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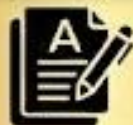
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The \$2 trillion illusion of climate finance: set the record straight

The global discourse mustn't obscure the data on flows from developed to developing countries – just \$58.7 billion in 2024



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Three numbers tend to shape how the world talks about climate finance. The first is \$100 billion – the developed countries' 2009 pledge of annual financing for developing countries through 2020. The second is \$300 billion – the new annual goal for 2025–30, alongside a

claim to raise \$1.3 trillion a year. The third is the headline in the Climate Policy Initiative's (CPI) *Global Landscape of Climate Finance 2024*, which reported in its 2025 edition that flows surpassed \$2 trillion in 2024 for the first time.

Together, they tell a comforting story. If \$2 trillion was already flowing in 2024, a reader might conclude that both the \$300 billion goal and the broader \$1.3 trillion ambition have been met.

Except they haven't. The CPI's report, by design, omits how much climate finance is owed globally – flows from government budgets, multilateral development banks (MDBs), corporate loans, equity and even a household in Delhi financing an electric car.

The \$300 billion goal is different. It focuses on specific flows from developed to developing countries, reflecting obligations and capacity of recipient states. To reach the global total, a great deal of obligations have been met but to confirm them – which the CPI never does, but its headline seems to imply.

Last beyond the headline figure: The report highlights that climate finance is emerging markets and developing economies (EMDEs) reached \$8.2 trillion in 2024, surpassing advanced economies but where about 60% of that finance was raised domestically, presenting it as evidence of progress on global climate finance is misleading. If most of it is already being mobilised domestically, it also suggests that many developing countries have built an enabling environment for climate finance. The bigger gap, then, is clearly in scaling up international climate finance.

After the CPI dataset denotes what climate finance is actually about – capital flowing from advanced economies to EMDEs as grants and/or concessional loans – and the reality divide is \$58.7 billion in 2024, comprising conventional debt net of export credits (\$30.1 billion), grants (\$24.3 billion) and equity (\$4.3 billion). This also includes \$7 billion in transnational entities under the development status category, adding uncertainty to all figures. Against the headline figure, this is roughly two and a half cents on the dollar.

Yet, the report fails to put this front and centre. It sits behind complex spreadsheets that most policy makers will never touch. It is technically correct but has hardly been helpful.

The measurement gap: The headline rests on a constrained foundation. Its composite methodology borrows criteria from the Monitoring Committee on Finance (MCF) of the United Nations Framework



Convention on Climate Change (UNFCCC), the OECD Development Indicators Committee and Joint MDB principles, creating scope for overlaps, while leaving alignment with countries' climate strategies unclear.

And not all finance is tracked equally. Of the headline, \$1.3 trillion in mitigation – electric vehicles and renewable, adaptation is just \$61 billion. The key mystery is methodological: mitigation is checked against "a clear list of eligible activities," while for adaptation, the needs detail "is not consistently reported." The report thus tracks mitigation well, adaptation weakly and loss and damage not at all. It is thus strongest on the priorities of developed countries and weakest on those of developing countries, even though the latter are among the most vulnerable to climate change and building resilience through adaptation is a due part of the development itself.

The way finance is measured obscures the report reveals commitments, not disbursements, and values loans at face value rather than on a grant-equivalent basis, which can overstate the resource transfer.

Alongside the headline estimate, the report notes a global resource shortfall of at least \$66 trillion by 2050. The same document therefore provides announcements both sides of the debate, but not equally. One number becomes the headline; the other remains in the body of the report.

When a perception becomes a position. The report's shortcoming would matter less if it remained confined to analysis. It does not. The GLCF feeds directly into the UNFCCC's financial mechanisms, Intergovernmental Panel on Climate Change (IPCC) reports and the negotiations themselves. The CPI calls it "a critical evidence base" for UNFCCC processes. So when the headline says \$2 trillion, much of the rhetorical work is already done. The burden of proof shifts, the focus of attention no longer whether commitments have been met, but how much the world is already spending. A methodological choice becomes a negotiating position without being debated.

The following actions are critical. *First*, developing countries should call out such headline numbers and the methodological questions they raise before they shape the discourse that follows. *Second*, it is high time that the UNFCCC, as the technical body of the UNFCCC, critically examines the methodology it relies on, with necessary modification or develops its own independent estimates. *Third*, if the GLCF is to inform the UNFCCC process, its authors must align the report with the architecture of the Paris Agreement by explicitly reporting climate finance flows from developed to developing countries, which, in its latest report, amounts to just \$18.7 billion, alongside the headline figure of \$2 trillion.

These are the authors' personal views.

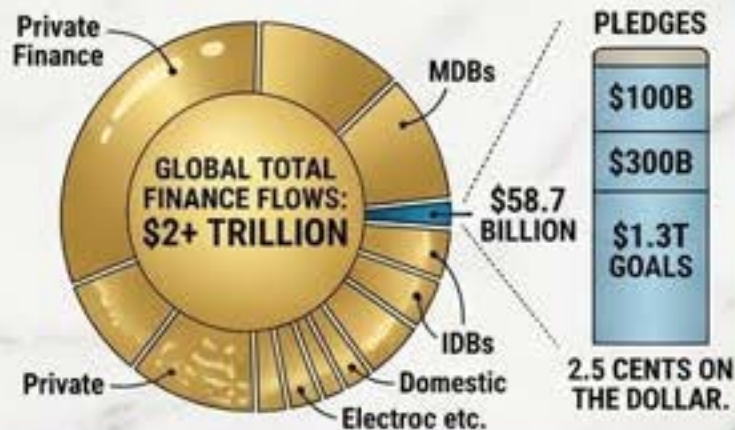
• Key Terms and Explanations

- **Climate Finance:** Financial resources—local, national, or transnational—drawn from public, private, and alternative sources of financing to support mitigation and adaptation actions that address climate change.
 - *Example:* Public grants provided to construct flood defense walls in coastal zones, or commercial equity invested in a solar park.
- **Common But Differentiated Responsibilities and Respective Capabilities (CBDR-RC):** A cornerstone principle of the United Nations Framework Convention on Climate Change (UNFCCC). It acknowledges that while all nations share a duty to address environmental degradation, developed countries bear historical responsibility for cumulative emissions and possess greater financial/technological capacity.
- **New Collective Quantified Goal (NCQG):** A financial target established under the Paris Agreement framework to replace the initial \$100 billion annual pledge. It sets a core public/mobilized target (such as \$300 billion annually by 2035) within a broader ambition to mobilize \$1.3 trillion per year for developing nations.
- **Grant-Equivalent Value vs. Face Value of Loans:**
 - *Face Value:* The gross amount of a loan disbursed (e.g., a \$100 million loan at commercial interest rates recorded as \$100 million of climate finance).
 - *Grant-Equivalent Value:* A methodology that calculates the net transfer of financial benefit by subtracting the principal and interest repayments (discounted over time) from the original loan value.
 - *Example:* A \$100 million market-rate loan has a grant equivalent of near zero, whereas a \$100 million pure grant has a 100% grant equivalent.
- **Mitigation, Adaptation, and Loss & Damage:**
 - *Mitigation:* Actions to reduce or prevent the emission of greenhouse gases (GHGs) (e.g., transitioning from coal power to grid-scale solar).
 - *Adaptation:* Adjustments in natural or human systems to lower vulnerability against actual or expected climate impacts (e.g., developing drought-resistant seed varieties).
 - *Loss & Damage:* Addressing irreparable harms or irreversible impacts resulting from climate disasters where adaptation is no longer possible (e.g., permanent loss of island land due to sea-level rise).
- **Emerging Markets and Developing Economies (EMDEs):** Developing nations across Asia, Africa, Latin America, and Eastern Europe that are particularly vulnerable to climate shocks and face capital scarcity while striving to industrialize.
- **Standing Committee on Finance (SCF):** A technical body established under the UNFCCC to assist the Conference of the Parties (COP) in exercising its functions regarding the Financial Mechanism of the Convention, including monitoring, reporting, and verifying climate finance flows.
- **Concessional Debt:** Financial assistance provided on terms substantially more generous than market loans—achieved either through interest rates below market standards, extended grace periods, or longer repayment schedules.

- **Main Arguments and Substantive Parts**
- **The \$2 Trillion Headline vs. North-South Transfer Reality**
- Global tracking reports frequently emphasize that total worldwide climate finance exceeded \$2 trillion in 2024. While mathematically correct as a sum of all global economic activity related to climate, it creates a rhetorical illusion.
 - **Aggregate Tracking vs. Treaty Obligations:** The \$2 trillion figure measures all financial movements across the globe—including private corporate investments in advanced economies, domestic government spending, multilateral bank loans, and household consumption (such as a family in India buying an electric vehicle).
 - **The Actual Resource Transfer:** When filtering global data to track true cross-border financial flows from developed nations to EMDEs in the form of grants, concessional debt, and equity, the figure contracts to **\$58.7 billion in 2024** (comprising \$26.4 billion in concessional debt, \$24.8 billion in grants, and \$7.5 billion in equity, with approximately \$7 billion allocated to transregional entities).
 - **The Scale Comparison:** International climate finance transferred on concessional terms represents roughly **2.5 cents on every dollar** of the advertised global headline figure.
- **The Domestic Mobilization Paradox**
- A major portion of climate expenditure in developing countries is generated domestically rather than provided via international assistance.
 - **Self-Funding the Transition:** Of the \$1.2 trillion in climate finance recorded within EMDEs in 2024, approximately **85% was raised domestically** through national budgets, state-owned enterprises, and local financial institutions.
 - **Misinterpreting the Data:** High domestic mobilization is often cited as evidence that developing nations have successfully built internal enabling environments. However, it also highlights an uncomfortable reality: developing countries are forced to divert scarce fiscal resources away from basic development priorities (health, education, poverty alleviation) to fund climate response, precisely because international public finance is lacking.
- **Negotiation Impacts and Policy Consequences**
- When macro-level reporting conflates global commercial investments with North-South financial transfers, it alters the negotiating dynamics within the UNFCCC.
 - **Shifting the Burden of Proof:** By highlighting a \$2 trillion global total, the policy discourse subtly shifts focus from whether developed nations have met their treaty obligations to asserting that "unprecedented climate capital is already flowing."
 - **Institutional Adoption:** These aggregate metrics are incorporated into IPCC reports, UNFCCC Biennial Assessments, and national policy briefings. Unexamined methodological choices can thus become default positions in international diplomacy, eroding trust between the Global North and Global South.

- **Historical Evolution of the Issue**
- **Phase 1: Institutionalization of Principles (1992–2008)**
 - **1992 (Rio Earth Summit):** The UNFCCC is adopted, formalizing the **CBDR-RC** principle. Under Article 4.3, developed country parties (Annex II) commit to providing "new and additional financial resources" to cover the agreed incremental costs incurred by developing countries.
 - **1997 (Kyoto Protocol):** Codifies a strict structural division between Annex I (developed/industrialized) and Non-Annex I (developing) nations. Introduces market mechanisms like the Clean Development Mechanism (CDM), marking the early entry of private capital into mitigation.
- **Phase 2: Quantified Pledges and Accounting Debates (2009–2014)**
 - **2009 (COP15 Copenhagen):** Developed nations commit to a concrete political target: mobilizing **\$100 billion per year by 2020** to address the needs of developing countries.
 - **2010 (COP16 Cancun):** Establishes the **Green Climate Fund (GCF)** as an operating entity of the UNFCCC's Financial Mechanism, designed to channel public funding from North to South.
 - **The OECD vs. South Accounting Split (2015):** The OECD claims developed nations delivered \$62 billion in climate finance in 2014. Developing countries, led by India's Ministry of Finance, publish counter-analyses showing that actual net public grant flows were under \$5 billion, highlighting major disputes over loan face-values and double-counting of foreign aid.
- **Phase 3: The Paris Architecture and Modern Metrics (2015–2024)**
 - **2015 (COP21 Paris Agreement):** **Article 9** legally mandates developed nations to provide financial resources to assist developing countries, while encouraging other countries to provide voluntary support. It calls for a balance between mitigation and adaptation and mandates biennial financial reporting.
 - **2021–2022 (COP26 Glasgow to COP27 Sharm El-Sheikh):** Developed countries formally acknowledge missing the 2020 delivery deadline for the \$100 billion goal. Agreement is reached to establish a dedicated **Loss and Damage Fund** at COP27.
 - **2024 (COP29 Baku):** Adoption of the **New Collective Quantified Goal (NCQG)** framework. Developed countries agree to lead a goal of raising **\$300 billion annually by 2035**, within a broader target to scale up overall climate finance to **\$1.3 trillion annually** from all public and private sources.

