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Page 01 : GS II : International Relations / Prelims Exam

The 2026 West Asian conflict has reached a critical inflection point following U.S. President Donald Trump's "America First" ultimatum to NATO allies. Amidst an ongoing war with Iran—marked by the "decapitation" of its leadership and the blockade of the Strait of Hormuz—the U.S. has signaled a shift from traditional security guarantees to a transactional alliance model. This development poses a significant threat to global energy stability and the cohesion of Western military frameworks.

Trump blasts allies, tells them 'get your own oil'

The U.S. President accuses his NATO partners of not being there for America during the conflict with Iran; he tells countries they can either buy fuel from the U.S. or go to the Strait of Hormuz to pick it up; extra British troops and air defence to be deployed, says U.K. Defence Secretary in West Asia, while Prime Minister Starmer says 'not our war'

Sriram Lakshman

U.S. President Donald Trump lashed out at allies on Tuesday telling them to fend for themselves regarding oil supplies, adding to the pressure within the Western military alliance, NATO, whose members have not joined the U.S. and Israel in their war on Iran.

Mr. Trump accused allies of not being there for the U.S. and encouraged countries to take the oil from the Strait of Hormuz, the crucial waterway bordering Iran that Tehran has mostly blocked off. The U.S. President's messages came as oil prices have been surging and hours after the UAE's authorities reported a drone attack on an oil tanker.

"All of those countries that can't get jet fuel because of the Strait of Hormuz, like the United Kingdom, which refused to get involved in the decapitation of Iran, I have a suggestion for you: Number 1, buy from the U.S., we have plenty, and Number 2, build up some delayed courage, go to the Strait, and just TAKE IT," Mr. Trump wrote on the Truth Social site, early Tuesday morning Washington time.

"You'll have to start learning how to fight for yourself, the U.S.A. won't be there to help you anymore, just like you weren't there for us. Iran has been, essentially, decimated. The hard part is done. Go get your own oil!" Mr. Trump added.

In recent weeks, the U.S. President has been at odds with the position of U.K. Prime Minister on Iran and the fallout of the war, after spending the larger part of last year embracing Mr. Starmer and the U.K.-U.S. "special relationship" since his return to the White House.

Royals' visit

However, Mr. Trump, in a subsequent post, said he "greatly respected" Britain's King Charles III and looked forward to welcoming the King and Queen on a state visit to Washington at the end of the month. Buckingham Palace confirmed the visit.

The U.K. government has used the British Royal Family as a diplomatic tool with Mr. Trump, including by hosting him for a second state visit in the U.K. last year. Asked for a reaction to Mr. Trump's statements, Downing Street directed *The Hindu* to Mr. Starmer's words on a visit to Finland last week.

There, the Prime Minister had focused on Russia's war with Ukraine saying there was a "war on two fronts", in Ukraine and Iran.

Russian President Vladimir Putin was benefiting from the war in West Asia, Mr. Starmer had said, as he urged the harder pursuit of Russia's 'shadow fleet' of oil-carrying vessels in European waters, circumventing Western sanctions.

"This is not our war and we're not going to get drawn in to it," Mr. Starmer had said on Monday, in reference to Iran, reiterating that the U.K.'s involvement was restricted to defensive action. U.K. Defence Secretary John Healey, on a visit to West Asia, said on Tuesday that extra British troops and air defence systems would be deployed to the region, according to a BBC report.

Several European countries have disagreed publicly with the U.S.'s actions to varying degrees, with none joining the U.S. and Israel in striking Iran.

Mr. Trump also took aim at France in his Tuesday posts.

"The Country of France wouldn't let planes headed to Israel, loaded up with military supplies, fly over French territory. France has been VERY UNHELPFUL with respect to the 'Butcher of Iran' [Ayatollah Ali Khamenei] who has been successfully eliminated! The U.S.A. will REMEMBER!!!" Mr. Trump wrote on Truth Social. *The Hindu* has reached out to the French foreign ministry for a response.

On Monday, Mr. Trump had threatened to destroy oil wells, power plants, Iran's Kharg Island (an oil hub) and desalination plants, if Iran did not reach a deal with the U.S. and open up the Strait of Hormuz.

U.S. Secretary of War Pete Hegseth reiterated Mr. Trump's message during a press briefing at the Pentagon on Tuesday.

He said the world should "be prepared to stand up" and that it was not just America's "problem set" going forward, claiming that the U.S. had done the "lion's share" of opening up the Strait.

COULDRON OF CONFLICT
» PAGE 8

'Iran has the will to end war, but needs guarantees'

TEHRAN

Iranian President Masoud Pezeshkian said on Tuesday that his country had the "necessary will" to end the ongoing war with Israel and the U.S., but was seeking guarantees that the conflict would not be repeated. "The solution to normalising the situation is the cessation of their aggressive attacks," he said even as U.S. hit a city that is home to one of Iran's main nuclear sites. » PAGE 14

Assessing damage: Red Crescent Society members at the site of a strike in Tehran on Tuesday. REUTERS

India can cater to PNG demand comfortably: govt.

NEW DELHI

India can comfortably cater to the demand of as many as 30 crore domestic piped natural gas (PNG) connections even if it were to solely rely on its domestic production of liquefied natural gas (LNG), as per to Anjan Kumar Mishra, Secretary at the Petroleum and Natural Gas Regulatory Board. He also said that the Centre was trying to scale up number of connections added every day. » PAGE 6

Key Dimensions of the Crisis

A. The Strategic Chokepoint: Strait of Hormuz

The Strait of Hormuz is the world's most vital oil transit chokepoint. Iran's blockade, in response to U.S.-Israeli strikes, has "decimated" its own infrastructure but successfully paralyzed global energy flows.

Trump's Proposition: Allies must either purchase U.S. shale oil or use their own military force to "take" oil from the Strait.

Impact: This essentially ends the "Carter Doctrine," where the U.S. committed to using military force to defend its interests (and those of its allies) in the Persian Gulf.

B. Transatlantic Divergence (U.S. vs. NATO/U.K.)

A sharp diplomatic rift has emerged between Washington and its European partners:

The "Not Our War" Stance: U.K. Prime Minister Keir Starmer has categorized the conflict as a U.S.-led initiative, refusing to participate in offensive operations.

Strategic Autonomy: European nations (France, U.K.) are prioritizing defensive measures (deploying air defenses to protect assets) rather than joining the offensive "decapitation" strikes.

The Russia Factor: The U.K. views the conflict as a "two-front war," where instability in West Asia directly benefits Russia by diverting Western resources away from Ukraine.

