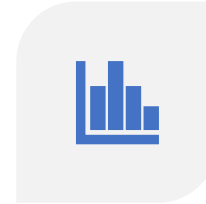
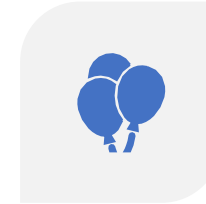




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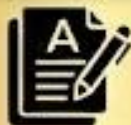
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India faces a 1991 moment: It needs to reform, relook at subsidies



FROM PLATE TO PLOUGH

BY ASHOK GULATI
AND RITIKA JUNEJA

THE INDIAN rupee continues to weaken against the US dollar. If the RBI does not intervene decisively, the exchange rate could well slide to Rs 100 per US dollar. To stabilise the rupee, the RBI may need a war chest of at least \$50-60 billion, and even that would provide only temporary relief. The underlying causes of the crisis lie largely beyond the RBI's control.

The crisis in the Middle East is finally hitting India pretty hard. Energy and fertiliser costs have almost doubled. The recent increase in petrol prices by around Rs 3-4 per litre is only a partial pass-through of global prices. Similar underpricing exists in LPG, LNG, and fertilisers, especially urea. These pressures are likely to widen the fiscal deficit beyond 5 per cent of GDP.

Foreign portfolio investors are losing interest in India and withdrawing their investments. Domestic investors are equally worried and are not coming forward to invest big. The IMD has forecast a strong El Niño. As a result, the Indian economy is losing momentum. Our calculation, based on today's conditions, is that in the current financial year (FY27), India will be lucky to clock 6 per cent GDP growth and contain Consumer Price Index (CPI) inflation below 6 per cent. If the Strait of Hormuz remains closed for another three months, GDP growth will fall below 6 per cent, and CPI inflation will shoot above 6 per cent — the upper band of the RBI for inflation control. The RBI will not have much choice but to raise the repo rates soon, triggering the northward movement of all interest rates. The economy seems to be on the brink of a major crisis. The only rational way



ILLUSTRATION: C R SAKHUMANI

to avoid this is to carry out major reforms, similar to those in 1991.

Prime Minister Narendra Modi has called for austerity measures, and some chief ministers have reportedly travelled on motorcycles, metros and electric cars. Such tokenism does not last long. After returning from his five-country visit, Modi held a meeting with his cabinet colleagues and asked them to carry out reforms that can save resources, especially energy, narrow down the twin deficits of trade and current account, and restore confidence in India's growth story. The technical blueprint of economic reforms is not difficult to prepare, but what is required is the political will to undertake such reforms. The culture of distributing freebies, at the central as well as the state level, is now deeply entrenched. That's the biggest hurdle in carrying out structural reforms. Let us demonstrate with the examples of fertiliser and food subsidies.

Take the case of fertilisers first. India imports anywhere from 20 to 25 per cent of its urea requirements. The last import tender showed that the minimum price of urea's landed cost on the west

coast would be \$935/tonne. But it is being sold at less than \$70/tonne to farmers. How prudent is this? Let the readers judge. But what we know is that such pricing creates a large arbitrage — a large amount that is being diverted away from agriculture to other industrial uses in India and also smuggled out to neighbouring countries. Bihar is an interesting example. Government data on fertiliser supply and usage reveal a mismatch. While official figures show large quantities of urea, DAP, and MOP being supplied, another set of government data — the Cost of Cultivation surveys used to determine the minimum support prices for major crops — suggests that actual on-farm usage is more than 50 per cent lower than the quantity supplied. The obvious question is: Where does the rest go?

Anyone familiar with Bihar's ground realities knows that the state has long been an easy route for fertiliser diversion into Nepal. Reports from border districts also indicate that subsidised fertilisers are routinely smuggled into Bangladesh. The root cause is the enormous subsidy on urea, which today

The ultimate solution — the real 'brahmastra' — lies in reforming the entire chemical fertiliser subsidy regime by moving towards a direct benefit transfer system on a per-acre basis, integrated with the PM-Kisan scheme

covers nearly 90 per cent of its cost.

The fertiliser subsidy bill, budgeted at Rs 1.71 lakh crore for FY27, is almost certain to exceed Rs 2.25 lakh crore and could even touch Rs 2.50 lakh crore. The ultimate solution — the real *brahmastra* — lies in reforming the entire chemical fertiliser subsidy regime by moving towards a direct benefit transfer system on a per-acre basis, integrated with the PM-Kisan scheme. Concerns relating to tenant farmers can be addressed by triangulating different data sets, provided the government gives this reform the same priority it once accorded the Jan Dhan-Aadhaar-mobile linkage initiative.

Once this transition is made, fertiliser prices should be left to market forces. That would curb leakages and the smuggling of urea, correct the imbalance in the use of nitrogen, phosphorus, and potassium, and improve nutrient use efficiency. Such reforms could save the government at least Rs 40,000-50,000 crore annually.

If comprehensive reform is politically difficult, the second-best option would be to impose quantitative restrictions on fertiliser sales based on landholding size and the crops being cultivated. If even that proves unfeasible, a third alternative would be to bring urea under the nutrient-based subsidy scheme, raise urea prices gradually, and potentially reduce the prices of phosphatic and potassic fertilisers, while keeping the overall subsidy bill around Rs 2 lakh crore.

A similar issue arises with food subsidies. The food subsidy bill for FY27 is budgeted at Rs 2.28 lakh crore. Yet, if the government claims that extreme poverty has fallen to 5.3 per cent, according to World Bank standards, or around 11 per cent according to NITI Aayog's Multidimensional Poverty Index, why should free food grain continue to be distributed to more than 800 million people? Rationalising the coverage under the scheme or increasing issue prices for those above the poverty line could potentially save another Rs 50,000 crore annually.

Failing to undertake these reforms would reflect not caution, but policy timidity.

Gulati is distinguished professor and Juneja a senior fellow at ICRIER. Views are personal.

- **Key Terms and Explanations**

- **Rupee Depreciation** – When the Indian rupee loses value against foreign currencies like the US dollar. Think of it like this: if earlier you needed ₹70 to buy \$1, now you might need ₹100. This makes imports costlier – from crude oil to electronic chips.
- **Fiscal Deficit** – The gap between what the government earns (taxes, dividends) and what it spends (salaries, subsidies, infrastructure). Expressed as a percentage of GDP. For context, India's FRBM Act targets 3% but actual figures often hover around 5-6%.
- **Current Account Deficit (CAD)** – When India imports more goods and services than it exports. A widening CAD means we are consuming more foreign exchange than we are earning, putting pressure on the rupee.
- **Foreign Portfolio Investors (FPIs)** – Institutional investors like hedge funds, mutual funds, and pension funds that invest in financial assets (stocks, bonds) without seeking management control. Unlike FDI which is sticky, FPIs can exit overnight – hence "hot money."
- **Repo Rate** – The rate at which RBI lends short-term money to commercial banks. When repo rate rises, banks raise their lending and deposit rates, cooling inflation but slowing growth.
- **Direct Benefit Transfer (DBT)** – A system where subsidies are credited directly into beneficiaries' bank accounts (linked to Aadhaar) rather than through price reductions on commodities. Example: LPG subsidy under PAHAL scheme.
- **Nutrient-Based Subsidy (NBS)** – A scheme where the government fixes a per-kilogram subsidy for plant nutrients (Nitrogen, Phosphorus, Potash – NPK) based on their nutrient content, rather than fixing the Maximum Retail Price.
- **Arbitrage** – Buying a commodity at a lower price in one market and selling it at a higher price in another. In the article's example: subsidised urea (sold at ₹70/tonne to farmers) is diverted to industrial users or smuggled to Nepal/Bangladesh where market price exceeds \$900/tonne.
- **El Niño** – A climate pattern where Pacific Ocean waters warm unusually, affecting monsoon rainfall in India. A strong El Niño typically means weaker monsoons, lower agricultural output, and rural distress.
- **Strait of Hormuz** – A narrow passage between Oman and Iran through which about 20% of global oil passes. Any closure here disrupts energy supplies to India, which imports over 80% of its crude oil.
- **PM-Kisan Scheme** – A central sector scheme providing ₹6,000 per year to small and marginal farmer families, transferred directly in three instalments. Coverage: over 11 crore farmers.

Main arguments and substantive parts

India's current macroeconomic stress

- Depreciation of the rupee, high global energy and fertiliser prices, and expanding subsidy bills have created pressures similar in seriousness (though not identical) to pre-1991 vulnerabilities.
- Without reform, fiscal space for growth-enhancing investment (infrastructure, R&D, health, education) gets squeezed.

Subsidies as the core structural problem

- Food and fertiliser subsidies together are now extremely large, with food subsidy well above ₹2 lakh crore and fertiliser subsidy also in that ballpark in high-price years.
- These subsidies are largely open-ended, demand-driven and politically sticky, making budget management difficult.

Food subsidy concerns

- Coverage under NFSA and emergency free food programmes now covers well over 60 per cent of the population, far beyond the truly vulnerable.
- Procurement at MSP plus free grain supply leads to excess buffer stocks, high storage costs, and market distortion for non-PDS consumers.

Fertiliser subsidy concerns

- Urea's highly subsidised price has remained almost frozen while costs have soared, greatly increasing the subsidy per tonne.
- The artificially low price encourages overuse, creates large arbitrage between domestic and international prices, and generates incentives to divert subsidised fertiliser to industry and neighbouring countries.

Argument for major structural reform ("1991-type" moment)

- The article conceptually argues that incremental tinkering (small price hikes, marginal coverage tweaks) is no longer enough.
- India must seize the current macro pressure as an opportunity to rationalise subsidies, much as the 1991 crisis forced liberalisation.

Proposed broad reform directions

- Move from product-based subsidies (cheap urea, cheap PDS grain) to person- or land-based income support via DBT, leveraging PM-KISAN and digital infrastructure.
- Rebalance nutrient subsidies to correct soil health, and gradually allow prices to reflect real costs while compensating farmers through direct transfers.
- Narrow PDS coverage or change entitlement design while protecting the poorest and focusing more on nutrition.

Implicit counter-view acknowledged

- Abrupt withdrawal of subsidies would harm small and marginal farmers, raise food inflation, and provoke political backlash.
- Therefore, reforms must be gradual, data-driven, and accompanied by robust safety nets, not a "big bang" removal.

Historical evolution of the issue

Pre-Independence and early years (before mid-1960s)

- Colonial policy largely neglected systematic subsidies; famines and food shortages were recurrent.
- Post-Independence, India initially relied on food imports (PL-480) and limited input subsidies.

Green Revolution phase (late 1960s–1970s)

- To encourage adoption of HYV seeds, irrigation, and fertiliser, the state introduced low administered fertiliser prices and power/water subsidies.
- Public procurement with MSP plus PDS was gradually built to ensure price support to farmers and food security for the poor.

1980s: Rising subsidy bills and macro stress

- Rapid expansion of irrigation, rural electrification and fertiliser use led to mounting subsidies and growing fiscal deficit.
- Food and fertiliser subsidies became prominent items in the Union budget, but political compulsions prevented serious pruning.

