 **The “Subsidy Burden” & Fiscal Slippage Risks:** The massive fiscal outlay for PLI schemes across 14 sectors creates a long-term liability on the public exchequer without guaranteeing that firms will become globally competitive once subsidies end.

- ✦ This “picking winners” strategy risks creating “infant industries” that refuse to grow up, diverting funds from critical health and education infrastructure.
- ✦ The PLI disbursement target was expanded to ₹1.97 lakh crore, yet largely utilized by capital-intensive sectors, significantly contributing to a fiscal deficit that hovered 54.5% of the annual budget target for 2025-26.

💡 **Green Transition & Carbon Protectionism Clash:** India’s push for domestic solar module manufacturing (ALMM list) effectively blocked cheaper imports, slowing down the pace of renewable energy capacity addition needed to meet 2030 climate goals.

- ✦ By prioritizing industrial policy over climate urgency, the cost of the green transition has artificially spiked for domestic power developers.
- ✦ For instance, the prices of Indian solar cells are 1.5 to two times more than alternatives from China even after basic customs duty.

💡 **Retaliatory Vulnerability in a Fragmented World:** As India deploys protectionist tools (QCOs, import bans), it invites reciprocal measures from trading partners, exposing its service sector exports (IT, Business Process) to retaliation.

- ✦ In a fragmenting global economy, being viewed as “protectionist” erodes the soft power India needs to position itself as a “Vishwaguru” or bridge-builder.
- ✦ In response to India’s digital hardware curbs, the US triggered a Section 301 review in 2025, threatening tariffs on India’s IT services exports.

💡 **Oligopolistic Market Concentration:** Critics argue that economic nationalism tends to favor large domestic conglomerates (“National Champions”) who have the capital to navigate complex compliance and capture subsidies, squeezing out smaller innovative players.

- ✦ This reduces domestic competition, leading to higher prices for Indian consumers and less incentive for firms to innovate efficiently.
- ✦ The top 20 business groups in India accounted for 70% of the profits of the listed corporate sector in 2024, signaling intense market concentration (Marcellus Investment Analysis 2025).

What Measures can India Adopt to Balance Economic Nationalism and Strategic Alignment?

💡 **Institutionalizing “Friend-Shoring” Protocol Frameworks:** India must establish formal “trusted

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geography” protocols that prioritize supply chain integration with politically aligned nations while retaining domestic core competencies.

- ✦ This involves creating legally binding **“zones of trust”** where tariff barriers are lowered exclusively for partners sharing democratic values and security standards.

- ✦ **Such a framework allows India to maintain economic sovereignty over critical sectors** like defense and energy while actively deepening market access for allies.

- ✦ This measure effectively operationalizes **“de-risking” strategies by replacing broad globalization with targeted, high-trust regional economic integration.**

- 💡 **Harmonized Foreign Investment Screening Mechanisms:** India should develop **interoperable “investment security”** standards that rigorously scrutinize inbound capital for national security risks **without stifling legitimate economic cooperation.**

- ✦ **By aligning screening criteria for sensitive technologies such as semiconductors, quantum computing, and biotechnology** with strategic partners, countries can prevent adversarial state-backed entities from exploiting open markets.

- ✦ This creates a **“security shield” around critical infrastructure while facilitating smoother capital flows** among allied nations who trust each other’s regulatory vigilance.

- 💡 **Coordinated Industrial Subsidy Rationalization:** To prevent a **“subsidy race to the bottom”** among allies, India must negotiate **“green lane” industrial policy agreements that permit domestic subsidies only when they benefit the collective strategic resilience.**

- ✦ It ensures that domestic manufacturing incentives, such as production-linked schemes, complement rather than cannibalize the industrial bases of strategic partners.

- ✦ This harmonization fosters a **“cooperative autonomy” where domestic strength supports alliance stability.**

- 💡 **Interoperable Digital Sovereignty Architectures:** Developing shared standards for data governance and digital infrastructure is essential to balance national data privacy mandates with the need for cross-border intelligence and commercial flow.

- ✦ This measure **entails creating “data trust corridors” where India with other nations agree on equivalent privacy and security protocols**, allowing for the free movement of non-sensitive industrial data while strictly localizing sovereign citizen data.

- ✦ **By decoupling commercial data integration from national security data protection**, India can foster a unified digital economy without compromising their cyber-sovereignty or intelligence autonomy.

- 💡 **Minilateral Innovation Corridors with Sovereign Manufacturing Rights:** India must pivot from broad multilateral trade deals to exclusive **“Minilateral Technology Groupings”** focused on sharing the high costs of pre-competitive R&D in sectors like 6G and fusion energy.

- ✦ The critical innovation here is a **“distributive manufacturing agreement,”** where shared R&D results in guaranteed rights for each member to manufacture the final product domestically.

- ✦ This prevents the **“innovation-production disconnect”** where one ally invents and another manufactures, ensuring that every partner strengthens its own industrial base while sharing the burden of scientific discovery.

- 💡 **Maintaining Infrastructure Efficiency:** To make economic nationalism viable, India is aggressively **lowering the cost of doing business to match global standards.**

- ✦ This ensures that domestic protectionism does not lead to **“Zombie Industries”** that are uncompetitive due to high local costs.

- ✦ **The state is integrating digital trade systems with physical infrastructure to reduce “dwell times” at ports**, making Indian exports as agile and reliable as those from established manufacturing hubs.

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Conclusion

Balancing economic nationalism with strategic alignment requires a sophisticated shift from reactive protectionism to proactive, rules-based economic statecraft. **By embedding security imperatives directly into trade logic, nations can secure their sovereign interests without sliding into isolationism.** Ultimately, the goal is to build an economic architecture that is resilient enough to withstand geopolitical shocks yet open enough to foster prosperity.



Changing Architecture Of Social Media Regulation in India

*This editorial is based on “**Freedom from toxicity**” which was published in The Hindu business line on 11/02/2026. This editorial examines India’s tightening social media regulations amid rising concerns over online toxicity and AI-driven abuse. It highlights the constitutional tension between rapid content takedowns and the preservation of free speech and due process.*

In an age where digital platforms amplify harm at unprecedented speed, India’s move to compress social media takedown timelines to just three hours reflects a growing urgency to curb online toxicity. However, the same velocity that spreads abuse can also accelerate censorship if power is exercised without restraint. The challenge lies in preventing digital harm without eroding the constitutional guarantee of free speech. This tension places India once again at the crossroads of technological governance and civil liberties.

What are the Major Recent Government Measures to Strengthen Social Media Oversight in India?

- 💡 **Algorithmic Accountability & Rapid Response:** The regulatory stance has shifted from passive “Safe Harbor” to hyper-active liability, where platforms are no longer neutral conduits but active gatekeepers forced to implement real-time censorship tools to retain legal immunity.

- ✦ The latest amendment fundamentally alters the “notice and takedown” timeline to near-impossible speeds.
- ✦ Recent government directive reduced the unlawful content takedown window from 36 hours to 3 hours and Deepfake pornography must now be removed within 2 hours to avoid criminal liability.

💡 **Synthetic Media & AI Governance:** The 2026 IT Amendment Rules define synthetically generated content as audio or visual material created or altered using computer algorithms in a way that makes it appear real and indistinguishable from an actual person or event.

- ✦ To combat the “liar’s dividend” (benefit people gain when real evidence is dismissed as fake) the government now mandates that “Synthetically Generated Information” (SGI) must be explicitly watermarked and labeled, effectively forcing platforms to redesign user interfaces to prioritize content provenance over seamless consumption or face bans under Section 69A of IT Act.

📎 Further, penalties for non-compliance include platform blocking and potential imprisonment of executives under the IT Act.

💡 **Data Sovereignty & Child Safety:** The **Digital Personal Data Protection Act (DPDPA) 2023** ends the era of unbridled data monetization by imposing a fiduciary duty on platforms to verify age and obtain “verifiable parental consent” for minors, a move that threatens the ad-revenue models targeting the lucrative under-18 demographic by creating high friction in user onboarding.

- ✦ For instance, A recent survey shows that 49% of urban Indian children aged 9–17 spend over three hours daily on social media, OTT platforms, and gaming, with 22% exceeding six hours.

📎 Given this scale of engagement, the DPDPA, 2023’s requirements for age verification and verifiable parental consent introduce onboarding friction and limit data-driven monetisation of minors.

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- 💡 **Institutional Oversight via Grievance Appellate Committees (GACs):** The government has decentralized the appeals process to empower “Digital Nagriks” (citizens) against the arbitrary moderation decisions of Big Tech.
 - ✦ This creates a “sovereign layer” of oversight that sits above the internal policies of platforms.
 - ✦ With a **reported 97% disposal rate**, it reflects high procedural efficiency, though it also marks a significant shift in the governance architecture of digital platforms in India.
- 💡 **Criminal Liability for Disinformation: Moving beyond the IT Act’s civil penalties**, the new penal code (BNS) criminalizes the creation or publishing of “false or misleading information” that jeopardizes the sovereignty of India, shifting liability from the platform (intermediary) to the individual user, who now faces non-bailable warrants for amplifying unverified narratives.
 - ✦ This marks a **significant shift from platform-centric regulation to user-centric criminal accountability in the digital ecosystem.**

Key Legislations Related to Social Media Regulation in India

- 💡 **Information Technology Act, 2000:** Parent legislation regulating electronic communication, intermediaries and cyber offences.
 - ✦ Provides legal basis for intermediary liability, content takedown, and government blocking powers under **Section 69A**.
 - 📎 Enables delegated rule-making for social media governance.
- 💡 **Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021:** Defines **due-diligence obligations for social media intermediaries, including grievance redressal and content moderation.**
 - ✦ Applies differential obligations for “significant social media intermediaries”.
- 💡 **Information Technology (Intermediary Guidelines) Amendment Rules, 2023:** Empowered government-notified **fact-checking units to flag false or misleading online content.**

- ✦ Expanded executive oversight over platform content moderation decisions.

Information Technology (Intermediary Guidelines) Amendment Rules, 2026:

Compressed compliance timeline for government takedown orders from **36 hours to 3 hours.**

- ✦ Mandated prominent labelling of AI-generated and synthetic content.

Digital Personal Data Protection Act, 2023 :

Establishes **consent-based framework** for processing personal data on digital platforms.

- ✦ Introduces Data Protection Board for enforcement and penalties.

Bharatiya Nyaya Sanhita, 2023:

Penalises offences such as **obscenity, defamation, sexual harassment and hate speech online.**

- ✦ Provides substantive criminal law basis for content takedown orders.

- ✦ Used in conjunction with IT Act provisions.

Protection of Children from Sexual Offences (POCSO) Act, 2012:

Section 13 of this act criminalises the use of a child in any form of media, **whether electronic, printed, or broadcast, for the purpose of sexual gratification.**

What are the Key Issues Associated with the Regulation of Social Media in India?

- 💡 **Expedited Takedowns and Potential Erosion of Procedural Safeguards:** The radical compression of the legal takedown window to just 3 hours forces platforms into a “delete-first, verify-later” operational loop, effectively stripping away the due process required to distinguish between legitimate political dissent and actual unlawful content.
 - ✦ It **conflicts with procedural safeguards** upheld by the Supreme Court in the **Shreya Singhal case**.
 - ✦ This speed-over-substance mandate **creates a systemic incentive for over-censorship to protect “Safe Harbor” immunity** from criminal prosecution.

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💡 **Potential Algorithmic Erasure of Satire and Context:** The government's mandate for "proactive monitoring" of AI-generated content (SGI) necessitates the use of automated filters that lack the cognitive capacity to detect irony, parody, or academic research, leading to the "algorithmic silencing" of artists and satirists.

✦ As per a recent survey, content moderators are reporting up to 80% error rates in AI-driven moderation systems, with some workers abandoning AI suggestions entirely due to high inaccuracies.

✦ By requiring platforms to "prevent" rather than just "remove" content, the state is effectively installing a permanent, automated digital border guard on every user's upload button.

💡 **Concerns Over Centralised Fact-Verification Authority:** The establishment of government-run Fact Check Units (FCUs) creates a dangerous constitutional conflict where the state acts as the "judge in its own cause," designating any criticism of government business as "fake or misleading."

✦ In 2024, the Supreme Court stayed the Union government's notification that established a fact check unit.

📌 The Bench led by Chief Justice D.Y. Chandrachud, and Justices J.B. Pardiwala and Manoj Misra observed that the Rule raises a "serious constitutional question" due to its possible "impact on the freedom of speech and expression."

💡 **The "Privacy vs. Traceability" Deadlock:** The push for "First Originator Traceability" to curb viral misinformation directly undermines End-to-End Encryption (E2EE), creating a "backdoor" vulnerability that can be exploited by both the state for surveillance and by cyber-criminals for data breaches.

✦ This regulatory friction places global platforms in an impossible position to comply with Indian law and compromise global security architecture, or defy the law and face a total market exit.

✦ For instance, WhatsApp has historically argued in the Delhi High Court that traceability would require breaking encryption for 500 million+ Indian users.

💡 **High Compliance "Barrier to Entry" for Startups:** While "Big Tech" can absorb the massive costs of 24/7 legal teams and advanced AI filters, the current regulatory "one-size-fits-all" approach acts as a barrier to entry for indigenous Indian social media startups.

✦ This "regulatory capture" unintentionally cements the monopoly of existing giants who are the only ones capable of managing the specialized technical and legal infrastructure required by the 2026 rules.

📌 Further, current rules require Resident Grievance Officers and 24/7 nodal contacts, raising cost for small players.

💡 **Broadcast-ification of the Creator Economy:** The recent reclassification of "Significant Influencers" as "Digital News Broadcasters" brings individual creators under the same "Programme Code" as massive TV networks, requiring them to pre-clear content through internal committees.

✦ This "Broadcast-ification" of the creator economy stifles the spontaneity and speed that define social media, potentially migrating India's creative talent to offshore or decentralized platforms.

✦ Also, the Draft Broadcasting Services (Regulation) Bill, 2023 proposes a three-tier self-regulatory framework comprising self-regulation, self-regulatory organisations, and a Broadcast Advisory Council (BAC).

📌 While the BAC can hear appeals and make recommendations, the final decision rests with the central government.

📌 The Bill neither clarifies whether the BAC's recommendations are binding nor provides an appeal mechanism against the government's decisions.

💡 **Legal Deterrence and the Shrinking Space for Political Speech:** The combination of rapid takedowns, AI-labelling, and the new penal code (BNS) creates a psychological "chilling effect"

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where citizens self-censor their political opinions to avoid the risk of non-bailable warrants or automated account bans.

- ✦ The significance of this issue lies in the transition of social media from a **“Town Square” for vibrant debate into a “Regulated Gallery”** where only state-approved narratives find a friction-less path to virality.

What Measures are Needed to Strengthen the Regulatory Framework for Social Media in India?

💡 **Institutionalizing Algorithmic Audits and Transparency:** To counter the **“black box” nature of content delivery**, a dedicated **“Algorithmic Accountability Bureau”** should be established under the Digital India framework to conduct periodic, independent audits of recommendation engines.

- ✦ This measure would mandate platforms to **disclose the parameters used for content amplification**, ensuring that algorithms do not disproportionately favor sensationalist, polarizing, or deepfake content for engagement metrics.

- ✦ By enforcing **“Safety by Design” principles**, regulators can compel intermediaries to demonstrate that their code does not inadvertently violate constitutional morality or user safety before features are rolled out. **This shifts the focus from reactive content takedowns to proactive systemic risk mitigation.**

💡 **Implementing a Risk-Based Classification of Intermediaries:** Moving beyond the binary **“Significant” vs. “Non-Significant” distinction**, the regulatory framework must adopt a nuanced, tiered approach that classifies platforms based on their user base, potential for harm, and function (e.g., **e-commerce vs. public discourse**).

- ✦ This allows for **“asymmetric regulation”** where high-risk platforms dealing with news and public opinion face stricter compliance burdens **such as mandatory fact-checking partnerships and rapid response teams** while smaller startups face lighter obligations.

- ✦ This ensures that regulation stifles disinformation without suffocating innovation, creating a flexible ecosystem that adapts to the specific risk profile of each digital entity.

💡 **Decentralized Co-Regulatory Grievance Models:** While the **Grievance Appellate Committee (GAC)** is a step forward, a more robust **“Co-Regulatory Self-Disciplinary Mechanism”** involving civil society, industry experts, and judiciary representatives should be empowered to adjudicate content disputes initially.

- ✦ **This creates a buffer between state control and platform autonomy**, ensuring that content moderation decisions are not purely government-driven nor left entirely to corporate discretion.

- ✦ **Such a body could set binding industry standards for “community guidelines”** that align with Indian constitutional values, ensuring that the interpretation of **“free speech” and “reasonable restrictions”** is consistent, transparent, and legally sound.

💡 **Enforcing “Rapid Response” Takedown Protocols for Hyper-Sensitive Content:** Recognizing that the viral nature of misinformation outpaces traditional legal recourse, the framework must institutionalize a **“Green Channel”** for immediate takedown of content related to national security, **child sexual abuse (CSAM)**, and incitement to violence.

- ✦ **This involves automated hash-matching technologies that instantly flag and suppress widely circulated illegal content** across all platforms simultaneously, reducing the **“whack-a-mole” problem**.

- ✦ By legally **reducing the compliance window for such specific categories** to under three hours as seen in recent amendments **the state creates a tangible deterrence against the weaponization of platforms** during crisis situations.

💡 **Digital Literacy and “Cognitive Security” Integration:** Regulation must extend beyond the platforms to the users by mandating **“Cognitive Security”** modules as part of the user onboarding process, requiring digital literacy verification for accounts with high reach.

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- ✦ Platforms should be legally obligated to run “pre-bunking” campaigns that inoculate users against known misinformation narratives before they spread, rather than just debunking them later.
 - ✦ This measure treats the user’s mind as the final line of defense, creating a regulatory requirement for platforms to invest a percentage of their local revenue into verified, neutral digital literacy initiatives that empower citizens to critically evaluate information.
- 💡 **Establishing an Independent Statutory ‘Digital Safety Authority’:** To professionalize enforcement and reduce allegations of political bias, the regulatory power should shift from the Ministry to an independent, quasi-judicial “Digital Safety Authority” modeled on bodies like SEBI.
- ✦ This specialized regulator would possess the technical competence to audit complex algorithms and the legal autonomy to levy graded penalties based on a platform’s global turnover rather than just local revenue.
 - ✦ By separating the “policymaker” from the “enforcer,” the state ensures that compliance orders are issued through a transparent, rule-bound process, thereby protecting the framework from executive overreach while ensuring stringent accountability for tech giants.
- 💡 **Mandating ‘Traceable Anonymity’ Standards:** To resolve the conflict between user privacy and law enforcement needs, the framework must enforce a “Traceable Anonymity” protocol where users remain anonymous to the public but are traceable via encrypted hash keys accessible only through judicial warrants.
- ✦ This mechanism allows for the “piercing of the corporate veil” of anonymity solely for specific unlawful acts, without requiring intrusive distinct identities (like Aadhaar linkage) for every general user.
 - ✦ This “middle-path” architecture preserves the democratic ethos of free, anonymous speech while dismantling the impunity currently enjoyed by coordinated bot networks and malicious actors.

Conclusion:

India’s evolving social media regulation reflects a decisive shift from platform neutrality to state-centric digital control driven by legitimate concerns of harm, misinformation and national security. However, hyper-velocity takedowns, executive-led truth adjudication and expanding criminal liability risk undermining constitutional guarantees of free speech, privacy and due process. The core challenge lies in balancing rapid harm mitigation with rights-preserving safeguards in a fast-moving digital ecosystem. A credible, future-ready framework must therefore embed proportionality, transparency and institutional independence at its core.



Tourism- India’S New Economic Frontier

This editorial is based on “Give tourism a boost” which was published in The Hindu business line on 13/02/2026. This editorial examines how tourism can become a transformational engine for jobs, growth, forex earnings, and soft power in India, yet remains chronically underfunded and poorly executed. It argues for shifting from ad-hoc promotion to capacity creation, sustainability, and infrastructure-led reforms to unlock tourism’s full economic potential.

Tourism is one of India’s most underexploited growth engines, contributing 6.7% to GDP while employing nearly 48 million people. With every rupee invested generating 3.5 times more jobs than the economy’s average, the sector offers unmatched employment potential. Despite possessing 44 UNESCO World Heritage Sites, India attracts only 10 million foreign tourists, far below its peers. Strategic scaling of tourism could transform it into a \$1-trillion GDP and 100-million-jobs sector by 2035.

What is the Significance of the Tourism Sector in India?

- 💡 **Economic Growth Engine & GDP Multiplier:** Tourism has evolved from a leisure activity into a critical economic pillar, acting as a high-multiplier sector that stimulates demand across construction, hospitality, and transport industries.

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- ✦ The **post-pandemic recovery** has been **“V-shaped,”** with domestic consumption shielding the sector from global headwinds, **making it a resilient driver of the \$5 trillion economy goal.**
- ✦ The growing economic salience of tourism is evident from **WTTC projections**, which estimate that **India’s travel and tourism sector will contribute nearly Rs 42 trillion to the economy in 2035**, underscoring its potential as a major driver of **growth, employment, and foreign exchange earnings.**
- 💡 **Massive Employment Generator:** This sector is **highly labor-intensive and inclusive, offering low-barrier entry jobs for the unskilled** while simultaneously creating high-value service roles.
 - ✦ It **uniquely empowers women and rural youth**, reducing disguised unemployment in agriculture by shifting the workforce to the service sector through homestays and gig-economy roles.
 - ✦ For instance, tourism already employs **48 million people**, and **every ₹1 invested generates 3.5 times more jobs** than the economy-wide average.
- 💡 **Foreign Exchange (Forex) Stabilizer:** Inbound tourism serves as a **vital “invisible export,”** significantly **narrowing the Current Account Deficit (CAD)** by bringing in debt-free foreign currency.
 - ✦ The recent depreciation of the Rupee has made India a cost-competitive destination, **further incentivizing foreign spending on luxury, heritage, and wellness segments.**
 - ✦ India has positioned itself prominently within the global tourism landscape, **accounting for 1.40% of total international arrivals and contributing 2.02% to worldwide tourism receipts.**
 - 📎 In 2024, India’s Foreign Exchange Earnings (FEEs) from tourism amounted to USD 35.016 billion.
- 💡 **Catalyst for Infrastructure Development:** Tourism demand is forcing a rapid upgrade of **“last-mile connectivity,”** justifying heavy **capital expenditure (Capex) on airports, expressways, and railways.**
 - ✦ This **creates a virtuous cycle** where better infrastructure attracts more tourists, which in turn funds further maintenance and expansion of public assets.
 - ✦ Improved connectivity has boosted tourism under the **UDAN Scheme**, which has operationalised **key tourism-specific air routes** linking remote destinations to metro hubs.
 - 📎 Complementing this, the launch of **160+ Vande Bharat trains** has sharply reduced travel time to major tourist centres such as **Jaipur, Puri, and Varanasi**, enhancing tourist inflows.
- 💡 **Socio-Cultural Soft Power & Local Economic Revitalization:** The government’s focus on **“pilgrimage rejuvenation”** has transformed religious travel from a seasonal, low-value activity into a year-round, high-spending economic ecosystem.
 - ✦ **This shift is creating new urban centers around temple towns**, driving infrastructure upgrades that benefit local populations beyond just tourists.
 - ✦ The impact of targeted religious tourism is evident under the **PRASHAD Scheme**, which has sanctioned **54 projects** to upgrade pilgrimage infrastructure.
 - 📎 For instance, the **Ayodhya Ram Mandir** inauguration led to a **significant expansion of the local economy.**
- 💡 **Medical Value Travel (MVT) Leadership:** India is positioning itself as the **“Pharmacy and Hospital of the World”** by **leveraging low-cost, high-quality healthcare** combined with traditional wellness systems (AYUSH).
 - ✦ The **“Heal in India”** initiative effectively captures the **global patient demographic seeking affordable surgeries and holistic rejuvenation.**
 - ✦ The growing role of medical tourism is evident as, **Medical tourism in India increased by around 33% year-on-year in 2023. (Investment Information and Credit Rating Agency of India Limited)**

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- ✦ India has expanded its **e-Medical and e-Medical Attendant visa facility to citizens of 171 countries**, significantly boosting medical tourism
- 💡 **Pioneering “Green” Growth and Ecological Stewardship:** Moving away from mass tourism, Indian tourism policy is now pivoting toward **“carrying capacity” and sustainability to preserve fragile ecosystems.**
 - ✦ Initiatives like **Swadesh Darshan 2.0** focus on **destination** management rather than just promotion, **integrating the “Travel for Life” mantra to nudge tourists toward responsible behavior.**
 - ✦ India’s shift toward sustainable tourism is reflected in **Swadesh Darshan 2.0**, under which **57 destinations** such as **Gandikota and Dholavira** are being developed as responsible tourism hubs.
 - 📌 For instance, **Lakshadweep’s eco-resort projects** is driving **solar energy use and zero-waste protocols** to safeguard fragile coral ecosystems.
- 💡 **Tool for Soft Power Projection & Global Diplomacy:** Tourism acts as a primary vehicle for cultural diplomacy, breaking stereotypes and building a **“brand India” narrative globally.**
 - ✦ **The G20 presidency successfully showcased India’s safety, scale, and diversity**, effectively countering negative travel advisories and opening new markets in non-traditional regions.
 - ✦ India’s tourism soft power received a boost post-G20, with **global travel searches for India rising by 45% in late 2024.**
 - 📌 For example, hosting **G20 meetings in Srinagar and Arunachal Pradesh** simultaneously asserted sovereignty and repositioned **Kashmir as a safe, globally visible tourist destination.**
- 💡 **Driving Economic Sophistication & High-Yield Value Capture:** The significance of this sector also lies in its transition **from a volume-based model to a value-driven ecosystem**, targeting segments that **maximize revenue per visitor while ensuring year-round economic activity.**

- ✦ By institutionalizing the wedding industry through **“Wed in India”**, **India is actively reversing “capital flight.”** Retaining the weddings of affluent citizens within domestic borders stimulates a massive localized value chain, **benefiting sectors from high-end hospitality to traditional artisans and jewelry.**
- ✦ Also, **the development of world-class venues like Bharat Mandapam (hosting Impact AI Summit 2026)** and Yashobhoomi has turned tourism into a catalyst for high-stakes business commerce.
 - 📌 **These centers allow India to compete for the global MICE market**, which generates significantly higher per-capita spending compared to leisure travel and **fosters international B2B partnerships.**
- 💡 **Regional Decongestion & Rural Development:** Tourism is the **most effective tool for decentralizing development, transferring wealth from urban centers to rural peripheries through homestays and agri-tourism.**
 - ✦ This **reduces migration pressure on metros and preserves rural heritage** by giving it economic value, incentivizing locals to protect their culture.
 - ✦ To promote decentralised tourism, the Ministry sanctioned **₹3,295 crore as interest-free loans to States in 2024–25** for developing **Iconic Tourist Centres to Global Scale.**
 - ✦ For instance, the **Vibrant Villages Programme** leverages development and tourism to transform border settlements from **“last villages” into “first villages” for visitors**, boosting livelihoods and strategic visibility.

What are Key Issues Associated with the Tourism Sector in India?

- 💡 **Severe Infrastructure Deficit & Last-Mile Connectivity:** While major airports are world-class, the **“last-mile” connectivity** to heritage sites and remote eco-tourism hubs remains broken, causing high travel fatigue.
 - ✦ The disparity between rapid air travel and decrepit road conditions in **hilly or tribal**

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circuits discourages high-value foreign tourists who prioritize comfort and seamless logistics over raw adventure.

- ✦ While over 100 new routes were launched in 2024 (including 20 in the Northeast), the “operational inconsistency” remains high in hilly areas where weather conditions frequently cause cancellations, and limited night-landing facilities at airports like Shimla or Kullu restrict consistent scheduling.

✍ For example, a 10-14 day “highlights” trip to Arunachal Pradesh or Nagaland often requires 3-5 days of pure transit.

- 💡 **Overtourism & Ecological Collapse:** The rebound of the tourism sector post-pandemic has triggered an ecological crisis in hill stations, where tourist influxes violently exceed the “carrying capacity” of fragile ecosystems.

- ✦ This unregulated mass tourism leads to land subsidence, water scarcity, and infrastructure collapse, turning scenic paradises into concrete slums and threatening long-term sustainability.

- ✦ Unregulated tourist inflows have pushed fragile Himalayan ecosystems beyond their limits, with popular circuits like **Char Dham** seeing visitor numbers soar from ~1 million annually in the early 2000s to over 5 million in 2023, far exceeding carrying capacities and stressing water, waste, and slopes.

✍ For instance, Kedarnath’s real sustainable carrying capacity is around 9,833 visitors/day, yet actual numbers typically surpass this, contributing to landslides, waste crises and ecological degradation.

- 💡 **Taxation & Price Competitiveness Issue:** India’s high taxation makes it a “cost-prohibitive” destination compared to neighbors like Vietnam or Thailand, diverting budget-conscious international travelers.

- ✦ The 18% GST on luxury hotels acts as a tariff barrier, neutralizing the benefits of a weaker Rupee and making package tours significantly more expensive than Southeast Asian competitors.

- ✦ While the September 2025 GST rationalization lowered taxes for mid-range hotels (₹7,500 and below) to 5%, luxury properties above this threshold remain stuck at higher GST.

✍ This creates a sharp “fiscal cliff” where a slight increase in room quality results in a disproportionate tax jump, making India’s premium heritage and wellness stays significantly pricier than those in Bali or Phuket.

- 💡 **Safety Perceptions & Crimes Against Women:** Despite improved policing, the global perception of India as “unsafe for solo female travelers” remains a stubborn brand order, fueled by sporadic but high-profile cases.

- ✦ This “fear factor” forces foreign tourists to stick to sanitized “Golden Triangle” bubbles, preventing wealth distribution to safer but lesser-known rural or tribal destinations.

- ✦ Travel advisories from nations like the US and UK frequently flag “sexual assault” risks, dampening the inbound solo-traveler market.

✍ Recently, the Fort Kochi police have registered a case over alleged sexual assault of a foreign national woman who was in the city to attend the Kochi-Muziris Biennale.

- 💡 **Acute Waste Management Crisis:** The “use-and-throw” tourism culture has turned pristine landscapes into landfills, with mountains and beaches choking on single-use plastics.

- ✦ Local municipalities in tourist hubs lack the revenue or technical capacity to process the seasonal waste spikes, leading to open dumping that destroys the very visual appeal tourists pay to see.

✍ The lack of segregation at source and processing plants in remote areas leads to “legacy waste” piling up in valleys and oceans.

- ✦ The ecological costs of unmanaged tourism are visible in Lakshadweep, where the UT’s forest and environment department reports nearly 4,000 tonnes of dry waste lying uncollected, despite mandates to ship it to the mainland.

