ForumIAS

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HISTORY
ECONOMICS
POLITY
SCIENCE AND TECHNOLOGY
GEOGRAPHY AND ENVIRONMENT

INDEX

Examine the bottlenecks in 'Make in India' for defence in light of global conflicts. Evaluate the private sector's role in achieving self-reliance.

Introduction

For India, the world's highest importer of arms, Atmanirbharta (Self-reliance) in defence under the Make in India banner is no longer an economic choice, but a strategic necessity. While defence exports reached an all-time high of over ₹23,600 crore in FY25, critical structural dependencies remain.

Global Conflicts and Lessons for India's Defence Ecosystem

Supply-Chain Vulnerability in Modern Warfare

1. Russia-Ukraine conflict exposed dependence on imported spares, ammunition and semiconductors during prolonged wars. Example: Russian sanctions shock.
2. Export controls and geopolitical disruptions can halt critical upgrades overnight. Example: US chip restrictions.
3. Dependence on foreign OEM software ecosystems creates operational vulnerability. Example: Fighter aircraft maintenance.

Shift Towards Technology-Intensive Warfare

1. Contemporary conflicts increasingly rely on drones, cyberwarfare, AI-enabled targeting and electronic warfare instead of only expensive conventional platforms. Example: Iran UAV strikes.
2. India's procurement model still favors long-cycle acquisitions over rapid innovation. Example: Delayed MRFA project.
3. Defence preparedness now requires software adaptability and indigenous component ecosystems. Example: Battlefield AI systems.

Strategic and Geopolitical Imperatives

1. Self-reliance has become central to strategic autonomy under India's Indo-Pacific doctrine. Example: QUAD security concerns.
2. China's defence-industrial rise demonstrates benefits of indigenous manufacturing depth. Example: PLA modernization.
3. Global fragmentation strengthens the need for diversified domestic production networks. Example: Europe ammunition shortages.

Structural Bottlenecks in Make in India

Institutional and Procurement Challenges

1. Over-centralised procurement and ambiguous Qualitative Requirements (QRs) delay acquisitions by years. Example: Parliamentary Standing Committee findings.
2. Multiple approval layers weaken timely decision-making and technological responsiveness. Example: Defence Acquisition Procedure delays.
3. DPSU (Defence-Public-Sector-Undertakings) dominance often discourages competitive private participation. Example: Nomination-based contracts.

Technological and R&D Constraints

1. India spends less than 1% of GDP on defence R&D, limiting innovation ecosystems. Example: Aero-engine dependency.
2. Weak academia-industry-DRDO collaboration slows commercialisation of prototypes. Example: Kaveri engine project.
3. Import dependence persists in critical materials and electronics. Example: Semiconductor imports.

Financial and Structural Bottlenecks

1. Revenue expenditure on salaries and pensions crowds out capital modernisation. Example: Defence budget composition.
2. Private firms face delayed payments, testing barriers and limited procurement assurances. Example: MSME vendor distress.
3. Lack of integrated component clusters reduces manufacturing depth. Example: Aerospace alloys dependence.

Evaluating the Private Sector's Role in Self-Reliance

Engine of Innovation and Efficiency

1. Private firms contribute over 60% of defence exports through cost-efficient production. Example: Bharat Forge artillery.
2. Start-ups under iDEX and ADITI are advancing drone swarms, AI and quantum technologies. Example: New-age defence startups.
3. Agile production systems enable faster adaptation to evolving warfare needs. Example: Loitering munitions.

Technology Partnerships and Manufacturing Expansion

1. Liberalised 74% FDI norms encourage joint ventures and technology transfer. Example: Tata-Airbus C-295.
2. Private participation strengthens India's integration into global defence supply chains. Example: Boeing-Tata collaboration.
3. MSMEs deepen ancillary ecosystems and employment generation. Example: Tamil Nadu defence corridor.

Strategic and Economic Significance

1. Indigenous defence manufacturing reduces forex outflow and import vulnerability. Example: Atmanirbhar Bharat initiative.
2. Defence exports enhance geopolitical influence and strategic partnerships. Example: BrahMos exports.
3. Competitive private participation aligns with constitutional goals of economic efficiency and innovation-driven growth under Article 39(c). Example: Industrial competitiveness.

Way Forward

1. Provide 10-15 year long-term procurement visibility for private investment.
2. Expand positive indigenisation lists for subsystems and components.
3. Ensure genuine level playing field by separating policy and buyer roles.
4. Strengthen DRDO-private-academia consortia for rapid commercialisation.
5. Focus on R&D incentives and testing infrastructure access for MSMEs.

Conclusion

The nation that swiftly adapts to the technological revolution holds the decisive edge. India's decisive edge cannot be imported, it must be designed, built, and sustained at home. The private sector is ready; the procurement architecture must match its ambition.

Examine how changing Arctic geopolitics impacts India-Nordic ties. Evaluate the strategic significance of India's 'northward turn' amidst rising regional militarization.

Introduction

The 3rd India-Nordic Summit in Oslo (May 2026) marks a critical transition in India's foreign policy, a structural northward turn. The Arctic, traditionally a sanctuary for scientific research, is fast transforming into a theater of militarization, deterrence, and intense resource competition.

Changing Arctic Geopolitics and India-Nordic Relations

Arctic Transformation: From Scientific Commons to Strategic Theatre

1. Rapid Arctic ice melt is opening shipping lanes, hydrocarbons, and rare-earth reserves, intensifying geopolitical competition. Example: Northern Sea Route.
2. Finland and Sweden joining North Atlantic Treaty Organization have transformed Arctic security architecture into a NATO-dominated zone. Example: Nordic NATO integration.
3. Russia-China cooperation in Arctic infrastructure and energy has institutionalised a Polar Silk Road. Example: Yamal LNG project.
4. Militarization of undersea cables, surveillance systems, and naval deployments is increasing regional insecurity. Example: Arctic submarine patrols.

Strategic Relevance for India-Nordic Ties

Geopolitical and Diplomatic Dimension

1. India's Arctic policy is shifting from passive observer status toward active stakeholder diplomacy. Example: Arctic Policy 2022.
2. Nordic countries provide India strategic diversification amid deepening Russia-China proximity. Example: Strategic hedging.
3. India's balanced diplomacy aligns with constitutional principles under Article 51 promoting peaceful international cooperation. Example: Strategic autonomy doctrine.

Climate and Environmental Security

1. Arctic warming directly impacts Indian monsoon variability and Himalayan glacier stability. Example: Barents-Kara linkage.

2. Joint climate modelling with Nordic institutions strengthens India's disaster resilience and food security planning. Example: Arctic-Himalaya corridor.

3. India's Himadri station and IndARC observatory enhance polar scientific capabilities. Example: Svalbard research presence.

Economic and Supply-Chain Significance

1. Nordic nations offer alternative access to critical minerals, reducing overdependence on Chinese processing dominance. Example: Swedish rare earths.

2. Arctic maritime routes can reduce Europe-Asia shipping time significantly. Example: Chennai-Vladivostok corridor.

3. Nordic expertise in shipping digitisation, green ports, and offshore logistics complements India's Sagarmala ambitions. Example: Maritime modernization.

Strategic Significance of India's Northward Turn

Maritime and Energy Security

1. The Arctic's emerging sea lanes complement India's Indo-Pacific maritime vision and trade diversification strategy. Example: NSR connectivity.

2. Norway's offshore energy expertise and Greenland-linked mineral access enhance India's energy resilience. Example: Deep-sea mining cooperation.

3. Ice-class vessel development strengthens India's long-term polar logistics capability. Example: Polar Research Vessel.

Technology and Innovation Partnerships

1. Nordic strengths in semiconductors, AI, batteries, hydrogen, and advanced materials align with India's manufacturing priorities. Example: Industry 4.0 cooperation.

2. Collaboration with Sweden's Esrange Space Centre improves satellite monitoring and remote sensing coverage. Example: Polar satellite tracking.

