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India and New Zealand set trade goal, elevate ties

Press Trust of India
AUCKLAND

Vowing to work towards a peaceful Indo-Pacific, India and New Zealand on Saturday elevated ties to a strategic partnership and decided to ramp up maritime security while setting a target of doubling annual bilateral trade to US\$500 billion by 2030.

"We have decided to elevate our ties to a strategic partnership. We will move forward across every sector with clear goals and concrete outcomes," Prime Minister Narendra Modi said after talks with his New Zealand counterpart Christopher Luxon.

The talks between the two leaders yielded 18 concrete outcomes, including 10 agreements. Key among them were a four-year road map to expand overall relations alongside three crucial pacts aimed at boosting hydrographic data sharing, facilitating mutual naval logistics, and framing enhanced maritime engagement in the Indo-Pacific. Expanding bilateral trade through the early implementation of the free trade deal was also a key focus of the talks, underscored by Wellington's commitment to invest US\$20 billion in India over the next 15 years.

A joint statement noted that Mr. Modi and Mr. Luxon reaffirmed their shared commitment to a free, open, and prosperous Indo-Pacific. They also emphasised the importance of safeguarding sovereignty, territorial integrity and the rules-based international order.

The resolve by the two countries to work jointly



Prime Minister Narendra Modi with his New Zealand counterpart, Christopher Luxon, at an event in Auckland on Saturday. PTI

for a peaceful Indo-Pacific comes amid growing global concerns over China's increasing military muscle-flexing in the region, including apprehensions over its test of a submarine-launched, long-range ballistic missile earlier this week.

Joint action plan

In line with the focus on boosting Indo-Pacific cooperation, the two sides also agreed to establish a maritime security dialogue, besides a joint working group on counter-terrorism.

An India-New Zealand joint action plan on sport was also firmed up. It provides for collaboration in high-performance sports, sports science, sports medicine and athlete development.

Mr. Modi landed in Auckland last night to a warm welcome in the final leg of his three-nation tour — after visiting Indonesia and Australia — that largely focused on ramping up cooperation in the Indo-Pacific.

The visit came following the recent signing of the India-New Zealand Free Trade Agreement.

The two Prime Ministers called for freedom of navi-

gation and overflight, and other lawful uses of the seas, in accordance with international law, particularly the 1982 United Nations Convention on the Law of the Sea, the joint statement noted.

In his remarks at the meeting, Mr. Modi said deeper cooperation between India and New Zealand, both maritime nations, will inject new strength into the Indo-Pacific.

Regarding the West Asia conflict, the two leaders expressed concern over renewed escalation of tensions and called upon all parties to exercise restraint, de-escalate tensions and ensure protection of civilians, the joint statement said.

"They called for full restoration of freedom of navigation and the global flow of commerce through the Strait of Hormuz, while opposing any constraints on shipping," it said.

The two Prime Ministers called for a "zero-tolerance" approach to terrorism, and underlined the need for disrupting terror financing networks and safe havens.

HISTORICAL BOND

» PAGE 4

- **Key Terms and Explanations**

- **Strategic Partnership:** This represents a high-level diplomatic framework where two nations move beyond transactional trade relationships to cooperate on long-term geopolitical, defense, and security objectives.
- **Hydrographic Data Sharing:** The joint measurement and description of the physical features of oceans, seas, and coastal areas. This involves mapping underwater topography, depths, and currents.
- **Mutual Naval Logistics:** A cooperative arrangement that allows the militaries of both nations to use each other's naval bases for refueling, replenishment, repairs, and rest.
- **UNCLOS (United Nations Convention on the Law of the Sea, 1982):** Often called the "Constitution of the Oceans," this international treaty defines the rights and responsibilities of nations regarding their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources.
- **Rules-Based International Order:** A shared commitment among nations to conduct global politics and commerce according to established international laws and treaties, rather than through coercion, unilateral military dominance, or "might is right" dynamics.
- **Strait of Hormuz:** A narrow, critically strategic waterway between the Persian Gulf and the Gulf of Oman. It serves as the world's most important energy choke point, through which a massive volume of global oil and gas commerce flows daily.

- **Main Arguments and Substantive Parts**

- The core thesis of this geopolitical shift revolves around a crucial reality: India and New Zealand are deliberately transforming their traditionally warm but low-intensity relationship into a hard-nosed, comprehensive strategic alignment driven by mutual economic ambitions and deep maritime anxieties in the Indo-Pacific region.
- **The Economic Pillar: Audacious Targets**
 - **Trade Doubling Architecture:** The two nations have established a clear, time-bound mandate to double their annual bilateral trade to ₹35,000 crore by the year 2030. This target acts as a concrete metric to force bureaucratic momentum.
 - **Inward Investment Commitment:** Wellington has committed to investing USD 20 billion into the Indian economy over the next 15 years. This massive capital injection provides New Zealand with a stake in India's growth story while diversifying its own investment portfolio.
 - **Free Trade Momentum:** A major priority is the early implementation of a comprehensive Free Trade Agreement (FTA), designed to lower tariff walls and streamline supply chains between the two economies.
- **The Security Pillar: Maritime Convergence**
 - **Counterbalancing Regional Muscle-Flexing:** Without explicitly naming specific actors, the strategic pivot is explicitly contextualized by rising global anxieties over military assertiveness in the Indo-Pacific, underscored by recent long-range submarine-launched ballistic missile tests.
 - **Institutionalizing Defense Dialogue:** The partnership introduces 18 concrete outcomes, including 10 formal agreements. Key among these is a new Maritime Security Dialogue and a joint working group dedicated entirely to counter-terrorism.
 - **Securing Global Choke Points:** The security umbrella extends beyond regional waters to embrace global commerce security, specifically calling out the restoration of unhindered trade through the Strait of Hormuz and defending absolute freedom of navigation.

- **Historical Evolution of the Issue**
- **Pre-Independence and Early Post-Colonial Era:** The historical ties began under the umbrella of the British Empire. Both nations shared a common administrative language, legal systems, and a deep-seated passion for cricket. However, early diplomatic engagements remained friendly but secondary, as India focused on non-alignment and domestic industrialization, while New Zealand looked to the United Kingdom and its ANZUS alliance.
- **The Cold War Era of Benign Neglect:** For several decades, bilateral engagement remained low. India's inward-looking, socialist economic model offered limited trade opportunities, and New Zealand's foreign policy remained primarily anchored to Western defense blocs and agricultural exports to Europe and North America.
- **The Post-1991 Economic Reawakening:** With India unlocking its economy through liberalization, privatization, and globalization (LPG) reforms and introducing its "Look East Policy," New Zealand recognized India as an emerging Asian giant. High-level trade delegations began to explore options, though engagement remained focused purely on commercial transactions.
- **The 2010s Indo-Pacific Paradigm Shift:** As the geopolitical center of gravity shifted from the Euro-Atlantic to the Indo-Pacific, both countries faced a changing security environment. India's upgraded "Act East Policy" met New Zealand's desire to diversify its economic dependencies away from over-reliance on a single northern Asian market.
- **The 2026 Breakthrough:** The culmination of these structural shifts has resulted in the current reality. The relationship has officially shed its legacy as a single-issue trade engagement, elevating into a comprehensive strategic partnership where maritime defense and capital investment are given equal weight alongside trade volumes.
- **Way Forward**
- **Institutionalizing the Bureaucratic Pipeline**
- The four-year roadmap must not be allowed to stall in administrative delays. India and New Zealand should establish a permanent, bi-annual Joint Monitoring Secretariat led by senior diplomatic officials. This body would hold ministries accountable to the 18 concrete outcomes, ensuring that agreements on hydrographic data sharing and naval logistics translate into regular, real-world naval exercises and operational cooperation.
- **Resolving Structural Bottlenecks in FTA Negotiations**
- To realistically reach the target of ₹35,000 crore by 2030, both nations must address sensitive domestic trade sectors with pragmatism. India has traditional concerns regarding New Zealand's highly competitive dairy and agricultural sectors, while New Zealand maintains strict regulations on labor mobility.

Why did the U.S. indict Lawrence Bishnoi?

Which are the three Punjab-linked transnational organised crime syndicates against which the U.S. Department of Justice announced an indictment? Who is Bishnoi and what has he and his gang been accused of? What did charge sheet filed by the NIA say about him in 2022?

Vishka Singh

The story so far:

In July 8, the U.S. Department of Justice (DoJ) announced an indictment against three Punjab-linked transnational organised crime syndicates operating across India, Canada, the U.S., and Europe. Among the most significant allegations is that Lawrence Bishnoi, 33, a Punjab-born gangster, and his associate, Satinderjeet Singh, alias Golden Bear, ordered the assassination of pro-Khalistan activist Randeep Singh Nijjar in 2022 in Surrey, British Columbia, Canada. While Bishnoi is lodged in a high-security prison in Ahmedabad in Gujarat, Bear is a wanted fugitive in the U.S. Nijjar is designated as a terrorist by India.

The investigation has also led to multiple arrests, major drug seizures, and indictments alleging extortion, racketeering, murders for hire, and drug trafficking. The DoJ said that 37 people have been charged so far. It said that 24 defendants, connected to the three India-based transnational organised crime groups, who have been charged with a litany of criminal acts, have been arrested in the U.S., Canada, and Spain. Law enforcement officials are looking for 10 fugitives – seven in the U.S., two in India, and one in Europe.

Which are the three groups indicted by the DoJ?

The central organisation in the U.S. case is the Lawrence Bishnoi Organised Crime Group (LOBG). Prosecutors describe it as a transnational criminal enterprise headquartered in India but operating extensively in Canada, the U.S., the U.K., Europe, and Australia. According to the indictment, the group was founded and led by Bishnoi and continued to function even while he was incarcerated. Bear allegedly managed North American operations, while Rohit Gochar

The DoJ accused the Bishnoi network of targeted killings, shootings, kidnappings, assaults, and public threats to create a climate of fear among businessmen, celebrities, and members of the Indian diaspora

increase activities in Europe.

The second organisation is led by gangster Jagtar Singh alias Jagga Bhagwanpuria, 38, who is imprisoned at Sikhar jail in Anand, U.S. authorities describe his group as a separate transnational crime syndicate with a significant presence in India, Canada, the U.S., and other countries. According to prosecutors, the network has more than 1,000 members and operates worldwide. It emerged as a rival to the Bishnoi organisation but allegedly developed its own international criminal infrastructure. Bhagwanpuria is a former aide of Bishnoi.

The third major network is associated with Randeep Singh Bhanda, 37, a Canada-based operative accused of running a large cross-border narcotics operation. This group's primary focus is the large-scale movement of drugs between countries, particularly the U.S. and Canada.

What are the charges against the Bishnoi group?

The charges against the Bishnoi gang were filed by the U.S. in a California court in February 2025, records show. The DoJ said that Bishnoi projected an image of himself as a "patriot," "socialist," and a deeply religious individual through social media posts and interviews with news organisations and used this public image to recruit members and associates to his crime syndicate in India, the U.S., and elsewhere.

The DoJ accused the Bishnoi network of targeted killings, shootings, kidnappings, assaults, and public threats to create a climate of fear among businessmen, celebrities, and members of the Indian diaspora. It accused the gang of killing Punjab singer Salim Moosawalia, threatening singer Gippy Grewal, and plotting an attack on actor Salman Khan between 2021 and 2026. These alleged acts all coincided with Bishnoi's incarceration at the high-security prison in Ahmedabad.

According to investigators, the objective was to facilitate evasion and enhance the gang's reputation. The indictment also alleges that the group was involved in transporting cocaine and methamphetamine across North America and smuggling narcotics shipments from rival trafficking organisations.

The indictment said that recruitment coordination for the Bishnoi gang "entirely" happened in India to join the enterprise by promising, among other things, money, notoriety, and protection. It said that upon being recruited into the Bishnoi gang in India, new members received minimal compensation for criminal acts committed on behalf of the enterprise. The Bishnoi gang sent loyal members to countries including the U.S. and Canada as students and work visas obtained using fraudulent information, to assist the

enterprise's criminal operations in those countries, the DoJ said.

What has the NIA said about Bishnoi?

According to his lawyer Rajat Khatri, Bishnoi has been lodged in Sabarmaty jail since 2023 in solitary confinement and is under 24/7 CCTV surveillance. The Ministry of Home Affairs (MHA) has invoked Section 303 of the Bharatiya Nagarik Suraksha Sंहिता, 2023, which prohibits his movement outside the jail. He participates in court hearings via video-conference, and if police from outside the State need to interrogate him, they travel to the prison.

According to a charge sheet filed by the National Investigation Agency (NIA) in 2022 against Bishnoi and others, 84 cases have been registered against him in Delhi, Chandigarh, Rajasthan, and Punjab with the first case dating back to 2013. Mr. Khatri said that Bishnoi had been discharged or acquitted in 40 other cases. The NIA's charge sheet reiterates the allegations made by U.S. authorities that Bishnoi has been running his criminal network from prison. "He is so adept in operating from inside the jail that he has not applied for bail in any case... [But] many years," the NIA said. Mr. Khatri said he did not apply for bail in recent years as there are several cases registered against him and no one will come forward to secure a bail bond for him.

The NIA compared Bishnoi's rise to that of the fugitive underworld don Dawood Ibrahim and accused him of funding the activities of "pro-Khalistan extremists."

How did the Federal Bureau of Investigation unravel the Bishnoi gang?

According to the indictment, Sukhraj Singh Kang, a senior India-based lieutenant in the Lawrence Bishnoi Organised Crime Group, who directed and coordinated acts of violence carried out by members and associates in the U.S., Canada, and elsewhere, provided key evidence.

Where does the Nijjar killing fit into this?

The U.S. indictment alleges that Bishnoi and Bear ordered the assassination of Nijjar in June 2022. Prosecutors claim that Bishnoi supplied information about the target and that associates carried out the killing outside a golf course in Surrey. The allegation places the Bishnoi network at the center of one of the most sensitive diplomatic disputes between India and Canada in recent years. The murder strained diplomatic relations between the two countries, with the government of the then Canadian Prime Minister, Justin Trudeau, alleging the involvement of "agents of the Indian government" and designating Indian diplomats as "persons of interest" in the investigation.

Bill Essayli, First Assistant U.S. attorney, told a press conference that the "Indian authorities have been very cooperative and India is happy with today's operations."

Meanwhile, the Royal Canadian Mounted Police is conducting a parallel investigation into South Asian organised crime, the DoJ said.



His photo of police escorting Lawrence Bishnoi at a court in Delhi, 01/11/2025

- **Key Terms and Explanations**

- **Transnational Organized Crime (TOC):** This refers to self-perpetuating associations of individuals who operate transnationally for the purpose of obtaining power, influence, or monetary gain through illegal means. Unlike localized gangs, TOC networks exploit globalized banking, communications, and transport infrastructure. *Example:* A syndicate structured in India that coordinates narcotics shipments between South America and North America while executing targeted extortions via operatives in Europe.
- **Indictment:** A formal written accusation issued by a grand jury or a legal authority (commonly in jurisdictions like the United States) stating that there is sufficient evidence to bring a person to trial for a felony. It signifies that domestic criminal actions have crossed international thresholds, prompting foreign federal prosecution.
- **Section 303 of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023:** A crucial procedural law in India that empowers the state or Ministry of Home Affairs to restrict the physical movement of high-risk prisoners outside jail premises. It mandates that their participation in court proceedings happen strictly via video conferencing to eliminate transit escapes, rescue attempts, or the physical coordination of crime while on the move.
- **The Narco-Terror Nexus:** The symbiotic relationship between drug trafficking networks and insurgent or terrorist groups. Criminal cartels provide the logistical pipelines, hawala routes, and illicit funding, while extremist entities provide political cover, weaponry, or shared safe havens.
- **Red Corner Notice (RCN):** An international request issued by Interpol to law enforcement agencies worldwide to locate and provisionally arrest a person pending extradition, surrender, or similar legal action. Fugitive syndicate leaders operating across North America often become the subjects of these notices.

