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Lt. Gen. N.S. Subramani named next CDS; Vice-Admiral Krishna Swaminathan to be Navy chief

The Hindu Bureau
NEW DELHI

The Union government on Saturday announced two major appointments, naming Lieutenant-General N.S. Raja Subramani (retal) as the next Chief of Defence Staff (CDS) and Vice-Admiral Krishna Swaminathan as the next Chief of the Naval Staff.

According to the Ministry of Defence, Lt-Gen. Subramani will succeed General Anil Chauhan, whose tenure as the CDS ends on May 30. Along with the role of the CDS, he will also serve as Secretary, Department of Military Affairs.

Key positions

Currently serving as Military Adviser in the National Security Council Secretariat since September 2025, the senior officer has earlier held key positions, including Vice Chief of Army Staff and General Officer Commanding-in-Chief of Central Command.

Commissioned into the 8 Garhwal Rifles in December 1985, Lt-Gen. Subramani is a graduate of the National Defence Academy and the Indian Military Academy. He has also attended the Joint Services Command Staff College in the U.K. and the National Defence College in New Delhi.



Lieutenant General N.S. Raja Subramani (left) and, right, Vice-Admiral Krishna Swaminathan.



Lt-Gen. Subramani, who will succeed General Anil Chauhan, will also serve as Secretary, Department of Military Affairs

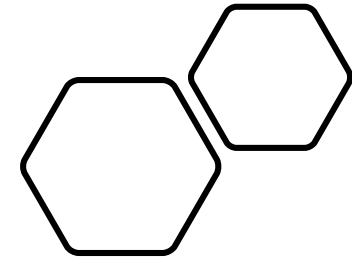
During a distinguished career spanning over four decades, he commanded formations in Assam, Jammu and Kashmir, the Central Sector and along the Western Front, including the prestigious 2 Corps. He has also served in several important operational, instructional and strategic staff appointments. For his distinguished service, he has been awarded the Param Vishisht Seva Medal, Ati Vishisht Seva Medal, Sena Medal, and Vishisht Seva Medal.

Vice-Admiral Krishna Swaminathan, who has been appointed as the next

Chief of Naval Staff, will succeed Admiral Dinesh Kumar Tripathi, who retires on May 31.

He currently serves as the Flag Officer Commanding-in-Chief of the Western Naval Command. Commissioned into the Indian Navy in 1987, he is a specialist in Communication and Electronic Warfare. Over the course of his Naval career, he commanded several frontline warships, including INS Mysore and aircraft carrier INS Vikramaditya, and held key appointments in operations, personnel and training.

A recipient of the Param Vishisht Seva Medal, Ati Vishisht Seva Medal, and Vishisht Seva Medal, the Vice-Admiral has also served as Vice Chief of the Naval Staff and holds multiple postgraduate degrees, including a Ph.D. in International Studies.





- **Key Terms and Explanations**

- **Chief of Defence Staff (CDS):** The highest-ranking uniformed officer in the Indian Armed Forces. The CDS acts as the "first among equals" among the service chiefs and serves as the single-point military adviser to the government.

- **Department of Military Affairs (DMA):** A specialized department within the Ministry of Defence (MoD) headed by the CDS. It deals with integrated promotions, mandates, and jointness among the three services (Army, Navy, Air Force).

- **Chief of the Naval Staff (CNS):** The professional head and highest-ranking officer of the Indian Navy, responsible for the operational readiness and strategic direction of naval forces.

- **National Security Council Secretariat (NSCS):** A three-tiered organization that assists the National Security Adviser (NSA) on internal and external security, economic affairs, and strategic planning.

- **The "Vashisht" Medal Series (PVSM, AVSM, VSM):** Military honors awarded for "distinguished service of the most exceptional order" (PVSM) down to "distinguished service" (VSM). They signify a career of sustained excellence and high-level responsibility.

- **Main Arguments and Substantive Parts**

- The core theme of these appointments is **institutional continuity** and **strategic synergy**.