3. India can leverage Nordic expertise in autonomous maritime systems and cyber resilience. Example: Smart shipping systems.

Green Transition and Sustainable Development

1. Iceland's geothermal expertise offers solutions for Himalayan and Ladakh energy deployment. Example: Geothermal adaptation.

2. Norway leads in carbon capture, green shipping and marine spatial planning. Example: Net-zero cooperation.

3. India-Nordic clean-energy partnerships support commitments under the Paris Climate Agreement. Example: Green hydrogen alliance.

Security and Strategic Autonomy

1. India's northward turn prevents strategic marginalisation in evolving Arctic governance structures. Example: Multipolar diplomacy
2. Deeper Nordic ties reduce excessive reliance on any single Arctic power bloc. Example: Balanced Arctic engagement
3. Presence in Arctic forums strengthens India's profile as a responsible global power. Example: Rules-based governance

Way Forward

1. Appoint a Special Envoy for Arctic Affairs to coordinate policy.
2. Develop indigenous ice-class vessels and polar research infrastructure.
3. Deepen joint R&D with Nordics on climate modelling and green technologies.
4. Establish an India-Arctic Economic Forum for industry linkages.
5. Balance engagement with Russia while expanding Nordic and Quad partnerships.

Conclusion

The 2026 Oslo Summit signals that India's geopolitical horizon now structurally extends to the Arctic Circle. By pivoting from an era of purely academic interest to robust economic and security cooperation with the Nordic states, India can establish itself as a stabilizing, responsible stakeholder in the polar commons.

Critically analyze the ecological and fiscal challenges of India's fertilizer subsidy regime. Evaluate measures required to enhance nutrient use efficiency.

Introduction

Economic Survey 2025-26 and Budget 2026-27 underline sustainable agriculture as central to Viksit Bharat. Yet India's ₹2 lakh crore fertilizer subsidy regime increasingly generates ecological degradation, fiscal stress, and declining nutrient-use efficiency (NUE).

Ecological Challenges of the Subsidy Regime

1. **Distorted NPK Ratios: G**overnment-controlled low price urea and decontrolled phosphatic and potassic fertilizers under the Nutrient-Based Subsidy (NBS) has distorted the NPK ratio to 10:4:1 against the ideal 4:2:1. Example: Punjab.
2. **Soil Degradation and Declining Productivity:** Excessive chemical application depletes beneficial microflora, burning out soil organic carbon and reducing the soil's natural capacity to hold water and nutrients. Fertilizer response ratio declined from nearly $1:10$ during the Green Revolution to about $1:2.7$. Soil Health Card data reveals zinc, sulfur, and iron deficiencies across major agricultural regions. Example: Indo-Gangetic plains.
3. **Environmental and Climate Costs:** Unused fertilizer nutrients create severe externalities:
   Nitrous oxide emissions accelerate global warming.
   Nitrate leaching contaminates groundwater, causing health hazards like Blue Baby Syndrome.
   Runoff triggers eutrophication in rivers and lakes. Example: Yamuna pollution.

4. **Cropping Pattern Distortions:** MSP-backed rice-wheat cultivation encourages excessive fertilizer dependence, undermining pulse-based crop rotations that naturally fix nitrogen. India simultaneously imports pulses despite cereal surplus. Example: Cobweb phenomenon.

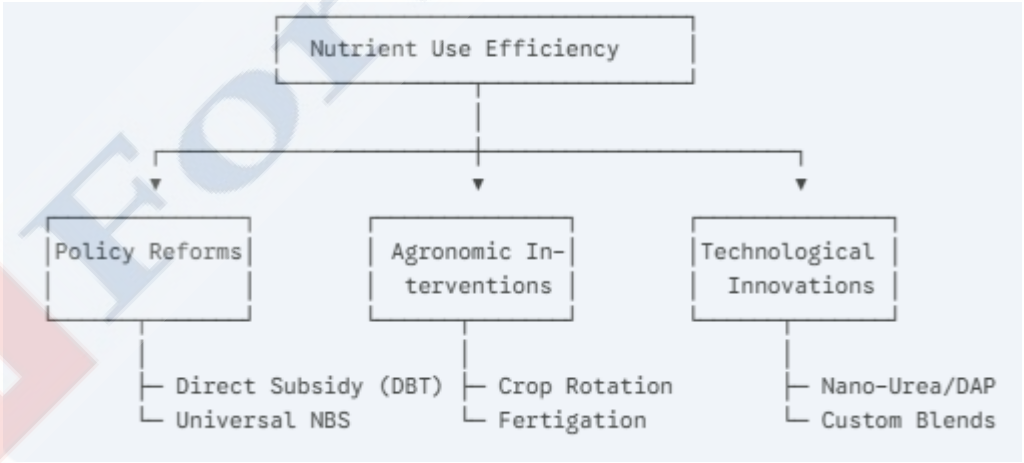
Fiscal Challenges of the Subsidy Regime

1. **Unsustainable Fiscal Burden:** Fertilizer subsidy expenditure crossed nearly ₹2 lakh crore during global commodity shocks. Budget volatility rises with LNG and phosphate import dependence. Subsidies crowd out productive agricultural investments like irrigation and R&D. Example: Capital expenditure squeeze.
2. **Regressive Subsidy Distribution:** Large farmers consume more fertilizers and corner a disproportionate subsidy share. Studies estimate only about one-third of benefits effectively reach small farmers. Example: Landholding disparity.
3. **Leakage and Diversion:** Cheap urea encourages diversion toward industries such as plywood, textiles, and illegal cross-border trade. Subsidizing products instead of farmers creates systemic leakages. Example: Industrial diversion.
4. **Import Vulnerability and Geopolitical Risks:** India remains heavily dependent on imported phosphatic fertilizers and natural gas. Russia-Ukraine and West Asia conflicts exposed fertilizer supply-chain fragility. Example: LNG shock.

Nutrient Use Efficiency (NUE) Crisis

Current NUE remains low at 35-40%, resulting in massive resource wastage.

1. Pricing asymmetry encourages urea overuse while discouraging balanced fertilisation. Example: NBS exclusion of urea.
2. Poor extension services lead to blanket applications instead of precision use. Example: Ignored Soil Health Cards.



Measures to Enhance Nutrient Use Efficiency (NUE)

1. **Rationalizing Subsidy Architecture:** Bring urea under the NBS regime gradually. Shift toward Direct Benefit Transfer (DBT) directly to farmers instead of manufacturers. Promote per-acre nutrient support rather than per-bag subsidy. Example: Targeted DBT.
2. **Precision and Technology-Driven Farming:** Scale Nano Urea and Nano DAP with higher absorption efficiency. Expand fertigation through micro-irrigation under PMKSY. Use AI-based precision agriculture linked to Soil Health Cards. Example: Precision farming.

3. **Reviving Sustainable Cropping Systems:** Incentivize pulse-cereal rotations and green manuring. Align MSP procurement beyond rice and wheat. Promote biofertilizers, compost, and biochar integration. Example: Legume rotation.
4. **Institutional and Governance Reforms:** Revive the Interministerial National Nitrogen Steering Committee. Strengthen agricultural extension services and farmer training. Integrate climate goals with fertilizer policy under India's net-zero commitments. Example: Mission LiFE.

Conclusion

Echoing Dr. M.S. Swaminathan's vision of an evergreen revolution, India must reform fertilizer subsidies toward efficiency, sustainability, and equity to secure food security without sacrificing fiscal stability or ecological balance.

Examine the judicial conflict between UAPA bail restrictions and constitutional safeguards, evaluating how conflicting Supreme Court benches impact personal liberty jurisprudence.

Introduction

The Supreme Court's 2026 *Syed Iftikhar Andrabi* ruling revived debate over Section 43D(5) of UAPA, where stringent anti-terror bail restrictions increasingly collide with Article 21's guarantees of liberty, due process, and speedy trial.