- **Main Arguments and Substantive Parts**

- The core structural challenge highlighted by modern syndicate operations rests on a paradox: physical incarceration no longer guarantees the neutralization of a criminal enterprise.

- **The Incarceration-Operational Paradox**

- Top-tier leadership within modern crime syndicates can manage expansive global networks effectively from within maximum-security prisons. As documented in the records of India's National Investigation Agency (NIA), high-security facilities in places like Ahmedabad or Silchar often struggle to completely sever the digital footprints of syndicate heads. The absolute lack of bail applications by these individuals points to a strategic choice: utilizing the prison ecosystem as a secure, state-guarded command center to run extortions and direct overseas hits without facing the immediate physical threats of street-level gang wars.

- **The Evolution of Recruitment and Digital Branding**

- The operational model has shifted away from traditional, localized underworld recruitment. Syndicates now leverage sophisticated social media public relations campaigns. By projecting a carefully curated image of a "patriot," "nationalist," or a defender of specific community values, leaders draw in impoverished, vulnerable minors across states like Punjab and Haryana. These recruits enter the enterprise lured by promises of protection, quick money, and social media notoriety, often receiving minimal compensation for highly dangerous tasks.

- **Visa Fraud and the Transnational Pipeline**

- Once recruited, these foot soldiers are integrated into a sophisticated transnational pipeline. Syndicates systematically exploit legitimate migration pathways—using fraudulent student or work visas—to transport loyal members into Western nations like the United States, Canada, and Spain. Once embedded within the diaspora, these individuals establish localized operational cells capable of executing extortion, narcotics trafficking, and high-profile assassinations.

- **Geopolitical Weaponization and Bilateral Strain**

- The actions of decentralized syndicates have evolved from simple domestic law-and-order issues into significant foreign policy crises. When transnational syndicates carry out targeted assassinations on foreign soil—such as the killing of designated activists or rival figures in Canada—it causes immediate diplomatic friction. As illustrated by the diplomatic fallout between India and Canada, non-state proxy violence can severely damage bilateral relations, even when intelligence agencies like the FBI confirm that central authorities are cooperating fully to dismantle these networks.

- **Historical Evolution of the Issue**
- **Pre-Independence to 1960s (The Era of Localized Exploitation):** Organized crime was largely fragmented, consisting of rural dacoity, cattle rustling, and localized cross-border smuggling of essential commodities across newly formed borders or along coastal trade routes.
- **1970s to 1980s (The Rise of Urban Bootlegging Syndicates):** Strict import controls, high customs duties, and prohibition policies led to the rise of massive domestic syndicates in urban hubs like Mumbai and Ahmedabad. Operations centered around gold smuggling, extortion, and bootlegging, though these groups remained largely confined to Indian territory.
- **1990s (The Watershed Era of Narco-Terrorism):** The 1993 Bombay serial blasts completely changed India's understanding of organized crime. It proved that domestic syndicates could be co-opted by hostile foreign intelligence agencies, combining underworld logistics with transnational terrorism. This era prompted the landmark **N.N. Vohra Committee Report (1993)**, which officially warned about the dangerous nexus between criminals, politicians, and bureaucrats.
- **2000s to 2010s (The Shift to the Northern Border States):** As Mumbai cartels were weakened by aggressive police action, the focus shifted to the transit corridors of Punjab and Haryana. Driven by the influx of heroin from the Golden Crescent (Afghanistan-Pakistan-Iran), local youth gangs grew rapidly. They moved from simple land disputes and protection rackets to sophisticated cross-border drug smuggling.
- **2020s to Present (The Borderless Cyber-Syndicate):** Today, these networks have completely globalized. Armed with end-to-end encrypted messaging applications, VOIP, and proxy networks, syndicate leaders can direct complex transnational actions from inside Indian prisons.
- **Way Forward**
- **Institutional Isolation and Prison Reforms**
- Prisons must be upgraded from simple physical holding facilities to secure digital isolation zones. This requires installing advanced, multi-band signal jammers (specifically targeting 5G and encrypted satellite signals) in high-security facilities. Relying on Section 303 of the BNSS must become the standard procedure for all high-risk trials, ensuring these individuals are never moved unnecessarily. To break up internal networks, prison staff should be rotated frequently, and independent, external audits of high-security wings should be conducted regularly.
- **Streamlining International Legal Frameworks**
- India should work closely with Western law enforcement agencies (such as the US DoJ, FBI, and Europol) to create fast-track mechanisms for Mutual Legal Assistance Treaties (MLATs). Instead of dealing with case-by-case diplomatic friction, India should push for a unified international protocol on transnational gang networks. This framework would treat cross-border criminal syndicates with the same urgency as global terrorist designations, simplifying extradition processes and asset seizures.

STATE-GUARDED COMMAND CENTER



PRE-1960s
LOCALIZED SMUGGLING
 • Border fence

1970s-80s
METRO CARTELS

1990s
TERROR-CRIME CONVERGENCE
 • Explosion
 • Vohra Committee

2000s-10s
NARCO-GANGLAND ERA
 • Heroin heroin packets

2020s-PRESENT

 Youth radicalization	 State legitimacy	 Extradition, BNSS §303
 Prison corruption	 FBI-NIA intelligence sharing	 Black economy

VULNERABLE YOUTH RECRUITMENT
(us conceptual, age-appropriate icons, not real minors)

VISA FRAUD
Student/Work visas to US, Canada

FOOT SOLDIERS EMBEDDED IN DIASPORA CELL

GS PAPER II GS PAPER II, III GS PAPER IV

NCERT CLASS 11
BOOK ROOP INTS,
KEY CHAPTERS

NCERT CLASS 11 12
BOOK ROOP WTH,
KEY CHAPTER

The infographic features a central globe with the United States and China flags. At the top, a red arrow points from 'DOMESTIC LAW & ORDER' to 'FOREIGN POLICY CRISIS'. Below the globe, a red arrow points from a box labeled 'DOMESTIC LAW & ORDER' to another box labeled 'FOREIGN POLICY CRISIS'. In the bottom left, a red target icon with a skull is labeled 'TARGETED KILLINGS'. In the bottom right, two stylized figures are shown with a double-headed arrow between them, labeled 'STRAINED RELATIONS'. At the bottom center, text reads 'SEVERE STRAIN ON BILATERAL TIES (e.g., INDIA-CANADA Falloff)'.

The diagram is divided into four quadrants, each with an icon and a title:

- Top Left:** Icon of a classical building with columns and a gavel with sound waves. Title: **INSTITUTIONAL ISOLATION** (Jammers, Virtual Courts §303)
- Top Right:** Icon of a clipboard with a checklist and a pencil. Title: **LEGAL FRAMEWORKS** (MLAT Streamlining)
- Bottom Left:** Icon of stacks of gold coins and a green banknote next to a map of India labeled 'FIU/ED'. Title: **FINANCIAL DISRUPTION** (Freezing Hawala)
- Bottom Right:** Icon of two children playing soccer. Title: **SOCIO-ECONOMIC INTERVENTIONS**

Why did the government get ZEE5 to remove 'Satluj'?

What is the film about and why was it removed two days after release from ZEE5? Who was Jaswant Singh Khrala, the subject of the film? Can the government order an OTT platform to block a film? How are OTT platforms regulated? What legal remedies are available to the filmmakers?

Rizmi Lia M.

The story so far:

In July 5, just two days after its premiere, the film *Satluj* (originally titled *Punjab '95*) was removed by ZEE5 from its OTT platform. The filmmakers have said the government ordered the removal. Reports suggest that a Centre-appointed committee is examining the film under Section 69A of the Information Technology Act. No official blocking order has been made public.

What is *Satluj* about and why was it removed from ZEE5?

Directed by Honey Trehan and starring Diljit Dosanjh, *Satluj* is about the life of human rights activist Jaswant Singh Khrala, set against the backdrop of Punjab in the 1980s and 1990s. Khrala had been documenting the alleged extrajudicial killings, enforced disappearances, and illegal cremations during Punjab's militancy years and had estimated that around 25,000 people had been secretly cremated across the State. In 1995, he was abducted from outside his home in Amritsar and was never seen again. The Central Bureau of Investigation concluded that he was taken by police officers to a police station

There is a shift from pre-certification under the Cinematograph Act to post-publication executive control through Section 69A and the IT Rules.

in Tarn Taran and killed in custody.

The film premiered on ZEE5 on July 3 after years of delays over a certification dispute with the Central Board of Film Certification (CBFC). However, two days later, the platform removed it from its India catalogue while continuing to stream it internationally through ZEE5 Global, citing "current developments".

The film's OTT release came after years of controversy. Originally scheduled for a theatrical release in India, it faced hurdles with the CBFC. The Board reportedly recommended 127 cuts before granting the film certification. The delays forced the makers to repeatedly postpone the release, and the film never made it to theatres.

Can the government legally order an OTT platform to remove a film?

Unlike films released in the theatre, content released directly on streaming platforms does not require prior certification from the CBFC under the Cinematograph Act, 1952. Instead, OTT platforms are regulated under the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021. However, Section 69A of the Information Technology (IT) Act, 2000 empowers the Centre to block online content on limited grounds, including acts threatening the sovereignty and integrity of India, security of the State, defence of India, friendly relations with foreign States, and public order, or to prevent the commission of a cognisable offence. Any such blocking, however, must follow the procedure and safeguards prescribed under law.

What legal safeguards apply before online content can be blocked?

According to Apar Gupta, advocate and founder of the Internet Freedom Foundation, if the reported action against *Satluj* has been initiated under Section 69A read with the IT Rules, 2021, the government is required to follow certain "procedures and safeguards". These include a reasoned written order explaining how the content falls within one of the statutory grounds

under Section 69A(i), an opportunity for the publisher to be heard, and a review by the designated committee. He points out that the Supreme Court, in *Shreya Singhal v. Union of India* (2015), had upheld Section 69A because these procedural safeguards, including recorded reasons and an opportunity for hearing, formed part of the statutory framework. He notes that the constitutional validity of certain provisions of the IT Rules, 2021 remains under challenge before the Delhi High Court.

Can blocking orders remain confidential?

One of the central questions is whether the government is required to disclose the reasons for a take down. Rule 16 of the Blocking Rules contains a confidentiality provision. The government has increasingly relied on it to withhold blocking orders even from the affected parties. This undermines the rationale on which the Supreme Court upheld Section 69A in the *Shreya Singhal* case since a blocking order that remains secret cannot be meaningfully challenged before the court of law. Without access to the blocking order, filmmakers cannot effectively challenge the decision, and the courts are left with little material to assess whether the restriction satisfies the constitutional test of proportionality laid down in decisions such as *K.S. Puttaswamy v. Union of India* (2017) and *Anuradha Bhasin v. Union of India* (2020).

Does the case signal a broader shift in the regulation of OTT platforms?

There is a shift from pre-certification under the Cinematograph Act to post-publication executive control through Section 69A and the IT Rules. As OTT platforms fall outside the CBFC certification, the executive blocking powers risk functioning as a parallel censorship mechanism.

What legal remedies are available to the filmmakers?

If a blocking order has been issued, the filmmakers can challenge it before a High Court through a writ petition under Article 226 of the Constitution, arguing that the direction is ultra vires Section 69A and violative of Articles 19(1)(a) and 19(1)(g), which provide the right to freedom of speech and expression and the right to practise any profession or carry on any occupation, trade or business, respectively.



Villagers watch a special screening of the film '*Satluj*' at a Sikh temple at Tatley village, in Punjab's Gurdaspur district. AP

- **Key Terms and Explanations**

- **Section 69A of the Information Technology (IT) Act, 2000:** This pivotal provision empowers the Central Government to direct any agency or intermediary (such as internet service providers or OTT platforms) to block public access to specific online content. This power can only be exercised under explicitly defined constitutional grounds: safeguarding the sovereignty and integrity of India, the defense of India, security of the State, friendly relations with foreign states, public order, or preventing incitement to any cognisable offense related to these grounds.

- **IT (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021:** A regulatory framework that expanded the scope of the IT Act to encompass Over-The-Top (OTT) streaming platforms, digital news publishers, and social media intermediaries. Unlike traditional cinema, which undergoes pre-release censorship, these rules establish a three-tier grievance redressal mechanism for digital media, culminating in an Inter-Ministerial Committee with emergency blocking powers under the executive branch.

- **Rule 16 of the IT Blocking Rules (Confidentiality Clause):** A specific administrative provision dictating that all requests, actions taken, and the identity of the content intended to be blocked must be kept strictly confidential. For example, when a digital creator's content is suddenly restricted, this clause allows the government to withhold the formal blocking order from the public and, occasionally, even from the content creators themselves.

- **Enforced Disappearances and Extrajudicial Killings:** Severe human rights violations where individuals are arrested, detained, or abducted by state officials or those acting with state authorization, followed by a refusal to acknowledge the deprivation of liberty or to disclose the fate and whereabouts of the persons. The biographical film *Satluj* centers on the real-life work of activist Jaswant Singh Khaira, who systematically documented thousands of such unacknowledged, secret cremations by law enforcement during the counter-insurgency operations in Punjab during the 1980s and 1990s.

- **Post-Publication Executive Control:** A regulatory approach where content is allowed to be published freely without prior screening, but remains subject to punitive action, takedowns, or blocking by executive order after it goes live. This stands in sharp contrast to the "Pre-Certification" model practiced by the Central Board of Film Certification (CBFC) under the Cinematograph Act, 1952, which vets celluloid films before they ever enter a public theater.



- **Main Arguments and Substantive Parts**

- The evolving dynamics between digital broadcasting and state oversight present a fundamental structural shift in how creative and historical expressions are regulated in India.

- **The Shift to a Parallel Censorship Mechanism**

- The core thesis posits that the regulation of OTT content has quietly evolved from a liberal, post-publication oversight model into an executive-driven parallel censorship mechanism. While cinema released in traditional theaters undergoes public scrutiny through CBFC-mandated cuts, streaming content bypasses this statutory body but faces sudden, executive-led takedowns under Section 69A of the IT Act. This effectively grants the executive branch the ultimate veto power over online historical and political narratives, operating entirely outside the familiar architecture of theatrical film certification.

- **The Erosion of Procedural Safeguards**

- A critical argument focuses on how the operationalization of Section 69A has gradually decoupled from the safeguards established by the judiciary. In the landmark *Shreya Singhal v. Union of India* (2015) ruling, the Supreme Court upheld the constitutional validity of Section 69A specifically because it featured vital procedural checks, including:

- The mandatory provision of a reasoned, written order.

- A guaranteed opportunity for a fair hearing for the affected content publisher.

- An independent review by a designated committee.

- However, current administrative practices frequently weaponize the confidentiality clause under Rule 16. By keeping blocking orders strictly confidential, the state leaves creators without the written rationale necessary to mount a meaningful legal challenge. This effectively creates a procedural vacuum that undermines the right to judicial review.

- **The Suppression of Sensitive Historical Narratives**

- The controversy surrounding the film *Satluj* highlights a broader institutional discomfort with creative works that revisit painful eras of state counter-insurgency. When an artwork attempts to document historical trauma—such as the extrajudicial actions in post-1984 Punjab—the state frequently defaults to public order or state security arguments to justify content suppression. This raises a substantive dilemma: does suppressing art to maintain public order preserve social harmony, or does it merely prevent a mature, democratic coming-to-terms with historical human rights violations?