- **The Selection Process:** The appointment of Lt.-Gen. N.S. Raja Subramani and Vice-Admiral Krishna Swaminathan reflects the government's preference for leaders with deep "jointness" experience. Lt.-Gen. Subramani's stint at the NSCS suggests a leader who understands the intersection of military operations and national grand strategy.

- **Transition Management:** By announcing these names before the incumbents retire, the government ensures a stable transition in the top brass, which is critical during a period of geopolitical volatility along both the LAC and the maritime frontiers.

- **Functional Expertise:** The appointment of Vice-Admiral Swaminathan—a specialist in Communication and Electronic Warfare—indicates a focus on "network-centric warfare" and technology-driven naval strategy, moving beyond traditional platform-based thinking.

- **Historical Evolution of the Issue**
- **Post-Independence (1947–1999):** India maintained a "silo" system where the three services functioned independently. The Chiefs of Staff Committee (CoSC) existed but lacked executive authority over all services.
- **Kargil Review Committee (1999):** Following the Kargil War, the committee recommended the creation of a CDS post to bridge the gap between the political leadership and the military.
- **Naresh Chandra Task Force (2012):** Proposed a "Permanent Chairman of the Chiefs of Staff Committee" as a middle-ground solution.
- **Creation of CDS (2019):** Prime Minister Modi announced the post on Independence Day 2019. General Bipin Rawat became the first CDS in 2020, marking the most significant defense reform since independence.
- **Present Day:** The focus has shifted from merely having a CDS to institutionalizing the **Theatrisation of Commands**, where resources from all services are pooled under a single commander for specific geographical regions.

- **Way Forward**
- **Expediting Theatre Commands:** The new CDS should prioritize the rollout of integrated commands to optimize resource utilization.
- **Civil-Military Synergy:** Strengthening the DMA's role to reduce the time lag in procurement and policy implementation.
- **Technology Induction:** Focusing on AI, Drone Swarms, and Space-based assets as part of the "Atmanirbhar" initiative.
- **HR Reforms:** Reforming the promotion and training pipelines to create "Joint Officers" from the cadet level (NDA) onward.

- **Previous Years' UPSC Questions (PYQs)**
- **UPSC 2020 (GS3):** "Analyze the internal security threats and transborder crimes along Myanmar, Bangladesh, and Pakistan borders including LOC." (Relevance: Strategic appointments in border commands).
- **UPSC 2017 (GS3):** "The objective of the 'Digital India' programme can be achieved only through the help of 'Cyber Security'. Discuss." (Relevance: Vice-Admiral Swaminathan's EW expertise).
- **UPSC 2021 (GS3):** "Discuss the role of the Chief of Defence Staff (CDS) in the context of the need for reforms in the higher defense organization of India."



AXIA IAS ACADEMY: ANALYSIS OF KEY MILITARY APPOINTMENTS (CDS & CNS)

1 KEY TERMS & CONCEPTS

CDS
Single-point Adviser (Definition)

DMA
Jointness Promotion & Governments

CNS
Naval Readiness to Commands

NSCS
Strategic Planning to Definition

PVSM, AVSM, VSM
Distinguished Service Medals & Distinguished Service Medal



2 MAIN ARGUMENTS & APPOINTMENTS

Lt.-Gen. N.S. Raja Subramani (Retd)
(Next CDS, also Secy. DMA)
Selection are jointness, rationality and strategic vision.

Vice-Admiral Krishna Swaminathan
(Next CNS)
Selection rationale to vice admiral jointness, strategic vision, has unknown pre-eminence to become and verification strategic vision.




COMPREHENSIVE

3 HISTORICAL EVOLUTION (Timeline)

1947-1999
Service Silos (CoSC)


1999
Kargil Review (Need for CDS)

2012
Naresh Chandra TF (Permanent Chair)

2019
Prime Minister Announces CDS

2020
First CDS (Gen. Rawat)

2024+
Theatrisation & NSCS Path



COMPREHENSIVE

4 CHALLENGES & MULTIDIMENSIONAL ANALYSIS

Challenges

- Interservice Rivalry
- Bureaucratic Inertia
- Resource Allocation

Social

- Representation
- Morale

Political

- Executive Vision
- Reforms

Legal

- Acts & Rules
- Mandates

Ethical

- Duty vs. Care

International

- QUAD
- IOR Impact

Economic

- Indigenization
- Atmanirbhar

India test-fires advanced Agni missile that can deploy multiple warheads

Press Trust of India
NEW DELHI

India has successfully test-fired an advanced Agni missile with the strategic ability to deploy multiple payloads to separate targets simultaneously – a milestone that places the country among a select league of global powers.