UAPA Bail Regime and The Constitutional Dilemma

1. India's anti-terror framework under the Unlawful Activities (Prevention) Act (UAPA) reflects the State's obligation to preserve sovereignty and national security under Article 355.
2. However, Section 43D(5) imposes exceptionally stringent bail conditions, creating a constitutional friction with Articles 14, 21, and 22 guaranteeing equality, liberty, and procedural safeguards.
3. The debate today is not merely legal, but civilizational: whether constitutional democracy can sustain security without diluting the presumption of innocence. Example: UAPA undertrials.

Judicial Conflict: Statutory Restriction vs Constitutional Liberty

1. **The Restrictive "Watali Doctrine":** In NIA v. Zahoor Ahmad Shah Watali, the Supreme Court held that courts must accept prosecution allegations at face value while deciding bail under UAPA.

   - Courts cannot undertake detailed evidence examination.
   - Defence evidence is severely constrained.
   - Prima facie true became a near-insurmountable threshold.

   This transformed pre-trial detention into prolonged incarceration, effectively reversing the criminal jurisprudence principle that "bail is the rule, jail the exception." Example: Extended undertrial detention.

2. **Constitutional Counterweight:** In Union of India v. K.A. Najeeb, a three-judge bench restored constitutional balance by ruling that statutory embargoes cannot override Article 21 where trials face extraordinary delay.

   - Speedy trial is intrinsic to Article 21.

- Constitutional courts retain inherent bail powers.
- Long incarceration without conviction becomes punitive detention. Example: Delayed terror trials.

Impact of Conflicting Supreme Court Benches

1. **Erosion of Judicial Discipline:** Subsequent two-judge benches adopted divergent approaches: Gurwinder Singh v. State of Punjab revived stricter UAPA standards. Delhi riots-related rulings narrowed *Najeeb*'s applicability. Conversely, Syed Iftikhar Andrabi v. NIA reaffirmed that constitutional liberty supersedes statutory rigidity. Such inconsistency weakens stare decisis and generates uncertainty across subordinate courts. Example: Bail unpredictability.
2. **Punishment Without Conviction:** NCRB data repeatedly indicates extremely low UAPA conviction rates compared to prolonged incarceration periods. Trials often extend beyond 5–10 years and bail denial converts process into punishment. Marginalized groups disproportionately suffer procedural incarceration. Example: Preventive incarceration.
3. **Constitutional and Democratic Implications:** Unchecked executive allegations risk weakening judicial oversight. Article 22 protections become diluted, separation of powers is undermined when courts mechanically defer to investigative agencies. Excessive anti-terror exceptionalism may normalize preventive detention culture. Example: Democratic chilling effect.
4. **International Human Rights:** India remains bound by the International Covenant on Civil and Political Rights (ICCPR), which emphasizes reasonable trial timelines and liberty safeguards. Overbroad detention standards attract criticism from global rights bodies. Example: ICCPR obligations.

Balancing National Security and Liberty

1. **Need for Constitution Bench Clarification:** A five-judge Constitution Bench should conclusively harmonize *Watali* and *Najeeb* principles. Establish objective bail standards. Define constitutional thresholds for prolonged detention. Example: Judicial certainty.
2. **Time-Bound Trial Mechanisms:** Special UAPA courts must ensure expedited trials with statutory timelines. Fast-track evidence and witness procedures. Prevent indefinite incarceration. Example: Speedy justice.
3. **Strengthening Procedural Scrutiny:** Courts should undertake limited but meaningful scrutiny of chargesheets. Discourage politically motivated prosecutions. Reinforce proportionality doctrine under Article 14. Example: Judicial oversight.
4. **Rights-Oriented Criminal Justice Reform:** The Malimath Committee and Law Commission emphasized balancing security with due process. Bail jurisprudence should remain liberty-centric unless guilt is proven. Example: Presumption of innocence.

Conclusion

As Justice H.R. Khanna warned in ADM Jabalpur, liberty once sacrificed rarely returns easily. India's constitutional morality demands that anti-terror laws remain subordinate to due process and human dignity.

Examine how structural learning deficits at the secondary stage drive student dropouts despite high parental aspirations. Evaluate necessary post-RTE policy reforms.

Introduction

According to the Economic Survey 2025-26 and NITI Aayog's school education review, India faces a "learning-

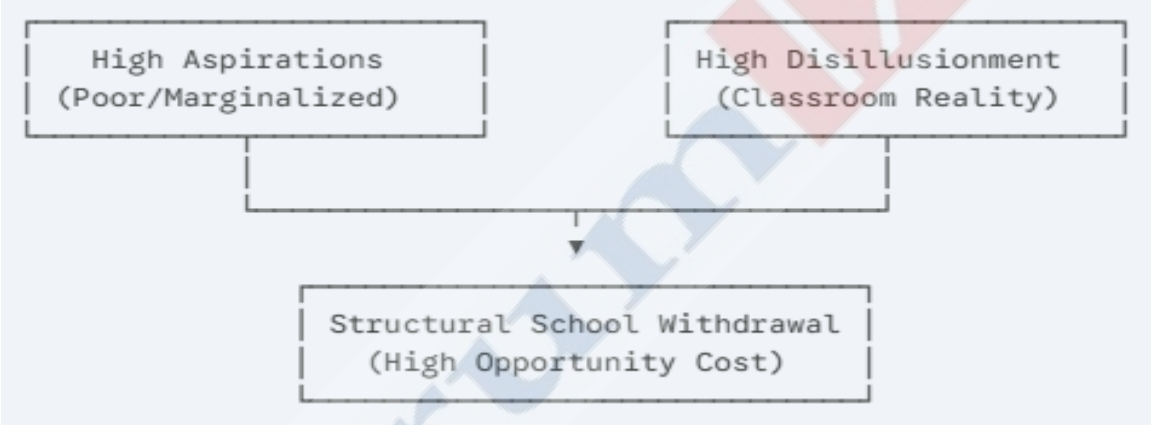
to-earning disconnect" where rising enrolment masks severe secondary-stage learning deficits, undermining demographic dividend aspirations and social mobility.

The Secondary Level (15–17) as the Epicenter of the Learning Crisis

Foundational Learning Crisis and Curriculum Shock

1. India's secondary-stage dropout crisis is fundamentally rooted in weak foundational literacy and numeracy (FLN). ASER findings repeatedly show many Class VIII students struggle with basic arithmetic and reading comprehension. When these students enter Class IX, curriculum complexity sharply rises, causing academic alienation. Example: Class IX failure spike.
2. The earlier Non-Detention Policy under the Right to Education Act masked learning deficiencies by automatically promoting students till Class VIII. Consequently, secondary schooling becomes the first real academic filter rather than a continuum of learning. Example: Hidden deficits.

The Paradox of Aspiration vs. Disillusionment



1. NFHS-V and recent NITI Aayog analyses reveal that poor, SC/ST, minority, and migrant households possess high educational aspirations, viewing schooling as a route to upward mobility.
2. However, poor classroom comprehension, rote pedagogy, and unemployable learning outcomes generate disillusionment. Example: Rural UP.
3. For economically vulnerable families, secondary education carries a high opportunity cost. When schooling fails to translate into visible skills or jobs, adolescents, especially boys, shift to informal labour markets. Example: Bihar migration belt.

Structural and Infrastructural Gaps

1. India's educational architecture resembles a "narrowing pyramid": nearly 7 lakh primary schools exist against far fewer secondary schools.
2. Long travel distances, inadequate transport, and unsafe environments disproportionately affect girls' retention. Example: Rajasthan desert districts.
3. Weak WASH facilities, absence of digital infrastructure, and teacher shortages further intensify disengagement. The issue is particularly acute among tribal and conflict-prone regions. Example: Aspirational districts.

Policy and Governance Lacunae in India's Education Architecture

1. The constitutional guarantee under Article 21A ends at age 14, creating a governance vacuum for the 15–17 age group. While elementary education enjoys statutory accountability, secondary education lacks enforceable entitlements. Example: Post-Class VIII exclusion.
2. Further, educational governance remains excessively input-oriented—tracking enrolment, classrooms, and uniforms rather than actual learning outcomes. This creates administrative success without educational success. Example: Enrolment-centric metrics.