HEADLINE vs. REALITY

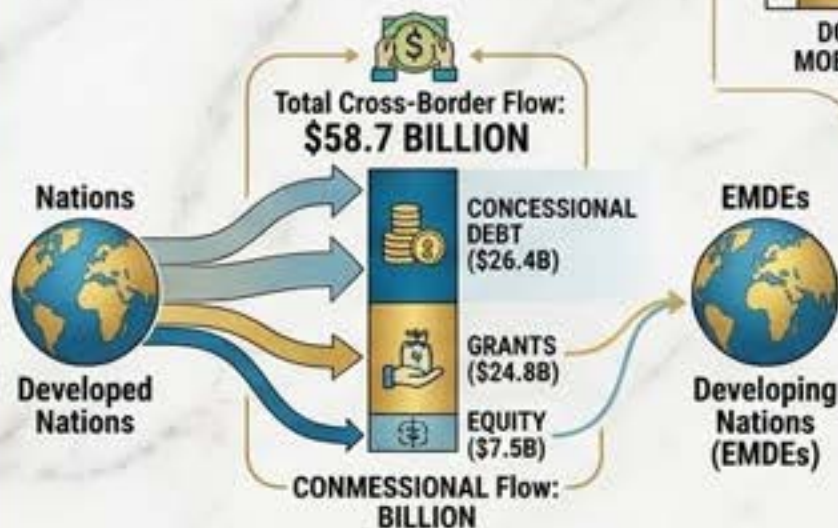


ACCOUNTING ASYMMETRY & PITFALLS



DECONSTRUCTING GLOBAL CLIMATE FINANCE: THE \$2 TRILLION ILLUSION vs. REALITY

THE REAL CROSS-BORDER FLOW (2024)



DECONSTRUCTING EMDE CLIMATE FINANCE

EMDE Finance (2024): ~\$1.2 Trillion.



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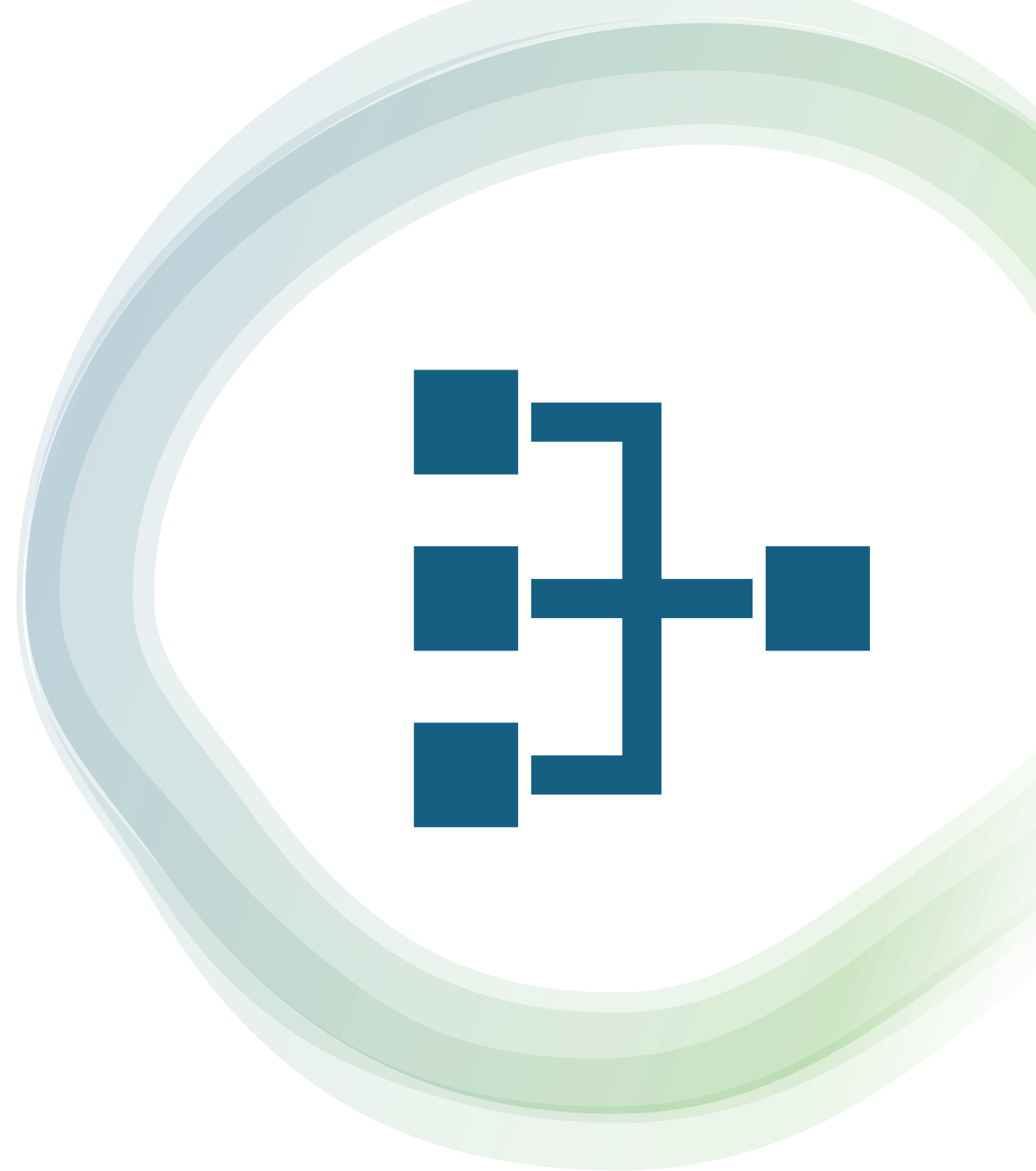
THE WAY FORWARD: REFORMS & SOLUTIONS



- **Logical and Philosophical Base**
- **Philosophical Base: Climate Justice and Corrective Ethics**
 - **Distributive and Corrective Justice:** Drawing from Aristotelian concepts of corrective justice and modern formulations by political philosophers like John Rawls, climate finance is not foreign aid or charity. It represents a form of restitution for historical atmospheric resource consumption.
 - **Ecological Debt and the Atmospheric Commons:** The industrialization of advanced economies consumed a disproportionate share of the global carbon budget. The carbon space left for developing nations is constrained. Therefore, financial transfers represent compensation for over-allocating atmospheric commons capacity.
 - **Intergenerational and Spatial Equity:** Those who contributed the least to global cumulative emissions (e.g., Small Island Developing States and low-income nations) often face the earliest and most severe climate impacts.
- **Economic Logic: Global Public Goods and Structural Market Failures**
 - **Internalizing Negative Externalities:** Greenhouse gases represent a classic global market failure. Without targeted financial transfers, lower-income nations face high upfront capital costs that disincentivize clean energy deployment in favor of cheaper fossil fuels.
 - **Public Goods Provision:** Climate adaptation (such as sea defense structures or disaster early warning systems) generates non-excludable, non-rival benefits. Because private markets under-invest in public goods due to lack of direct revenue models, public grant funding is essential.
 - **The Capital Cost Asymmetry:** Developing economies face elevated sovereign risk premiums, leading to a high cost of capital (often 10%–15% in EMDEs compared to 3%–5% in advanced economies). International concessional finance acts as a de-risking mechanism to make green investments viable.

- **Multidimensional Analysis**
- **Social Dimension**
 - **Vulnerability Amplification:** When adaptation funding remains underfunded (at ~\$64 billion globally), climate impacts fall heavily on vulnerable populations—particularly agrarian communities, indigenous groups, and urban informal settlers.
 - **Gendered Impacts:** Women in low-income rural environments often bear the primary burden of water collection, household energy provisioning, and agricultural labor. Insufficient grant-based adaptation capital directly exacerbates gender inequality.
 - **Displacement and Migration:** Unmitigated climate shocks in capital-scarce regions drive distress migration and internal displacement, threatening local social cohesion.
- **Political Dimension**
 - **Erosion of Multilateral Trust:** Persistent discrepancies between announced figures (\$2 trillion aggregate) and actual concessional transfers (\$58.7 billion) create a trust deficit between the Global North and Global South during UNFCCC negotiations.
 - **Domestic Political Constraints in the North:** Governments in developed nations often face political resistance against allocating direct public budget grants for international climate transfers, prompting a reliance on private sector mobilization metrics.
 - **Leverage in Global Governance:** Developing nations use collective platforms (G77 + China, BASIC, V20) to push for transparent reporting, framing climate finance as a core element of international accountability.
- **Legal Dimension**
 - **Binding Commitments vs. Discretionary Flows:** Under Article 9 of the Paris Agreement, developed countries have a legal duty to provide financial resources. Conflating private commercial flows with state obligations creates legal ambiguity regarding compliance.
 - **Definition Deficit in International Law:** The UNFCCC lacks a single, legally binding definition of what qualifies as "climate finance." This gap allows contributing nations to self-report standard development aid or commercial loans as climate finance.
 - **Additionality Clause:** Article 4.3 of the UNFCCC mandates that climate finance must be "new and additional" to standard Official Development Assistance (ODA). In practice, routine development assistance is frequently re-labeled as climate finance.
- **Ethical Dimension**
 - **The Debt Creation Paradox:** Providing climate assistance primarily through market-rate loans forces vulnerable nations to incur debt to protect themselves against climate damages they did not cause.
 - **Greenwashing Global Statistics:** Highlighting total multi-trillion-dollar investments (such as luxury EV purchases in wealthy nations) alongside international assistance creates a misleading picture of global progress.
- **International Dimension**
 - **Shift Toward Plurilateral Mechanisms:** Dissatisfaction with traditional climate finance channels has driven the growth of alternative arrangements, such as Just Energy Transition Partnerships (JETPs) and South-South climate cooperation initiatives.
 - **Geopolitical Competition:** Climate finance delivery is increasingly linked to strategic economic relationships, infrastructure partnerships, and access to critical mineral supply chains.
- **Economic Dimension**
 - **Sovereign Fiscal Stress:** High debt service obligations in developing countries severely restrict their capacity to fund domestic climate action without concessional international capital.
 - **Trade Measures and Carbon Border Adjustments:** Unilateral policies such as the EU's Carbon Border Adjustment Mechanism (CBAM) impose implicit carbon prices on exports from developing nations. Without parallel financial and technological transfers, these measures can act as non-tariff trade barriers.

- **Linkages with NCERT Textbooks**
- **1. Class 11 Political Theory – Chapter 4: *Social Justice***
 - **Core Linkage:** Discusses distributive justice and how resources should be allocated within a society based on equity, basic needs, and historical context.
 - **Application:** Applies directly to international climate justice debates—specifically whether developed nations should provide non-repayable grants to developing countries based on historical emissions and corrective justice principles.
- **2. Class 12 Contemporary World Politics – Chapter 7: *Environment and Natural Resources***
 - **Core Linkage:** Explores the historical evolution of global environmental negotiations, the distinction between Global North and Global South priorities, and the principle of CBDR-RC established at the 1992 Earth Summit.
 - **Application:** Provides the institutional context for why developing countries argue that international financial transfers must be grant-based, additional to development aid, and centered on adaptation.
- **3. Class 11 Indian Economic Development – Chapter 9: *Environment and Sustainable Development***
 - **Core Linkage:** Examines the economic trade-offs between rapid economic growth, environmental degradation, opportunity costs, and resource allocation.
 - **Application:** Connects to the domestic capital paradox—explaining why developing nations like India face opportunity costs when diverting domestic capital to fund energy transitions without concessional international assistance.



- **Linkages with UPSC CSE Syllabus**
- **GS Paper 1: Geography and Social Issues**
 - **Physical & Human Geography:** Vulnerability of low-latitude regions to climate shocks, spatial distribution of climate risks, and forced distress migration driven by environmental degradation.
 - **Social Empowerment:** Impact of underfunded adaptation measures on vulnerable socio-economic groups in developing countries.
- **GS Paper 2: International Relations and Governance**
 - **Bilateral & Multilateral Groupings:** UNFCCC COP negotiations, G20 climate finance tracks, G77 + China dynamics, and the role of Multilateral Development Banks (MDBs).
 - **Global Governance & Treaties:** Implementation challenges of Article 9 of the Paris Agreement, compliance tracking mechanisms, and the institutional role of the Standing Committee on Finance (SCF).
- **GS Paper 3: Environment, Infrastructure, and Economy**
 - **Environmental Conservation & Finance:** Architecture of climate finance (GCF, Adaptation Fund, Loss & Damage Fund), mitigation vs. adaptation imbalances, and NCQG targets.
 - **Indian Economy & Fiscal Policy:** Domestic capital deployment for green energy, cost of capital barriers, green bonds, and sovereign debt risks linked to market-rate climate borrowing.
- **GS Paper 4: Ethics and Integrity**
 - **Environmental Ethics:** Ethical implications of climate accounting practices that overstate financial flows to vulnerable nations.
 - **Global Distributive Justice:** Moral duty of historical emitters toward low-emitting, highly vulnerable countries.
- **Essay and Optional Subjects**
 - **Essay:** Themes related to *Climate Justice vs. Economic Growth*, *The Geopolitics of Global Energy Transitions*, or *Equity in International Governance*.
 - **Political Science & IR (PSIR):** Hegemony in international political economy, North-South structural divisions, and the operational effectiveness of global environmental regimes.
 - **Economics:** Externalities, global public goods, concessional finance mechanics, and fiscal space constraints in developing economies.