C. Energy Mercantilism

Trump's rhetoric highlights a shift toward Energy Mercantilism. By telling allies to "Buy from the U.S.," Washington is leveraging its position as a leading energy producer to force allies into economic compliance, potentially using the crisis to secure long-term market share for U.S. LNG and crude.

D. The Role of Soft Power (Royal Diplomacy)

Despite the harsh rhetoric, the mention of King Charles III's state visit indicates that "Personalist Diplomacy" remains a core feature of the Trump administration. The U.K. continues to use the Monarchy as a "stabilizing bridge" to maintain the Special Relationship amidst policy chaos.

Implications for India

Energy Security: As a major importer of crude, India faces "imported inflation" due to surging oil prices. Any disruption in the Strait of Hormuz directly threatens India's 80% oil import dependency.

Strategic Balance: India must navigate its "Strategic Autonomy" between its growing defense ties with the U.S. and its historical/logistical interests in the Persian Gulf (e.g., Chabahar Port).

Diaspora Safety: The escalation puts millions of Indian expatriates in the Gulf at risk, necessitating potential large-scale evacuation plans (Sankat Mochan style).

Comparative Analysis: U.S. vs. U.K. Position

Feature	United States Position	United Kingdom Position
Objective	Regime change ("Decapitation")	Regional stability & Defensive posture
Energy	Transactional; "Buy U.S. or fend for yourself"	Focus on "Shadow Fleet" and sanctions

Feature	United States Position	United Kingdom Position
Military Role	Offensive strikes on Iranian infra	Deployment of Air Defense (Sky Sabre)
Alliances	Demands absolute participation	"Not our war"; Selective cooperation

Conclusion

The current standoff represents a paradigm shift in global security architecture. The U.S. transition from a "Security Provider" to a "Security Vendor" leaves a power vacuum in West Asia that could embolden regional players and further fracture NATO. For the global community, the immediate challenge is not just the military defeat of an adversary, but the prevention of a total collapse in energy markets that could trigger a global recession. For India, the situation reinforces the urgency of diversifying energy sources and accelerating the transition to a gas-based and renewable economy to mitigate "Strait-dependency."

UPSC Prelims Exam Practice Question

Ques: Which of the following best describes "Energy Mercantilism"?

(a) Free trade of energy resources across nations

(b) State control over domestic energy prices

(c) Use of energy exports as a geopolitical tool

(d) Transition toward renewable energy

Ans: c)

UPSC Mains Exam Practice Question

Ques: Discuss the geopolitical and economic significance of the Strait of Hormuz. How does its disruption affect India? **(150 Words)**

Page 01 : GS III : Envrionment / Prelims Exam

In a significant departure from recent years, the IMD's 2026 forecast presents a fragmented climate map for India. While North India anticipates a "cooler-than-normal" summer due to increased Western Disturbances, the rest of the country prepares for intensified heatwaves. This atmospheric cooling, combined with the projected emergence of a "Super El Niño" and global supply chain disruptions from the Iran-Israel-U.S. conflict, creates a complex "Triple Threat" for India's food and energy security.

Most parts of India to see more heatwave days: IMD

Jacob Koshy
NEW DELHI

North India is likely to experience a cooler-than-normal summer this time, while other parts of the country may see more number of heatwave days, the India Meteorological Department (IMD) said on Tuesday.

From April to June, above-normal maximum temperatures are expected over most parts of east and northeast India, as well as eastern parts of central India, and adjoining peninsular regions. Maximum temperatures are likely to be "normal to below normal" over the remaining parts.

There will likely be more than the usual number of heatwave days over parts of east, central and northwest India, and southeast peninsula during this period. Many parts of coastal Odisha, West Bengal, Tamil Nadu, Puducherry, Andhra Pradesh, and some regions of Gujarat, Maharashtra and Karnataka are likely to see heatwaves in April.

El Nino fears

The country will likely receive 12% more rain than usual in April.

In July, however, forecasts suggest the emergence of an El Nino, warming of regions of the Central Pacific Ocean that frequently links to reduced rain in India. Experts said it is still early to link cooler summers to diminished monsoon rainfall though it is a pattern that has held in the past. The IMD is expected to provide an initial forecast on the expected performance of monsoon 2026 on April 15. India experienced surplus monsoon in 2024 and 2025.With fertilizer output expected to be hit this year on account of the Iran-Israel-U.S. war, weak rainfall could impact kharif sowing.

Experts say it is early to link cooler summers to low monsoon rains, though it is a pattern seen in the past. SHASHI SHEKHAR KASHYAP

"Cooler than normal summer means less heating of the landmass, which typically acts as a natural pull for moisture and monsoon. This could affect the onset of the monsoon and its initial progress [over Kerala in June]," said Madhavan Rajeevan, climatologist and former Secretary, the Ministry of Earth Sciences.

"However a clearer picture could emerge only around end May. There is also a forecast for a 'super' El Nino. We shouldn't worry now but if these signals persist in May, the government should prioritise drought management."

The Paradox: Cooler Summers vs. Weak Monsoons

Typically, an intense summer is the "engine" of the Indian Monsoon.

- **The Mechanism:** High temperatures over the Indian landmass create a robust Low-Pressure Zone. This acts as a vacuum, pulling in moisture-laden winds from the High-Pressure Zone over the cooler Indian Ocean.
- **The Risk:** A "cooler" North India suggests a weaker pressure gradient. As noted by climatologist Madhavan Rajeevan, this could reduce the "natural pull" for moisture, potentially delaying the monsoon onset or weakening its initial progress over Kerala in June.

Key Forecast Highlights (April–June 2026)

Region	Temperature Outlook	Heatwave Probability

Region	Temperature Outlook	Heatwave Probability
North India	Below Normal	Low
East & Northeast	Above Normal	High
Central India	Above Normal	High
South Peninsula	Above Normal	Moderate (Coastal Odisha/TN)

April Rainfall: Expected to be 112% of the Long Period Average (LPA), providing temporary relief but potentially masking the long-term drying trend predicted for July.

The "Super El Niño" Factor

The transition from a neutral phase to a Super El Niño by July 2026 is the primary concern for the second half of the monsoon.

What is it? An abnormal warming of the Central and Eastern Pacific Ocean.

Historical Impact: El Niño is strongly correlated with drought years in India (e.g., 2004, 2014, and 2023). A "Super" El Niño implies temperature anomalies exceeding 2°C, which can lead to severe rainfall deficits across the grain-belt.

The War Multiplier: Fertilizer & Kharif Sowing

The IMD's climate warning coincides with a geopolitical crisis in West Asia that directly threatens the Kharif (summer) crop season.