1991 crisis and early reforms

- Balance of payments crisis pushed India into IMF-World Bank supported stabilisation, prompting attempts to reduce subsidies and contain the fiscal deficit.
- There were modest hikes in fertiliser prices and PDS rationalisation, but political costs limited deeper change; agricultural subsidies broadly survived.

Post-1991 to 2000s: Expansion with welfare orientation

- Economic growth improved revenues, allowing governments to expand welfare schemes (e.g., Targeted PDS, mid-day meals).
- Subsidies remained high but were often justified as inclusive growth measures, especially for farmers.

2000s–early 2010s: Rights-based regime

- Enactment of NFSA converted many food entitlements into legal rights, locking in large food subsidies.
- Fertiliser reforms in 2010 introduced Nutrient Based Subsidy for non-urea fertilisers, but urea remained price-controlled.

Post-2014: Digitalisation and DBT groundwork

- Aadhaar, Jan Dhan, and mobile connectivity created the “JAM trinity,” enabling wide DBT experiments (LPG subsidy, PM-KISAN).
- Yet, large structural reform of food and fertiliser subsidies remained politically sensitive; instead, programmes like PM-KISAN and expanded NFSA benefits added to costs.

Covid-19 and recent shocks

- Free foodgrain schemes during the pandemic, later extended, sharply increased food subsidy.
- Post-2021 spikes in global fertiliser and energy prices, coupled with rupee depreciation and geopolitical tensions in West Asia, dramatically expanded fertiliser and fuel subsidy needs.

Current context

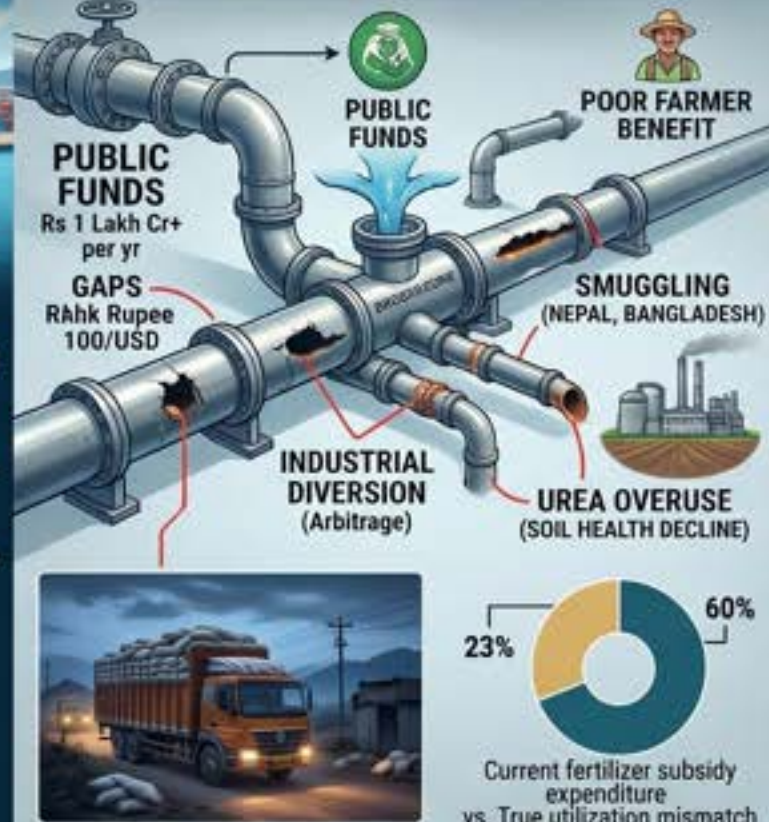
- Total food and fertiliser subsidies now approach or cross ₹4 lakh crore annually in high-price years.
- Policymakers and experts increasingly view this as a structural drag, calling for a new reform cycle equivalent in significance to the 1991 economic reforms.

The Contemporary Crisis: Macroeconomic Shocks



- **EXTERNAL SHOCKS**
Energy, Fertilizer costs spike from Middle East
- **TWIN DEFICITS**
Fiscal & Current Account widen
- **CURRENCY RISK**
Weak Rupee near 100/USD
- **CAPITAL FLIGHT**
Foreign and domestic investment stall

The Leaky Subsidy Pipe: Distortions and Diversions



The DBT Brahmastra: The Definitive Solution

DIRECT BENEFIT TRANSFER: THE REAL SOLUTION

- Funds Direct to Farmer Direct Market Purchase.
- Eliminates Arbitrage and Leakage.
- Uses PM-Kisan data for Targeting.

Pragmatic Roadmap to Structural Reform

- **PHASED UREA NBS**
Correcting N-P-K imbalance
- **PER-ACRE CASH TRANSFERS**
Using digital land records
- **RATIONALIZED FOOD COVERAGE**
Dynamic targeting via Multidimensional Poverty Index
- **POTENTIAL FISCAL SAVINGS: Rs 1 LAKH CRORE+ ANNUALLY**
To invest in Rural Infrastructure and productivity)



UPSC CSE PREPARATION INSIGHTS

- Strong Linkages:**
- **GS PAPER 3:** (Farm Subsidies, PDS Revamping, Government Budgeting, Resource Mobilization)
 - **GS PAPER 2** (Welfare Schemes, Governance Policies)
 - **GS PAPER 4** (Transparency in Public Service)
 - **ESSAY THEMES** (Economic Reform vs. Populism)

Model Answer: Key Points

Class 11 Intdiary, Class 9 Food Security, Class 12 Macroeconomics



ALL PYQ THEMES COVERED

Logical and philosophical base

Efficiency versus equity trade-off

- The core logical tension is between economic efficiency (avoiding waste, distortions, fiscal imprudence) and social equity (supporting vulnerable farmers and consumers).
- The argument is that current subsidies fail both: they are fiscally wasteful and poorly targeted, while truly needy households still suffer deprivation.

Incentive-compatible policy design

- When prices are artificially low (for urea or PDS grain), consumers are incentivised to overuse, hoard or divert, leading to moral hazard.
- The reform argument rests on aligning incentives using market-based prices with income transfers, so behaviour naturally moves towards efficient use.

Philosophy of the “enabling state”

- Instead of a paternalistic state that delivers cheap goods, the idea is of an enabling state that directly empowers citizens with income support and public goods.
- This aligns with liberal-economic thought and capability approaches, where the state strengthens capabilities rather than micro-managing consumption choices.

Inter-generational justice and sustainability

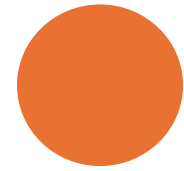
- Persistent high subsidies funded by borrowing transfer the burden to future taxpayers, undermining inter-generational equity.
- Soil degradation and groundwater depletion caused by skewed subsidies also compromise the rights and opportunities of future generations.

Rule of law and rights-based frameworks

- Food security is now a legal guarantee; reforms must respect constitutional commitments while re-interpreting how the right is delivered (e.g., nutrition-oriented cash or diversified baskets instead of only rice/wheat).
- Philosophically, the shift is from “right to cheap grain” to “right to food and nutrition” with flexibility in instruments.

Pragmatic gradualism

- The logic is not to dismantle welfare abruptly but to adopt calibrated, evidence-based transitions.
- This reflects a pragmatic philosophy: reforms must be politically feasible and socially acceptable, not just theoretically optimal.





- **Multidimensional Analysis**

- **Social:** Blanket food subsidies act as a vital safety net. Any abrupt rationalization risks increasing nutritional insecurity among borderline vulnerable populations. Reforms must ensure absolute precision in inclusion/exclusion errors.

- **Political:** The "culture of freebies" has become deeply entrenched in the democratic process. Undertaking structural reform requires a consensus-building approach across central and state governments to prevent the issue from becoming a political weapon.

- **Legal:** The National Food Security Act legally binds the state to provide subsidized grains. Altering this framework requires legislative amendments, not just executive orders, opening up complex constitutional debates on the Right to Life and adequate nutrition.

- **Ethical:** It is fundamentally unethical for taxpayer money, intended to uplift poor farmers, to line the pockets of black-market smugglers. Eliminating these leakages is a moral imperative for transparent governance.

- **International:** India's domestic economic policies are heavily dictated by external factors. A crisis in the Middle East chokes shipping lanes (like the Strait of Hormuz), spikes freight and energy costs, and immediately bleeds into India's fiscal deficit, proving that domestic resilience requires insulation from global volatility.

- **Economic:** Misallocation of resources stifles capital formation. When the majority of the budget goes toward revenue expenditures (subsidies, salaries), little is left for capital expenditures (infrastructure, cold chains), trapping the economy in a cycle of low productivity.



- **Linkages with NCERTs**

- **Economics, Class 9 – “Food Security in India”**
 - Discusses PDS, buffer stocks, and government intervention in foodgrain markets.
 - Students can connect how current debates on food subsidy reform relate to issues of leakages, targeting and buffer stock management.
- **Economics, Class 10 – “Indian Economy: Some Features” and “Sector of the Indian Economy” (old editions) / similar chapters in new texts**
 - Explains the role of the government in distribution, subsidies and poverty alleviation.
 - Helps conceptualise why subsidies exist and how they impact primary, secondary and tertiary sectors.
- **Economics, Class 11 – “Indian Economy 1950–1990” and “Economic Reforms Since 1991”**
 - Provides background on the 1991 crisis, fiscal deficit and role of subsidies in pre-reform imbalances.
 - Essential for understanding the “1991 moment” analogy.
- **Economics, Class 12 – “Government Budget and the Economy” (Macroeconomics)**
 - Explains revenue and capital expenditure, fiscal deficit, and subsidies, giving tools to analyse today’s subsidy burden.
 - Very useful for drawing diagrams and explaining crowding-out effects.
- **Economics, Class 12 – “Indian Economic Development” chapters on Poverty, Rural Development, and Environment**
 - Show how subsidies relate to rural livelihoods, poverty reduction and environmental externalities.
 - Good base to discuss trade-offs between short-term relief and long-term sustainability.
- **Political Science, Class 11–12 – “Constitution at Work”, “Rights in the Indian Constitution”, “Social Justice”**
 - Offers normative and institutional context for rights-based schemes like NFSA and debates on state responsibility.

Linkages with UPSC CSE syllabus

GS Paper I

- Post-independence consolidation and reorganisation of India (evolution of economic policy, Green Revolution, 1991 reforms).
- Issues related to urbanisation and regional imbalances (subsidies and cropping patterns affecting regional ecology).

GS Paper II

- Functions and responsibilities of the Union and States in welfare schemes; issues of cooperative federalism in PDS and agricultural subsidies.
- Government policies and interventions for development in various sectors; development processes and the development industry.
- Role of statutory and constitutional bodies (e.g., CAG reports on subsidies, Food Commission under NFSA).

GS Paper III

- Indian Economy and issues relating to planning, mobilisation of resources, growth, development and employment.
- Subsidies, inclusive growth, issues arising from direct and indirect farm support.
- Major crops, irrigation and storage; issues of minimum support prices, PDS, buffer stocks.
- Environmental degradation, conservation, climate change and sustainable agriculture.
- Science and Technology for farmers (fertigation, precision agriculture, satellite-based monitoring).