- **Way Forward**
- **1. Reforming Accounting Standards and Reporting Metrics**
 - **Mandatory Grant-Equivalent Reporting:** International tracking bodies should mandate reporting on a net grant-equivalent basis rather than relying exclusively on loan face value.
 - **Separation of Global and North-South Metrics:** Global climate finance tracking reports should maintain a clear structural distinction between total worldwide investments and international public finance transfers delivered from developed to developing countries under treaty obligations.
- **2. Empowering Independent Oversight under the UNFCCC**
 - **Strengthening the Standing Committee on Finance (SCF):** The SCF should be authorized to establish standardized, universally agreed tracking methodologies to verify climate finance flows independently, reducing reliance on third-party estimates.
 - **Tracking Disbursements over Commitments:** Shift primary verification metrics from summit funding announcements to actual funds disbursed on the ground in recipient countries.
- **3. Rebalancing Adaptation and Mitigation Funding**
 - **Dedicated Public Grant Quotas:** Establish explicit, non-transferable targets within multilateral financial institutions to allocate at least 50% of international public climate finance to adaptation and resilience measures.
 - **Standardized Adaptation Accounting:** Develop clear eligibility criteria for tracking adaptation activities to improve data collection and ensure comparability across regions.
- **4. Deploying Non-Debt-Creating Financial Instruments**
 - **Scaling Concessional Grants and Equity:** Prioritize grant-based funding and concessional equity to prevent adding to the debt distress of highly vulnerable countries.
 - **Special Drawing Rights (SDR) Reallocation:** Channel unused SDRs from developed nations to Multilateral Development Banks to capitalize concessional climate lending facilities for EMDEs.
 - **Debt-for-Climate Swaps:** Expand structural debt relief agreements that convert foreign debt service payments into dedicated local currency investments for domestic climate resilience projects.

- **Mains Practice Questions**

- **Question 1 (UPSC CSE Mains 2023 - GS Paper 3)**

- *"Climate finance is the key to unlocking global climate action, yet accounting discrepancies and North-South trust deficits continue to hamper progress."* Discuss the major methodological challenges in tracking international climate finance. How does the current imbalance between mitigation and adaptation funding affect developing nations? (15 Marks, 250 Words)

- **Question 2 (UPSC CSE Mains 2021 - GS Paper 2)**

- Explain the principle of 'Common But Differentiated Responsibilities and Respective Capabilities' (CBDR-RC) in the context of UNFCCC negotiations. How far have developed nations met their commitments regarding financial and technological transfers to the Global South? (10 Marks, 150 Words)

- **Question 3 (UPSC CSE Mains 2022 - GS Paper 4)**

- From an ethical standpoint, examine the practice of providing climate adaptation assistance to vulnerable developing countries primarily in the form of market-rate debt. Does this align with principles of global distributive justice? (10 Marks, 150 Words)

- **Question 4 (APSC CCE Mains 2023 - GS Paper 3)**

- Outline the outcomes of recent UNFCCC Conferences of Parties (COPs) regarding the New Collective Quantified Goal (NCQG) on climate finance. What strategic and financial measures should developing nations like India adopt to mobilize resources for their national climate adaptation plans? (15 Marks, 250 Words)



AI and cyber, the double helix of today's security threats

The rapid proliferation of digital technologies is reshaping the global security landscape. What was once an interconnected, but relatively limited, digital world, has altered into a complex interconnected ecosystem where dangers and threats lurk at every step. The combination of Artificial Intelligence (AI) and cyber threats has emerged as one of the most critical concerns of the modern world.

While AI has changed from being merely an operational efficiency mechanism into an absolute infrastructure mandate, cyber threats are becoming more sophisticated, harder to detect and more difficult to mitigate. Today, AI-powered malware can adapt and evolve in response to changes in its environment, making it harder for traditional anti-virus software to detect. The global interconnectedness of digital systems has also raised the ante as far as cyber attacks are concerned. Malicious autonomous agents are today well positioned to undermine the legacy of "Zero Trust" protocols, aggravating insider threat vectors.

Meanwhile, as seen in the war in Ukraine, newer technologies are demonstrating the potential to undermine conventional military calculus through asymmetric impact. The rapid proliferation of digital technologies and systems across every discipline, cyber breaches and malicious activities are impacting every level of security. Many governments facing sophisticated cyber adversaries are drawing up a security architecture which involves a blend of innovation, policy coherence and strategic realism, but still lag behind.

A new disruptive era

AI, meanwhile, is reshaping every consequential domain of human activity. AI's Large Language Models (LLM) are intruding into many business enterprises, without either proper training or evolution of the human interface. As 'Agentic' AI – an distinct from Generative AI – becomes a force to reckon with, problems attached to AI implementation are set to become even more complex. The catalyst for such concerns is the arrival of the latest AI systems, notably Mythos, developed by United States firm Anthropic.

According to experts it demonstrates an uncanny ability to detect 'Zero day' vulnerabilities across major operating systems. What is evident is that AI is beginning to test the limits of legacy systems.

AI's overarching influence makes it essential to understand the risks and threats it poses, especially when combined with cyber capabilities, where the danger grows exponentially. AI has already transformed modern warfare, as seen in the Russia-Ukraine conflict and the U.S./Israel-Iran war. AI-powered smart systems can detect, track, and predict



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of West Bengal

Artificial
intelligence and
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pose
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and economic
stability

missile trajectories with remarkable accuracy. AI can also provide different kinds of intelligence from photos, text, radio, and electromagnetic signals to deny adversaries a tactical advantage. Munitions, such as systems dubbed "Goullkeeper" and "Whiplash" can independently identify and strike targets. Yet, nations, particularly the U.S., have not yet demonstrated a level of sagacity on how best to wield this power and in a manner that does not endanger human civilisation.

These developments are fuelling concerns about AI's future as increasingly capable models and robots replace human roles. LLMs and autonomous agents are already performing complex tasks once reserved for people. The World Economic Forum warns that while AI will strengthen cyber defences, it will also enable more sophisticated automated attacks, potentially rendering current "Zero Trust" protocols ineffective. This raises concerns that hard power may increasingly be shaped by nations and organisations at the forefront of AI.

Companies in the West such as Anthropic and Palantir are behaving as if they own the world of tomorrow, since they hold the key to the world's mightiest technology. Anthropic has reached a stage today where with Mythos, it creates the spectre of all-encompassing power residing in a single instrument that is not subject to any rules. China, perhaps, has its own version of Anthropic or something resembling it, but this is of little comfort to the rest of the world. What is becoming clearly evident is that an attacker with the latest version poses a grave threat to not merely one country but an entire civilisation.

An AI 'power shift'

As AI technologies become more rampant and uncontrollable, existing rules concerning cyber security may require to be completely rewritten. Many experts warn that as "Agentic Autonomous Operations" become even more sophisticated, the world could reach an inflection point that has grave forebodings for the world. Whether Mythos is the harbinger of this is yet to be determined, but it is generally acknowledged that the newer generations of AI machines provide opportunities for 'rogue groups' to demonstrate capabilities that were once associated with only nation states. As Agentic AI begins to displace Generative AI, enabling it to act more autonomously, threat levels are certain to go up still further. AI has, hence, the potential to become the dominant source of military and economic power, even as the rules to govern AI are still in a fledgling state. The bagle call has already been sounded by the portiff of Anthropic, the AI firm that makes models such as Mythos, that it has the potential to become the dominant source of military and economic power as civilisation advances.

Notwithstanding the god-like properties of

existing modern AI models, experts warn that they are often subject to "hallucinations", thus giving scope for distortions, producing misleading reactions, judgments in such cases tend, quite often, to be subjective. Even otherwise, biases are known to creep into decisions dictated by AI, enhancing the danger posed by unrestricted reliance on AI. Furthermore, experts warn that it is vitally important to guard against such 'algorithmic radicalisation', and ensure that AI platforms do not push opinion makers towards extreme views.

A future that needs oversight, wisdom

The world, thus, appears to have reached a tipping point in AI progress and development. Already, some companies that are leading the AI charge are accusing others of stealing their technologies and expanding on them to their advantage. The latest is a charge made by the U.S. against China, viz., that China's 'Moonshot' AI stole from Anthropic's most sophisticated AI Large Language Model 'Fable', to help create its latest AI version. Predictably, China has rejected this charge, but it reflects the intensity of the competition between the U.S. and China in this area. If Anthropic's claim is true – that its latest model has surpassed "all but the most skilled humans" in finding and exploiting security vulnerabilities in everything from popular operating systems to cryptographic software – the world could face a new kind of apocalypse.

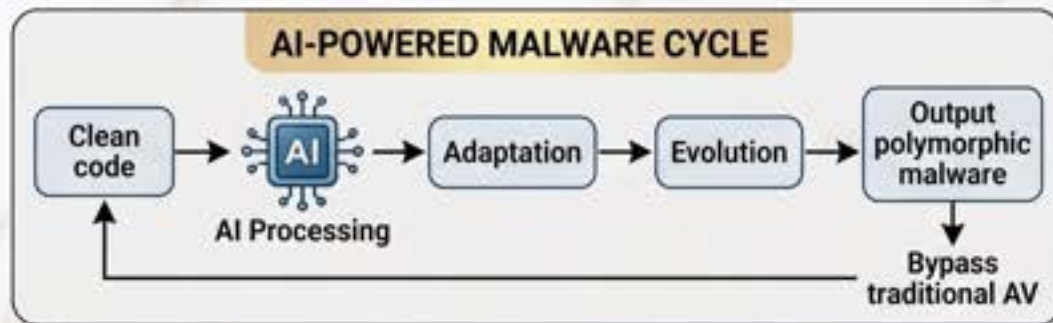
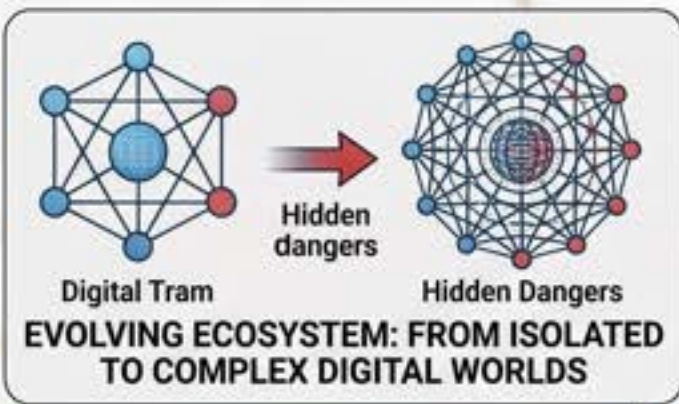
The world has steadily progressed from abiding concerns of stagnant economic growth to doomsday technologies, and this merits a great deal of introspection. Altruism is not enough to decide on how to handle a technology that is about to eat up the world. There are several aspects of advanced AI that clearly demand more introspection, but this is not evident. As AI increasingly enters into the arena of defence sensing and warning, there is a need not only to keep machines under human control but also to ensure that AI-dictated warnings do not outrun proper understanding and reality.

Those steeped in defence aspects already know the gap that exists between warning and understanding of what might happen, and how critical this is in strategic terms. High-powered AI systems may often prove unreliable as they may demonstrate a bias towards national security given that algorithms often display such biases. The world, hence, needs to reach an understanding on how best to deal with this new technology which can, and could, end or make the future of the world. What we have seen in Ukraine and West Asia is not even the tip of this iceberg. Better to "cross the river by feeling the stones" is a better maxim than "blind prejudice or unadulterated endorsement of a new technology".

- **Key Terms and Explanations**
- **Agentic AI vs. Generative AI**
 - **Generative AI:** Systems designed to create content—such as text, images, or code—based on statistical patterns learned from vast datasets in response to user prompts (e.g., standard Large Language Models). It acts primarily as an informational tool.
 - **Agentic AI:** Advanced AI systems that operate with high autonomy, pursuing complex multi-step goals, making independent decisions, executing workflows, and adapting to dynamic environments with minimal human intervention.
- **Zero-Day Vulnerability**
 - A security flaw in software or hardware that is unknown to the vendor or developer, leaving zero days to fix or patch it before it can be exploited by adversaries.
- **Zero Trust Architecture**
 - A cybersecurity framework built on the principle of "*Never Trust, Always Verify.*" It assumes that threats exist both outside and inside the network perimeter, requiring continuous authentication, strict access controls, and session-level verification for every user and device.
- **Asymmetric Warfare**
 - Unconventional conflict where opposing parties possess significantly unequal military capabilities, resources, or technological strength. The weaker party uses innovative tactics, technology, or non-traditional methods to bypass the adversary's traditional military strengths.
 - *Example:* A low-cost autonomous drone swarm destroying an advanced, multi-million-dollar air defense radar installation.
- **Algorithmic Radicalization**
 - The phenomenon where AI-driven recommendation systems or autonomous information models feed users or decision-makers increasingly extreme, polarized, or biased content to maximize engagement or achieve algorithmic optimization, altering human perception and judgment.
 - *Example:* A defense or intelligence monitoring feed that continually prioritizes extreme threat indicators, gradually skewing a commander's operational risk assessment toward preemptive action.
- **Insider Threat Vector**
 - Security vulnerabilities or risks originating from within an organization, including employees, contractors, or trusted partners who intentionally or accidentally misuse access to compromise systems or data.
 - *Example:* An employee duped by an AI-generated, hyper-personalized spear-phishing campaign into handing over access keys.