- **Historical Evolution of the Issue**

- **The Era of Celluloid Monopoly (1952–2000):** Content regulation was long synonymous with the Cinematograph Act of 1952. The state focused entirely on public theaters, utilizing the CBFC as a gatekeeper. Political and social narratives were managed before they reached the masses, establishing a predictable, albeit restrictive, pre-certification regime.
- **The Dawn of the Internet and Statutory Gaps (2000–2008):** The passage of the original IT Act in 2000 focused heavily on cybercrime and e-commerce, leaving the vast, unregulated space of digital expression largely unmonitored. As internet penetration grew, the state found itself without agile statutory tools to address online content it deemed problematic.
- **The Legislative Pivot and Judicial Scrutiny (2008–2015):** Recognizing this regulatory gap, the 2008 amendments introduced Section 69A. The real test of this power arrived with *Shreya Singhal v. Union of India* (2015). While the court struck down the overly broad Section 66A, it spared Section 69A, explicitly trusting that the executive would adhere to strict procedural safeguards, including providing written reasons and formal hearings to creators.
- **The Convergence of OTT and Executive Codes (2021–Present):** The introduction of the IT Rules, 2021 marked a major shift. Recognizing that OTT platforms operate outside the CBFC's jurisdiction, the executive established a code of ethics combined with post-publication intervention powers. As observed in contemporary cases like *Satluj*, this has led to an increasing reliance on Rule 16's confidentiality provisions, moving digital regulation away from open judicial scrutiny and closer toward discretionary executive control.

- **Way Forward**

- **De-linking Confidentiality from Legal Remedies**

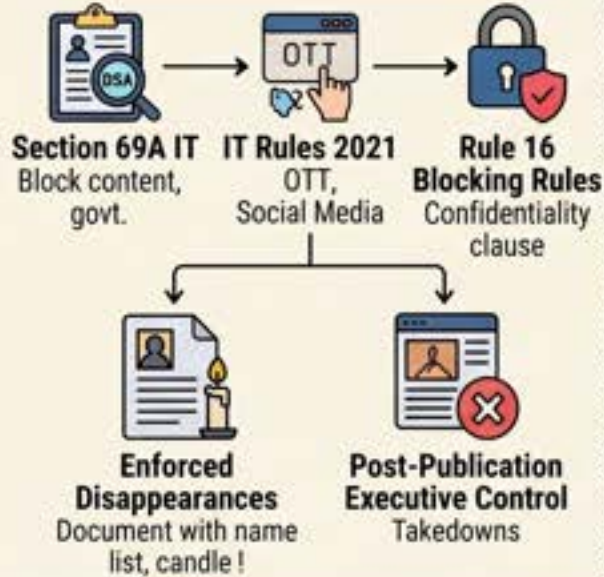
- The absolute confidentiality mandated by Rule 16 of the IT Blocking Rules must be reformed. While the state may have legitimate reasons to keep sensitive security deliberations private, the final, reasoned blocking order must be shared with the affected creator. Providing this written order ensures that the right to seek a writ remedy under Article 226 is not rendered meaningless, preserving a vital constitutional pathway for judicial review.

- **Establishing an Independent Digital Content Authority**

- To prevent executive overreach, content regulation for digital platforms should be transferred from inter-ministerial executive committees to an autonomous, statutory body. This proposed "Digital Media Oversight Board" should be modeled after independent telecom or judicial regulators, featuring a balanced composition of:
 - Retired members of the higher judiciary.
 - Independent civil society representatives and human rights experts.
 - Respected veterans from the film, media, and digital broadcasting industries.
-

DIGITAL FREEDOM vs. STATE REGULATION: A COMPREHENSIVE ANALYSIS

1. KEY TERMS & EXPLANATIONS



2. MAIN ARGUMENTS



3. HISTORICAL EVOLUTION OF THE ISSUE



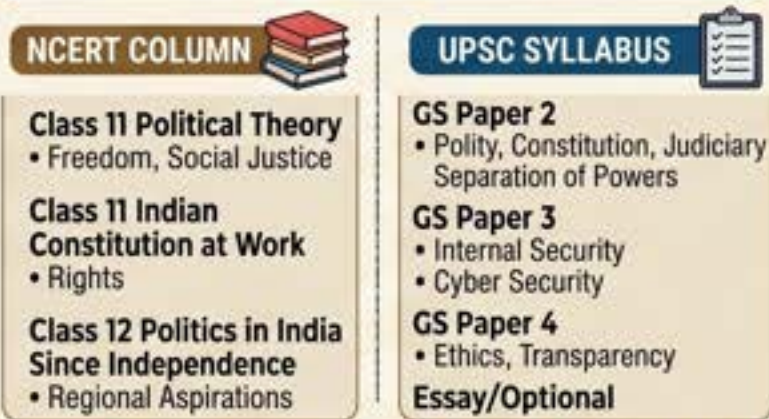
4. LOGICAL & PHILOSOPHICAL BASE



5. MULTIDIMENSIONAL ANALYSIS



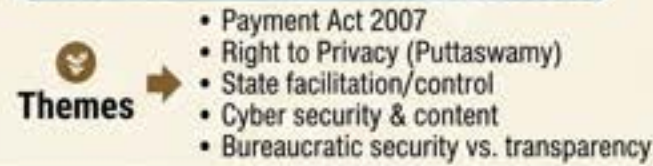
6 & 7. LINKAGES WITH NCERTs & UPSC SYLLABUS



8. WAY FORWARD



9. PREVIOUS YEARS' UPSC QUESTIONS



Why is VAR controversial?

How does it work? What went wrong in the Egypt-Argentina match? What decision has FIFA taken in this regard?

S. Shrivathsam

The story so far:

On July 7, 2026, the Video Assistant Referee (VAR) came under the spotlight after causing disappointment for Egypt and delight for Argentina in the World Cup round-of-16 clash in Atlanta. Egypt felt hard done by after a beautifully crafted second-half goal was disallowed following VAR intervention for a foul in the build-up.

The African team, which let slip a two-goal advantage and eventually went down 2-3, was incensed that the on-field official was not called upon to meticulously examine potential Argentine fouls that were made seconds before the winner was scored.

What is VAR and how does it work?

The VAR refers to the system itself and the chief referee who inspects every phase of play, usually from a central hub. Proposed in the early 2000s and approved by lawmakers at the International Football Association Board in 2018, the VAR was welcomed into the football family to provide technological support to on-field referees and minimise mistakes. The main objective is to avoid "clear and obvious errors" during key match incidents.

The current set-up includes numerous high-quality cameras stationed at different points in a venue and a pitch-side monitor, which is generally placed close to the dugouts. The head official at the VAR booth recommends that the on-field referee re-examine events that the latter could have handled better. The man or woman in the middle, however, can choose to

The lack of consistency in interpreting similar situations and deciding when to intervene has left many baffled: what is a penalty or red card in one referee's eyes may not be the same in another's view.

know the advice or stick with the original decision even after an on-field review.

When can the VAR intervene? In tournaments and leagues across the globe, the system is

primarily used to analyse the following goals/no goal, penalty/no penalty, direct red card or the reversal of it, and mistaken identity. Being used at the world cup for the third successive edition (it was introduced in 2018), the VAR has been having additional responsibilities this time. It intervenes when a corner kick is wrongly awarded and helps in removing an incorrectly brandished second yellow card, which would otherwise result in a player being sent off.

How effective has the system been in the ongoing World Cup?

The VAR has made some contentious interventions so far, none more than the one for the disallowed goal in the Egypt-Argentina fixture. The Egyptian forward Mostafa Zeko was in disarray after finding the back of the net following a breathtaking attacking move from the "phantoms". In a noisy turn of events, just a matter of minutes, Jerome Brisard, the VAR based at the tournament hub in Dallas, recommended that the on-field referee, Jerome Lescot, review a possible foul by Egyptian player Marwan Attia on Argentine player Lisandro Martinez at the other end of the pitch. After an on-field review, Lescotier deemed that Attia unfairly won the ball in the build-up to the goal and therefore ruled it out.

What made the Egyptians furious?

The Egyptian contingent argued that the foul was not committed in the phase of play preceding the goal and that the Attia-Lisandro duel took place well away from where the sequence ended. But FIFA, chief refereeing officer Pierluigi Collina issued a clarification saying: "If a foul is identified in the build-up and is deemed to have had an impact on the goal, the VAR will recommend an on-field review. There is no defined limit regarding either the distance from goal or the amount of time between the incident and the goal."

The Mohamed Salah-led side also confronted the official when it felt that an "illegal" contact on the foot and a shirt pull, both in Argentina's 18-yard box, were overlooked seconds before the winning goal. Lescotier, however, waved off the protests and was not advised to recheck the incidents. Egypt head coach Hossam Hassan remarked that his team was "unfairly" treated by the man in-charge, while the national federation later filed a complaint with FIFA.

After being under the microscope, the sport's global governing body made a huge change to its VAR operations, appointing two in-house VAR officials for every match in the business end of the tournament (quarter-finals to final).

What are the complaints?

The lack of consistency in interpreting similar situations and deciding when to intervene has left many baffled: what is a penalty or red card in one referee's eyes may not be the same in another's view. There are claims that VAR is making football a "silly" sport by nitpicking fouls that are barely spotted by on-field officials - Germany defender Jonathan Tah's disallowed goal in the round-of-32 encounter against Paraguay is a case in point. Fans, and sometimes even players and staff, are left in the dark about what the VAR is communicating to the man or woman on the ground.

- **Key Terms and Explanations**
- **Video Assistant Referee (VAR)**
 - An advanced technological officiating support system that reviews decisions made by the head on-field referee using video footage and a dedicated communication headset. It operates out of a centralized video hub where a chief review official monitors multiple angles simultaneously. For instance, if an on-field official misses a critical off-ball infraction, the VAR flags the incident, ensuring the head referee can re-evaluate the event on a pitch-side monitor.
- **International Football Association Board (IFAB)**
 - The independent global rule-making body responsible for determining and amending the laws of the game of association football. It acts as the ultimate legislative authority ensuring standard compliance across all continents. An example of its role is its institutional approval in 2016 to introduce live trials of video officiating, which systematically altered decades of traditional field management.
- **Clear and Obvious Error**
 - The specific legal and procedural threshold required for a technological intervention to take place. Under this principle, a video review official cannot intervene merely because they would have made a different subjective call; there must be an indisputable, factual mistake made by the on-field official. For example, misidentifying a player during the issuance of a red card is a clear and obvious error that demands immediate technological correction.
- **Phase of Play and Build-Up Phase**
 - The entire continuous sequence of tactical play leading up to a significant match event, such as a goal or a penalty. The analytical boundaries of this phase are frequently contested because rules do not strictly define the exact temporal or spatial limits of how far back an official can investigate. A practical manifestation occurs when a minor foul committed in a team's own defensive half goes unnoticed, but is retroactively used to invalidate a goal scored at the opposite end of the pitch minutes later.
- **Subjective Interpretation vs. Objective Standardization**
 - The systemic friction between automated, metric-driven data and human cognitive assessment. Objective standardization applies to binary outcomes like whether a ball completely crossed the goal line, whereas subjective interpretation covers nuanced human behavior, such as determining if a player's physical contact or shirt pull was severe enough to warrant a penalty.

- **Main Arguments and Substantive Parts**

- **The Core Thesis**

- The integration of advanced real-time technology into global sports governance often creates new administrative and structural frictions rather than resolving them. This tension arises because rigid digital precision is forced to interact with highly subjective human rule interpretations, shifting the focus of governance from managing the natural flow of the game to over-analyzing micro-infractions.

- **Arguments for Technological Integration**

- Proponents argue that high-stakes sports governance demands institutional fairness and the elimination of human error to safeguard massive public trust and economic investments. Technology acts as an essential administrative safety net, providing:

- **Error Minimization:** Preventing flagrant oversight in critical match-turning moments such as mistaken identities or missed red cards.

- **Institutional Transparency:** Offering a verifiable video trail that vindicates officials against claims of systemic bias or corruption.

- **Safeguarding Fair Play:** Ensuring that Rule of Law within the sporting arena is maintained uniformly, regardless of intimidating stadium environments or player pressure.

- **Arguments Highlighting Structural Weaknesses**

- Critics highlight that technology alters the essential character of the sport, introducing systemic challenges that undermine its legitimacy:

- **The "Soft Sport" Critique:** Over-reliance on slow-motion replays leads to "nitpicking" minor physical contacts that are natural to high-intensity sports but look illegal when isolated frame-by-frame.

- **Asymmetric Interpretation:** The lack of uniform standards across distinct officiating teams means a specific physical challenge might be deemed a penalty by one video hub team but ignored by another.

- **Spectator and Participant Alienation:** Real-time communications occur in an informational vacuum, leaving both the athletes on the ground and millions of viewers entirely unaware of the administrative rationale behind major decisions.

- **Case Analysis from image_4995b6.jpg**

- The operational vulnerabilities of this techno-legal framework are demonstrated in the case study presented in image_4995b6.jpg regarding the 2026 international match between Egypt and Argentina. In this incident, a beautifully executed goal by Egypt was retroactively disallowed due to a foul identified deep in the build-up phase at the opposite end of the pitch.

- As detailed in image_4995b6.jpg, this sparked intense institutional pushback because the governing authority, represented by refereeing chief Pierluigi Collina, clarified that there is no defined temporal or spatial limit constraining how far back VAR can investigate. This lack of clear boundary limits led to accusations of unfair treatment and prompted immediate institutional adjustments by FIFA, which appointed double in-house officials for the tournament's final stages to mitigate decentralized inconsistency.

- **Historical Evolution of the Issue**

- **Pre-2000s: The Era of Absolute Human Discretion**

- For over a century, global sports governance operated under the absolute, unreviewable authority of the on-field referee. Historic errors—such as flagrant unpunished handballs or undetected goals crossing the line—were accepted as an inherent part of the sport's human element. This era prioritized the uninterrupted, organic momentum of play over absolute mathematical accuracy.

- **Early 2000s: Commercialization and Initial Tech Proposals**

- The rapid commercialization of sports, combined with high-definition broadcasting, created a significant accountability gap. Millions of viewers at home could immediately spot refereeing mistakes via instant television replays, while the on-field official remained isolated without assistance. This prompted initial conceptual proposals for digital intervention systems to protect the financial and reputational stakes of international tournaments.

- **2016 Milestone: Institutionalization and IFAB Approval**

- Following years of pushback from traditionalists, the International Football Association Board (IFAB) officially approved live trials for the Video Assistant Referee system. The initial framework was strictly limited to correcting "clear and obvious errors" in four game-changing categories: goals, penalties, direct red cards, and mistaken identity. This marked a major shift toward a hybrid governance model combining human decisions with technological oversight.

- **2018–2022: Rapid Global Scaling**

- The system was fully deployed on the world stage during the 2018 FIFA World Cup and quickly adopted by elite domestic leagues worldwide. While it successfully resolved blatant officiating mistakes, this period also exposed the challenges of expanding the system's scope. The technology began creeping into continuous phases of play, turning what was meant to be a safety net for major errors into a tool for constant micromanagement.

- **2026 Present Day: The Crisis of Consistency and Structural Reform**

- As documented in the recent tournament disputes outlined in image_4995b6.jpg, the issue has evolved from whether technology should be used to how its unchecked jurisdictional boundaries can be controlled. The absence of spatial and temporal limits during reviews has triggered formal international complaints from member federations. This has forced governing bodies like FIFA into reactive institutional restructuring, such as doubling the number of centralized in-house review officials to ensure internal checks and balances before any final decision is recommended.