GS Paper IV (Ethics)

- Ethical issues in public administration: accountability, transparency, and corruption in subsidy delivery, leakages and diversion.
- Moral dilemmas in balancing efficiency versus equity, inter-generational justice and sustainable development.

Way forward

Adopt a phased, calibrated reform strategy

- Begin with modest rationalisation: small, predictable increases in urea and PDS prices indexed to inflation, clearly communicated in advance.
- Simultaneously, expand and strengthen DBT-based income support to cushion vulnerable groups.

Re-target subsidies with clear priorities

- Restrict food subsidies under NFSA to genuinely vulnerable households using updated SECC and multidimensional poverty metrics, while ensuring robust grievance redress.
- In fertiliser, prioritise marginal and small farmers with higher per-hectare support relative to larger landholders.

Invest in enabling infrastructure and R&D

- Redirect part of the savings into irrigation efficiency (micro-irrigation), soil health cards, agricultural R&D and extension services.
- Support adoption of precision farming and nutrient-smart practices to reduce dependency on chemical fertilisers.

Strengthen land records and inclusion mechanisms

- Accelerate digitisation and verification of land records, especially in eastern and central India.
- Design flexible mechanisms to include tenants, women farmers and forest-dependent cultivators, such as self-declaration with community verification.

Enhance transparency and citizen communication

- Publish annual subsidy incidence reports showing who benefits, in what amount, and with what outcomes.
- Use mass communication campaigns and farmer-producer organisations to explain reforms, timelines, and grievance channels.

Promote diversified, nutrition-sensitive food systems

- Align PDS and MSP with millets, pulses and coarse grains in appropriate regions, reducing pressure on water and fertiliser-intensive rice/wheat monoculture.
- Integrate food subsidy reform with nutrition programmes (ICDS, mid-day meals, Poshan Abhiyaan).

Build political consensus and institutional mechanisms

- Set up a high-level, multi-party commission on subsidy rationalisation with representation from states, farmer groups, experts and civil society.
- Introduce sunset clauses and periodic review provisions for major subsidies to avoid permanent entitlements without evaluation.

- **UPSC CSE – Prelims**

- **2013–2014 (various years):** Questions on MSP, PDS, buffer stock norms, and features of NFSA.
- **2015:** Question on “Nutrient Based Subsidy (NBS) Scheme” for fertilisers.
- **2016–2023:** Repeated questions on JAM trinity, DBT, and financial inclusion relevant to subsidy delivery.
- **Multiple years:** Questions on fiscal deficit, revenue expenditure, subsidies in government budget.

- **UPSC CSE – Mains (GS)**

- **GS-III 2013:** “Food security bill is expected to eliminate hunger and malnutrition in India. Critically discuss.”
 - **GS-III 2014:** Questions on “Subsidy and cash transfer for better targeting of subsidies” and PDS reforms.
 - **GS-III 2015:** “Price subsidies, when administered, create distortions in resource allocation and distribution. Comment.”
 - **GS-III 2017:** “Examine the role of PDS in ensuring food security” and questions on MSP.
 - **GS-III 2018:** “How far is integrated nutrient management helpful in sustaining agricultural production?”
 - **GS-III 2019:** Question on “PM-KISAN” and income support schemes.
 - **GS-III 2020–2023:** Questions on DBT, JAM, and reforms in agricultural marketing and input support.
-

Why naval supremacy is no longer optional for India

SUSHIL DAS & VIKAS SINGH



are, respectively, a retired Indian Navy veteran, and an author.

Two straits are all it took to hold the global economy hostage. The blockade of the Strait of Hormuz—through which about a quarter of the world's seaborne oil once used to flow daily—has combined with Iran's threat to close the Bab al-Mandab at the southern mouth of the Red Sea to transform a targeted military campaign into a full-spectrum maritime conflict of global consequence. Missile and drone strikes on US military installations across the Gulf region and Israeli operations reaching deep into Lebanon have further expanded the theatre; today, the distinction between the West Asia war and Indian Ocean crisis has effectively ceased to exist.

But it pays to look at what lies beneath the surface—that is, under the carrier battle groups, destroyer formations and mine-countermeasures operations. Here lies a dimension of maritime warfare that has become strategically decisive: submarine operations. Silent, nearly undetectable and capable of projecting power across entire ocean basins,

submarines have emerged as the ultimate arbiters of naval dominance in the 21st century. Even the Far East is witnessing a contest of undersea power projection, with China ranged against the Aukus alliance of Australia, the UK and US. The Arctic could become a similar zone of rivalry too. Right now, however, the global focus is on the Indian Ocean region.

For every country dependent on free passage across the high seas for trade, energy security and prosperity, the message is unambiguous: A comprehensive naval force, one that commands both surface and sub-surface domains, is necessary to hold the line between economic growth based on national sovereignty and catastrophic disruption caused by adversarial forces.

This lesson from the Strait of Hormuz carries particular significance for India, whose prosperity and regional security rest to a significant extent on uncontested command of the Indian Ocean. Regional powers like India with blue-water naval aspirations (which go far beyond the country's littoral) must build multi-dimensional capability with adequate submarine and anti-submarine heft.

The latest war's basic lesson: The current war has taught the world a critical truth: the

ocean is no longer a free waterway for ships to traverse. Decades of uncontested American maritime supremacy had allowed us to treat it as such, even take maritime movement for granted. Cargo and passengers moved freely; oil flowed without interruption; trade expanded unchecked. But this year's US-Israeli conflict with Iran has turned the Indian Ocean into an active theatre of hostility with no end in sight.

By late April, many vessels had been attacked in Gulf waters—struck by missiles, drones and torpedoes—forcing insurers, shipping companies and commodity traders to fundamentally rethink the safety of the world's most critical trade corridors. Global trade has not merely been disrupted, its character has changed, and the scars of the conflict will outlast any ceasefire by decades.

Less visible but far more consequential is the role that submarine deployments and the threat of submarine-launched attacks have played in reshaping strategic calcula-

tions across the region. The presence of even a single unlocated hostile submarine creates strategic paralysis, forcing defending navies to concentrate on defensive resources, modify operational patterns and limit the freedom of manoeuvre that surface vessels need.

Iran's deployment of its diesel-electric submarines has injected a degree of uncertainty into every US-led naval operation. For the first time in the modern era, a numerically inferior naval force, equipped with advanced submarine technology, has effectively constrained the operations of vastly superior surface fleets.

Comprehensive naval dominance is a strategic imperative for India: India's position as a regional power is inextricably

linked to its capacity to maintain uncontested maritime supremacy in the Indian Ocean. The region accounts for nearly 40% of global maritime trade and multiple critical shipping routes converge in these waters, even as energy flows pass through choke-points vulnerable to interdiction. India's

economic growth depends on the security and freedom of these sea lanes.

The war in West Asia and the Indian Ocean is reshaping global maritime strategy in real time. It has demonstrated that surface naval power—however formidable—is incomplete without advanced submarine capabilities. It has shown that strategic dominance in the maritime domain requires integrated operations across surface, sub-surface and air dimensions. And it has made unmistakably clear that nations without comprehensive maritime power are vulnerable to coercion, interdiction and worse.

For India, which has one of the world's most strategically consequential oceans around it and remains heavily dependent on its waterways for progress, stepped up naval investment is a strategic necessity.

Our economic growth, energy security, regional dominance and national sovereignty will increasingly rely on the country's ability to project power across the Indian Ocean in order to serve its strategic interests. The investment outlay must prioritize submarines, for these are the key instrument of maritime power.

In a fractured world where old certainties are falling apart, we must move quickly. The world is watching. Will India act?

We must boost undersea power projection as today's theatre of war expands to the Indian Ocean region

- **Key terms**

- **Maritime chokepoints**

- Maritime chokepoints are narrow sea passages through which very large volumes of trade and energy move; disruption there can affect prices, insurance, shipping routes, and strategic calculations across regions.
- Strait of Hormuz: connects the Persian Gulf with the Gulf of Oman and the Arabian Sea; strategically vital because Gulf oil exports depend heavily on it.
- Bab al-Mandab: links the Red Sea to the Gulf of Aden and the wider Indian Ocean; it matters because it sits on the Asia-Europe corridor connected to Suez.
- For UPSC, remember the triad of high-value chokepoints in India's extended maritime environment: Hormuz, Bab al-Mandab, and Malacca.

- **Blue-water navy**

- A blue-water navy is a navy capable of sustained operations far from its coastline, across the open ocean, for deterrence, sea control, escort, surveillance, and expeditionary roles.
- It differs from a brown-water or littoral navy, which is mainly designed for coastal defense and near-shore operations.
- India's naval thinking increasingly reflects blue-water aspirations tied to Indian Ocean leadership and wider Indo-Pacific responsibilities.

- **Submarines and anti-submarine warfare**

- A submarine is an underwater combat platform used for sea denial, deterrence, intelligence gathering, covert insertion, and precision strike.
- Diesel-electric submarines are quieter in some tactical conditions and useful in choke-point warfare; nuclear submarines have greater endurance and range.
- Anti-submarine warfare (ASW) includes ships, aircraft, helicopters, sensors, sonars, seabed awareness, and tactics meant to detect, track, and neutralize submarines.
- Indian naval modernization in 2025–26 has explicitly highlighted sharpening ASW and undersea warfare capability.

- **Sea control and sea denial**

- Sea control means the ability to use a maritime zone for one's own purposes while preventing the adversary from doing the same.
- Sea denial is narrower: it does not require full control; it only requires making the sea unsafe or unusable for the adversary.
- The article's deeper claim is that submarines allow weaker powers to achieve sea denial against stronger surface fleets.

- **Maritime domain awareness**

- This means persistent knowledge of what is happening at sea and undersea: ships, submarines, cargoes, fishing fleets, drones, and threats.
- It is essential because submarines create uncertainty; even one unlocated submarine can alter fleet behavior.

- **SAGAR**

- SAGAR stands for "Security and Growth for All in the Region," articulated by India in 2015 as a maritime vision combining security, cooperation, freedom of navigation, capacity-building, and regional stability in the Indian Ocean Region.

- **Main arguments and substantive parts**

- **Core thesis**

- The central argument is that maritime conflict in West Asia and adjoining waters reveals a larger truth: economic globalization rests on vulnerable sea-lanes, and naval strength—especially subsurface capability—is now indispensable.
 - The emphasis is not only on fleets in general but on undersea dominance as the decisive layer of 21st-century naval competition.

- **Supporting logic**

- Chokepoint disruption affects more than warships; it reshapes trade, insurance, energy flows, freight rates, and national risk calculations.
 - Hormuz is exceptionally sensitive because of the sheer scale of oil traffic moving through it.
 - The Red Sea–Bab al-Mandab corridor is likewise crucial because it links Asia-Europe traffic through Suez, making conflict there a global commercial issue, not a local one.