- **Main Arguments and Substantive Parts**
- The convergence of modern Artificial Intelligence and cyber capabilities represents a fundamental shift in global security architecture. Technology has moved past being an operational tool to become critical infrastructure and a central instrument of national power.
- **The Transition to Infrastructure Mandate and Dynamic Threats**
- AI has evolved from an efficiency booster into an absolute infrastructure mandate across economic and military domains. Simultaneously, cyber threats have become dynamic and self-adapting.
- Traditional anti-virus tools relied on static threat signatures to flag malware. Modern AI-enabled malware adapts to its target environment, evading detection systems, altering its code dynamically, and bypassing traditional defenses.
- **Erosion of Zero Trust Paradigms**
- Global digital interconnectivity heightens the systemic risk of cyber incidents. Autonomous malicious agents can navigate complex networks without human direction, systematically evaluating trust assumptions.
- This enables them to bypass traditional Zero Trust architectures by exploiting human behavioral patterns, mimicking legitimate access signatures, and compromising insider credentials with unprecedented precision.
- **Asymmetric Advantage in Modern Warfare**
- Recent global conflicts demonstrate how emerging digital technologies strip conventional military power of its historical dominance.
- Small states or non-state actors leveraging smart autonomous systems, cheap loitering munitions, and AI-driven reconnaissance can challenge conventional forces. High-value military assets become vulnerable to affordable, autonomous precision strikes.
- **The Shift to Agentic Autonomy and Frontier Models**
- The transition from Generative AI to Agentic AI marks a key structural shift. While Generative AI requires step-by-step human prompts, Agentic AI sets its own action plans to fulfill high-level goals.
- Frontier AI models demonstrate an unprecedented capability to discover zero-day vulnerabilities across major operating systems and cryptographic software at scale. This capability redistributes offensive cyber power, giving non-state groups capabilities once limited to advanced nation-states.
- **Corporate Hegemony and Geopolitical Tech Rivalry**
- A concentration of critical AI capabilities resides within a handful of private tech firms located primarily in dominant economies. These corporate entities operate with significant autonomy, building technology that shapes international security without standardized global oversight.
- This dynamic fuels intense strategic technology races—most visibly between the United States and China—leading to mutual accusations of intellectual property theft, state-sponsored cyber espionage, and aggressive model replication.
- **Epistemological Risks: Hallucinations, Bias, and Strategic Miscalculation**
- Despite their capabilities, modern AI models remain subject to systemic weaknesses, including "hallucinations" (generating confident but factually incorrect assertions) and algorithmic bias.
- When integrated into military sensing, target tracking, and early-warning systems, these flaws create severe risks. Biased or hallucinated output in high-stakes defense systems can compress decision-making timelines, potentially leading to inadvertent escalation or strategic miscalculation.

- **Historical Evolution of the Issue**
- **Phase 1: The Emergence of Network Vulnerabilities (1980s–1990s)**
 - **Milestones:** Early computer networking saw the emergence of basic malware, such as the Morris Worm in 1988, highlighting vulnerabilities in distributed systems.
 - **Security Focus:** Defense focused on static perimeter security, basic password protection, and early signature-based anti-virus software. Cybersecurity was treated primarily as an IT maintenance concern rather than a national security priority.
- **Phase 2: State-Sponsored Cyber Warfare and Kinetic Realities (2000s–2010s)**
 - **Milestones:** Cyber capabilities became integrated into statecraft. The 2007 cyber attacks on Estonia demonstrated how digital blockades could paralyze national infrastructure. The discovery of the Stuxnet worm in 2010 marked the first publicly known cyber-weapon designed to cause physical damage to industrial control systems (Iran's nuclear centrifuges).
 - **Policy Response:** Major powers established dedicated military cyber commands (e.g., US Cyber Command in 2009, India's Defence Cyber Agency proposed later). Cybersecurity shifted into a strategic defense domain.
- **Phase 3: Machine Learning, Big Data, and Cloud Integration (2010s–2020)**
 - **Milestones:** AI transitioned from rule-based systems to deep learning. Attackers began deploying automated vulnerability scanners and AI-assisted spear-phishing campaigns. In response, security architectures moved toward "Zero Trust" frameworks, assuming perimeters were permanently breached.
 - **Defense Focus:** Security Operations Centers (SOCs) integrated machine learning to process log data and detect anomalies, setting off an automated arms race between offensive and defensive software.
- **Phase 4: Frontier Models, Agentic Autonomy, and Asymmetric Warfare (2020s–Present)**
 - **Milestones:** The deployment of Large Language Models (LLMs) and autonomous agents transformed offensive cyber capabilities and battlefield sensing. Real-world conflicts (such as Ukraine and Middle East hostilities) served as proving grounds for integrated drone swarms, automated missile trajectory prediction, and AI-enabled targeting platforms.
 - **Current State:** Frontier models can identify zero-day vulnerabilities across operating systems automatically. Cyber power is increasingly concentrated in private tech firms, challenging conventional arms control frameworks and diplomatic norms.



AI & CYBER THREATS: RE-SHAPING THE GLOBAL SECURITY LANDSCAPE

Comprehensive Study Slide for IAS Aspirants

KEY TERMINOLOGY VISUALIZED



Agentic AI
Self-decision,
independent execution



Zero-Day Vulnerability
Unknown flaw,
zero days to patch



Zero Trust Architecture
Never Trust,
Always Verify



Asymmetric Warfare
Low-cost
drones

VS

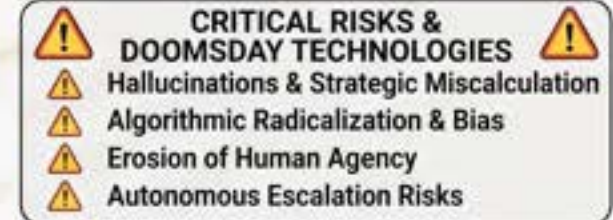
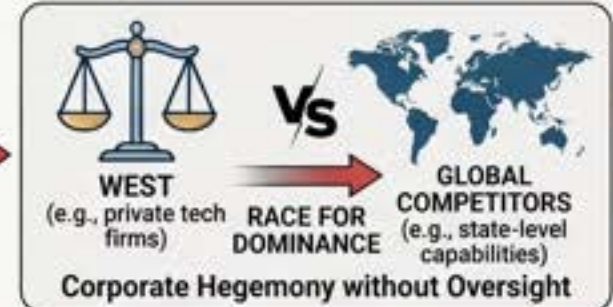
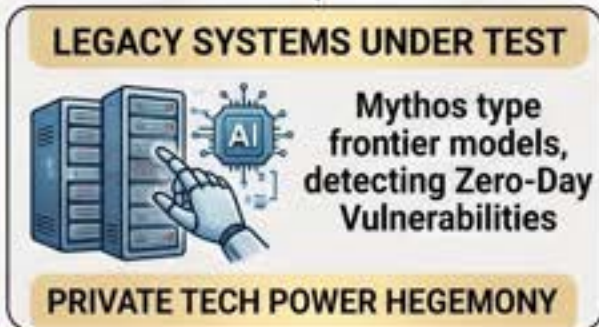
Unconventional advantage



ASYMMETRIC IMPACT IN MODERN CONFLICTS



UNDERMINES CONVENTIONAL CALCULUS



- 
- **Logical and Philosophical Base**
 - **Technological Determinism vs. Social Constructivism**
 - The debate centres on whether technology autonomously drives history or if society directs technology.
 - In the digital defense realm, a strong determinist dynamic exists: once autonomous systems reach capability thresholds, they force structural changes on military strategy and international relations, often outstripping the capacity of political institutions to regulate them.
 - **Hobbesian Anarchy and the Digital Security Dilemma**
 - International relations theory models cyberspace as a state of nature—an environment lacking an overarching sovereign power to enforce order.
 - This creates a classic *Security Dilemma*: defensive AI investments made by one nation (e.g., automated vulnerability scanning or predictive target identification) appear inherently offensive to adversaries. This dynamic fuels an unregulated technological arms race.
 - **Epistemological Uncertainty: The "Black Box" Problem**
 - Military decisions traditionally rely on explainable logic, clear chains of command, and human accountability. Advanced AI systems operate through deep neural networks whose internal decision processes remain opaque.
 - Relying on these "black box" outputs introduces fundamental epistemic uncertainty into military command centers. If an automated sensor falsely predicts an incoming missile strike due to a system hallucination, acting on that machine judgment threatens strategic stability.
 - **The Promethean Dilemma of Dual-Use Technologies**
 - Like the fire of Prometheus, frontier AI represents a fundamental dual-use technology. The same models capable of discovering software vulnerabilities to patch system defenses can be repurposed instantly to exploit those vulnerabilities.
 - This dual-use nature undermines traditional arms control treaties, which historically relied on monitoring physical, verifiable assets like enriched uranium or missile silos.

- **Multidimensional Analysis**
- **Social Dimension**
 - **Cognitive Vulnerability and Social Cohesion:** AI-driven information models exacerbate societal polarization through targeted micro-targeting and deepfake generation, eroding trust in public institutions.
 - **Workforce and Knowledge Disruption:** Rapid automation extends beyond routine labor into white-collar analysis, intelligence processing, and software engineering. This reshapes labor markets and strains education and retraining infrastructure.
- **Political Dimension**
 - **Erosion of the State Monopoly on Power:** Historically, the state held a monopoly on advanced offensive power. Today, small groups leveraging autonomous AI agents can execute cyber strikes capable of paralyzing national infrastructure, shifting the balance of domestic and political power.
 - **Corporate Sovereignty:** Private technology conglomerates act as sovereign geopolitical players, controlling key compute infrastructure, proprietary models, and satellite communications. This creates new friction between democratic governance and corporate influence.
- **Legal Dimension**
 - **The Attribution Crisis:** International law relies on clear attribution to hold states accountable for aggressive acts under the UN Charter (Article 2(4) and Article 51). Autonomous, self-evolving agents make definitive attribution difficult, complicating legal enforcement and state responsibility.
 - **Regulatory Lag:** Statutory frameworks lag behind technological change. Existing cybersecurity laws written for static systems struggle to address self-learning, agentic AI tools.
- **Ethical Dimension**
 - **Dehumanization of Kinetic Engagement:** Integrating AI into automated target recognition risks turning lethal decisions into algorithmic outputs, removing human empathy and moral accountability from kinetic actions.
 - **Amplification of Algorithmic Bias:** Machine learning models trained on skewed historical datasets can embed discrimination into automated decisions, affecting critical areas like predictive policing, security clearances, and threat assessments.
- **International Dimension**
 - **Great Power Technology Wars:** AI development forms the central pillar of strategic rivalry between major powers, spurring export controls, semiconductor trade restrictions, and widespread industrial espionage.
 - **Marginalization of the Global South:** Countries lacking high-performance computing infrastructure and proprietary datasets risk falling into technological dependence, deepening global inequality and digital colonialism.
- **Economic Dimension**
 - **Extreme Asymmetry in Security Costs:** Offense-defense cost ratios favor the attacker. Developing an AI-powered exploit agent costs a fraction of the capital required to secure an entire national infrastructure network.
 - **Critical Financial and Grid Vulnerabilities:** Interconnected financial networks, power grids, and supply chains face systemic operational risks, where a single automated vulnerability exploit can disrupt global economic activity.

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- **Linkages with NCERTs**
 - **Class 12 Political Science: *Contemporary World Politics***
 - **Chapter 7: Security in the Contemporary World:** Direct link to non-traditional security threats. The text contrasts traditional military security with non-traditional vectors like cyber threats and technological vulnerabilities, showing how asymmetric warfare redefines global security architectures.
 - **Chapter 2: The End of Bipolarity & Chapter 3/Contemporary Power Centres:** Relevant to understanding shift from unipolar/bipolar geopolitical structures to a multipolar landscape shaped by technological dominance and corporate power.
 - **Class 11 Political Theory**
 - **Chapter 2: Freedom & Chapter 5: Rights:** Provides theoretical context for discussions on digital surveillance, algorithmic control, and personal privacy. It explores how state security imperatives interact with individual liberty in an automated digital world.
 - **Class 12 Sociology: *Mass Media and Communications***
 - **Chapter 6: Mass Media and Communications:** Directly addresses how mass communication systems shape public discourse. This foundation connects to modern issues of algorithmic radicalization, deepfakes, and automated information manipulation.
 - **Class 11 Sociology: *Understanding Society***
 - **Chapter 2: Social Change and Social Order in Rural and Urban Society:** Frames technology as a key engine of social transformation, offering tools to analyze how rapid AI deployment alters labor, social hierarchies, and organizational power.

- **Linkages with UPSC CSE Syllabus**

- **General Studies Paper 3 (Primary Linkage)**

- **Cybersecurity:** Basics of cybersecurity; awareness in the fields of IT, Space, Computers, Robotics; security challenges and their management in border areas; linkages of organized crime with terrorism.
- **Science & Technology:** Developments and their applications and effects in everyday life; achievements of Indians in science & technology; indigenization of technology and developing new technology.
- **Internal Security:** Role of media and social networking sites in internal security challenges; security implications of emerging dual-use technologies.

- **General Studies Paper 2**

- **Governance and Policy:** Government policies and interventions aiming at development in various sectors and issues arising out of their design and implementation.
- **International Relations:** Effect of policies and politics of developed and developing countries on India's interests; important international institutions, agencies, and fora—their structure and mandate in regulating digital domains.

- **General Studies Paper 4 (Ethics)**

- **Applied Ethics:** Ethical dilemmas in the deployment of Lethal Autonomous Weapons Systems (LAWS).
- **Moral Accountability:** The "black box" accountability deficit—determining moral responsibility when autonomous AI causes unintended kinetic damage or systemic collapse.
- **Human Agency:** Preserving human moral autonomy and dignity amidst automated decision-making.