Input Crisis: India imports nearly 40% of its fertilizers/raw materials from West Asia. The closure of the **Strait of Hormuz** due to the Iran-Israel-U.S. war has spiked prices of Urea and Ammonia.

Double Jeopardy: If the monsoon is weak (due to El Niño) and fertilizer is scarce/expensive (due to war), farmers face a "scissors effect"—rising costs of production meeting falling crop yields. This could trigger significant food inflation in the latter half of 2026.

Conclusion

The 2026 seasonal outlook serves as a critical warning for policymakers. The "textbook" relationship between land heating and rainfall suggests that the current cool spell in the North might be a precursor to a sluggish monsoon. When viewed alongside the "Super El Niño" alert and the fertilizer supply shock from the West Asian war, the situation demands an immediate shift toward Drought Management and Strategic Fertilizer Reserving. For India, 2026 will be a test of "Climate-War Resilience," requiring a synergy between meteorological foresight and diplomatic maneuvering to safeguard the agrarian economy.

UPSC Prelims Exam Practice Question

Ques: Which of the following best explains the mechanism of the Indian Monsoon?

(a) Rotation of the Earth

(b) Pressure gradient between land and ocean

(c) Ocean salinity differences

(d) Polar jet stream shifts only

Ans: (b)

UPSC Mains Exam Practice Question

Ques: "The Indian Monsoon is a product of land-ocean thermal contrast." Examine how a cooler-than-normal summer in North India can affect monsoon dynamics. **(150 Words)**

Page 06 : GS III : Science & Technology / Prelims Exam

The inauguration of the Kaynes Semiconductor Plant in Sanand marks a pivotal shift in India's industrial strategy—moving from a consumer of electronics to a critical node in the global high-tech supply chain. By framing Sanand as a "bridge" to Silicon Valley, Prime Minister Modi has signaled that India is no longer just seeking foreign investment, but is actively integrating into the Pax Silica—the emerging global order defined by semiconductor sovereignty.

Sanand 'bridge' to Silicon Valley: PM on rise in semiconductor ecosystem

Abhinay Deshpande
AHMEDABAD

Prime Minister Narendra Modi on Tuesday positioned Gujarat's Sanand as an emerging link in the global semiconductor network as he inaugurated a semiconductor assembly and test facility of Kaynes Semicon in Sanand, declaring that a "bridge" now connects the industrial town with Silicon Valley.

Addressing the gathering, the Prime Minister described the current period as the "decade of India" and underscored the rapid expansion of the country's electronics sector. He projected that India's semiconductor market could exceed $100 billion by the end of the decade.

The plant, built at an estimated cost of ₹3,300 crore, will serve as a significant milestone under India's semiconductor mission.

Switching on: Prime Minister Narendra Modi at the inauguration of the Kaynes Semiconductor Plant in Ahmedabad on Tuesday. ANI

Global market

Stating that India is emerging as a reliable semiconductor supplier in the global market, Mr. Modi added that chips manufactured in Sanand will reach the United States and illuminate the world. "India's current global semiconductor market stands at ₹4.5 lakh crore, with a target of reaching ₹9 lakh crore by 2030," he said.

"As a result, the Semiconductor Mission was launched in India in 2021. This is not merely an industrial policy, but a declaration of India's confidence on the global stage. He added that today's New India is not just witnessing change but is moving forward to lead it," he said.

India's position

Referring to India's recent participation in the Pax Silica initiative, a U.S.-led coalition focused on securing supply chains for semiconductors, artificial intelligence and rare earth elements, Mr. Modi said such collaborations will enhance resilience in critical technology sectors.

'Techade'

Describing the current period as India's 'Techade', Mr. Modi noted that India is among the leading adopters of artificial intelligence and pointed to the success of Digital India and fintech as evidence of growing public trust in technology.

Key Dimensions of the News

A. The Shift to OSAT (Outsourced Semiconductor Assembly and Test)

The Kaynes plant is an OSAT facility. In the semiconductor lifecycle, this is the crucial stage where silicon wafers are assembled into finished chips and tested for quality.

Strategic Importance: While full-scale "fab" (fabrication) manufacturing takes longer to establish, OSAT plants allow India to enter the value chain quickly, creating a skilled workforce and local ecosystem.

Economic Goal: The target of a $100 billion (₹9 lakh crore) market by 2030 relies on India becoming a global "Reliable Supplier," providing an alternative to the China-dominated supply chain.

B. Geopolitical Alignment: Pax Silica

The mention of Pax Silica is a significant geopolitical development. It refers to a U.S.-led initiative (similar to the CHIPS Act ecosystem) designed to secure supply chains for:

Semiconductors: Powering everything from smartphones to missiles.

Artificial Intelligence: Ensuring democratic nations lead in AI computing power.

Rare Earth Elements: Breaking the monopoly on minerals essential for green tech.

The "Reliability" Factor: In the wake of the 2026 West Asian conflict (Iran-Israel-U.S.), global tech giants are looking for "China+1" and "Middle East+1" strategies. India is positioning itself as that stable, democratic alternative.

C. The "Sanand-Silicon Valley" Synergy

Sanand, once known primarily as an automotive hub (Tata Nano, etc.), is being repurposed into a high-tech "plug-and-play" zone.

Infrastructure: Proximity to ports in Gujarat and the Delhi-Mumbai Industrial Corridor (DMIC) makes it ideal for the "just-in-time" logistics required for chip exports to the U.S. and Europe.

Significance for India

Pillar	Impact/Significance
Economic	Reduces the massive electronics import bill (currently second only to oil).

Pillar	Impact/Significance
Strategic	Critical for "Atmanirbhar Bharat" in defense; chips are essential for modern electronic warfare and drones.
Employment	The "Techade" vision focuses on high-value engineering jobs rather than just low-skill assembly.
Diplomatic	Strengthens the iCET (initiative on Critical and Emerging Technology) with the United States.

Challenges Ahead

Despite the optimism, India faces significant hurdles:

Resource Intensity: Semiconductor plants require uninterrupted ultra-pure water and 24/7 high-quality power, which remains a challenge in many parts of India.

Global Competition: India is competing with massive subsidies from the U.S. (CHIPS Act), the EU, and Vietnam to attract the same global players (Intel, TSMC, Samsung).

Conclusion

The Sanand facility is more than just a factory; it is a manifestation of India's "Strategic Autonomy 2.0." By securing a seat at the "Semiconductor Table," India is ensuring that its future digital economy—from UPI to AI-driven governance—is not vulnerable to global supply shocks. For the UPSC aspirant, this represents the convergence of Foreign Policy (Pax Silica), Industrial Policy (ISM), and Internal Security (Supply Chain Resilience). As the Prime Minister noted, if the 20th century was about oil, the 21st is about "Silicon," and India is finally building its own bridge to that future.