Evaluation of Necessary Post-RTE Reforms

1. **Universalize RTE up to Age 18:** The National Education Policy 2020 recommends universalization of education from preschool to secondary level. Extending Article 21A-backed entitlements till Class XII would institutionalize accountability and reduce structural dropouts. Example: Finland model.
2. **Outcome-Linked Funding:** Educational financing under Samagra Shiksha should incorporate outcome-linked indicators such as FLN proficiency, transition rates, and employability metrics instead of infrastructure alone. Example: Performance-linked grants.
3. **Targeted Remedial Bootcamps:** Implement systemic, multi-month bridging programs at the entry point of Class IX (such as "Teaching at the Right Level") to address foundational learning deficits before subjecting students to board exam curricula. Example: Pratham TaRL.
4. **Vocationalization of Secondary Streams:** Integrating coding, apprenticeships, AI literacy, and vocational streams from middle school onwards can reconnect education with employability and reduce parental disillusionment. Example: German dual-training model.
5. **Technology and Inclusion Reforms:** AI-enabled adaptive learning platforms, portability of entitlements for migrant children, multilingual digital content, and community-based monitoring systems like SHARDA must be scaled nationally. Example: Nagaland Communitisation.

Conclusion

As Amartya Sen argued in Development as Freedom, education must expand human capabilities, not merely enrolment statistics; otherwise, demographic dividend risks degenerating into intergenerational educational and economic exclusion.

Examine why Indian federalism debates must expand beyond Centre-state relations. Evaluate how empowering local governments can kickstart urban innovation and growth.

Introduction

The Economic Survey 2025-26 notes Indian cities generate nearly two-thirds of GDP, yet municipal revenues remain barely 1% of GDP, exposing a federal imbalance where economic engines lack adequate constitutional, fiscal, and administrative empowerment.

Why Federalism Must Expand Beyond Centre–State Relations

Critical Structural Realities

1. **The Scale of Sub-National Governance:** Many Indian cities have populations and economic outputs larger than several sovereign nations. Treating their governance as a localized municipal issue rather than a core federal theme limits national efficiency.
2. **The "Step-Motherly" Devolvement:** While states aggressively guard their autonomy against Central encroachment, they often show the same centralization of power when dealing with local

bodies. The 73rd and 74th Constitutional Amendment Acts (1992) mandated decentralization, but its spirit has been systematically diluted by states reluctant to yield fiscal and political control.

Urbanization and Governance Complexity

1. According to NITI Aayog and UN-Habitat projections, India's urban population may exceed 600 million by 2030. Mega-cities face hyper-local crises air pollution, waste management, flooding, transport congestion, and housing stress that centralized state bureaucracies cannot micromanage effectively. Example: Bengaluru flooding.
2. Urban governance today directly affects macroeconomic productivity, climate resilience, and public health, making cities central to federal stability itself. Example: Delhi pollution crisis.

Democratic and Social Effect

1. Local governments deepen participatory democracy by bringing governance closest to citizens. Marginalized groups, women, and minorities gain political voice through ward-level representation and reservations mandated under constitutional amendments. Example: Women sarpanches.
2. Further, decentralized governance strengthens social trust and civic accountability, reducing alienation from distant state capitals. Example: Kerala participatory planning.

How Local Empowerment Drives Innovation and Growth

1. **Unlocking Municipal Bond Markets:** Empowered, credit-worthy cities can independently issue municipal bonds to fund massive infrastructure projects without relying on state hand-outs.
2. **Optimizing Local Revenue:** Giving local bodies autonomy over property taxes, land monetization, and user charges creates a direct financial incentive to foster a business-friendly environment that attracts private investments.
3. **Agglomeration Economies:** Cities are natural cradles for innovation because they concentrate talent, capital, and academic institutions. Accountable local governments can design targeted bylaws, create localized startup zones, and deploy smart-city tech far more dynamically than a centralized state bureaucracy.
4. **The Mayor-in-Council Model:** Empowering city mayors with long, fixed tenures and executive authority (similar to global hubs like New York, London, or Shanghai) provides the political stability needed to execute long-term economic visions.
5. **Economic and Climate Resilience**: Empowered ULBs are critical for India's green transition and disaster resilience. Climate adaptation urban drainage, heat action plans, waste recycling, and sustainable transport requires decentralized execution rather than distant policymaking. Example: Chennai floods.

The Structural Triad of Impediments: Funds, Functions, and Functionaries

The Crisis Dimension	Core Roadblock / Bottleneck	Impact on Local Autonomy
Funds	Municipal revenues in India hover at a stagnant 1% of GDP, compared to roughly 6% in Brazil and 7.4% in South Africa.	Extreme fiscal dependency on discretionary state grants, freezing long-term capital planning.
Functions	Parastatal agencies (like state-controlled Development Authorities and Water Boards) routinely usurp the 18 subjects listed under the 12th Schedule.	The democratic link is broken; elected municipal corporations are reduced to dealing with minor maintenance while losing control over major city planning.

Functionaries	Bureaucratic leadership (Municipal Commissioners appointed by the state) holds real executive power, leaving the elected Mayor as a nominal head.	Bureaucrats are accountable to state capitals rather than city residents, which fundamentally weakens local democratic accountability.

Way Forward

1. Implement predictable, formula-based fiscal devolution to ULBs through State Finance Commissions.
2. Transfer all 18 functions under the 12th Schedule fully to elected municipalities.
3. Institutionalize directly elected mayors with executive authority and fixed five-year tenure.
4. Integrate metropolitan governance authorities for transport, housing, and climate planning.
5. Expand digital governance platforms and participatory budgeting mechanisms. Example: Porto Alegre model.

Conclusion

As B.R. Ambedkar emphasized, democracy must become "a mode of associated living"; empowering local governments transforms federalism from administrative decentralization into genuine grassroots democratic and economic nation-building.

https://www.thehindu.com/opinion/op-ed/drone-mania-separating-hype-from-battlefield-reality/article71003125.ece

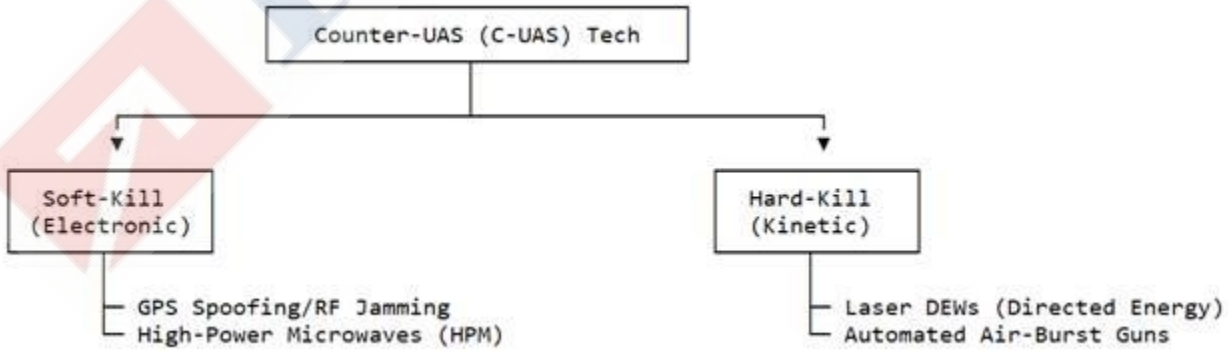
https://indianexpress.com/article/explained/explained-law/why-bcci-is-not-covered-under-the-right-to-information-act-10698809/?ref=explained_pg

Q.1) Critically analyze the battlefield reality of rapid drone advancements against evolving countermeasures. Evaluate its implications for modern asymmetric warfare.

Introduction

Economic Survey 2025-26 identifies autonomous warfare and AI-enabled defence systems as emerging strategic disruptors, while Budget 2026-27 expanded indigenous defence innovation funding, reflecting how drone warfare increasingly shapes contemporary asymmetric conflict doctrines globally.