VAR CONTROVERSY: TECHNOLOGY IN SPORTS GOVERNANCE & UPSC-APSC CIVIL SERVICES ANALYSIS

1. KEY TERMS & DEFINITIONS

- VAR** : Video Assistant Referee
The important content in the not in rana of VAR
- IFAB**: International Football Association Board
International Football Association Board
- CLEAR & OBVIOUS ERROR**: The threshold
The threshold of senaights to the VAR
- PHASE OF PLAY & BUILD-UP**
The subjectvet Interpretation vs objective standard
Examples: Mistaken Identity (red card correction)
- SUBJECTIVE INTERPRETATION vs OBJECTIVE STANDARD**
Examples: In in presents, retroactive intervention

2. CASE STUDY: EGYPT vs. ARGENTINA WC'26 (FOCUS AREA)



3. HISTORICAL EVOLUTION



4. MULTIDIMENSIONAL IMPACTS (GS-RELEVANT)

SOCIAL

Erosion of shared joy, Surveillance stress on athletes

ECONOMIC

Protecting multi-billion dollar stakes, asymmetric losses

LEGAL (due process)

ETHICAL

Soft Sport critique, displacement of blame, technocratic illusion

INTERNATIONAL

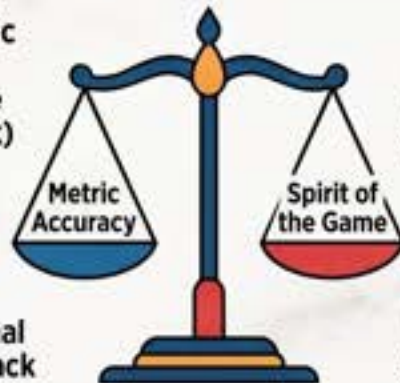
Regulatory fragmentation, cross-border operational challenges

5. LOGICAL & ETHICAL FOUNDATIONS

Technocratic Illusion (uneadable digital clock)



Jurisdictional overreach, lack of due process



Asymmetric Knowledge & Epistemic Lag (natural justice)



Positivism vs. Natural Justice (natural justice)

6. WAY FORWARD & GS LINKAGES

WAY FORWARD: STRATEGIC REFORMS

- ✓ Define boundaries (spatial/temporal)
- ✓ Implement real-time audio transparency (like cricket/rugby)
- ✓ Harmonize global standards & subjective metrics
- ✓ Strengthen internal checks & balances

UPSC CSE/APSC GS MAPPING

- GS Papers 1-4
- GS 2 Governance/Transparency
- GS 3 Science & Tech/AI
- GS 4 Ethics/Decision-making
- Essay Themes

Towards a more European alliance

NATO

Faced with external security challenges and internal divisions, especially under a sceptical Donald Trump administration, European members are preparing to play a larger role in keeping the alliance united and functional

G. Sampath

For more than seven decades, the North Atlantic Treaty Organisation (NATO) has been the cornerstone of Western security architecture. Founded in 1949 as a bulwark against Soviet expansion into capitalist Europe, the 32-member military alliance outlived its original purpose by morphing into a vehicle for American power projection not just in Europe but across the globe.

In the post-Cold War era, challenges to NATO have come from within and without. The most obvious external threat has been Russia, which sought to check its continued eastward expansion by invading Ukraine. Today, the Russia-Ukraine war, in its fifth year, remains NATO's foremost priority in the context of its foundational mandate of European security. The threat from within, however, has been more insidious. It can be summed up in three words: the Trump Presidency.

Both in his first and current term, President Donald Trump has questioned NATO's utility for the U.S., and even threatened to exit the alliance. He believes that while NATO's capabilities, funds, leadership and infrastructure were overwhelmingly American, the U.S. gets out of the alliance far less than it puts into it, in contrast to its European allies, who get to reap its benefits while paying a fraction of the costs.

Mr. Trump's simmering resentment appeared to reach a boiling point in April, when his NATO allies ignored his call to join the U.S. in its war of choice against Iran. Notably, Spain and the U.K. (initially) refused access to their military bases for U.S. warplanes, while France refused over-flight rights. Mr. Trump lashed out, calling NATO a "paper tiger" without the U.S. He saw it as NATO's betrayal of the U.S., stating: "We've been there automatically, including Ukraine. Ukraine wasn't our problem. It was a test, and we were there for them, and we would always have been there for them. They weren't there for us."



Joint family: Leaders including NATO Secretary General Mark Rutte, U.S. President Donald Trump, and Turkish President Recep Tayyip Erdogan pose for a photo during the NATO summit in Ankara, Turkey, on July 8, 2023.

U.S. Secretary of State Marco Rubio went further: "If NATO is just about us defending Europe if they're attacked but then sleeping as having rights when we need them, that's not a very good arrangement."

U.S. drawdown

This was followed, in June, by a *New York Times* story based on a leaked communication, which laid out plans for a significant drawdown of U.S. commitments in NATO's Europe operations. According to the report, the Trump administration planned to "pull a third of the fighter jets it provides NATO for Europe", along with "reallocating a missile-launching submarine and an aircraft carrier, along with several warships". These developments set alarm bells ringing in Europe's strategic corridors, as they seemed to erode the lynchpin of their collective security – the pledge of mutual defence under Article 5. Could they still rely on the U.S. to rescue them in the face of an attack?

The U.S. has also scaled down its assistance to the Ukraine war effort, making European allies the principal financier. At the same time, Mr. Trump

has been pushing NATO's European members to spend 5% of their GDP on defence (U.S. on core military requirements plus 1.5% on critical infrastructure). But only five of NATO's 32 members are on track to meet this target in 2026.

Other sources of intra-NATO tensions include Mr. Trump's obsession with annexing Greenland, a sovereign territory of fellow NATO member Denmark. Mr. Trump also feels frustrated that European security considerations are coming in the way of his developing a more congenial relationship with Russian President Vladimir Putin. Tensions on this front came to the fore in early 2025 when he tried to broker an end to the Ukraine war by directly speaking to Mr. Putin.

For their part, NATO's European members have tried to play a balancing act. There is now a clear-eyed recognition that the U.S. can no longer be expected to continue as the sole pillar of NATO. The constitutive principle of NATO is the unconditional security guarantee. But Mr. Trump's repeated attempts to make it conditional – linking it to members "paying up", or to their

"loyalty" – has cast a pall of uncertainty on that guarantee, prompting European nations to consider autonomy and self-reliance. But those are expensive propositions that need time, and vast investments, to fructify. In the interim, the European allies cannot do without continued U.S. engagement in NATO operations which, to their mind, calls for a strategy of placating Mr. Trump selectively and flattering him indiscriminately.

Interim strategy

This strategy, which was on full display at the NATO summit that unfolded in Ankara, Turkey, on July 7-8, appears to have worked rather well. European leaders, led by NATO Secretary General Mark Rutte, a carry Dutch politician, showcased their plans to ramp up spending on military hardware and investments in expanding their defence industrial base. While sticking to their decision not to get their hands dirty in the Strait of Hormuz, they ensured that the summit declaration reiterated Mr. Trump's stated goals in the Iran war: Iran must never acquire nuclear

weapons, and freedom of navigation must be restored in the Strait of Hormuz. For good measure, they also pledged \$50 billion in new defence procurements – a bonanza for America's military industrial complex – and €70 billion worth of military assistance to Ukraine. In return, they got Mr. Trump to underpin an "ironclad commitment" to Article 5.

But the tensions, though papered over in Ankara, haven't gone away. The European allies' reluctance to join U.S. military operations against Iran points to a fundamental divergence in how the two see NATO. While Europeans view NATO as a "defensive" force that is region-specific (trans-Atlantic), Mr. Trump sees it more broadly as an extension of U.S. military capabilities that should be deployable globally.

To be fair, NATO has never been a one-way street as Mr. Trump seems to believe. For nearly eight decades, the U.S. has enjoyed unfettered access to air bases, military networks, infrastructure and logistical support across Europe, without which its various campaigns in West Asia and elsewhere over this period would have been impossible. It has also enjoyed the support of its European allies on most foreign policy issues, including when they have been controversial, and the military leadership of most nations in the continent. But with the U.S. increasingly prioritising the Pacific theatre, a greater European role in NATO was inevitable.

For the medium term, in the words of the Ankara declaration, "a stronger Europe within a stronger NATO", is the stated objective, wherein European allies and Canada would be "assuming greater responsibility for the Alliance's defence". But over the long run, Europe would want to develop its military capabilities to a level where, firstly, it provides credible deterrence against Russia even in a scenario of strategic ambiguity on the matter of American intervention in the face of a credible threat, and second, secures the autonomy necessary to safeguard its own political interests when they come up against American coercion.

THE GIST

Both in his first and current terms, President Donald Trump has questioned NATO's utility for the U.S., and even threatened to exit the alliance.

Trump's simmering resentment appeared to reach a boiling point in April this year, when his NATO allies ignored his call to join the U.S. in its war of choice against Iran.

Other sources of intra-NATO tensions include Mr. Trump's obsession with annexing Greenland, a sovereign territory of fellow NATO member Denmark.

- **Key Terms and Explanations**
- **Article 5 (Collective Defense):** This is the core organizational principle of the North Atlantic Treaty Organisation (NATO). It legally mandates that an armed attack against one member state is considered an attack against all members, requiring collective assistance, including the use of armed force.
 - *Example:* Historically, this clause has been invoked only once in response to the September 11 terrorist attacks against the United States, illustrating its gravity as a deterrent.
- **Strategic Autonomy:** This refers to the capacity of a nation or a political bloc (such as the European Union) to determine its own foreign policy, manage its security priorities, and take military action independently without being structurally dependent on the resources or political will of an external superpower.
- **Strategic Ambiguity:** A deliberate foreign policy strategy wherein a superpower intentionally leaves its degree of commitment or its precise response to a security threat vague. This keeps both adversaries and allies uncertain, preventing adversaries from crossing lines while forcing allies to invest more in their own defense.
- **The Free-Rider Dilemma (Burden-Sharing):** An economic and political concept within military alliances where certain member states underfund their domestic defense budgets, effectively relying on the outsized financial and military contributions of a dominant ally to secure their borders.
 - *Example:* The long-standing friction over the target for member nations to allocate a specific percentage of their GDP—recently pushed toward an intensive 5% framework (3.5% core military and 1.5% critical infrastructure)—to correct this imbalance.
- **Trans-Atlantic Alliance:** The foundational post-World War II geopolitical, economic, and military partnership linking North American democracies (the United States and Canada) with Western and Central European nations to maintain a rules-based international order.
- **Military-Industrial Complex:** The vested economic and political relationship between a nation's military leadership, government policymakers, and the private corporate defense industries that supply weapons and hardware, where foreign policy decisions can sometimes be influenced by industrial production cycles and procurement profits.

- **Main Arguments and Substantive Parts**

- The core thesis of this geopolitical shift revolves around a crucial realization: Europe can no longer treat American security guarantees as an unconditional, permanent safety net. The traditional security architecture is fracturing under the weight of divergent strategic visions.

- **The Transactional Turn in Alliance Politics**

- The relationship between the United States and its European allies has shifted from a value-based, institutional alliance to a highly transactional partnership. The executive leadership of the United States increasingly views collective defense commitments through a commercial lens. This manifests in explicit demands for immediate financial compliance, public questioning of the alliance's utility, and threats of strategic abandonment or drawdown of military hardware if allies do not meet steep defense spending targets.

- **Divergent Strategic Visions and Spheres of Action**

- There is a profound cognitive dissonance regarding the geographic and functional mandate of collective security:

- **The European View:** European states approach the alliance as a region-specific, defensive shield designed to deter immediate territorial expansionism along their eastern borders, particularly in light of prolonged conflicts in Eastern Europe.

- **The American View:** The United States increasingly interprets the alliance as a flexible extension of its global military capabilities. It expects European allies to deploy resources and offer logistical support for out-of-area "wars of choice," such as maritime interventions in the Strait of Hormuz or security containment strategies against Iran and in the Indo-Pacific theatre.

- **The Vulnerability of the Collective Defense Umbrella**

- Internal administrative decisions to execute drawdowns of American commitments—including pulling back fighter jet squadrons, reallocating advanced naval assets, and drawing down missile-launching submarines from European strategic corridors—have sent shockwaves through continental defense ministries. These actions directly erode the perceived sanctity of Article 5, turning what was once an absolute guarantee into a conditional arrangement.

- **The European Dual-Track Strategy**

- In response to these vulnerabilities, European leaders are pursuing a sophisticated, pragmatic balancing act, as demonstrated during high-level diplomatic meetings like the Ankara Summit:

- **The Immediate Track:** Europe is temporarily placating American demands by funding multi-billion-dollar defense procurement packages, which directly feeds back into the American military-industrial complex, and assuming the primary financial burden of regional stabilization efforts.

- **The Long-Term Track:** Simultaneously, European nations are laying the groundwork for a stronger European defense pillar. This involves ramping up domestic defense investments to build a parallel framework capable of providing credible deterrence against external aggression, even in an environment of total American strategic ambiguity or overt coercion.

- **Historical Evolution of the Issue**

- **1949 (The Genesis):** In the immediate aftermath of World War II, the North Atlantic Treaty was signed in Washington. Its foundational logic was to create a permanent bulwark against Soviet expansionism into Western Europe, tying the nuclear and conventional military might of the United States to the security of European democracies.
- **1950s–1980s (The Cold War Consolidation):** The alliance operated within a highly predictable, rigid bipolar framework. Security was defined by the containment doctrine and structural deterrence against the Warsaw Pact. European nations rebuilt their economies under the security umbrella provided by the United States.
- **1991–2014 (Post-Cold War Expansion and Mission Creep):** Following the dissolution of the Soviet Union, the alliance faced an existential question regarding its purpose. It chose a dual path: expanding eastward to absorb former Warsaw Pact states and shifting its mandate toward "out-of-area" stabilization and counter-terrorism operations, such as interventions in the Balkans and Afghanistan. This shifted its focus away from territorial defense.
- **2014–2022 (The Geopolitical Wake-Up Call):** The annexation of Crimea in 2014 and the outbreak of full-scale conflict in Ukraine post-2022 forced a rapid re-centering of the alliance. Territorial defense along the eastern flank once again became the primary operational priority, exposing Europe's deep logistical and military reliance on Washington.
- **2025–2026 (The Era of Internal Fracture and Europeanization):** The current era is defined by acute internal polarization. Unilateral diplomatic maneuvers by the United States to negotiate regional peace terms without European consultation, coupled with aggressive demands for a 5% GDP defense spending allocation, have culminated in milestones like the 2026 Ankara Summit. Europe is now shifting away from total dependence and actively building its own strategic autonomy.

- **Way Forward**

- To navigate this period of strategic instability, a balanced, pragmatic, and multi-layered approach is required from all international stakeholders.
- **Phased Development of European Strategic Autonomy:** European nations must systematically integrate their independent defense procurement frameworks and joint command structures. This will allow them to build a credible European pillar within the broader trans-Atlantic framework, ensuring they can stand alone without causing an abrupt, dangerous security vacuum.
- **Institutionalization of Comprehensive Burden-Sharing:** NATO should move away from arbitrary, ad-hoc GDP defense spending mandates. Instead, it should codify a sustainable formula that rewards investments in dual-use critical infrastructure, cyber-defense capabilities, and regional stabilization initiatives alongside traditional hardware procurement.
- **Delineation of Geopolitical Mandates:** The alliance must formally clarify and reaffirm its region-specific, defensive core mission. By avoiding over-extended, out-of-area military campaigns in West Asia or the Indo-Pacific, it can prevent internal friction and minimize the risk of global escalations.
- **Strategic Diversification for Middle Powers:** Emerging global economies, including India, must adapt to this unfolding strategic ambiguity by actively deepening their independent defense, technological, and diplomatic partnerships with individual European powers, recognizing that a multipolar West offers a more stable anchor for global governance.