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- ✍ This waste backlog threatens **fragile coral ecosystems**, exposing the sustainability gap in island tourism models.
- 💡 **Skill Gap & Service Quality Deficit:** There is a critical shortage of quality-trained hospitality staff who possess soft skills, foreign language proficiency, and digital literacy.
 - ✘ While the industry demands “**experience curators**,” the workforce is **often unskilled gig-workers**, leading to poor service standards that damage the “**Atithi Devo Bhava**” brand promise and reduce repeat visitor rates.
 - ✘ Despite headline-grabbing luxury hotel signings, India’s hospitality sector faces a skills gap, as **8,656 seats remained vacant in NCHMCT-affiliated Hotel Management Institutes in 2024**, highlighting weak vocational uptake amid rapid sectoral expansion.
- 💡 **Regulatory Red Tape & Licensing Hurdles:** Currently, the travel and tourism sector is largely treated as a state subject in India.
 - ✘ And starting and running a **tourism business in India involves a labyrinth of licenses (fire, police, excise, municipal) that varies violently** by state.
 - ✘ This “**license raj**” discourages innovation and **small entrepreneurs (SMEs)**, forcing many **homestays and adventure operators** to function in a grey market without safety audits or insurance.
- 💡 **Fragmented Marketing & Branding:** India lacks a cohesive, single-window brand narrative like “**Amazing Thailand**” and “**Visit Saudi**” with states often competing against each other rather than collaborating.
 - ✘ This fragmentation confuses international tourists, **who see disjointed campaigns (e.g., “Kerala: God’s Own Country” vs. “MP: MP Ajab Hai, Sabse Gajab Hai!”)** without a unified national value proposition or itinerary.
 - ✘ Disparate state policies and marketing budgets prevent the creation of cross-state thematic circuits.
- 💡 **Geopolitical & Social Instability Sensitivity:** Tourism in India is hyper-sensitive to internal social

unrest and border tensions, **which trigger immediate mass cancellations and travel advisories.**

- ✘ **Incidents in regions like Manipur or Jammu & Kashmir create a “ripple effect”** of fear, causing tourists to abandon entire regions, devastating local economies dependent on seasonal cash flow.
- ✘ The vulnerability of tourism to internal instability is evident in **Manipur**, where **official data (November 2025)** shows tourist arrivals collapsing from **1.79 lakh in 2019–20 to about 17,000 in 2024–25**, a **90.5% decline**.

What Measures are Needed to Unlock the Potential of the Tourism Sector in India?

- 💡 **Accelerating Integration of National Digital Tourism Mission (NDTM):** The implementation of a “**Unified Tourism Interface**” is essential to create a seamless digital layer across the travel lifecycle, integrating UPI, DigiYatra, and ONDC.
 - ✘ By standardizing digital data exchange between transport, hospitality, and government agencies, **India can offer frictionless “One-Click”** travel experiences for international visitors.
 - ✘ **This backend integration will enable real-time crowd monitoring** and personalized itinerary curation through AI-driven intelligence hubs.
- 💡 **Granting Full Infrastructure Status to Hospitality:** Formally **accorded “Infrastructure Status” to all hotel projects**, including budget and mid-market segments, would unlock low-cost, long-tenure institutional financing and favorable interest rates.
 - ✘ Currently, the lack of this status **restricts capital flow to Tier-2 and Tier-3 cities**, where **the potential for regional growth is highest but financial risks** are perceived as significant.
 - ✘ This move **would drastically reduce the cost of asset creation**, encouraging global FDI and domestic private investment.
- 💡 **Implementation of Carrying Capacity-Based Regulation:** To prevent the ecological collapse of fragile hill stations and heritage zones, a “**Smart Permit System**” based on scientific carrying capacity must be enforced at the municipal level.

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- ✦ By utilizing IoT sensors and real-time footfall data, authorities can dynamically adjust entry fees or pause arrivals once a destination hits its environmental threshold.
- ✦ This protects the “brand equity” of the site and ensures that tourism remains a sustainable resource rather than an extractive industry.
- 💡 **Establishment of Specialized Tourism Police & Safety Cells:** Safety remains a psychological barrier, hence, the nationwide deployment of a dedicated “Tourist Police” wing, trained in foreign languages and soft-skill crisis management, is imperative.
 - ✦ These units should operate from visible, tech-enabled kiosks in all high-footfall zones and be linked to a central 24/7 multilingual emergency helpline.
 - ✦ Strengthening the ground-level security apparatus will directly counter negative global travel advisories and boost the confidence of solo female travelers.
- 💡 **Rationalization and Uniformity of Tourism GST:** The current tiered GST structure for hotels and transport is complex and often makes India more expensive than its Southeast Asian competitors.
 - ✦ Implementing a uniform, competitive “Flat Tourism Tax” or providing “Deemed Export” status to earnings from foreign tourists would immediately enhance price competitiveness.
 - ✦ This fiscal relief would allow operators to reinvest in service quality and sustainability upgrades, creating a more robust and price-transparent market for global travelers.
- 💡 **Decentralized Skill Development via IIM-Partnered Hubs:** A “National Institute of Hospitality” (Union Budget 2026) should be established to bridge the gap between academic theory and industry demand, focusing on vocational training in Tier-2/3 towns.
 - ✦ By partnering with premium institutes like IIMs to train “Experience Curators” and “Storyteller Guides,” the sector can move away from transactional service to high-value experiential tourism.
 - ✦ Upskilling a fixed set of guides annually in niche areas like heritage restoration and digital content creation would create a specialized, elite workforce.
- 💡 **Last-Mile Multimodal Connectivity:** Unlocking the “hinterland potential” requires a dedicated “Tourism Transport Fund” to link regional airports with last-mile road networks through high-quality electric bus fleets.
 - ✦ Expanding the *Vande Bharat* sleeper networks to cover specific tourist circuits, such as the Buddhist Trail or the Desert Circuit, will provide world-class rail comfort that appeals to both domestic and foreign demographics.
 - ✦ Seamless multi-modal integration ensures that the journey itself becomes an attractive part of the tourist experience.
- 💡 **“Wed in India” and MICE Infrastructure Clustering:** India should aggressively develop dedicated “Global Event Districts” that combine massive convention centers (MICE) with luxury hospitality and specialized wedding venues in a single ecosystem.
 - ✦ By providing single-window clearances for international conferences and mega-weddings, India can capture a larger share of the global wedding market.
 - ✦ This clustering approach reduces logistical hurdles for event planners and creates high-revenue peaks during the traditional “off-season.”
- 💡 **Mainstreaming Regenerative and Astro-Tourism:** Beyond basic eco-tourism, policy must incentivize “Regenerative Tourism,” where a portion of tourist revenue is mandatorily reinvested into local forest restoration or community heritage.
 - ✦ Promoting niche segments like “Astro-Tourism” (Dark Sky Reserves in Ladakh/Spiti) and “Trekking Trails” in the Eastern Ghats can divert crowds from oversaturated metros to carbon-sink regions.
 - ✦ This diversifies the product portfolio and appeals to the growing global demographic of environmentally conscious “Gen Z” travelers.
- 💡 **Transition to Single-Window Regulatory Clearances:** The “Ease of Doing Business” in tourism is currently hampered by the requirement of different licenses from various state and central departments.

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- ✦ Implementing a digital “**Unified Licensing Portal**” with time-bound, deemed approvals would empower small entrepreneurs to start homestays and adventure sports businesses legally.
- ✦ **Streamlining these bureaucratic bottlenecks is the most effective way to formalize the informal sector** and ensure standardized safety audits across the country.

Conclusion

Tourism holds the unique potential to **simultaneously deliver growth, jobs, forex, regional balance, and soft power for India**. However, without addressing infrastructure gaps, ecological limits, safety perceptions, and skill shortages, these potential risks remain unreleased. A shift from volume-driven to value-driven, sustainable, and digitally enabled tourism is imperative. **If governed with foresight, tourism can evolve from a leisure sector into a cornerstone of India’s inclusive and resilient development model.**



India’s Nutritional Security Push

*This editorial is based on “**Addressing nutrition along with hunger: Funding and policy push vital**” which was published in *The Business Standard* on 15/02/2026. This editorial examines India’s transition from food security to nutritional security, highlighting persistent deficits in micronutrients, maternal and child health, and diet diversity despite expansive welfare schemes. It argues that sustained funding, policy convergence, and nutrition-centric agriculture are vital to secure India’s future human capital.*

While the **Green Revolution successfully decoupled India from the threat of mass starvation**, it inadvertently prioritized caloric quantity over nutritional quality. **Today, the nation faces a “hidden hunger”** where staple-heavy diets provide sufficient energy but lack the critical micronutrients necessary for healthy development. Shifting the focus from food security to **nutritional security**

is no longer a choice but a biological imperative to improve the productivity and health of India’s future human capital.

What is the Current Status of Nutritional Security in India?

⚡ Undernourishment & Hunger

- ✦ About **₹12% of India’s population** remains undernourished (₹172 million people), a significant reduction from past years but still large.
- ✦ India ranks low on the **Global Hunger Index (GHI 2025)** around **102th out of 123 countries** with a “serious” level of hunger.

⚡ Child Malnutrition

- ✦ **According to recent estimates:**
 - 📎 **Stunting** (low height-for-age): **~35% of under-5 children**, indicates chronic undernutrition.
 - 📎 **Wasting** (low weight-for-height): **18.7%**, one of the **highest in the world**, signaling acute malnutrition.
- ✦ **Overweight/obesity** among children is also rising, a sign of the double burden of malnutrition.

⚡ Micronutrient Deficiencies

- ✦ **Anaemia** is widespread, especially among women and young children:
 - 📎 67.1% of children and 59.1% of adolescent girls in India are anemic (NFHS-5).
- ✦ High rates of micronutrient deficiency (iron, zinc, vitamin A etc.) **indicate hidden hunger, where caloric needs are met but essential micronutrients are lacking.**

⚡ Diet Quality & Affordability

- ✦ **40.4% of people cannot afford a healthy diet** (as of 2024- State of Food and Nutrition in the World’ (SOFI) 2025 report), food price inflation makes nutrient-rich diets expensive.
- ✦ Many households can access calories through subsidised grains, but **quality nutrition (proteins, fruits, vegetables, micronutrients)** remains out of reach for large sections.

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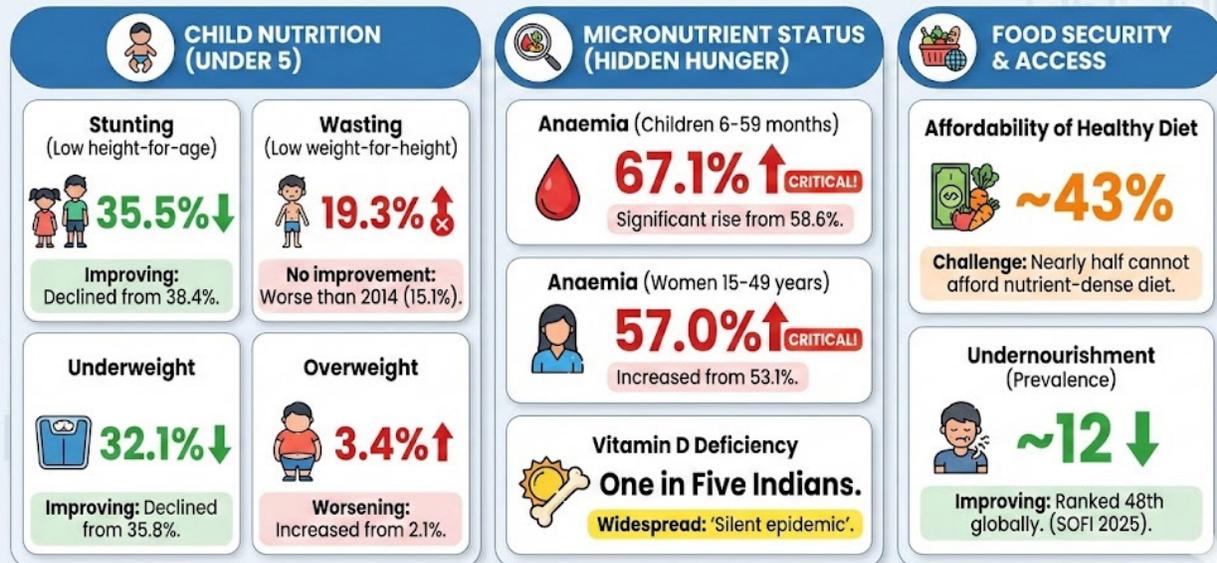
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INDIA'S NUTRITION LANDSCAPE: KEY INDICATORS & TRENDS.



What are the Key Developments in India's Shift Towards Nutritional Security?

- ⚡ **Shift to "Genetic" Nutrition:** The agricultural paradigm is decisively shifting from "caloric sufficiency" to "nutrient density," using bio-fortified crops to passively deliver micronutrients like **Zinc and Iron** to the population without requiring behavioral changes in diet.
 - ✦ For instance, **ICAR has developed over 150 biofortified varieties**. The biofortified varieties are 1.5 to 3.0 times more nutritious than the traditional varieties.
 - ✦ For instance, the **rice variety CR DHAN 315 has excess zinc**, the Wheat variety HD 3298 is enriched with protein and iron. The **Pusa Mustard 32 is enriched with low Araucic Acid**, while **Girnar 4 and 5 varieties of Peanuts are rich in increased Oleic Acid**.
- ⚡ **Universal Rice Fortification:** The "**Rice Fortification**" push has matured from a pilot scheme to a nationwide safety net, effectively turning the **Public Distribution System (PDS) into a massive vehicle for delivering iron, folic acid, and Vitamin B12** to the poorest demographics.
 - ✦ **100% of the custom-milled rice (CMR)** supplied to the Central Pool by the Food Corporation of India (FCI) and state agencies **is now fortified**.
 - ✦ A notable **efficacy study in the Chandauli (an aspirational district of Uttar Pradesh)** showed a **7.5% reduction in anemia levels following the consistent supply of fortified rice**.
- ⚡ **Poshan Tracker" & Digital Governance:** The governance of nutrition has moved from manual registers to real-time algorithmic auditing, where the **Poshan Tracker** app now closes the "**delivery gap**" by tracking actual consumption **rather than just distribution at Anganwadis**.
 - ✦ For last mile tracking of service delivery, **Facial Recognition System (FRS) has been introduced in Poshan Tracker app for distribution of Take-Home Ration** to ensure that benefit is given only to the intended beneficiary registered in Poshan Tracker.

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- 💡 **Mainstreaming “Shree Anna”:** Post-International Year of Millets (IYOM) 2023, policy incentives have successfully integrated climate-resilient millets into the state procurement basket, addressing the “diabetes-malnutrition” double burden by replacing refined carbohydrates with high-fiber, mineral-rich alternatives.

 - ✦ For example, Odisha has integrated millet laddus into mid-day meals.
 - ✦ Moreover, for the Kharif Marketing Season (KMS) 2025-26, the MSP for Jowar (Hybrid) was increased by ₹328 per quintal. Further, Ragi saw one of the highest absolute increases in MSP for the 2025-26 season, rising by ₹596 per quintal.
- 💡 **Increased Focus on The “First 1000 Days”** Interventions have become hyper-targeted towards the critical “conception-to-age-two” window, recognizing that **stunting (32.9%) is largely irreversible after this period**, this shifts strategy to Conditional Cash Transfers (CCTs) linked strictly to Antenatal Care (ANC) and immunization compliance to ensure early health tracking..

 - ✦ **PMMVY 2.0** coverage expanded to the **second child (if a girl)** with higher cash transfers (₹6,000).
 - ✦ Also, **Under Mission Poshan 2.0, 2 lakh Anganwadi Centres** located in Government buildings are to be strengthened as Saksham Anganwadis for delivery of improved nutrition and for Early Childhood Care and Education in the 15th Finance Commission cycle.
- 💡 **Climate-Smart Nutritional Security:** Recognizing that **rising CO2 levels reduce the nutrient density of staple crops**, the new agricultural roadmap prioritizes “**nutrition-per-drop**” and heat-tolerant varieties to prevent a collapse in dietary quality due to climate stress.

 - ✦ To strengthen nutritional security, the **National Mission on Natural Farming** has been rolled out across **17,267 clusters covering 8.52 lakh hectares (January 2025)**, with a focus on pulse cultivation in rainfed areas to ensure protein availability amid erratic monsoons.
- 💡 **Tackling “Hidden Hunger” via Social Audit:** The “Jan Andolan” (People’s Movement) strategy has decentralized accountability, empowering “**Poshan Panchayats**” to conduct social audits and manage localized nutritional gardens to supplement carb-heavy rations with fresh micronutrients.

 - ✦ Under nutrition-focused interventions, **more than 4 lakh Poshan Vatikas (Nutri-gardens) have been established at Anganwadis (March 2023)**, with rural pilot areas reporting higher green leafy vegetable intake among pregnant women.
- 💡 **Addressing the “Double Burden”:** Nutritional policy has broadened to tackle the simultaneous crisis of **undernutrition and obesity/NCDs**, with **FSSAI** implementing aggressive “**Front-of-Pack Labeling**” (FOPL) to discourage consumption of ultra-processed foods.

 - ✦ Also, recently the **Supreme Court has urged FSSAI** to examine the introduction of **mandatory front-of-package warning labels (FOPL) on packaged foods** high in sugar, salt, and saturated fats.
 - ✦ The Court emphasized that such regulatory steps are necessary to protect citizens’ right to health.
- 💡 **One Nation One Ration Card (ONORC):** The ONORC platform has **dissolved geographical barriers to food access**, acting as the single most critical nutritional safety net for the **450 million migrant workforce** who historically faced starvation during transit or migration.

 - ✦ Demonstrating the scale of food security portability, **over 197 crore transactions have been recorded under the scheme since 2019** (as of December 2025).
- 💡 **PM-JANMAN-Reaching the “Last Mile” (Tribal Nutrition):** Targeting the most marginalized, **PM-JANMAN** focuses on **Particularly Vulnerable Tribal Groups (PVTGs)**, acknowledging that standard coverage often misses remote habitations, it creates a saturation model ensuring basic nutritional infrastructure (Anganwadis) reaches these isolated hamlets first.

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- ✦ Under PM JANMAN for the **targeted development of 75 Particularly Vulnerable Tribal Groups (PVTGs)**, a total of **2,500 Anganwadi Centres (AWCs)** has been sanctioned for construction across the country.

What are the Key Issues Associated with Nutrition Security in India?

- 💡 **The “Calorie-Nutrient” Mismatch:** India’s food system suffers from a **“Green Revolution hangover,”** still to an extent prioritizing **caloric sufficiency (yields) over nutrient density**, leading to a population that is **“full but malnourished”** due to micronutrient-deficient staple grains.
 - ✦ India’s safety net is heavily skewed towards **carbohydrate-rich cereals (Rice/Wheat)** at the expense of proteins and pulses, failing to provide a balanced **“thali” necessary to combat muscle wasting and cognitive deficits.**
 - 📌 A recent nationwide survey revealed a significant nutritional crisis: nearly 60% of urban Indians suffer from Protein Deficiency.
 - ✦ The **Economic Survey 2026** highlights the need for greater awareness regarding health supplements and raises concerns over the increasing prevalence of lifestyle diseases linked to nutritional deficiencies.
- 💡 **Persistent Child Stunting & Wasting:** Structural malnutrition remains dangerously high due to intergenerational poverty and poor maternal health, creating a cycle where undernourished mothers birth undernourished children, stalling human capital development.
 - ✦ Despite extensive food security measures, **GHI 2025 ranks India 102nd, underscoring continuing nutritional deficits.**
 - ✦ The **high prevalence of stunting and wasting among under-5 children** places the country in the **“serious” hunger category.**
- 💡 **The Anemia Burden in Women:** Gender-based nutritional inequality persists, with women eating **“last and least,”** leading to chronic iron deficiency that directly impacts productivity and newborn health, resisting decades of supplementation programs.
- ✦ Malnutrition remains rampant among lactating mothers, **with over 50% of women of reproductive age still anemic, highlighting that biofortified crop introductions** have yet to translate into broad nutritional gains.
- 💡 **Slow Adoption of Biofortified Crops:** Despite the development of **nutrient-rich seeds (Iron-Pearl Millet, Zinc-Wheat), the “lab-to-land” transfer** is sluggish because farmers prioritize older, high-yield varieties without guaranteed premium pricing for nutritional quality.
 - ✦ Although **100+ biofortified varieties** are released, **they still cover a minority of total acreage.** Further widely grown commercial crops **still lack essential micronutrients.**
- 💡 **Climate Change Impact on Nutrient Quality:** Rising atmospheric CO₂ and temperature stress are actively **reducing the protein, iron, and zinc content of staple crops, meaning the same quantity of food now delivers less nutrition** than it did decades ago.
 - ✦ A recent study suggests that **rising CO₂ levels could lower the protein content in rice by about 10% and reduce its iron levels by nearly 8%.**
- 💡 **Economic Inaccessibility of “Protective Foods”:** While staples are subsidized, inflation in **“protective foods” (eggs, vegetables, fruits)** puts a diverse diet out of reach for the working poor, forcing reliance on cheap, empty calories.
 - ✦ Even as cereals are subsidised, **inflation in protective foods like eggs, fruits and vegetables has made balanced diets unaffordable** for the working poor, **pushing households toward cheap, calorie-dense but nutrient-poor foods.**
 - ✦ A critical **lack of cold chain infrastructure causes a significant portion of India’s horticulture produce** to rot before reaching the consumer, keeping nutrient-dense fruits and vegetables artificially expensive and inaccessible to the poor, effectively nullifying gains in production.
- 💡 **The Rising “Double Burden”:** India is simultaneously battling malnutrition and rising obesity/non-communicable diseases (NCDs) as **urbanization shifts diets toward processed, sugar-heavy foods before undernutrition is fully eradicated.**

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- ✦ NCDs such as cardiovascular diseases, diabetes, cancer, and chronic respiratory ailments now account for nearly **63–65% of all deaths in India**
- ✦ Urban slums show paradoxical trends where **stunting coexists with obesity** in the same households due to poor-quality, energy-dense but nutrient-poor processed food consumption.
- 💡 **Policy Implementation Gaps:** Nutrition demands a **“convergence” approach (Sanitation + Health + Food)**, but silos between ministries and leakage in delivery mechanisms dilute the impact of well-intentioned schemes like **Poshan Abhiyaan**.
 - ✦ Nutritional intake is often nullified by poor Water, Sanitation, and Hygiene (**WASH**) which causes **Environmental Enteropathy (gut dysfunction)**, this prevents nutrient absorption, meaning **“feeding” programs fail to “nourish”** because the child’s compromised gut constantly leaks nutrients.
- 💡 **Antibiotic Resistance (AMR)- The “Gut Health” Sabotage:** The rampant, unregulated use of growth-promoting antibiotics in the Indian poultry and dairy sectors is breeding drug-resistant bacteria that enter the human gut through food, causing **dysbiosis (gut imbalance)** that physically prevents the absorption of nutrients, rendering good diets ineffective.
 - ✦ For instance, a study conducted by researchers at Kerala Veterinary University found a significant presence of antimicrobial-resistant (AMR) *Escherichia coli* (*E. coli*) in chicken samples collected from six districts of the state.
- 💡 **Lack of Nutritional Awareness & Dietary Diversity:** Cultural habits and a lack of nutritional literacy lead to poor dietary choices even among those who can afford better, with a heavy reliance on monotonous diets lacking in fruits, vegetables, and coarse grains.
 - ✦ Aggressive marketing of ultra-processed foods and rising urban lifestyles have further shifted consumption patterns toward calorie-dense but nutrient-poor diets.

- ✦ **Inadequate emphasis on locally available, seasonal, and traditional foods** has also weakened dietary diversity, aggravating hidden hunger and micronutrient deficiencies.

What Measures are Needed to Strengthen Nutritional Security in India?

- 💡 **Nutrition-Linked Minimum Support Price (MSP):** To make nutrition economically viable for farmers, the agricultural procurement policy must transition to a **“Nutrition-Linked MSP”** structure.
 - ✦ By offering a distinct price premium for biofortified varieties (like **High-Zinc Wheat or Iron-Pearl Millet**) over conventional grains, the state can naturally incentivize the shift from **“volume-centric”** to **“quality-centric”** farming.
 - ✦ This ensures that the **Public Distribution System (PDS)** becomes passively enriched with essential micronutrients without requiring complex post-harvest fortification logistics.
- 💡 **Decentralized “Nutri-Basket” Procurement:** The PDS needs to evolve from a centralized cereal silo into a localized **“Nutri-Basket”** system that mandates the inclusion of regionally relevant coarse grains and pulses.
 - ✦ **Empowering districts to procure and distribute local superfoods** (like **Ragi in the south or Bajra in the west**) drastically reduces the carbon footprint of logistics while ensuring beneficiaries receive culturally palatable, **high-fiber diets that actively combat the rising incidence of diabetes and obesity among the poor**.
- 💡 **Convergence for the “First 1000 Days”:** Interventions must rigorously enforce a **“Lifecycle Convergence Framework”** that integrates maternal health, sanitation (WASH), and immunization into a single delivery vertical for the critical conception-to-age-two window.
 - ✦ **Legally linking maternity entitlements to antenatal nutrition compliance and exclusive breastfeeding** milestones shifts the paradigm from treating malnourished children to preventing **“intrauterine growth restriction,”** thereby arresting stunting before a child is even born.

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- 💡 **Dynamic “Hotspot” Targeting via AI:** Leveraging India’s Digital Public Infrastructure, the administration should utilize AI-driven analytics on **Poshan Tracker** data to identify real-time **“Nutritional Hotspots”** instead of relying on lagging survey data.

 - ✦ This allows for the surgical, dynamic allocation of supplementary nutrition and medical officers to specific high-burden blocks or slums, **ensuring that fiscal resources are concentrated on the most vulnerable demographics before acute malnutrition becomes irreversible.**
- 💡 **Community-Led Social Audits:** To plug leakage and ensure quality, the governance of Anganwadis must be democratized through **“Community-Led Social Audits”** empowered by **local Self-Help Groups (SHGs).**

 - ✦ **Transforming nutrition from a bureaucratic deliverable into a community-owned asset ensures that funds for supplementary nutrition are actually spent** on milk and eggs, while fostering a bottom-up culture of accountability where the village itself monitors the growth charts of its children.
- 💡 **Mandatory “Passive Fortification” Standards:** Regulatory bodies must aggressively enforce **“Mandatory Fortification Standards”** for open-market essentials like edible oil, milk, and salt to create a passive immunity shield for the urban poor who fall outside the PDS net.

 - ✦ **By collaborating with the private sector to standardize micronutrient** premixes and subsidizing compliance costs for MSMEs, the state ensures that even non-subsidized, **daily-wage food purchases contribute to lifting the national baseline of Vitamin A and D levels.**
- 💡 **Climate-Resilient “Agro-Nutritional” Zones:** Agricultural planning must pivot towards establishing **“Agro-Nutritional Zones”** that align crop patterns with local ecological carrying capacity to prevent the **“Nutrient Dilution”** effect caused by rising carbon dioxide levels.

 - ✦ **This ensures sustainable food production that does not compromise on nutritional quality,** safeguarding future generations against the **“hidden hunger”** exacerbated by climate change while simultaneously reducing water and fertilizer dependence.
- 💡 **Urban “Migrant-Specific” Nutrition Corridors:** Recognizing the unique nutritional vulnerability of India’s transient workforce, the **“One Nation One Ration Card” (ONORC)** must be expanded into **“Urban Nutrition Corridors”** that offer subsidized, energy-dense cooked meals.

 - ✦ Establishing **“Community Kitchens” at major industrial clusters ensures that migrant laborers,** who often lack access to cooking fuel and potable water, receive adequate calories and protein **without relying on unsafe street food.**
- 💡 **Behavioral “Nudging” via SBCC:** A sustained **“Social and Behavioural Change Communication” (SBCC)** campaign is essential to dismantle dietary myths and promote the consumption of diverse, locally available **“protective foods”** over aspirational processed goods.

 - ✦ **Integrating nutritional literacy into school curricula creates a demand-side pull** for healthy eating, ensuring that increased purchasing power translates into improved nutritional outcomes **rather than just higher consumption of refined carbohydrates.**
- 💡 **“One Health” Zoonotic Surveillance:** Adopting a **“One Health” Framework** is crucial to monitor and control the quality of **animal-source foods (milk, eggs, meat),** which are vital for combating protein deficiency in a vegetarian-dominant society.

 - ✦ Strengthening veterinary services **ensures that the livestock sector delivers safe, high-protein nutrition without introducing zoonotic diseases or antibiotic residues** into the human food chain, thereby protecting both nutritional status and public health safety.

Conclusion

India’s nutritional challenge **today is not scarcity of food, but scarcity of quality nutrition.** Despite robust safety nets like PDS and PM-GKAY, **high stunting, wasting, and anemia reveal deep structural and dietary gaps.** Recent policy shifts toward biofortification, millets, digital

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governance, and first-1000-days interventions mark a decisive course correction. **Achieving this is a prerequisite to fulfilling SDG 2 (Zero Hunger), specifically Target 2.2, which mandates ending all forms of malnutrition by 2030.**



Rethinking India's Tech-Driven Development

This editorial is based on "Budget 2026: Decoding union govt's 'tech' push" which was published in The Financial Express on 10/02/2026. This editorial examines how India's technology policy has matured from incentive-driven assembly to ecosystem-led strategic capability building across AI, semiconductors, space, defence, and clean energy. It also highlights the structural bottlenecks that must be resolved for India to convert technological momentum into long-term economic and strategic power.

Union Budget 2026 marks India's transition from incentive-driven electronics assembly to ecosystem-led manufacturing. By treating electronics as an integrated value chain, spanning cloud infrastructure, components, logistics, and semiconductors, **the Budget signals policy maturity and continuity.** The budget reflects India's broader push toward tech-driven development, positioning digital infrastructure, advanced manufacturing, and innovation as **central pillars of its long-term growth strategy.**

How Is India Progressing Towards Tech-Driven Development?

- 💡 **Sovereign AI Infrastructure & "Compute-as-a-Public-Good":** India is treating Artificial Intelligence not just as software but as **critical national infrastructure, launching a "sovereign compute" strategy to democratize access for startups and researchers** who cannot afford private cloud costs.
 - ✦ This creates a strategic moat against global tech monopolies by building indigenous foundation models on government-backed hardware, **ensuring data sovereignty and culturally contextual AI.**

- ✦ The **February 2026 AI Impact Summit** showcased "**BharatGen**", India's first sovereign text-to-speech model covering 22+ Indian languages, marking a shift from imported AI solutions to **digital linguistic sovereignty.**

- ✦ It demonstrates **how indigenous AI can deepen inclusion, reduce platform dependence, and align technological growth** with India's cultural and federal diversity.

- 💡 **Semiconductor 2.0- Commercial Fab & Component Indigenization:** Moving beyond the **initial hype of assembly, the ecosystem has matured into "ISM 2.0,"** creating a complete supply chain including equipment, specialty gases, and substrate materials to support commercial fabrication.

- ✦ This shift **reduces the "import intensity"** of electronics manufacturing and insulates the economy **from geopolitical supply shocks by securing the most critical layer of the tech stack.**

- ✦ The 2026 Union Budget **expanded the Electronics Component Manufacturing Scheme outlay to ₹40,000 crore,** signalling policy support for domestic production of semiconductor equipment, materials, and components, key inputs previously almost entirely imported.

- 💡 **Private Entry in India's Space-Tech Sector:** The space sector has successfully transitioned from a state-monopoly to a commercially **vibrant "NewSpace" economy,** where private players are now executing end-to-end missions from satellite manufacturing to launch.

- ✦ This structural **reform allows ISRO to focus on deep-space exploration** while private entities capture the lucrative global **low-earth orbit (LEO) market,** significantly boosting India's share of the global space economy.

- ✦ The Indian space sector, **valued at about USD 8.4 billion** and currently around 2–3 % of the global space economy, is projected to grow to **USD 44 billion by 2033** through NewSpace reforms and private participation.