- **India-focused argument**

- The article frames India as a state whose prosperity depends on stable Indian Ocean sea-lanes and whose geopolitical role requires credible maritime power.
 - This aligns with India's stated maritime outlook under SAGAR and its ongoing operational presence in the western Indian Ocean and Gulf-adjacent waters.
 - It also fits recent policy emphasis on undersea warfare, new ASW vessels, and submarine modernization.
 - Implicit evidence used by the argument
 - Vulnerability of narrow sea routes.
 - Strategic impact of even limited undersea threats.
 - Difficulty of locating submarines once deployed.
 - Need for integrated operations across surface, subsurface, and air dimensions.

- **Historical evolution**

- **Pre-independence background**

- India's strategic geography has long been shaped by sea routes linking West Asia, East Africa, and Southeast Asia through the Indian Ocean.
- Under colonial rule, control of sea routes was central to imperial trade, military mobility, and resource extraction.
- A useful conceptual takeaway: Indian Ocean importance is not new; what has changed is the scale of energy dependence, container trade, and high-tech naval rivalry.

- **Early post-independence phase**

- In the first decades after Independence, India's naval posture was modest and largely continental priorities dominated national security.
- Maritime issues mattered, but they did not occupy the same central place as land frontiers, partition legacies, and wars with neighboring states.

- **1971 and after**

- The 1971 war demonstrated the utility of naval action and sea denial in regional conflict.
- Over time, India recognized that naval power was not peripheral but a core instrument of regional strategy.

- **Post-Cold War and globalization era**

- Liberalization increased India's dependence on maritime trade, imported hydrocarbons, and global supply chains.
- As trade intensified, the security of the Indian Ocean became tied directly to economic growth and external sector stability.

- **After 26/11**

- Coastal security, maritime surveillance, and inter-agency coordination received major attention after the 2008 Mumbai attacks.
- The concept of maritime security broadened from traditional naval warfare to include terrorism, piracy, infiltration, and port security.

- **2015 onward**

- SAGAR marked a clearer political articulation of India's Indian Ocean role.
- The Indo-Pacific construct widened India's strategic horizon from near-seas to broader connectivity, rules, and balance-of-power concerns.

- **Contemporary phase**

- The Red Sea crisis, Gulf tensions, Chinese naval expansion, and Pakistan's undersea acquisitions have together elevated the urgency of submarine and ASW capability.
- India is moving through a modernization cycle involving Project-75 lineage, indigenous AIP insertion, and more ASW platforms.



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GLOBAL CONFLICT IN THE CHOKEPOINTS



- **BLOCKADE OF GLOBAL OIL TRANSIT** (e.g., Strait of Hormuz)



- **FULL-SPECTRUM MARITIME CONFLICT**

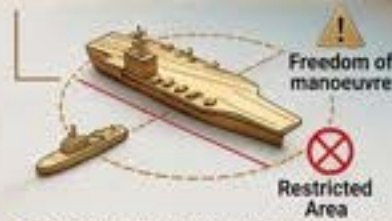


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- **STRATEGIC PARALYSIS OF SUPERIOR FLEETS**



- **DEMOCRATIZATION OF SEA DENIAL (Asymmetric Warfare)**

INDIA'S STRATEGIC MARITIME MANDATE



- **DEPENDENCY ON IOR FOR TRADE & ENERGY**



- **COUNTERING TWO-FRONT & EMERGING THREATS**



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- **Logical and philosophical base**

- **Realist foundation**

- The argument is strongly realist: states survive in an anarchic international system by securing power, deterrence, and strategic autonomy.
 - Maritime mobility, trade protection, and sea control are treated as hard-power necessities rather than optional public goods.

- **Mahanian influence**

- The reasoning resembles Alfred Thayer Mahan's stress on sea power as a basis of national greatness, trade protection, and geopolitical influence.
 - Economic prosperity is linked to secure maritime routes, and therefore naval power becomes a foundation of sovereignty.

- **Deterrence logic**

- The article assumes that credible undersea capability deters coercion by increasing uncertainty and raising the cost of hostile action.
 - This is strategically sound in part, because submarines are valued precisely for stealth and survivability.

- **Philosophical assumptions**

- Security precedes commerce.
 - Sovereignty requires autonomous coercive capacity.
 - Technology reshapes the balance between stronger and weaker states.
 - Strategic neglect of the maritime domain eventually produces economic vulnerability.

- **Limits in the philosophical frame**

- A purely realist reading may underplay cooperative security, international law, confidence-building, and interdependence.
 - For UPSC, this is where liberal and constructivist counterpoints can be introduced: institutions, norms, UNCLOS, coalition patrols, and regional trust also matter.



- **Multidimensional analysis**

- **Social**

- Secure sea-lanes protect fuel availability, prices, jobs linked to trade, and everyday economic stability.
- Maritime insecurity eventually reaches households through inflation, shortages, and transport cost increases.
- A wider social point: national security is not abstract; it affects welfare indirectly through markets and supply chains.

- **Political**

- Maritime crises test executive decision-making, strategic communication, and crisis response capacity.
- Naval preparedness strengthens a state's credibility, but overmilitarized rhetoric may also escalate tensions.
- For India, maritime policy now intersects with great-power politics, neighborhood diplomacy, and domestic expectations of strategic autonomy.

- **Legal**

- UNCLOS, freedom of navigation, innocent passage, EEZ rights, and rules around blockades and use of force are central.
- States must distinguish between lawful security operations and measures that violate international maritime norms.
- For UPSC, legal reasoning should accompany strategic reasoning.

- **Ethical**

- Protection of commerce is legitimate, but escalation that endangers civilian shipping raises moral questions.
- The ethics of deterrence involve proportionality, distinction, and minimizing harm to non-combatants.
- There is also an ethical duty to protect seafarers and preserve global commons.

- **International**

- Chokepoint insecurity globalizes regional conflict because energy importers, insurers, exporters, and naval powers are all affected.
- Asian economies are particularly exposed to Hormuz-related disruptions; India itself is a major destination for oil moving through that route.
- The Indian Ocean is therefore both a regional and global arena.

- **Economic**

- Disruption raises freight, insurance, rerouting, and commodity costs.
- Hormuz matters because oil volumes transiting it remain enormous.
- Maritime insecurity can widen current account pressures, fuel inflation, and weaken growth prospects in import-dependent economies.

- **Linkages with NCERTs**

- **Class 12 Political Science**

- Themes of security, sovereignty, international organizations, and contemporary world politics.
- Useful for understanding realism, balance of power, regional conflicts, and India's foreign policy choices.

- ***Class 11 Political Theory***

- State, sovereignty, justice, and rights.
- Helps students think about how national security can be justified while remaining constitutionally and ethically bounded.

- **Class 12 Geography**

- Human geography, transport and communication, international trade, and strategic location.
- Directly linked to chokepoints, sea routes, maritime trade patterns, and India's locational advantage.

- ***Class 10/11 Economics***

- Globalization, trade, energy dependence, and inflation transmission.
- Useful for connecting maritime disruption to domestic economic effects.

- **History NCERT themes**

- Indian Ocean trade networks and maritime linkages in older historical periods.
- This helps students see continuity: the sea has long shaped power, exchange, and state formation.



- **Linkages with UPSC CSE syllabus**

- **GS II**

- India and its neighborhood.
- Bilateral, regional and global groupings.
- Effect of policies and politics of developed and developing countries on India's interests.
- International relations, strategic autonomy, maritime diplomacy.

- **GS III**

- Security challenges and their management.
- Role of external state and non-state actors.
- Various security forces and agencies.
- Infrastructure, transport, energy security, indigenization of technology, defense modernization.

- **GS I**

- Indian Ocean as part of world geography, strategic location, resources, and trade routes.
- Historical role of maritime networks in shaping civilizations and regional linkages.

- **GS IV**

- Ethics of national security, civil-military responsibility, proportionality, public interest, and global commons.
- Administrative ethics in procurement, capability development, and long-term strategic planning.

- **Way forward**
- **Capability building**

- Accelerate submarine induction, refits, indigenous AIP integration, and long-term undersea planning.
- Expand ASW vessels, helicopters, maritime patrol aircraft, seabed sensors, and networked surveillance.

- **Institutional reforms**

- Strengthen jointness among Navy, Air Force, Coast Guard, intelligence, shipping, and energy agencies.
- Improve maritime domain awareness architecture and fusion of civilian-commercial and military information.

- **Economic resilience**

- Diversify energy sources, build strategic reserves, and reduce single-route vulnerability.
- Encourage resilient shipping, port readiness, and insurance-response mechanisms.

- **Diplomatic strategy**

- Deepen Indian Ocean partnerships through training, HADR, capacity-building, and coordinated patrols in the spirit of SAGAR.
- Combine deterrence with reassurance so that India is seen as a security provider, not merely a competitor.

- **Legal-normative approach**

- Continue supporting freedom of navigation, UNCLOS principles, and rules-based maritime conduct.
- This strengthens India's legitimacy while protecting its interests.



- **All Previous Years' UPSC**

- **UPSC GS-2 (2013):** The string of pearls model is an interpretation of Chinese intentions in the Indian Ocean region. Evaluate the model and its implications for India.
- **UPSC GS-3 (2014):** How illegal trans-border migration does pose a threat to India's security? Discuss the strategies to curb this, bringing out the factors which give impetus to such migration. (Can be linked to coastal security).
- **UPSC GS-2 (2015):** Project `Mausam' is considered a unique foreign policy initiative of the Indian Government to improve relationships with its neighbors. Does the project have a strategic dimension? Discuss.
- **UPSC GS-2 (2022):** India is an age-old friend of Sri Lanka. Discuss India's role in the recent crisis in Sri Lanka in the light of the preceding statement. (Highlights the importance of maritime neighbors).
- **UPSC GS-3 (2022):** Discuss the types of organized crimes. Describe the linkages between terrorists and organized crime that exist at the national and transnational levels. (Relevant to maritime piracy and arms smuggling).



Creating semicon dependency?

DESIGN MATTERS. With focus merely on assembly, testing, and packaging, India walks into a high-investment, low-yield trap



NISSHANT SAHDEV

India is pouring concrete in Odisha, but the rules for what goes inside those factories are redrafted in Washington. While the recent inauguration of domestic packaging facilities is a legitimate win for job creation, celebration is justified but complacency is not. While bilateral frameworks like the Initiative on Critical and Emerging Technology (ICET) are sold to Indian institutional investors as a triumph, the numbers tell a harsher story.

In February, Washington imposed a uniform 10 per cent tariff. In March, the USITB launched aggressive Section 301 investigations into industrial capacities across 18 economies. These are not accidents of diplomacy. They are the new baseline of American trade policy, which is growing highly protectionist. India is building the physical hardware for the future, but the US holds the rules for how that hardware can be used. We are building a house on a rented foundation.

New Delhi suffers from the assumption of linear progress. Policymakers believe geopolitical alignment with the US guarantees technology transfers, which fuels manufacturing, ending in export dominance.

This ignores how modern supply chains actually work. Trade policy today is a highly volatile market. If a domestic facility's viability can be erased overnight by a sudden pivot in foreign export controls, it is not an independent Indian asset. It is a leveraged project dependent on external permission.