UPSC Prelims Exam Practice Question

Ques: The term OSAT (Outsourced Semiconductor Assembly and Test) refers to:

(a) Designing semiconductor chips

(b) Manufacturing silicon wafers
(c) Assembling and testing semiconductor chips
(d) Extracting rare earth elements
Ans: c)

UPSC Mains Exam Practice Question

Ques: "Semiconductors are the new oil of the 21st century." Examine India's strategy to become a key player in the global semiconductor value chain. **(150 Words)**

Page 07 : GS III : Science & Technology / Prelims Exam

The Earth's orbital environment is transitioning from a "vast frontier" to a "congested neighborhood." While technological leaps—led by reusable boosters and mega-constellations like SpaceX's Starlink—have democratized space access, the legal and ethical frameworks governing them remain stuck in the Cold War era. This "governance lag" has created a high-risk environment where commercial exploitation outpaces environmental stewardship.

Earth's orbits are filling up because governance hasn't kept pace

There is no regular way to check whether satellite operators follow through on promises to make satellites safe when they stop working, to move them out of the way or to bring them down once their mission ends; thus, regulators often go by what companies say they will do before launch rather than on what regulators can confirm

Shrawani Shagun
Abhiram Nair

Throughout human history, the sky symbolised freedom – vast, open, untouched. Today, that no longer holds. The earth's orbital environment has become crowded, fragile, and vulnerable, threatened by what is today evidently a failure of governance rather than just of engineering.

The language of space sustainability has grown familiar in international forums and policy documents. Yet familiarity has bred complacency. As launches become more frequent and the number of private actors multiplies, the gap between what is promised and what is implemented has continued to widen. The result is an orbital environment that is actively used, commercially exploited, and strategically warranted but ethically under-governed.

Orbital harm is difficult to govern because much of the debris capable of causing damage is impossible to track consistently. Authorities are also able to say which fragment came from which object only after it has caused some damage, and even then with limited certainty.

Reducing risk depends on having accurate information about when objects in orbit might come close to one another and exactly where they are.

But access to this information is uneven across satellite operators and countries, and it may be withheld for commercial reasons or kept secret for security reasons.

There's also no regular way to check whether operators actually follow through on promises to make satellites safe when they stop working, to move them out of the way or to bring them down once their mission ends, especially for small satellites or missions that last only a short time.

As a result, regulators mostly go by what companies say they will do before launch rather than on what regulators can confirm once the satellite is in orbit, which ultimately leaves responsibility unclear.

Responsibility and prevention

Even debris smaller than a coin, travelling at orbital velocities, carries enough energy to disable or destroy active satellites. Each collision generates thousands of new fragments, multiplying risk. International law obligates states to take reasonable measures to prevent foreseeable harm arising from activities under their jurisdiction. In the context of orbital debris, this means states need to plan for collisions, fragmentation, and long-term congestion – but do they? Indeed, choosing not to mitigate risk is itself a decision because it expects others to deal with dangerous situations.

Orbital governance also remains anchored in outdated assumptions. The existing treaties were written for an era when space activity was limited, controlled by states, and innovation was slow. Importantly, they do not address cumulative harm and stewardship. Article VI of the Outer Space Treaty makes states internationally responsible for national activities in outer space, including those carried out by private actors. Article VII establishes liability for damage caused by space objects. Yet these provisions were not designed to prevent cumulative harm and are also poorly suited to preventing cumulative harm before it becomes irreversible.

At present, there is no international duty-of-care standard for the earth's orbits and no ethical threshold for 'acceptable' congestion.

National licensing regimes are one of a few mechanisms that can enforce orbital responsibility before damage occurs. Increasingly of late, before they approve a rocket launch or a mission, regulators need to be told the orbital lifetime, the ways in which the payload can be disposed of, whether it has provisions to avoid collisions, and whether it can be passivated (i.e. deprived of the ability to move around). However, regulators in different jurisdictions ask for different levels of details, so operators register in permissive regulatory environments.

To avoid this, licensing conditions need to be standardised, alongside mandating launch operators to use measurable debris-mitigation thresholds, compulsorily share data to improve space situational awareness, and use verifiable end-of-life disposal strategies.

By dramatically cutting launch costs, reusable boosters allowed SpaceX to deploy the large Starlink satellite constellation at an economically viable scale. SPACEX

Orbital harm is difficult to govern because much of the debris capable of causing damage is impossible to track consistently. Authorities are also able to say which fragment came from which object only after it has caused some damage

The ethical vacuum is becoming more pronounced as new actors enter space. Nations entering spaceflight for the first time and private enterprises are central to the future of orbital activity – but will these actors inherit the permissive norms that produced today's congestion or will they help redefine responsibility for the decades ahead?

Principles embedded in international environmental law, including precaution, proportionality, and intergenerational equity, offer a useful guide. These principles recognise that uncertainty does not excuse inaction and that the way we use (non-rivalrous) resources today should not foreclose future generations' access to the same resources.

India's opportunity

The present moment is particularly significant for India. Its space programme has for a long time operated with tight constraints while delivering global services. As commercial participation expands and launch capabilities grow, India can either remain a silent participant or help shape their ethical norms. Specifically, as India develops its national space legislation and licensing regime, it has a chance to embed orbital responsibility as a legal requirement.

Ethical governance means recognising that shared environments demand shared restraint and that access to orbit carries obligations beyond national interest or commerce. Setting up such a governing system in turn requires us to answer some tough questions first: When does congestion become negligence? Who bears responsibility for cumulative risk? What obligations do present-day operators owe to future spacefarers?

Voluntary guidelines and rhetorical commitments no longer work; instead, governments and private sector enterprises must express the best principles of environmental governance in enforceable terms in space policy. Existing guidelines to mitigate debris in orbit, while being technically sound, rely largely on voluntary compliance and lack uniform monitoring or sanctions for non-compliance. This has resulted in an uneven regulatory landscape in which the responsible operators absorb higher costs.

Space should be sustainable, which means we should be willing to build the ethical governance required to make it so. In space as on the earth, governance that waits for damage before assigning responsibility will arrive too late.