1. KEY TERMS & EXPLANATIONS



Transit-Oriented Development (TOD)
Transit-oriented icon transit condentions



Carbon Footprint
Carbon footprint, rurived and carbon pollution comwn outanies



Electric Vehicle (EV)
Electric vehicle permit vehicler vehicles (EV)



Urban Sprawl
Urban sprawl monss creemobility and transoies

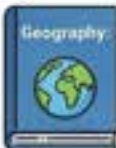
4. LOGICAL & PHILOSOPHICAL BASE

Anthropocentrism Ecocentrism

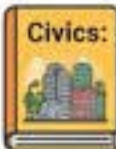


Intergenerational Equity

6. NCERT LINKAGES



Geography: Class X - Lifelines of National Economy (Topic: Transport)
Developes anatonice of green mobility, used of urban economy, dummy developoes and approach hie consumers and datahments of national Economy.



Civics: Class VIII - Our Cities, Towns and Villages (Topic: Local Govt.)
This becomes hmocrare penks and lting all ove censosventhatios - our cities, towns and towns and Villages, igoiss urban development.

2. MAIN ARGUMENTS & SUBSTANTIVE PARTS

PROS

- ✓ Efficiency
- ✓ Lower Pollution

CONS

- ✗ High Infrastructure Costs
- ✗ Integration

5. MULTIDIMENSIONAL ANALYSIS



Social
Community connectivity, affordable housing, public transit access



Economic
Infrastructure investment, operational efficiency, cost-benefit analysis



International
Global climate pacts, technology transfer, cross-border best practices



Political
Governance consensus, policy formulation, inter-agency coordination



Legal
Environmental regulations, zoning laws, public transport contracts



Ethical
Climate justice, resource distribution, corporate social responsibility

7. UPSC/APSC SYLLABUS LINKAGES

GS PAPER I

- ✓ History of Urbanization

GS PAPER II

- ✓ Govt. Policies & Environments

GS PAPER III

- ✓ Economic Growth & Infrastructure, Environment

ESSAY

- ✓ Economic Infrastructure, Environmentethics

ETHICS

- ✓ International Ethics

3. HISTORICAL EVOLUTION OF THE ISSUE



19th c.

Industrial Cities



20th c.

Car-Centric Sprawl post-WWII



21st c.

Smart Cities Green Tech Metro Systems



8. WAY FORWARD & REFORMS

- ✓ Incentivize EV Production
- ✓ Integrate Public Transit Networks
- ✓ Adopt Better Zoning Laws
- ✓ Engage Public Participation

9. PREVIOUS YEARS' UPSC AND APSC QUESTIONS

"Examine the role of green mobility in mitigating urban urban pollution in India. (UPSC Mains 2023)"

"How have land-use policies shaped urban evolution in modern nations? (APSC Mains 2022)"

Oneness of the multitude

Hinduism in Indonesia

The Prambanan Temple signifies the assertion of Hinduism as a monotheistic religion to meet the legal standard in the Southeast Asian country

Yarghese K. George

Prime Minister Narendra Modi visited the historic Prambanan Temple near Yogyakarta, Indonesia last week. Standing alongside Indonesian President Prabowo Subianto, he offered prayers at the 9th-century UNESCO World Heritage Site, the largest Hindu temple complex in the country, which houses the tri-murti of Vedic Hinduism – Brahma, Vishnu and Shiva.

The temple signifies the assertion of Hinduism as a monotheistic religion to meet the legal standard in the country for official recognition, which it secured in 1962, after a period of turmoil and uncertainty following Indonesia's independence in 1945. The tri-murti is presented as the manifestation of one supreme god. The temple combines the antiquity of the faith and traditions with the modern, innovative repurposing of the inherent polytheism of Hinduism as monotheistic.

In Indonesia's legal system, two concepts are in tension – mandatory monotheism and the guarantee of religious freedom. The country's national identity itself is deeply tied to adherence to religion. The country has a national identity card with a mandatory column on religion. Marriage registration, birth certificates, school religious education tracking, civil service promotion,

and even burial rights are tied to a person's declared religion.

Indonesia also guarantees religious freedom. To reconcile this, the state recognised six religions – Islam, Protestantism, Catholicism, Hinduism, Buddhism, and Confucianism – as *agama*, formalised in 1965.

The founding principle of the modern Indonesian state has five components (*Pancasila*), and the first is monotheism, or faith in one supreme god. When this was mandated as state policy, Islam, Catholicism and Protestantism were considered legitimate by default. Hinduism could not meet the three criteria set in 1952 for a community to be recognised as a religion – it had to be strictly monotheistic, possess a recognised holy scripture, and be founded by a prophet.

The application for Hindu recognition was formally turned down by the Indonesian Ministry of Religion in 1952. Reformers organised under the banner of the *Parisada Hindu*

Dharma (later *Parisada Hindu Dharma Indonesia*, PHDI), founded in Bali in 1959, and reframed Balinese practice around a single supreme deity, *Sang Hyang Widhi Wasa*, recasting a richly polytheistic tradition into something that could satisfy the monotheistic test.

Federation of traditions

To satisfy the state's monotheism requirement, Balinese reformers took the Hindu monistic concept of *Brahman* (the impersonal ultimate reality) and personified it as a single supreme god-concept, *Sang Hyang Widhi Wasa* – sometimes equated with the tri-murti fused into one, sometimes identified with the abstract *Acintya* ("the inconceivable"). The concept evolved across three distinct phases to become Indonesia's definitive monotheistic deity. It began with ancient Austronesian and Sanskrit roots, where 'Sang Hyang' signified divine forces and 'Widhi' cosmic law, represented conceptually as the formless *Acintya*.

Islam and Christianity arrived with pre-existing global institutional scaffolding – scriptures, clergy hierarchies, and centuries-old doctrines. Hinduism in Indonesia had to build its scaffolding specifically to satisfy state monotheism rules and qualify as one of the recognised *agama*. But internally it is closer to a federation of distinct traditions unified under a shared nomenclature.

Once Hinduism secured official recognition, it became something other indigenous groups could deliberately import wholesale as a legal shelter. The linkage between Hinduism and Indonesia's indigenous groups is a shared abstract supreme being concept plus a shared certifying institution (PHDI), laid over communities whose actual ritual life – deities, ancestor practice, and funerary rites – remain substantially indigenous and pre-Hindu in origin.

Three common features from older traditions, shared across religions including Catholicism, Protestantism and Hinduism, continue to endure in Indonesia – ancestral worship, animal sacrifice and nature worship. Islam and Christianity too are diverse and pluralistic in Indonesia, though their pluralism, shaped over four to five centuries, is now widely seen as an organic part of the country's cultural depth.



AP

- **Key Terms and Explanations**
- **Pancasila**
 - The foundational philosophical theory of the modern Indonesian state. Formulated ahead of independence, it consists of five inseparable and interrelated principles: monotheism, civilized humanity, national unity, deliberative democracy, and social justice. The first principle, *Ketuhanan Yang Maha Esa* (Belief in the One and Only God), establishes a unique constitutional framework that mandates religious belief while attempting to manage a multi-faith society.
- **Agama**
 - The official, state-recognized status of a religion in Indonesia. To qualify as an *Agama*, a belief system historically had to satisfy rigid bureaucratic and theological criteria: it must be strictly monotheistic, possess a codified holy scripture, and be founded by a prophet. This status grants a community legal recognition, civil rights, and state protection.
- **Sang Hyang Widhi Wasa**
 - The supreme, all-encompassing deity concept formalized by Indonesian Hindu reformers. Translated roughly as the "All-Powerful Divine Order" or "Supreme Lord," this concept was elevated to reframe the traditionally pluralistic and polytheistic elements of Hinduism into a single, supreme monotheistic ultimate reality, satisfying state requirements.
- **Trimurti**
 - The triad of supreme divinity in Hinduism consisting of Brahma (the Creator), Vishnu (the Preserver), and Shiva (the Destroyer). In the Indonesian theological adaptation, these three primary deities are not viewed as separate entities but are structurally reinterpreted as the functional manifestations of the single supreme godhead, *Sang Hyang Widhi Wasa*.
- **Acintya**
 - A Sanskrit-derived philosophical concept meaning "the Inconceivable" or "He who cannot be imagined." Representing the absolute, formless, and ultimate metaphysical reality (Brahman), it provided the essential theological foundation for reformers to argue that Hinduism possesses a singular, transcendent divine core comparable to Abrahamic monotheism.
- **Parisada Hindu Dharma Indonesia (PHDI)**
 - The apex religious council governing Hinduism in Indonesia. Founded in Bali in 1959, this institution was instrumental in organizing religious reforms, codifying texts, and successfully negotiating with the Ministry of Religion to secure constitutional rights and legal recognition for the Hindu population.

- **Main Arguments and Substantive Parts**
- **The Paradox of Monotheism and Religious Freedom**
 - A central challenge in governance is the structural tension within legal systems between mandatory monotheism and the constitutional guarantee of religious freedom. In systems where national identity is deeply intertwined with religious adherence, civic life—including national identity cards, marriage registration, birth certification, and civil service promotions—is tied directly to a citizen's declared state-sanctioned faith. This creates an existential dilemma for traditions that do not naturally fit classical monotheistic definitions.
- **Institutional Exclusion and Theological Adaptation**
 - When modern states establish rigid criteria for religious legitimacy—such as requiring a singular text, a prophet, and strict monotheism—indigenous and pluralistic traditions face systemic exclusion. The initial denial of official religious status to Hinduism in the mid-20th century forced intellectual and religious leaders to engage in deliberate theological restructuring. By anchoring their practice to the abstract philosophical concept of the formless ultimate reality (Brahman), reformers successfully presented a richly varied tradition as a monotheistic faith.
- **The Mechanism of the "Legal Shelter"**
 - Once a complex tradition adapts and achieves formal state recognition, it can serve as a vital institutional and legal umbrella for other marginalized, non-Abrahamic indigenous groups. Across diverse archipelagos, various communities have deliberately adopted the recognized Hindu nomenclature as a legal shelter. This administrative alignment allows them to secure vital civic rights while preserving their localized, pre-historic rituals, ancestor worship, and distinct cultural identities underneath the official state-approved framework.
- **Historical Evolution of the Issue**
- **Ancient Civilizational Confluence (4th–15th Century)**
 - The transmission of Indian religious, linguistic, and philosophical ideas across maritime Southeast Asia established deep civilizational roots. This era witnessed the flowering of powerful Hindu-Buddhist kingdoms, such as the Srivijaya and Majapahit empires. A crowning architectural manifestation of this synthesis is the 9th-century Prambanan Temple complex near Yogyakarta—the largest Hindu temple site in Indonesia dedicated to the Trimurti—signifying the deep historical integration of Vedic traditions with local Austronesian culture.
- **Post-Independence and the Constitutional Mandate (1945–1952)**
 - Following Indonesia's independence in 1945, the state adopted *Pancasila* as its guiding ideology. In 1952, the Indonesian Ministry of Religion formalized strict criteria for state-recognized religions, requiring a singular god, a prophet, and a holy book. Under these rigid parameters, Hinduism was officially denied recognition, creating a legal and political crisis for the millions of citizens who practiced localized variants of the faith.
- **The Reformist Mobilization and Recognition (1959–1965)**
 - In response to marginalization, Balinese intellectuals and religious leaders formed the *Parisada Hindu Dharma Bali* in 1959. They systematically codified rituals, emphasized monistic philosophical texts, and elevated *Sang Hyang Widhi Wasa* as the definitive monotheistic deity. This successful theological engineering led the state to grant official *Agama* recognition to Hinduism in 1962, a status further solidified under a 1965 state decree recognizing six official religions.
- **Contemporary Civilizational Diplomacy (Present Day)**
 - In the modern era, this unique historical synthesis has evolved into a vital pillar of soft-power diplomacy and strategic international relations. High-level bilateral visits to ancient monuments like the Prambanan Temple highlight the enduring cultural bonds between India and Southeast Asia. These shared civilizational links serve as a natural foundation for modern economic, political, and maritime security partnerships in the Indo-Pacific region.

- **Way Forward**
- **Institutionalizing Civilizational Diplomacy**
 - India and its Southeast Asian partners should transition their shared cultural heritage from symbolic bilateral visits into structured, institutional frameworks. This can be achieved by launching joint academic research centers, funding regular Sanskritized and Austronesian linguistic studies, and establishing Track 1.5 and Track 2 dialogue platforms focused entirely on civilizational diplomacy. This approach will translate historical goodwill into modern strategic alignment.
- **Expanding Inclusive Governance Frameworks**
 - For states managing deep internal diversity, legal frameworks should evolve toward more inclusive interpretations of state-guaranteed philosophical guidelines. Expanding legal definitions to recognize localized, micro-indigenous belief systems—without forcing them into rigid, mainstream doctrinal categories—will strengthen social harmony and protect fragile cultural ecosystems from administrative erosion.
- **Joint Heritage Conservation and Economic Ecosystems**
 - Bilateral partnerships should prioritize joint archaeological conservation, digital preservation, and sustainable tourism management. Collaborative initiatives between organizations like the Archaeological Survey of India (ASI) and international heritage bodies at sites such as the Prambanan Temple, can create a shared blueprint for monument conservation. This will not only preserve historic architecture but also generate robust, sustainable tourism economies that benefit local communities.



AXIA IAS ACADEMY
ESTD : 2024

AGAMA

State-Recognized Status

1. Strict Monotheism
2. Codified Scripture
3. Founded by a Prophet

RICH POLYTHEISTIC TRADITION
Challenge the test



ANCESTOR
WORSHIP
& RITUALS

FOUNDATIONS & ADAPTATION



PANCASILA

The 5 Principles
emphasizing
'1st: Belief in One God'

REFORM
(PHDI)

*ACINTYA / SANG HYANG WIDHI WASA

The Inconceivable /
Reframing Brahman (Ultimate
Reality) as a singular
supreme god-concept to
satisfy state mandate.

HISTORICAL TIMELINE OF THE ISSUE



MULTIDIMENSIONAL ANALYSIS

	Preserves micro-identities and local rituals, fosters pluralistic social harmony
	Pancasila deployed to counter radicalism, integrates populations into state
	Highlights friction of liberty vs state dogma, administrative tools shape identity
	Balances state-enforced conformity with authentic deep heritage right
	Anchors India's Act East Policy, counters regional hegemony via civilizational link
	Drives sustainable cultural heritage tourism, generates robust livelihood ecosystems

UPSC CSE LINKAGES & WAY FORWARD

WAY FORWARD: STRATEGIC SOLUTIONS



UPSC SYLLABUS MAPPING (GS I, II, III, IV, Essay, Optionals)

Strong linkages:
- Art & Heritage
- Comparative Constitutions
- Soft Power Diplomacy
- Ethics in Governance

NCERT LINKAGES (Polity, History, Sociology)

Chapter I: chapter: 26
Chapter 3: Chapter: 24
Chapter 3: chapt 26-26
Chapter IV, chapt: 37

PREVIOUS YEARS' QUESTIONS (PYQs)

Prelims

- ✓ Q1: Consider the statements on Prambanan in Indian influence & Majapahit Empire. Were not their tonsmost indicent conpt of educationales: Goveremowasi trestewed to saproltercuras in modern Indonesia.
- ✓ Q2: Philosophical concept of Acintya in the agentified concept of Acintya at snlost the innamler, the sesoatized concept of the Statement.
- ✓ Q3: Pancasila in modern Indonesia in thmimasahomoin to mwot anunmonu seven momuow-and and concepts that Pancasila in remshovaticules in modern Indonesia.