THE PACKAGING TRAP

Washington's playbook in the Indo-Pacific (economically rational) omits the high-margin, intellectually rigorous work of chip design and AI research, and outsources the lower-margin, occupationally demanding labour of assembly, testing, and packaging (ATP) to partner nations. Look at the underlying economics. In the global semiconductor value chain, fabline design and core intellectual property capture nearly 50 per cent of the industry's total profit. Assembly and packaging yield less than 10 per cent. By focusing state incentives primarily on ATP and legacy manufacturing, India walks into a high-investment, low-yield trap.

A fab without design capability is a factory with rent to pay. The 3D Glass Solutions partnership in Odisha creates vital employment, but it cannot be the



ACT NOW. India must aggressively scale up its chip design talent incentives.

final destination. Without a corresponding surge in indigenous chip design and intellectual property ownership, India will remain a highly capable subcontractor.

This is the Silicon Shackle: achieving the status of being physically indispensable to the global supply chain, while remaining fundamentally dependent on the original architect. If India owns the building but not the operating system, sovereignty is cosmetic.

THE TOKEN TAX

This dependency extends into the digital sphere. A new nose of influence is being drawn by the US Department of Commerce that prioritises American technological hegemony over global market access.

Under these rules, acquiring the compute-dense GPU (graphics processing units) necessary for India's 10,000-chip National AI Mission requires navigating National Validated End User (NVEU) authorisations. For Indian data centres, these mandatory audits act as a silent embargo. They delay time-to-market by months. India subsidises the power and constructs the data centres, but the computing power humming inside them remains muted and overseen by a foreign capital.

India is building the physical hardware for the future, but the US holds the rules for how that hardware can be used. We are building a house on a rented foundation.

Compute dependence is the new oil dependence. Furthermore, we must confront the hidden economic drain of our current AI ecosystem. Over 90 per cent of Indian AI startups today build their applications on top of US-hosted, proprietary foundational models. This creates a perpetual Token Tax. Every time an Indian enterprise utilises an American API to process a prompt or analyse data, a micro-payment of capital — and crucially, behavioural data — flows outward.

India's electronics import bill is already projected to cross a staggering \$120 billion by the end of this fiscal cycle. Now, factor in the cost of artificial intelligence. A single cluster of top-tier Nvidia GPUs costs tens of millions of dollars, and Indian enterprises are currently forced to rent this compute power by the hour from American hyperclouds. If we do not cultivate our own foundational model weights, we will add a crippling digital trade deficit to that ledger. We risk becoming a rent workforce of diligent prompt engineers rather than the architects of original systems.

THE CLOSING WINDOW

Historically, India's greatest leverage in technology negotiations has been its demographic scale. We represent the largest open data market in the world, processing over 13 billion digital public infrastructure transactions every single month. Global AI giants have extracted this data to train their models for free.

This is where India should worry. The frontier of artificial intelligence is moving away from scraping raw human data. The next generation of models increasingly relies on synthetic data — data automatically generated by

algorithms training themselves. As this happens, our demographic advantage will precipitously diminish. Once algorithms no longer need our data to become smarter, our primary bargaining chip disappears.

We must urgently embrace a Data-for-Tech framework. If foreign entities wish to utilize the high-quality datasets generated by the Indian population, they must be compelled to provide more than localized software services. They must share the underlying blueprints: the model weights and the source code. Access to our digital market must be priced as a high-value geopolitical trade.

A POLICY BLUEPRINT

If India wants to transition from diplomatic optimism to hard-headed execution, it must adopt an uncompromising approach:

A sovereign GPU reserve: India must establish a state-backed stockpile of high-end compute. This requires unlocking institutional capital to secure long-term, non-renewable licenses for cutting-edge hardware, insulating domestic startups from sudden export control shocks.

IP co-development mandate: Any foreign firm receiving taxpayer-funded incentives under the India Semiconductor Mission must be legally required to enter into binding IP co-development agreements with Indian entities. We need the design blueprints, not just the assembly instructions.

Targeted chip design scaling: India must aggressively scale up its Design Linked Incentives (DLIs), offering massive R&D tax credits specifically for fabless chip-design firms. The objective is clear: own the intellectual architecture of the chips we are currently paying to package.

The "Indi LLM" initiative: We require a heavily funded national mission to build foundational models trained explicitly on Indian languages and legal frameworks, with the core weights stored domestically. This guarantees that if external APIs are ever restricted, India's digital nervous system continues to function.

The global technological order is currently being recalibrated. The margin for error is zero. To move beyond the role of a diligent subcontractor, India must recognise that true autonomy is the product of calculated holding and aggressive IP ownership. We must ensure that when we build for the future, we are building on ground that we unquestionably control.

The writer is a physicist at the University of North Carolina at Chapel Hill and an expert on AI, infrastructure, and global systems.

- **Key Terms and Explanations**

- **ATP (Assembly, Testing, and Packaging):** This is the final stage of semiconductor manufacturing. It involves cutting the manufactured silicon wafers into individual chips, encasing them in protective packaging, and testing them for functionality. While crucial for job creation, it represents the lower end of the value chain, yielding profit margins usually below 10 percent.
- **Fabless Design:** Companies in this category focus entirely on designing the intellectual architecture of a chip (the blueprints) but outsource the actual manufacturing to fabrication plants (fabs). This is the most intellectually demanding phase and captures nearly 50 percent of the industry's total profit.
- **Sovereign GPU Reserve:** Graphics Processing Units (GPUs) are the engines that power Artificial Intelligence training. A sovereign reserve implies a state-backed, heavily funded stockpile of these computing resources, ensuring domestic startups and researchers are insulated from foreign export controls or sudden price hikes.
- **Foundation Models (LLMs):** These are large-scale artificial intelligence models trained on vast quantities of unstructured data. They serve as a foundational base upon which specific applications can be built.
- **Synthetic Data:** As AI models exhaust the supply of raw, human-generated data on the internet, they are increasingly relying on data generated autonomously by other algorithms to continue their training and improvement.
- **Technology Transfer:** The process of sharing or disseminating skills, knowledge, technologies, and manufacturing methods from one entity (often foreign) to another to ensure wider accessibility and indigenous development.

- **Main arguments and substantive parts**

- **High-investment, low-yield trap**

- Countries that emphasise chip assembly, testing and packaging without parallel investments in design, IP and high-end fabs risk entering a “low-yield trap” – high capital expenditure but low long-term strategic and economic returns.
- This is because value and bargaining power lie upstream (design, IP, tools) and in sovereign control over advanced compute, not in labour-intensive packaging work.

- **Geopolitical trade policy and export controls**

- Semiconductors are now at the heart of the geopolitical contest, especially US–China tech rivalry, and trade policy is being used as a strategic weapon.
- Tariffs, export controls and investment screening are no longer temporary measures but central instruments of long-term statecraft.

- **Risk of a new dependency structure**

- If a country only builds “the physical hardware for the future” (factories, ATMP units) while others hold the IP, design tools and export levers, it gets locked into a subordinate role.
- This resembles earlier patterns of commodity or colonial dependency, where the periphery provided labour and infrastructure, while the core retained control over technology and finance.

- **Compute as the new oil / choke point**

- Advanced GPUs and AI accelerators are framed as the “new oil” of the digital age, with export controls on such chips functioning as choke points.
- Without secure access to high-end compute, countries cannot build frontier AI systems, which in turn limits their ability to negotiate in the digital economy.

- **Need for a sovereign, rules-based approach**

- The conceptual argument is that a large democracy must create its own sovereign layer in the semiconductor and AI stack—through domestic design, sovereign compute infrastructure, and stronger data governance.
- Otherwise, demographic advantage and market size may be used by others, while policy space gets constrained by foreign IP and supply chain leverage.

- **Policy blueprint idea**

- The conceptual “blueprint” includes: a sovereign GPU reserve, data-for-tech conditionality, tighter regulation of critical AI APIs, and prioritisation of domestic IP and Indian-language foundational models.
- The normative claim is that without such measures, the global technological order will mirror the unequal financial order, with developing countries stuck at the low-value end.

- **Historical evolution of the issue**

- **Early electronics and import dependence (pre-1991)**

- Post-Independence India treated electronics and computing as strategic but maintained a protectionist, public-sector-dominated approach; chip initiatives remained limited and often uncompetitive.
- The global semiconductor industry, however, rapidly globalised, with US firms focusing on design and East Asian economies (Japan, South Korea, Taiwan) building powerful fab capacities.

- **Liberalisation and IT services rise (1990s–2000s)**

- Economic reforms shifted India toward export-oriented IT services rather than high-end hardware manufacturing.
- Chip design centres and R&D labs of global firms came to India, but fabrication remained offshore due to high capex, infrastructure gaps and uncertain policy.

- **Global value chains and Asia's rise (2000s–2010s)**

- Taiwan, South Korea and later China invested heavily in fabs, subsidies and industrial policy, capturing global market share in foundry and OSAT.
- India's electronics imports (including semiconductors) grew rapidly, contributing to a widening trade deficit, especially with China.

- **US–China tech rivalry and the weaponisation of chips (2018 onwards)**

- Starting with tariffs and then more systematically with the October 2022 US export controls, semiconductors became a frontline tool of strategic competition.
- Advanced GPUs and lithography tools were brought under stringent controls, affecting not just China but also third countries in some categories.

- **India's semiconductor push (2021 onwards)**

- India launched Semicon India and related schemes to support fabs, compound semiconductor units, ATMP/OSAT and design-linked incentives.
- Several large investments in Gujarat and other states targeted packaging and testing hubs, while a few logic and compound semiconductor fabs were approved.

- **AI boom, GPU scarcity and policy rethink (2023 onwards)**

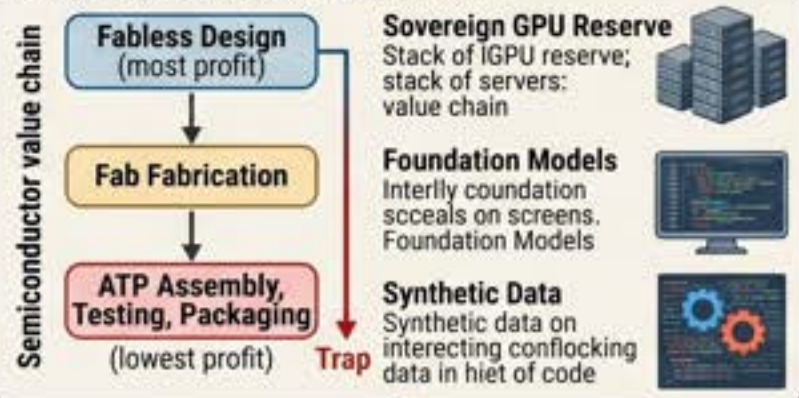
- Generative AI's rise led to intense global race for GPUs and high-end compute, exposing latecomers' dependence on a few vendors and export control jurisdictions.
- This triggered debates on "compute sovereignty", national AI clouds, and strategic positioning in the semiconductor value chain—precisely the context in which concerns about a "semiconductor dependency" for countries like India have emerged.