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THE GIST

- The earth's orbital environment has become crowded, fragile, and vulnerable, threatened by what is today evidently a failure of governance rather than just of engineering
- Reducing risk depends on having accurate information about when objects in orbit might come close to one another and exactly where they are
- Even debris smaller than a coin, travelling at orbital velocities, carries enough energy to disable or destroy active satellites
- The existing treaties were written for an era when space activity was limited, controlled by states, and innovation was slow

The Core Challenge: Governance vs. Engineering

A. The Monitoring Gap

Regulators currently face a "Verification Paradox." They approve missions based on pre-launch promises (declarations of intent) because there is no international mechanism to confirm if a satellite is actually moved or "de-orbited" once its mission ends.

The Result: Small satellites and short-term missions often become "ghost debris" because the cost of compliance is higher than the penalty for negligence.

B. The Kessler Syndrome and Cumulative Harm

The article highlights that even a coin-sized fragment can destroy a satellite due to high orbital velocities. This leads to the **Kessler Syndrome**—a theoretical scenario where the density of objects in Low Earth Orbit (LEO) is high enough that collisions create a self-sustaining cascade of debris.

Legal Failure: Existing treaties (like the 1967 Outer Space Treaty) focus on liability after damage rather than prevention of cumulative risk.

C. Regulatory Arbitrage

Because national licensing regimes vary, space operators often engage in "forum shopping"—registering their launches in "permissive jurisdictions" with lax debris-mitigation rules. This creates a "race to the bottom" in orbital safety.

Key Legal & Ethical Principles for Space

To address this vacuum, the analysis suggests borrowing from International Environmental Law:

Precautionary Principle: Scientific uncertainty (difficulty in tracking small debris) should not be an excuse for delaying protective measures.

Intergenerational Equity: Current spacefarers must not "use up" the orbits so much that future generations cannot access space safely.

Polluter Pays Principle: Moving from voluntary guidelines to enforceable sanctions for operators who leave "dead" hardware in orbit.

India's Strategic Opportunity

As India expands its commercial space sector via NewSpace India Limited (NSIL) and private startups, it stands at a crossroads:

The Vision: India can lead the Global South in advocating for a "Space Duty-of-Care" standard.

National Legislation: India is currently drafting its comprehensive Space Act. By embedding mandatory "End-of-Life" (EoL) disposal strategies into this law, India can set a global benchmark for responsible spacefaring.

ISRO's Precedent: ISRO has already been proactive (e.g., the System for Safe and Sustainable Space Operations Management - IS4OM), but the article argues this needs to be codified into hard law.

Comparative Analysis: Current vs. Proposed Governance

Feature	Current Framework (Outdated)	Proposed Ethical Governance
Compliance	Voluntary / Self-reported	Verifiable / Standardized
Focus	Post-accident Liability	Pre-launch & Active Monitoring
Data Sharing	Restricted (Security/Commercial)	Compulsory Space Situational Awareness (SSA)
Resource View	Rivalrous (First-come-first-serve)	Non-rivalrous (Shared Stewardship)

Conclusion

Space sustainability is no longer a luxury but a functional necessity. The "Ethical Vacuum" mentioned in the report suggests that if we treat space as a landfill, it will eventually become a graveyard for global communication, navigation, and climate monitoring systems. For India, the opportunity lies in transitioning from a participant to a Norm-Setter, ensuring that "Pax Silica" or "Techades" are built on a foundation of sustainable orbits. Governance must move from "waiting for damage" to "preventing the cascade."

UPSC Prelims Exam Practice Question

Ques: Consider the following statements regarding the Outer Space Treaty:

1. It prohibits placement of nuclear weapons in space.

2. It provides a detailed framework for space debris mitigation.

3. It establishes that outer space is the province of all mankind.

Which of the statements given above is/are correct?

(a) 1 and 3 only

(b) 2 only
(c) 1, 2 and 3
(d) 3 only
Ans: a)

UPSC Mains Exam Practice Question

Ques: Explain the concept of the Kessler Syndrome. What are its implications for global communication and security? **(250 Words)**

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In early 2026, India finds itself at a "macroeconomic contradiction." While headline GDP growth remains robust at over 8%, the escalating conflict in West Asia has exposed deep-seated structural vulnerabilities. With the Indian crude basket hitting $156.29/barrel and the Rupee sliding to ₹95/$, the "fiscal arithmetic" of the country is being reshaped. This crisis marks a transition from a period of stable growth to one of "active macroeconomic stress," testing the limits of India's capital-expenditure-led recovery.

On global tensions and India's economy

In an economy that imports more than four-fifths of its crude oil, external shocks transmitted through energy prices, shipping route, and volatile commodity markets can significantly reshape fiscal arithmetic. In this context, India must rebalance toward income-led demand, more resilient revenue bases and greater energy diversification

ECONOMIC NOTES

Deepanshu Mohan

Rising geopolitical instability in West Asia is forcing a reassessment of how India's macroeconomic strength is measured.

As of March 2026, this instability has translated into active macroeconomic stress. The rupee has depreciated to a record low of ₹95 per dollar, the Indian basket of crude oil hit $156.29 per barrel, and the Reserve Bank of India has deployed billions of dollars of foreign exchange reserves to contain volatility. In such conditions, strong quarterly GDP prints capture domestic activity but often overlook vulnerabilities linked to energy imports, shipping routes and fiscal buffers.

Against this backdrop, India enters the post-Budget season with a striking macroeconomic contradiction. Headline indicators remain robust: the State Bank of India expects Q3 FY26 GDP growth of about 8.1 percent, public capital expenditure is near 4 percent of GDP, and fiscal consolidation toward a 4.3 percent deficit by FY27 remains intact. At the same time, external buffers are weakening. Foreign exchange reserves have declined from recent highs to about $709.76 billion, while foreign portfolio outflows of over $8 billion following the onset of the conflict have intensified currency pressures.

Yet income dynamics are weaker. Real wages remain subdued, household liabilities have risen to roughly 41 percent of GDP, and private investment continues to lag the state's capex-led expansion.

This divergence reflects a deeper shift in India's fiscal architecture: revenue buoyancy is increasingly driven by transaction-linked taxation while expenditure tilts toward capital formation. In a stable global environment this model can sustain growth, but when energy markets become volatile, its durability depends on whether fiscal revenues, consumption and investment can withstand external commodity shocks.

Shifts in revenue structure

India's revenue structure has been shifting in ways that matter more in a volatile global environment. Revenue receipts have risen from 8.5 percent of GDP in FY16-20 to about 9.1 percent in FY22-FY25 (PA), but the increase reflects recomposition rather than a broadening of income taxation. The Union Budget 2026-27 estimates gross tax revenue at ₹44.04 lakh crore, yet much of the buoyancy now comes from transaction-linked channels. GST collections reached ₹22.8 lakh crore in FY25, while levies on financial and cross-border transactions have also expanded.