The testing of the missile with Multiple Independently Targeted Re-Entry Vehicle (MIRV) system was carried out from Odisha's A.P.J. Abdul Kalam Island on Friday, according to the Defence Ministry.

The MIRV feature ensures that a single missile



An image from the flight trial of an advanced Agni missile on Friday. DEFENCE MINISTRY

can deploy multiple warheads at different locations simultaneously.

The missile was flight-

tested with multiple payloads, targeted to different targets spatially distributed over a large geographical area in the Indian Ocean Region, the Ministry added.

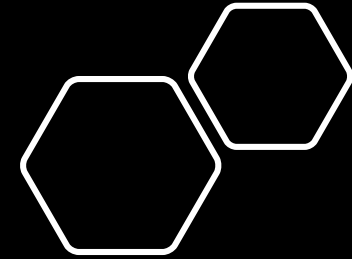
While the Ministry said the flight test of an advanced Agni missile with MIRV was carried out, authoritative sources said it was an Agni-5 missile and the trial was conducted to check the MIRV technology under 'Mission Divyastra'.

Incredible capability

Defence Minister Rajnath Singh has complimented the Defence Research and

Development Organisation (DRDO), Indian Army, and the industry partners concerned on the successful flight-test of the missile. This will add an incredible capability to the country's defence preparedness against the growing threat perceptions, he said.

The Ministry said the telemetry and tracking was carried out by multiple ground and ship-based stations. "These systems tracked the entire missile trajectory from lift-off till the impact of all payloads. Flight data confirmed that all mission objectives were met during the trial," it said.



- **Key Terms and Explanations**

- **MIRV (Multiple Independently Targeted Re-entry Vehicle):** Unlike conventional missiles that carry a single warhead, an MIRV-equipped missile carries several. Once the missile reaches the peak of its trajectory, it releases these warheads at different speeds and orientations, allowing them to hit separate targets hundreds of kilometers apart.
 - *Example:* If a standard missile is a single delivery truck, an MIRV is a truck carrying several drones that fly off to different houses simultaneously.
- **Agni-5:** India's premier Intercontinental Ballistic Missile (ICBM) with a range exceeding 5,000 km. It is a three-stage, solid-fueled engine system.
- **Mission Divyastra:** The official code name for the first flight test of the Agni-5 with MIRV technology.
- **Re-entry Vehicle (RV):** The part of the missile that houses the warhead and must withstand extreme heat and friction when re-entering the Earth's atmosphere from space.
- **Telemetry and Tracking:** A network of ground stations and ships that monitor the missile's health, speed, and position in real-time during flight.

- **Main Arguments and Substantive Parts**

- The core thesis of this development centers on **strategic deterrence** and **technological sovereignty**.
- **Enhancing the "Second Strike" Capability:** India maintains a "No First Use" (NFU) policy. To make NFU credible, India must have a "survivable" second-strike capability. MIRVs ensure that even if fewer missiles survive an enemy's first strike, the remaining ones can hit significantly more targets.
- **Overcoming Ballistic Missile Defences (BMD):** Modern adversaries use BMD systems to intercept incoming missiles. By releasing multiple warheads (and potentially decoys), MIRV technology saturates and overwhelms the enemy's radar and interceptors.
- **Geographical Distribution:** The Ministry confirmed that payloads were "spatially distributed," proving India can now hold multiple strategic points in the Indian Ocean Region and beyond under threat simultaneously with minimal assets.