Drone Revolution and the Changing Nature of Warfare



Battlefield Reality of Drone Advancements

1. **Extreme Cost Asymmetry:** Cheap FPV drones costing a few hundred dollars can destroy tanks, radar systems, or artillery worth millions, fundamentally altering attrition economics. Example: Ukraine FPV strikes.
2. **Democratization of Airpower:** Commercial-off-the-shelf (COTS) components enable even non-state actors to access precision-strike capabilities once monopolized by advanced militaries. Example: Hezbollah fibre-optic drones.
3. **High Attrition and Vulnerability:** Despite operational success, battlefield drone survival rates remain extremely low due to jamming, spoofing, and air-defence interception. Their lifespan is often measured in hours. Example: Electronic warfare zones.
4. **Supply-Chain Dependence:** Dependence on imported semiconductors, batteries, and Chinese electronics creates strategic vulnerabilities in prolonged conflicts. Example: Lithium bottlenecks.
5. **Environmental Constraints:** Adverse weather, mountainous terrain, dust storms, and electromagnetic disturbances sharply reduce drone effectiveness compared to conventional artillery or aircraft. Example: High-altitude operations.

Evolution of Countermeasures

1. **Soft-Kill Mechanisms:** RF jamming disrupts operator control, GPS spoofing diverts autonomous navigation and cyber intrusion hijacks communication links. Example: Russian EW systems.
2. **Hard-Kill Technologies:** Directed Energy Weapons (DEWs) such as lasers offer near-zero marginal interception cost. High-Power Microwave (HPM) systems disable electronics instantly. Automated air-burst guns neutralize swarms kinetically. Example: Israeli Iron Beam
3. **AI-Integrated Defence Networks:** Modern militaries increasingly integrate radar, electro-optical sensors, AI tracking, and automated firing systems into layered air-defence shields. Example: European Drone Wall Initiative.

Implications for Modern Asymmetric Warfare

1. **Decentralization of Combat:** Persistent drone surveillance makes large troop concentrations vulnerable, forcing militaries toward dispersed squad-based warfare. Example: Trench warfare adaptation.
2. **Shift from Platform-Centric Warfare:** Traditional superiority based on tanks or fighter jets is increasingly challenged by low-cost autonomous systems. Warfare now rewards adaptability over expensive hardware accumulation. Example: Loitering munitions.
3. **Blurring of State–Non-State Divide:** Insurgent groups can now deploy capabilities approaching conventional militaries, reducing entry barriers into high-intensity warfare. Example: ISIS drone adaptation.
4. **Strategic Depth Erosion:** Drones extend kinetic threats deep into national interiors, requiring round-the-clock homeland air defence. Example: Operation Spider's Web.
5. **Ethical and Legal Challenges:** AI-enabled lethal autonomy raises serious concerns regarding accountability, proportionality, and compliance with International Humanitarian Law (IHL). UN discussions on autonomous weapons continue unresolved. Example: Killer robots debate.

Implications for India's Security Architecture

1. **Western Front Challenges:** Pakistan-backed groups increasingly employ drones for smuggling narcotics, weapons, and explosives across Punjab and Jammu borders. Example: Punjab drone drops.

2. **Northern Front Competition:** China's PLA integrates autonomous swarms and sophisticated EW systems along the Line of Actual Control (LAC), threatening Indian logistics and forward deployments. Example: Tibetan plateau surveillance.
3. **Indigenous Defence Push:** Schemes like iDEX, the Drone Rules 2021, and the proposed "Sudarshan Chakra" air-defence architecture aim to build indigenous drone and anti-drone ecosystems. Example: DRDO DURGA-II.

Way Forward

1. Accelerate indigenous DEW and HPM deployment.
2. Develop AI-enabled autonomous drones resilient to jamming.
3. Strengthen semiconductor and battery self-reliance under Atmanirbhar Bharat.
4. Integrate civilian and military drone regulation architecture.
5. Expand tri-service integrated C-UAS command structures.
6. Promote agile procurement and battlefield innovation cycles.

Conclusion

As President A.P.J. Abdul Kalam envisioned in India 2020, technological superiority must combine innovation with strategic wisdom; future warfare will favour resilient ecosystems, not mere fascination with disruptive weapons.

Analyze the legal parameters defining a 'public authority' under the RTI Act. Evaluate the tension between institutional autonomy and accountability in sports governance.

Introduction

Economic Survey 2025-26 emphasized transparent institutions as pillars of democratic governance, while India's expanding sports economy and Budget 2026-27 investments in sporting infrastructure revived debates on accountability, autonomy, and RTI applicability to sports bodies.

Legal Parameters Defining a 'Public Authority' under the RTI Act

The Right to Information Act, 2005 operationalizes citizens' fundamental right to know under Article 19(1)(a). However, transparency obligations apply only to entities classified as "public authorities" under Section 2(h).

1. **Constitutional and Statutory Origin:** A body qualifies if established: by the Constitution, by parliamentary/state legislation, by government notification/order. Thus, institutions like the Election Commission or SEBI fall squarely within RTI jurisdiction. In contrast, the Board of Control for Cricket in India is registered under the Tamil Nadu Societies Registration Act, making it a private association rather than a statutory body. Example: Society registration.
2. **Ownership and Government Control Test:** Section 2(h) extends to bodies "owned, controlled or substantially financed" by government. The Supreme Court in Thalappalam Service Cooperative Bank Ltd v State of Kerala clarified that control must be "deep and pervasive," not merely regulatory oversight. Mere licensing or supervision does not amount to state control. Example: Regulatory distinction.
3. **Substantial Financing Principle:** Direct or indirect public funding must be material to the entity's survival. Tax exemptions, police deployment, or subsidized infrastructure alone are insufficient. The CIC's 2026 ruling held that BCCI's revenues arise primarily from IPL broadcasting, sponsorships, and ticketing rather than government grants. Example: IPL media rights.

4. **Public Function vs. Statutory Text:** A major jurisprudential tension exists between: **De facto public role** and **De jure legal structure**. Although BCCI selects Team India and monopolizes cricket administration, the Supreme Court in Zee Telefilms Ltd v Union of India ruled that performing public functions alone does not convert a private body into "State" under Article 12 or a "public authority" under RTI. Example: Cricket monopoly.

THE GOVERNANCE GAP

De Facto Public Function	De Jure Private Ambit
• Selects national teams (Team India). • Monopolizes a public sport. • Uses national flags/symbols.	• Registered as a private body. • Receives zero state grants. • Funded by IPL & media rights.

Case for Institutional Autonomy

1. **Protection from Political Interference:** Autonomy safeguards sports administration from regime-driven interference, preserving sporting neutrality and compliance with global norms. International bodies like the International Olympic Committee discourage governmental intrusion. Example: IOC suspension risks.
2. **Operational and Commercial Flexibility:** Modern sports governance involves rapid commercial decisions, broadcasting negotiations, franchise management, and sponsorship contracts. Excessive bureaucratic scrutiny may reduce efficiency. Example: IPL ecosystem.
3. **Market-Based Financial Independence:** Self-funded bodies argue that absence of taxpayer dependence weakens justification for intrusive RTI obligations. Example: Broadcasting revenues.

Case for Greater Accountability

1. **Public Character of Sports Governance:** Sports bodies wield enormous public influence by selecting national teams, managing public emotions, and utilizing national symbols. Example: Team India selection.
2. **Use of Public Resources:** Even autonomous federations benefit indirectly through state-funded security, concessional land, public stadiums, and diplomatic support. Example: Police deployment.
3. **Corruption and Governance Concerns:** The Indian Premier League spot-fixing controversy exposed opacity, conflict of interest, and governance deficits within cricket administration. Consequently, the Lodha Committee and Law Commission's 275th Report recommended bringing BCCI under RTI. Example: Governance reforms.
4. **Democratic Accountability:** Transparency strengthens procedural fairness in athlete selection, sponsorship allocation, and financial management, especially where monopolistic control exists. Example: Athlete grievances.