AXIA IAS ACADEMY PREPARATION: SEMICONDUCTOR DEPENDENCY & DATA SOVEREIGNTY (COMPREHENSIVE ANALYSIS)

LEFT (FOUNDATIONS)

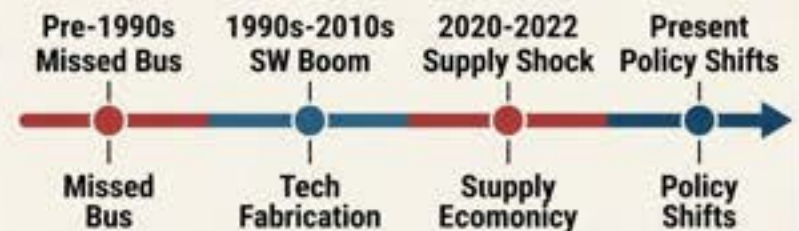
1. KEY TERMS & EXPLANATIONS



2. MAIN ARGUMENTS

- Low-Yield Trap**
Rented, crumbling foundation
 - Illusion of Tech Transfer**
Tanited, crunodling foundation
 - Compute Dependency**
Rented renting, crumbling foundation
 - Diminishing Demographic Dividend**
Rented over nonneloping foundation
-

3. HISTORICAL EVOLUTION



MIDDLE SECTION (DEPTH & IDEAS)

4. LOGICAL FOUNDATION



5. NEW FEATURES & UNIQUE IDEAS



6. SUSTAINABILITY



11. CORE SYLLABUS CONNECTION

- Detailed to links to GS 3, Indirapuzation of connection
- Indigenization of Technology and IPR**
- Link to GS 3, mappimg Indigenation of cinds on IPR and technology

12. WAY FORWARD



APPLICATION & UPSC SPECIFICS

7. CHALLENGES



8. MULTI-DIMENSIONAL ANALYSIS



9. LINKAGES WITH NCERTs

- Class 11/12 specific:**
- Geography (Geography)
 - Econ (Topoc Geogramies)
 - Pol Science (Pol Science)

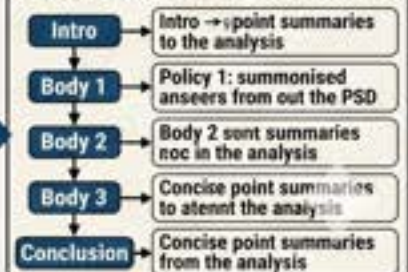
10. LINKAGES WITH UPSC SYLLABUS

- GS 2 & 3**
- Indigenization of Technology to theme**

13. PREVIOUS YEARS' PYQs

- 2015/2018/2022/2023**
- Sample themes:**
- 2015/2018/2022/2023,
 - 2022/2023/2023
- Sample themes:**
- Somimonization
 - Revention of Technology
 - Recent languager gyins

14. MODEL ANSWER POINTS



- **Logical and philosophical base of the arguments**

- **Structuralist political economy**

- The reasoning is grounded in a structuralist view: where a country sits in global production hierarchies determines its bargaining power, development prospects and strategic autonomy.
- Staying at the low-value end (assembly, packaging) replicates core–periphery dynamics seen earlier in commodities and manufacturing.

- **Strategic autonomy and sovereignty**

- The argument assumes that technological self-reliance—in at least critical nodes like design IP, foundational AI models and compute—is necessary to preserve strategic autonomy.
- Philosophically, it aligns with republican ideas of freedom as non-domination: dependence on another state’s export controls is seen as a form of potential domination.

- **Data as a sovereign resource**

- Data is conceptualised not just as an economic input but as a collective national resource, akin to natural resources.
- This leads to the normative claim that using citizens’ data without adequate reciprocal transfer of technology or IP is unjust and strategically naïve.

- **Precautionary approach to digital colonialism**

- The underlying logic draws on concerns about “digital colonialism”, where global firms extract data and shape digital ecosystems in developing countries.
- Therefore, frameworks like data-for-tech and restrictions on external AI APIs are seen as precautionary measures to avoid a future lock-in.

- **Developmental state and industrial policy**

- A strong state-led industrial policy is implicitly endorsed: targeted subsidies, strategic procurement, and regulatory conditionality to build domestic champions.
- This reflects a belief that market forces alone will not correct structural technological disadvantages.

-

• **Multidimensional analysis**

• **Social dimension**

- Indigenous semiconductor and AI ecosystems can create high-quality jobs, spur STEM education, and reduce digital divides via local language technologies.
- Yet, uneven regional distribution of fabs and data centres can deepen intra-national disparities if not accompanied by broader skill and infrastructure policies.

• **Political dimension**

- Control over semiconductors and AI compute enhances a state's ability to exercise strategic autonomy and negotiate in global forums.
- Domestically, large subsidies and strategic contracts raise issues of transparency, cronyism and federal equity.

• **Legal dimension**

- Data-for-tech and access-to-compute rules intersect with data protection law, IPR regimes, competition law and export-control commitments.
- Clarity on jurisdiction, liability and dispute resolution is essential to avoid chilling investment.

• **Ethical dimension**

- The decision on who gets priority access to sovereign compute—state agencies, startups, academia, defence—has profound ethical implications.
- Embedding fairness, accountability and transparency in AI models and in allocation of compute is crucial.

• **International dimension**

- Semiconductor policy is deeply embedded in global alliances (Quad, IPEF, technology partnerships) and in global export-control coalitions like the Wassenaar Arrangement.
- A unilateral, highly restrictive data-for-tech posture could clash with commitments under trade and investment agreements and complicate strategic partnerships.

• **Economic dimension**

- A successful semiconductor strategy can reduce import dependence, improve the current account, and incentivise upstream R&D.
- But mis-targeted subsidies and overcapacity can create “white elephants” and crowd out other developmental priorities.

- **Linkages with NCERTs**

- **NCERT Economics (Class 11–12)**
 - Chapters on liberalisation, globalisation and the Indian economy help frame how global value chains and trade policies shape domestic industrial choices.
 - The semiconductor debate exemplifies issues of comparative advantage, industrial policy and external sector vulnerability.
- **NCERT Political Science (Class 11: “Political Theory”; Class 12: “Contemporary World Politics”)**
 - Concepts of sovereignty, justice, globalisation and power can be applied to data sovereignty and tech dependency.
 - US–China tech rivalry and global governance of technology map onto chapters dealing with globalisation and contemporary international politics.
- **NCERT Science and Technology references (Class 9–10 Science, Class 12 Physics – semiconductor chapter)**
 - Basic concepts of semiconductors, diodes and transistors provide scientific background to understand why fabrication is complex and capital-intensive.
 - Helps demystify terms like “integrated circuits”, “logic chips”, “compound semiconductors”.
- **NCERT Sociology (Class 12: “Indian Society”, “Social Change and Development in India”)**
 - Chapters on globalisation, social change and development can be linked to the social impact of digital technologies, jobs, and regional imbalances.

Linkages with UPSC CSE syllabus

GS Paper 1 (Society, World History)

- Themes: Globalisation and its impacts, industrialisation and urbanisation, regional disparities, world wars to global power shifts.
- Tech dependency and digital colonialism connect to patterns of imperialism and unequal exchange.

GS Paper 2 (Polity and International Relations)

- Topics: Functions and responsibilities of the Government; issues relating to federalism; government policies and interventions; India and its neighbourhood; effect of policies of developed countries.
- Export controls, data sovereignty, and India's tech partnerships fall squarely here.

GS Paper 3 (Economy, Science & Tech, Security)

- Core linkage: infrastructure, industrial policy, external sector, science and technology, indigenisation of technology, cyber and internal security.
- Semiconductor policy, sovereign compute, AI models, and data-for-tech are directly relevant.

GS Paper 4 (Ethics)

- Issues of technological justice, fairness in data use, equity in access to compute, and responsibility of state and corporates in digital governance.

- **Way forward**
- **Balance ATMP with upstream capabilities**
 - Use ATMP and OSAT projects as stepping stones, not endpoints: couple every major packaging investment with parallel programmes for design IP, EDA tools training and R&D centres.
 - Encourage fabless Indian chip firms via design-linked incentives and long-term procurement commitments.
- **Build sovereign compute and AI commons**
 - Establish a national GPU and data-centre grid accessible to universities, startups and public agencies under transparent rules.
 - Prioritise open, audited Indian-language models as public digital infrastructure, with clear API access norms.
- **Negotiate smartly on data-for-tech**
 - Integrate data-for-tech principles into digital trade negotiations and FDI approvals, seeking code audits, joint IP or access to model weights where feasible.
 - At the same time, avoid over-stringent demands that may deter investment; aim for calibrated reciprocity.
- **Strengthen regulatory and institutional capacity**
 - Create specialised techno-legal bodies for semiconductor and AI regulation, combining domain expertise with legal and economic analysis.
 - Build long-term cadres and training pipelines so that policy does not depend on a few individuals.
- **Invest in human capital and R&D**
 - Expand semiconductor-focused curricula, chip design centres of excellence, and funded PhD programmes in material science, device physics and AI systems.
 - Encourage industry–academia consortia and mission-mode projects for critical technologies (EDA, advanced materials, compound semiconductors).
- **Embed sustainability and equity**
 - Mandate water-recycling, renewable energy use and local environmental safeguards for fabs and data centres.
 - Ensure regional spread of projects and reservation of compute budgets for social-sector applications like health, agriculture and education.

- **UPSC GS-2 (International Relations & Policies)**
 - 2023: “How does India’s policy of Atmanirbhar Bharat reconcile with globalisation and strategic partnerships?”
 - 2020: “Discuss the implications of the US–China trade war for India’s foreign policy and economic strategy.”
 - 2017: “The growing role of technology in diplomacy has altered the nature of international relations. Discuss.”
- **UPSC GS-3 (Economy & S&T)**
 - 2023: “India aims to become a global hub for semiconductor manufacturing. Examine the opportunities and challenges.”
 - 2022: “What are the main challenges in achieving self-reliance in critical technologies such as semiconductors and defence equipment?”
 - 2021: “Data is the new oil. Critically comment in the context of India’s digital economy.”
 - 2020: “Discuss the linkages between digital infrastructure, innovation and inclusive growth in India.”
- **UPSC Essay**
 - 2023: “Technology as the silent factor in world politics.”
 - 2020: “Ships do not sink because of water around them but because of the water that gets into them.” (Can be related metaphorically to internal vulnerabilities in tech dependence.)
- **UPSC Prelims (selected themes)**
 - Questions on semiconductor materials, opto-electronics, compound semiconductors, and on schemes like Production Linked Incentive (PLI) and Atmanirbhar Bharat.



Nuclear consensus remains elusive

Non-Proliferation Treaty's Review Conference ends on a predictably disappointing note



C. UDAY BHASKAR
DIRECTOR, SOCIETY
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THE 2026 Review Conference (RevCon) of the Nuclear Non-Proliferation Treaty (NPT) concluded at the United Nations in New York on May 22 without adopting a final consensus document.