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- ✦ Private players like **Skyroot Aerospace (Vikram-S rocket)** and **Agnikul Cosmos (3D-printed engines)** are propelling India's space economy.
- 💡 **AI-Integrated Digital Public Infrastructure (DPI 2.0):** India is upgrading its world-famous DPI (UPI, Aadhaar) into "DPI 2.0" by embedding voice-based AI agents to make digital services accessible to the illiterate and semi-literate population.
 - ✦ This evolution from "app-based" to "conversational" interactions is dissolving the digital divide and creating a new exportable standard for the **Global South**, offering a **low-cost, high-tech governance model**.
 - ✦ India's DPI currently empowers **97% of the population with Aadhaar digital IDs (NASSCOM 2024)** and in 2022, UPI contributed an estimated **\$16.2 billion to India's GDP**, underscoring its growing role in driving the country's digital economy.
- 💡 **Rise of Defense Tech- From Buyer to High-Value Exporter:** The defense sector has achieved a "technological breakout," moving from licensed production to designing and exporting complex systems like artillery, missiles, and avionics.
 - ✦ This reversal is powered by "**Positive Indigenization Lists**" that ban imports, forcing the domestic industry to **invest in high-end R&D and creating a self-sustaining military-industrial complex that competes on quality, not just price**.
 - ✦ India's defence indigenisation push is yielding results, with **defence exports reaching a record ₹23,622 crore in FY25, nearly 34-times growth in a decade, while 75% of the capital procurement budget is now reserved for domestic industry**, catalysing indigenous R&D and private sector participation.
- 💡 **Green Hydrogen & Clean Tech Manufacturing:** India is positioning itself as the "**Green Shop floor**" of the world by leveraging its low-cost renewable energy to produce Green Hydrogen and Ammonia for export to Europe and Asia.
 - ✦ The strategy **integrates PLI schemes for electrolyzers** with guaranteed offtake mandates, creating a commercially viable alternative to fossil fuels for hard-to-abate sectors like steel and shipping.
- ✦ India's green transition is gathering pace, with the **National Green Hydrogen Mission targeting 5 MMT annual production by 2030**, and **JSW Steel has commissioned the country's largest green hydrogen plant in 2025** to decarbonise steel manufacturing.
- 💡 **6G Research & Telecom Standardization Leadership:** Instead of playing catch-up as in previous generations, India is actively shaping **6G standards to ensure future networks align with its specific needs for rural coverage and affordability**.
 - ✦ The "**Bharat 6G Alliance**" brings together **academia and industry** to secure essential patents early, ensuring India becomes a technology creator and licensor rather than just a royalty-paying consumer.
 - ✦ India's 6G strategy aims to secure **10% of global 6G patents by 2030**, supported by the operationalisation of **100+ 5G/6G research labs**, strengthening indigenous R&D and India's role in global telecom standard-setting.
- 💡 **Deep-Tech Policy & "Startup to Scaleup" Pivot:** The government has formally recognized "**Deep Tech**" as a **distinct asset class**, revising policies to provide "**patient capital**" for startups working on **long-gestation technologies** like quantum computing and biotech.
 - ✦ This acknowledges that **science-based innovation** requires different support structures than software services, aiming to **build generational companies that solve fundamental problems**.
 - ✦ India's deep-tech push was formalised in **February 2026 with a new "Deep Tech Startup" definition**, unlocking targeted tax incentives, alongside the launch of a **₹1,000 crore sovereign venture capital fund for space startups**.
- 💡 **Data-Driven Healthcare & AI Diagnostics:** The healthcare ecosystem is transitioning from physical files to a "**longitudinal digital health record**" system, now overlaying "**Responsible AI**" standards (SAHI) to benchmark clinical algorithms and ensure safe deployment of AI diagnostics in public health.

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✦ **As of August 2025, 79.9 crore ABHA IDs are active.** At the India AI Impact Summit 2026, the Union Minister for Health and Family Welfare launched SAHI (Secure AI for Health Initiative) and BODH (Benchmarking Open Data Platform for Health AI) to strengthen AI-driven innovation in India's healthcare ecosystem.

💡 **Bio-Manufacturing & Precision Agritech:** The government is fusing biotechnology with digital tools to revolutionize agriculture and healthcare, **moving towards "Biomanufacturing"** to replace fossil-fuel based chemicals and deploying drone fleets to modernize farm productivity through precision application of fertilizers.

✦ For instance, **the BioE3 Policy (Aug 2024)** targets a \$300 billion bioeconomy by 2030. And, **Namo Drone Didi** scheme marks a significant shift from manual and labor-intensive practices to precision agriculture.

✦ **1,094 drones have been distributed to women SHGs** by Lead Fertilizer Companies, including **over 500 drones provided under the Namu Drone Didi initiative.**

What are the Key Issues Associated with India's Tech-Driven Development?

💡 **The AI Power Paradox and Resource Intensity:** The rapid scaling of AI data centers is clashing with India's climate commitments, as **high-density GPU clusters demand exponential energy and water for cooling.**

✦ This creates a **"sustainability friction"** where the pursuit of digital sovereignty through sovereign AI models like BharatGen risks depleting local natural resources and straining the national power grid.

✦ **Large-scale AI training and data center expansion in India are outstripping renewable energy integration,** forcing a continued reliance on coal-based baseload power.

✦ For instance, **over 50% of national data centre capacity is concentrated in Mumbai,** and rest lies across **Bengaluru, Chennai, and Delhi-NCR,** all water-stressed metros, raising concerns over cooling water demand, groundwater depletion, and climate-resilient urban planning.

💡 **Semiconductor Supply Chain "Upstream" Vulnerabilities:** Despite the success of the **India Semiconductor Mission (ISM)** in attracting assembly and testing units, the ecosystem remains **dangerously dependent on foreign imports for raw materials like ultrapure water, specialty gases, and silicon wafers.**

✦ **Without achieving "Upstream Autonomy,"** Indian fabs remain vulnerable to the same geopolitical supply shocks they were designed to mitigate, potentially turning them into **"glorified assembly lines."**

✦ India's semiconductor ambitions are **currently "mid-stream" heavy, lacking a robust domestic base** for the 250+ specialty chemicals required for front-end fabrication.

✦ **While 10 ATMP (Assembly, Testing, Marking, and Packaging) projects worth ₹1.60 lakh crore are approved,** yet critical upstream equipment (**dominated by the US, Japan, and ASML of the Netherlands**) and specialty materials like high-purity gases and photoresists remain largely imported, exposing India to supply-chain and geopolitical risks.

💡 **The "Employability Gap" in Deep-Tech Roles:** While India produces the **world's largest number of STEM graduates,** a severe **"quality-mismatch"** exists between traditional IT skills and the specialized requirements of **generative AI, quantum computing, and VLSI design.**

✦ This talent scarcity is driving hyper-inflation in specialized wages while leaving millions of general engineering graduates underemployed, **threatening the "Demographic Dividend" and turning it into a social challenge.**

✦ The velocity of tech evolution has **surpassed the pace of curriculum reform,** creating a **"two-speed" labor market** where only a tiny elite is deep-tech ready.

✦ **Surging demand for cybersecurity professionals in India has led to a supply gap of as much as 30-50% for roles such as cloud security, architecture, and zero trust. (Teamlease Data)**

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💡 **DPI and the Expanding Cyber Attack Surface:** The unprecedented success of UPI and Aadhaar has centralized national data, creating a high-value “single point of failure” for state-sponsored cyber-adversaries.

- ✦ **As India integrates AI into governance (DPI 2.0),** the attack surface expands into hyper-personalized phishing and deepfake-driven financial fraud, **which currently outpaces the investigative capacity of local law enforcement.**
- ✦ The “**Interconnectedness**” of India’s digital stack means a single breach in a minor gateway can cascade into systemic financial or identity risks.
- ✦ India’s cyber risk landscape is intensifying, with **reported cybersecurity incidents more than doubling from 10.29 lakh in 2022 to 22.68 lakh in 2024,** while a February 2026 FICCI–EY survey found **51% of firms identifying cyber breaches as their top performance risk,** underscoring systemic vulnerabilities in the digital economy.

💡 **The “Regulatory Interpretation” Chasm :** The rollout of the **Digital Personal Data Protection (DPDP) Act** and its **2025 Rules** has created a compliance bottleneck, where small and medium enterprises (SMEs) struggle with **the high cost of data localization and “consent-manager” frameworks.**

- ✦ This regulatory **complexity risks stifling the “lean startup”** culture as firms divert limited capital from R&D toward legal compliance and data-auditing infrastructure.
- ✦ While the DPDP Act empowers citizens, its **implementation lacks “regulatory clarity” for non-metropolitan firms,** leading to uneven adoption and high “**technical debt.**”
- ✦ According to the recent EY report, **71% of Indian enterprises reported** that they continue to **struggle with interpreting the Act and its newly notified rules.**

💡 **Tier-1-Centric Tech Concentration:** Tech-driven development in India remains heavily concentrated in key “**Tier-1**” hubs, creating a geographic

imbalance that inflates urban real estate while **leaving other parts of “Bharat” as a mere consumer of services** rather than a creator of technology.

- ✦ This concentration **limits the diversity of AI training data and excludes** rural entrepreneurs from the high-value manufacturing and design value chains.
- ✦ The “**Silicon Valley of India**” model is hitting a ceiling of urban infrastructure collapse, while “**BharatNet**” has yet to **monetize** rural connectivity into local manufacturing.
- ✦ **Bengaluru alone accounts for 26–31% of all AI job postings,** underscoring how high-value tech creation is concentrated in Tier-1 hubs. This urban clustering inflates real estate and strains infrastructure.

💡 **E-Waste and the “Hardware Obsolescence” Cycle:** The push for electronics manufacturing and the rapid **2-3 year lifecycle of AI-specific hardware (GPUs)** is generating a toxic e-waste stream that India’s formal recycling sector is **unequipped to handle.**

- ✦ Most “AI-trash” ends up in the informal sector, leading to heavy metal leaching into groundwater, **effectively trading long-term environmental health for short-term technological gains.**
- ✦ **India lacks a “Circular Tech Economy”** policy that mandates hardware longevity or advanced extraction of rare earth minerals from scrapped electronics.
- ✦ **CPCB data shows e-waste generation at 13.98 lakh tonnes in 2024–25,** highlighting the widening **gap between electronics consumption and effective recycling and circular-economy capacity.**

💡 **Algorithmic Exploitation in the Gig Economy:** The booming “**Quick Commerce**” sector is built on an exclusionary labor model where opaque algorithms ruthlessly dictate “**10-minute delivery**” targets, effectively stripping workers of social security and physical safety while reducing them to mere data points in a high-pressure logistical grid.

- ✦ For instance, **gig workers staged a nationwide strike in December 2025 against Food delivery app’s unsafe delivery models.**

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✍ The unions are currently demanding a higher minimum base rate to counter plummeting real wages and unsafe working conditions.

💡 **Innovation Deficit and IP Ownership Challenges:** India's gross expenditure on research and development (R&D) remains stuck at approximately **0.64% of GDP**. (Economic Survey 2025-26).

✦ Despite the **"Make in India"** push, much of the high-value Intellectual Property (IP) for the chips and software manufactured in India is owned by foreign multinationals.

✍ This keeps India in a **"Value Trap"** where it captures the thin margins of labor and assembly, while the bulk of the profit (royalty and design value) flows back to parent companies in the US or Europe.

✍ India's tech growth is still primarily **"input-driven"** (labor/capital) rather than **"innovation-driven"** (patents/IP), limiting the long-term wealth creation for the domestic economy.

✦ For instance, despite iPhone exports hitting ₹1.5 lakh crore in FY25, India's **"Domestic Value Addition"** (DVA) only crossed 20%.

✍ This means ~80 cents of every dollar exported still flows back abroad as payments for imported components and IP royalties.

✦ A rising culture of **"pseudo-innovation"** in private academia, where imported technologies are rebranded as indigenous to secure grants and rankings, is weakening genuine R&D and distorting India's innovation ecosystem.

✍ The recent controversy involving Galgotias University's cosmetically rebranded Unitree Go2 robodog in AI Impact Summit 2026 showcased how such PR-driven claims can undermine the credibility of India's Atmanirbhar ambitions.

What Measures are Needed to Strengthen India's Tech-Driven Development?

💡 **Institutionalize "Translational Research" Frameworks:** To bridge the **"Valley of Death"**

between academic patents and commercial products, the government must mandate and fund professional **Technology Transfer Offices (TTOs)** within all premier institutes.

✦ This creates a formal **"Lab-to-Market" pipeline** where intellectual property is aggressively licensed to domestic startups rather than stagnating in journals.

✦ By aligning academic incentives with **Commercialization Velocity**, India can transform its massive research output into tangible economic value and proprietary deep-tech assets.

💡 **Establish a "Sovereign Deep-Tech Fund":** Recognizing that private Venture Capital avoids high-risk, long-gestation hardware projects, the state must anchor a **Fund-of-Funds** dedicated solely to **Deep Science innovation with a 15-year horizon**.

✦ This **"Patient Capital"** effectively de-risks early-stage investments in semiconductors, quantum computing, and biotech, signaling stability to private investors. It corrects the market failure where capital chases quick software wins over foundational, strategic technology capabilities.

💡 **Operationalize "Agile Regulatory Sandboxes":** Policymaking must move from **"permission-based"** to **"consultation-based"** by creating sector-specific **Innovation Sandboxes** for AI, drones, and fintech.

✦ These controlled environments allow startups to test disruptive technologies with **Safe Harbor** provisions, exempting them from archaic compliance norms during the pilot phase.

✦ This **"Iterative Governance"** prevents innovation from being stifled by red tape while ensuring regulators understand risks before framing final laws.

💡 **Secure "Upstream" Critical Mineral Assets:** To prevent semiconductor and EV manufacturing from becoming mere assembly lines, India must aggressively pursue **Mineral Security Partnerships** to own equity in foreign lithium, cobalt, and gallium mines.

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- ✦ This strategy of **Resource Diplomacy** secures the raw material supply chain against geopolitical shocks and cartels.
- ✦ By vertically integrating backwards, India ensures that its high-tech industrial base is not held hostage by raw material scarcity.
- 💡 **Mandate “Digital Twins” for Public Infrastructure:** The government should enforce a **Digital Twin Standard** for all major capital expenditure projects (**railways, power grids, urban planning**), creating virtual replicas of physical assets.
 - ✦ This integrates IoT and AI into the core of infrastructure, enabling **Predictive Maintenance** and scenario planning that drastically reduces operational costs.
 - ✦ It transforms static concrete infrastructure into “Smart Assets” that generate data for continuous optimization and efficiency.
- 💡 **Enforce a “Circular Tech Economy” Policy:** To combat resource depletion, policy must pivot to **Urban Mining, incentivizing the extraction of gold and rare earth metals** from e-waste to feed the domestic electronics supply chain.
 - ✦ Implementing strict **Extended Producer Responsibility (EPR)** and “Right to Repair” laws will force manufacturers to design for longevity and recyclability.
 - ✦ This creates a **self-sustaining material ecosystem** that reduces import dependence for critical manufacturing inputs.
- 💡 **Developing “Tier-2 Innovation Clusters”:** To arrest the infrastructure collapse of metros, **specific Tier-2 cities** should be designated as **Special Technovation Zones with subsidized high-speed connectivity and tax holidays** for setting up R&D centers.
 - ✦ This **Spatial Deconcentration** leverages lower operational costs and untapped talent pools, making the tech economy more inclusive and resilient.
 - ✦ It prevents “Hub Risk” where a crisis in one city (like Bengaluru floods) cripples the entire national IT output.
- 💡 **Architect a “Zero-Trust” Sovereign Cyber-Shield:** As Digital Public Infrastructure expands, the

security paradigm must shift from “**perimeter defense**” to a **Zero-Trust Architecture** mandated for all government and critical sector networks.

- ✦ This involves **deploying indigenous, AI-driven Threat Hunting systems** that assume breaches are inevitable and continuously verify every digital interaction.
- ✦ **Strengthening this “Cyber-Kinetic” resilience is non-negotiable** to protect national sovereignty in an era of state-sponsored cyber warfare.

Conclusion

India’s tech-driven development has **clearly moved beyond slogans to systemic capability-building across AI, semiconductors, space, defence, and clean energy**. Yet, unresolved structural frictions, **upstream dependence, talent gaps, sustainability stress, and urban concentration threaten to cap these gains**. The next phase must therefore pivot from scale to depth, from assembly to ownership, and from adoption to innovation. **Only by aligning technology with institutional reform, resource security, and inclusivity can India convert its tech momentum into durable global leadership.**



Rise Of the India–UAE Growth Corridor

This editorial is based on “[The UAE-India corridor is sparking a growth story](#)” which was published in The Hindu on 16/02/2026. The article brings into picture the remarkable pace of India–UAE ties, the partnership has surpassed \$100 billion in trade five years ahead of schedule, evolving far beyond its energy roots under CEPA.

The **India–UAE economic partnership** has entered a new phase of unprecedented momentum, achieving the **\$100 billion bilateral trade** target 5 years ahead of schedule under the 2022 CEPA. What began as an energy-driven relationship has evolved into a diversified corridor spanning advanced manufacturing, infrastructure, finance, technology, renewables, and AI. Massive two-way

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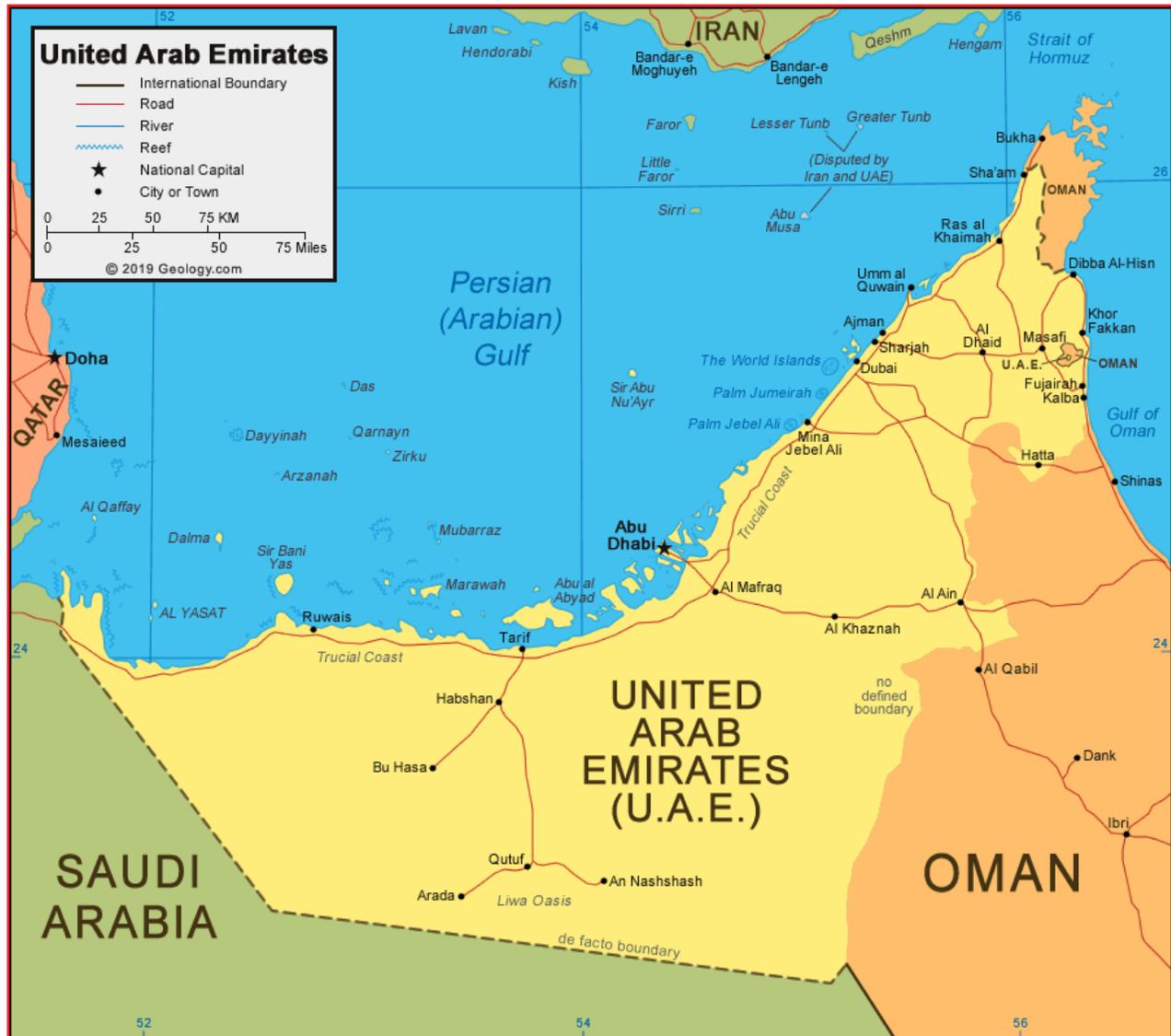
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investments, deep diaspora linkages, and robust institutional frameworks including **CEPA** and the **Bilateral Investment Treaty**, have strengthened long-term strategic trust. The corridor is now expanding into third markets across **Africa and Eurasia**, signalling global ambition beyond bilateral gains. As India rises as a \$4 trillion economy, the **India-UAE axis exemplifies how aligned policy, capital, and execution** can reshape regional and global economic architectures.



What are the Key Areas of Convergence Between India-UAE Relations?

- 🔦 **Economic Statecraft & Supply Chain Integration:** India and the UAE have fundamentally pivoted from **transactional commodity trading toward deep institutional economic integration** designed to shield both markets from global supply chain volatility.
 - ✦ For instance, the landmark **CEPA accelerated bilateral trade past the \$100 billion milestone in FY2024-25**, prompting a newly upgraded target of \$200 billion by 2032 in **January 2026**.
 - ✎ Furthermore, **non-oil trade between the two countries grew nearly 20% last year to reach \$65 billion**, demonstrating that this partnership has moved well beyond its energy origins.

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💡 **Energy Security & Clean Energy Transition:** The bilateral energy convergence has decisively shifted from a **simple buyer-seller dynamic centered on crude oil to a comprehensive partnership encompassing energy transition, strategic reserves, and advanced nuclear collaboration.**

✦ In January 2026, a 10-year pact was signed for the UAE to supply 0.5 million tonnes of LNG annually to India starting in 2028, significantly reducing India's reliance on volatile spot markets.

📎 Simultaneously, following India's 2025 SHANTI Act, both sides are formally exploring partnerships in **Small Modular Reactors (SMRs)** alongside joint investments in green hydrogen value chains.

💡 **Frontier Technologies & Digital Interdependence:** Convergence in the digital domain represents a calculated shift toward high-end technological interdependence, prioritizing **data sovereignty, cross-border digital public infrastructure, and joint aerospace innovation.**

✦ By synergizing India's immense IT talent pool with the UAE's sovereign capital and strategic vision, the partnership is fostering an ecosystem capable of leading the **Fourth Industrial Revolution.**

✦ A landmark 2026 agreement between C-DAC and G42 will establish a massive supercomputing cluster in India.

📎 Furthermore, **IN-SPaCe and the UAE Space Agency recently signed a Letter of Intent to jointly develop commercial launch facilities.**

💡 **Strategic Defense & Maritime Security:** Defense ties have rapidly evolved from nominal joint exercises into a robust security architecture aimed at **preserving stability in the Indian Ocean Region and countering transnational threats.**

✦ Both states share a profound strategic autonomy imperative, viewing each other as indispensable anchors against regional volatility, maritime piracy, and cross-border terrorism.

✦ The January 2026 visit culminated in a critical **Letter of Intent for a formal Strategic Defense Partnership.**

📎 The inauguration of a world-class small arms manufacturing facility in Hyderabad by **UAE-based CARACAL, under the EDGE Group, in partnership with India's ICOMM Tele Ltd**, marks a significant milestone in India's defence manufacturing landscape.

💡 **Connectivity & Intercontinental Corridors (IMEC):** India and the UAE are transforming regional geography by championing the **India-Middle East-Europe Economic Corridor (IMEC)**, positioning themselves as central nodes in a new multimodal Eurasian trade architecture.

✦ By institutionalizing port connectivity, both nations are creating a resilient, rules-based supply chain pathway that permanently links the Global South to European consumer markets.

✦ Also, the **Bharat-Africa Setu initiative** aims to establish the **UAE as a strategic gateway for Indian products**, particularly from MSMEs, to enter African markets.

💡 **Financial Architecture & Fintech Interoperability:** The bilateral financial convergence has decisively pivoted away from dollar reliance toward **sovereign fintech integration, fostering a frictionless, low-cost ecosystem for cross-border trade and remittances.**

✦ By directly interlinking their digital public infrastructures, both nations are setting a pioneering global standard for real-time financial interoperability that shields their macroeconomies from external currency shocks.

✦ The complete **integration of India's UPI with the UAE's AANI instant payment platform**, alongside the interlinking of the RuPay and JAYWAN card networks has fundamentally streamlined a remittance corridor.

💡 **Multilateralism & Plurilateral Coalitions (BRICS+ & I2U2):** Strategic convergence transcends bilateral boundaries, **manifesting in coordinated leadership within plurilateral frameworks designed to reform outdated global governance structures.**

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- ✦ By aligning their diplomatic weight in expanded forums, India and the UAE effectively amplify the geopolitical voice of the Global South while pushing for multipolarity and equitable institutional financing.
- ✦ As **India officially assumed the BRICS Chairmanship in January 2026**, the UAE, now a fully integrated member, committed comprehensive support to **New Delhi's agenda of resilience and innovation**.
 - ✍ Simultaneously, under the **I2U2 (India, Israel, UAE, USA)** grouping, the UAE's \$2 billion commitment to develop climate-smart integrated food parks across India is actively progressing to stabilize inter-regional agricultural supply chains.

💡 **Sovereign Wealth & Institutional Investment:** The investment dynamic has matured from passive portfolio allocations into **strategic, long-term sovereign wealth deployments targeting India's core infrastructure and high-tech manufacturing sectors**.

- ✦ The UAE increasingly views India's unprecedented economic growth as a secure, high-yield anchor to diversify its massive post-oil wealth transition.
- ✦ During the landmark January 2026 bilateral summit, the Indian Prime Minister actively invited UAE sovereign wealth funds to participate in the **upcoming second NIIF Infrastructure Fund** to underwrite national mega-projects.
- ✦ Reinforcing this institutional pipeline, the **UAE committed heavy investments into Gujarat's Dholera Special Investment Region**.

What are the Key Areas of Friction in India-UAE Relations?

💡 **Structural Trade Imbalance & CEPA Underutilization:** Despite the operationalization of the **Comprehensive Economic Partnership Agreement (CEPA)**, a structural trade imbalance persists, fundamentally skewing the **economic corridor toward energy dependency rather than diversified manufacturing**.

- ✦ This dynamic frictionizes bilateral commerce, forcing New Delhi to continuously tighten regulatory scrutiny to protect its domestic industries from indirect dumping.
- ✦ In FY2024-25, even as total bilateral trade successfully crossed the \$100 billion threshold, **India's trade deficit remained stubbornly high at \$26.8 billion due to inelastic crude dependencies**.
 - ✍ Furthermore, **sudden surges in gold and silver imports routed through the UAE** have repeatedly triggered Indian regulatory crackdowns to prevent the circumvention of established CEPA rules of origin.

💡 **Geopolitical Vulnerability & IMEC Stalling:** The geopolitical fragility of West Asia poses a severe bottleneck to bilateral connectivity ambitions, directly **threatening the viability of mutually championed mega-projects like the India-Middle East-Europe Economic Corridor (IMEC)**.

- ✦ Consequently, **New Delhi's requirement for strategic autonomy frequently collides with the UAE's complex regional hedging**, particularly regarding the ongoing Israel-Gaza war and maritime security in the Red Sea.
 - ✍ The operational rollout of the **UAE-Israel leg of the IMEC network has been effectively paralyzed since late 2023** due to the sustained Gaza conflict, freezing physical infrastructure integration.
 - ✍ Highlighting this operational disconnect, **India's sustained 40-warship deployment in the Red Sea through early 2026** has functioned completely independently of Emirati naval assets, reflecting a reality of parallel coordination rather than true military integration.

💡 **Diaspora Labor Vulnerabilities & "Emiratisation":** The demographic backbone of the relationship, the massive Indian expatriate workforce, remains a latent diplomatic pressure point due to systemic labor vulnerabilities and shifting domestic employment policies in the UAE.

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✦ While recent reforms have attempted to **modernize the kafala sponsorship framework**, persistent issues of wage theft, inadequate workplace safety, and exploitative contract conditions continue to generate high volumes of migrant distress.

✦ Simultaneously, **Abu Dhabi's aggressive "Emiratisation" quotas** introduce long-term job insecurity for the Indian white-collar diaspora, signaling a gradual transition from a labor-import model to a highly protectionist domestic market.

✍ Official data presented to the Indian Parliament in early 2026 revealed that the UAE accounted for **1,500+ registered labor grievances on the MADAD portal**, making it the second-highest source of overseas distress calls.

💡 **The China Factor & Technology Transfer Limits:** A subtle but critical strategic friction stems from the **UAE's deepening technological and commercial entanglement with China**, which directly complicates India's calculus regarding sensitive technology transfers and joint defense manufacturing.

✦ As New Delhi seeks to **build secure, sovereign digital infrastructures and limit Beijing's regional influence**, Abu Dhabi's willingness to integrate Chinese state-linked entities into its telecommunications and logistics hubs creates a severe security dilemma.

✦ Extensive investments by **Chinese firms within the Khalifa Economic Zones Abu Dhabi (KEZAD) and joint AI ventures** have raised persistent red flags regarding supply chain security within the plurilateral I2U2 framework.

💡 **Multilateral Irritants & The OIC-Pakistan Nexus:** While bilateral relations have reached unprecedented heights, a structural diplomatic disconnect persists regarding the **UAE's role within the Organization of Islamic Cooperation (OIC)** and its historical balancing act with Pakistan.

✦ This forces India to continuously **expend diplomatic capital to compartmentalize bilateral warmth from multilateral**

condemnation, exposing the limits of the UAE's willingness to unilaterally neutralize anti-India rhetoric within Islamic blocs.

✦ Also, **Pakistan's concurrent defense pact with Saudi Arabia ensures the UAE must maintain a delicate regional equilibrium** rather than entirely de-hyphenating India from Pakistan.

What Measures can India Adopt to Enhance its Relations with UAE?

💡 **Operationalizing Sovereign Data Corridors & Digital Embassies:** India should accelerate the operationalization of the **proposed "Digital Embassies" framework** to establish mutually recognized, sovereign data corridors that protect critical national infrastructure.

✦ By institutionalizing **strict data localization and shared cybersecurity protocols, both nations can safely deepen their integration across sensitive frontier technologies.**

✦ This necessitates the rapid deployment of joint supercomputing clusters, leveraging the synergies between **India's vast artificial intelligence engineering talent and the UAE's sovereign capital ecosystem.**

💡 **Institutionalizing Defense-Industrial Co-Production:** To materialize the **Strategic Defense Partnership**, India must decisively pivot from conducting standard interoperability exercises to institutionalizing deep defense-industrial co-production.

✦ This requires **establishing fast-tracked, reciprocal technology transfer frameworks that allow UAE-based advanced technology conglomerates to seamlessly co-develop kinetic platforms alongside Indian defense public sector undertakings.**

✦ **New Delhi should also integrate the UAE into its broader domestic defense supply chains**, effectively utilizing the Emirates as a strategic springboard for exporting jointly manufactured hardware to third-party markets.

💡 **Plurilateral Geoeconomic Expansion in the Global South:** India should strategically leverage the UAE's extensive geoeconomic footprint to **jointly execute**

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structural developmental projects across the Global South, moving beyond bilateral confines into a plurilateral growth model.