Way Forward

1. Enact a comprehensive National Sports Governance Law.
2. Mandate proportional transparency linked to public funding.
3. Institutionalize independent sports ombudsmen and ethics bodies.
4. Expand proactive disclosures under Section 4 RTI spirit.
5. Separate commercial operations from regulatory functions.
6. Strengthen athlete representation in governance structures.

Conclusion

As B.R. Ambedkar warned, constitutional morality demands balancing liberty with accountability; sports governance must preserve institutional autonomy while ensuring transparency proportionate to public trust and democratic legitimacy.

Examine the physical mechanisms responsible for heatwaves. Why are they scientifically characterized as stagnant atmospheric anomalies rather than traveling thermal waves?

Introduction

IMD data warn that India's heatwaves are becoming longer, earlier, and deadlier. These events emerge from stagnant atmospheric blocking systems rather than moving thermal disturbances across regions.

Physical Mechanisms Responsible for Heatwaves in India

Persistent High-Pressure Anticyclonic Systems

1. The primary driver of Indian heatwaves is the formation of quasi-stationary high-pressure systems over northwest and central India during pre-monsoon months (March–June).
2. Descending air undergoes adiabatic compression, increasing temperature without external heating.
3. Subsiding air suppresses convection and cloud formation, allowing uninterrupted solar radiation.
4. These heat domes trap warm air near the surface for prolonged periods. Example: Rajasthan–Vidarbha belt.

Jet Stream Disturbances and Atmospheric Blocking

1. Heatwaves are linked with disruptions in upper atmospheric circulation. Large-scale Rossby waves in the subtropical jet stream sometimes become stationary, creating Omega blocks.
2. These blocking highs prevent western disturbances or moist maritime winds from entering India.
3. Consequently, hot air remains locked over one region for several days. Example: North India 2024.

Delayed Monsoon and Continental Heating

1. The late arrival or weakening of southwest monsoon circulation intensifies heat conditions.
2. Dry continental interiors heat rapidly due to intense insolation. Absence of cloud cover increases incoming shortwave radiation.
3. Pre-monsoon low-pressure troughs draw hot winds from the Thar Desert and southwest Asia. Example: Loo winds.

Soil Moisture–Temperature Feedback Loop

1. Heatwaves intensify through land-atmosphere interactions. Dry soils reduce evapotranspiration, eliminating latent heat cooling.
2. Solar energy is converted mainly into sensible heat, sharply raising air temperatures.
3. Agricultural droughts therefore amplify thermal extremes. Example: Central India drought zones.

Urban Heat Island Effect

1. Rapid urbanization has added anthropogenic dimensions to Indian heatwaves. Concrete surfaces absorb and re-radiate heat at night.
2. Reduced green cover and waste heat from vehicles intensify warm nights.

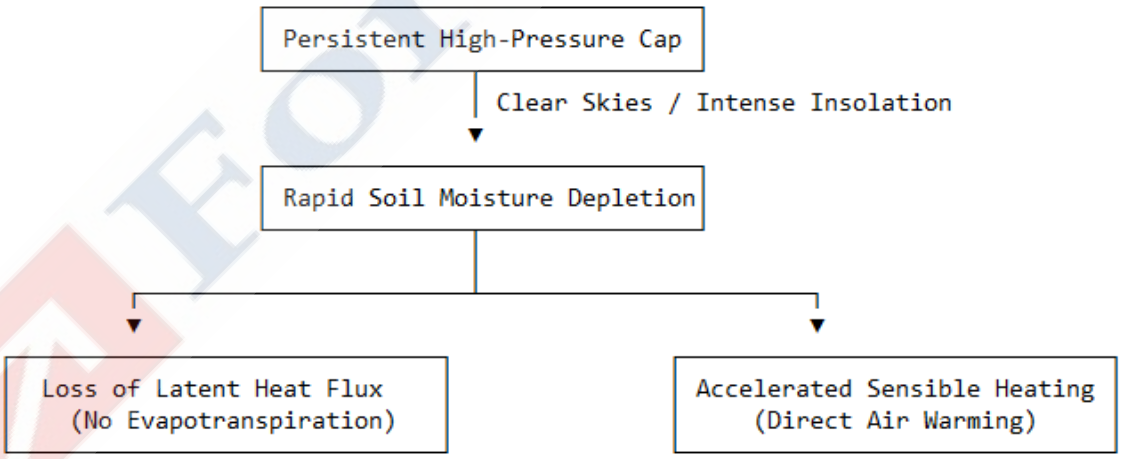
3. NITI Aayog's urban climate assessments warn that megacities face severe thermal stress. Example: Delhi NCR.

Climate Change Amplification

1. Anthropogenic warming has structurally increased heatwave frequency and duration.
2. IPCC AR6 notes South Asia as a major hotspot for compound heat extremes.
3. Arctic amplification weakens the equator-pole temperature gradient, slowing jet streams and increasing atmospheric stagnation.
4. IMD recorded multiple severe heatwave spells in 2025–26 across eastern and central India. Example: Odisha–Jharkhand corridor.

Why Characterized as Stagnant Atmospheric Anomalies

1. **Absence of Horizontal Thermal Propagation:** Unlike sound or ocean waves, heatwaves do not transport energy dynamically across space. Heat remains concentrated over a fixed geographic region due to stationary pressure systems. The phenomenon is therefore an "event" rather than a moving thermal pulse.
2. **Atmospheric Blocking Creates Stagnation:** Blocking highs prevent circulation renewal. Cooler air masses are diverted away. Wind speeds weaken, producing atmospheric immobility. Heat accumulates cumulatively over days. Example: European heat dome 2023.
3. **Self-Reinforcing Thermodynamic Feedbacks:** Heatwaves sustain themselves through positive feedback loops. Dry soils → less evaporation → higher sensible heating → hotter air → further drying. This cyclical intensification reflects a localized anomaly rather than a traveling disturbance.
4. **Scientific Classification by Meteorological Agencies:** IMD defines heatwaves through temperature persistence and deviation from climatological normals, not movement characteristics. Heatwave declaration requires abnormal temperatures across stations for consecutive days. Thus, persistence not propagation, is the defining scientific criterion.



Way Forward

1. Strengthen real-time monitoring through expanded IMD heatwave warning networks.
2. Promote climate-resilient farming with heat-tolerant crops and micro-irrigation.
3. Implement urban heat action plans with green infrastructure and cool roofs.
4. Integrate long-term forecasting with early warning dissemination at district levels.
5. Enhance inter-ministerial coordination for heatwave disaster management frameworks.

Conclusion

Echoing Amartya Sen's development philosophy, climate resilience must prioritize human capability protection. Recognizing heatwaves as structural atmospheric disasters—not temporary anomalies—is essential for safeguarding India's ecological and developmental future.

Examine India's proactive engagement with the Quad despite fluctuating member commitments. Evaluate how exercises like Malabar shape its future strategic relevance.

Introduction

Amid intensifying geopolitical contestation, India increasingly views the Quad as a flexible strategic stabilizer rather than a formal alliance. For India, the Quad is not a rigid alliance but a flexible **plurilateral tool** designed to secure a free, open, and rules-based Indo-Pacific.

India's Proactive Engagement with the Quad

Strategic Balancing Without Formal Alliances

1. India supports the Quad to balance China's expanding geopolitical footprint while preserving strategic autonomy.
2. The Quad strengthens India's leverage against coercive behavior in the Indo-Pacific without entering NATO-style obligations.
3. It complements India's SAGAR doctrine and Indo-Pacific Oceans Initiative (IPOI).
4. India avoids bloc politics while supporting a rules-based maritime order. Example: South China Sea stance.

Maritime Security and Indo-Pacific Stability

1. The Indian Ocean Region (IOR) has become central to global trade and energy flows.
2. Nearly 95% of India's trade by volume moves through maritime routes.
3. Quad initiatives like the Indo-Pacific Partnership for Maritime Domain Awareness (IPMDA) enhance monitoring of illegal fishing, grey-zone coercion, and dark shipping.
4. Cooperation strengthens India's role as a net security provider in the IOR. Example: Indian Ocean surveillance.