Direct taxes typically expand when more workers move into stable paid employment. As a result, revenue growth increasingly depends on the volume of economic transactions rather than income deepening.

External shocks particularly energy price spikes that raise transport costs and compress household spending can quickly slow transactions. In such conditions, a fiscal model reliant on activity-linked taxation becomes more sensitive to geopolitical disruptions that ripple through consumption, trade and financial markets.

This vulnerability has been evident during past shocks. During the pandemic, widening gaps between projected and actual GST revenues forced the Union government to borrow over ₹2.69 lakh crore between 2020 and 2022 to compensate states for revenue shortfalls.

The effects of oil price surge

India's fiscal system remains structurally exposed to oil price volatility. The country imports around 85-87 percent of its crude oil, making it directly vulnerable to external energy shocks.

Empirical estimates suggest that a $10 per barrel rise in crude prices can increase Consumer Price Index inflation by roughly 0.2 percentage points, widen the current account deficit by about $9-10 billion (around 0.4 percent of GDP) and reduce GDP growth by nearly 0.5 percentage points under partial pass-through conditions. Oil shocks also propagate through the fiscal system: higher energy costs raise fertiliser and LPG subsidy requirements, increase transport and logistics costs, and elevate inflation-linked expenditure.

Recent policy responses illustrate this transmission. Following the Russian invasion of Ukraine, the Indian crude basket surged from roughly $59 per barrel in 2019 to over $120 in mid-2022.

To contain inflation, the government reduced central excise duties on petrol and diesel by a cumulative ₹13 and ₹16 per litre between November 2021 and May 2022, resulting in an estimated ₹2.2 lakh crore revenue loss. At the same time, energy-linked subsidies expanded, with fertiliser support rising sharply and total energy subsidies touching nearly ₹3.2 lakh crore.

Amid the ongoing conflict in West Asia, estimates by ICRA suggest that if oil prices average around $100 per barrel, India's current account deficit could widen from about 0.7-0.8 percent to nearly 1 percent of GDP, while government expenditure could rise by as much as ₹3.6 trillion due to higher subsidy and compensation requirements. This underscores how energy shocks translate simultaneously into external imbalances and fiscal stress.

When oil prices spike, governments typically absorb part of the shock through tax reductions and subsidy expansion, compressing fiscal space. In a system increasingly reliant on transaction-linked taxes, such shocks can simultaneously weaken consumption, reduce GST buoyancy and expand expenditure pressures, creating a direct fiscal squeeze.

Impact on households

Household balance sheets reveal a key channel through which energy volatility transmits into the domestic economy.

Private consumption accounts for roughly 61.4 percent of India's GDP, yet household liabilities have risen sharply from about 36-37 percent of GDP in 2022 to over 41 percent by 2025, increasing sensitivity to inflationary shocks and suggesting that consumption is being sustained less by income growth and more through credit expansion.

Net financial savings have also become more volatile, falling to around 3-4 percent of GDP in recent quarters before recovering to about 7.6 percent.

The exposure is being amplified by the current shock, as disruptions to LPG supply chains – over 60 percent of which depend on imports – have translated into longer refill cycles and local shortages, raising household energy costs even as leverage remains elevated.

At the same time, India's expenditure strategy has pivoted toward infrastructure-led growth. The Union Budget 2026-27 places effective capital expenditure at ₹17.15 lakh crore.

While such front-loaded investment strengthens long-term productive capacity, it compresses fiscal space for welfare stabilisers. Allocations for the Mahatma Gandhi National Rural Employment Guarantee Act fell to ₹60,000 crore in 2023-24, 33 percent below the previous year's revised estimate; by December 2022, States had already spent ₹17 percent of available funds, with ₹8,449 crore in pending liabilities.

In a low-wage environment, imported energy inflation compresses real incomes while debt servicing obligations remain fixed. Rising household leverage therefore becomes a macroeconomic vulnerability, especially when fiscal policy prioritises capital formation over income support.

Implications for industrial sector

India's industrial upswing is increasingly concentrated in capital-intensive sectors aligned with public investment. Industrial output rose 7.8 percent in December 2025, with manufacturing expanding 8.1 percent year-on-year and 4.8 percent over April-December. High- and medium-technology industries now account for about 46 percent of manufacturing value added, according to the Economic Survey 2025-26.

By contrast, labour-intensive industries remain weak.

Private investment remains cautious despite rising project announcements. CMIE (Centre for Monitoring Indian Economy) data shows private firms account for nearly 80 percent of new project announcements, yet only about 9 percent reached completion in 2022-23, suggesting a recovery that expands production capacity more than wage-linked income.

In a volatile global environment, this financial strength has translated into greater risk selectivity rather than broader credit expansion.

The recent LPG crisis induced shortages of commercial cylinders have forced the closure of restaurants, cloud kitchens and small food businesses, with gig worker unions reporting a 30-60 percent decline in food delivery orders. Such shocks disproportionately affect labour-intensive and informal sectors, where incomes are directly tied to daily demand and lack institutional protection, even as capital-intensive sectors remain relatively insulated within the financial system.

As external pressures intensify, they raise a broader question of fiscal optionality: the state's ability to absorb shocks without abandoning consolidation targets. With fiscal space tied to capital expenditure and revenues dependent on economic transactions, geopolitical disruptions can quickly narrow the room for counter-cyclical intervention. In such a context, India must rebalance toward income-led demand, more resilient revenue bases and greater energy diversification, or risk turning external shocks into a recurring source of fiscal stress.

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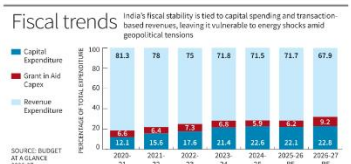
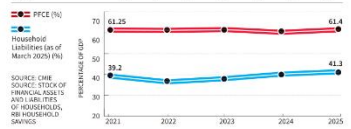
Fiscal trends India's fiscal stability is tied to capital spending and transaction-based revenues, leaving it vulnerable to energy shocks amid geopolitical tensions



SOURCE: BUDGET AT A GLANCE 2026-27



SOURCE: CMIE SOURCE: STOCK OF FINANCIAL ASSETS AND LIABILITIES OF HOUSEHOLDS, RBI HOUSEHOLD SAVINGS

THE GIST

- India's fiscal system remains structurally exposed to oil price volatility. External shocks, particularly energy price spikes raise transport costs and compress household spending.
- Private consumption accounts for roughly 61.4 percent of India's GDP, yet household liabilities have risen sharply, increasing sensitivity to inflationary shocks. At the same time, India's expenditure strategy has pivoted toward infrastructure-led growth.
- In a low-wage environment, imported energy inflation compresses real incomes. Rising household leverage therefore becomes a macroeconomic vulnerability, especially when fiscal policy prioritises capital formation.