- ✦ By actively operationalizing frameworks like the newly proposed **“Bharat-Africa Setu,”** both nations can synergize Indian manufacturing scale with Emirati logistical prowess to dominate emerging African and Eurasian markets.
- ✦ This trilateral approach demands the alignment of UAE sovereign wealth funds with India’s project execution capabilities in sectors ranging from climate-resilient agriculture to sustainable green energy corridors.

💡 **Frictionless Fintech Harmonization & De-Dollarization:** To maximize the utility of their economic agreements, India must prioritize the complete, frictionless harmonization of bilateral fintech architectures to facilitate instantaneous cross-border capital flows.

- ✦ By structurally expanding the **Local Currency Settlement System**, India can aggressively drive the de-dollarization of bilateral commerce, significantly insulating both macroeconomies from external currency volatility and unilateral financial sanctions.
- ✦ Furthermore, **New Delhi should actively streamline the regulatory frameworks within its specialized financial tech cities to offer bespoke, fast-tracked investment pathways** for Emirati institutional investors.

💡 **Integrated Food Security and Agritech Corridors:** To structurally resolve persistent regional supply chain vulnerabilities, **India and the UAE must operationalize an integrated, climate-resilient food security corridor.**

- ✦ This necessitates a transition from traditional bulk agricultural exports to the co-development of advanced, **AI-driven mega food parks within India, entirely underwritten by Emirati sovereign investments.**
- ✦ Additionally, **pooling resources into joint agritech research for arid-climate farming and desalination** will simultaneously tackle the impending planetary crises of water scarcity and soil degradation.

💡 **Critical Minerals and Advanced Materials Synergy:** To secure dominance in the impending global energy transition, **India and the UAE must establish a unified consortium for the acquisition and processing of critical rare earth minerals.**

- ✦ This **strategic resource acquisition must be immediately coupled with the co-development of advanced metallurgical processing hubs** and material science research centers within Indian special economic zones.
- ✦ Furthermore, creating a shared intellectual property bank for **next-generation material sciences** will rapidly accelerate their mutual ambitions in indigenous semiconductor, aerospace, and battery manufacturing.

Conclusion:

The **India–UAE partnership today stands as a model of pragmatic, future-oriented diplomacy anchored in trust and economic synergy.** It reflects how strategic alignment, policy stability, and human linkages can transform bilateral ties into a global growth corridor. As both nations expand cooperation in **defence, technology, energy, and third markets**, the relationship is moving from transactional engagement to structural integration. The next phase will test not ambition, but the depth and durability of this strategic convergence.



Strategic Evolution Of India–France Relations

*This editorial is based on **“With Emmanuel Macron’s visit, Delhi and Paris chart a ‘third way’, across traditional divides”** which was published in The Hindu on 18/02/2026.*

This editorial examines the evolution of India- France relations from post-colonial pragmatism to a comprehensive strategic partnership. It highlights how defence, technology, Indo-Pacific cooperation, and global governance have positioned France as India’s most reliable European partner.

French President **Emmanuel Macron’s visit to India in 2026** marks more than a diplomatic engagement, it signals a strategic recalibration in India’s engagement

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with the West. As global power concentrates around the US and China, India and France are charting a “third way” rooted in strategic autonomy and multipolar cooperation. France has emerged as India’s most trusted European partner across defence, technology, and the Indo-Pacific. This partnership reflects India’s evolving foreign policy, from balancing powers to shaping outcomes in a fragmented global order.



How India-France Relations Have Evolved Over the Time?

- 📌 **Phase 1: Post-Independence & Decolonization (1947–1962):** Following India’s independence, the primary focus was the peaceful transfer of French colonial territories back to India.
 - ✦ **Diplomatic Establishment:** Relations were formally established in 1947.

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- ✦ **The Cession of Territories:** Unlike the Portuguese in Goa, France chose a diplomatic path for its enclaves.

✍ A treaty was signed in 1956, and by 1962, territories like **Puducherry, Karaikal, Mahe, and Yanam** were officially transferred to Indian sovereignty.

- ✦ **Early Defence Ties:** Even in the 1950s, India began looking to France for military hardware, acquiring *Ouragan* (Toofani) and *Mystère* aircraft.

💡 **Phase 2: Strategic Pragmatism & Cold War (1963–1997)**

- ✦ During the Cold War, while the world was polarized, France and India found common ground in their desire for “**strategic autonomy**”, the ability to act independently of superpowers (the US and USSR).

- ✦ **Space Cooperation (1960s-70s):** The partnership began in the early 1960s when India’s first sounding rocket launch carried a French payload. **India’s Department of Atomic Energy (DAE)** soon signed a MoU with the French space agency **Centre National D’Etudes Spatiales (CNES)** for training ISRO scientists.

✍ It provided the **Viking engine technology**, which became the **basis for India’s Vikas engine used in the PSLV and GSLV rockets.**

- ✦ **Nuclear Support:** When the US stopped supplying fuel for the **Tarapur Nuclear Power Plant** due to non-proliferation laws, France stepped in to provide enriched uranium.

- ✦ **Defence Diversification:** India acquired the **Mirage 2000** fighters in the 1980s, which remain a backbone of the Indian Air Force today.

💡 **Phase 3: The Strategic Partnership (1998–2022):** This phase transformed the relationship into a formal, deep-seated alliance.

- ✦ **1998 Nuclear Tests:** After India’s **Pokhran-II tests**, most Western nations imposed sanctions. **France, however, refused to do so, recognizing India’s security concerns.**

- ✦ **First Strategic Partner:** In 1998, France became the first Western country with which India signed a formal **Strategic Partnership.**

- ✦ **Major Developments:** This era saw the landmark **Rafale fighter jet** deal and the **P-75 Scorpene submarine** project.

✍ In 2015, during **COP21 in Paris**, India and France **jointly launched the International Solar Alliance (ISA)**, stepping up as leaders in the global climate change narrative

💡 **Phase 4: Horizon 2047 & The Indo-Pacific(2023-2025):** Marking 25 years of the partnership, the focus shifted from “**buyer-seller**” to “**co-developer.**”

- ✦ **Horizon 2047 Roadmap:** Launched in 2023, this 25-year plan aims for complete sovereignty in green energy and advanced military technology.

- ✦ **Indo-Pacific Pivot:** Both nations, as residents of the Indian Ocean (France via territories like Réunion), **enhanced joint naval patrols to ensure a “free and open Indo-Pacific.”**

💡 **Phase 5: Special Global Strategic Partnership (Ongoing):** As of **February, 2026**, following President Emmanuel Macron’s visit to Mumbai, **the relationship has been officially upgraded to Special Global Strategic Partnership**

- ✦ This new status reflects a **shift toward solving global problems together**, including **AI governance and climate change.**

- ✦ **Key Outcomes of Recent French President Visit to India:**

✍ Creation of an **India–France Innovation Network. (India-France Year of Innovation 2026)**

✍ Inauguration of **H125 helicopter final assembly line in Karnataka.**

✍ Renewal of **bilateral Defence Cooperation Agreement.**

✍ BEL–Safran JV to manufacture **HAMMER missiles** in India.

✍ **Reciprocal military officer postings** between Indian and French land forces.

✍ Formation of a **Joint Advanced Technology Development Group** for critical and emerging technologies.

✍ Plan to establish a **Centre on Advanced Materials (DST–CNRS).**

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- ✍ Launch of Indo-French Centre for AI in Health at AIIMS, New Delhi.

What are the Key Areas of Convergence in India- France Relations?

💡 **Defence Industrial Integration & Strategic Autonomy:** India and France share a profound commitment to multipolar strategic autonomy, actively resisting rigid global bloc politics through deep defence industrial integration.

- ✦ This convergence has fundamentally shifted from a traditional buyer-seller dynamic toward the co-development and co-production of advanced, dual-use military technologies.
- ✦ In **February 2026**, this partnership was elevated to a **“Special Global Strategic Partnership,”** marked by the inauguration of the **Tata-Airbus H125 helicopter final assembly line.**
- ✦ Furthermore, the **ongoing procurement of 26 Rafale-Marine jets and the new BEL-Safran joint venture to manufacture HAMMER air-to-surface missiles** in India exemplify this robust technological transfer.

💡 **Space Security & Satellite Technology:** Space cooperation remains a bedrock of the bilateral relationship, driven by a mutual imperative to maintain sovereign access to space and enhance space situational awareness.

- ✦ The **ISRO-CNES partnership** operates on a highly synergetic model, focusing heavily on Earth observation, climate monitoring, and advanced satellite navigation systems.
 - ✍ Building upon their recent defence space agreements, both nations are advancing the joint **TRISHNA** thermal infrared earth observation satellite mission slated for launch this year.
- ✦ Additionally, **CNES continues to provide critical expertise in human spaceflight for India’s upcoming 2027 Gaganyaan mission,** underscoring a deep, high-trust technological reliance.

💡 **Digital Sovereignty & Artificial Intelligence:** The intersection of **digital sovereignty and**

technological innovation forms a new frontier of convergence, emphasizing secure, inclusive, and trustworthy artificial intelligence governance.

- ✦ Both democracies recognize the urgent need to democratize AI resources globally, ensuring that emerging technologies serve the public interest rather than authoritarian surveillance.
- ✦ This shared vision positions India and France as pioneering leaders in shaping international regulatory frameworks for AI outside the **dominant US-China technological paradigm.**

✍ The **Indian Prime Minister and French President jointly inaugurated the “India-France Year of Innovation 2026” in Mumbai** to deeply connect their respective startup and research ecosystems.

- ✦ This was immediately followed by France’s active participation in the **AI Impact Summit 2026 hosted in New Delhi,** directly building upon the foundations of the **2025 AI Action Summit in Paris.**

💡 **Clean Energy Transition & Civil Nuclear Expansion:** Combating climate change through a pragmatic transition to low-carbon base-load power drives the deep energy convergence between **New Delhi and Paris.**

- ✦ Recognizing that intermittent renewable energy alone cannot sustain India’s massive industrialization, both nations prioritize next-generation civil nuclear technology as a strategic pillar for energy security.
- ✦ Following a **2025 Declaration of Intent,** the two countries are actively accelerating the joint research and co-development of **Small Modular Reactors (SMRs).**

✍ This critical technological exchange directly supports India’s newly articulated target of achieving **100 GW of nuclear power capacity by 2047.**

💡 **Indo-Pacific Security & Maritime Domain Awareness:** As resident powers in the Indian Ocean, India and France share a vital strategic imperative to maintain a free, open, and rules-based Indo-Pacific architecture.

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- ✦ Their geopolitical convergence acts as a stabilizing counterbalance to expansionist maritime aggression, ensuring the protection of vital sea lanes of communication.
- ✦ Guided by the Indo-Pacific Roadmap, **Indian and French navies conducted the 23rd edition of the Varuna bilateral naval exercise in March 2025** in the Arabian Sea. Alongside France's recent delivery of the 6th Scorpène-class submarine to the Indian Navy.
- ✦ **Bilateral merchandise trade, remaining broadly balanced at \$11.68 billion in FY2024-25**, further anchors this geopolitical synergy through robust maritime economic security.
- 💡 **Counter-Terrorism & Intelligence Sharing:** India and France share a zero-tolerance approach toward radicalization and state-sponsored extremism, viewing robust internal security as paramount to democratic stability.
 - ✦ **This convergence is institutionalized through deep intelligence-sharing frameworks and joint capacity-building mechanisms** that address the evolving nature of hybrid threats, including cyber-terrorism and online propaganda.
 - ✦ By actively **cooperating within multilateral forums like the UN and the Financial Action Task Force (FATF)**, both nations continuously pressure the global community to dismantle terrorist safe havens and financial networks.
 - 📌 During their **February 2026** bilateral summit, President Macron **unequivocally condemned recent terror attacks in India**, reaffirming absolute support for New Delhi's right to defend itself against cross-border terrorism.
 - ✦ This strategic alignment is further cemented by India's explicit backing of **France's upcoming hosting of the "No Money For Terror" (NMFT) Conference**, scheduled to be held in Paris in May 2026.
- 💡 **Blue Economy & Ocean Governance:** Recognizing the oceans as critical frontiers for sustainable economic growth and climate regulation, **New Delhi and Paris have forged a comprehensive alliance centered on the Blue Economy.**
- ✦ By integrating **advanced scientific observation with policy governance**, the two nations aim to **protect the high seas** while concurrently generating maritime employment and combating climate-induced coastal erosion.
- ✦ At the **February 2026 India AI Impact Summit in New Delhi**, focus was placed on **integrating Artificial Intelligence with oceanographic data to revolutionize cyclone forecasting and marine livelihood protection.**
- ✦ Furthermore, recently both countries appreciated the progress on the **Indo-Pacific Triangular Development Cooperation (IPTDC)** aimed at supporting climate and **SDG** focused projects from third countries of the Indo-Pacific.
- 💡 **Global Governance & Reformed Multilateralism:** As staunch advocates for a multipolar world order, India and France actively collaborate to reform outdated global governance structures that no longer reflect contemporary geopolitical realities.
 - ✦ **France views India as an indispensable voice of the Global South**, consistently championing **New Delhi's inclusion in multilateral institutions (e.g, reformed United Nations Security Council)** to ensure equitable global representation.
 - ✦ This high-level multilateral coordination was **also practically demonstrated by their joint pledge to advance international peace initiatives**, including shared support for implementing **UN Security Council Resolution 2803 (Peace Plan for Gaza)**.
- 💡 **Educational Mobility & People-to-People Ties:** The bedrock of this strategic partnership is **rapidly expanding beyond state-to-state diplomacy** into deep demographic and intellectual integration through robust educational mobility networks.
 - ✦ By aligning visa regulations with academic cycles and dramatically expanding English-taught programs, **Paris is actively positioning itself as the premier European destination for India's top-tier STEM and management students.**

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- ✍ Speaking at AIIMS in **February 2026**, President Macron officially launched a massive educational push, establishing a firm target to welcome **30,000 Indian students annually by 2030**.
- ✦ To immediately operationalize this, **France introduced a new pilot program offering visa-free airport transit** for Indian nationals, alongside streamlined, multi-year visas calibrated specifically **to match the full duration of degrees like PhDs**.

What are the Key Areas of Friction in India-France Relations?

- 💡 **Nuclear Implementation Deadlock at Jaitapur:** Despite decades of high-level political backing, the **Jaitapur Nuclear Power Project** remains stalled by technical disagreements over reactor design and the high cost of electricity per unit.
 - ✦ Resolving these **price-point and liability hurdles** is critical if France is to remain a primary partner in India's carbon-neutral energy journey.
 - ✍ The project, intended to house six **1,650 MW EPR reactors**, has seen years of negotiations without a concrete development.
 - ✍ While the **SHANTI Act (2025)** offers a ray of hope by clarifying liability caps, only time will tell if it satisfies French legal scrutiny.
- 💡 **Trade Volatility and Imbalance Pressures:** While bilateral trade has grown, it remains **highly volatile and heavily reliant on a few high-value sectors like aerospace and petroleum**, leading to fluctuating trade deficits for New Delhi.
 - ✦ **India seeks more diversified market access for its textiles and agricultural products**, while France pushes for the removal of non-tariff barriers.
 - ✦ Also, India's merchandise trade with France is showing heightened volatility despite remaining broadly stable at **USD 14–15 billion in recent years**, with a sharp contraction in petroleum exports and sustained aircraft imports reshaping the bilateral balance.

- ✍ Also, **French foreign direct investment** in India continues to lag behind other major partners, **ranking only 11th globally as of September 2025**.
- 💡 **Divergence on Russia-Ukraine Geopolitics:** France, as a core leader of the European Union, **maintains a rigid stance against Russian aggression, whereas India continues its "multi-aligned" strategy to protect its energy and defense security**.
 - ✦ This divergence creates a subtle diplomatic friction, particularly when France pushes for stronger language against Moscow in joint statements or multilateral forums like the **G7**.
 - ✦ **While the partnership is "all-weather," the difference in "strategic vocabulary"** regarding territorial integrity remains a delicate balancing act for both leaders.
 - ✍ India calls for **"cessation of hostilities,"** but notably lacked a direct condemnation of Moscow.
- 💡 **Defense Tech-Transfer Depth and Bureaucratic Inertia:** The shift from a **"buyer-seller" to a "co-development" model** has introduced significant delays in the actual transfer of high-end proprietary technology (ToT).
 - ✦ **French OEMs (Original Equipment Manufacturers) often struggle with India's stringent "Buy Global – Manufacture in India" requirements**, citing concerns over intellectual property and local vendor quality.
 - ✍ These bureaucratic and technical bottlenecks can slow the modernization of the Indian Armed Forces despite the strong political will.
 - ✦ **France currently accounts for 28% of India's arms imports**, yet true "sovereign" technology sharing remains limited.
 - ✍ Although the deal for **26 Rafale-M jets** was finalized, the joint development of the **110kN combat engine** is still in the **"framework" stage**.
- 💡 **Digital Tax and Data Localization Friction:** France's push for a global digital services tax and India's stringent data localization rules under the **Digital Personal Data Protection (DPDP) Act** create friction for tech conglomerates in both nations.

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- ✦ Paris advocates for the OECD's multilateral tax framework, while New Delhi has historically used its own Equalization Levy to capture revenue from foreign tech giants, including French firms.
- ✦ These differing "digital sovereignty" philosophies can impede the seamless flow of data-driven innovation and startup collaboration.
 - ✍ India's Budget 2026 introduced a tax holiday for cloud providers, but strict data retention rules under the DPDP Act remain a compliance hurdle.
- 💡 **Strategic Competition in the "Global South":** While France supports India's role as the "Voice of the Global South," both nations occasionally compete for strategic influence and infrastructure projects in Francophone Africa and the Indian Ocean.
 - ✦ France's historical "Françafrique" influence sometimes overlaps with India's growing development partnership model, leading to quiet competition for resources and political alignment.
 - ✦ Managing this overlap is essential to ensure they act as "complementary" rather than "competing" partners in developing regions.
 - ✍ In 2025-2026, both nations have attempted to mitigate this by proposing "trilateral cooperation" with African partners.
 - ✍ However, concrete joint funding for large-scale infrastructure in Africa remains a small fraction of their bilateral spend. Most funding still flows through separate national channels.
 - ✦ For instance, France channels its engagement primarily through the French Development Agency, while India leverages sovereign Lines of Credit (LoCs) to support infrastructure and renewable energy.
- 💡 **"Brain Drain" Concerns:** Despite the 2026 push to triple Indian student numbers in France, friction persists regarding the "circularity" of this migration and the "Young Professional Scheme's" limited intake.

- ✦ India is wary of a permanent "brain drain" of its tech talent to French startups, while French labor unions express occasional concern over the influx of non-EU skilled workers displacing local talent in specialized sectors.
- ✦ The ambitious target of 30,000 Indian students by 2030 faces a mismatch between Indian professional expectations and French labor market protectionism.

What Measures are Needed to Strengthen India-France Relations?

- 💡 **Institutionalizing the Defence Industrial Roadmap:** Both nations must accelerate the transition from vendor-based procurement to a joint-intellectual property (IP) framework for next-generation combat systems.
 - ✦ This involves establishing dedicated "Co-Development Zones" where French OEMs and Indian DPSUs can share sensitive source codes and core metallurgy secrets under a secure bilateral legal umbrella.
 - ✦ Moving beyond simple assembly lines, the focus should shift toward manufacturing 110kN aero-engines.
 - ✍ Such deep industrial integration will immunize the defence partnership against shifting global export control regimes and third-party sanctions.
- 💡 **Operationalizing the Indo-Pacific Trilateral Framework:** To counter regional hegemony effectively, India and France should formalize "Plug-and-Play" naval logistics hubs across key territories in the Indian Ocean.
 - ✦ This measure requires the standardization of maritime communication protocols and the deployment of a permanent joint task force for "Blue Economy" policing and anti-piracy operations.
 - ✦ By involving third-party partners like the UAE or Australia in a trilateral format, they can create a resilient security architecture that provides an alternative to bipolar power structures.

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- ✍ Enhanced maritime domain awareness through a shared satellite constellation will be the technological bedrock of this oceanic stability.
- 💡 **Resolving the Nuclear Liability and Pricing Standoff:** The long-standing **deadlock over the Jaitapur project necessitates a “Grand Energy Bargain”** that decouples the high initial capital expenditure from long-term operational costs through innovative sovereign-backed financing models.
 - ✦ **Both governments should establish a binational regulatory task force** to harmonize safety standards.
 - ✦ Shifting the immediate focus to the co-development of **Small Modular Reactors (SMRs)** can offer a **“proof-of-concept”** for localized nuclear manufacturing before scaling up to massive EPR units.
 - ✍ This modular approach will ensure that nuclear energy remains a reliable, base-load pillar for India’s 2047 net-zero aspirations.
- 💡 **Harmonizing Digital Sovereignty and AI Ethics:** In the wake of the 2026 AI Impact Summit, a **“Common Digital Standards Board”** should be created to align **India’s Data Protection Act with France’s GDPR-influenced European model.**
 - ✦ This body **would facilitate “Data Flow with Trust” (DFWT)**, allowing Indian startups and French research institutes like INRIA to share large datasets for training ethical, non-biased AI models in healthcare and climate science.
 - ✦ By co-authoring a global charter on AI governance, both nations can lead a **“Third Way” in technology that prioritizes human rights over both state-led surveillance and unregulated corporate monopolies.**
 - ✍ This measure would turn their digital convergence into a global norm-setting powerhouse.
- 💡 **Expanding the “Innovation Year” into a Permanent Tech-Bridge:** The **“India-France Year of Innovation 2026”** must be converted into a permanent, institutionalized **“Innovation Bridge”** that facilitates the seamless exchange of venture capital and technical talent.
 - ✦ This involves setting up a joint **Sovereign Tech Fund** specifically aimed at scaling dual-use technologies in deep-tech, space-tech, and green-tech sectors.
 - ✦ Providing reciprocal **“Startup Visas”** with long-term residency permits for founders and researchers will ensure that the brightest minds can build **“born-global” companies** across the **Paris-Mumbai axis.**
 - ✍ This measure **will ensure that the bilateral relationship remains relevant** to the next generation of digital-native entrepreneurs and scientists.
- 💡 **Strengthening Intelligence and Counter-Hybrid Threat Synergy:** To address the rise of asymmetric warfare, both nations should move **toward a “Continuous Intelligence Feed” model for tracking cross-border terror financing** and cyber-propaganda networks.
 - ✦ This requires the establishment of a **Joint Cyber-Defence Command** for protecting critical national infrastructure (CNI) like power grids and satellite networks from state-sponsored hacks.
 - ✦ **By conducting regular “Hybrid Threat” simulation exercises,** the internal security agencies of both nations can develop shared playbooks for rapid response during global crises.
 - ✍ This level of **“no-limits” intelligence cooperation** would signal a level of trust typically reserved for the closest intelligence-sharing alliances.
- 💡 **Collaborative Leadership in Global South Financing:** India and France should co-launch a **“Global South Resilient Infrastructure Fund”** to provide affordable, transparent alternatives to debt-trap diplomacy in Africa and the Indo-Pacific.
 - ✦ **By leveraging France’s influence in the Paris Club and India’s expertise in Digital Public Infrastructure (DPI),** they can offer a holistic development model that combines physical connectivity with digital inclusion.
 - ✦ This measure would involve **“Triangular Cooperation” projects where French capital**

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and Indian technological solutions (like UPI or Aadhaar-stack) are deployed to solve governance challenges in third-party developing nations.

- Such visible global leadership would cement their role as the twin pillars of a stabilized, multipolar international order.

Conclusion

India–France relations have evolved into a future-oriented strategic partnership anchored in trust, autonomy, and convergence across defence, technology, and global governance. **As middle powers navigating a US–China dominated order, both countries are shaping a pragmatic “third way” rooted in sovereignty and rule-based multilateralism.** While structural challenges persist in trade, nuclear energy, and technology transfer, political alignment remains strong. **Sustained institutional cooperation under Horizon 2047 can transform this partnership into a stabilising pillar of the multipolar world.**



Harmonizing Privacy and Accountability (RTI Vs DPDP)

*This editorial is based on “[Privacy and transparency: On the RTI Act amendment, petitions](#)” which was published in *The Hindu* on 20/02/2026. This editorial examines the constitutional tension between the Right to Information and the new Data Protection regime, highlighting how legislative amendments may weaken state accountability.*

The recent decision of the Supreme Court of India to examine amendments diluting the Right to Information Act has revived concerns over shrinking transparency in governance. In a constitutional democracy, **information is the currency of accountability.** When the State accumulates data power without reciprocal public access, governance risks sliding into opacity. Transparency thus remains central to trust, participation, and responsive administration.

What are the Key Measures India has Taken to Enhance Transparency?

- Digital Welfare Disintermediation (DBT):** The **Direct Benefit Transfer (DBT) framework** mitigates systemic leakages by fundamentally re-engineering the welfare state into a disintermediated, targeted delivery matrix.
 - By leveraging the **JAM trinity (Jan Dhan, Aadhaar, Mobile)**, the government has dismantled rent-seeking middleman networks that historically plagued subsidy distribution.
 - This targeted digital architecture ensures precise beneficiary mapping and establishes an auditable, real-time fiscal trail that reinforces absolute state accountability.
 - In FY 2025-26, cumulative DBT transfers hit a record ₹5.62 lakh crore across 327 active schemes spanning 56 ministries.
 - Consequently, this systemic transparency has generated estimated cumulative savings of ₹4.31 lakh crore as of February 2026 by systematically weeding out ghost beneficiaries.
- Algorithmic Public Procurement :** The **Government e-Marketplace (GeM)** democratizes public procurement by dismantling opaque, monopolistic vendor ecosystems through a centralized, algorithmic open-source platform. It embeds structural transparency by utilizing AI-driven anomaly detection and standardized pricing mechanisms, ensuring equal opportunity for marginalized MSMEs.
 - This digital shift eradicates discretionary tender allocations and bureaucratic favoritism, fostering a competitive, merit-based economy while optimizing exchequer costs.
 - For instance, by late 2025, GeM surpassed a historic cumulative Gross Merchandise Value (GMV) of ₹15 lakh crore, integrating millions of micro-sellers into the formal economy.
- Data-Driven Tax Administration :** The transition to a **Faceless Tax Assessment** regime revolutionizes fiscal governance by deliberately severing the physical interface between the taxpayer and the assessing officer. By utilizing dynamic jurisdiction,

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data analytics, and automated random case allocation, **the system effectively neutralizes territorial biases and subjective extortion.**

- ✦ This structural reform enforces an objective, team-based review mechanism that drastically reduces bureaucratic harassment and incentivizes voluntary citizen compliance.
 - ✦ Reflecting this improved compliance, gross direct tax collections surged to a provisional ₹27.02 lakh crore in FY 2024-25, doubling within a five-year span.
 - ✦ Furthermore, over 9.19 crore Income Tax Returns were filed in this period, heavily supported by transparent, pre-filled Annual Information Statements (AIS).
- 💡 **Electoral Finance Accountability:** The Supreme Court's invalidation of the Electoral Bonds scheme marks a watershed constitutional moment in restoring democratic equity and curbing opaque corporate hegemony. The apex court decisively ruled that absolute donor anonymity fundamentally violates a citizen's intrinsic Right to Information protected under Article 19(1)(a).
- ✦ By dismantling this legal shroud, the judicial mandate compels the state machinery to realign political finance with the principles of anti-cronyism and an informed electorate.
 - ✦ Following the landmark 2024 judgment (Association for Democratic Reforms v. Union of India), the State Bank of India was forced to digitally disclose all historical bond purchase data to the Election Commission for immediate public scrutiny.
- 💡 **Proactive Grassroots Disclosure:** State-level Jan Soochna (Public Information) Portals decentralize governance by shifting the paradigm from reactive RTI petitions to proactive, suo-motu data disclosures. These open-data dashboards mandate real-time public visibility into local expenditures, audit reports, and welfare beneficiary lists directly down to the village panchayat level.
- ✦ This localized transparency architecture empowers the poorest citizens to conduct continuous social audits, effectively neutralizing systemic information asymmetry at the grassroots.

- ✦ For example, the pioneering Rajasthan Jan Soochna portal currently publishes granular, real-time data across more than 200 public schemes from over 115 government departments.

💡 **Judicial Transparency via e-Courts Phase III: The e-Courts Mission Mode Project** (Phase III) fundamentally transitions the judiciary from an opaque, paper-dependent silo into a digitally searchable, "Open Justice" ecosystem. By institutionalizing live-streaming and universalizing e-filing, it eliminates the "black box" of courtroom proceedings and reduces the information gap between the legal elite and common litigants.

- ✦ This reform enforces systemic accountability by making case lifecycles, orders, and judge-wise performance metrics accessible to the public in real-time.
- ✦ As of December 2025, the **National Judicial Data Grid (NJDG)** tracks over 25 crore cases, while the e-Courts portal records a massive 35 lakh daily hits.

📎 This digital infrastructure has enabled the disposal of 8.96 crore traffic challans through 29 Virtual Courts, collecting over ₹895 crore in revenue with zero human intervention.

💡 **Geospatial Clarity & Land Transparency (ULPIN & NAKSHA):** The implementation of **Bhu-Aadhaar (ULPIN)** and the **NAKSHA** project dismantles the legacy of "benami" transactions and opaque land titles through high-precision geospatial mapping. By assigning a 14-digit alphanumeric ID to every land parcel, the state creates a "Single Version of Truth" that prevents fraudulent multiple-sales and bureaucratic tampering of records.

- ✦ This transparency acts as a catalyst for financial inclusion, allowing marginalized farmers to use verifiable digital titles as collateral for institutional credit without middleman exploitation.
- ✦ For instance, by early 2026, ULPIN has been assigned to over 36 crore land parcels, and land record computerization has achieved 97.27% saturation across Indian villages.

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✦ In urban areas, the **NAKSHA pilot** across 157 cities is expected to increase municipal property tax compliance by **25-40%** through transparent, drone-based boundary demarcation.

💡 **Modernization of National Statistical Systems:** India is undergoing a structural overhaul of its official data architecture to ensure that national indicators (GDP, CPI, IIP) are immune to methodological opacity and reflect real-world economic shifts. The launch of the **e-Sankhyiki portal** and the revamped **Microdata Portal** enforces **“Transparency by Design,”** allowing researchers and citizens to scrutinize the raw data behind government claims.

✦ By rebasing economic indices to **2022-23** and introducing **monthly labor indicators** (PLFS) from 2025, the state is providing more granular, frequent, and honest snapshots of the informal economy.

✦ Since January 2025, the **Microdata Portal** has recorded over **88 lakh hits**, demonstrating a high public appetite for verifiable official statistics.

✍ This move toward **“Data Democratization”** ensures that policy debates are grounded in evidence rather than administrative discretion or political narrative.

💡 **Institutionalized Social Audits in Education & Welfare:** The shift toward **Mandatory Social Audits** transforms transparency from a top-down reporting requirement into a bottom-up, community-led verification of public expenditure. This model empowers local stakeholders (parents, workers, and Gram Sabhas) to physically verify if the funds allocated for school infrastructure or rural wages match the ground reality.

✦ By video-recording proceedings and uploading **Action Taken Reports (ATRs)** online, the process creates a public **“shame-and-fame”** mechanism that deters local-level corruption.

✦ For instance, in 2025, **Uttar Pradesh** launched a massive plan to socially audit **1.33 lakh government schools**, involving over **1.6 lakh community facilitators** to evaluate resource delivery.

✦ Furthermore, by 2026, many states have **strictly separated Social Audit Units from implementing agencies** to eliminate **“conflicts of interest,”** as seen in recent High Court mandates in Kerala.

What are the Key Issues Associated with India’s Transparency Framework ?