Technological and Economic Convergence

1. India sees the Quad as extending beyond military coordination. Cooperation on semiconductors, Open RAN, AI, cyber resilience, and critical minerals reduces overdependence on single-country supply chains.
2. The Quad Critical Minerals Initiative gained momentum after supply disruptions linked to China's dominance.
3. Economic Survey 2025–26 emphasized resilient technology partnerships as vital for India's growth trajectory. Example: Semiconductor resilience.

India as the Stabilizing Anchor of the Quad

1. Despite fluctuating enthusiasm from partner countries, India has sustained continuity.
2. US strategic attention periodically shifts toward Europe and the Middle East.
3. Australia and Japan face domestic political and economic constraints.
4. India therefore maintains momentum through ministerial meetings, working groups, HADR exercises, and maritime cooperation mechanisms. Example: Quad FM meetings.

THE QUAD'S GEOPOLITICAL ALIGNMENT

United States / Japan / Australia	India
• Focus primarily on Pacific theaters. • Seek formal global containment strategies. • Strongly tied to formal western security architectures (e.g. AUKUS).	• Faces a direct, continental border dispute along the LAC. • Prioritizes strategic autonomy and resists bloc politics.

Challenges Emerging from Fluctuating Member Commitments

1. **Divergent Strategic Priorities:** The US prioritizes Pacific deterrence against China. India simultaneously faces a continental challenge along the LAC. This creates asymmetry in threat perceptions. Example: Galwan aftermath.
2. **Risk of Institutional Drift:** Delayed summits and diluted political attention create fears of Quad fatigue. China has repeatedly described the Quad as temporary sea foam diplomacy.
3. **Balancing ASEAN Sensitivities:** India carefully avoids portraying the Quad as an anti-China military bloc. ASEAN centrality remains crucial for India's Act East Policy. India emphasizes inclusivity and rules-based order rather than containment.

How Malabar Shapes Future Strategic Relevance

1. **Operational Interoperability:** Exercise Malabar transformed the Quad from diplomatic consultation into credible maritime coordination. It includes anti-submarine warfare, carrier operations, air-defense drills, and cross-deck helicopter operations. Such interoperability increases deterrence credibility in contested waters. Example: Philippine Sea drills.
2. **Strategic Signaling and Deterrence:** The inclusion of Australia institutionalized the "Quad naval geometry." Conducting exercises in the Bay of Bengal and Western Pacific sends a calibrated message against unilateral maritime coercion. It reinforces freedom of navigation principles under UNCLOS. Example: Indo-Pacific signaling.
3. **Logistics and Defense Integration:** Foundational agreements deepen operational synergy. India's LEMOA with the US and logistics pacts with Japan and Australia expand refueling and repair access. This enhances maritime reach from the eastern African coast to the Pacific. Example: Diego Garcia proximity.
4. **Non-Traditional Security Cooperation:** Malabar also strengthens Humanitarian Assistance and Disaster Relief (HADR) capabilities. Coordinated disaster responses enhance regional legitimacy and soft power. This broadens the Quad beyond purely military optics. Example: Tsunami preparedness.

Way Forward

1. Institutionalise working-level mechanisms to insulate from political cycles.
2. Expand Quad agenda into resilient supply chains and green technologies.
3. Deepen Malabar into advanced domains like unmanned systems and space awareness.
4. Engage Quad-plus partners for inclusive regional architecture.
5. Maintain continental-maritime balance through parallel border and maritime strategies.

Conclusion

Echoing PM"s "free, open and inclusive Indo-Pacific" vision, the Quad's enduring relevance lies not in rigid alliances but in resilient, adaptive cooperation safeguarding regional stability and multipolar equilibrium.

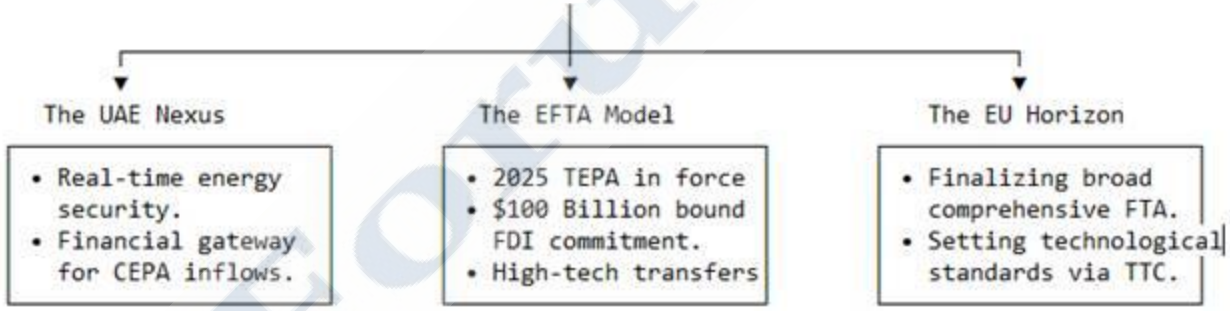
Assess how India's intensifying engagements with the UAE and Europe reflect a strategic shift toward economic diversification amid fragmenting global rule-based architectures.

Introduction

Amid fractured supply chains, weaponized interdependence, and slowing globalization, India's intensified engagement with the UAE and Europe reflects a calibrated shift toward resilient economic diversification, strategic autonomy, green transitions, and technology-secure partnerships.

India's Strategic Shift amid Fragmenting Global Architectures

1. The contemporary global order is witnessing simultaneous disruptions, Russia-Ukraine conflict, Red Sea insecurity, U.S.-China technological rivalry, and coercive trade practices.
2. The NITI Aayog and the Economic Survey 2025–26 highlighted supply-chain resilience, energy diversification, and trusted technology ecosystems as central pillars of India's long-term growth strategy. Simultaneously, Budget 2026–27 emphasized green hydrogen corridors, semiconductor incentives, logistics modernization, and Free Trade Agreement (FTA)-driven export expansion.
3. Against this backdrop, India's diplomatic outreach toward the UAE, Nordic countries, and the European Union reflects a transition from passive non-alignment to multi-alignment with strategic realism.



UAE: From Energy Partner to Strategic Economic Gateway

1. **Energy and Financial Security:** The India-UAE Comprehensive Economic Partnership Agreement (CEPA) transformed ties beyond hydrocarbons into logistics, fintech, food security, and renewable investments. UAE sovereign wealth funds increasingly finance Indian infrastructure, ports, and green-energy projects. Example: NIIF investments.
2. **Currency Diversification:** Rupee-Dirham trade settlement mechanisms reduce overdependence on dollar-denominated transactions and insulate trade from geopolitical sanctions or financial weaponization. Example: local-currency settlement.
3. **IMEC and Connectivity Diplomacy:** The proposed India-Middle East-Europe Economic Corridor positions the UAE as India's maritime bridge to Europe, offering an alternative to China's BRI. Example: multimodal corridor.
4. **Strategic and Maritime Cooperation:** India-UAE naval coordination in the western Indian Ocean secures sea lanes vulnerable to Houthi disruptions and piracy. Example: Arabian Sea security.

Europe and Nordic Outreach: Technology-Led Diversification

1. **India-EFTA TEPA:** The Trade and Economic Partnership Agreement with European Free Trade Association is historically significant because it includes a legally binding $100 billion investment commitment over 15 years with projected employment generation. Example: Swiss manufacturing.
2. **Green Transition Partnerships:** Nordic partnerships target green hydrogen, offshore wind, and semiconductor cooperation, maritime sustainability, and green hydrogen, complementing India's net-zero pathway. Example: Green Strategic Partnership.
3. **Technology and Semiconductor Cooperation:** India's collaboration with Sweden and Finland focuses on 6G research, AI governance, telecom security, and semiconductor ecosystems to reduce dependence on concentrated Asian supply chains. Example: Open RAN.
4. **Trade Diversification and Market Access:** The proposed India-EU FTA seeks expanded access for pharmaceuticals, textiles, and digital services while integrating India into trusted global value chains. Example: Supply chain resilience.