This is a major setback to the equitable regulation of the global nuclear domain, which is in considerable disarray due to the deep geopolitical discord among the major powers, the steady loss of trust about the intent and commitment of the five nuclear weapon states (NWS) towards disarmament, and the uncertainties induced by the emergence of new technologies, including AI (artificial intelligence) that can erode the levels of nuclear deterrence.

The inability to reach a consensus was no surprise. It marks the third consecutive review cycle (following 2010 and 2022) to end without an agreed-upon statement among the 121 NPT member states.

India, Pakistan and Israel are non-signatories to the NPT, while North Korea withdrew from the treaty in 2003. It is instructive that these four nations are nuclear weapon states, with Israel maintaining ambiguity about nuclear tests, unlike the other three.

The NPT, a very unequal treaty, came into force in 1980. It sought to segregate the five nuclear haves or NWS (nuclear weapon states) — the US, erstwhile USSR (now Russia), UK, France and China — from the rest of the world, which was expected to remain non-NWS (NNWS) in perpetuity. The five NWS are also the permanent members of the UN Security



MISSION: The world needs rock-solid stakeholders to repair the treaty's pillars in an equitable, empathetic manner. *AP/WIDEWORLD*

Council, the P5, deemed to be the executive agent of the UN system and responsible for global peace and security.

The NPT scaffolding was built around three pillars that sought to balance rights and obligations among the NWS and the NNWS — nuclear non-proliferation, disarmament and the peaceful use of nuclear energy.

The five NWS agreed not to transfer nuclear weapons or help others acquire them, while the NNWS agreed not to acquire or develop nuclear weapons. The objective was to stop the spread of nuclear weapons beyond the original five.

The disarmament pillar was framed as the NWS committed to pursue negotiations "in good faith" towards nuclear disarmament, leading to general and complete disarmament. This is the Article VI obligation and the reason why NNWS agreed to forgo acquiring the apocalyptic nuclear weapon capability — the onerous promise by the NWS that existing arsenals would eventually be reduced to zero.

The third pillar is the peaceful use of nuclear energy, wherein all parties have the "inalienable right" to develop nuclear energy for peaceful purposes. In return, non-nuclear states must

The 2026 Review Conference's failure underscored the need to restore the sanctity of deterrence norms.

accept IAEA (International Atomic Energy Agency) safeguards to verify that enriched material is not being diverted towards weapons.

In essence, the NPT bargain was basically a template that was imposed on the NNWS by the "Test five", whose dictate to the rest of the world was: you are not to build bombs, you get help with peaceful nuclear energy and we, the countries that have bombs, will work to get rid of them.

Regrettably, all three pillars have been weakened or distorted over the decades. The most blatant transgression was in relation to proliferation. The five NWS closed ranks to allow vertical proliferation of their respective arsenals, but growled in unison to prevent horizontal proliferation. The first violation of the NPT was the covert assistance provided by NWS to enable Israel, Pakistan and North Korea to acquire nuclear weapons during the Cold War decades.

The disarmament commitment and the pledge by the NWS not to use or threaten to use their nuclear weapon capability against NNWS have also been tainted. In recent years, this has been evident in the actions of Russia and the US in the Ukraine and Iran wars, respectively.

Both Ukraine and Iran have revealed the manner in which the core NPT provisions have been nullified. Paradoxically, Ukraine, which had nuclear weapons when it was part of the USSR, became a de facto NWS when the Cold War ended in December 1991. It was prevailed upon to renounce this status and become a NNWS. Solemn pledges were made that its sov-

erignty would not be violated, but then the February 2022 Russian invasion happened. And in the early stages of the war, Moscow engaged in not-so-subtle nuclear saber-rattling.

Iran, which is a signatory to the NPT as a NNWS and had accepted IAEA safeguards under the (P5 plus 1) negotiated nuclear deal during the Barack Obama years, was blatantly attacked by the US and Israel on "trumped-up" charges earlier this year. The "unalienable right" of a NNWS to peaceful nuclear pursuit is in tatters.

India has no de jure (on paper) status of the NPT since it is a non-signatory, but it has a de facto dialectical relationship with the global nuclear order. Since the 1950s, when Jawaharlal Nehru was at the helm, India was in the vanguard of global disarmament advocacy and contributed to the Partial Test Ban Treaty.

However, Delhi was cast as a nuclear outlier by the US G2 as it became a nuclear weapon state in May 1998 and was then accorded an exceptional status in late 2008. This extraordinary media blitz was enabled in large measure by then US President George W Bush, it has given India a distinctive perch in the global nuclear architecture.

The 2026 RevCon ended on a predictably disappointing note, but the failure underscored the need to restore the sanctity of deterrence norms — it is more urgent now than ever before. The US, Russia and China have abdicated their responsibility in different ways. Also, they are no longer the guardians they were expected to be. The world needs resolute stakeholders to repair the NPT pillars in an equitable, empathetic and consensual manner.

In the mid-1960s, the Indian representative to the Eighteen-Nation Committee on Disarmament (CND) in Geneva, Ambassador VC Menon, described the nascent NPT as a means to "disarm the unarmed." Sixty years later the NPT should not morph into a treaty aimed at destroying the unarmed.

- **Key Terms and Explanations**

- **Nuclear Non-Proliferation Treaty (NPT)** – This is an international treaty signed in 1968 and enforced from 1970, designed to prevent the spread of nuclear weapons. It creates a legal distinction between five recognized nuclear-weapon states and all other signatories, who agree to remain non-nuclear. For example, Germany and Japan, despite having advanced technological capabilities, remain non-nuclear weapon states under this treaty.
- **Nuclear Weapon States (NWS)** – These are the five countries that possessed nuclear weapons before the NPT came into force on January 1, 1967: the United States, Russia (formerly USSR), United Kingdom, France, and China. They are also the permanent members of the UN Security Council (P5). Think of them as the "nuclear club" whose membership was frozen at the treaty's creation.
- **Non-Nuclear Weapon States (NNWS)** – The remaining 186 signatory countries that have legally committed not to acquire nuclear weapons. In return, they receive assistance for peaceful nuclear energy and security assurances. Brazil and South Africa are prominent examples of NNWS that have significant nuclear energy programs but no weapons.
- **Review Conference (RevCon)** – Held every five years, this is where NPT members assess implementation of the treaty. The 2026 RevCon failed to produce a consensus document, continuing a pattern from 2015 and 2022. Imagine it as a progress report meeting where all 191 members must agree on every word – a single objection can collapse the entire outcome.
- **IAEA Safeguards** – The International Atomic Energy Agency's verification system that inspects nuclear facilities in NNWS to ensure enriched uranium or plutonium is not diverted from peaceful purposes to weapons production. These are essentially international inspections that non-nuclear states must accept as part of their NPT obligation.
- **Vertical vs Horizontal Proliferation** – Vertical proliferation means existing nuclear states expanding or modernizing their own arsenals (adding more bombs or making them more sophisticated). Horizontal proliferation means new countries acquiring nuclear weapons for the first time. The NWS have strictly opposed the latter while freely engaging in the former.
- **Article VI Obligation** – This is the disarmament clause of the NPT, requiring all parties to pursue negotiations in good faith toward nuclear disarmament and general and complete disarmament. It remains the most contested and least fulfilled pillar of the treaty.
- **Nuclear Deterrence** – The strategic doctrine that possessing nuclear weapons prevents an adversary from attacking, because any attack would trigger catastrophic retaliation. During the Cold War, the US and USSR maintained "Mutually Assured Destruction" – neither could attack first without being destroyed in return.

- **Main Arguments and Substantive Parts**

- The central thesis presented is that the NPT regime is in serious disarray, and the 2026 Review Conference's failure to reach consensus represents not an anomaly but a predictable continuation of a deteriorating nuclear order. Let me break this down systematically.

- **Core Thesis Statement** – The global nuclear governance framework, built around the NPT since 1970, has fundamentally failed to deliver on its three pillars, and the major powers have abandoned their responsibilities as guardians of nuclear order. The author argues that what was always an unequal treaty has now become dangerously dysfunctional.

- **Evidence Supporting the Thesis** – Three consecutive review cycles (2015, 2022, 2026) have ended without consensus documents. This is unprecedented in NPT history and signals systemic breakdown rather than temporary difficulties. The author points to vertical proliferation among NWS while they aggressively prevent horizontal proliferation as evidence of bad faith.

- **The Ukraine Argument as Evidence** – Ukraine surrendered its Soviet-era nuclear weapons in 1994 under the Budapest Memorandum, receiving solemn security assurances from Russia, the US, and the UK. When Russia invaded in 2022, these assurances proved worthless, and Moscow engaged in nuclear sabre-rattling against a non-nuclear state. This, the author argues, has fatally undermined trust in NPT security guarantees.

- **The Iran Argument as Evidence** – Iran, an NPT signatory NNWS, accepted stringent IAEA safeguards under the Joint Comprehensive Plan of Action (JCPOA) negotiated during the Obama administration. The US later withdrew from this agreement and, along with Israel, launched attacks on Iranian nuclear facilities on what the author calls "trumped-up" charges. This demonstrates that even compliance with safeguards does not protect a NNWS from attack.

- **The Three Pillars in Crisis** – The non-proliferation pillar has been violated by NWS themselves through covert assistance to Israel, Pakistan, and North Korea during the Cold War. The disarmament pillar remains unfulfilled, with NWS modernizing rather than eliminating arsenals. The peaceful use pillar has been undermined through attacks on Iran and discriminatory application of safeguards.

- **India's Distinctive Position** – The author notes that India, as a non-signatory nuclear weapon state, maintains a unique de facto relationship with the NPT regime. From Nehru's disarmament advocacy in the 1950s to the exceptional 2008 US-India nuclear deal, India has navigated from being cast as a nuclear outlier to achieving an extraordinary modus vivendi with the nuclear order.

- **Historical Evolution of the Issue**

- Understanding the nuclear non-proliferation regime requires tracing its development from the dawn of the atomic age through the Cold War and into the contemporary multipolar world. Let me walk through this timeline systematically.

- **Pre-1945 Scientific Foundations** – The discovery of nuclear fission by German scientists Otto Hahn and Fritz Strassmann in 1938, followed by the theoretical explanation by Lise Meitner and Otto Frisch, laid the scientific groundwork. Albert Einstein's 1939 letter to President Roosevelt warning of Nazi German nuclear research initiated the Manhattan Project.

- **The Manhattan Project Era (1942-1945)** – The United States, with British and Canadian support, developed the first nuclear weapons at Los Alamos Laboratory under J. Robert Oppenheimer's scientific direction and General Leslie Groves' military command. The Trinity test on July 16, 1945, demonstrated the weapon's feasibility. Hiroshima and Nagasaki were bombed on August 6 and 9, 1945, respectively.

- **Early Cold War Arms Race (1945-1960s)** – The Soviet Union tested its first nuclear weapon in 1949, much earlier than American intelligence predicted. The US developed the hydrogen bomb (1952), followed by the USSR (1953). The United Kingdom tested its first nuclear weapon in 1952, France in 1960. China tested its first nuclear device in 1964. By the mid-1960s, five nuclear weapon states had emerged.