💡 **Dilution of RTI via DPDP Act (Loss of “Public Interest Override”):** The **DPDP Act** structurally weakens the RTI framework by amending **Section 8(1)(j)** and completely removing the **“public interest override”** that previously permitted access to public officials’ data.

✦ By imposing a blanket statutory exemption on all **“personal information,”** it creates an **impenetrable legal shield** allowing **bureaucrats to hide assets, credentials, and disciplinary records.**

✦ Consequently, the **delicate democratic balance has tilted heavily toward administrative opacity, prioritizing state protection over citizen empowerment.**

💡 **Severe Backlogs and Institutional Paralysis in Information Commissions:** The nation’s transparency infrastructure is **practically suffocating** under severe understaffing, transforming a fast-track statutory redressal mechanism into a **prolonged bureaucratic nightmare.**

✦ Chronic delays in appointing Information Commissioners **violate legislative mandates and erode the deterrent effect of the RTI,** as delayed information loses its actionable relevance. This systemic tendency of governments to leave transparency watchdogs under-resourced signals a deliberate strategy to blunt grassroots democratic oversight.

✦ **As of January 2026, the Central Information Commission alone struggles with a crippling backlog of over 32,200 pending cases,** with projected clearance **times hitting 40 months.**

✦ Furthermore, a late 2024 Supreme Court review noted that state commissions collectively **harbor a staggering 4.1 lakh pending appeals** (as per the “Report Card” by the Satark Nagrik Sangathan), **paralyzing the citizen’s right to know.**

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💡 **Opacity in Corporate Political Funding:** While the Supreme Court's landmark 2024 annulment of the **Electoral Bonds scheme** was a **constitutional victory**, massive corporate funding continues to flow through alternative, **semi-opaque channels** like "Electoral Trusts." These trusts, despite requiring nominal disclosures to the Election Commission, effectively obscure the direct one-to-one nexus between a specific corporate donor and specific state policy favors.

- ✦ This persistent financial asymmetry **undermines democratic equity, leaving independent candidates financially paralyzed while dominant political parties** consolidate power through deep-pocketed conglomerates.
- ✦ Recent 2025 data reveals that the **Progressive Electoral Trust, backed by major corporate groups, channeled over \$110 million ahead of the general elections.** Of this amount, approximately **82% was received by a single ruling party**, drawing attention to the concentration of funding.

💡 **Dismal Proactive Disclosure and Section 4 Non-Compliance:** The foundational philosophy of the RTI Act was to **shift the burden of transparency onto the state through mandatory, suo-motu digital disclosures**, yet this mandate remains systematically ignored. Instead of maintaining updated open-data dashboards regarding public procurement and administrative decisions, **authorities force citizens to file adversarial RTI petitions for routine data.**

- ✦ This bureaucratic stubbornness **artificially inflates the burden on Information Commissions, transforming transparency into an exhausting struggle** rather than an institutionalized governance standard. Civil society assessments in 2025 reveal that a vast majority of central and state departments continually fail to update their Section 4 manuals online.
 - 📌 Consequently, **citizens are forced to weaponize the RTI act simply to track basic welfare scheme delivery**, which fundamentally **clogs the entire justice delivery system.**

💡 **Proposals for "Ministerial Veto" and Deliberative Exemptions:** The recent **Economic Survey (2025-26)** introduced a highly controversial narrative arguing **that the current RTI framework hampers bureaucratic efficiency and fuels "idle curiosity."** It formally proposes introducing a **"Ministerial Veto"** and **exempting internal deliberative processes (like draft notes and working papers)** from any public scrutiny.

- ✦ If legislated, this **would establish an unprecedented culture of state secrecy**, allowing the executive to conceal the underlying lobbying influences and policy trade-offs that shape national legislation. **Critics vehemently oppose these recommendations, noting there is absolutely no empirical evidence** proving civil servants are paralyzed by transparency.
- ✦ Shielding these **"brainstorming notes" directly contradicts the democratic necessity** of tracking exactly how and why public money is allocated behind closed doors.

💡 **The "Chilling Effect" on Investigative Journalism:** The newly operationalized DPDP Rules aggressively classify investigative journalists as **"Data Fiduciaries,"** legally equating critical news gathering with commercial corporate data processing.

- ✦ By mandating that reporters obtain explicit consent from the very individuals or corrupt officials they are investigating, **the framework makes post-facto validation of independent news reports legally perilous.** Without explicit statutory exemptions for journalistic purposes, **this regulatory overreach threatens to reduce independent media to mere amplifiers of sanitized government press releases.**
- ✦ **Non-compliance under this stringent DPDP framework carries crippling financial penalties of up to ₹250 crore for independent media houses.**
 - 📌 Furthermore, **Section 12 allows individuals to demand immediate data erasure, granting corrupt actors a direct legal mechanism to force journalists to destroy investigative evidence.**

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💡 **Asymmetric Exemptions for State Surveillance and Instrumentalities:** While India's new digital privacy architecture imposes heavy compliance burdens on private tech enterprises, **it carves out vast, unchecked exemptions for "State instrumentalities."**

- ✦ **The central government retains the arbitrary, unchecked power to exempt its own law enforcement and intelligence agencies from fundamental privacy protocols under the broad guise of national security.**
- ✦ **This asymmetric legal structure risks institutionalizing mass digital surveillance, rendering the citizen entirely transparent to the state while the state remains entirely opaque to the citizen.**
- ✦ **The Internet Freedom Foundation (IFF) warns that these 2025 rules offer absolutely no independent judicial oversight mechanism to audit state data collection.**

📌 Consequently, **broad government exemptions fundamentally undermine the K.S. Puttaswamy judgment** by enabling unchecked and opaque data processing by state agencies.

💡 **Flawed Implementation of Social Audits and Whistleblower Vulnerability:** Despite statutory mandates integrating social audits into major welfare schemes, the ground reality suffers from an acute conflict of interest as local implementing agencies often control the audit bodies.

- ✦ **These skewed local power dynamics, heavily compounded by the absence of a robust and fully operational Whistleblowers Protection Act, severely intimidate rural auditors. Without physical and legal safeguards, grassroots transparency activists remain highly vulnerable to targeted violence, rendering the theoretical right to information practically hazardous.**
- ✦ **Alarming civil rights data (Commonwealth Human Rights Initiative) indicates that 67 RTI activists have been murdered since the Act's inception two decades ago.**

📌 State governments **repeatedly fail to physically separate Social Audit Units from their administrative departments, completely diluting the independent verification of billions in public funds.**

💡 **Ambiguous Consent Mechanisms and Digital Literacy Barriers:** The newly enforced DPDP Rules (2025) establish **"Consent Managers"** and **place the complex burden of managing digital permissions squarely on ordinary citizens** who often lack basic digital literacy. The regulatory language **fails to explicitly outlaw deceptive design practices or "dark patterns"** that major tech platforms utilize to aggressively extract broad data processing permissions.

- ✦ **As a result, "informed consent" devolves into a mere legal fiction, allowing massive corporations to continue exploiting user data under the strict veneer of statutory compliance.**
- ✦ **While the rules mandate clear consent notices within an 18-month phased rollout ending in 2026, the lack of government-prescribed standardized templates leaves massive room for corporate manipulation.**
- 📌 **Millions of rural citizens remain highly vulnerable to "consent fatigue," undermining the very privacy protections the DPDP framework claims to guarantee.**

What Measures are Needed to Strengthen Transparency Framework in India ?

💡 **Codifying a "Public Interest Test" within the DPDP Framework:** The government must introduce a statutory **"Harm-Benefit Balancing Test"** within the **Digital Personal Data Protection (DPDP) Rules** to restore the primacy of the Right to Information. **By explicitly defining categories of "Public-Facing Personal Data"** such as assets of public servants, educational credentials of officials, and departmental file notings, the law can prevent the misuse of privacy as a shroud for administrative opacity.

- ✦ **This measure would replace the current absolute exemption with a proportional disclosure regime, ensuring that the "right to be left alone" does not morph into a "right to be unaccountable."**

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- 💡 **Institutionalizing “Algorithmic Transparency” and Open-Source Audits:** As governance shifts toward AI-driven decision-making in welfare and procurement, India needs a **“National Algorithmic Accountability Protocol”** to mandate the disclosure of logic behind automated systems.

 - ✦ This involves **making the source code and training datasets of critical platforms like the GeM portal and DBT matching engines accessible for third-party “White-Box” audits** to detect systemic biases or exclusions. Such a measure **ensures that the “Black Box” of technology does not replace the “Red Tape”** of bureaucracy, maintaining a clear trail of digital accountability for every automated state action.
- 💡 **Implementing Decentralized “Information Self-Service” Kiosks:** Moving beyond digital portals, the state must establish physical, blockchain-enabled **“Information Self-Service Kiosks”** at the Panchayat and Block levels to bridge the digital divide for the rural poor.

 - ✦ These kiosks should offer **real-time, read-only access to local muster rolls, inventory ledgers, and social audit reports** without requiring a formal RTI application or intermediary assistance.
 - ✦ **By embedding “Transparency by Design”** at the grassroots, the framework shifts the burden of information retrieval from the citizen to the infrastructure, **fostering an environment of continuous social oversight.**
- 💡 **Strategic Decoupling of Social Audit Units (SAUs):** To ensure the integrity of grassroots monitoring, **Social Audit Units must be granted complete financial and administrative autonomy**, effectively decoupling them from the implementing line departments they are tasked to monitor.

 - ✦ This involves **creating a dedicated, non-lapsable “Transparency Fund” managed by the Comptroller and Auditor General (CAG)** to pay for auditors’ salaries and logistics. By removing the **“power of the purse” from local bureaucrats, SAUs can operate as fearless independent watchdogs**, transforming social audits from a ceremonial **“box-ticking” exercise** into a potent tool for forensic public scrutiny.
- 💡 **Harmonizing Whistleblower Protection with Digital Safeguards:** There is an urgent need to operationalize the **Whistleblower Protection Act** by integrating it with encrypted, anonymous **“Digital Reporting Channels”** that protect the identity of insiders through advanced zero-knowledge proofs.

 - ✦ This measure would **provide a safe, state-sanctioned alternative to the risky RTI route** for exposing high-level corruption, ensuring that the **“Source”** remains anonymous even to the receiving agency.
 - ✦ **Legal immunity for “Good Faith Disclosures”** must be strictly enforced to counteract the **“chilling effect”** created by stringent data protection penalties and potential surveillance overreach.
- 💡 **Universalizing “Real-Time Fiscal Dashboards” for All Public Projects:** The Ministry of Finance should mandate that every public infrastructure project exceeding a certain threshold be mapped onto a **“Live Project Transparency Dashboard”** using Geospatial (GIS) and IoT sensors.

 - ✦ These **dashboards would display real-time physical progress, contractor payment cycles, and quality-test certificates** alongside the original tender specifications.
 - ✦ Such granular, proactive disclosure **would allow the public and civil society to track the conversion of tax rupees** into physical assets, making **“leakages” visible and rectifiable before the project reaches completion.**
- 💡 **Creating a “Legislative Transparency Index” (LTI):** To enhance the quality of democracy, India should adopt a **“Legislative Transparency Index”** that tracks the pre-legislative consultation process, the frequency of parliamentary committee referrals, and the disclosure of lobbying influences.

 - ✦ This measure would require all draft bills to be accompanied by a **“Consultation Summary Report”** detailing which stakeholder inputs were accepted or rejected and why.
 - ✦ By formalizing the **“Right to Know” during the law-making phase, the state can mitigate the risk of “Captured Policy”** and ensure that laws are the product of deliberative consensus rather than opaque executive fiat.

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- 💡 **Professionalizing the Information Commission Cadre:** To eliminate institutional paralysis, the selection process for Information Commissioners should be diversified to include a mandatory quota for data scientists, legal scholars, and civil society veterans, rather than solely relying on retired bureaucrats.
 - ✦ This “Multi-Disciplinary Bench” would be better equipped to adjudicate complex modern disputes involving data privacy, trade secrets, and emerging technologies.
 - ✦ Furthermore, a “Deemed Vacancy” rule should be implemented, where new appointments must be finalized six months before a sitting commissioner retires, ensuring that the transparency machinery never grinds to a halt due to administrative lethargy.
- 💡 **Judicial “Open Data” Mandate and Performance Tracking:** The judiciary must lead by example by mandating a “Standardized Open Data Protocol” across all tiers of courts, ensuring that case data is not just “digitized” but “machine-readable” for large-scale analysis.
 - ✦ This involves publishing granular metrics on case pendency per judge, reasons for adjournments, and historical sentencing patterns to identify bottlenecks and biases within the legal system.
 - ✦ By making the “Process of Justice” as transparent as the “Judgment of Justice,” the judiciary can rebuild public trust and provide the data-driven evidence needed for systemic legal reforms.

Conclusion:

The future of Indian democracy hinges on reconciling the citizen’s right to privacy with the mandatory transparency required for state accountability. While digital tools have revolutionized service delivery, the legislative dilution of the RTI Act risks creating a permanent information asymmetry that favors the executive. Strengthening transparency now requires a shift from reactive disclosures to an institutionalized, “open-by-default” governance architecture that protects the individual without shielding the institution.



AI and the Transformation Of State-Capital Dynamics

This editorial is based on “As we contemplate possibilities of AI, it is wreaking enduring transformations in state-capital relations” which was published in The Indian Express on 21/02/2026. The editorial examines how Artificial Intelligence is fundamentally transforming state-capital relations by anchoring capital to infrastructure, data, and national security. It highlights the rise of techno-nationalism and the governance challenges posed to democracy, markets, and civil liberties.

Artificial Intelligence is no longer merely a disruptive technology, it is reconfiguring the architecture of political economy itself. Unlike earlier waves of globalisation that thrived on mobile and footloose capital, AI is deeply infrastructure-heavy, territorially anchored, and data-intensive. This has altered the incentives of capital, drawing it closer to the state for regulation, security, and strategic support. Consequently, AI is catalysing a profound transformation in state-capital relations, marked by techno-nationalism, concentration of power, and the erosion of traditional market-state boundaries.

How is Artificial Intelligence Reshaping the Structure Of State-Capital Relations in India ?

- 💡 **Techno-Nationalism & The Rise of Infrastructure Monopolies:** India is moving from a passive regulator to an active co-investor in AI infrastructure, aligning state capacity with large domestic firms to build sovereign compute and foundational models. This techno-nationalist strategy seeks to reduce dependence on foreign Big Tech by fostering scale-intensive infrastructure monopolies, creating a close, strategic state-capital alliance driven by geopolitical and economic imperatives.
 - ✦ Under the ₹10,372 crore IndiaAI Mission, the state has recently deployed over 38,000 GPUs at a subsidized rate of ₹65 per hour through strategic public-private partnerships.
 - ✦ Concurrently, the ₹76,000 crore India Semiconductor Mission is incentivizing

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domestic champions, such as Tata Electronics' recent 2026 partnership with Qualcomm, to manufacture critical AI chips locally.

💡 **Convergence of State Surveillance & Corporate Data Extraction:** AI is erasing the divide between private data extraction and state authority, with firms relying on legal sanction to deploy mass analytics while the state increasingly outsources policing and governance to private algorithms.

✦ This symbiosis fuels surveillance capitalism, where corporate revenues are secured through state contracts and public security becomes dependent on proprietary tools.

✦ During the 2025 Ganesh Chaturthi in Pune, AI-enabled CCTV systems using private facial recognition software reportedly generated over 8 lakh behavioural alerts, while the February 2026 integration of AI into national criminal databases for predictive policing further institutionalised this state–corporate interdependence.

💡 **Digital Public Infrastructure (DPI) & Informational Capitalism:** The Indian state is redefining its economic role by architecting Digital Public Infrastructure (DPI) that democratizes foundational AI resources to catalyze private wealth creation. By nationalizing anonymized datasets and providing open-source models, the state actively dismantles the data moats of foreign tech monopolies to facilitate domestic informational capitalism.

✦ Consequently, the state transitions into an indispensable ecosystem enabler, ensuring that private sector AI innovation and capital accumulation are structurally dependent on state-maintained public goods.

✦ The government's AiKosh platform actively drives this by offering over 7,500 high-quality datasets and 273 AI models as shared national resources for startups and enterprises.

✦ Additionally, Andhra Pradesh's February 2026 launch of the "Swadeshi AI Stack" in partnership with IBM and NxtGen exemplifies regional governments providing centralized digital goods for private commercial exploitation.

💡 **Regulatory Capture & Pro-Innovation Policy Alliances:** Private capital is heavily shaping India's AI regulatory landscape by lobbying for "light-touch," pro-innovation frameworks that prioritize rapid market expansion over stringent rights-based safeguards. Rather than constraining tech monopolies like the European Union, the Indian state strategically aligns with capital, viewing deregulation as a necessary geopolitical compromise to attract global investment.

✦ This structural concession reveals a state-capital consensus where civil liability and privacy concerns are subordinated to the mutual goal of accelerating domestic technological supremacy. Validating this deregulatory alliance, the February 2026 India AI Impact Summit successfully secured over \$250 billion in infrastructure investment commitments from both global and domestic tech conglomerates.

✦ Concurrently, the government's recently published AI Governance Guidelines maintain a strictly non-interventionist stance, reflecting industry demands for self-regulation and enabling a projected \$32 billion domestic AI market by 2031.

💡 **Algorithmic Governance & the Casualization of Labor:** The state actively permits tech capital to utilize algorithmic management to casualize labor, systematically prioritizing frictionless capital accumulation over traditional worker protections. By refusing to mandate formal employment status for gig workers, the government structurally aligns with platform monopolies to suppress wage costs and bypass social security obligations.

✦ This consensus fundamentally restructures the industrial workforce, shifting the entire economic risk of platform capitalism onto atomized, algorithmically managed digital labor. Following the January 2026 nationwide gig worker strikes, the Ministry of Labour declined to classify platform workers as formal employees, allowing platforms to retain AI-driven piece-rate wages.

✦ Consequently, India's digital gig workforce, projected to exceed 23.5 million by 2030,

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remains structurally excluded from statutory provident funds and guaranteed minimum wages under current digital labor codes.

💡 **Sovereign Venture Capitalism & Deep-Tech Protectionism:** The Indian state is fundamentally blurring public finance and private enterprise by aggressively acting as a venture capitalist to insulate strategic AI innovation from foreign acquisition. By assuming the role of the ultimate underwriter of high-tech risk, the government structurally tethers private capital accumulation directly to sovereign geopolitical interests.

✦ This interventionist posture ensures that critical AI breakthroughs by private startups remain entirely captive to domestic state agendas rather than global financial markets. Through the newly operationalized ₹10,000 crore **DeepTech Fund**, the government has directly co-invested in over 12 indigenous AI startups focusing on dual-use technologies since late 2025.

💡 **Militarisation of AI and the Emerging Military-Tech Complex:** State-capital relations are increasingly militarised as governments move beyond traditional public sector defence manufacturing to engage agile private technology firms for AI-enabled capabilities. This shift is driven by the need for rapid innovation in areas such as autonomous systems, surveillance analytics, and counter-drone technologies, which conventional defence PSUs often struggle to deliver at pace.

✦ As a result, national security architectures are becoming structurally dependent on private intellectual property, elevating specialised defence-tech firms to the status of strategic sovereign assets.

✦ Recent defence modernisation priorities and procurement reforms have facilitated greater participation of startups and private firms in AI-driven threat assessment, unmanned systems, and decision-support tools.

✦ This trend signals the gradual emergence of a domestic military-industrial-tech complex, where public defence objectives and private technological capital are increasingly fused, reshaping the balance between state authority and market power in the security domain.

💡 **“GovTech” Privatization & Algorithmic Austerity:** The state is increasingly outsourcing its core welfare architecture to private cloud and analytics capital to achieve fiscal consolidation through algorithmic optimization and austerity. By transforming citizen-welfare delivery into a lucrative “GovTech” procurement market, private firms directly profit from streamlining state expenditure and identifying administrative redundancies.

✦ This creates a structural dependency where the state’s fundamental capacity to govern and distribute resources is entirely mediated by proprietary, private-sector predictive models.

✦ The late-2025 integration of private AI analytics into Aadhaar-linked Public Distribution Systems generated over \$1.8 billion annual AI revenue in continuous state contracts for IT majors like TCS and Infosys.

What Issues Arise from the AI-Driven State-Capital Nexus?

💡 **Regulatory Capture & Monopolization:** The symbiotic alliance between governments and Big Tech fosters severe regulatory capture, effectively stifling grassroots innovation and market competition. As states increasingly rely on corporate capital to secure national AI supremacy, they enact protectionist policies that inherently shield existing tech monopolies.

✦ Consequently, public interest and ethical safeguards are systematically subverted to sustain the market dominance of a few elite behemoths. For instance, digital industry lobbying expenditures in the EU surged to €151 million by 2026 to dilute the AI Act’s data protection clauses.

✦ Similarly, major US tech firms funded the \$100 million “Leading the Future” Super PAC in 2025 to successfully block state-level AI regulations and secure federal regulatory moratoriums.

💡 **Surveillance Capitalism & Digital Authoritarianism:** The nexus accelerates the deployment of mass surveillance architectures, seamlessly merging

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corporate data extraction with state security apparatuses. Capital constructs hyper-invasive predictive models driven by profit, **which authoritarian and democratic states alike weaponize to monitor citizens and crush political dissent.**

- ✦ This convergence obliterates privacy rights, **creating a digital panopticon where biometric tracking becomes a mandatory condition for societal participation.** In Pakistan, **state authorities have explored AI-driven facial progression models built from social media data to track marginalized groups** like the Baloch community across generations.
- ✦ In the US, **the FTC recently banned Rite Aid from using biased facial recognition security systems,** highlighting how unchecked corporate surveillance tools lead to the wrongful targeting of minorities.
- 💡 **Hyper-Militarization & Autonomous Warfare:** Private capital is aggressively militarizing AI technology, blurring the line **between civilian innovation and lethal autonomous weapons systems.**
 - ✦ Defense departments funnel billions into tech corporations to develop AI-powered target identification and command-and-control infrastructures, **fundamentally altering the ethics of modern warfare.** This privatized arms race lowers the threshold for lethal engagement, bypassing traditional geopolitical breakers that prevent catastrophic conflicts.
 - ✦ The UN General Assembly **recently adopted resolution 79/239 in late 2024 to address the severe international security risks posed by this rapid military-AI integration.** A stark example is the documented use of AI systems like **“Lavender” in the Middle East,** where automated algorithms generated kill lists with human operators approving **strikes in as little as 20 seconds.**
- 💡 **Unchecked Environmental Degradation:** The state-capital race for AI supremacy actively ignores the catastrophic ecological footprint of hyperscale compute infrastructure. Governments grant massive subsidies and regulatory exemptions to

corporate data centers, prioritizing **techno-nationalism** over binding international climate commitments.

- ✦ This insatiable demand for processing power exacerbates resource scarcity, plunging vulnerable regions into severe water and energy crises. **The International Energy Agency projects global data center electricity demand will double to 945 terawatt-hours by 2030.**
- ✦ Furthermore, water consumption by **Indian data centers is slated to double to 358 billion liters by 2030,** worsening the climate crisis in an already water-stressed nation.
- 💡 **Geopolitical Bifurcation & The “Splinternet”:** The fusion of state strategy and technological capital is fracturing the global digital ecosystem into deeply polarized, sovereign tech blocs. **Driven by techno-nationalism, superpowers are weaponizing semiconductor supply chains and hardware exports** to starve geopolitical rivals of frontier compute capabilities.
 - ✦ This zero-sum competition destroys the promise of an open, **globally integrated internet, forcing third-party nations to choose sides in an algorithmic Cold War.** The strategic divergence is stark, **Washington leverages private-sector innovation and export controls via the \$53 billion CHIPS Act,** while Beijing pursues state-led self-reliance with goals exceeding **90% AI adoption by 2030.**
 - ✦ Consequently, **global AI research is bifurcating, with China capturing over 40% of global AI citations in 2024, four times higher than the US individually.**
- 💡 **Digital Colonialism & Global South Exploitation:** The AI nexus perpetuates a modern form of **digital colonialism,** where powerful state-backed tech conglomerates extract resources and data from the Global South. **Developing nations are relegated to supplying cheap labor for data annotation and raw critical minerals for hardware,** while the immense wealth generated by AI remains concentrated in Western and Chinese capitals.

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✦ This structural inequality **strips developing nations of their digital sovereignty, forcing them into perpetual technological dependency.** Building a standard 2 kg computer requires extracting 800 kg of raw materials, heavily relying on unsustainable rare earth mining in the Global South to fuel northern AI hardware.

✦ Additionally, advanced tech ecosystems in **Silicon Valley and Shenzhen hoard the trillions in projected AI-driven GDP growth,** leaving developing nations marginalized and without equitable access to foundational models.

💡 **Labor Disruption & Extreme Wealth Concentration:** Corporate capital utilizes AI to aggressively automate labor and slash operational costs, **while state policies fail to protect displaced workforces or redistribute the resulting productivity gains.**

✦ This structural shift moves power away from human labor directly into the hands of computer-owners, fundamentally destabilizing the middle class and exacerbating socio-economic divides.

✦ Governments, heavily influenced **by tech lobbying, actively resist implementing robust welfare nets or universal basic income,** prioritizing corporate margins over societal stability.

✦ In the US alone, **AI-related capex** currently equates to approximately **0.8% of US GDP.** Meanwhile, **widespread commercial automation is accelerating job displacement across both blue-collar and white-collar sectors, sparking severe populist backlash and localized protests against rising inequality.**

💡 **Democratic Erosion & Algorithmic Propaganda:** The alliance between state actors and digital platforms weaponizes information ecosystems, **utilizing generative AI to manipulate public perception at an unprecedented scale.** Capital prioritizes engagement-driven algorithms that amplify polarizing content, **which states and political entities easily exploit to launch targeted disinformation campaigns and suppress democratic discourse.**

✦ This synthetic manipulation of reality erodes institutional trust and dismantles the shared factual baseline required for functioning democracies. **During recent global election cycles, deep fakes and algorithmic bias were heavily utilized to hyper-target voters,** exploiting the vast troves of personal data collected by tech monopolies.

✦ **AI lobbying groups like CCIA continue to push for the right to scrape sensitive political and demographic data** without active consent, ensuring these systems remain highly effective manipulation engines.

What Measures are Required To Manage This Transformation?

💡 **Sovereign Digital Public Infrastructure for AI:** To prevent complete corporate capture of foundational AI models, governments must establish robust, publicly funded **digital public infrastructure (DPI)** dedicated to AI compute and datasets. This approach democratizes access **by treating advanced computing clusters and high-quality training data as shared public utilities** rather than exclusive proprietary assets.

✦ By offering subsidized access to sovereign **GPU grids and culturally representative open-source datasets, states can empower local startups** and researchers to build competitive models without relying on **Big Tech ecosystems.**

✦ Such a measure directly dismantles the high barriers to entry that currently define the frontier AI market, fostering a decentralized innovation landscape. Ultimately, **building a public option for AI infrastructure guarantees technological sovereignty** and ensures that critical digital development remains aligned with public interest rather than solely corporate margins.

💡 **Implementation of Federated Data Trusts:** Breaking the monopolistic grip on the raw material of AI requires the legal establishment of **federated data trusts** to govern data sharing and utilization. These independent, **fiduciary-driven trusts would act as intermediaries between data subjects and**

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AI developers, ensuring that data is accessed ethically, securely, and purely for authorized purposes.

- ✦ Operating on principles of data portability and interoperability, **this framework mandates that dominant tech platforms share anonymized, high-value datasets with smaller market players through highly regulated APIs.**
- ✦ This structural intervention eliminates the **zero-sum nature of data hoarding, effectively neutralizing the massive network effects** that shield incumbent monopolies from competition. By placing collective bargaining power back into the hands of a fiduciary, data trusts transform **extractive surveillance practices into a balanced, consent-driven data economy.**

💡 **Ex-Ante Antitrust Enforcement for the AI Stack:**

Traditional competition laws are too reactive for the rapid evolution of the AI state-capital nexus, necessitating a shift toward aggressive, **ex-ante antitrust frameworks.** Regulators must proactively define and monitor the critical chokepoints of the AI technology stack, **spanning from silicon manufacturing and cloud compute to foundational models and consumer applications.**

- ✦ This measure involves strictly blocking vertical mergers and exclusive supply partnerships that allow dominant players **to lock in ecosystem control and starve competitors of essential infrastructure.** By legally enforcing structural separation between the layers of the AI supply chain, authorities can prevent conglomerates from self-preferencing their own downstream applications.
- ✦ Consequently, **this proactive market-shaping ensures a level playing field where innovation is driven by merit and technological superiority** rather than entrenched capital power.

💡 **Embedding Techno-Legal Compliance by Design:**

The inherent complexity and opacity of neural networks demand that regulatory compliance is no longer treated as a post-development checklist but is hardcoded directly into the AI architecture. Policymakers must mandate a **techno-legal**

governance framework where legal obligations, such as **privacy preservation, bias mitigation, and transparency, are mathematically embedded into the model's training and deployment pipelines.**

- ✦ This involves **requiring developers to integrate automated audit trails, real-time anomaly detection, and explainability modules** before a system can be commercially released. By merging rule-based legal conditioning with technical enforcement mechanisms, **regulators can achieve continuous, automated oversight without suffocating the pace of innovation.**
- ✦ This architectural shift **ensures that frontier models remain intrinsically bound by societal safeguards,** drastically reducing the risk of catastrophic failures or undetected systemic discrimination.

💡 **Mandatory Algorithmic Impact Assessments:** To counter the socio-economic risks generated by algorithmic decision-making, states must enforce mandatory **Algorithmic Impact Assessments (AIAs)** for all high-risk AI deployments. Modeled after environmental impact studies, these standardized assessments compel corporations to rigorously evaluate and document the potential consequences of their AI systems on marginalized communities, labor markets, and democratic institutions.

- ✦ Crucially, **the assessment process must include mandatory consultations with diverse cross-functional teams,** domain experts, and the public communities most likely to be affected by the technology.
- ✦ By forcing organizations to transparently justify their algorithmic choices and explicitly outline their risk-mitigation strategies, **this measure pierces the veil of corporate secrecy.** Institutionalizing **this preemptive scrutiny transforms AI development from a rapid beta-testing endeavor** into a deliberate, accountable, and socially responsible engineering practice.

💡 **Graded Liability and Human-in-the-Loop Mandates:** Addressing the accountability vacuum in autonomous systems requires the

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implementation of a graded, function-based liability regime paired with strict **human-in-the-loop** oversight mandates. **This legal structure proportionally assigns legal and financial responsibility to AI developers, deployers, and importers based on the system's risk classification and the specific function it performs.**

- ✦ For applications operating in critical sectors like healthcare, criminal justice, or infrastructure, this measure legally mandates **a human-in-the-loop workflow to review and approve machine-generated decisions.** Implementing these operational fail-safes ensures that algorithmic hallucinations or biased outputs cannot automatically **trigger life-altering actions without human contextual judgment and intervention.**
 - ✦ By aligning **severe financial penalties with negligent algorithmic deployment,** this measure **economically incentivizes corporations to prioritize safety and precision over rapid market capture.**
- 💡 **Agile Regulatory Sandboxing for Sovereign Innovation:** Navigating the tension between rigid state control and unchecked capitalist expansion requires the widespread adoption of agile, state-sponsored **regulatory sandboxes.**
- ✦ These controlled testing environments **allow emerging startups to experiment with frontier AI applications under the direct, collaborative supervision of regulatory authorities.**
 - ✦ Within **these sandboxes, companies receive temporary waivers from certain compliance burdens in exchange for granting regulators full transparency** into their model's behavior, training protocols, and risk profiles.
 - ✦ This dynamic feedback loop **enables policymakers to craft precise, evidence-based rules derived from real-world technological capabilities** rather than abstract, outdated legislative assumptions. Ultimately, this collaborative approach **fosters a pro-innovation ecosystem that nurtures sovereign technological capabilities** while simultaneously designing the exact guardrails needed to protect public safety.