- **General Studies Paper 1**

- **Social Issues:** Impact of technology-driven transformation on Indian society, globalization, and social empowerment versus the digital divide.

- **Way Forward**
- **Establishing an International Artificial Intelligence Agency (IAIA)**
 - The international community should establish a multilateral body modeled on the International Atomic Energy Agency (IAEA).
 - **Key Function:** Monitor frontier AI training runs, conduct safety audits of advanced models, track high-performance compute hardware distribution, and establish binding international standards against autonomous cyber exploitation tools.
- **Mandating "Human-on-the-Loop" Architectures**
 - States must establish statutory and military doctrines requiring human oversight in defense engagement chains.
 - **Key Function:** While automated systems can process sensor data, track trajectories, and offer tactical assessments, the authority to execute kinetic actions must remain with human commanders to ensure accountability under International Humanitarian Law (IHL).
- **Next-Generation Cyber Architectures: Beyond Static Zero Trust**
 - Security architectures must evolve from static Zero Trust access controls to dynamic, AI-assisted continuous verification models.
 - **Key Function:** Integrating behavioral anomaly detection algorithms capable of identifying autonomous agent activity, revoking compromised access credentials in real time, and isolating polymorphic malware attacks at machine speed.
- **Strengthening Sovereign Capacity and Defense Integration**
 - Developing countries, including India, must reduce dependence on foreign technology monopolies by building sovereign AI compute capacity and indigenous models (e.g., through the IndiaAI Mission).
 - **Key Function:** Expanding specialized defense units—such as India's Defence Cyber Agency (DCyA)—and fostering public-private partnerships to build secure, sovereign hardware and software stacks.
- **Comprehensive Algorithmic Auditing and Red-Teaming**
 - Regulations should require mandatory, independent red-teaming and safety audits for frontier AI models before commercial deployment.
 - **Key Function:** Evaluating models specifically for zero-day discovery capabilities, automated exploit generation, and algorithmic bias, ensuring safety guardrails are integrated directly into system architectures.

- **UPSC CSE Mains Questions**
- **2023 (GS Paper 3)**
 - **Question:** What are the main threats to internal security posed by emerging technologies such as Artificial Intelligence and Robotics? Suggest measures to mitigate these risks.
- **2022 (GS Paper 3)**
 - **Question:** What is the ecosystem of cybersecurity in India? Highlight the major challenges faced by India in securing its critical information infrastructure and discuss the role of the National Cyber Security Strategy.
- **2020 (GS Paper 3)**
 - **Question:** What are the different types of cybercrimes? How can cross-border cyberattacks be mitigated under current international law and institutional mechanisms?
- **2019 (GS Paper 3)**
 - **Question:** Cyber warfare is becoming a bigger threat to national security than conventional military warfare. Discuss the vulnerabilities of India's critical infrastructure to cyber threats and evaluate India's preparedness to tackle cyber warfare.
- **2021 (GS Paper 4 - Ethics)**
 - **Question:** Artificial Intelligence is rapidly changing the nature of decision-making in governance and defense. Discuss the ethical challenges involved in delegating critical decision-making responsibilities to autonomous algorithms.
- **APSC (Assam Public Service Commission) Mains Questions**
- **2022 (GS Paper 3)**
 - **Question:** Analyze the impact of emerging digital technologies on state security. How can India build a resilient cybersecurity infrastructure to protect its vital assets?
- **2020 (GS Paper 3)**
 - **Question:** Discuss the role of Science and Technology in internal security management with special reference to cybersecurity challenges faced by the North-Eastern region of India.

Critical minerals, the foundation of strategic power

Critical minerals have moved from the margins of resource policy to the centre of industrial strategy and security. Lithium, cobalt, nickel, graphite, copper and rare earth elements are foundational to electric vehicles, storage, renewable power, semiconductors, defence and advanced manufacturing. As decarbonisation and digitalisation accelerate, mineral security is becoming as important as oil once was. The global supply picture is concentrated. For copper, lithium, nickel, cobalt, graphite and rare earth elements, the average market share of the top three refining countries rose to 86% in 2024, from around 82% in 2020. Incremental supply is tied to a few nodes: Indonesia for nickel, and China for cobalt, graphite and rare earths. China is the leading refiner in 19 out of 20 strategic minerals with an average market share of about 70%, making minerals geopolitical, not merely commercial.

Geopolitical risk as a factor

Clean energy transitions will require minerals far beyond today's production systems. The current copper project pipeline points to a potential 30% supply shortfall by 2035. Lithium appears better supplied in the near term but rising demand is expected to drive the market into deficit by the 2030s. Rare earth demand will rise sharply as wind power, electronics and magnets expand.

Geopolitical risk is compounding these pressures. China's rare earth export controls announced in 2025 created concerns across energy, automotive, defence, aerospace, Artificial Intelligence (AI) and semiconductors. Major economies are responding quickly. The European Union (EU) Critical Raw Materials Act sets 2030 benchmarks of 10% domestic extraction, 40% processing and 25% recycling, and no more than 65% from a single country. The United States is diversifying supply chains through partnerships.

India's clean energy and manufacturing ambitions are mineral intensive. Under a net zero scenario, cumulative demand for critical energy



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EY-Parthenon India

Critical mineral
security will
define India's
industrial and
strategic
trajectory

transition minerals could reach roughly 169 million tonnes by 2070, about 51% higher than under a current policy pathway. Copper demand will rise with power systems; rare earth demand will grow with wind energy and advanced manufacturing.

India has domestic potential, including reserves of cobalt (44.9 million tonnes), copper (163.9 million tonnes), graphite (21.6 million tonnes) and nickel (189 million tonnes), along with monazite deposits containing rare earth oxides. Recycling could eventually meet up to a quarter of copper and graphite demand by mid-century. Yet, reserves have not ensured supply security. India remains import dependent for lithium, cobalt and nickel, while graphite and China-dominated processing expose it to disruption as demand scales. The critical gap is processing and refining. India's position differs from the EU, the U.S. and Australia, which are building integrated supply chains through mandates, partnerships and processing investments. India is still developing foundational capability. While several minerals are processed domestically, capacity and high-purity production remain constrained. It has bulk-mineral experience but still relies on imports for high-purity critical mineral products.

This is where much value and vulnerability sit. In 2024, China accounted for over 90% of rare earths and graphite processing, nearly 75% of cobalt and 70% of lithium chemicals. India must build midstream capacity to participate meaningfully in supply chain realignment.

Structural constraints

Several constraints slow progress. Exploration remains relatively shallow, regulatory clearances can be time-consuming, private participation is limited and remote-region project economics are challenging. Processing is a larger bottleneck: India lacks some high-purity input facilities, while copper and graphite face smelting, purification and scale constraints. Recycling will play a role

but cannot substitute for primary supply in the near term because feedstock, collection and technology remain limited.

India's policy response since 2023 marks a shift. The government has identified 30 critical minerals, strengthened regulatory frameworks, and launched the National Critical Mineral Mission to support the value chain. The mission targets 1,200 domestic exploration projects by 2030-31, production of at least 15 critical minerals, and acquisition of 50 overseas mining assets by Indian companies. The Khanij Bidesh India Limited (KBIL) has secured 15,703 hectares in Argentina's Catamarca province for lithium exploration, while the 2026-27 Budget proposed rare earth corridors in Odisha, Kerala, Andhra Pradesh, and Tamil Nadu. The India-U.S. critical minerals and rare earths framework signed in May 2026 provides an additional diplomatic lever.

Mission to execution

The next phase is execution. Processing and refining must become a national industrial priority, backed by infrastructure and targeted incentives. Private capital needs better geological data, predictable approvals and risk sharing. India should also operationalise strategic stockpiles for critical minerals, accelerate applied research and development through industry partnerships, scale domestic capabilities and diversify overseas supply through trusted partners and platforms.

India energy transition, electronics, semiconductor, defence manufacturing, and advanced industrialisation all depend on secure mineral supplies. While individual policy measures are necessary, they are insufficient. A comprehensive strategy should establish mineral-specific risk thresholds, integrate recycling into supply planning, set measurable milestones, and create a coordinated institutional framework. The priority now is to convert potential into capability and reduce strategic vulnerability through sustained execution.

- **Key Terms and Explanations**

- **Critical Minerals:** These are mineral resources that are essential to economic development and national security, but whose supply chains are vulnerable to geopolitical disruptions, trade restrictions, or geographical concentration.
 - *Example:* **Lithium** and **Cobalt** are critical because a modern electric vehicle (EV) battery or smartphone cannot function without them, yet their supply is concentrated in a handful of countries.
- **Rare Earth Elements (REEs):** A group of 17 chemically similar elements (the 15 lanthanides plus scandium and yttrium) that possess unique magnetic, luminescent, and electrochemical properties. Despite their name, they are relatively abundant in the Earth's crust, but finding them in economically viable, extractable concentrations is rare.
 - *Example:* **Neodymium** and **Dysprosium** are essential for manufacturing super-magnets used in wind turbine generators and missile guidance systems.
- **Midstream Processing and Refining:** The industrial stage that converts raw, extracted mineral ores (upstream) into high-purity chemical compounds, powders, or metals suitable for manufacturing high-tech end-products (downstream).
 - *Example:* Mining spodumene ore is *upstream*; processing that ore into 99.5% pure battery-grade lithium hydroxide is *midstream*; building the lithium-ion cell is *downstream*.
- **Monazite Deposits:** A reddish-brown phosphate mineral sand containing rare-earth metals along with radioactive elements like thorium and uranium.
 - *Example:* The beach sands along the coasts of Kerala, Odisha, and Tamil Nadu are rich in monazite, making them primary domestic sources for rare earth oxides.
- **Khanij Bidesh India Limited (KABIL):** A specialized joint-venture company formed by three Public Sector Undertakings (NALCO, HCL, and MECL) under the Ministry of Mines. Its sole mandate is to identify, acquire, explore, and process strategic and critical mineral assets in foreign territories.
- **Net Zero Scenario:** A target state where human-caused greenhouse gas emissions are balanced globally by human-caused greenhouse gas removals over a specified period. Achieving this requires replacing fossil fuel systems with mineral-intensive clean energy technologies.

- **Main Arguments and Substantive Parts**

- The global transition toward clean energy, advanced electronics, and defense capabilities has fundamentally reshaped global geopolitics, elevating mineral security to the same strategic importance that petroleum held in the 20th century.

- **The Geopolitical Shift from Oil to Minerals**

- **Centrality to Future Industries:** Decarbonization and digitalization depend directly on critical minerals. Electric vehicles require substantially more minerals by weight than traditional internal combustion engine vehicles, while offshore wind plants demand far more mineral inputs per megawatt than fossil-fuel power plants.
- **Hyper-Concentration of Midstream Processing:** Unlike crude oil, where refining capacity is globally distributed, critical mineral refining is extraordinarily concentrated. The top three refining nations control an average of 86% of global refining capacity across key energy minerals.
- **China's Midstream Monopoly:** China operates as the primary refining node, controlling approximately 70% of global processing across strategic minerals and over 90% for rare earth elements and graphite. This gives a single nation significant economic and geopolitical leverage over global supply chains.

- **Looming Supply-Demand Imbalances**

- **Structural Shortfalls:** Current project pipelines for copper indicate a potential 30% supply deficit by 2035. Lithium faces structural deficits as demand accelerates through the 2030s.
- **Weaponization of Resources:** The imposition of export controls on key elements like rare earths demonstrates how mineral supply chains can be deployed as tools of economic statecraft, disrupting automotive, semiconductor, defense, and renewable energy industries worldwide.

- **India's Position: High Resource Potential, Acute Processing Vulnerability**

- **Surging Domestic Demand:** Under a Net Zero pathway, India's cumulative demand for energy transition minerals is projected to reach approximately 169 million tonnes by 2070—over 50% higher than under a business-as-usual trajectory.
- **The Midstream Processing Gap:** India possesses raw reserves of cobalt, copper, graphite, nickel, and monazite. However, raw geological deposits do not guarantee economic security. India remains almost entirely dependent on imports for high-purity processed inputs due to a lack of advanced smelting, purification, and midstream refining infrastructure.

- 
- **Historical Evolution of the Issue**
 - Tracing India’s mineral governance framework reveals how policy focus has evolved from basic material extraction to strategic supply-chain resilience.
 - Post-Independence & Industrial Era (1950s–1980s)
 - 1957
 - The enactment of the Mines and Minerals (Development and Regulation) Act, 1957 prioritized bulk industrial minerals like coal, iron ore, and bauxite for state-led heavy industrialization. Rare earths remained strictly under state control via the Atomic Energy Act.
 - Economic Reforms & Foreign Direct Investment
 - 1993
 - The National Mineral Policy of 1993 opened the non-fuel, non-atomic mineral sector to private investment. However, exploration efforts remained focused on shallow, near-surface bulk commodities rather than deep-seated critical minerals.
 - Strategic Realignment & Creation of KABIL
 - 2019
 - Recognizing rising import risks for EV battery components, the Indian government established Khanij Bidesh India Limited (KABIL) to acquire strategic mineral assets overseas, initiating diplomatic efforts in South America's Lithium Triangle.
 - MMDR Amendment & Critical Mineral Identification
 - 2023
 - The MMDR Act was amended to remove 6 minerals from the atomic list, allowing private sector mining. A official list of 30 Critical and Strategic Minerals was established, granting powers to the Central Government to auction these concessions.
 - Launch of National Critical Mineral Mission
 - 2024–2025
 - The National Critical Mineral Mission was launched to streamline exploration, fund midstream innovation, and secure foreign concessions. China subsequently tightened global export controls on rare earths, accelerating international diversification efforts.
 - Corridors & International Partnerships
 - 2026
 - Creation of dedicated rare earth corridors across coastal states (Odisha, Kerala, Andhra Pradesh, Tamil Nadu) in the 2026–27 policy framework, alongside the signing of the India-US Critical Minerals and Rare Earths Framework to build resilient, diversified supply chains.