The "Triple Shock" Transmission

A. The Energy-Inflation-Growth Link

India's dependency on imported crude (85–87%) acts as a direct conduit for global instability into the domestic economy.

The Math of Oil: Every $10 rise in crude prices typically widens the Current Account Deficit (CAD) by $10 billion and shaves 0.5 percentage points off GDP growth.

Fiscal Squeeze: To prevent runaway inflation, the government often cuts excise duties (as seen in 2021-22), leading to massive revenue losses (potentially ₹2.2 lakh crore) while simultaneously being forced to increase subsidies for fertilizers and LPG.

B. The "Transaction-Tax" Vulnerability

A key insight from Professor Deepanshu Mohan is the shift in India's revenue structure.

Buoyancy vs. Depth: Government revenue is increasingly driven by GST and transaction-linked taxes (9.1% of GDP) rather than deep income-based taxation.

The Risk: Transaction taxes are highly sensitive to consumption. When high energy prices force households to cut spending, GST collections can plummet, creating a "fiscal trap" where revenues fall just as expenditure (subsidies) needs to rise.

C. Household Fragility

Unlike previous cycles, Indian households in 2026 are more leveraged.

Rising Liabilities: Household debt has surged to 41% of GDP, while net savings remain volatile.

Consumption Shift: Consumption is increasingly fueled by credit expansion rather than real wage growth. Subdued real wages mean that any spike in LPG or petrol costs immediately compresses the "discretionary spending" that drives the economy.

The Industrial Divergence: K-Shaped Recovery

The analysis reveals a stark contrast in the industrial sector:

The Resilient: Capital-intensive, high-tech manufacturing (46% of manufacturing value) backed by public Capex (₹17.15 lakh crore).

The Vulnerable: Labour-intensive and informal sectors (restaurants, cloud kitchens, gig workers). The recent **LPG crisis** has reportedly caused a 50-60% decline in food delivery orders, highlighting how energy shocks disproportionately hit the most vulnerable workers.

Key Macroeconomic Indicators (March 2026)

Indicator	Current Status (March 2026)	Significance
Crude Oil (Indian Basket)	**$156.29 / barrel**	Critical stress on CAD and Inflation.
Exchange Rate	**₹95 / USD**	Record low; increases cost of all imports.
Forex Reserves	**$709.76 Billion**	Declining due to RBI intervention.
Fiscal Deficit Target	**4.3% by FY27**	Under threat due to subsidy expansion.
Household Debt	**41% of GDP**	High sensitivity to inflationary shocks.

Implications for Policy

- **Energy Diversification:** The crisis underscores the need to move beyond the "Strait of Hormuz" dependency. Investing in the Green Hydrogen Mission and Strategic Petroleum Reserves (SPR) is no longer optional but a survival necessity.
- **Direct Tax Reforms:** To build a "resilient revenue base," India needs to move toward broadening the direct tax net (income-led) rather than relying solely on indirect transaction taxes.
- **Welfare Stabilizers:** The reduction in MGNREGA funding (down 33%) during a period of low wages and high inflation could lead to rural distress, suggesting a need for a more balanced "Capex vs. Opex" (Capital vs. Welfare) expenditure strategy.

Conclusion

The 2026 geopolitical crisis has acted as a "stress test" for the Indian economy. It has shown that while infrastructure-led growth builds long-term capacity, it does not provide an immediate buffer against commodity shocks. For India to sustain its growth story, it must re-pivot toward income-led demand—ensuring that the "Techade" benefits the wage-earner as much as the capital-owner. Without a rebalancing of the fiscal architecture, India remains a "hostage to the headline" oil price, where external shocks can reset the national fiscal arithmetic overnight.

UPSC Prelims Exam Practice Question

Ques: Which of the following best explains the term "K-shaped recovery"?

(a) Equal recovery across all sectors

(b) Recovery led only by agriculture

(c) Divergent recovery where some sectors grow while others decline

(d) Recovery after a recession followed by stagnation

Ans: c)

UPSC Mains Exam Practice Question

Ques: India's fiscal architecture is increasingly vulnerable due to its reliance on indirect taxes. Critically analyze. **(250 Words)**

Page : 08 : Editorial Analysis

Counting people is not counting disaster risk

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Structural problems in the 16th Finance Commission's disaster funding formula leave India's most hazard-prone States underserved

Odisha is, by any measure, one of India's most disaster-prone States. Its 574.7-kilometre coastline has absorbed some of the most powerful cyclones to make landfall on the subcontinent. Over two decades, through investment in early warning systems, cyclone shelters, and mass evacuations, the State has reduced cyclone mortality to near zero. It is, therefore, not merely paradoxical but troubling that the 16th Finance Commission has awarded Odisha the single largest reduction in disaster funding share among all 28 States, a decline of 1.57 percentage points relative to the 15th Finance Commission's allocation.

How does a State with the highest hazard score in the country, and the deepest investments in preparedness, end up losing the most? The answer lies in a structural problem in the Finance Commission's allocation formula.

The revised formula and its rationale

The 16th Finance Commission has allocated ₹2,04,401 crore to State Disaster Response Funds (SDRF), a 59.5% increase over its predecessor. The Commission adopted a multiplicative Disaster Risk Index (DRI = Hazard X Exposure X Vulnerability), drawing on the theoretical framework. This is a departure from the additive approach of the 15th Finance Commission, which treated hazard and vulnerability as substitutes rather than complements. Risk arises only when hazard intersects with exposed and vulnerable populations. A powerful cyclone striking an uninhabited coastline is a natural event, not a disaster. The logic is correct. The operationalisation is not.

The first problem lies in the measurement of 'Exposure'. The Commission uses the total population of each State, scaled linearly between 1 and 25, as its exposure metric. Uttar Pradesh receives 25 and Sikkim receives 1. This is administratively convenient but scientifically indefensible. Exposure, per the United Nations Intergovernmental Panel on Climate Change (IPCC)'s Sixth Assessment Report, is the presence of people in places that could be adversely affected by hazards, not simply the number of people within a political boundary. A State with 10 crore people on a hazard-safe inland plateau has lower exposure than a State with three crore people settled entirely along a cyclone-prone coastline. Total population and hazard-zone population are not the same variable.