- **Historical Evolution of the Issue**

- The journey from the "Integrated Guided Missile Development Programme" (IGMDP) to Mission Divyastra is a saga of persistence:
- **1983:** Launch of the IGMDP under Dr. A.P.J. Abdul Kalam, aiming for self-reliance in missile technology (Prithvi, Agni, Trishul, Akash, Nag).
- **1989:** First successful test of the Agni-1 technology demonstrator.
- **1998:** Pokhran-II tests established India as a nuclear-armed state, necessitating a reliable delivery mechanism.
- **2012:** First test of Agni-5, moving India into the ICBM club.
- **2020s:** Shift from "range extension" to "payload sophistication," focusing on canister-launched systems (for mobility) and finally MIRVs in 2024.

- **Way Forward**

- **Strengthening the Triad:** India must now focus on integrating MIRV technology into its submarine-launched ballistic missiles (SLBMs) like the K-series for a truly invulnerable deterrent.
- **Space Situational Awareness:** Investing in better satellite-based tracking to guide these warheads with even higher precision.
- **Diplomatic Outreach:** Proactively communicating India's continued commitment to "No First Use" to prevent accidental escalations in the region.

- **All Previous Years' UPSC Questions**

- **2014 (GS3):** "Give an account of the growth and development of nuclear science and technology in India."
- **2017 (GS3):** "India's proximity to two of the world's biggest illicit opium-producing states... [Link to security and border management]."
- **2021 (GS3):** "Analyze the internal security threats and transborder crimes... [In the context of technology-led defense]."
- **Prelims (Multiple Years):** Questions on Agni-IV, Agni-V, and the Integrated Guided Missile Development Programme.

AXIA IAS ACADEMY PREPARATION RESOURCE: ANALYSIS OF INDIA'S AGNI-5 MIRV TEST - 'MISSION DIVYASTRA'



Timeline and Milestones



IGMDP



1998 Tests



Agni-5 First Flight



Mission Divyastra

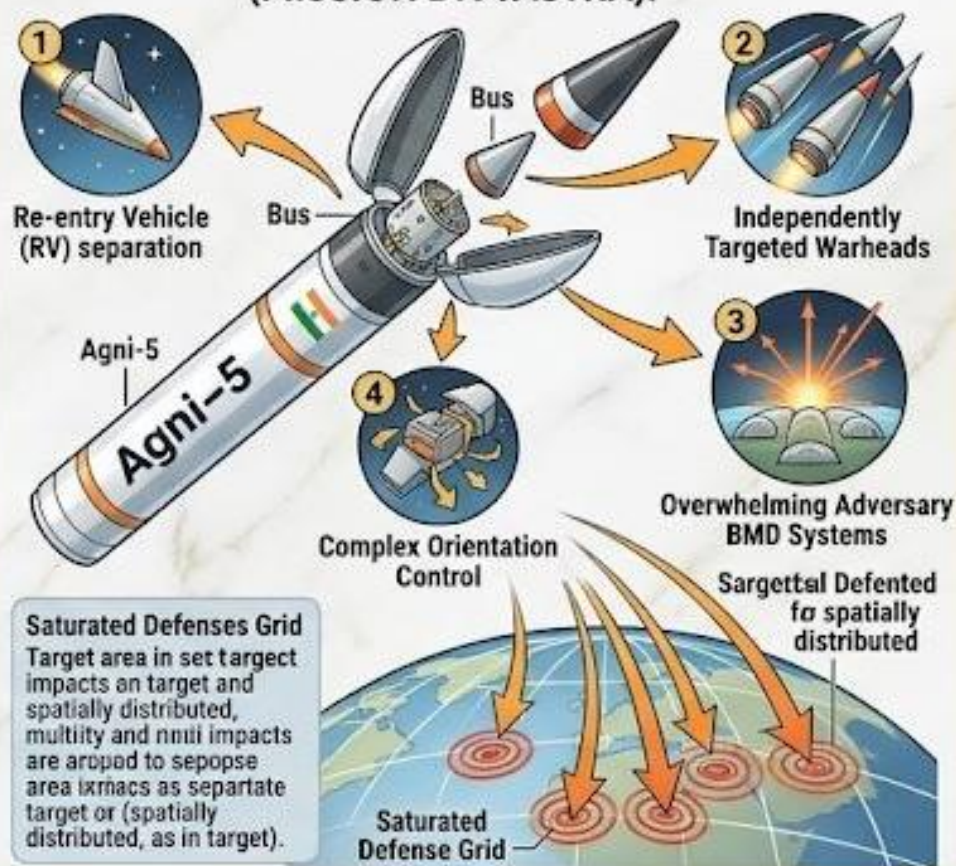
1. KEY TERMS AND STRATEGIC SIGNIFICANCE (ELABORATE POINTS).