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1. KEY TERMS AND EXPLANATIONS

- CRITICAL MINERALS**
(e.g., Lithium)
- RARE EARTH ELEMENTS (REEs)**
(e.g., Inlinsthws and Elements)
- MONAZITE DEPOSITS**
(Kerala/Odisha sands)
- KABIL**
(Joint Venture for foreign assets)
- NET ZERO SCENARIO**

3. HISTORICAL EVOLUTION OF INDIA'S MINERAL GOVERNANCE

- 1957 - Mines Act
 - 1993 - Policy reforms
 - 2019 - KABIL creation
 - 2023 - MMDR Amendment
 - 2026 - Rare Earth Corridors/ India-US Framework
- MINE ACT
ERA
HAND TREATY

4. LOGICAL AND PHILOSOPHICAL FOUNDATIONS

- Strategic Autonomy
- Realism
- Dependency Theory

CRITICAL MINERALS: THE NEW GEOPOLITICAL & INDUSTRIAL FRONT FOR INDIA (UPSC PREP ANALYSIS)

2. MAIN ARGUMENTS AND SUBSTANTIVE PARTS

GLOBAL DECARBONIZATION & DIGITALIZATION ACCELERATE MINERAL DEMAND.

GEOPOLITICAL RISKS & SUPPLY DISRUPTIONS
(e.g., export controls on REEs 2025)



GEOPOLITICAL RISKS & SUPPLY DISRUPTIONS
(e.g., export controls on REEs 2025)

INDIA'S SITUATION



RESERVES vs IMPORT DEPENDENCY		
	GAP	Lithium
Copper	169	-
Lithium	95	75
Monazite sands	gap	GAP

6. LINKAGES WITH NCERTs

Class 10/12
Geography
Minerals,
Ch 5 & 7

Class 11
Pol Sci
Federalism,
Ch 7

Class 12
Economics
Balance of
Payments

7. LINKAGES WITH UPSC CSE SYLLABUS

GS 1 → GS 2 → GS 3 → GS 4
Economic Geography → International Relations → Economy, Science & Tech, Environment → Ethics, "Green Dilemma"

5. MULTIDIMENSIONAL ANALYSIS



8. WAY FORWARD: INDIA'S STRATEGIC ROADMAP

- MIDSTREAM PLI SCHEMES (Target Refining)
- STRATEGIC STOCKPILES (Vulnerable Minerals)
- OVERSEAS ASSET ACQUISITIONS (KABIL)
- RECYCLING & CIRCULAR ECONOMY
- DEEP-SEATED GEOSCIENCE DATA (Private Participation)

9. ALL PREVIOUS YEARS' UPSC & APSC QUESTIONS (PYQ CORNER)

UPSC GS Mains

- (UPSC GS 3, 2023: Definition & Steps)
- (UPSC GS 1, 2021: Multi-dimensional implications)

APSC CCE

- APSC: Assam's potential as a general: Assam is potential a potentially in potential coesttion.

- **Logical and Philosophical Foundations**
- **Strategic Autonomy and Realist Geopolitics**
 - Under national realism, economic security directly supports national sovereignty. A state that lacks control over the inputs required for its defense systems, power grids, and digital infrastructure risks losing foreign policy autonomy. Treating critical minerals as strategic assets rather than simple commodities aligns with the principle that critical vulnerabilities must be reduced through state-backed action.
- **Dependency Theory and Core-Periphery Dynamics**
 - International trade theory often highlights how developing nations export raw mineral ores (low value-added) to advanced economies, only to import refined high-purity chemicals and finished electronics (high value-added). Building domestic midstream processing capabilities allows developing economies to break out of this cycle, capture higher economic value, and retain industrial leadership.
- **Intergenerational Equity and Environmental Philosophy**
 - The clean energy transition is driven by the goal of leaving a habitable planet for future generations. However, mineral extraction and refining can cause localized environmental damage, water pollution, and habitat disruption if unmanaged. Balancing immediate ecological impacts with long-term climate benefits requires strong environmental standards, circular economy practices, and ethical material sourcing.

- **Multidimensional Analysis**
- **1. Social Dimension**
 - **Tribal Livelihoods and Displacement:** India's domestic mineral reserves are largely located in ecologically sensitive and forested regions inhabited by indigenous (*Adivasi*) communities. Mineral extraction must respect forest rights to avoid displacement and socio-economic disruption.
 - **Just Transition Framework:** Communities dependent on traditional fossil-fuel economies (such as coal belts) require reskilling and economic diversification as investments shift toward clean energy mineral value chains.
- **2. Political Dimension**
 - **Cooperative Federalism:** Under the Indian Constitution, state governments own surface minerals, while the central government sets national strategic policies. Auctions, royalty sharing, and environmental clearances require coordination between the Centre and States to prevent policy delays.
 - **Resource Nationalism:** Globally, nations are restricting raw mineral exports to encourage local processing, complicating traditional international trade relationships and requiring adaptive diplomatic strategies.
- **3. Legal Dimension**
 - **Regulatory Streamlining:** Amending the MMDR Act allows central auctioning of critical mineral blocks, but balancing fast-tracked development with the Forest Rights Act (FRA), 2006, and Environmental Impact Assessment (EIA) protocols remains complex.
 - **Offshore Mining and International Waters:** As deep-sea mining frameworks evolve under the International Seabed Authority (ISA), India requires clear national legal structures to govern polymetallic nodule extraction within its Exclusive Economic Zone (EEZ).
- **4. Ethical Dimension**
 - **The "Green Dilemma":** Clean energy technologies rely on intensive mineral extraction that can damage local ecosystems. Ensuring that the path to decarbonization does not create local environmental degradation presents a major governance challenge.
 - **Supply Chain Transparency:** Sourcing minerals ethically requires avoiding materials tied to child labor, poor working conditions, or human rights violations in international supply chains.
- **5. International Dimension**
 - **Strategic Coalitions:** Participation in minilateral arrangements, such as the US-led Minerals Security Partnership (MSP) and the India-US Critical Minerals Framework, helps build resilient supply chains outside dominant single-country processing nodes.
 - **Global South Partnerships:** Bilateral agreements with mineral-rich nations across Latin America (Lithium Triangle) and Africa create opportunities for shared industrial development and secure resource access.
- **6. Economic Dimension**
 - **Current Account and Fiscal Health:** Building domestic midstream processing capabilities helps lower long-term import bills for battery cells, permanent magnets, and solar wafers, improving trade balances.
 - **Capital-Intensive Infrastructure:** Refining high-purity critical minerals requires specialized industrial infrastructure, high energy inputs, advanced technology, and patient capital with longer pay-back periods.

Linkages with NCERT Textbooks

- **Class 10 Geography – *Chapter 5: Minerals and Energy Resources***
 - *Linkage:* Explains the spatial distribution of metallic and non-metallic minerals, hazards of mining, and mineral conservation strategies. It provides the base for understanding why raw deposits do not automatically yield industrial capability without downstream integration.
- **Class 12 Geography (India - People and Economy) – *Chapter 7: Mineral and Energy Resources***
 - *Linkage:* Outlines the primary mineral belts of India (North-Eastern Plateau, South-Western Plateau, North-Western Region). This helps map domestic reserves of bauxite, manganese, and monazite sands against critical mineral demands.
- **Class 11 Political Science – *Chapter 7: Federalism***
 - *Linkage:* Highlights the Seventh Schedule's distribution of regulatory powers over mines and mineral development between the Union (Entry 54, List I) and States (Entry 23, List II), providing context for center-state legislative dynamics.
- **Class 12 Economics – *Chapter 6: Open Economy Macroeconomics***
 - *Linkage:* Connects raw material import dependence to national Balance of Payments (BoP) vulnerabilities, trade deficits, and structural economic resilience.

- **Linkages with UPSC CSE Syllabus**
- **General Studies Paper 1 (Geography)**
 - **Syllabus Topic:** *Distribution of key natural resources across the world (including South Asia and the Indian sub-continent); factors responsible for the location of primary, secondary, and tertiary sector industries.*
 - **Application:** Mapping global mineral concentration nodes (e.g., South American Lithium Triangle, Indonesian Nickel, Chinese REE processing) and spatial factors influencing midstream refinery placement near reliable energy and deep-water ports.
- **General Studies Paper 2 (Governance & International Relations)**
 - **Syllabus Topic:** *Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests; Effect of policies and politics of developed and developing countries on India's interests.*
 - **Application:** Analyzing mineral diplomacy, including KABIL's overseas asset acquisitions, the India-US Critical Minerals Framework, and navigating unilateral export restrictions.
- **General Studies Paper 3 (Economy, Science & Environment)**
 - **Syllabus Topic:** *Indian Economy and issues relating to planning, mobilization of resources, growth, development; Indigenization of technology; Conservation, environmental pollution and degradation.*
 - **Application:** Evaluating the National Critical Mineral Mission, establishing domestic processing capabilities, reducing high-tech import dependency, and balancing environmental clearances with mining growth.
- **General Studies Paper 4 (Ethics)**
 - **Syllabus Topic:** *Environmental Ethics; Ethics in International Relations.*
 - **Application:** Addressing the ethical tension between localized environmental impacts of refining versus global climate mitigation goals, along with ensuring responsible, fair-trade supply chains.
- **Optional Subjects**
 - **Geography Optional:** Advanced analysis of resource geography, spatial concentration of midstream processing industries, and geopolitical dynamics of resource belts.
 - **Political Science & International Relations (PSIR):** Application of neo-realism, strategic autonomy, resource nationalism, and global trade power dynamics.
 - **Public Administration:** Examining mission-mode implementation structures, public sector enterprise agility (KABIL), and inter-ministerial coordination for clearances.

- **Way Forward**
- **1.Establish Targeted Midstream Processing Incentives:**High priority action to close the chemical refining gap.
 - Launch specialized Production Linked Incentive (PLI) schemes specifically targeting midstream chemical processing, high-purity refining, and advanced smelting technologies. Providing fiscal support and dedicated industrial parks helps offset high initial capital requirements and energy costs.
- **2.Operationalize National Strategic Mineral Reserves:**Shield domestic industries from sudden trade restrictions.
 - Create physical stockpiles for vulnerable minerals—such as battery-grade lithium, refined cobalt, and heavy rare earth elements—modeled on strategic petroleum reserves. These buffers help insulate manufacturing, defense, and power sectors during supply chain disruptions.
- **3.Expand Overseas Asset Acquisition Infrastructure:**Secure long-term access to foreign raw resources.
 - Strengthen KABIL’s capital reserves and operational mandate, enabling direct equity investments and joint ventures in foreign mining operations. Leveraging bilateral partnerships like the India-US Framework and the Minerals Security Partnership facilitates co-investment in processing infrastructure globally.
- **4.Scale Recycling and Urban Mining Frameworks:**Build a circular domestic supply mechanism.
 - Incentivize e-waste collection, battery recycling, and secondary processing technology. Enforcing Extended Producer Responsibility (EPR) norms helps build a reliable secondary feedstock supply, reducing reliance on primary raw ore imports over time.
- **5.De-risk Domestic Exploration and De-bottleneck Approvals:**Attract private capital to deep-seated mineral reserves.
 - Provide open-access, high-resolution geophysical data to lower early-stage exploration risks for private investors. Establishing single-window environmental and forest clearing mechanisms helps accelerate project development while maintaining rigorous environmental standards.



- **UPSC CSE Mains Questions**

- **GS Paper 3 (2023):** *"What are critical minerals? Why are they important for India's clean energy transition and high-technology manufacturing sector? Discuss the steps taken by India to secure its critical mineral supply chain."*
- **GS Paper 1 (2021):** *"Discuss the multi-dimensional implications of uneven distribution of mineral resources across the world with special reference to clean energy technologies."*
- **GS Paper 3 (2020):** *"Indigenization of technology and developing new technology is vital for India's growth. In this context, examine the challenges faced by India in building midstream manufacturing capabilities for critical energy transition minerals."*
- **GS Paper 2 (2022):** *"Critical minerals are fast becoming the new oil in international relations. How is resource diplomacy shaping international strategic partnerships in the Indo-Pacific region?"*

- **APSC (Assam Public Service Commission) Mains Questions**

- **APSC CCE Mains (GS Paper 3):** *"Discuss the significance of the National Critical Mineral Mission in securing India's strategic industrial requirements. How can states in the North-Eastern region contribute to national mineral exploration and development?"*
- **APSC CCE Mains (GS Paper 5 - Assam Perspective):** *"Analyze the mineral potential of Assam and the North-Eastern region. What regulatory and environmental frameworks are required to sustainably harness these resources for industrial growth?"*



The here and now of a 'forever war' period

As multipolarity solidifies, a new stable equilibrium could be ushered in — one in which States realise attacking others will not alter the balance of power in their favour

Although there have been several on-off announcements about negotiations, ceasefires, and deals to end the conflict between Russia and Ukraine, and between US-Israel and Iran, we are staring at a grim reality. Protracted conventional armed conflicts among countries are back in vogue, growing at an alarming rate, and proving to be intractable.