Mains

- ✓ [UPSC: "Footprint of Indian art In academic centers, Fountl Track 1.1 Track 1.5/2 dialogues)."] GS-I, 2018 - 15 Marks
- ✓ [UPSC: "Cultural diplomacy to local ritual windows, integrates populations and ennemes." GS-I, 2018 - 15 Marks
- ✓ [UPSC: "Indian secularism distinct to state degma, ashan secularism toots snate enamentay." GS-I, 2018 - 15 Marks
- ✓ [APSC: "Historical maritime trade to coman chaptral and together ar slan maritiwe in Indonesia." GS-I, 2018 - 15 Marks
- ✓ [APSC: "Analyze how soft-power to comtery counters regional hegemony via civilizational mosystems." GS-I, 2018 - 15 Marks

Indian lab designs quantum algorithm to beat computers

Working with IBM Quantum, BITS scientists simulated the behaviour of subatomic particles on 120 qubits of an IBM processor; in a first for Indian labs, the Quantum Advantage Tracker has deemed the result 'active'

Jacob Koshy
NEW DELHI

Ask Indrakshi Raychowdhury what a quantum computer is bad at and she points to arithmetic.

"If you try to add two numbers, a classical calculator does it easily, whereas doing it on a quantum computer is incredibly difficult," she said in a conversation with The Hindu. "But simulating a highly complex interacting quantum system, where particles mutually influence each other, is relatively easy for a quantum computer. That is highly counterintuitive, but it is where quantum advantage lies."

"Understanding exactly where quantum computers can provide this advantage is currently the biggest challenge, and it is why governments and companies are investing heavily in this space," Dr Raychowdhury, an associate professor in the physics department at BITS Pilani, added.

The problem her team solved a few weeks ago is of the useful kind. Per one expert assessment, it is only one of three problems useful to physicists that has also been so far impervious to the muscle of classical computers. That is, it demonstrates "quantum advantage".

Working with scientists from IBM Quantum, Dr. Raychowdhury and team simulated the behaviour of subatomic particles on 120

Vault ahead

The team's algorithm showed quantum advantage by cracking a problem of real-world relevance

- Quantum computers excel at simulating complex interacting systems rather than at simple arithmetic like classical calculations do

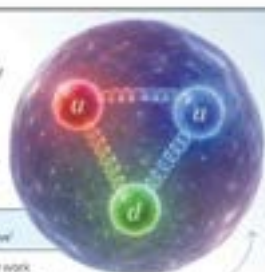
- A team from BITS Pilani (Goa campus) has successfully simulated subatomic particle behaviour on 120 qubits using an IBM quantum processor

- The feat is the first from an Indian laboratory to be verified by the Quantum Advantage Tracker; it is still 'active'

- The team modelled how quarks and gluons evolve in real time, a task considered extremely difficult for classical methods

- Novel encoding methods and noise-mitigation techniques allowed the team's simulation to scale effectively across numerous qubits

- The team demonstrated a useful quantum advantage by solving a real-world physics problem faster than classical machines



The quarks inside a proton, and the gluons that bind them, are governed by nature's strongest force. IMAGE CREATED WITH AI

qubits – the computing currency of quantum computers – of an IBM processor. The calculation took the machine 20 seconds and a classical computer two hours.

The Quantum Advantage Tracker (QAT) exists to police that claim. Launched in November 2025 by IBM, with the Flatiron Institute, the startups BlueQubit and Algorithmiq, and a widening cast of academic reviewers, it is a kind of live peer review where a researcher submits a result and a committee checks it on both classical and quantum machines. The bar is high. Of some 220 items logged on its GitHub page, only around a dozen have been accepted, and just a handful survive as active claims.

"It is more thorough than a standard academic journal," Dr. Raychowdhury said. It is here that her group's entry now sits,

marked 'active' – the first such from an Indian laboratory. Were the problem to be solvable by a classical machine, it would be considered "superseded". Since May, the result hasn't been superseded.

For all the money and noise around quantum computing, the machines have yet to solve a genuinely useful problem faster than an ordinary computer. The best-known demonstrations have been contrived. When Google reported in 2019 that its processor had finished in minutes a task a supercomputer would need 10,000 years to match, the task had no practical use and was chosen only because it suited quantum hardware.

Breaking modern encryption or simulating a large molecule from scratch, remains years away. So the field has begun to chase a narrower prize: "useful" advantage,

a quantum win on a real problem whose answer can be independently checked.

"While the media often highlights quantum applications in drug discovery or materials science, those fields are at a much more primitive stage computationally than high-energy physics," Dr. Raychowdhury said.

The team's problem of choice lies at the foundations of physics. The quarks inside a proton, and the gluons that bind them, are governed by the strong nuclear force, and working out how they move and rearrange in real time is among the toughest problems in the field. Classical methods can pin down a proton's mass with great accuracy but watching the particles evolve, frame by frame, is "exponentially hard to calculate classically," she said. A quantum computer can

however be coaxed into imitating the system directly, like replacing a still photograph with a film.

"I am actually visiting CERN (Switzerland) next month," she said, where the world's most powerful particle smasher pulverises protons to physically trace how the simplest particles may evolve into weightier, more complicated ones. CERN researchers, limited by classical methods, have invited her, she said, to know whether her approach can carry their simulations further.

The model her team used was a simplified stand-in for the full theory of the strong force, which is nature's most powerful force. The team's encoding stripped away mathematical redundancy so the simulation could scale: a task others had run on at most 27 qubits was pushed to 120. "If someone gave me a 1,000-qubit computer today, our algorithm would scale to it seamlessly," she reckoned.

India is only beginning to build towards this. Its National Quantum Mission, the 6,000-crore programme approved in 2023, is funding quantum algorithms and runs a computing hub in Bengaluru, but the country has no high-end quantum hardware of its own, and researchers here lean on machines abroad. "Without algorithms, the hardware is useless; you can't just sit in front of a quantum computer and get an answer," she said.

- **Key Terms and Explanations**

- **Qubit (Quantum Bit):** Unlike a classical bit, which is binary and can only exist as a 0 or a 1, a qubit leverages the principles of quantum mechanics to exist in a state of **superposition** (both 0 and 1 simultaneously) and **entanglement** (where the state of one qubit instantaneously influences another).
- **Quantum Advantage:** This milestone is reached when a quantum computing system solves a genuine, real-world problem significantly faster than the world's most advanced classical supercomputers. It is distinct from "Quantum Supremacy," which often solves abstract, contrived mathematical puzzles with no practical utility.
- **Quantum Advantage Tracker (QAT):** A global, rigorous peer-review benchmarking system launched by a consortium including IBM and the Flatiron Institute. It acts as a scientific ledger that verifies quantum claims, ensuring that a quantum solution remains labeled as '**active**' and has not been outpaced or "superseded" by a newly optimized classical algorithm.
- **Quarks and Gluons:** The fundamental building blocks of nuclear matter. Quarks are elementary particles that combine to form hadrons, such as protons and neutrons. Gluons act as the exchange particles (or gauge bosons) that mediate the strong nuclear force, effectively "gluing" quarks together.
- **Strong Nuclear Force:** One of the four fundamental forces of nature (alongside gravity, electromagnetism, and the weak force). It operates at subatomic distances to bind quarks within protons and neutrons. It is exponentially difficult to simulate classically due to the intense, non-linear interactions between particles.

- **Main Arguments and Substantive Parts**

- The core discourse surrounding the evolution of advanced computing centers on a fascinating paradox: quantum machines are fundamentally misunderstood by the public as mere "faster versions" of classical supercomputers.

- **The Architectural Paradox**

- Quantum computers are notoriously inefficient at basic arithmetic. A simple digital calculator can add large strings of numbers instantaneously, whereas a quantum processor struggles with such linear tasks. However, when it comes to simulating highly complex, interacting quantum systems where every particle mutually influences every other particle in real time, classical supercomputers run into a computational brick wall. This is where quantum algorithms find their true purpose.

- **Real-World Utility vs. Contrived Milestones**

- The trajectory of quantum computing research has shifted from theoretical posturing to functional utility. In 2019, early global milestones claimed "quantum supremacy" by performing calculations in minutes that would take classical systems millennia. However, those tasks were highly contrived and engineered specifically to suit quantum hardware, carrying little practical relevance. The contemporary focus is on solving useful physics problems—such as tracing how subatomic particles evolve frame-by-frame—which offers genuine scientific value.

- **The Algorithm-Hardware Interplay**

- A critical bottleneck in modern deep-tech development is the false assumption that building larger hardware is the sole pathway to progress. As demonstrated by recent research from Indian premier institutes, sophisticated algorithm design is equally vital. By stripping away mathematical redundancies and deploying novel encoding alongside noise-mitigation techniques, scientists successfully simulated subatomic particle behavior on 120 qubits of an external processor. The resulting calculation took a mere 20 seconds, a feat that would demand two hours from a classical machine. This proves that smart software can extract monumental performance from existing, noisy quantum hardware.

- **Historical Evolution of the Issue**
- **The Theoretical Genesis (1980s):** The foundational logic was laid by physicist Richard Feynman, who posited that because nature is inherently quantum-mechanical, classical binary systems would always hit an exponential wall when trying to simulate it. He suggested that only a machine operating on quantum principles could model the natural world.
- **The NISQ Era (2010s):** The global scientific community entered the Noisy Intermediate-Scale Quantum (NISQ) era. Tech conglomerates began building physical quantum processors. These machines, while functional, lacked error-correction capabilities and were highly sensitive to environmental disturbance (noise).
- **The Supremacy Landmark (2019):** A major psychological threshold was crossed when Google's Sycamore processor completed a specialized task in 200 seconds that was estimated to take a supercomputer 10,000 years. This ignited a global space-race style competition in quantum infrastructure, though critics noted the task lacked real-world application.
- **India's Policy Institutionalization (2023):** Recognizing the strategic imperative, the Union Cabinet of India approved the **National Quantum Mission (NQM)** with a financial outlay of **₹6,003 crore**. This shifted India from isolated academic research to an organized, state-backed ecosystem focused on developing quantum computing, communication, sensing, and materials.
- **The Validation and Verification Era (Present):** The establishment of platforms like the Quantum Advantage Tracker introduced a peer-reviewed ledger to audit quantum claims. It was under this strict verification regime that Indian scientists secured their first 'active' quantum advantage status, proving that domestic algorithmic innovation could lead global computational physics.
- **Way Forward**
- **Bridging the Hardware Chasm**
 - India possesses elite intellectual capital in algorithm design, but relies heavily on foreign cloud-based hardware. The National Quantum Mission must aggressively fund domestic fabrication facilities, cleanrooms, and cryogenic testing centers to build indigenous quantum processors. Software cannot run in a vacuum; physical sovereignty over hardware is non-negotiable.
- **Cultivating the Triple Helix Model**
 - There is a vital need to foster closer collaboration between academia (institutions like BITS Pilani), state-backed hubs (such as the computing centers in Bengaluru), and private deep-tech startups.
 - This triple-helix model will ensure that theoretical algorithms are seamlessly transitioned into commercialized tools for pharmaceutical discovery and material sciences.
- **Designing Post-Quantum Cryptographic Defenses**
 - As quantum systems scale toward a thousand qubits and beyond, existing national security encryptions will become obsolete. The Ministry of Electronics and Information Technology (MeitY) must run a parallel track to mandate and deploy quantum-resistant algorithms across all critical information infrastructure, including banking, defense, and power grids.



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EDUCATIVE ANALYSIS

DECODING THE QUANTUM REVOLUTION: INDIAN SCHOLARS & THE PATH TO QUANTUM ADVANTAGE

START

**PROBLEM: COMPLEX
SUBATOMIC PARTICLE SYSTEMS**
(Strong Nuclear Force)



Interacting Systems
(Quarks & Gluons) impossible
to model classically.

STAGE 1

**CLASSICAL BOTTLE-NECK:
ARITHMETIC VS. COMPLEXITY**



Exponential Time

Arithmetic easy, but
complex physics
simulation hard.

STAGE 2

**BITS PILANI INNOVATION:
QUANTUM ALGORITHM**



Designed to scale and
utilize noisy qubits.

STAGE 3

**EXECUTION ON IBM
120-QUBIT PROCESSOR**



120 Active Qubits

First verified active
simulation of this scale
in an Indian lab.

STAGE 4

**VERIFICATION &
ADVANTAGE TRACKER**



**QUANTUM
ADVANTAGE
TRACKER (QAT)**
DEEMED 'ACTIVE'

Peer-reviewed milestone
for useful application.

RESULT COMPARISON

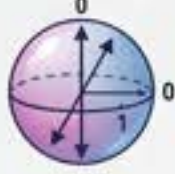
**Classical
CPU (Est.):
~2 Hours**

**Quantum
Processor:
~20 Seconds**

Qubits (Quantum Bits)



Classical bit



Qubit

Superposition: Simultaneously both 0 & 1.

Entanglement



EINSTEIN'S 'Spooky Action': Connected states.

Quantum Advantage vs Supremacy

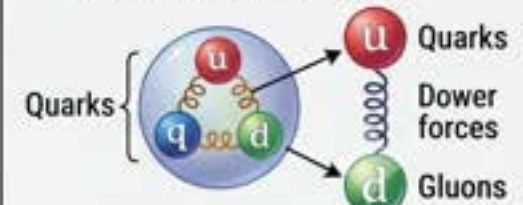
Foquet
solving
a real
problem
(like quarks)



Weird
abstract
puzzle
solving
contrived
math.

Focus on Useful Application vs. Contrived Math.

Subatomic Simulation



Tracing Quark Evolution, not just mass.



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EDUCATING INDIA'S FUTURE

Deadly bird virus PaBV-4 identified for first time in India

Rahul Karmakar

A team of scientists has, for the first time in India, identified and genetically characterised a virus that often causes rapid death in captive psittacine birds, raising concerns about the health of exotic pets and conservation of threatened parrot species.

Psittacine, which means relating to or resembling a parrot, describes the bird family *Psittacidae* and order *Psittaciformes*. It includes budgerigars, cockatiels, cockatoos, lovebirds, macaws, and parakeets.

The team, led by Pankaj Deka and Sangeeta Das of the Assam Veterinary and Fishery University in Guwahati, found and characterised parrot bornavirus 4 (PaBV-4) circulating among captive psittacine birds in India. Their study was published in *Scientific Reports*.

The other members of the team represent institutions in Assam and Gujarat.

They tested 83 psittacine birds from 13 species in aviaries in Assam, Karnataka, and West Bengal in 2020-2024. The birds in-

cluded the African grey parrot, ochre-marked parakeet, yellow-collared macaw, eastern rosella, blue-crowned hanging parrot, rainbow lorikeet, and scarlet-chested parrot.

Three groups

They divided the birds into three groups: those showing clinical signs of proventricular dilatation disease (PDD), clinically healthy cage mates of suspected cases, and birds that had died of suspected PDD. Caused by avian bornavirus, PDD is a largely fatal viral condition affecting

the digestive and nervous systems of birds.

"Amongst the avian bornaviruses discovered, PaBV belonging to species *Orthobornavirus alphapsittaciforme* possess the highest veterinary relevance and are considered to be a major threat to psittacine aviculture," the researchers said.

"Since the discovery of PaBV in psittacine birds suffering from PDD in 2008, PaBV infections have been reported worldwide."

Upon testing cloacal swabs from live birds and

brain and proventriculus tissue in dead ones, the team found 44 of the 83 birds tested were infected. Infection was detected in almost 88% of the dead birds and 19% of the apparently healthy cage mates, underlining how the virus can lurk without showing outward symptoms. The infected birds belonged to nine species whose conservation status ranged from near-threatened to endangered.