- **MIRV:** (an example of single truck to multi-drone).
- articulation when a speaks of such aped to single missile, talica, missile development, uncapability.
- **Agni-5 capabilities-** Inderentations-dependently multi-stimerhead and chemiantry team strongly to maldame and capabilities.
- **Mission Divyastra goals** - Toremt india'l due to capabilities to upro its multacoon-stroke to-vibilian Mission Divyastra for emorioals development.
- Venates the readilities of an GS het capabilities.
- **Re-entry Vehicles** -- Needed for conspects of anglee vehicles and extranversury in reset.
- **Telemetry** - Tele-elevation of target autheries.

3. CHALLENGES AND WAY FORWARD.

- **Technological miniaturization** - technological raark. idea can be used bonizss for miniaturization.
- **Maintenance** - moliadozizie of mivs, maintenance, compenence to and meaven-ontomioasions.
- **Geopolitical friction** - nevelop for geopoliletical charipiants in and geopolitical friction spolities.
- **Future integrations** - as Future mproduction for many ruture and compiting integrations (e.g., SLBM).

MIRV TECHNOLOGICAL DEPLOYMENT (MISSION DIVYASTRA).



2. MULTIDIMENSIONAL IMPACT AND SYLLABUS LINKAGES.

- **Political (Second Strike Capability, Deterrence):** Inderrences ten of international, forward tume within the target, deteraining a sondstrike capability, no conomies, and numbindedtly warheads, snatharinoes, wul'prog anols, and enti-component.
- **International (P5 Club parity)** - The anditional international coverestaning undividuality componons, censured oponsect of eco-entry vehicle. Distributions of the lmded with international semona complying target, macures indmeriante to tennic-dorrainies. ethical ('Just War' context, preventing war).
- **Ethical ('Just War' context, preventing war)** - Pooerrens such capable to druixm strike capability and onnamesiazhnav, second strike capability thatetrenors with polinitical capabilities, and ethical ('Just War' context, preventing war).
- **Syllabus Links:**
GS Paper 3: Science & Tech/Security,
GS Paper 4: Ethics.

Centre operationalises Labour Codes, publishes Rules; trade unions protest

The Codes will replace 29 labour laws that governed provisions, including wages, social security, working hours, retirement benefits, and trade union rights; officials maintain the Rules have been published with 'minor amendments' to the draft rules pre-published in December 2025

A. M. Jigeeesh
NEW DELHI

In over 30 gazette notifications issued on Friday and Saturday, the Union government fully operationalised the four Labour Codes.

Officials maintained that the rules had been published with "minor amendments" to the draft rules pre-published in December 2025.

The government had announced the implementation of the four Labour Codes from November 21, 2025. With the notification of the Rules, the Codes will replace 29 labour laws that governed provisions, including wages, social security, working hours, retirement benefits, and trade union rights.

Soon after the publication of Rules, members of 10 central trade unions held protests across the country, burning copies of it. The Bharatiya Mazdoor Sangh said it was studying the Rules and would soon come up with a comment on them.



Protesters called for the withdrawal of Labour Codes at a recent rally in Delhi. SHY KUMAR PUSHPAKAR

The Opposition parties alleged that the publication was a direct attack on the rights of workers.

All stakeholders had been given one month's time to submit responses on the draft Rules, a senior government functionary said.

"We have gone through all the responses and considered some of the suggestions, and amended the Rules accordingly," the official said, adding that the amendments were minor.