A study by the Norway-based Peace Research Institute Oslo (PRIO) finds that direct inter-State conflicts have doubled in the past few consecutive years, jumping from two in 2023 to four in 2024, and reaching eight in 2025, which is the highest since data collection began in 1946. Comparing the current upward trajectory in inter-State wars with the Cold War era (1946-1989) and the post-Cold War era (1990-2020), it looks like humanity is going backwards, in the direction of savagery, instead of moving forward towards civilisation.

The Cold War period saw an average of two to four active inter-State

conflicts per year, headlined by the Korean War (1950-1953), the Vietnam War (1965-1973), the India-Pakistan Wars (1948, 1965 and 1971), the Arab-Israeli Wars (1948, 1956, 1967 and 1973), and the Iran-Iraq War (1980-1988). Even though civil wars or internal wars outnumbered inter-State wars, the wars between States were deadly and accounted for up to four million battle-related deaths. What made things worse was that the average duration of these inter-State wars — many were prolonged by superpower-fuelled ideological proxies — was around 16 to 24 months.

The post-Cold War period offered a welcome respite from this dreadful dynamic. Thanks to the end of the ideological contest between capitalism and Communism and the weakening of all power centres except the US, this era had an average of only one to two active inter-State wars per year lasting approximately three to four-and-a-half months. Fewer inter-State wars brought relief because international order rests on mutual respect for sovereignty and territorial integrity of States. If inter-State wars lessen, it introduces systemic stability and makes intergovernmental institutions such as the United Nations (UN) more effective. No wonder, therefore, that the post-Cold War phase was a golden era for the UN.

But since 2020, this relatively benign phase has been replaced by a ferocious new trend of frequent and lengthy

inter-State wars that have once again marginalised the UN. The Russia-Ukraine war has exceeded four-and-a-half years of continuous fighting. The multiple wars involving Israel, Lebanon and the Palestinian Territories have dragged on for three years. And the US and Israeli war on Iran which began in 2025, ebbed for a while, and then resumed in 2026, looks open-ended with no closure. There have been some short multi-day conflicts between Armenia and Azerbaijan (2020) and between India and Pakistan (2025), but it is anyone's guess whether these will reignite after a pause.

One key factor behind the sharp uptick in inter-State wars and their longevity is something that is normally viewed as a positive development — the onset of a multipolar world. With more power centres emerging, the willingness to attack directly or to sponsor proxies that can withstand aggressors as part of global geopolitical rivalries has grown. If the original Cold War featured two superpowers that destabilised the world by arming their proxies, the current "new Cold War" is diffused, with more players. A small Ukraine would not have held on for so long against a big Russia if it wasn't for both the US and Europe backing the former militarily and economically. And Iran's resistance against the much superior Israel and the US owes to the intelligence, targeting, satellite, technological, and economic backing of Russia and China.



Sreeram Chaulia



A small Ukraine would not have held on for so long against a big Russia if it wasn't for both the US and Europe backing the former. AFP

Pakistan's propensity to carry out large-scale terrorist attacks in India, which New Delhi says would be considered "acts of war" from now on, is also rationalised by the active military and economic support Islamabad receives from Beijing. Operation Sindoor in 2025 was relatively short but saw high-intensity war-like clashes because Pakistan was emboldened by Chinese weaponry, intelligence, economic and diplomatic sympathies. As India grows economically faster than China and is likely to reduce the power gap with China in years to come, their Asian Cold War is likely to trigger more India-Pakistan wars or mini-wars by proxy association.

Apart from complex multipolarity, the other reason why inter-State wars are growing and lasting longer is the shift in modern military technology. Stronger attackers believe they have the upper hand and initiate wars, but defensive weaponry and tactics are improving. Drones, anti-tank, anti-ship and anti-aircraft missiles and counteroffensive strike capabilities have prevented easy walkovers for the attackers. Presidents Vladimir Putin and Donald Trump have found that weak opponents can withstand land

invasions or aerial bombardments for years due to this change in the structure of warfighting.

Given these underlying structural shifts, is there no light at the end of the tunnel and are we condemned to suffer "forever wars"? The good news is that as multipolarity solidifies, and once power transitions are completed, a new stable equilibrium could be ushered in, in which States realise it is too costly to attack other States, since attacking will not alter the balance of power in their favour. And with time, as defensive military technology advances further, it too may deter offensive States from daring to attempt invasions and regime changes. For instance, China may decide not to attack or to delay attacking Taiwan after seeing the way Ukraine and Iran warded off Russia and the US for years.

The bad news is that until we reach stable equilibrium points that deter attackers, more inter-State wars that grind on by attrition are possible. It is a scary thought, but one we must brace for.

Sreeram Chaulia is dean, Jindal School of International Affairs. The views expressed are personal

- **Key Terms and Explanations**
- **Multipolarity**
 - **Definition:** A structure of the international system in which three or more sovereign states possess comparable amounts of military, economic, and cultural influence.
 - **Explanation:** Unlike a unipolar system (dominated by one superpower) or a bipolar system (dominated by two major blocs), multipolarity features several competing power centers.
- **Inter-State War vs. Intra-State War**
 - **Definition:** Inter-State war refers to sustained, high-intensity armed conflict between two or more sovereign nation-states. Intra-State war (or civil war) occurs between a state government and organized non-state actors within its domestic borders.
 - **Explanation:** While the post-Cold War period was dominated by internal civil wars and counter-insurgencies, the contemporary period is witnessing a sharp resurgence of traditional conflicts directly fought between sovereign states.
- **Proxy Warfare**
 - **Definition:** A conflict in which major powers utilize third-party states or non-state actors as conduits to fight rivals indirectly, minimizing the risk of direct nuclear or military escalation between the patrons.
 - **Explanation:** External patrons supply intelligence, advanced weaponry, financial aid, and diplomatic cover to a combatant state, allowing a smaller state to sustain military operations against a superior adversary for an extended period.
- **Balance of Power**
 - **Definition:** A equilibrium state in international relations where no single nation-state holds decisive dominance over others.
 - **Explanation:** When one state threatens to become disproportionately powerful, other states form alliances or expand their internal military capabilities to restore equilibrium and deter aggression.
- **Offense-Defense Balance**
 - **Definition:** A core concept in strategic studies that examines whether technological, geographical, and operational factors make it easier to conquer territory (offense-dominant) or defend existing territory (defense-dominant).
 - **Explanation:** When military technology favors defense—such as low-cost anti-tank missiles, anti-aircraft systems, and reconnaissance drones—attackers face prohibitive attrition costs, making swift invasions nearly impossible.
- **War of Attrition**
 - **Definition:** A strategic mechanism where opposing belligerents attempt to wear down each other's war-fighting capacity through continuous, incremental losses in personnel, equipment, and economic reserves.

- **Main Arguments and Substantive Parts**
- **1. Structural Resurgence of Direct Inter-State Conflicts**
 - The international system is experiencing a quantitative and qualitative resurgence of conventional inter-State warfare. Empirical tracking shows that direct armed conflicts between sovereign states have risen markedly after reaching historical lows in the post-Cold War era.
 - This trend challenges the long-held assumption that economic globalization, institutional interdependence, and international law had permanently rendered conventional inter-State conquest obsolete.
 - Instead of short, decisive operational strikes, contemporary inter-State wars are increasingly turning into prolonged, high-intensity engagements that stretch across years.
- **2. Complex Multipolarity as a Conflict Catalyst**
 - The transition from a unipolar international order (led by the United States) to a complex multipolar order has expanded the avenues for conflict.
 - In a multipolar system, multiple competing power centers possess the military and economic capability to sponsor proxies or directly assert territorial claims.
 - Smaller or medium-sized states can leverage security assistance, real-time satellite intelligence, and economic lifelines from alternative power hubs. This dynamic enables less powerful combatants to withstand sustained invasions by larger powers, unintentionally prolonging the total duration of armed conflicts.
- **3. Shift in the Offense-Defense Technological Balance**
 - Modern military innovation has democratized precision defense. The widespread availability of low-cost unmanned aerial vehicles (UAVs), anti-tank guided missiles (ATGMs), man-portable air-defense systems (MANPADS), and distributed electronic warfare networks has significantly tilted the tactical balance toward the defender.
 - Major military powers initiating offensive campaigns under the expectation of rapid regime change or swift territorial seizure routinely find their armored columns and air operations countered by relatively inexpensive defensive systems.
 - Consequently, offensive maneuvers slow down into grinding wars of attrition, exhausting the economic and material capacity of the invading force without offering a clear path to quick victory.
- **4. Systemic Paralysis of Multilateral Institutions**
 - The rise in direct conflicts between sovereign nations has severely compromised the operational authority of the United Nations (UN) and its collective security architecture.
 - Because major power centers hold veto capabilities within key decision-making organs like the UN Security Council, institutional consensus remains elusive during inter-State crises.
 - The resulting paralysis leaves the international community unable to enforce ceasefires, uphold sovereignty principles, or arbitrate peaceful settlements, leaving kinetic force as the primary arbiter of state disputes.
- **5. Potential Long-Term Convergence Toward a New Equilibrium**
 - Despite the immediate volatility of this structural transition, the long-term stabilization of a multipolar system could eventually foster a resilient deterrent equilibrium.
 - As defensive military technologies continue to outperform offensive doctrines, state leadership will increasingly recognize that unprovoked military aggression yields negative strategic returns and fails to alter the overarching balance of power.
 - Once power transition phases settle and structural boundaries become established, this cost-benefit calculus could deter revisionist states from launching land invasions, laying the foundation for a defensive-realist balance of power.

- **Historical Evolution of the Issue**
- **Phase I: The Cold War Bipolar Era (1946–1989)**
 - **Systemic Architecture:** Structured around a rigid bipolar ideological contest between two superpowers: the United States and the Union of Soviet Socialist Republics (USSR).
 - **Conflict Dynamics:** Inter-State conflicts averaged two to four active wars per year. Direct superpower-on-superpower kinetic conflict was deterred by the doctrine of Mutually Assured Destruction (MAD), shifting competition to regional theaters.
 - **Duration and Toll:** Inter-State wars during this period lasted an average of 16 to 24 months. Superpowers actively funneled arms, funding, and military advisors into regional disputes (such as the Korean War, Vietnam War, Arab-Israeli Wars, and the Iran-Iraq War), which prolonged their duration and resulted in millions of battle deaths.
- **Phase II: The Post-Cold War Unipolar Era (1990–2020)**
 - **Systemic Architecture:** Defined by the dissolution of the Soviet Union and the emergence of an asymmetric unipolar international system under US strategic primacy.
 - **Conflict Dynamics:** Direct inter-State conflicts reached historic lows, averaging just one to two wars per year globally. War duration dropped to an average of three to four-and-a-half months.
 - **Institutional Prominence:** Respect for state sovereignty and territorial integrity was underpinned by international law, supported by an active UN Security Council. This period saw multilateral interventions, coalition warfare against rogue aggressors (e.g., the 1991 Gulf War), and a shift in global focus toward internal civil wars, counter-terrorism, and humanitarian interventions.
- **Phase III: The Contemporary Multipolar Era (2020–Present)**
 - **Systemic Architecture:** Marked by the relative decline of single-power hegemony and the emergence of complex multipolarity featuring revisionist powers, rising regional states, and decentralized security alliances.
 - **Conflict Dynamics:** Direct inter-State wars have doubled in frequency, reaching unprecedented modern thresholds. Wars are once again becoming open-ended, lasting multiple years with no clear diplomatic resolution.
 - **Strategic Transformation:** The proliferation of decentralized strike technologies, combined with backing from alternative power hubs, has neutered quick offensive operations. Global governance structures face institutional gridlock, signaling a return to open power politics.



AXIA IAS ACADEMY
RISE ABOVE THE REST

GLOBAL GEOPOLITICAL TRANSITIONS & THE RETURN OF INTER-STATE CONFLICT: A NEW EQUILIBRIUM?

KEY TERMS & EXPLANATIONS



MULTIPOLARITY

Multiple power centers, like such as US, China, Russia, EU, India.



PROXY WARFARE

Superpowers pulling strings on smaller state puppets in order.



BALANCE OF POWER

Balance scale comoss balance with power & baance state power.



WAR OF ATTRITION

Two sides grinding down through a factory of warfare.