- 💡 **Harmonized Global Interoperability Standards:** Because the AI-driven state-capital nexus operates fluidly across borders, managing its influence requires establishing binding, **interoperable global governance standards.** International coalitions must **establish unified technical benchmarks for AI safety, content provenance, and data security to prevent corporations** from exploiting regulatory arbitrage by relocating to permissive jurisdictions.
 - ✦ This measure involves standardizing technical protocols such as cryptographic watermarking for synthetic media and universal incident reporting frameworks to track global algorithmic harms. **Aligning international legal definitions and compliance architectures ensures that multinational tech conglomerates cannot play sovereign nations against one another to dilute ethical requirements.**
 - ✦ By forging a **cohesive global regulatory net,** states can collectively assert **democratic dominance over borderless capital,** ensuring that the trajectory of artificial intelligence serves a unified vision of human progress.

Conclusion:

Artificial Intelligence is **not merely transforming production but reordering power between the state and capital.** By anchoring capital to territory, infrastructure, and data, **AI has dissolved traditional market-state boundaries.** The emerging techno-nationalist compact promises strategic capacity **but risks deepening inequality, surveillance, and democratic erosion.** Managing this transformation demands **proactive governance** that subordinates **technological power to constitutional values and public interest.**



Strengthening India-Brazil Relations

This editorial is based on "[India, Brazil set \\$30 billion trade target by 2030, sign mineral pacts](#)" which was published in The Hindustan Times on 22/02/2026. This

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editorial analyses the evolving India–Brazil partnership against the backdrop of global trade fragmentation and multipolar realignment. It examines historical evolution, contemporary significance, persistent frictions, and future pathways for deepening strategic cooperation.

In an era of trade fragmentation and tariff nationalism, the India–Brazil decision to scale bilateral trade to **\$30 billion by 2030** signals a quiet but consequential Global South recalibration. Beyond commerce, the partnership

anchors **critical minerals, digital public infrastructure, and defence cooperation** to reduce systemic dependence on monopolised supply chains. As a digital superpower converges with a renewable energy and mineral superpower, the relationship reflects a shift from transactional diplomacy to **strategic autonomy through multilateralism**. Together, India and Brazil are scripting a template for **developmental cooperation without hegemonic overreach**.



How India-Brazil Relations Have Evolved Over Time?

- 💡 **Phase 1: The Lusophone Connection & Cold War Ambivalence (1500s – 1980s):** The foundation of the relationship was rooted in historical accidents and Cold War posturing.
 - ✦ **The Lusophone Connection:** The historical link dates back to 1500 when Portuguese explorer Pedro Álvares Cabral was blown off course to Brazil while attempting to follow Vasco da Gama's route to India.
 - 📎 This established centuries of agricultural and cultural exchange, most notably the transfer of Indian Zebu cattle (like the Gir breed) which form the backbone of Brazil's modern livestock.
 - 📎 Between the 16th and 18th centuries, Brazil and Goa, both outposts of the Portuguese imperialist empire, had bilateral exchanges that are reflected in food and dressing as well as local traditions.

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- ✦ **Diplomatic Inception & The Goa Friction:** Formal diplomatic relations were established in 1948. However, early relations faced significant friction.

✍ When India liberated **Goa from the Portuguese in 1961**, Brazil, bound by its deep cultural and diplomatic ties to Portugal initially opposed India's actions at the UN.

- ✦ **Strategic Autonomy:** Despite early tensions, both nations fiercely guarded their strategic autonomy during the Cold War.

✍ A notable convergence occurred when both **New Delhi and Brasília condemned the discriminatory nature of the nuclear Non-Proliferation Treaty, 1968.**

- 💡 **Phase 2: Post-Cold War Realignment & Plurilateral Awakening (1990s – 2005):** The end of the Cold War and mutual economic liberalization forced both nations to look beyond their immediate neighborhoods.

- ✦ As both nations opened their economies in the 1990s, they began viewing each other as massive, untapped emerging markets.

✍ This phase saw the institutionalization of "South-South Cooperation." The creation of the **IBSA Dialogue Forum** (India, Brazil, South Africa) in 2003 was a watershed moment, creating a bloc of multi-ethnic, developing democracies.

- ✦ The signing of the **Bilateral Defense Cooperation Agreement in 2003 (ratified in 2006)** marked the beginning of strategic and military alignments.

- ✦ In 2004, **India and Brazil (alongside Germany and Japan) formed the G4**, uniting their diplomatic weight to lobby for permanent seats on a reformed UN Security Council.

✍ Also, India signed a **Preferential Trade Agreement (PTA)** with the **MERCOSUR bloc** (which includes Brazil) in 2004

- 💡 **Phase 3: The Strategic Partnership & The BRICS Era (2006 – 2020):** Ties were formally elevated, and the relationship became a cornerstone of the new multipolar world order.

- ✦ In 2006, Bilateral ties were officially elevated to a "**Strategic Partnership**," unlocking broader institutional frameworks, including **Joint Commissions on science, technology, and defense.**

- ✦ India and Brazil became foundational pillars of the **BRICS** grouping.

✍ This platform allowed them to challenge **Western-dominated global financial architectures** and coordinate macroeconomic policies.

- ✦ Besides, the **Brazilian TV serial called 'Caminho das Indias' (Path to India)** released in 2009 has had a great impact in enhancing awareness of India in the minds of the Brazilian people.

- ✦ Under the **BASIC** grouping (Brazil, South Africa, India, China), the two nations coordinated tightly at **UNFCCC** summits to protect the economic interests of developing nations against stringent, inequitable climate mandates.

- 💡 **Phase 4: Diversification, Technology & The Global South Vanguard (2021– Present):** The current phase is characterized by **rapid diversification beyond traditional commodities into deep-tech, renewable energy, and critical supply chains.**

- ✦ The relationship has seen **unprecedented VVIP engagement, punctuated by the Indian PM's landmark visit to Brazil in July 2025** and President Luiz Inácio Lula da Silva's **reciprocal State Visit to New Delhi in February 2026.**

- ✦ The February 2026 summit fundamentally upgraded the partnership. The **two nations signed a Joint Declaration on a Digital Partnership** (focusing on AI, supercomputers, and digital public infrastructure) and a landmark MoU on **Rare Earth and Critical Minerals to build resilient, non-Western supply chains.**

- ✦ **Energy Transition Superpowers:** Brazil, a pioneer in ethanol, and India, a solar champion, are deeply integrated in the green transition.

✍ **Brazil is a founding member of the India-led Global Biofuels Alliance (GBA)** and the **International Solar Alliance (ISA).**

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✦ Trade between the two countries stood at \$2.4 billion in 2006, when they formalised their strategic partnership. **It has since expanded to around \$13 billion.**

✍ Recognizing this momentum, **PM Modi and President Lula established an ambitious new target in February 2026, scaling bilateral trade to \$30 billion by 2030.**

What is the Significance of Brazil for India?

💡 **Exponential Trade Growth & Economic Complementarity:** Brazil is indispensable for India's strategic mandate to build resilient supply chains and reduce asymmetric dependencies on adversarial monopolies for next-generation technologies. By anchoring India's transition to green mobility and advanced manufacturing, Brazil acts as a secure geopolitical hedge against the weaponization of critical resources.

✦ Expanding frameworks like the **MERCOSUR Preferential Trade Agreement** provides Indian exporters critical, tariff-reduced access to Latin America.

✦ Bilateral trade witnessed an **impressive 25.5% growth in 2025**, with India maintaining a healthy trade surplus.

✍ Capitalizing on this momentum, the two leaders established an ambitious new target in **February 2026 to scale bilateral trade to \$30 billion by 2030.**

💡 **Defence Co-Production and Aerospace Synergy:** India-Brazil defence ties have dramatically transitioned from simple **buyer-seller dynamics to deep industrial co-production, directly advancing India's Aatmanirbhar Bharat (self-reliance) goals.**

✦ By integrating their defence supply chains, **India not only secures a massive export market but also gains access to advanced aerospace manufacturing technologies.**

✍ This symbiotic ecosystem enhances India's strategic footprint and military-industrial base across the Atlantic.

✍ For instance, **Brazilian aerospace giant Embraer signed a 2026 agreement with Adani Defence to establish a Final Assembly Line for E175 jets in India.**

💡 **Pioneering the Global Energy Transition:** Brazil's unmatched expertise in **bioenergy combined with India's massive scale in renewable deployment** makes this partnership a cornerstone of India's climate action strategy.

✦ Together, **they are redefining the global clean energy architecture**, reducing the developing world's reliance on volatile fossil fuel imports.

✦ This alliance allows India to transition to greener **fuels swiftly while saving billions in foreign exchange.**

✍ The **India-led Global Biofuels Alliance (GBA), strongly backed by Brazil**, is projected to help India save an estimated \$5.4 billion annually in oil imports.

✍ Both countries share common goals in their national biofuel initiatives, **India's National Biofuel Policy and Brazil's RenovaBio Program**, which focus on increasing the blending percentages of biofuels with petrol and diesel, aiming to enhance sustainability and energy security.

💡 **Digital Public Infrastructure (DPI) and AI Integration:** As a rising tech superpower, India is leveraging its relationship with Brazil to globalize its **Digital Public Infrastructure (DPI)** and establish equitable AI governance frameworks.

✦ By exporting scalable **digital solutions to the largest economy in Latin America**, India validates its tech-diplomacy model and creates vast opportunities for its IT sector.

✦ This partnership ensures the **Global South has a definitive voice in shaping future digital norms.**

✍ For example, the **February 2026 Joint Declaration on the "Digital Partnership for the Future"** emphasizes joint DPI initiatives and AI adoption in education.

✍ Furthermore, **the launch of the Open Planetary Intelligence Network (OPIN)** highlights their joint push to merge digital and climate transformations.

💡 **Securing Critical Minerals for Future Technologies:** Securing a resilient, **non-monopolized supply**

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chain for critical minerals is an existential economic priority for India's high-tech and EV manufacturing ambitions.

- ✦ Brazil, possessing vast reserves of rare earths and strategic minerals, serves as a crucial partner in breaking China's dominance over these critical resources.
- ✦ This mineral security is foundational for India's transition to a green and digitally advanced economy.
 - ✍ For instance, during the February 2026 bilateral summit, a landmark Memorandum of Understanding (MoU) on Rare Earth and Critical Minerals was signed.
 - ✍ This agreement directly supports India's domestic battery manufacturing and green energy grids by ensuring a reliable supply of raw materials.
- 💡 **MSME Collaboration and Pharmaceutical Synergies:** Integrating the Micro, Small, and Medium Enterprises (MSME) sectors of both nations unlocks massive grassroots economic potential and cross-border innovation for India.
 - ✦ Concurrently, the alignment in the pharmaceutical sector allows India to solidify its position as the "pharmacy of the world" by penetrating the highly regulated Latin American healthcare market.
 - ✍ This dual focus drives inclusive economic growth and global health equity.
 - ✦ In February 2026, a dedicated MoU was signed between India and Brazil to deepen cooperation in the Micro, Small and Medium Enterprises (MSME) sector.
 - ✍ In pharma, the nations committed to the co-development and technology transfer of essential medicines.
- 💡 **Strategic Geopolitical Alignment & Global South Leadership:** India and Brazil act as the foundational pillars of the Global South, actively coordinating to democratize global governance rather than disrupt it.
 - ✦ By anchoring plurilateral forums like BRICS, IBSA, and the G20, they amplify developing nations' voices against Western-dominated financial architectures.

- ✍ Their shared push for a multipolar world fundamentally strengthens India's diplomatic leverage on the global stage.

- ✦ For instance, during President Lula's February 2026 State Visit to New Delhi, both nations reiterated their joint G4 demand for UN Security Council [UN Security Council](#) reform.

- ✍ Furthermore, PM Modi officially invited President Lula to the 18th BRICS Summit to be hosted by India later in 2026 to consolidate this multipolar agenda.

What are the Key Areas of Frictions in India-Brazil Relations?

- 💡 **Agricultural Competition and the WTO Sugar Dispute:** The most persistent economic friction between New Delhi and Brasília stems from direct competition in the global agricultural market, specifically regarding sugarcane pricing policies.
 - ✦ Brazil contends that India's domestic support mechanisms artificially depress global prices, creating an uneven playing field for market dominance.
 - ✍ In late 2021, the [WTO](#) ruled against India's sugar subsidies following a complaint by Brazil, Australia, and Guatemala, prompting an ongoing unresolved appeal by New Delhi.
 - ✦ Despite recent 2024–2026 dialogues aiming to share Brazilian ethanol technology to absorb India's excess production, structural bottlenecks such as pricing distortions, infrastructure gaps, feedstock variability, and regulatory misalignment continue to limit the full realization of a mutually beneficial biofuel partnership.
- 💡 **Trade Imbalance and MERCOSUR Limitations:** Bilateral economic engagement is structurally constrained by a narrow trade basket and the sluggish expansion of broader regional trade frameworks.
 - ✦ The relationship heavily relies on a few primary commodities, leaving overall trade volumes vulnerable to global price shocks rather than fostering diverse industrial integration.

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- ✍ Furthermore, the lack of a comprehensive free trade agreement restricts deeper market access for specialized sectors like Indian IT and pharmaceuticals.
- ✦ Meanwhile, the **India-MERCOSUR Preferential Trade Agreement (PTA)**, signed in 2004, still remains limited to a highly restrictive list of merely 450 items despite repeated pledges for expansion.
- 💡 **G4 Stagnation and UNSC Reform Deadlock:** The shared diplomatic ambition of securing permanent seats on the **United Nations Security Council (UNSC)** has inadvertently become a source of strategic fatigue.
 - ✦ **Operating under the G4 framework**, both nations invest significant diplomatic capital, but differing regional rivalries fundamentally stall their respective candidacies.
 - ✦ The inability to circumvent the veto powers of existing permanent members, coupled with resistance from within their own BRICS cohort, severely limits the effectiveness of their alliance.
- 💡 **Geopolitical Alignment Issues:** The ongoing expansion and strategic direction of the BRICS+ grouping present nuanced ideological frictions between New Delhi and Brasília.
 - ✦ India actively resists efforts to transform the bloc into an overtly anti-Western coalition dominated by Beijing, preferring a strictly non-aligned, multipolar platform.
 - ✦ Also, while Brazil also balances its Western ties, its recent diplomatic posturing under the Lula administration occasionally aligns with Sino-Russian geopolitical narratives.
 - ✍ Also, Brazil's heavy economic reliance on China as its top trading partner often forces it to walk a tighter diplomatic tightrope, creating subtle rifts in India-Brazil policy coordination.
- 💡 **Critical Minerals and Tech Transfer Limits:** The race to secure critical mineral supply chains reveals underlying friction regarding resource nationalism versus raw material extraction.
 - ✦ India urgently seeks to secure rare earth elements to decouple from Chinese monopolies and fuel its domestic green energy transition.
 - ✍ However, Brazil remains highly protective of its unexploited mineral wealth, demanding substantial technology transfer and local processing investments rather than simply exporting raw ores to India.
 - ✦ A landmark agreement on rare earths and critical minerals was signed in February 2026 during bilateral talks, aiming to stabilize the steel and technology supply chains, however, its long-term credibility will depend on effective implementation and sustained political and commercial commitment.
- 💡 **Biofuel Dominance vs. Energy Security:** While the **Global Biofuels Alliance** presents a unified front, fierce technological and commercial competition simmers beneath the surface of their energy cooperation.
 - ✦ Brazil, as an established global superpower in renewable energy and ethanol production, closely guards its advanced flex-fuel engine and bio-refinery intellectual property.
 - ✍ India, aggressively scaling its own blending mandates to ensure domestic energy security, demands deeper technological concessions that Brazilian private entities are hesitant to surrender cheaply.
 - ✦ Although Brazil recently agreed to share basic ethanol production technology to resolve the WTO sugar dispute, finalizing the commercial terms for business-to-business (B2B) tech transfers remains a contentious negotiating point.

What Measures are Needed to Strengthen India-Brazil Relations?

- 💡 **Critical Minerals Integration:** Fortifying industrial sovereignty requires a synchronized framework for the joint exploration, extraction, and beneficiation of rare earth elements. Deploying shared AI-driven geological surveying technologies will optimize mineral processing methodologies while minimizing ecological footprints.

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- ✦ Establishing **bilateral institutional mechanisms for secure maritime logistics ensures the uninterrupted flow of essential metallurgical inputs.** Aligning strategic reserves policies effectively insulates core manufacturing sectors from unilateral global supply shocks.
- ✦ This **creates a robust, closed-loop supply chain that guarantees long-term industrial security for expanding infrastructural needs.**
- 💡 **Digital Public Infrastructure Interoperability:** Deepening technological synergy **necessitates the architectural integration of digital public infrastructures** to enable seamless cross-border verifiable credentials.
 - ✦ Establishing a **unified intelligence network facilitates the collaborative training of open-source algorithmic models** tailored specifically for Global South demographics.
 - 📌 Governments must institutionalize joint data protection protocols and ethical AI governance frameworks to actively prevent algorithmic bias.
 - ✦ Fostering **institutional linkages between apex technological centers** accelerates the deployment of predictive governance and decentralized finance models.
 - 📌 **This digital convergence fundamentally democratizes technological access** while cementing mutual leadership in global digital policymaking.
- 💡 **Bioenergy and Green Fuel Corridors:** Accelerating the green transition mandates the comprehensive harmonization of biofuel blending mandates and unified alternative fuel benchmarks.
 - ✦ **Nations should operationalize dedicated sustainable aviation fuel corridors backed by mutual certification protocols and green customs fast-tracking.**
 - 📌 Collaborative genomic research into advanced cellulosic ethanol and **next-generation biomass feedstocks systematically resolves agricultural land-use conflicts.**
- ✦ This synergistic energy diplomacy fundamentally **redefines tropical climate action and ensures absolute long-term energy autonomy.**
- 💡 **Defense Industrial Base Amalgamation:** Transitioning toward strategic defense autonomy requires moving beyond transactional procurement into comprehensive co-production ecosystems for aerospace and naval sectors.
 - ✦ **Implementing reciprocal military logistics support agreements directly enhances operational interoperability** and streamlines advanced marine platform maintenance.
 - 📌 Facilitating joint ventures between premier **defense conglomerates will localize the manufacturing of specialized aviation components** and unmanned autonomous systems.
 - ✦ This deep integration inherently **transforms military collaboration into a formidable catalyst for indigenous technological sovereignty.**
- 💡 **Biopharmaceutical Regulatory Convergence:** Strengthening global health security demands the immediate **mutual recognition of pharmaceutical regulatory frameworks and synchronized clinical trial protocols.**
 - ✦ Establishing a **bi-national fast-track approval corridor for active pharmaceutical ingredients** drastically reduces time-to-market for life-saving therapeutics.
 - 📌 **Harmonizing traditional medicine pharmacopeias and integrating smart hospital management matrices** directly optimizes cross-border healthcare delivery.
 - 📌 This structured medical diplomacy ensures equitable healthcare **access while systematically dismantling restrictive non-tariff trade barriers.**
- 💡 **Climate-Resilient Agro-Technology Alignment:** Securing nutritional sovereignty requires systematically dismantling rigid phytosanitary **barriers through mutually recognized electronic certificates of origin.**

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- ✦ Collaborative agricultural research must prioritize the genomic engineering of drought-tolerant seed varieties optimized for shifting tropical monsoon patterns.
- ✦ Integrating precision farming matrices using satellite-based earth observation telemetry optimizes biofertilizer application and soil health monitoring.
 - ✍ This agricultural modernization framework inherently stabilizes global food supply chains while exponentially boosting rural economic resilience.

💡 **Space Domain and Geospatial Intelligence Collaboration:** Elevating extraterrestrial diplomacy requires formulating a comprehensive joint roadmap for satellite constellation co-development and deep-space telemetry tracking.

- ✦ Synchronizing earth observation capabilities will drastically enhance real-time disaster management, climate anomaly detection, and maritime domain awareness.
- ✦ Establishing a bilateral astrobiology and microgravity research consortium accelerates civilian technological spin-offs for terrestrial industrial application.
 - ✍ This unified orbital strategy solidifies their presence as dominant space-faring powers while democratizing cosmic access for developing regions.

Conclusion:

In a fragmented global order marked by protectionism and supply chain coercion, **India–Brazil relations are evolving into a pillar of Global South strategic autonomy.** The partnership has transcended trade to encompass **critical minerals, digital public infrastructure, defence co-production, and clean energy transitions.** While frictions persist in agriculture, trade frameworks, and multilateral reform, institutional convergence has steadily deepened. If leveraged with policy coherence and political will, **this relationship can emerge as a blueprint for equitable multipolar cooperation.**



Decarbonizing India'S Development Journey

This editorial is based on "[From budget provision to national capability: Why India's CCUS commitment matters](#)" which was published in The Hindustan Times on 23/02/2026. This editorial provides a comprehensive status on India's multidimensional decarbonization strategy, it critically examines the friction between coal-based energy security and the ambitious leap toward a technology-led, net-zero industrial landscape.

India is driving a multi-pronged decarbonization strategy to reach **Net Zero by 2070**, anchored by an ambitious target of **500 GW of non-fossil fuel capacity** by 2030 and a record **24% budget increase** for the Ministry of New And Renewable Energy in 2026. This push integrates the **National Green Hydrogen Mission** (targeting 5 MMT annual production) with a new **₹20,000 crore** commitment to **CCUS** for hard-to-abate sectors like steel and cement. By launching a domestic **Carbon Credit Trading Scheme (CCTS)** by mid-2026 and establishing "**Rare-Earth Corridors**" for EV supply chains, India is evolving from simple energy substitution to a comprehensive, technology-led industrial transformation.

What Strides is India Taking Towards the Decarbonisation of Its Development Trajectory?

- 💡 **Heavy Industry Decarbonization (CCUS):** India is pragmatically addressing hard-to-abate industrial emissions by shifting from pure energy substitution to deep industrial transformation.
 - ✦ **Carbon Capture, Utilisation, and Storage (CCUS)** allows the nation to preserve its young manufacturing asset base while aligning with climate imperatives.
 - ✦ By deploying **cluster-based capture facilities in industrial corridors**, India minimizes unit costs and regulatory friction without stalling economic growth.
 - ✍ The 2026-27 Union Budget allocated a landmark **₹20,000 crore** to scale CCUS infrastructure and de-risk private capital.

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- 💡 **Massive Scaling of Non-Fossil Power:** The rapid scaling of utility-scale and decentralized renewable generation capacity **forms the bedrock of India's strategy to decouple economic growth from fossil fuels.**
 - ✦ India is **advancing aggressively toward its 500 GW non-fossil capacity target by 2030**, with **total renewable capacity surpassing the 200 GW milestone.**
 - 📌 As of late 2025, India achieved a landmark in its energy transition, with non-fossil fuel sources accounting for over 51% of its total installed electricity capacity.
 - ✦ The **PM Surya Ghar Muft Bijli Yojana** is driving **rapid rooftop solar adoption** reaching the **30 lakh (3 million) households milestone** as of February, 2026.
- 💡 **Expansion of Green Hydrogen Ecosystem:** Green hydrogen is positioned as the critical vector for decarbonizing heavy mobility, fertilizers, and refining sectors where direct electrification falls short.
 - ✦ **By heavily subsidizing domestic electrolyser manufacturing and molecule production**, the government aims to **establish India as a dominant global green export hub.**
 - 📌 This systemic transition **ensures long-term energy security by replacing imported liquefied natural gas and ammonia** with indigenously generated clean molecules.
 - ✦ The **₹19,744 crore National Green Hydrogen Mission** is executing massive tenders to hit a **5 MMT annual production capacity by 2030.**
 - 📌 Also, the **Ministry of New and Renewable Energy** has formally recognised three major ports **Deendayal Port Authority (Gujarat), V.O. Chidambaranar Port Authority (Tamil Nadu), and Paradip Port Authority (Odisha)** as **Green Hydrogen Hubs** under the **National Green Hydrogen Mission (NGHM).**
- 💡 **Industrial Decarbonization via Carbon Markets:** India is institutionalizing a market-driven approach to emissions reduction through the establishment of a **domestic cap-and-trade compliance mechanism.**
 - ✦ **Carbon Credit Trading Scheme (CCTS) in India** is a mechanism designed to reduce greenhouse gas (GHG) emissions through carbon pricing
 - 📌 By monetizing verified emissions reductions, **the system ensures that private capital flows efficiently toward the most cost-effective decarbonization technologies.**
 - 📌 The framework is **divided into two streams, a mandatory Compliance Mechanism and an Offset Mechanism.**
 - ✦ As of January 2026, the Indian carbon market covers **490 obligated entities across India's most emission-intensive industries.**
 - 📌 The Government of India is notifying **Greenhouse Gas Emission Intensity (GEI)** targets under the CCTS for major carbon-intensive sectors, including **Aluminium, Cement, Refineries, and Petrochemicals**, thereby expanding the Indian Carbon Market's compliance framework.
- 💡 **Push for E-Mobility and Battery Supply Chains:** The electrification of surface transport is fundamentally disrupting urban mobility patterns and curbing the nation's systemic macroeconomic reliance on imported crude oil.
 - ✦ **Supply-side production-linked incentives are synergizing perfectly with demand-side subsidies to exponentially accelerate the adoption of two-wheelers and commercial fleets.**
 - 📌 Concurrent investments in **localized battery supply chains** mitigate the geopolitical risks associated with critical mineral dependencies and secure domestic manufacturing.
 - ✦ **Sustained initiatives like the PM E-DRIVE scheme** are driving EV penetration targets toward **30% of total vehicle sales by 2030.**
 - 📌 Domestic advanced chemistry cell (ACC) battery manufacturing capacity is currently **scaling up rapidly under a dedicated ₹18,100 crore PLI scheme.**
- 💡 **Advancing Grid Energy Storage Infrastructure:** Managing the inherent intermittency of utility-

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scale renewables requires robust, **round-the-clock grid stabilization infrastructure and advanced peak-load shifting capabilities.**

- ✦ Policy focus has aggressively pivoted toward **Battery Energy Storage Systems (BESS)** and pumped hydro projects to ensure long-term national grid resilience.

- ✎ Targeted viability gap funding is unlocking early-stage private investments, effectively turning variable green energy into dispatchable, firm power baseloads.

- ✦ For instance, the **Ministry of Power approved a massive second VGF scheme targeting 30 GWh of standalone BESS. This is funded with ₹5,400 crore from the Power System Development Fund (PSDF).**

💡 **Promoting Biofuels and Circular Economy:** Maximizing the utility of agricultural residue and municipal waste through **biofuels provides a dual solution for urban waste management and rural energy transition.**

- ✦ **Ethanol blending** directly reduces transport tailpipe emissions and import bills while injecting massive additional revenue streams into the agrarian economy.

- ✦ The strategic promotion of **compressed biogas (CBG) creates decentralized, low-carbon energy networks** that are completely independent of global supply chain shocks.

- ✎ For instance, **India successfully hit its 20% ethanol blending in petrol (E20) target ahead of schedule**, cutting millions of tonnes of carbon emissions annually.

- ✎ Further, **India-led Global Biofuels Alliance** is standardizing international markets and **deploying technology-sharing protocols to scale global biofuel adoption.**

💡 **Green Finance and Taxonomy:** Mobilizing vast pools of domestic and international capital is absolutely **critical to funding the massive infrastructure overhaul required for a net-zero trajectory.**

- ✦ The **issuance of sovereign green bonds** establishes an **authoritative pricing benchmark** for private sector green borrowing and **long-term risk assessment.**

- ✦ Regulatory advancements toward a **standardized national green taxonomy** prevent corporate greenwashing.

- ✦ For instance, India has issued **₹15,000 crore in sovereign green bonds in FY26**, taking total issuances to **₹72,697 crore since FY23.** Municipal green bonds could **mobilize USD 2.5–6.9 billion for climate action** by urban local bodies over the next decade.

💡 **Energy Efficiency & Demand Optimization:** Curbing overall energy intensity through demand-side optimization **acts as the absolute most cost-effective and immediate lever for national decarbonization.**

- ✦ Mandatory energy efficiency standards for appliances and heavy industrial processes **drastically shrink the aggregate power demand curve before new generation is needed.**

- ✦ Smart grid deployments and advanced metering infrastructure **empower consumers to actively optimize their consumption based on real-time grid pricing signals.**

- ✎ The **Perform, Achieve and Trade (PAT) scheme** alone has **avoided approximately 110 million tonnes of CO2 emissions annually.**

- ✎ It has saved energy worth **₹55,000 crore per year** by reducing specific energy consumption in energy-intensive sectors.

- ✦ Further, through the **UJALA scheme**, the government aims to save **85 lakh kWh of electricity and 15,000 tonnes of CO2 by replacing 77 crore traditional bulbs & CFLs and 3.5 crore streetlights with LEDs.**

What are the Persisting Issues in India's Decarbonization Push?

💡 **The Coal "Phase-Down" vs. "Phase-Out" Dilemma:** India's rapidly accelerating economic growth mandates an insatiable demand for reliable baseload power, **making a near-term pivot away from thermal generation practically impossible.**

- ✦ Despite aggressive renewable capacity additions, **the national grid's stability remains firmly tethered to coal to prevent mass outages during peak demand hours.**

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- ✦ Coal still accounts for about 72% of India's total electricity generation. To meet the projected electricity demand of India's rapidly expanding economy, 13.32 GW of new coal-based thermal capacity has been awarded in FY 2025-26.
- ✦ Also, millions of people in mineral-rich states such as Jharkhand, Chhattisgarh, and Odisha depend directly or indirectly on the coal value chain for their livelihoods.
 - ✍ Failing to engineer a highly managed "just transition" through aggressive reskilling and economic diversification will inevitably trigger massive localized unemployment and severe political blowback.
- 💡 **The Staggering Green Finance Deficit:** The sheer scale of capital required to fund India's net-zero trajectory heavily outstrips both domestic fiscal capacity and the current velocity of foreign direct investment.
 - ✦ Persistently high domestic costs of capital and currency hedging risks severely deter international institutional investors from committing long-term debt to Indian green infrastructure.
 - ✍ Macroeconomic estimates indicate India requires over \$10 trillion by 2070 to achieve net-zero, translating to an annual funding gap running into hundreds of billions of dollars.
- 💡 **Supply Chain Vulnerability in Critical Minerals:** The rapid transition from fossil fuels to clean technologies replaces a historical reliance on oil cartels with an acute vulnerability to localized critical mineral supply chains.
 - ✦ Domestic scarcity of essential elements like lithium, cobalt, and rare earth metals exposes India to significant geopolitical leverage from dominant global refiners (like China) and hostile state actors.
 - ✦ Developing indigenous processing capabilities and securing overseas mining assets is a highly capital-intensive, multi-year process that constantly threatens to bottleneck domestic EV and storage deployment.
 - ✍ For instance, despite the much-publicized discovery of 5.9 million tonnes of lithium-inferred resources in Jammu & Kashmir, commercial extraction and battery-grade refining remain years away from viability.
- 💡 **Grid Intermittency and High Storage Costs:** Expanding variable renewable energy inherently destabilizes national grid frequency, necessitating massive parallel investments in firming infrastructure and dispatchable storage solutions.
 - ✦ However, the current levelized cost of storage (LCOS) for utility-scale batteries remains prohibitively expensive, deterring distribution companies from signing round-the-clock (RTC) green power purchase agreements.
 - ✦ As per the [National Electricity Plan \(NEP\) 2023](#), India will require around 411.4 GWh of energy storage capacity by 2031–32, of which 236.22 GWh is expected from Battery Energy Storage Systems (BESS).
 - ✍ However, the current pace of storage capacity development remains inadequate to meet this target.
- 💡 **Land Acquisition and Socio-Ecological Friction:** Megawatt-scale solar and wind parks are inherently land-intensive infrastructure projects, inevitably sparking severe socio-economic friction with agrarian communities and indigenous populations.
 - ✦ Ambiguous land titling, protracted environmental clearances, and fierce right-of-way disputes for transmission lines constantly derail project timelines and inflate execution costs.
 - ✦ For instance, in February 2026, a massive 700-km march was conducted in Rajasthan to protest the diversion of Orans (sacred groves) for solar plants.
 - ✍ Furthermore, major high-voltage transmission projects in Rajasthan frequently face multi-year legal injunctions due to local agrarian protests and overlapping habitats of the critically endangered Great Indian Bustard.
- 💡 **Market Credibility in the Carbon Trading Scheme:** As the Indian Carbon Market (ICM) begins its compliance phase in 2026, concerns persist

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regarding “over-supply” of credits and weak price signals that might fail to incentivize actual technology shifts. Without a robust price-stability mechanism, there is a risk that companies will buy cheap, low-quality offsets rather than investing in deep decarbonization of their industrial processes.