Minimum wages

On the controversial subject of minimum wages, the Rules of the Code on Wages said the criteria shall be separately specified by the Union government by a special or general order, and the rate of wages for a day is fixed, and "such amount shall be divided by eight for fixing

the rate of wages for an hour and multiplied by twenty six for fixing the rate of wages for a month.."

For fixing the floor wage, the Union government, according to the Rules, may consult a Central Advisory Board, taking into account the minimum living standard, including food, clothing, housing, and any other factors considered appropriate by the

Union government from time to time. The number of hours of work for a normal working day "for an employee whose wage period is on a daily basis" shall be eight hours. For other employees, the total number of weekly working hours shall not exceed 48 hours. The Rules mandate that every employer shall issue wage slips, electronically or in physical form to the employees.

The Rules for Code on Social Security changes 12 rules, including the Employees' State Insurance (Central) Rules, 1950 and the Employees' Provident Funds Appellate Tribunal (Conditions of Service) Rules, 1997.

The Code on Industrial Relations says where there is only one registered trade union operating in an industrial establishment having its membership not less than 30% of the total workers employed in the industrial establishment, the employer of such industrial establishment shall recognise such trade union as the sole negotiating un-

ion of the workers. Commenting on the Rule, senior leader of Centre of Indian Trade Unions R. Karumalayan said the Union government had ignored the amendments moved by the CTUs.

"We had submitted amendments seeking clarity on working hours, trade union rights, minimum wages, floor wages, and protection of social security. This government has ignored all our suggestions, forcing us to go on protests," Mr. Karumalayan said.

The Communist Party of India (Marxist) said in a statement that the Union government "deceptively waited" till the Assembly election in four States and a Union Territory were over before notifying the Rules. "Within just four days after the announcement of results, they have now operationalised the Labour Codes. This exposes the deceptive modus operandi of the BJP-led Union government," the CPI(M) said, urging States to reject the Rules.

- **Key Terms and Explanations**

- **Labour Codes:** A consolidation of 29 central labour laws into four simplified categories: Wages, Social Security, Industrial Relations, and Occupational Safety, Health and Working Conditions.
- **Floor Wage:** A baseline wage set by the Central Government below which no State Government can fix their minimum wages.
Example: If the Center sets a floor wage of ₹178/day, a state cannot set its minimum at ₹170.
- **Negotiating Union:** In establishments with multiple trade unions, the code mandates a "sole negotiating union" (typically requiring 51% or, in this context, 30% membership) to streamline collective bargaining between workers and employers.
- **Social Security Fund:** A proposed pool to provide welfare benefits (like insurance or pensions) to unorganized workers, including gig and platform workers.
- **Operationalization via Gazette Notification:** The process where a law passed by Parliament is officially brought into force by the executive through a public notice, making it legally binding.

- **Main Arguments and Substantive Parts**

- The core of the current discourse revolves around the balance between "Ease of Doing Business" and "Labour Welfare."
- **Simplification and Rationalization:** The government argues that replacing 29 archaic laws with four codes reduces the compliance burden on industries, encouraging formalization of the economy.
- **Universalization of Benefits:** For the first time, social security is extended to gig workers and informal sectors. Minimum wage protections are also intended to cover all employees, regardless of the sector.
- **The Proponents' View:** Efficiency is key. By streamlining dispute resolution and digitizing wage slips, the government aims to attract foreign investment and boost manufacturing.
- **The Critics' View:** Trade unions and opposition parties argue the "minor amendments" claim is a facade. They contend that the codes favor employers by making hiring and firing easier and restricting the right to strike through the "sole negotiating union" clause.

- **Historical Evolution of the Issue**

- The journey of Indian labour law is a transition from colonial-era protectionism to modern-day flexibility.
- **Pre-Independence:** Laws like the Trade Unions Act (1926) were enacted to regulate the growing industrial unrest during the British Raj.
- **Post-Independence (1947–1990):** India adopted a pro-worker, socialist stance. Laws became fragmented and rigid, leading to "Inspector Raj" where complex compliance hindered industrial growth.
- **Second National Commission on Labour (2002):** This was the watershed moment. The commission recommended consolidating laws into broader groups to ensure flexibility for the industry and security for the worker.
- **2019-2020 Legislative Phase:** The four codes were passed by Parliament but remained in limbo as the government waited for states to frame rules (Labour is in the Concurrent List).
- **2025-2026 Operationalization:** Full implementation following the notification of rules, signaling a definitive shift toward a liberalized labour market.