Why This Strategic Shift Matters

1. Diversification reduces vulnerability arising from concentrated import dependencies and external shocks. Example: China+1 strategy.
2. India balances relations across competing power centers without entering rigid alliance structures. Example: strategic autonomy.
3. Partnerships support trusted digital infrastructure, cyber resilience, and critical mineral access. Example: semiconductor supply chains.
4. Long-term LNG, crude reserves, and renewable collaborations strengthen energy resilience amid Middle East volatility. Example: strategic petroleum reserves.
5. Europe's green technologies accelerate India's decarbonization targets under Mission LiFE and National Green Hydrogen Mission. Example: offshore wind.

Key Challenges

1. EU Carbon Border Adjustment Mechanism (CBAM) may hurt Indian exports. Example: steel sector.
2. Divergence on data localization and digital regulations persists. Example: GDPR tensions.
3. Geopolitical instability threatens IMEC implementation. Example: Red Sea crisis.
4. India must avoid overdependence on any alternative bloc. Example: strategic balancing.

Way Forward

1. Fast-track ratification of the India-EU FTA with balanced IP and procurement clauses.
2. Operationalise IMEC as a resilient trade alternative to traditional corridors.
3. Deepen Quad-plus and Nordic-plus engagements for critical minerals and green tech.
4. Integrate local currency trade mechanisms across key partnerships.
5. Align domestic reforms in logistics and skilling to maximise FDI inflows.

Conclusion

Echoing K. Subrahmanyam, strategic autonomy today demands diversified partnerships, not isolation. India's UAE-Europe outreach reflects a mature multipolar strategy securing resilience, technology leadership, and long-term economic sovereignty.

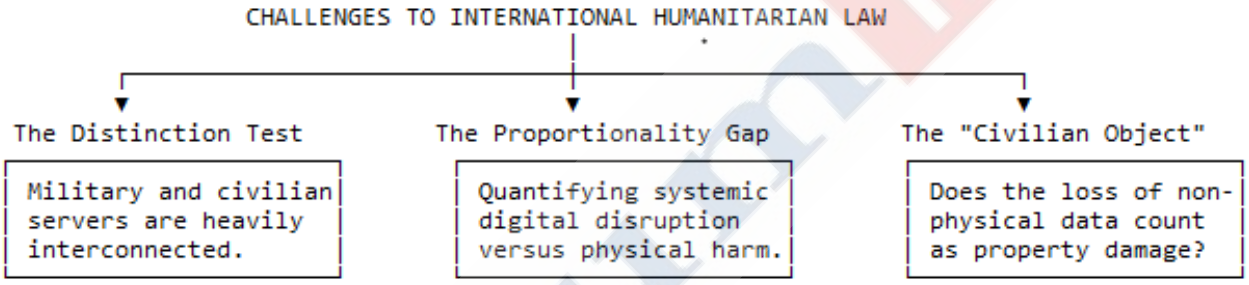
Evaluate how modern cyber-kinetic hybrid conflicts challenge international humanitarian law. Analyze the bottlenecks in fixing state responsibility for state-sponsored cyber operations.

Introduction

The multi-state kinetic actions of 2026, characterized by direct conflicts involving the United States, Israel, and Iran—demonstrate that offensive cyber operations are no longer just tools of espionage; they are core components of kinetic military strikes. This shift has created an operational reality that outpaces the traditional international legal frameworks built to govern state-on-state violence.

Cyber-Kinetic Hybrid Conflicts

1. Modern warfare has moved beyond conventional battlefields into cyberspace. Recent conflicts involving Russia-Ukraine, Israel-Iran, and the US demonstrate how cyber operations now accompany missile strikes, surveillance, propaganda, and economic disruption.
2. This hybridization has exposed serious limitations in International Humanitarian Law (IHL), which was designed primarily for physical warfare.



Challenges to International Humanitarian Law (IHL)

1. **Blurring Distinction Between Civilian and Military Targets:** The Geneva Conventions require distinction between civilians and combatants. However, cyber infrastructure is largely dual-use. Civilian telecom systems, satellites, and cloud servers are often integrated with military networks. Cyberattacks targeting defence systems can unintentionally disrupt hospitals, airports, banking, and emergency services. Example: Ukraine power grid.
2. **Abiguity in Defining Use of Force:** Article 2(4) of the UN Charter prohibits the use of force, but cyber operations rarely fit traditional definitions. Malware disrupting electricity grids or financial systems may create severe economic and humanitarian consequences without physical destruction. Tallinn Manual 2.0 recognizes cyber force only when effects resemble kinetic attacks. Example: Stuxnet attack.
3. **Problems of Proportionality and Collateral Damage:** IHL mandates proportionality between military gain and civilian harm. Cyber operations challenge this principle because digital systems are highly interconnected. A malware attack can spread uncontrollably across borders. Civilian supply chains, healthcare, and governance systems may collapse indirectly. Example: WannaCry ransomware.
4. **Weaponization of Information Ecosystems:** Hybrid warfare increasingly targets public psychology and social stability. Hacking media portals, spreading disinformation, and manipulating social media influence civilian perception and democratic institutions. Such operations bypass conventional battlefield restrictions while destabilizing societies. Example: Deepfake campaigns.

Bottlenecks in Fixing State Responsibility

1. **Attribution Problem:** Under the International Law Commission's Articles on State Responsibility (ARSIWA), wrongful acts must be attributable to a state. However: cyberattacks use proxy servers, encrypted routing and fake digital footprints. Even strong intelligence assessments often fail legal evidentiary standards. Example: SolarWinds breach.
2. **Use of Non-State Proxies:** States increasingly rely on patriotic hackers, cyber mercenaries, and criminal syndicates. Proving "effective control," as required in the Nicaragua Case, is extremely difficult. States exploit plausible deniability to avoid international liability. Example: Handala hackers.
3. **Absence of Binding Global Cyber Law:** Unlike nuclear or chemical weapons regimes, cyberspace lacks enforceable international treaties. Budapest Convention focuses mainly on cybercrime. UN cyber frameworks remain voluntary and fragmented. Example: UN-GGE limitations.
4. **Jurisdictional and Sovereignty Constraints:** Cyber disputes rarely reach international courts because: states avoid exposing intelligence capabilities, sovereign immunity limits domestic litigation, cyber evidence is often classified. Example: Pegasus controversy.

Strategic Implications for India

1. **Economic and Technological:** India's expanding digital economy, UPI ecosystem, AI systems, and smart infrastructure increase cyber vulnerabilities. NITI Aayog and CERT-In have repeatedly emphasized cyber resilience as essential for economic security. Example: DPI ecosystem.
2. **National Security:** India faces persistent grey-zone threats involving cyber intrusions, disinformation, and digital espionage from hostile actors. Cyber warfare now intersects with border tensions, maritime competition, and space security. Example: LAC intrusions.

Way Forward

1. **Develop a Digital Geneva Convention:** The international community should establish binding norms prohibiting cyberattacks on critical civilian infrastructure like hospitals, power grids, and nuclear facilities.
2. **Strengthen Attribution Mechanisms:** Global institutions must develop cooperative cyber-forensic mechanisms and impose "due diligence obligations" upon states hosting malicious cyber infrastructure.
3. **Build India's Cyber Resilience:** India should strengthen: indigenous encryption, AI-driven cyber defence, semiconductor security, National Cyber Command, critical infrastructure isolation. Example: CERT-In expansion.
4. **Promote Global Cyber Governance:** India should utilize platforms like G20, QUAD, SCO, and the UN to shape equitable cyber norms balancing sovereignty, security, and accountability.

Conclusion

As states increasingly pair digital sabotage with physical strikes, international law must evolve to close these accountability gaps. Failing to establish clear, enforceable rules for cyberspace risks turning the digital domain into a lawless zone of perpetual, destabilizing conflict.