- ✦ Between 2010 and 2022, India already issued 278 million credits in the voluntary carbon market, accounting for 17% of global supply. Experts warn that without a Price Adjustment Mechanism, credit prices (currently ₹500-700) may stay too low to drive the adoption of expensive green technologies like Carbon Capture.

What Measures are Needed to Accelerate India's Decarbonisation Efforts ?

- 💡 **Maturing the Carbon Pricing Architecture:** Accelerating decarbonisation demands a rapid tightening of domestic carbon markets through declining emission caps and a credible price floor.
 - ✦ India must shift from voluntary, intensity-based targets to absolute emission caps, especially for hard-to-abate sectors, to create real scarcity and strong price signals.
 - ✦ Linking domestic markets with international carbon frameworks, backed by robust third-party MRV systems, will prevent carbon leakage, curb greenwashing, and mobilise global capital, forcing industries to internalise climate externalities and adopt deep decarbonisation technologies.
- 💡 **Scaling Dispatchability and Ancillary Grid Markets:** Addressing renewable intermittency requires aggressive incentives for energy storage through dedicated ancillary service markets.
 - ✦ Grid regulators must mandate time-of-day pricing and reward peak shifting and frequency regulation.
 - ✦ Allowing revenue stacking, standardising interoperability, and mandating storage co-location in large solar and wind parks will reduce curtailment losses and convert variable renewables into reliable round-the-clock clean power.

💡 **Institutionalising Blended Finance and Green Taxonomy:** Bridging the climate finance gap requires blended finance vehicles that combine sovereign guarantees with concessional multilateral capital to de-risk private investment.

- ✦ India must operationalise a legally binding green taxonomy to prevent capital misallocation.
- ✦ Stricter ESG disclosures and targeted sovereign green bonds for high-risk technologies like offshore wind will lower the cost of capital, unlocking large-scale green infrastructure deployment.
- 💡 **Mandating Green Public Procurement (GPP):** The state must leverage public spending to create assured markets for low-carbon steel and cement through mandatory Green Public Procurement.
 - ✦ Setting rising embedded-carbon thresholds in public projects bridges the green premium constraining heavy industry.
 - ✦ Guaranteed long-term offtake visibility de-risks private investment, allowing public capital to act as a market-maker that drives scale and accelerates cost reductions.
- 💡 **Accelerating CCUS Hub-and-Spoke Deployment:** Scaling CCUS requires shared infrastructure across industrial clusters via a hub-and-spoke model. Government participation as an anchor tenant in pipelines and storage facilities reduces prohibitive upfront costs.
 - ✦ Pooling emissions from steel, cement, and petrochemicals, alongside faster right-of-way approvals and clear long-term liability rules, cuts abatement costs and preserves the competitiveness of India's industrial base.
- 💡 **Indigenizing Circular Economy and Urban Mining:** Supply-chain security demands mandatory closed-loop recycling for batteries and solar components and the formalisation of urban mining.
 - ✦ Strong Extended Producer Responsibility (EPR) norms must enforce rising use of secondary materials.
 - ✦ Subsidising recovery technologies and integrating the informal waste sector will reduce dependence on volatile global mineral markets and decouple clean-tech growth from ecologically destructive extraction.

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- 💡 **Decentralizing Energy via Peer-to-Peer Trading:** Grid democratization requires **regulatory sandboxes** for **P2P electricity trading** among **prosumers and microgrids**.
 - ✦ Enabling households to sell rooftop solar power locally reduces reliance on inefficient utility monopolies.
 - ✦ Mandatory **bidirectional charging** and **V2G integration** can transform EVs into a distributed storage asset, cutting **transmission losses**, enhancing **grid resilience**, and accelerating rural energy autonomy.
- 💡 **Engineering a Managed “Just Transition”:** Phasing down fossil fuels demands a **legally anchored just transition framework** to protect **coal-dependent regions**.
 - ✦ Dedicated **sovereign transition funds** must finance economic diversification and industrial restructuring.
 - ✦ A national **green skills taxonomy**, retraining programs, and repurposing mines into **solar parks or pumped hydro** can generate alternative livelihoods, easing political resistance and ensuring **socially inclusive decarbonisation**.
- 💡 **Optimizing the Agricultural Energy-Water Nexus:** Decarbonising agriculture requires integrating **solarised rural feeders** with **groundwater conservation**. Solar pumps and microgrids must be paired with **smart metering** to prevent aquifer depletion.
 - ✦ Incentivising farmers to sell surplus power and expanding **compressed biogas (CBG)** from crop residue can curb **stubble burning**, boost rural incomes, and transform agriculture into a pillar of India’s **net-zero strategy**.

Conclusion :

India’s decarbonization journey has evolved from aspirational targets into a high-precision industrial strategy, **marked by the 2026 budgetary commitment to CCUS and the operationalization of the domestic carbon market**. Achieving Net Zero by 2070 is thus no longer just an environmental mandate but a fundamental blueprint for India’s future macroeconomic sovereignty.



Recasting India’S Export Competitiveness

*This editorial is based on “**Export Promotion Mission thoughtfully structured; impact uncertain**” which was published in *The Business Standard* on 26/02/2026. This editorial provides a deep-dive analysis of India’s evolving trade landscape, contrasting the high-growth potential of defense and electronics with systemic logistics and green-tax hurdles. It offers a strategic roadmap for a \$2 trillion export economy through digital trade architecture, GVC integration, and structural policy reforms.*

India’s export sector is **undergoing a strategic metamorphosis**, evolving from a reliance on traditional commodities to becoming a high-tech manufacturing hub fueled by the **“Make in India”** initiative. While the **Export Promotion Mission (EPM)** and its ₹25,060 crore outlay address structural bottlenecks like trade finance and compliance, the broader vision integrates digital trade reforms and global value chain participation. **By diversifying into electronics, renewables, and defense**, India is positioning itself not just as a global supplier, **but as a resilient alternative in the shifting landscape of international trade**.

What are the Emerging Growth Drivers in India’s Export Economy?

- 💡 **Electronics & Premium Smartphone Manufacturing:** India is rapidly transitioning from a basic assembly destination to a sophisticated global manufacturing hub, aggressively capturing the **“China Plus One” supply chain realignment**.
 - ✦ This structural pivot is strictly fueled by **Production-Linked Incentive (PLI) schemes** that actively incentivize deep-tier component manufacturing and localized ecosystems.
 - 📌 Consequently, the sector has **shifted toward high-value premium devices**, permanently altering India’s export basket and generating massive employment.
 - ✦ For instance, **smartphone exports reached a record \$30 billion** in CY2025 driven heavily by Apple, pushing total electronics exports past the **₹4 trillion** milestone.

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💡 **Services Sector Dominance & GCC Expansion:** The services sector acts as the primary anchor for India's external trade resilience, **effectively cushioning merchandise trade deficits caused by global macroeconomic headwinds.**

✦ This structural advantage **now transcends basic IT outsourcing, driven by the exponential growth of Global Capability Centers (GCCs)** delivering **high-end R&D, AI, and financial solutions.**

✦ By aggressively climbing the technological value chain, **Indian knowledge exports are cementing their absolute indispensability in global corporate operations.**

📌 For example, services exports touched an all-time high of **\$387.6 billion** in FY25, with January 2026 alone contributing an estimated **\$43.90 billion.**

💡 **Defense Indigenization and Strategic Export Pivot:** India has orchestrated a profound strategic reversal, **pivoting from historical import reliance to aggressively emerging as a credible net exporter of advanced military hardware.**

✦ This transformation is underpinned by the **'Atmanirbhar Bharat' mandate**, negative import lists, and the deep integration of private MSMEs into the defense manufacturing ecosystem.

📌 Defence Public Sector Undertakings (DPSUs) and other PSUs accounted for **approx. 77% of total production**, while the private sector contributed 23%.

✦ By **securing international contracts for complex weapons systems**, India simultaneously achieves strategic defense autonomy and establishes new geoeconomic leverage across the Global South.

✦ For instance, defense exports surged to a record **₹23,622 crore (\$2.8 billion)** in FY24-25. India now exports to **over 100 nations**, including to the United States, France and Armenia.

📌 Also, India is pursuing significant **export deals for BrahMos missiles, with countries like Vietnam and Indonesia (after a successful deal with Philippines).**

💡 **Strategic Trade Diversification & FTA Utilization:** To mitigate systemic risks from demand contraction in traditional Western economies, **India has executed a calculated diversification of its export destinations and product portfolios.**

✦ The proactive operationalization of recent **Free Trade Agreements (FTAs)** is aggressively dismantling non-tariff barriers and embedding Indian exporters deeply into complex regional value chains.

📌 This multidimensional hedging strategy ensures that **isolated geopolitical shocks or localized downturns do not disproportionately derail India's long-term macroeconomic momentum.**

✦ For instance, **the India-EFTA Trade and Economic Partnership Agreement (TEPA)**, guarantees a landmark, **legally binding FDI commitment of \$100 billion over 15 years.**

📌 Additionally, recent agreements such as the **India-EU FTA** and the **India-New Zealand FTA**, provide tariff elimination on several key Indian exports.

✦ Reflecting this, **UNCTAD** currently ranks India **third in the Global South** for trade diversification.

💡 **High-Value Pharmaceuticals & Engineering Upgradation:** India's legacy strongholds in engineering and pharmaceuticals are experiencing a critical qualitative renaissance, **systematically moving from low-margin volumes to complex, compliance-heavy categories.**

✦ The pharmaceutical sector is **evolving far beyond basic generics to produce advanced biologicals**, successfully capturing highly regulated global healthcare markets.

✦ Similarly, **engineering exports are upgrading via advanced manufacturing to cater directly to high-tech global automotive, aviation, and infrastructure supply chains.**

📌 For instance, Engineering goods exports surpassed the **\$10.40 billion mark in January 2026.**

✦ Further, Overall pharmaceutical exports rose **9.4% to \$30.47 billion in FY25**, crossing the **\$30 billion milestone.**

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💡 **Cross-Border E-Commerce & D2C Globalization:** India's cross-border e-commerce is rapidly evolving into a structural pillar of international trade, aggressively democratizing **global market access for domestic MSMEs and artisanal clusters.**

- ✦ Propelled by the **Foreign Trade Policy's** dedicated mandate and the expansion of integrated logistical hubs like **Dak Niryat Kendras**, grassroots producers are seamlessly integrating into **international B2C supply chains.**
- ✦ This targeted digital globalization deliberately shifts the export paradigm from traditional **bulk B2B shipments to high-margin, direct-to-consumer (D2C) retail across global marketplaces.**
- ✦ Reflecting this institutional push, India is actively targeting **\$200 to \$300 billion** in e-commerce exports by FY30, leveraging a domestic D2C segment projected to grow at a **40% CAGR** to reach **\$60 billion** by 2027.

💡 **Agricultural Resilience & Value-Added Food Processing:** The agricultural export sector is deliberately transitioning from volatile raw commodity shipments to climate-resilient, **value-added processed foods, securing a robust global trade surplus** despite geopolitical headwinds.

- ✦ Backed by **expansive APEDA market intelligence** and the operationalization of domestic **Mega Food Parks**, Indian agribusinesses are decisively capturing highly lucrative international niches in ready-to-eat meals and organic millets.
 - 📌 For instance, agricultural exports maintained a formidable **\$51.9 billion** milestone in 2025.

💡 **Clean Energy Manufacturing & Solar Module Exports:** India is aggressively capitalizing on global energy transition realignments, positioning its domestic manufacturing as the premier, risk-mitigated alternative to Chinese dominance in clean energy supply chains.

- ✦ **Supercharged by multi-billion-dollar Production-Linked Incentive (PLI) allocations, domestic solar PV manufacturing has**

achieved unprecedented scale, swiftly converting historical import dependency into export supremacy.

- ✦ By actively capturing demand from Western markets executing strict geopolitical de-risking and anti-dumping measures, India is successfully embedding its clean tech components **into the multi-trillion-dollar global decarbonization mandate.**
- ✦ Highlighting this rapid momentum, **India's solar module exports rose 30.7% in April-October 2025, with the US accounting for almost the entire increase in shipment value.**

What are the Key Issues Associated with India's Export Sector?

💡 **Structural Logistics Constraints:** Despite the push under **PM Gati Shakti** and a recent **decline in logistics costs** as a percentage of GDP, India's logistics cost remains a structural disadvantage compared to peer manufacturing hubs, **primarily due to an over-reliance on road transport over more efficient rail or inland waterways.**

- ✦ This modal imbalance, combined with "last-mile" inefficiencies at secondary ports, **inflates the final landed cost of Indian goods**, making them less competitive in price-sensitive global markets.
- ✦ For instance, **roads dominate with about 71% of freight movement, railways carry around 18%, while Inland Water Transport remains marginal at just 2%.**
 - 📌 In contrast, **countries like China rely far more on railways for bulk cargo movement**, significantly lowering logistics costs and enhancing export competitiveness.

💡 **The CBAM and Green Protectionism Hurdle:** The European Union's **Carbon Border Adjustment Mechanism (CBAM)**, which entered its financial phase in **January 2026**, poses a severe threat to India's carbon-intensive exports like steel, aluminum, and cement.

- ✦ Many Indian MSMEs lack the sophisticated **"carbon accounting"** infrastructure required

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for compliance, risking either high carbon taxes or total exclusion from the lucrative EU market.

- ✦ Recent data suggests Indian steel exporters may face an additional tax burden of **20–35%**, **potentially wiping out the price advantage** of Indian-made primary metals in Europe.

✍ Although **India has strategically secured a Most Favoured Nation (MFN) clause to guard against discriminatory carbon pricing**, the real challenge lies in the practical implementation and harmonization of these complex extraterritorial compliance mechanisms.

- 💡 **MSME Credit Gap and Formalization Stress:** While the MSME sector is the backbone of Indian exports, it continues to **suffer from a massive structural credit gap** that prevents small firms from scaling up to meet global quality standards.

- ✦ The transition to a **“formalized” digital economy has increased short-term compliance costs**, and many small exporters find it difficult to secure collateral-free working capital despite various government guarantee schemes.

- ✦ The current **credit gap for MSMEs is estimated at a staggering ₹30 lakh crore**, with high interest rates for export credit often being **2–4%** higher than those available to global competitors.

- 💡 **Low FTA Utilization and Information Asymmetry:** India has signed several high-profile **Free Trade Agreements (FTAs)** recently, yet the **“utilization rate” among domestic exporters remains disappointingly low due to complex Rules of Origin (RoO)** and a lack of awareness.

- ✦ Many exporters continue to **pay full MFN (Most Favoured Nation) duties** because the administrative cost of proving domestic value-addition outweighs the potential tariff benefits.
- ✦ For instance, while **FTA trade grows at 12%**, the **actual utilization rate for older agreements remains below 25%**, compared to **70–80%** in advanced trading nations.

- 💡 **Inverted Duty Structures in Manufacturing:** A persistent **“Inverted Duty Structure”** where raw materials are taxed at a higher rate than finished products **continues to disincentivize domestic value-addition in critical sectors** like electronics and chemicals.

- ✦ This makes it cheaper to import the final product than to manufacture it locally for export, **effectively “exporting” potential jobs and manufacturing growth to other nations.**

- ✦ For example, raw materials like **rubber or specialty chemicals often have higher tax rates compared to finished goods in India**, making imported tyres cheaper to bring in than producing them domestically.

- ✦ Additionally, **India’s historical dependence on China for over 70% of its API requirements** exposes the rapidly growing pharmaceutical export sector to critical supply disruptions and arbitrary price hikes.

- 💡 **Non-Tariff Barriers (NTBs) and Quality Compliance Issue:** Indian exporters increasingly face sophisticated Non-Tariff Barriers, **such as stringent Sanitary and Phytosanitary (SPS) measures in the US and EU**, which often act as **“hidden protectionism”** against Indian agri-products.

- ✦ The lack of globally accredited testing laboratories at the local cluster level means that even high-quality products are frequently rejected at destination ports due to minor procedural or residue mismatches.

- ✦ Under the **Harmonized System code HS04**, which includes dairy products as well as eggs and honey, **India faced 344 shipment rejections in the United States and Australia between 2010 and 2024.**

- 💡 **Concentration Risk in the Export Basket:** Despite efforts to diversify, India’s merchandise export basket remains heavily concentrated in **a few categories like petroleum products and gems & jewelry**, which are highly sensitive to global commodity price swings.

- ✦ This lack of **“depth” in high-technology manufacturing (outside of smartphones)** leaves the overall trade balance vulnerable to **external shocks** and shifts in global demand.

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What Measures are Needed to Strengthen India's Export Competitiveness?

- 💡 **Unified Digital Trade Architecture (TRACE):** India must operationalize an end-to-end, AI-driven **"Single Window 2.0"** that merges customs, shipping lines, and quality certification bodies into a real-time interoperable ecosystem.

 - ✦ By automating **"Rules of Origin"** verification and implementing **"Trusted Supplier"** green-channel clearances, the state can eliminate the bureaucratic friction that currently delays shipment cycles.
 - ✦ **This digital-first approach institutionalizes transparency and drastically reduces the high compliance cost** for MSMEs entering complex global value chains.
- 💡 **Strategic "GVC-First" Component Manufacturing:** Policy must pivot from final assembly to deep-tier component manufacturing by **aggressively expanding "Sovereign Industrial Corridors"** dedicated to high-tech sub-assemblies.

 - ✦ Through targeted **PLI 3.0 schemes for rare earth processing**, semiconductor materials, and chemical intermediates, India can **secure its upstream supply chain and reduce "imported inflation"** within its export goods.
 - ✦ This structural **deepening ensures that the domestic value-add increases**, transforming India from a packaging hub into a **global design and manufacturing anchor**.
- 💡 **Green Transition and "Carbon-Neutral" Branding:** With the **EU's CBAM and global ESG** mandates becoming non-negotiable, **India needs a national "Green Export Credit"** facility to subsidize the decarbonization of energy-intensive sectors like steel and textiles.

 - ✦ **Establishing indigenous "Carbon Accounting" frameworks** and accredited green-labeling bodies will allow Indian exporters to bypass predatory carbon taxes at destination ports.
 - ✦ This **proactive environmental compliance turns a potential trade barrier** into a unique competitive advantage, **positioning "Made in India" as a premium sustainable choice**.
- 💡 **Port-Led Industrialization and Modal Rebalancing:** To resolve the logistics bottleneck, India must fast-track the integration of **Dedicated Freight Corridors (DFCs)** directly into automated **"Mega Ports"** to ensure a seamless **"Rail-to-Ship" transition**.

 - ✦ Shifting the logistics mix from road to cost-effective coastal shipping and inland waterways will structurally deflate the landed cost of **Indian exports by at least 20-30%**.
 - ✦ Integrating **"Multi-Modal Logistics Parks" (MMLPs)** with specialized cold-chain and hazardous-material storage will allow for the export of high-value perishables and specialized chemicals.
- 💡 **Institutionalized FTA Utilization Hubs:** The government should establish **"FTA Facilitation Centers"** at the district level to provide granular, commodity-specific intelligence on tariff benefits and non-tariff barriers in partner countries.

 - ✦ By deploying **"Trade Attaches" focused solely on on-ground market intelligence** and B2B matchmaking in emerging markets **like the GCC and Africa**, India can move beyond signing pacts to actually harvesting them.
 - ✦ Addressing **information asymmetry ensures that small-scale exporters can navigate complex legalities and utilize preferential duties** to outcompete regional rivals.
- 💡 **Diversified Trade Finance and Export Factoring:** Strengthening the export sector requires moving beyond traditional bank loans to a robust **"Export Factoring"** and **"Deep-Tier Financing"** ecosystem that provides immediate liquidity against digital invoices.

 - ✦ By integrating TReDS with international trade platforms, MSMEs can unlock working capital without collateral, mitigating the **"liquidity trap"** caused by long global payment cycles.
 - ✦ Establishing a **"Sovereign Export Insurance Fund"** with **higher risk-appetite for non-traditional markets** will embolden exporters to explore high-growth regions in Latin America and Central Asia.
- 💡 **Global E-Commerce Export Hubs (ECEHs):** Creating specialized **"E-Commerce Export Zones"** with

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simplified “Return & Re-export” policies and integrated courier terminals is essential for capturing the global B2C retail wave.

- ✦ These hubs should offer “bonded warehousing” and automated GST refunds for small-value shipments, allowing Indian D2C brands to compete directly on global platforms like Amazon and Etsy.
- ✦ This measure democratizes exports, allowing artisanal and “One District One Product” (ODOP) clusters to reach global consumers without the need for traditional bulk distributors.

💡 **Quality Harmonization and Global Standards Alignment:** India must pursue “Mutual Recognition Agreements” (MRAs) with major trading partners to ensure that Indian laboratory certifications are accepted globally without redundant testing.

- ✦ Investing in “National Quality Infrastructure” and state-of-the-art testing clusters will bridge the gap between domestic production and hyper-stringent international SPS (Sanitary and Phytosanitary) standards.
- ✦ This measure prevents the frequent rejection of agri-products and pharmaceuticals, safeguarding India’s reputation as a reliable, high-standard supplier in the global marketplace.

Conclusion:

India’s export trajectory is transitioning from a volume-driven commodity base to a value-driven high-tech ecosystem, bolstered by strategic indigenization and supply chain realignment. While structural hurdles like high logistics costs and green protectionism persist, the integration of digital trade architecture and GVC-focused manufacturing offers a resilient pathway. Ultimately, the success of this metamorphosis depends on the seamless execution of the Export Promotion Mission and the active utilization of global trade agreements. Achieving the \$2 trillion export target by 2030 remains a tangible reality if India continues to balance competitive pricing with global quality standards.



Rewriting India’s Developmental Trajectory Through AI

This editorial is based on “AI for all: On the India AI Impact Summit 2026” which was published in The Hindu on 24/02/2026. This editorial examines how Artificial Intelligence is reshaping India’s development through governance, agriculture, healthcare, finance, and climate resilience. It also highlights structural constraints and policy pathways for building a sovereign, inclusive AI ecosystem.

Artificial Intelligence has emerged as a critical general-purpose technology shaping India’s next phase of development, as reflected in the unprecedented enthusiasm witnessed at the India AI Impact Summit 2026. With one of the world’s largest digitally connected populations, India is rapidly transitioning from an AI consumer to a developmental user of intelligent systems. AI now sits at the intersection of economic transformation, governance efficiency, and social inclusion, promising productivity gains across sectors. How India deploys, governs, and indigenises AI will decisively influence the trajectory of its developmental journey in the coming decade.

What are the Current Trends in Leveraging AI for India’s Development?

- 💡 **Multilingual Natural Language Processing Bridging the Digital Divide:** India is bypassing generic AI to build sovereign, language-inclusive DPI that dismantles linguistic barriers to governance and digital equity.
 - ✦ This structural integration democratizes state services, ensuring that vernacular diversity no longer obstructs civic participation or economic access for marginalized populations.
 - ✦ The **BHASHINI** platform illustrates how AI is deepening digital inclusion in India by deploying AI language models across 36+ text and 22+ voice languages, including dialects like Awadhi and Braj.
 - 📌 Also, Bengaluru-based startup Sarvam AI has introduced two advanced, indigenous

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Large Language Models (30B and 105B parameters) designed for India's multilingual landscape.

- 💡 **Precision Agriculture & Risk Mitigation:** AI is transitioning **Indian farming from reactive methods to proactive precision models** that mitigate macroeconomic risks like monsoon volatility and resource wastage.
 - ✦ Synthesizing satellite and soil data at the micro-level stabilizes rural supply chains and optimizes yields through hyper-localized agronomic interventions.
 - ✦ The **National Pest Surveillance System (NPSS)** demonstrates AI-driven precision agriculture by covering **66 crops** and monitoring **432+ pest species** through AI/ML image analytics.
 - 📎 **YES-TECH, CROPIC, and the PMFBY WhatsApp Chatbot** are leveraging AI-enabled tools to make crop insurance under PMFBY more innovative, faster, and more transparent for farmers.
 - ✦ Also, the Union Budget 2026-27 proposed **Bharat-VISTAAR**, a multilingual AI tool to integrate the **AgriStack portals and the ICAR package** with AI systems.
- 💡 **Conversational AI for Financial Inclusion:** Voice-activated AI is radically deepening financial inclusion by replacing complex visual interfaces with intuitive, natural language commands for the digitally illiterate.
 - ✦ This **shift eradicates friction in P2P and micro-merchant transactions**, accelerating the flow of formal credit into previously isolated rural markets.
 - ✦ **UPI 123PAY** demonstrates conversational AI-led financial inclusion by enabling **voice-based transactions for feature phone users**, eliminating app literacy barriers.
- 💡 **Sovereign AI Compute & Data Localization:** India is aggressively building domestic **GPU clusters and AI-ready data centers** to secure intellectual property and prevent reliance on foreign hyperscalers.
 - ✦ This sovereign compute strategy ensures that **sensitive national datasets and security algorithms remain strictly within Indian regulatory and physical jurisdiction.**

- ✦ Backed by the Union Budget 2026's ₹1,000 crore allocation for the IndiaAI Mission, the **government extended data center tax holidays up to 2047.**

- 💡 **Decentralized Rural Governance:** AI is **restructuring rural administration by automating the documentation of panchayat proceedings**, removing the bureaucratic bottlenecks that historically stalled local development.
 - ✦ **Vernacular speech-to-text models enforce radical transparency**, ensuring grassroots decisions are audited and archived in real-time without manual administrative bias.
 - ✦ In FY 2024-25, the **eGramSwaraj portal (to which SabhaSaar AI too is integrated)** successfully onboarded over **2.53 lakh gram panchayats.**
- 💡 **AI-Enabled Healthcare Triage:** Decentralized AI networks are bridging the specialist deficit by deploying automated **diagnostic tools and computer vision to rural point-of-care facilities.**
 - ✦ This democratizes clinical expertise, allowing for early pathology detection and maternal risk assessment **without requiring immediate physical hospital infrastructure in tier-3 regions.**
 - ✦ The **Suman Sakhi chatbot** showcases AI-enabled **maternal healthcare** by delivering **24x7 Hindi guidance via WhatsApp** on antenatal care, high-risk pregnancies, and schemes like **Pradhan Mantri Matru Vandana Yojana**, lowering access barriers for rural women.
 - ✦ Moreover, **ASHA workers** now use **AI-powered tools like Shishu Maapan** to record newborn anthropometric measurements (**weight, height, head circumference**) using a **simple 15-second smartphone video.**
- 💡 **Climate Resilience & Geospatial Monitoring:** India is operationalizing high-fidelity machine learning to forecast extreme weather and **monitor ecological assets, shifting national strategy from recovery to preemptive mitigation.**
 - ✦ These geospatial models process complex **data to predict localized floods or droughts more accurately than legacy deterministic systems**, safeguarding vulnerable coastal economies.

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✦ For instance, the **BhuPRAHARI**, integrates AI and geospatial technologies to monitor assets created under MGNREGA. The platform will **now be utilised for monitoring assets created under the Viksit Bharat-Guarantee for Rozgar and Ajeevika Mission (Gramin) (VB-G RAM G)**.

✦ The **Bharat Forecasting System (BharatFS)** demonstrates AI for climate resilience by delivering **village-level, 6 km resolution rainfall forecasts up to 10 days ahead**.

💡 **AI-Driven Skilling & Human Capital:** Institutional frameworks are using AI-driven **personalized learning** to align the national workforce **with deep-tech demands, closing the skill gap in tier-2 and tier-3 cities**.

✦ This proactive strategy ensures India's demographic dividend **becomes a globally competitive, AI-fluent talent pool rather than facing economic obsolescence**.

✦ The Union Budget 2025-26 allocated **₹500 crore for a Centre of Excellence in AI for Education** to feed the **booming GCC ecosystem**.

📌 Also, Budget 2026 proposed the creation of a high-powered **"Education to Employment and Enterprise"** Standing Committee to strengthen the link between education, jobs and enterprise creation.

💡 **Strategic Collaboration for AI:** India has formally joined the **U.S.-led Pax Silica initiative to co-secure the entire AI technology stack**, from critical minerals to advanced semiconductor fabrication.

✦ This move marks a departure from non-alignment to a **"Trusted Trade"** paradigm, ensuring that India is **not just a consumer but a primary manufacturing node in the global silicon supply chain**.

What are the Key Takeaways from India AI Impact Summit 2026?

💡 **Global Participation & Consensus:** **88 countries and international organisations** signed the **New Delhi Declaration on AI**.

✦ Signatories included major AI powers like the **U.S., China, and France**.

📌 The declaration emphasises:

- ✦ Voluntary, non-binding commitments
- ✦ "Democratic diffusion" of AI
- ✦ AI for economic growth and social good

✦ Summit continues a series that began in **2023 at Bletchley Park (UK)**, followed by **Seoul (2024)** and **Paris (2025)**.

📌 India Prime Minister co-chaired the 2025 Paris edition with French President **Emmanuel Macron**.

💡 **New Delhi Declaration:** The Declaration outlines several institutional mechanisms:

✦ **Global AI Impact Commons:** A shared database of AI use cases for countries to replicate and adapt.

✦ **Trusted AI Commons:** Repository of benchmarks, tools and best practices for secure AI systems.

✦ **International Network of AI for Science Institutions:** Linking global technical institutes for research collaboration.

✦ **AI Workforce Development Playbook:** Framework for reskilling and future workforce preparation.

✦ **AI for Social Empowerment Platform:** Focus on inclusion and developmental applications.

💡 **Investment Announcements**

✦ **Total commitments: \$250 billion in overall AI investments**

📌 **\$20 billion for frontier deep-tech research**

💡 **India's Domestic Positioning:** Projected India as an **AI infrastructure and innovation hub**

✦ Focus areas: healthcare, agriculture, education

✦ Launch of India's first domestically trained multi-billion parameter LLMs by **Sarvam AI**

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Other Major AI Summits

- 💡 **AI Action Summit, Paris (February 2025):** It successfully launched the “Public Interest AI Platform” to help developing nations build sovereign compute capacity without falling into “digital neo-colonialism.”
- 💡 **AI Seoul Summit, South Korea (May 2024):** Building on previous safety frameworks, this summit prioritized “Innovation and Inclusivity” alongside safety, leading to the historic “Seoul Declaration.”
- 💡 **GPAI New Delhi Summit, India (December 2023):** India utilized this summit to position “Digital Public Infrastructure” (DPI) as the primary vehicle for democratic AI access.
 - **AI Safety Summit, Bletchley Park (November 2023):** With the landmark “Bletchley Declaration” which acknowledged that advanced AI poses “existential risks” requiring global oversight.