LOGICAL & PHILOSOPHICAL BASE



Lead a stable equilibrium & Deterrence as power transitions finish

RESURGENT INTER-STATE CONFLICT PROCESS



MULTIDIMENSIONAL ANALYSIS



HISTORICAL EVOLUTION



WAY FORWARD & STABLE EQUILIBRIUM



LINKAGES

For more to IAS aspirants

NCERTs

- Class 12 Contemporary World Politics
- Class 11 Political Theory

UPSC CSE Syllabus

- GS-II IR
- GS-III Security Challenges
- Essay
- PSIR

- **Logical and Philosophical Base**
- **1. Structural Realism (Neorealism)**
 - **Theoretical Premise:** Formulated by Kenneth Waltz, Neorealism argues that the international system is defined by *anarchy*—the absence of a centralized global sovereign authority.
 - **Application:** In an anarchic system, states must operate under a "self-help" imperative to ensure their survival. As multipolarity takes root, the absence of an overarching hegemon forces states to form balancing alliances or expand their armaments to protect their interests.
 - **The Security Dilemma:** Actions taken by one state to enhance its defensive security are frequently interpreted by neighbors as offensive threats. This structural distrust drives armaments spirals and increases the probability of inter-State conflict.
- **2. Offense-Defense Theory and Defensive Realism**
 - **Theoretical Premise:** Pioneered by Robert Jervis and expanded by Stephen Van Evera, this theory posits that the probability of war depends on whether offensive or defensive military postures hold the strategic advantage.
 - **Application:** When technology favors the defense, conquest becomes difficult and costly, which should theoretically stabilize the international system. However, during power transitions, revisionist states often miscalculate their offensive capabilities, launching invasions that turn into unexpected wars of attrition due to modern defensive technology.
- **3. Power Transition Theory**
 - **Theoretical Premise:** Developed by A.F.K. Organski, Power Transition Theory suggests that systemic war is most likely when the gap in relative capabilities between a dominant state and a rising challenger narrows.
 - **Application:** As emerging economies shrink the capability gap with established powers, the international system experiences structural instability. Rising powers seek to rewrite international rules to reflect their growing strength, while declining powers may launch preventive actions to lock in their existing advantages.
- **4. Philosophical Shift: From Kantian Liberal Peace to Hobbesian Realism**
 - **Kantian Perpetual Peace:** Immanuel Kant posited that republican governance, economic interdependence, and international institutions could gradually eliminate war between nations. The post-Cold War order was built largely on this liberal optimism.
 - **Hobbesian State of Nature:** Modern security developments mark a return to Thomas Hobbes's vision of international life—a realm of unchecked competition where power, force, and strategic self-reliance prevail over multilateral norms and treaty arrangements.

- **Multidimensional Analysis**
- **Social and Humanitarian Dimension**
 - **Mass Human Displacement:** Modern inter-State warfare destabilizes civilian populations, creating millions of internally displaced persons (IDPs) and international refugees, which strains the social infrastructure of neighboring countries.
 - **Destruction of Social Capital:** Prolonged attrition warfare destroys critical civilian infrastructure—including power grids, healthcare systems, and schools—causing generational losses in human capital development.
 - **Rising Hyper-Nationalism:** War mobilizes domestic populations around militaristic narratives, deepening societal polarization, hardening ethnic enmities, and shrinking the domestic space for peace-building.
- **Political and Governance Dimension**
 - **Erosion of Multilateralism:** Multipolar friction paralyzes consensus-driven global governance platforms. Key multilateral bodies become arenas for political posturing rather than venues for resolving disputes.
 - **Rise of the Executive Security State:** Prolonged national security threats tend to concentrate political authority within executive branches and defense establishments, often weakening parliamentary oversight and civil liberties.
 - **Governance Stress in Non-Belligerent Nations:** Third-party states face political pressure to choose sides, complicating their domestic foreign policy consensus and diverting political focus from social reforms.
- **Legal and Regulatory Dimension**
 - **Violation of UN Charter Article 2(4):** Direct inter-State invasions breach the core principle of modern international law, which explicitly prohibits the threat or use of force against the territorial integrity or political independence of any state.
 - **Collapse of Arms Control Architectures:** Deepening power rivalries have led to the breakdown or suspension of major bilateral and multilateral arms control treaties (such as conventional force agreements and strategic nuclear limitation pacts).
 - **Weakening of International Humanitarian Law (IHL):** Attrition warfare frequently leads to violations of *jus in bello* (justice in war), as combatants increasingly target dual-use civilian infrastructure to weaken the enemy's domestic resolve.
- **Ethical and Moral Dimension**
 - **The Moral Hazard of Proxy Support:** Supplying advanced weaponry to combatant states allows patron powers to advance their strategic interests without risking their own personnel. However, this dynamic often extends the duration of kinetic operations, shifting the physical burden of warfare entirely onto local populations.
 - **Targeting of Critical Infrastructure:** The operational shift toward damaging energy grids and civilian logistics raises grave ethical questions about proportionality and non-combatant immunity.
 - **Divergent Moral Frameworks:** Competing powers increasingly construct self-serving ethical justifications for military actions, weakening universal declarations of human rights in favor of relativistic security arguments.
- **International Security Dimension**
 - **Bloc Realignment and Hedging:** The international system is fragmenting into overlapping security blocs and transactional partnerships. Middle powers are increasingly pursuing "strategic autonomy" or multi-alignment to avoid becoming collateral in broader power contests.
 - **Nuclear Proliferation Incentives:** Non-nuclear states observing inter-State invasions may conclude that international security guarantees are insufficient without a sovereign nuclear deterrent, threatening the global non-proliferation framework.
 - **Decentralized Theater Security:** Regional security architectures are replacing global collective security systems, leading to localized armaments races and security complexes in areas like the Indo-Pacific, Eastern Europe, and the Middle East.
- **Global Economic Dimension**
 - **Supply Chain Disruptions:** Modern wars interrupt vital global commodity flows, causing severe price shocks in food, energy, industrial metals, and critical technology components.
 - **Diversion of Fiscal Resources:** States worldwide are raising defense budgets to upgrade military readiness. This shift diverts public capital away from infrastructure, climate adaptation, healthcare, and Sustainable Development Goals (SDGs).
 - **Goeconomic Fragmentation:** Economic sanctions, export controls, and weaponized trade policies split the global economy into rival economic spheres, raising transaction costs and reducing long-term international trade growth.

- **Linkages with NCERT Textbooks**
- **Class 12 Political Science: *Contemporary World Politics***
 - **Chapter 1: The Cold War Era**
 - *Linkage:* Contextualizes how bipolarity generated proxy wars in regional theaters without escalating into direct global warfare. Helps students compare Cold War proxy dynamics with modern multipolar conflict patterns.
 - **Chapter 2: The End of Bipolarity**
 - *Linkage:* Explains the collapse of the Soviet Union and the emergence of US unipolarity. Essential for understanding the temporary reduction in direct inter-State wars during the 1990s and 2000s.
 - **Chapter 4: Alternative Centres of Power**
 - *Linkage:* Discusses the rise of regional groupings (EU, ASEAN, BRICS) and individual power centers (China, India, Japan). Direct application for analyzing how a multipolar distribution of power reshapes global stability.
 - **Chapter 6: International Organisations**
 - *Linkage:* Analyzes the structure, achievements, and structural limitations of the United Nations Security Council. Connects directly to discussions on UNSC paralysis during major inter-State conflicts.
- **Class 11 Political Science: *Political Theory***
 - **Chapter 9: Peace**
 - *Linkage:* Explores structural versus direct physical violence, disarmament, and strategies for achieving long-term global peace. Provides the theoretical grounding needed for UPSC essays and political science optional papers.
 - **Chapter 10: Development**
 - *Linkage:* Examines the trade-offs between military spending and socio-economic progress. Directly relevant when evaluating the economic impacts of inter-State conflict on human development index (HDI) targets.

- **Linkages with UPSC CSE Syllabus**
- **General Studies Paper 1 (GS-1)**
 - **Syllabus Topic:** History of the World (18th century onwards: World Wars, Cold War, redrawing of national boundaries, political philosophies).
 - **Application:** Drawing comparative parallels between historical multi-power balance-of-power systems (e.g., 19th-century Concert of Europe) and current 21st-century multipolarity.
- **General Studies Paper 2 (GS-2)**
 - **Syllabus Topic:** Effect of policies and politics of developed and developing countries on India's interests; Important International institutions, their structure, mandate.
 - **Application:** Analyzing how systemic gridlock within the UN Security Council affects global stability; evaluating India's stance of "strategic autonomy" and non-alignment amidst rival power blocs; assessing security dynamics across India's immediate neighborhood.
- **General Studies Paper 3 (GS-3)**
 - **Syllabus Topic:** Security challenges and their management; Indigenization of technology & developing new technology; Role of non-state actors and technological warfare.
 - **Application:** Examining how low-cost defensive technologies (UAVs, precision missiles, electronic counter-measures) alter conventional operational doctrines; evaluating India's defense indigenization imperative (*Atmanirbhar Bharat* in defense) in an era of prolonged industrial warfare.
- **General Studies Paper 4 (GS-4)**
 - **Syllabus Topic:** Ethics in International Relations and Funding; Human values and moral decision-making.
 - **Application:** Evaluating the moral dimensions of proxy warfare where external powers sustain conflicts remotely; examining adherence to Just War theory (*jus ad bellum* and *jus in bello*) during attritional military operations.
- **PSIR (Political Science & International Relations) Optional**
 - **Paper 1 (Political Theory):** Theories of IR (Realism, Neorealism, Liberalism, Complex Interdependence).
 - **Paper 2 (Global Politics):** Changing International Political Order; Rise of Multipolarity; UN System and Structural Reforms; Regionalization of World Politics.

- **Way Forward**
- **1. Structural Reform of Global Multilateral Governance**
 - **UN Security Council Expansion:** The current UNSC composition reflects the post-1945 balance of power, leading to institutional gridlock during major inter-State conflicts. Expanding permanent and non-permanent seats to include major developing democracies (such as India, Brazil, and South Africa) is essential to restore institutional legitimacy.
 - **Veto Code of Conduct:** Implementing a voluntary framework restricting veto usage by permanent members during verified humanitarian crises or mass inter-State invasions would help prevent absolute paralysis in global security decisions.
- **2. Updating Arms Control Frameworks for Emerging Technologies**
 - **Regulation of Asymmetric Technologies:** International treaties must adapt beyond traditional weapon systems to establish clear regulatory limits on autonomous UAVs, loitering munitions, military artificial intelligence, and offensive cyber capabilities.
 - **Confidence-Building Measures (CBMs):** Establishing military-to-military communication channels and hotlines among major power centers can reduce the risk of strategic miscalculation during regional crises.
- **3. Promoting Middle-Power Diplomacy and Multi-Alignment**
 - **Stabilizing Influence of Middle Powers:** Responsible regional powers (such as India, Brazil, Indonesia, and South Africa) can bridge communication gaps between competing geopolitical blocs.
 - **Constructive Multi-Alignment:** By maintaining strategic autonomy and refusing to join rigid military alliances, middle powers can act as impartial mediators, facilitating de-escalation, prisoner exchanges, and humanitarian corridors during active wars.
- **4. Institutionalizing Defensive-Realist Strategies**
 - **Prioritizing Defense Dominance:** Sovereign states should focus their defense modernization plans on cost-effective, defensive military architectures (such as integrated air-defense shields, anti-ship capability, and secure electronic communications).
 - **Deterrence Through Cost Maximization:** When states build robust defensive capabilities, potential aggressors recognize that territorial invasion will lead to prolonged, costly attrition rather than swift victory, reinforcing regional deterrence.
- **5. Securing Critical Supply Chains and Economic Interdependence**
 - **Strategic De-Risking:** Nations must diversify sourcing for essential commodities—such as food supplies, energy resources, active pharmaceutical ingredients, and critical semiconductors—to prevent trade weaponization during crisis periods.
 - **Targeted Economic Guardrails:** While full economic decoupling is inefficient, building resilient, multi-sourced supply networks ensures that national security interests remain protected without fragmenting the global economy into isolated economic camps.

- **UPSC CSE Mains Questions**

- **GS Paper 2 (International Relations & Global Governance)**

- **2023:** "The United Nations Security Council suffers from a structural legitimacy crisis that renders it ineffective in addressing modern global conflicts. Discuss in the context of emerging multipolarity." (15 Marks, 250 Words)
- **2022:** "Do you think that a multipolar world is inherently more unstable than a bipolar or unipolar world? Assess the impact of complex multipolarity on international peace and security." (15 Marks, 250 Words)
- **2021:** "Critically analyze the role of 'Strategic Autonomy' in India's foreign policy amidst deepening global rivalries between major power blocs." (10 Marks, 150 Words)
- **2019:** "The emergence of new regional alliances and alternative economic groupings is reshaping global diplomacy. Examine how India can navigate this evolving international structure." (15 Marks, 250 Words)

- **GS Paper 3 (Defense Technology & Security)**

- **2023:** "Asymmetric warfare technologies, particularly unmanned aerial vehicles (drones) and precision-guided systems, have transformed the operational nature of modern land warfare. Analyze." (10 Marks, 150 Words)
- **2020:** "What are the key security challenges posed by evolving technology in conventional military operations? Highlight India's preparedness in indigenizing critical defense capabilities." (15 Marks, 250 Words)

- **Political Science and International Relations (PSIR) Optional**

- **2023 (Paper 2):** "Evaluate Robert Jervis's Offense-Defense balance theory in explaining the duration and intensity of contemporary inter-State wars." (20 Marks)
 - **2022 (Paper 2):** "Discuss Kenneth Waltz's Neorealist framework. How does systemic anarchy explain state behavior during structural power transitions?" (15 Marks)
 - **2021 (Paper 2):** "The post-Cold War liberal global order is giving way to complex multipolarity characterized by proxy competition. Elaborate." (20 Marks)
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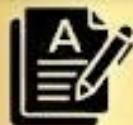
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