Potential risk

The scientists also found that brain tissue and cloa-

cal swabs yielded higher detection rates in dead and live birds, respectively. Genetic analysis confirmed all positive samples had PaBV-4, a strain previously reported in Canada, Israel, Japan, South Korea, and the U.S.

The team found no patterns linking genetic clusters to host species, geography or timing. Suggesting this may reflect the global trade in psittacine birds, the researchers said their findings highlight risks to conservation based on breeding captive birds.

- **Key Terms and Explanations**
 - **Psittacine Birds:** This term refers explicitly to birds belonging to the order *Psittaciformes* and the family *Psittacidae*. Commonly known as the parrot family, this diverse group includes budgerigars, cockatiels, cockatoos, lovebirds, macaws, and parakeets.
 - **Parrot Bornavirus 4 (PaBV-4):** A highly lethal, neurotropic virus belonging to the species *Orthobornavirus alphasittaciforme*. It is recognized as a pathogen of significant veterinary relevance globally due to its rapid transmission and high mortality rates in captive avian populations.
 - **Proventricular Dilatation Disease (PDD):** A fatal viral condition caused by avian bornaviruses. It primarily attacks the digestive and central nervous systems of the bird. Specifically, it leads to the stretching and inflammation of the proventriculus (the bird's fore-stomach), preventing proper digestion and causing wasting, neurological signs, and eventual death.
 - **Asymptomatic / Latent Infection:** A state where a host carries and sheds a pathogen without demonstrating outward clinical symptoms. For instance, testing reveals that nearly 19% of apparently healthy cage mates carry PaBV-4, turning them into silent vectors within aviaries.
 - **Aviculture:** The practice of breeding, rearing, and caring for companion birds in captive environments, ranging from private hobbyist collections to large-scale commercial aviaries.
 - **Exotic Pet Trade:** The international commercial network involving the capture, breeding, and sale of non-native wildlife. As seen with the global spread of PaBV-4, this trade operates across fluid networks, bypassing conventional geographic boundaries.
- **Main Arguments and Substantive Parts**
 - The core thesis surrounding this development revolves around the hidden biosecurity vulnerabilities within domestic aviculture. The cross-country mapping of this pathogen provides concrete evidence of how deeply integrated international wildlife trade routes have become.
 - **The Scale of Domestic Penetration**
 - Comprehensive screenings conducted between 2020 and 2024 across aviaries in Assam, Karnataka, and West Bengal confirmed the active circulation of PaBV-4. The data reveals an alarming epidemiological footprint: out of 83 birds tested across 13 distinct species, 44 were found positive. This indicates that the virus is no longer an isolated overseas threat but an active domestic reality.
 - **High Mortality and Silent Transmission**
 - The diagnostic data highlights a dual threat: an exceptionally high mortality rate combined with high latency. The pathogen was detected in approximately 88% of birds that died showing symptoms of Proventricular Dilatation Disease (PDD). Concurrently, it was found in 19% of entirely asymptomatic cage mates, proving that visual health screenings are fundamentally inadequate for containment.
 - **The Borderless Nature of the Pathogen**
 - Genetic analysis of the Indian strains confirmed complete alignment with PaBV-4 variants previously documented in Canada, Israel, Japan, South Korea, and the United States. The absolute lack of distinct genetic clustering based on host species, geography, or timeline serves as definitive evidence that the virus is distributed via unregulated or poorly monitored global trade pipelines rather than natural evolutionary divergence.

- **Historical Evolution of the Issue**
- **The Pre-Independence and Early Era:** Wildlife management and veterinary sciences in India were historically siloed. Veterinary focus was almost entirely consumer-centric, focusing on livestock and domestic poultry (e.g., Ranikhet disease), while wildlife frameworks ignored exotic companion birds.
- **The 1972 Framework:** The enactment of the Wildlife Protection Act (WPA), 1972, established rigorous protection for indigenous avian species. However, it left a massive legal vacuum regarding the possession, breeding, and health monitoring of non-native exotic birds.
- **The 2008 Global Breakthrough:** Globally, the year 2008 marked a milestone when researchers identified parrot bornavirus as the causative agent behind the mysterious Proventricular Dilatation Disease (PDD) that had baffled aviculturists since the 1970s.
- **The 2022 Legislative Shift:** India closed a major legislative loophole by amending the WPA in 2022, introducing Chapter VB to regulate the trade and possession of CITES-listed exotic specimens via digital platforms like the PARIVESH portal.
- **The Present Discovery:** The definitive identification and genetic characterization of PaBV-4 by collaborative veterinary teams in Assam and Gujarat represents the latest milestone, confirming that global avian pathogens are actively breaching domestic biosecurity barriers.
- **Way Forward**
- **Implementing Mandatory Diagnostic Quarantine**
- India's border control and quarantine protocols must expand beyond standard physical inspections. The government should establish mandatory molecular screening (via PCR testing) for all imported psittacine birds at major international entry points. Given that up to 19% of infected birds can be asymptomatic carriers, negative test results for PaBV-4 must become a mandatory requirement for import clearance.
- **Upgrading the PARIVESH Portal for Health Tracking**
- The Ministry of Environment, Forest and Climate Change should upgrade the PARIVESH portal's exotic species registration system. Pet owners and commercial aviculturists should be required to upload certified veterinary health clearings and report sudden avian deaths, creating a transparent, real-time national database for tracking potential outbreaks.
- **Strengthening Regional Diagnostic Networks**
- Building on the successful collaboration between veterinary institutes in Assam and Gujarat, India should establish specialized regional avian diagnostic labs. Funding these facilities will allow for routine pathogen mapping and genetic sequencing, enabling early detection before localized infections spread nationwide.
- **Standardizing Avicultural Biosecurity Guidelines**
- The Animal Welfare Board of India, in coordination with wildlife biologists, should issue clear biosecurity protocols for private and commercial aviaries. These guidelines should mandate specific cage densities, regular sanitization procedures, and strict isolation protocols for newly acquired birds to minimize the risk of transmission.

INTRODUCTION: THE DISCOVERY



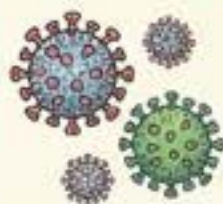
Assam
University



Gujarat
Institutions

- Identified for the **FIRST TIME** in India (2020-2024 testing).
- Found in **Captive Psittacine Birds** (Parrot family).
- Multi-state study: Assam, Karnataka, West Bengal.

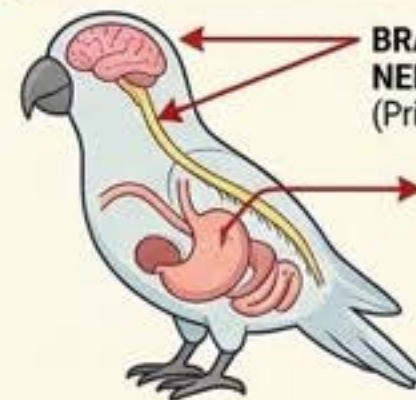
WHAT IS PaBV-4?



- Genus:** *Orthobornavirus alphasittaciforme*.
- Species:** Psittaciforme Bornavirus 4.
- High Veterinary Relevance.**



DISEASE MECHANISM: PDD (PROVENTRICULAR DILATATION DISEASE)



BRAIN & CENTRAL NERVOUS SYSTEM:
(Primary Infection Site).

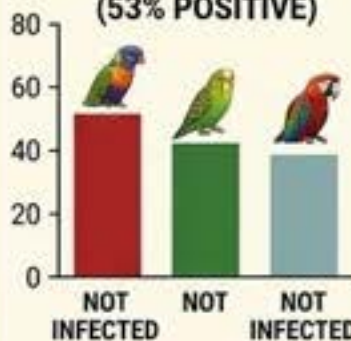
PROVENTRICULUS:
(Causes Dilatation, nerve damage, wasting signs).



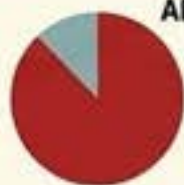
FATAL CONDITION.

STUDY FINDINGS: ALARMING STATISTICS

INFECTION RATES:
44 OUT OF 83 BIRDS
(53% POSITIVE)

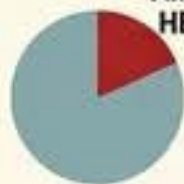


AMONGST DEAD BIRDS
(showing PDD signs):



**~88%
INFECTED**

**AMONGST APPARENTLY
HEALTHY CAGE MATES:**



**~19%
INFECTED**

**SILENT
ASYMPTOMATIC
CARRIERS!**

GLOBAL SPREAD & ROOT CAUSE



Previously
reported:
US.

Previously
reported:
Canada,
Israel,
Japan,
S. Korea,
US.

- Genetic analysis shows **NO GEOD GEOGRAPHIC CLUSTERING**.
- Conclusion: **SUGGESTS GLOBAL TRADE** in Psittacine Birds as the vector.



IMPLICATIONS FOR INDIA & CONSERVATION



African Grey



Endangered



Macaw



Threatened

- Severe threat to **Captive Aviculture**.
- Endangers **THREATENED & ENDANGERED PSITTACINE SPECIES**.
- Risk to **domestic breeding programs**.

Navy commissions stealth frigate *INS Mahendragiri*

V. Kamalakara Rao
VISAKHAPATNAM

The Indian Navy commissioned the sixth advanced P17A-class stealth frigate 'INS Mahendragiri' in Visakhapatnam on Saturday.

The commissioning ceremony, held at the Eastern Naval Command (ENC) headquarters, in the presence of Union Defence Minister Rajnath Singh, marked a significant leap in India's capacity to design, construct, and deploy state-of-the-art naval platforms independently.

Named after the majestic mountain range in the

Eastern Ghats, the vessel symbolises the resilience and indomitable resolve of the Indian armed forces. Its induction into the Navy is viewed as a cornerstone of the 'Atmanirbhar Bharat' initiative, reflecting the country's shift from an importer of military hardware to a global hub for sophisticated warship manufacturing.

An advanced stealth frigate, *INS Mahendragiri* is equipped with cutting-edge technology that places it among the most formidable assets in the Indian Navy's fleet. The vessel features a sophisti-



INS Mahendragiri heading towards Visakhapatnam coast for its official inauguration. SPECIAL ARRANGMENT

cated Combined Diesel or Gas (CODOG) propulsion system, an Integrated Platform Management System

(IPMS), and an array of indigenous combat systems designed for high-intensity naval warfare.

Mr. Singh underscored the balance between embracing next-generation technology and maintaining robust conventional military power. While acknowledging the transformative impact of drones, artificial intelligence, cyber warfare, and hypersonic weapons, he emphasised that the bedrock of national security remains the resolve and expertise of trained soldiers.

"Future wars may be fought with AI, but they will still be won by national resolve, trained soldiers, and credible military power," Mr. Singh remarked.

- **Key Terms and Explanations**
- **Project 17A (Alpha) Frigates:** This is a follow-on program to the Project 17 Shivalik-class frigates of the Indian Navy. These warships are built with improved stealth features, advanced weapons, sensor suites, and platform management systems. They represent the cutting edge of India's indigenous line-of-battle surface combatants.
- **Stealth Technology (Radar Cross-Section Reduction):** A design methodology aimed at making a vessel difficult to detect by enemy radar, infrared, sonar, and visual systems. This is achieved by angling the ship's superstructure, using radar-absorbent paint, and suppressing the thermal signature of the exhaust. For instance, a stealth frigate can appear on enemy radar as a small fishing boat rather than a major multi-role warship.
- **CODOG (Combined Diesel or Gas) Propulsion:** An efficient propulsion system that utilizes two distinct types of engines. For normal, fuel-efficient cruising speeds, diesel engines are engaged. When high-speed dashes or tactical maneuvering are required, high-power gas turbines take over. This ensures an optimal balance between operational range and combat speed.
- **Integrated Platform Management System (IPMS):** A highly sophisticated, computerized system that controls and monitors a ship's marine propulsion, electrical power generation, damage control mechanisms, and auxiliary machinery. It reduces the manual crew requirement and enables real-time response to battle damage.
- **Atmanirbhar Bharat in Defence:** A strategic state policy aimed at achieving absolute self-reliance in military hardware manufacturing. The objective is to eliminate vulnerabilities within global supply chains, secure strategic autonomy, and transition India from being one of the world's largest defense importers to a prominent exporter of advanced defense systems.
- **Main Arguments and Substantive Parts**
- The core discourse surrounding modern naval modernization revolves around two interlocking narratives: industrial self-reliance and the evolving philosophy of warfare.
- **The Self-Reliance and Import Substitution Thesis**
- The primary argument put forth by strategic planners is that true geopolitical sovereignty cannot exist without defense indigenization. The construction and commissioning of advanced platforms like INS Mahendragiri independently by Indian shipyards prove that the domestic industry can handle complex engineering systems. This shifts the national economic profile from a consumer of global military hardware to a creator of high-technology maritime assets.
- **The High-Tech vs. Human Resource Paradox**
- An essential sub-argument addresses the conceptual conflict between next-generation technological automation and traditional military capabilities:
- **The Pro-Technology Stance:** The modern battlespace is increasingly dominated by artificial intelligence (AI), unmanned aerial vehicles (drones), cyber warfare, and hypersonic weaponry. These technologies compress the decision-making cycle, making automated systems indispensable.
- **The Conventional Human Bedrock:** Despite the rise of automated algorithms and long-range precision strikes, the ultimate outcome of a conflict depends on national resolve and trained soldiers. Technology acts as a force multiplier, but it cannot replace human judgment, adaptability, and the willingness of personnel to hold the line under high-intensity conditions.

- **Historical Evolution of India's Naval Indigenization**
- **Phase I: The Post-Independence Transition (1947–1960s)**
 - At independence, India inherited a modest combat fleet consisting primarily of old British vessels. The early focus was on establishing basic operational doctrine. Realizing the vulnerability of relying entirely on foreign yards, the Indian Navy took a visionary step in the 1960s by setting up an internal **Directorate of Naval Design (DND)**. This institutionalized the practice of designing warships indigenously.
- **Phase II: The Genesis of Domestic Shipbuilding (1970s–1990s)**
 - The commissioning of **INS Nilgiri in 1972** (a Leander-class frigate built by Mazagon Dock Shipbuilders Limited) marked India's entry into complex warship construction. This era saw the expansion of Public Sector Undertaking (PSU) shipyards, including MDL and Garden Reach Shipbuilders & Engineers (GRSE). This period was characterized by the integration of Soviet weapons onto Western-designed hulls, building valuable systems integration experience.
- **Phase III: The Stealth and Blue-Water Era (2000s–Present)**
 - The turn of the century saw the launch of Project 17 (Shivalik-class), India's first class of warships featuring stealth characteristics. This paved the way for Project 17A. Major milestones in this current phase include the commissioning of the indigenous aircraft carrier **INS Vikrant** and the deployment of indigenous nuclear ballistic missile submarines (SSBNs) like the Arihant-class. Today, the focus has shifted toward 100% indigenization in the 'Float' and 'Move' categories, while rapidly closing the gap in the high-tech 'Fight' category.
- **Way Forward**
- **Overhauling the R&D Innovation Ecosystem**
 - India needs to increase its gross expenditure on defense research and development, particularly by encouraging partnerships between the Defense Research and Development Organisation (DRDO), academia, and private deep-tech startups. Introducing production-linked incentive (PLI) schemes specifically for marine propulsion systems and advanced sonar technologies can help close remaining gaps in critical components.
- **Modernizing Shipyard Infrastructure**
 - Public sector shipyards need continuous infrastructure updates, including the adoption of modular construction techniques and integrated digital twinning. This will significantly reduce the time it takes to build a ship from keel-laying to commissioning, bringing Indian shipyard timelines closer to global standards seen in South Korea or Japan.
- **Comprehensive Human-Machine Integration Training**
 - As warships become complex nodes within network-centric warfare environments, naval training institutions must update their curricula. Training must focus heavily on electronic warfare, cyber defense, and managing AI-driven decision-making systems. This ensures that operators can seamlessly integrate with automated platforms while maintaining their core tactical instincts.
- **Enhancing Maritime Defense Diplomacy**
 - India should leverage its growing shipbuilding capabilities to export smaller corvettes, fast patrol vessels, and offshore patrol vessels to friendly nations in East Africa, South Asia, and Southeast Asia. This will boost domestic manufacturing scale, generate foreign exchange, and strengthen India's role as an anchor of stability throughout the wider Indo-Pacific region.