What are the Key Issues Faced by India in Leveraging AI for its Developmental Journey?

- 💡 **Severe Compute Infrastructure Deficit:** India’s ambition to transition from an AI consumer to an AI creator is severely bottlenecked by a massive deficit in high-performance compute infrastructure.
 - ✦ Without a robust, sovereign hardware ecosystem, the nation risks long-term digital colonization and loss of technological autonomy to global hyperscalers.
 - ✦ For instance, despite generating nearly 20% of the world’s data consumption, India currently hosts less than 5% of global data center capacity.
- 💡 **Acute AI Workforce Skilling Gap:** The rapid integration of AI across enterprise sectors has severely outpaced human technological readiness, creating an acute employability gap in the domestic labor market.
 - ✦ While India produces a high volume of traditional IT graduates, the academic curriculum structurally lacks the practical,

domain-specific training required for advanced machine learning and foundational model development.

- ✦ Industry projections indicate that India’s AI sector will generate over 2.3 million job openings by 2027, yet the qualified talent pool is only expected to reach 1.2 million (as per research data released by Bain & Co).
- 💡 **Exponential Energy and Grid Strain:** The aggressive expansion of AI-ready, high-density data centers is placing unprecedented stress on India’s national power grid and fragile environmental resources.
 - ✦ Training and running advanced AI models require massive electricity and water for cooling, directly conflicting with the nation’s aggressive decarbonization and sustainability targets.
 - ✦ Electricity consumption from Indian data centers is projected to surge dramatically from 10–15 TWh in 2024 to 40–45 TWh by 2030.
 - 📎 With high-growth digital corridors like Maharashtra and Tamil Nadu expected to add 2–3 GW of peak demand each, the pace of AI infrastructure growth is rapidly outstripping new clean power generation.
- 💡 **Deepfakes and the Erosion of Information Integrity:** The democratization of generative AI has catalyzed a surge in highly realistic synthetic media, fundamentally threatening democratic integrity, personal privacy, and public trust.
 - ✦ The rapid proliferation of deepfakes, voice clones, and fabricated official records outpaces traditional content moderation, disproportionately harming vulnerable demographics through financial fraud and non-consensual imagery.
 - ✦ Over 75% of Indians surveyed online in the past year have seen deepfakes, and at least 38% have been targeted by a deepfake scam. (McAfee)
 - ✦ Mitigating this crisis requires a highly delicate regulatory balance between enforcing strict intermediary liability and preserving the open-source innovation ecosystem that startups rely on.

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💡 **Vernacular Data Scarcity and Linguistic Bias:** Developing truly sovereign AI models is heavily constrained by the severe scarcity of high-quality, digitized training data across India's vast linguistic landscape.

✦ Because foundational global models are trained predominantly on Western, English-centric datasets, their application in India frequently results in contextual hallucinations and deep cultural misrepresentations.

📌 Consequently, marginalized populations utilizing regional dialects risk being algorithmically excluded from digital public infrastructure and emerging digital economies if these biases remain uncorrected.

✦ While Sarvam AI built 30B and 105B parameter indigenous LLMs trained on Indian languages, the sheer volume of digitized vernacular data still lags significantly behind English repositories.

📌 Developers face exceedingly high costs and extended timelines to manually curate, clean, and digitize regional datasets to ensure accurate algorithmic reasoning for tier-3 and rural users.

💡 **Concentration of Venture Capital and Funding Imbalance:** India's AI startup ecosystem suffers from a stark funding imbalance, where venture capital is heavily concentrated among a few high-profile generative AI firms while early-stage startups struggle.

✦ This financial bottleneck prevents smaller innovators from scaling their prototypes, effectively monopolizing the domestic AI landscape and suppressing diverse technological advancements.

✦ Also, the Budget 2026 decision to halve allocation for the IndiaAI Mission to Rs 1,000 crore in 2026-27 from Rs 2,000 crore this fiscal year has raised concerns over the country's AI push.

💡 **Hardware Dependency and Geopolitical Vulnerability:** India's macroeconomic strategy for AI is dangerously reliant on a highly monopolized global supply chain for advanced semiconductor chips and specialized accelerators.

✦ India currently imports roughly 90–95% of its semiconductors from, or through, countries like China, Taiwan, and South Korea to meet its rapidly growing electronics market needs.

✦ The inability to domestically manufacture high-end graphic processing units (GPUs) leaves the nation vulnerable to international export controls, geopolitical embargoes, and aggressive pricing dynamics.

📌 This fundamental lack of hardware sovereignty means India remains a net importer of core AI technology, severely undercutting its strategic autonomy on the global stage.

💡 **Regulatory Issues and Compliance Friction:** The integration of AI into government decision-making for welfare distribution (DPI) lacks "Explainable AI" (XAI), leading to high rates of "algorithmic exclusion" where legitimate beneficiaries are denied aid by opaque code.

✦ Also, without a unified, predictable legal framework, multinational and domestic companies face high compliance costs and litigation risks, chilling potential foreign direct investment.

✦ The operationalization of the Digital Personal Data Protection (DPDP) Act, combined with the stringent new 2026 IT Rules for synthetic media, has dramatically increased compliance overhead for developers.

✦ Tech industry bodies in 2026 are actively petitioning for clear legislative safe harbors and a centralized national AI regulatory stack to resolve crippling data ownership and IP transfer ambiguities.

💡 **Pseudo-Innovation-The "Import-and-Rebrand" Crisis:** India faces a growing challenge where academic institutions prioritize optical "firsts" and volume-based metrics over genuine deep-tech R&D, leading to the rebranding of off-the-shelf foreign technology as in-house innovation.

✦ This trend of "Pseudo-Innovation" creates a deceptive narrative of self-reliance while stalling actual engineering capabilities and eroding the integrity of India's burgeoning "Make in India" AI ecosystem.

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- ✦ For instance, in February 2026, Galgotias University was ordered to vacate AI Summit Expo after falsely claiming a **Chinese-made “Unitree Go2” robotic dog was an in-house development named “Orion.”**

What Measures are Needed to Effectively Utilize AI for India’s Development?

- 💡 **Democratizing Sovereign Compute through Federated GPU Clusters:** India must establish **decentralized, public-private federated compute clusters** to dismantle capital barriers for deep-tech startups.
 - ✦ This model **socializes hardware costs, allowing indigenous firms to transition from foreign model dependency** to sovereign algorithmic development via fractional GPU access.
- 💡 **Mandating Decentralized Vernacular Data Trusts for Linguistic Equity:** Operationalizing community-owned, cryptographically secure data trusts will resolve linguistic biases by **aggregating high-quality regional datasets with robust IP protections**.
 - ✦ Treating vernacular data as a **public good ensures accurate algorithmic reasoning for rural populations** while preventing extractive global training practices.
- 💡 **Establishing Agile Regulatory Sandboxes for Algorithmic Auditing:** Sector-specific regulatory sandboxes should be deployed to enforce dynamic auditing and stress-testing of high-stakes AI applications before population-scale rollout.
 - ✦ This adaptive governance model **proactively neutralizes hidden biases and ensures constitutional equity** without stifling the agility of the domestic startup ecosystem.
- 💡 **Integrating AI Micro-Credentialing into Core Vocational Frameworks:** National skilling frameworks **must pivot to hyper-modular AI micro-credentials**, focusing on prompt engineering and human-in-the-loop workflows for the existing labor force.
 - ✦ This continuous **cognitive upskilling prevents algorithmic obsolescence** and transforms the demographic dividend into a globally competitive, **AI-fluent talent pool**.

- 💡 **Enforcing Green AI Mandates for Grid-Responsive Infrastructure:** Mandating liquid-cooling efficiencies and captive renewable energy for all AI data centers **will decouple digital growth from intense ecological and grid strain**.

- ✦ By **prioritizing computationally efficient, low-parameter models**, India can expand its sovereign compute capacity **without jeopardizing national decarbonization targets or water resources**.
- 💡 **Standardizing Edge AI Protocols for Rural Healthcare Triage:** Standardizing interoperable Edge AI architectures **allows for specialist-level diagnostics on point-of-care devices** in regions with zero connectivity.
 - ✦ Shifting computation to the **device level democratizes rural healthcare, transforming reactive treatment** into an algorithmically augmented, proactive safety net.
- 💡 **Deploying Open-Access Geospatial APIs for Climate Resilience:** Providing open-access, **state-maintained APIs for geospatial machine learning will empower local administrators with real-time predictive intelligence** on meteorological anomalies.
 - ✦ This democratized analytical capacity shifts the national climate strategy from expensive **disaster recovery to hyper-targeted, algorithmically guided preemptive resilience**.
- 💡 **Structuring Sovereign Blended Finance Vehicles for Deep-Tech:** India must deploy sovereign blended finance vehicles **to provide patient capital for hardware-intensive, low-margin AI sectors like agronomy and education**.
 - ✦ Utilizing **state-backed funds to de-risk long development cycles** attracts private institutional investment and prevents the **monopolistic stagnation of the AI landscape**.

Conclusion:

India’s AI journey is a strategic shift from being a “digital backyard” to a “sovereign tech powerhouse,” as evidenced by the **New Delhi Declaration 2026**. By anchoring AI in Public Digital Infrastructure and local vernaculars, the nation is redefining inclusive growth for the Global South. However, **the long-term success of this**

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vision depends on ensuring that rapid innovation does not outpace ethical governance. Ultimately, India's ability to balance its demographic dividend with algorithmic intelligence will decide its status as a leading global technology architect.



India-Israel Ties- From Tactical Engagement to Structural Partnership

This editorial is based on "An Israel visit- its strategic, economic, regional impact" which was published in The Hindu on 25/02/2026. This editorial examines the transformation of India-Israel ties into a "Special Strategic Partnership," analyzing its multidimensional impact across defense, agriculture, and regional connectivity. It further evaluates the friction points, such as the Iran factor and FTA hurdles, while proposing a roadmap for long-term bilateral resilience.

In an increasingly volatile West Asian region marked by shifting alliances and persistent conflict, **India-Israel relations** have emerged as a pillar of strategic stability. What began as a cautious engagement has evolved into a **deep, de-hyphenated partnership** spanning defence, technology, agriculture and innovation. Shared security challenges and complementary capabilities have pushed ties **from transactional arms trade to joint development and co-production**. Today, the relationship reflects India's pragmatic diplomacy, balancing regional sensitivities while pursuing strategic autonomy and national interest.

How India-Israel Relations Have Evolved Over the Time ?

- 📌 **Phase I- Ideological Estrangement & Hesitation (1948–1992):** During this period, India's foreign policy was anchored in **Non-Alignment (NAM)** and **solidarity with the Arab world**.
 - ✦ Key Developments:
 - 📌 **1947–1950:** India voted against the UN Partition Plan but recognized Israel in 1950.



- 📌 **1953:** Israel opened a **consulate in Mumbai**, but full diplomatic ties remained frozen.
- 📌 **Covert Pragmatism:** Despite the lack of formal ties, **Israel provided critical, discreet military assistance** during the 1965, and 1971 War with Pakistan.

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Phase II: Prudent Rapprochement (1992–2014)

- ✦ The end of the Cold War and the 1991 Madrid Peace Process provided India the “geopolitical cover” to normalize ties.
- ✦ **Key Drivers: Collapse of the Soviet Union** (India’s primary arms supplier), **economic liberalization**, and the **rise of cross-border terrorism**.
- ✦ Key Developments:
 - ✦ **1992:** Full diplomatic relations established under PM Narasimha Rao.
 - ✦ **The Kargil Catalyst (1999):** Israel provided emergency supplies of laser-guided munitions and UAVs when others hesitated, building deep institutional trust.
 - ✦ **Defense-Centric Growth:** The relationship was often described as a “closet affair”, robust in defense and intelligence but low-key in public diplomacy.
 - ✦ **Technological Seeds:** Initiation of the **Indo-Israel Agricultural Project (IIAP)** and cooperation in space (e.g., RISAT-2 launch).

Phase III: The Era of De-Hyphenation & Strategic Depth (2014–2023)

- ✦ The relationship “came out of the closet” and moved toward a public, ideological, and strategic embrace.
- ✦ **Key Drivers: “De-hyphenation”** (treating Israel and Palestine as independent bilateral tracks), shared **concerns over radical extremism**, and India’s **Atmanirbhar Bharat** (Self-Reliant India) mission.
- ✦ Key Developments:
 - 📌 **Strategic Upgrade:** Ties were elevated to a **Strategic Partnership** in 2017.
 - 📌 **Technological Fusion:** Creation of the **I4F (Industrial R&D and Innovation Fund)** to co-develop futuristic tech.
 - 📌 **I2U2 Grouping (2021):** India joined Israel, the UAE, and the USA in a “**West Asian Quad**,” focusing on food security and clean energy.

Phase IV: The Special Strategic Partnership (2024–Present)

- ✦ As of early 2026, the relationship has entered a “**Special**” category, characterized by integration into regional security and high-tech supply chains.
- ✦ Key Developments:
 - 📌 In June 2025, India **abstained** from the **UN General Assembly resolution** calling for an immediate, unconditional, and permanent ceasefire in Gaza, citing a lack of negotiation and an imbalanced text. This decision **reflects India’s nuanced approach, balancing its humanitarian aid to Gaza with strong economic and strategic ties to Israel**.
 - 📌 In February 2026, the relationship was upgraded to a “**Special Strategic Partnership for Peace, Innovation, and Prosperity**.”

Also, the **Bilateral Investment Agreement** was welcomed and formally **advanced Free Trade Agreement negotiations**.

The two countries launched a **new initiative on Critical and Emerging Technologies** covering AI, semiconductors, quantum computing, biotechnology and cyber systems.

India and Israel agreed to establish the **India–Israel Academic Cooperation Forum** to deepen institutional linkages. An MoU between **Nalanda University and Hebrew University of Jerusalem** will promote joint research and academic exchanges.

Also, they decided to **establish an India–Israel Cyber Centre of Excellence in India**.

What is the Significance of Israel for India?

- ✦ **Strategic Defense and National Security:** Israel serves as a bedrock for India’s defense self-reliance by providing “**no-strings-attached**” **technology and critical systems during crises**, especially as India shifts toward indigenous manufacturing.
 - ✦ By shifting from a restrictive buyer-seller dynamic to **joint co-production, India secures critical asymmetric warfare capabilities**.

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- ✍ This **targeted technology transfer in cutting-edge** defensive and offensive weaponry directly neutralizes regional multi-front threats.
- ✦ For instance, India **currently absorbs 34% of Israeli arms exports**, with bilateral defense trade totaling **\$20.5 billion between 2020 and 2024**.
- ✦ Further, according to a recent **Forbes India report**, Israel has **agreed to arms deals worth \$8.6 billion with India in 2026**.
- 💡 **Economic Integration & Trade Resilience:** The economic synergy between New Delhi and Jerusalem is rapidly diversifying **beyond traditional diamonds into high-tech electronics and digital commerce**.
 - ✦ Total merchandise trade between the two countries **stood at USD 3.62 billion in FY 2024-2025**.
 - ✦ Securing a comprehensive **Free Trade Agreement (FTA) acts as a critical strategic gateway** for Indian businesses into wider Mediterranean markets.
 - ✦ This **deepening geo-economic integration builds highly resilient supply chains**, insulating both nations from global maritime and trade disruptions.
- 💡 **Agriculture, Water & Climate Security:** Israel's pioneering **mastery over arid-climate technologies is fundamentally vital for ensuring India's long-term food and water security**.
 - ✦ By institutionalizing **Israeli precision agriculture, micro-irrigation, and wastewater recycling**, India drastically improves crop yields and resource efficiency.
 - ✍ This **grassroots-level agricultural diplomacy directly uplifts millions of Indian farmers** while combating the severe, **unpredictable impacts of global climate change**.
 - ✦ The **Indo-Israel Centres of Excellence (CoE) are high-tech, intensive agricultural hubs** established to facilitate the transfer of Israeli agri-technologies adapted to local conditions.
- 💡 **Labor Mobility & Geopolitical Convergence:** The partnership has seamlessly evolved into a demographic bridge, **aligning India's vast talent pool with Israel's labor-starved industrial sectors**.
 - ✦ This strategic workforce mobility generates a high-value remittance corridor while embedding Indian influence **deeply within West Asian geo-economics**.
 - ✍ Furthermore, this human capital synergy directly anchors broader multilateral frameworks **like the I2U2 grouping and the India-Middle East-Europe Economic Corridor (IMEC)**.
 - ✦ Capitalizing on Israel's recent labor recalibration, **which saw 61,000 new foreign worker permits issued in 2025, Indian talent is rapidly filling critical workforce gaps**.
 - ✦ In a landmark February 2026 agreement, **Israel officially committed to inducting an additional 50,000 Indian workers over five years across construction, manufacturing, and caregiving**.
- 💡 **Critical Technologies & Cyber Defense:** Israel's global dominance in cybersecurity and artificial intelligence **serves as a critical multiplier for India's digital economy** and national security architecture.
 - ✦ The February 2026 bilateral framework **launched a new initiative on Critical and Emerging Technologies** covering AI, semiconductors, quantum computing, biotechnology and cyber systems.
 - ✍ A dedicated **MoU on Artificial Intelligence** was also signed to institutionalize cooperation in frontier technologies.
- 💡 **Space Cooperation & Extraterrestrial Commercialization:** The **ISRO-Israel Space Agency (ISA) partnership perfectly complements Israel's miniaturized payload ingenuity** with India's highly reliable, **cost-effective heavy-lift launch capabilities**.
 - ✦ This **symbiotic space diplomacy enhances dual-use earth observation arrays**, strengthening both **climate-resilient agricultural monitoring and strategic military surveillance**.

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- ✦ Pooling resources for deep-space missions and satellite communications ensures both nations remain highly competitive in the rapidly commercializing global space economy.
- ✦ India has successfully launched multiple Israeli satellites over the years, including the strategic radar imaging RISAT series and the student-built DUKIFAT-3.
- 💡 **Geostrategic Minilateralism (I2U2 & IMEC):** India aggressively leverages its profound Israeli ties to anchor influential minilateral coalitions, providing a strategic counterweight to China's expanding footprint in West Asia.
 - ✦ Integrating Israel into the I2U2 framework and the India-Middle East-Europe Economic Corridor (IMEC) transforms fragmented bilateral ties into a unified regional architecture.
 - 📎 At the first I2U2 summit, the UAE pledged \$2 billion for food parks in India .
 - ✦ Despite intense regional hostilities throughout 2024 and 2025, the February 2026 strategic dialogues decisively reaffirmed both nations' financial commitments to IMEC's trans-regional rail-to-port infrastructure.

What are the Areas of Friction in the India-Israel Relationship?

- 💡 **The Iran Paradox & Strategic Balancing:** India's deepening engagement with Iran, specifically via the Chabahar Port, remains a primary point of contention for an Israel that views Tehran as an existential threat.
 - ✦ New Delhi views Iran as a critical gateway to Central Asia and a vital energy partner, a stance that directly clashes with Israel's objective of total diplomatic and economic isolation of the Iranian regime.
 - 📎 India's 10-year lease for the Chabahar Port (signed 2024) and continued discussions on the International North-South Transport Corridor (INSTC) signal long-term commitment to Iran.

- ✦ However, India also distanced itself from SCO's statement that "strongly" condemned Israeli military strikes on Iran in June 2025, underscoring its effort to maintain a balanced diplomatic stance with both Israel and other regional partners.
- 💡 **Divergence on the Palestinian Statehood Question:** Despite its "de-hyphenation" policy, India maintains a principled, historical commitment to a sovereign, independent State of Palestine, which frequently irks right-wing Israeli administrations.
 - ✦ While India has moved closer to Israel on counter-terrorism, it consistently votes in favor of a Two-State Solution at the United Nations, contrasting with the current Israeli government's expansionist rhetoric in the West Bank.
 - 📎 Also, the Government of India released US\$2.5 million to the 'United Nations Relief and Works Agency for Palestine Refugees in the Near East' (UNRWA), as part of its annual contribution of US\$5 million for the year 2024-25.
 - ✦ At the October 2025 NAM Summit, India reiterated that a negotiated two-state solution is the "only viable path," a statement that stood in stark contrast to the Netanyahu government's contemporary posture.
- 💡 **Defense Dependency vs. Technology Sovereignty:** India's "Atmanirbhar Bharat" (Self-Reliant India) mission creates friction with Israel's traditional "buyer-seller" model, as New Delhi now demands full Transfer of Technology (ToT) and intellectual property rights.
 - ✦ Israel, protective of its niche technological edge, often hesitates to share core source codes or sensitive high-end algorithms, leading to prolonged procurement delays.
 - 📎 While Israel is a major arms supplier to India, current joint ventures still face challenges regarding the "Indigenous Content" percentage.
- 💡 **Economic Protectionism & FTA Hurdles:** Despite decades of talk, the India-Israel Free Trade Agreement (FTA) remains unsigned due to persistent disagreements over market access for agricultural products and chemical patents.

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✦ India's protective stance on its domestic farming sectors **clashes with Israel's desire to export high-tech agricultural solutions without heavy tariffs.**

✎ Conversely, **India seeks greater mobility for its IT professionals**, which faces periodic resistance from Israeli labor unions.

✦ Also, during 2024-25, **India's exports to Israel fell 52% to \$2.14 billion, down from \$4.52 billion in 2023-24.**

💡 **Cybersecurity Ethics & The Pegasus Shadow:** The recurring controversy surrounding Israeli-made spyware, specifically **Pegasus**, continues to create domestic political friction in India and complicates bilateral **"Deep Tech" cooperation.**

✦ While the Indian government values **Israeli cyber-intelligence tools**, the fallout from surveillance allegations creates a reputational risk that forces the relationship into a **"low-transparency" zone.**

✎ Investigations into the use of **NSO Group's tools in India have triggered multiple Supreme Court-led inquiries.**

💡 **Regional Volatility & IMEC Viability:** The viability of the **India-Middle East-Europe Economic Corridor (IMEC)** is heavily dependent on regional stability, which is frequently disrupted by the Israel-Palestine and Israel-Hezbollah conflicts.

✦ India's massive investment in this corridor is **"held hostage" by Israeli security decisions that can freeze construction or trade flows indefinitely.**

✦ The **IMEC project**, intended to bring down logistics costs by up to 30%, reduce transportation time by 40%, faced a near-total logistical **halt during the recent regional escalations.**

💡 **The China "Dual-Trade" Dilemma:** India remains deeply wary of Israel's substantial economic ties with China, particularly Beijing's management of the **Haifa Bay Port** and investments in Israeli tech startups.

✦ **New Delhi views China as its primary strategic adversary** and is concerned that Israeli innovations shared with India might also be accessible to Chinese entities via commercial channels.

✦ This creates a **"security vetting" friction** where India occasionally prefers Western or domestic alternatives over Israeli tech to avoid **Chinese "backdoor" risks.**

What Measures are Needed to Strengthen India-Israel Relations?

💡 **Institutionalizing the "Co-Development" Defense Paradigm:** Both nations must move beyond the "buyer-seller" model by operationalizing a dedicated **Joint Defense Technology Fund** to fuel the **co-production of niche military systems under Atmanirbhar Bharat.**

✦ This requires synchronizing the Israeli "battle-proven" algorithm culture with India's industrial-scale manufacturing, specifically focusing on **Directed Energy Weapons (DEWs)**, autonomous drone swarms, and AI-driven predictive maintenance.

✦ By establishing **regional MRO (Maintenance, Repair, and Overhaul) hubs** in India for **Israeli equipment used globally**, the partnership can create a **permanent industrial footprint that ensures strategic autonomy for both.**

💡 **Operationalizing the "Digital Intelligence" & Semiconductor Corridor:** To secure the digital backbone of both economies, India and Israel should launch a high-speed **Cyber-Semiconductor Pathway** that links the **"Silicon Wadi" of Tel Aviv with India's "Semicon City" (Dholera/Bengaluru).**

✦ This involves joint R&D in **"Security-by-Design"** for chipsets and the co-development of sovereign **Quantum Cryptography** protocols to protect critical financial and energy infrastructure.

✦ Establishing a permanent **India-Israel AI Ethics & Innovation Lab** would allow both nations to set global standards for the responsible military and civilian use of artificial intelligence, bypassing dependency on Western or Chinese tech-stacks.

💡 **Institutionalizing Structured "G-to-G" Labor & Talent Mobility:** Following the 2026 mobility agreements, both nations must replace unregulated migration with a **Structured Talent Mobility Framework** that aligns India's vast STEM workforce with Israel's high-tech and industrial labor shortages.

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- ✦ This involves the **“mutual recognition of qualifications”** and the establishment of pre-departure **Centers of Excellence in Vocational Training** within India, specifically tailored to Israeli industrial standards.
- 💡 **Anchoring the “IMEC-I2U2” Connectivity Nexus:** To insulate bilateral trade from regional volatility, New Delhi and Jerusalem must prioritize the physical and digital completion of the **India-Middle East-Europe Economic Corridor (IMEC)**.
 - ✦ This necessitates joint investments in **“Smart Port”** technology at major ports, integrating blockchain-based logistics to ensure seamless, real-time tracking of goods across the Mediterranean-Arabian sea link.
 - ✦ By treating the **I2U2 grouping** as a commercial clearing-house, both nations can de-risk their economic interests, turning the corridor into a permanent, **multi-modal alternative to the Belt and Road Initiative**.
- 💡 **Scaling “Precision Diplomacy” in Water & Agriculture:** The partnership must shift from demonstration-based **“Centers of Excellence”** to large-scale, **Tech-Integrated District Irrigation** projects that bring Israeli desalination and **“Water-Grid”** management to India’s most water-stressed regions.
 - ✦ This involves the mass-deployment of **Satellite-Based Precision Farming** and AI-driven **“Internet of Things” (IoT) sensors** in Indian fields, supported by a joint **Agri-Fintech Fund** that offers micro-insurance to farmers adopting these high-tech tools.
 - ✦ Such a transition would turn **“Agriculture Diplomacy”** into a **“National Security”** asset, ensuring food price stability and climate resilience for India’s massive agrarian population.
- 💡 **Expanding “Minilateral” Space & Satellite Commercialization:** India’s ISRO and the Israel Space Agency (ISA) should establish a **Bilateral Space-Tech Incubation Center** to co-manufacture miniaturized, low-earth orbit (LEO) satellites for global commercial export.
 - ✦ By combining **India’s cost-effective PSLV/SSLV launch capability** with Israel’s miniaturization and Synthetic Aperture Radar (SAR) expertise, the duo can dominate the **“New Space” market for the Global South**.
 - ✦ This measure would **provide critical “eye-in-the-sky”** data for climate monitoring, maritime domain awareness, and border surveillance, **independent of major power satellite constellations**.
- 💡 **Strengthening “People-to-People” Track-II Diplomacy:** The strategic relationship lacks a robust **“civilizational”** layer, which can be addressed by launching more **“Targeted Youth Fellowship”** and an integrated **University Research Exchange** program.
 - ✦ By fostering **deep academic and cultural ties through joint film co-production and “Startup Bridges,”** the partnership can build a domestic constituency in both nations that transcends shifting political administrations.

Conclusion:

The India-Israel partnership has transcended its traditional defense-heavy origins to become a sophisticated, multidimensional alliance essential for India’s technological and food security. While geopolitical divergences on Iran and Palestine persist, the **“de-hyphenation”** strategy ensures that **bilateral pragmatic interests remain insulated from regional volatility**. Moving forward, the successful integration of the IMEC corridor and high-tech co-production will be the true litmus test for this **“Special Strategic Partnership.”**



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1. Despite an expanded legal and institutional framework, wetland degradation in India continues unabated. Analyse the major challenges associated with wetland conservation in India and suggest measures to address them in a rapidly urbanising and climate-vulnerable context.
2. India's health sector reflects a paradox of expanding coverage but persistent inequities.
3. Examine the structural architecture of India's health system and analyse how chronic underfunding and federal asymmetries limit the effectiveness of public healthcare delivery.
4. India's agriculture is witnessing a structural shift from crop-centric growth to allied sectors and value-chain-led development. Critically examine how this transition can enhance farm income resilience amid climate and market uncertainties.
5. "Deep technology is increasingly shaping a country's economic competitiveness and strategic autonomy." Examine India's deep-tech ecosystem in this context, highlighting recent policy initiatives and the structural constraints that continue to limit its scaling.
6. Examine the rationale behind India's strategy of diversifying its trade markets. Discuss the key drivers, challenges, and the measures required to ensure sustainable and resilient trade diversification for India.
7. Despite a rise in defence expenditure, India continues to face persistent capability gaps.
8. Examine the structural and institutional factors that limit the translation of higher defence spending into effective military capability.
9. Critically examine how Budget 2026 reflects a shift from a welfare-based to a rights-based approach towards persons with disabilities, and identify the gaps that still persist.
10. Evaluate the potential of transforming Northeast India from a "transit corridor" to a "value-chain hub" within the Act East framework, highlighting the structural challenges and necessary policy interventions.
11. Infrastructure-led growth has emerged as the central pillar of India's economic strategy. Examine how recent logistics and mobility reforms support this transition.
12. "Despite record capital expenditure, Indian Railways continue to face structural financial and operational constraints." Critically examine.
13. Examine how India is recalibrating its strategic autonomy in response to the increasing weaponisation of trade and energy geopolitics.
14. "Social media regulation in India reflects a tension between safeguarding national security and preserving democratic freedoms." Examine.
15. Tourism in India has the potential to act as a growth engine, employment generator, and soft power tool, yet remains structurally underleveraged. Examine the reasons and suggest measures to unlock its full potential.
16. Despite large-scale welfare schemes, India continues to face high levels of child stunting and anemia. Analyze the structural causes and suggest solutions.
17. Despite rapid advances in AI, semiconductors, and digital public infrastructure, India faces several structural constraints. Discuss the key challenges and suggest measures to address them.

Drishti Mains Questions

18. "The India–UAE partnership has evolved from an energy-centric relationship to a comprehensive strategic and economic corridor." Examine the key drivers behind this transformation. Discuss its significance for India's economic growth, energy security, defence cooperation, and outreach to West Asia and Africa.
19. Examine the key areas of convergence between India and France and assess the challenges that limit the full realisation of their strategic partnership.
20. "Transparency is the currency of accountability in a constitutional democracy." In light of the Digital Personal Data Protection (DPDP) Act 2023, critically analyze the potential impact on the Right to Information (RTI) framework in India.
21. Examine the rise of techno-nationalism in the age of Artificial Intelligence. How does it alter the logic of globalisation and sovereignty?
22. "The transition from energy substitution to deep industrial transformation is critical for India's Net Zero 2070 goal." In this context, evaluate the role of Carbon Capture, Utilisation, and Storage (CCUS) in decarbonizing India's hard-to-abate sectors.
23. "India is pivoting from being a global back-office to a global manufacturing front-office." Critically analyze this statement in the context of recent developments in the electronics and defense export sectors.
24. "India's 'Sovereign AI' strategy is a necessary pivot toward technological autonomy but faces severe bottlenecks in hardware and energy infrastructure." Critically analyze this statement in the context of the IndiaAI Mission 2026.
25. "While defense remains the bedrock of India-Israel ties, the future of the partnership lies in the nexus of food, water, and digital security." Discuss this statement in the context of recent bilateral developments.