The practical consequences are stark. Odisha's hazard score of 12 is the highest in the country. But because its population score is only 5, its computed DRI of 79.8 is overshadowed by Bihar's 224.2 and Uttar Pradesh's 413.2, two States with lower hazard scores. The multiplicative formula, in practice, rewards demographic size. A State can face the most intense hazard in India and still lose funding because it is not populous. This is precisely the outcome that a risk-based allocation framework was designed to prevent.

The second problem compounds the first. Vulnerability is measured through each State's average per capita Net State Domestic Product (NSDP), inverted so that poorer States score higher. The intuition is clear – poorer States have fewer fiscal resources to absorb disaster shocks. But the NSDP measures fiscal capacity, not disaster vulnerability. Vulnerability is multidimensional, encompassing housing quality, health infrastructure in hazard zones, early warning reach, and the share of population in structurally unsafe dwellings. Average per capita income conceals enormous intra-state inequality.

In 2018, Kerala suffered its worst flooding in a century, causing estimated damages of ₹31,000 crore. Yet, the formula assigns Kerala a vulnerability score of just 1.073, near the minimum, because its per capita income is relatively high. Combined with a population score of 4, Kerala's DRI, of 34.5, is lower than many States with negligible disaster history. Jharkhand, with the second-highest vulnerability score reflecting genuine poverty and tribal fragility, still loses 0.78 percentage points of funding share because its population score cannot compensate in the multiplicative framework. Twenty States in total have lost relative share. The common thread is not that they are safer; it is that they are smaller, wealthier on average, or both.

What needs to change

Exposure should be measured as the number of people living within defined hazard zones, flood plains, cyclone-prone coastal belts, earthquake-susceptible zones, using the Building Materials and Technology Promotion Council (BMTPC) Vulnerability Atlas cross-referenced with Census enumeration block data. Vulnerability should be reconstituted as a composite index incorporating the share of kutcha housing, agricultural labour dependence, health infrastructure density in high-hazard districts, crop insurance penetration, and early warning effectiveness. The National Family Health Survey (NFHS)-5, the Pradhan Mantri Fasal Bima Yojana (PMFBY) database, National Health Mission (NHM) facility surveys, and India Meteorological Department (IMD) monitoring records collectively provide that information. The Finance Commission should mandate the National Disaster Management Authority to publish an annual State Disaster Vulnerability Index as the authoritative input for each subsequent award period, institutionalising the methodology and ending contested metrics at every Commission.

India cannot afford to get disaster finance wrong. Climate projections indicate intensifying cyclone frequencies along both coastlines, expanding drought belts across peninsular and central India, and escalating extreme rainfall in already-stretched States. The States most likely to face the sharpest increase in disaster frequency – Odisha, Andhra Pradesh, Kerala, Assam – are precisely those the current formula underserves. A formula that measures total population rather than the exposed population is not a risk index. It is a headcount.

GS Paper III: Disaster Management

UPSC Mains Exam Practice Question: Discuss the concept of "paradox of preparedness" in disaster management. Illustrate with examples. **(150 Words)**

Context : The 16th Finance Commission has introduced a new multiplicative formula to determine the State Disaster Response Fund (SDRF) allocations. While the intent was to transition to a scientifically rigorous Disaster Risk Index (DRI), the operationalization of this formula has led to a "paradox of preparedness." States like Odisha, which lead the country in disaster hazard and mitigation, have seen the sharpest decline in their funding share. The core of the critique lies in the Commission's decision to equate "total population" with "disaster exposure."

The New Formula: Logic vs. Reality

The Commission defines Risk using the standard IPCC-aligned equation:

Disaster Risk Index (DRI) = Hazard × Exposure × Vulnerability

A. The Exposure Fallacy (Population vs. Location)

The Flaw: The FC-XVI uses a State's total population as a proxy for exposure.

The Reality: Exposure is the presence of people in hazard-prone areas (coasts, floodplains, seismic zones).

The Impact: A high-population inland State (e.g., Uttar Pradesh) receives a higher exposure score than a coastal State (e.g., Odisha or Kerala), even if the latter has more people living in high-risk "Red Zones." This effectively turns disaster funding into a "demographic dividend" for larger States.

B. The Vulnerability Gap (Income vs. Fragility)

The Flaw: Vulnerability is measured by inverting the Per Capita Net State Domestic Product (NSDP).

The Reality: While NSDP measures fiscal capacity, it ignores "Physical Vulnerability" (type of housing, distance to health centers, quality of embankments).

The Impact: Wealthier States like Kerala are penalized with low vulnerability scores. However, a high per capita income does not protect a house from a massive landslide or a 2018-style flood; structural fragility (kutcha houses) and geography are better indicators.

Winners and Losers: A Comparative Snapshot

State	Hazard Score	Population (Exposure)	Funding Outcome
Odisha	**12 (Highest)**	5 (Low)	**Lost 1.57 percentage points**
Uttar Pradesh	Lower than Odisha	**25 (Maximum)**	Gained share due to population weight

State	Hazard Score	Population (Exposure)	Funding Outcome
Kerala	High (Floods/Landslides)	4 (Low)	Low DRI due to high per capita income
Bihar	High (Floods)	High	High DRI (224.2) due to population

Proposed Reforms: Moving Toward "Scientific Federalism"

To align funding with actual ground realities, the analysis suggests three critical shifts:

Granular Mapping: Use the BMTPC Vulnerability Atlas to count only the people living in specific hazard zones rather than the entire State population.

Composite Vulnerability Index: Replace per capita income with multi-dimensional data, including:

Share of Kutcha housing (structurally unsafe).

Crop insurance penetration (PMFBY data).

Health infrastructure density in high-hazard districts.

Institutionalization: Empower the National Disaster Management Authority (NDMA) to publish an annual "State Disaster Vulnerability Index" to serve as a dynamic input for future Finance Commissions.

Implications for India

Climate Change & Equity: As climate change intensifies (cyclones in the Arabian Sea, melting Himalayan glaciers), the current formula risks leaving frontline States underfunded just as their risks escalate.

Fiscal Federalism: If disaster funding is perceived as a "headcount reward," it creates friction between the Union and States that have successfully implemented population control but remain geographically vulnerable.

Disaster Resilience: Reducing the share of States like Odisha—which invested heavily in early warnings—could disincentivize other States from spending on long-term "soft" infrastructure like cyclone shelters.

Conclusion

The 16th Finance Commission's multiplicative formula is a theoretical step forward but a practical step backward. By confusing "counting people" with "counting risk," the framework inadvertently rewards size over safety. For India to be truly disaster-resilient, the "S" in SDRF must stand for Scientific as much as it does for State. Governance that ignores the specific geography of risk will, as the author warns, always arrive too late.