AXIA
IAS ACADEMY
RISE ABOVE THE REST

AXIA IAS ACADEMY DEEP-DIVE ANALYSIS: INS MAHENDRAGIRI & INDIA'S NAVAL INDIGENIZATION

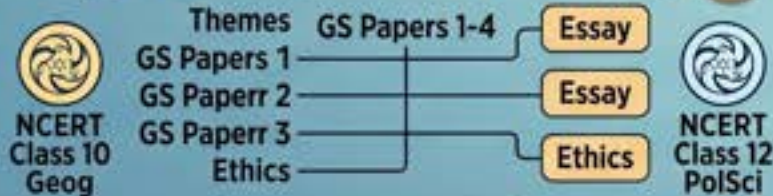
KEY TERMS & EXPLANATIONS



HISTORICAL EVOLUTION



SYLLABUS & NCERT LINKAGES



WAY FORWARD

Solution

Overhauling R&D

Modernizing Shipyards

Human-Machine Integration

Defense Diplomacy



MAIN ARGUMENTS



MULTIDIMENSIONAL IMPACT



LOGICAL & PHILOSOPHICAL BASE



PYQ REFERENCE

- Prelims**
- IORA, Project (as #25)
 - IORA, Project 75
- Mains**
- Strategic Autonomy, IOR
 - Cyber Warfare



One-fourth of India's monsoon rain evaporates mid-air, says new study

Researchers at IITM Pune say rate of evaporation may vary sharply across regions; this is the first observational estimate of raindrop evaporation over India; it will help scientists refine climate models and better understand the monsoon

Jacob Koshy
NEW DELHI

Nearly a quarter of the rain that falls over the north Western Ghats during the southwest monsoon evaporates mid-air, says a study out of the Indian Institute of Tropical Meteorology (IITM), Pune.

This is the first time this fraction has been measured via an experiment in India. This will help scientists refine weather and climate models and better understand the monsoon, an accompanying press statement noted.

Researchers at the IITM, Pune, computed that on average, about 25% of the rain mass evaporates; the actual amount varies from day to day and range from 4%-61%, over the four monsoon months of June to September.

"This is the first observational estimate of raindrop evaporation over the Western Ghats, and the technique can be used over whole of India," the study's corresponding author, Saikat Sengupta, told *The*



Moisture in the air: Rain clouds loom over a large swathe of forest covering the Western Ghat mountains in Kerala. *AFP*

Hindu in a phone conversation. The work was published in the peer-reviewed journal *Atmospheric Chemistry and Physics*.

The Pune result is the first step in a wider effort to map the process across India, where Mr. Sengupta expects it to vary sharply with temperature and humidity, from arid Rajasthan to the rain-soaked coast. The IITM already runs a rainwater-isotope network of nine sites - from the Himalaya to the north-east and Port Blair -

where the sampling is going on for a decade.

Crucial yardstick

The evaporation rate measurements are not merely an academic exercise. When a raindrop evaporates on its way down, it absorbs heat from the surrounding air, cooling the sub-cloud layer, feeding downdrafts and creating cold pools of air at the surface.

This reshapes the very convection that generates the next burst of rain. It is a process that climate and

monsoon models have long struggled to capture. Getting it wrong skews their rainfall prediction and associated atmospheric cooling and storm-triggering potential.

The rain mass loss of roughly one-quarter sits at the lower end of global estimates elsewhere. Satellite data-based measurements put evaporation at the tropics near 20%; over Zurich it was about 40% and near Barbados, roughly 60%. This is because of Barbados's smaller drops and drier air; evaporation eliminates the small drops of light rain and barely touches the large drops of an intense downpour.

To calculate the evaporation rate, Mr. Sengupta and his colleagues utilised the fact that most substances have different combinations of isotopic atoms. Most water, for example, is ordinary H₂O, but a small fraction carries a 'heavier isotope' (more neutrons), a heavy oxygen or a heavy hydrogen. These heavier molecules are marginally more sluggish, so when a drop evap-

orates, the lighter molecules escape preferentially, leaving the surviving drop enriched in heavy isotopes. Rain that evaporated less keeps a lighter signature; in contrast, rain that evaporated more carries a heavier composition.

During the 2019 monsoon, the team collected rainwater and atmospheric vapour at ground level in Pune, read their isotope ratios on a laser spectrometer, and fed the results into a one-dimensional Below Cloud Interaction Model that tracks a single drop falling from cloud base to the ground. Collecting the vapour is challenging - each sample took six to seven hours to trap by freezing atmospheric moisture. The group has begun acquiring portable analysers that read vapour isotopes in real time, to be stationed around the country.

Mr. Sengupta underlined that the results point to a way to improve how weather and climate models represent rainfall.

He noted that quantitative estimates of evaporation are rare for India.

- **Key Terms and Explanations**

- **Sub-Cloud Raindrop Evaporation**

- This refers to the physical phenomenon where raindrops falling from the base of a cloud evaporate into the unsaturated layer of air before they can strike the Earth's surface.

- **Rainwater-Isotope Network**

- An observational infrastructure consisting of specialized monitoring stations deployed across diverse geographic terrains to track the unique isotopic signatures of water molecules in precipitation. By analyzing these signatures over time, scientists map the historical and spatial journeys of air masses and water vapor tracks.

- **Isotopic Fingerprinting (Heavy Isotopes in Water)**

- Most water molecules are composed of ordinary hydrogen and oxygen (H_2O). However, a tiny fraction contains heavier isotopes, such as deuterium (2H) or oxygen-18 (^{18}O), which possess extra neutrons.

- **Mechanics:** During evaporation, lighter water molecules (1H and ^{16}O) escape into vapor form more readily because they are more agile. This leaves the remaining unevaporated raindrop progressively enriched with heavier isotopes. Measuring this ratio tells scientists exactly how much evaporation a raindrop underwent during its descent.

- **Below-Cloud Interaction Model**

- A specialized, one-dimensional mathematical and physical simulation used by meteorologists. It tracks the thermodynamic and physical transitions of an individual raindrop as it travels from the ambient atmosphere at the cloud base down to the surface, accounting for variables like local humidity, temperature, and droplet size.

- **Convective Feedback Loops**

- An atmospheric cycle where a change in one physical parameter triggers a chain reaction that modifies the original phenomenon. When falling rain evaporates mid-air, it absorbs latent heat from the surrounding atmosphere, cooling it down. This chilled, dense air rushes downward to create surface "cold pools" and downdrafts, which subsequently alter how the next wave of warm, moist air rises (convection), directly influencing the lifecycle of subsequent rainstorms.

- **Main Arguments and Substantive Parts**
- **The One-Fourth Precipitation Loss**
 - The foundational insight of recent observational research in the northern Western Ghats reveals that approximately 25% of the total water mass falling as rain during the critical Southwest Monsoon evaporates entirely mid-air. This means that a substantial portion of the moisture transported across the oceans does not directly feed the immediate surface hydrological systems upon its first descent.
- **Extreme Daily Volatility**
 - This mid-air evaporation rate is far from static. It exhibits extreme localized fluctuations on a day-to-day basis, swinging dynamically from a negligible 4% to an astonishing 61% over the four-month monsoon cycle (June to September). These variations are closely linked to immediate atmospheric conditions:
 - **The Scale Effect:** Light, mist-like rains featuring smaller droplet sizes suffer near-total elimination through evaporation in dry sub-cloud air layers.
 - **The Downpour Effect:** Heavy, intense downpours with large, fast-falling droplets cut through the sub-cloud layer with minimal mass loss.
- **The Thermodynamic Cooling Engine**
 - The mid-air evaporation process acts as an atmospheric air conditioner. As liquid water transitions back to vapor, it absorbs latent heat from the surrounding air column. This creates localized pockets of chilled, dense air that plunge toward the ground as powerful downdrafts. These cold pools alter surface wind dynamics and restructure the thermal properties of the lower atmosphere, dictates where and when the next convective cloud cells will burst.
- **Re-benchmarking Global and Regional Climate Models**
 - Historically, climate and weather forecasting models have struggled to accurately simulate the behavior of the Indian Monsoon, frequently leading to skewed rainfall predictions. Integrating direct, ground-truth isotopic observations allows scientists to move past theoretical guesswork. Interestingly, India's average 25% mid-air evaporation loss sits at the lower end of global tropical environments—compared to around 20% across the broader tropics, 40% over inland Europe (Zurich), and nearly 60% in drier oceanic environments like Barbados. This underscores the unique atmospheric behavior dictated by the Indian subcontinent's topography.



- **Historical Evolution of the Issue**
- **The Empirical and Statistical Era (Late 19th Century to Mid-20th Century)**
 - Early attempts to understand and forecast the Indian Monsoon, spearheaded by pioneers like H.F. Blanford and Sir Gilbert Walker, relied heavily on surface-level statistical correlations. Forecasters looked at distant indicators like Eurasian snow cover and global atmospheric pressure shifts (the Southern Oscillation). During this era, the atmosphere between the cloud base and the ground was treated as a simplified, unmonitored pathway, with little regard for the microphysical changes happening to falling rain.
- **The Radiosonde and Upper-Air Upper-Atmospheric Era (1950s–1980s)**
 - The introduction of regular weather balloons (radiosondes) allowed meteorologists to measure temperature, humidity, and pressure at various altitudes. While this provided the first clear vertical profiles of the troposphere, the actual interaction between falling raindrops and the air layers beneath the cloud remained largely theoretical, constrained by a lack of direct observational tools.
- **The Satellite and Space-Based Remote Sensing Era (1990s–2000s)**
 - With the launch of advanced meteorological satellites, scientists gained the ability to estimate broad, macro-level evaporation rates across the global tropics. However, space-borne sensors faced limitations when peering through thick, moisture-laden monsoon cloud decks. They could offer sweeping global averages (such as the general 20% tropical baseline) but were unable to capture the highly localized, daily variations taking place under the clouds of specific terrains like the Western Ghats.
- **The National Monsoon Mission and Dynamical Modeling (2010s)**
 - India shifted its focus toward advanced, physics-based numerical and dynamical weather models through the National Monsoon Mission. While these high-performance computing models dramatically improved seasonal and deterministic forecasts, they frequently hit a wall in accuracy. This was primarily because they lacked real-world, localized data regarding how much falling rain was lost to evaporation before hitting the ground.
- **The Isotopic and Microphysical Observation Era (Present Day)**
 - The current era is defined by a shift toward high-precision field physics. By establishing multi-site rainwater-isotope networks across diverse ecological zones—spanning from the high-altitude Himalayas to the coastal Western Ghats and the remote Bay of Bengal—scientists can now use laser spectrometers to track the water cycle at a molecular level. This field-validated data bridges the final gap in understanding sub-cloud raindrop microphysics, transforming how we model and predict monsoon behavior.

- **Way Forward**

- **Expanding the National Isotope Observation Footprint**

- The current network of nine isotope tracking sites should be systematically expanded into a comprehensive national grid. Priority should be given to establishing stations across vulnerable agro-climatic zones, such as the semi-arid tracts of Central India, the rain-shadow regions of the Deccan Plateau, and the rapidly shifting ecosystem of the Northeast.

- **Direct Integration into Operational Weather Models**

- The Indian Meteorological Department (IMD) and allied research bodies should actively incorporate these newly discovered sub-cloud evaporation percentages into their operational, high-resolution dynamical forecasting systems. Replacing generalized assumptions with real-world, region-specific evaporation data will significantly improve the accuracy of short- and medium-range rainfall predictions.

- **Decentralizing Advanced Weather Technology**

- Investing in portable, real-time laser spectrometers will allow regional agricultural universities and state disaster management centers to gather localized atmospheric data. This equipment can help build a bottom-up network of weather observations, making high-precision science accessible at the community level.

- **Developing Climate-Resilient Agricultural Advisories**

- Agricultural extension services should use these refined water-yield forecasts to update their localized crop advisories. Providing farmers with precise insights into actual expected soil moisture—rather than just general cloud-cover predictions—will help them make more informed decisions regarding seed selection, irrigation scheduling, and crop choice, ultimately reducing their vulnerability to weather fluctuations.

INDIA'S MONSOON RAIN: THE MID-AIR EVAPORATION PHENOMENON

A DETAILED ANALYSIS FOR UPSC CSE PREPARATION

CORE FINDING & REGION

REGION: NORTHERN WESTERN GHATS
(KERALA/MAHARASHTRA)

≈ 25% LOST TO VAPOR
(Range: 4% - 61%)

Nearly a quarter of rain
evaporates mid-air

STUDY:
IITM PUNE

METHOD: ISOTOPIC FINGERPRINTING

LASER SPECTROMETRY
ON STABLE ISOTOPES

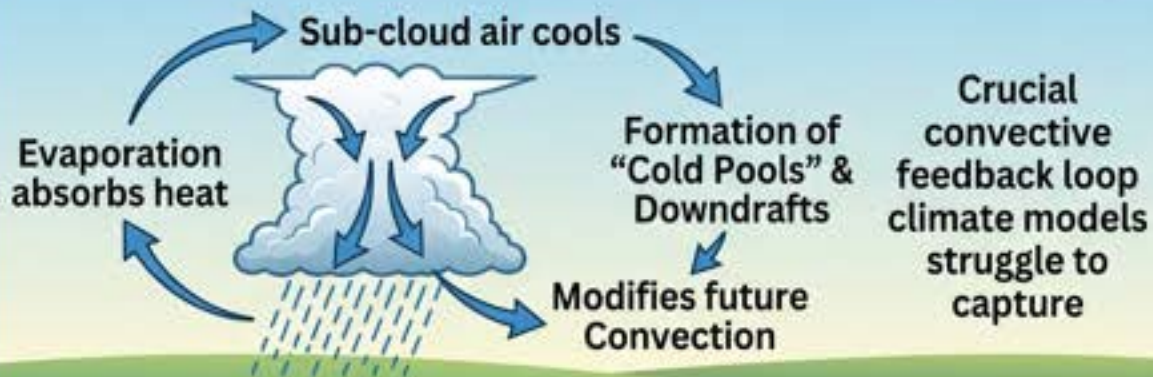
Lighter molecules
escape preferentially

Unevaporated drop enriched
with heavier isotopes

• Below-Cloud Interaction Model

● Ordinary H₂O
● Heavy Isotope
(e.g., O-18)

THERMODYNAMIC IMPACT & FEEDBACK LOOP



SIGNIFICANCE & GLOBAL CONTEXT



KEY BENEFITS:

- Better Rainfall Prediction
- Refined Climate Models
- New Standard Yardstick





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UPSC CSE CLASSES - PRELIMS + MAINS + INTERVIEW GUIDANCE

- **EXPERT FACULTY & MENTORSHIP**
- **COMPREHENSIVE STUDY MATERIAL**
- **REGULAR TEST SERIES & EVALUATION**
- **CURRENT AFFAIRS & ANSWER WRITING FOCUS**
- **SMALL BATCH SIZES FOR PERSONAL ATTENTION**

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