- **Early Non-Proliferation Efforts** – The Baruch Plan (1946) proposed international control of nuclear energy but failed due to Soviet opposition. The International Atomic Energy Agency was established in 1957. The Partial Test Ban Treaty (1963) prohibited atmospheric, underwater, and outer space nuclear testing but allowed underground testing.

- **The NPT Negotiation and Signing (1965-1968)** – The Eighteen Nation Committee on Disarmament in Geneva negotiated the treaty. The author mentions Indian Ambassador VC Trivedi's prescient critique in the mid-1960s that the treaty would "disarm the unarmed." The treaty opened for signature in 1968 and came into force in 1970 with 43 initial parties.

- **India's Nuclear Journey** – Jawaharlal Nehru advocated for comprehensive disarmament in the 1950s. India refused to sign the NPT, calling it discriminatory. The "Smiling Buddha" nuclear test of May 1974 demonstrated India's capability. Further tests in May 1998 (Pokhran-II) formally established India as a nuclear weapon state outside the NPT.

- **Exceptions and Proliferation (1970s-1990s)** – Israel developed nuclear weapons with French assistance (undeclared capability by late 1960s). Pakistan developed weapons with covert assistance from China and others, testing in 1998. North Korea joined the NPT in 1985 but announced withdrawal in 2003 after suspected weapons development.

- **The Post-Cold War Period** – South Africa voluntarily dismantled its nuclear weapons program and joined the NPT as a NNWS in 1991. Ukraine, Belarus, and Kazakhstan surrendered Soviet nuclear weapons inherited after USSR dissolution. The NPT was indefinitely extended in 1995.

- **Recent Review Conferences** – The 2015 RevCon collapsed. The 2022 RevCon collapsed amid tensions from the Ukraine war. The 2026 RevCon followed the same pattern, marking the third consecutive failure.

- **Contemporary Challenges** – Russia's 2022 invasion of Ukraine, US-Iran tensions, North Korean nuclear advances, and the emergence of artificial intelligence in nuclear command and control systems create unprecedented pressure on the non-proliferation regime.



THE CURRENT GLOBAL NUCLEAR NON-PROLIFERATION CRISIS: DEADLOCK AND WAY FORWARD.

A COMPREHENSIVE SUMMARY ANALYSIS BASED ON A RECENT GEOPOLITICAL NOTE.

THE CURRENT NPT DEADLOCK

FAILURE OF CONSENSUS:
Third Consecutive RevCon (2015, 2022, 2026) without agreement.



191
member states

Deep geopolitical discord prevents a unified final statement among NPT members.

P5 HYPOCRISY: Failure of the Five NWS



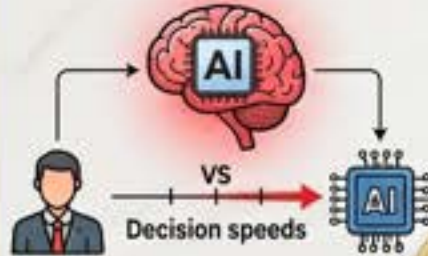
Growing nuclear stockpiles

NWS close ranks to prevent horizontal proliferation while ignoring their own disarmament obligations (Art VI).



KEY DRIVERS OF EROSION

**EMERGING TECHNOLOGIES:
AI IN THE NUCLEAR DOMAIN**



Muddying deterrence norms, risk of accidental escalation, AI-accelerated decisions.

FLASH WAR SCENARIO
- Increased Risk of Miscalculation



**REVIVED NUCLEAR
SABRE-RATTLING:
Failure of Pledges**



**NWS PLEDGE:
DO NOT USE OR
THREATEN NNWS**

Renewed Threats in Contemporary Conflicts.

KEY DRIVERS OF EROSION

NEED FOR NEW STAKEHOLDERS

NWS abdicated responsibility. Need for equitable, empathetic, and resolute non-proliferation stakeholders.



Include Non-Signatories with proven records.

THE PATH FORWARD: RESTORING THE SANCTITY OF NON-PROLIFERATION

UPHOLDING THE THREE PILLARS



Non-Proliferation, Disarmament (Art VI), Peaceful Use (Art IV) with strict IAEA safeguards.



BINDING TIMELINE FOR NWS DISARMAMENT



Hold NWS accountable to Article VI commitments. Plan the gradual, verifiable reduction of all arsenals.

INTERNATIONAL AI IN NC3 PROTOCOLS



MANDATORY HUMAN-IN-THE-LOOP CONTROL
Develop protocols for AI in Nuclear Command to reduce 'flash war' risks.

- **Logical and Philosophical Base**
- Beneath the legal treaties and political rhetoric lies a complex philosophical and logical foundation that drives state behavior in the nuclear realm:
 - **Structural Realism and Survival:** The dominant logic is rooted in Hobbesian realism. In an anarchic international system lacking a supreme global enforcer, states rely on self-help for survival. Nuclear weapons represent the ultimate guarantor of sovereignty.
 - **The Ethics of Mutually Assured Destruction (MAD):** Deterrence rests on a paradoxical ethical foundation: ensuring peace by threatening catastrophic mass murder. It assumes perfectly rational actors, an assumption heavily challenged by modern psychology and the chaos of actual warfare.
 - **The Fallacy of "Disarming the Unarmed":** A core philosophical critique of the current regime is that it focuses disproportionately on preventing new actors from getting weapons (disarming the unarmed) while giving a free pass to those who already possess apocalyptic arsenals. This violates fundamental principles of natural justice and equity in international law.

- **Multidimensional Analysis**

- **Social:** The societal dimension involves the psychological burden of living under the shadow of nuclear annihilation. It also touches upon civil society movements (like ICAN) driving grassroots pressure for disarmament.
- **Political:** Nuclear weapons are the ultimate currency of hard power. They dictate permanent membership in the UN Security Council and shape global power hierarchies, creating a divide between the "rule-makers" and the "rule-takers."
- **Legal:** The dichotomy between international law (which seeks to regulate and limit weapons) and state sovereignty (which defends the right to self-preservation at all costs) creates continuous legal friction.
- **Ethical:** The humanitarian consequences of nuclear detonations raise profound moral questions. Threatening civilian populations as a military strategy contradicts the fundamental principles of the Just War theory.
- **International:** The issue fuels regional arms races (e.g., in South Asia and the Middle East) and destabilizes bilateral relations, creating a persistent global trust deficit.
- **Economic:** Maintaining and modernizing nuclear arsenals drains trillions of dollars from global economies—resources that are urgently needed for sustainable development, climate action, and poverty eradication.



- **Linkages with NCERTs**
- **Class 12 Political Science – Contemporary World Politics, Chapter 1: The Cold War Era** is directly linked because nuclear deterrence, arms race, Cuban Missile Crisis and bipolar rivalry form the background of the global nuclear order. Students should connect deterrence theory with the logic of superpower competition.
- **Class 12 Political Science – Contemporary World Politics, Chapter 4: Alternative Centres of Power** helps in understanding how emerging powers challenge older Western-dominated institutions. India's nuclear diplomacy after 1998 and its special position after the civil nuclear agreement fit this theme.
- **Class 12 Political Science – Contemporary World Politics, Chapter 6: International Organisations** is essential because the NPT, IAEA, UN Security Council and export control regimes are part of global governance. This chapter helps students analyse why institutions succeed in some areas but fail when great power interests clash.
- **Class 12 Political Science – Contemporary World Politics, Chapter 7: Security in the Contemporary World** is perhaps the strongest NCERT linkage. It deals with traditional security, non-traditional security and disarmament. Nuclear weapons sit at the intersection of state security and human security.
- **Class 11 Political Theory – Chapters on Justice, Rights, Peace and Development** provide the philosophical base. The question is not only whether nuclear weapons protect states, but whether they are compatible with justice, human rights and peace.
- **Class 10 Science – Sources of Energy** and **Class 12 Physics – Nuclei** help students understand the scientific foundation of nuclear energy, fission, radiation and peaceful applications. This is useful for GS Paper 3 and Prelims.

- **Linkages with UPSC CSE Syllabus**

- **GS Paper 2: International Relations**

- This is the strongest linkage. The topic connects with India's foreign policy, global groupings, international treaties, global governance, UN reforms and the impact of developed-country policies on India's interests. India's non-signatory position on the NPT, its nuclear doctrine and its relationship with the NSG are all core GS2 areas.

- **GS Paper 3: Security and Science & Technology**

- Nuclear technology connects with internal and external security, border tensions, strategic deterrence, missile systems, nuclear energy, cyber risks and emerging technologies. Students can also connect it with energy security and India's three-stage nuclear programme.

- **GS Paper 4: Ethics, Integrity and Aptitude**

- The issue is rich for ethics answers. It raises questions of means versus ends, responsibility of scientists, just war theory, intergenerational justice, humanitarian consequences, public accountability and moral limits of state power.

- **Essay Paper**

- This theme can support essays on science and ethics, peace and security, global inequality, technology and humanity, and international institutions. It gives strong examples for both philosophical and contemporary essays.

- **Optional Subjects**

- In Political Science and International Relations, it connects with realism, deterrence, arms control and India's foreign policy. In History, it links with Cold War and post-war global order. In Philosophy, it links with ethics of war. In Law, it connects with international law and humanitarian law.

- **Way Forward**

- **Re-energizing Universal Disarmament:** The global community must pivot back to the principles of universal, verifiable, and non-discriminatory disarmament, akin to the Rajiv Gandhi Action Plan of 1988, phasing out arsenals in a time-bound manner.
- **De-alerting and Risk Reduction:** In the short term, nuclear-armed states must take their weapons off "hair-trigger alert" and increase transparency to prevent accidental launches due to miscalculation or system errors.
- **Regulating AI in Nuclear Command:** A strict, legally binding international protocol must be established to ensure that human beings—not algorithms—retain absolute control over nuclear command and control infrastructure.
- **Mainstreaming the TPNW:** While NWS reject the Treaty on the Prohibition of Nuclear Weapons, NNWS should continue to build normative pressure, stigmatizing the possession of these weapons much like chemical and biological weapons.

- **Mains - GS Paper 2:**

- (2015) In what ways would the ongoing US-Iran Nuclear Pact Controversy affect the national interest of India? How should India respond to this situation?
- (2018) Discuss the role of the International Atomic Energy Agency (IAEA) in ensuring the peaceful use of nuclear energy. How successful has it been in preventing the proliferation of nuclear weapons?
- (2022) The expansion and strengthening of NATO and a stronger US-Europe strategic partnership works well for India. What is your opinion about this statement?

- **Mains - GS Paper 3:**

- (2013) With growing energy needs should India keep on expanding its nuclear energy programme? Discuss the facts and fears associated with nuclear energy.

- **Prelims:**

- (2015) With reference to 'Nuclear Suppliers Group (NSG)', consider the following statements: 1. It has access to advanced technology. 2. It automatically becomes a member of the NPT. Which of the statements given above is/are correct?
- (2018) Consider the following countries: 1. Australia 2. Canada 3. China 4. India 5. Japan 6. USA. Which of the above are among the 'free-trade partners' of ASEAN?





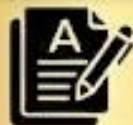
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