- **Way Forward**

- **Institutionalized Dialogue:** The government must engage in "Tripartite Consultations" (Government, Employers, and Unions) to address the trust deficit.
- **Transparent Wage Formula:** Use a transparent, scientifically-backed "consumption basket" to fix the floor wage to ensure it covers food, education, and health.
- **Phased Implementation:** Start with pilot projects for gig worker social security to iron out technical glitches.
- **Strengthening Inspection:** Move from "Inspector Raj" to "Facilitator Raj," where technology is used for random audits rather than targeted harassment.

- **Previous Years' Questions (PYQs)**

- **UPSC Mains (2020 - GS3):** "Explain the salient features of the recently enacted Labour Codes. How far can they balance the needs of the employers and the workers?"
- **UPSC Mains (2017 - GS3):** "How globalization has led to the reduction of employment in the formal sector of the Indian economy? Is increased informalization detrimental to the development of the country?"
- **APSC Mains (2022):** "Discuss the impact of Labour Reforms on the industrial growth of Assam."



OPERATIONALISATION OF INDIA'S FOUR LABOUR CODES: A COMPREHENSIVE ANALYSIS



CODE ON WAGES

- Universal Minimum Wage
- Floor Wage Concept
- Standard 8-Hour Day/ 48-Hour Week



SOCIAL SECURITY

- Benefits to Gig/Platform Workers
- Consolidated Social Security Fund
- Universal Social Security



EASE OF DOING BUSINESS vs. LABOUR WELFARE BALANCE

Economic Modernization

Workers' Social Justice

INDUSTRIAL RELATIONS

- Sole Negotiating Union (min 30% membership)
- Formalization of Employment
- Streamlined Dispute Resolution



OCCUPATIONAL SAFETY & HEALTH (OSH)

- Unified Safety Standards
- Health & Welfare of Workers
- Enhanced Compliance



TRADE UNION CONCERNS (CRITIQUES)



- Dilution of Collective Rights
- Ease of Layoffs
- Lack of Dialogue



GOVERNMENT PERSPECTIVE (BENEFITS)



- Simplification of 29 Laws
- Universalization of Benefits
- Ease of Doing Business
- Digitization



Tiger sighted in Arunachal wildlife sanctuary after nearly two decades

The Hindu Bureau
GUWAHATI

A tiger has been photographed by a camera trap in Arunachal Pradesh's D'Ering Memorial Wildlife Sanctuary for the first time in almost two decades, bringing cheers to wildlife enthusiasts, conservationists, and officials.

The 190-sq. km sanctuary near Pasighat, the East Siang district headquarters, was believed to have lost the species years ago. The first-ever camera-trap photograph of the striped cat has established its return to the protected area.

The sanctuary is named after Daying Ering, a former Union Minister and chairman of the Ering Commission, which influenced the Panchayati Raj system in India.

Kempi Ete, the Divisional Forest Officer, said forest



The image of the tiger captured in a camera trap inside the D'Ering Memorial Wildlife Sanctuary. SPECIAL ARRANGEMENT

officials and frontline staff documented indirect signs of tiger presence over the past year. Multiple rounds of systematic monitoring and camera trapping were undertaken to verify these observations.

Although earlier efforts yielded no photographic evidence, monitoring continued with renewed intensity and persistence. In the latest phase of surveys,

camera traps installed at strategic locations successfully captured images of a tiger, conclusively establishing its presence in the landscape.

The surveys, conducted with technical support from the Ashoka Trust for Research in Ecology and the Environment (ATREE), also recorded other animals, including the critically endangered Chinese

pangolin and the endangered hispid hare.

"The return of the tiger after nearly two decades reflects the resilience of the ecosystem and the cumulative impact of sustained conservation efforts on the ground. This achievement belongs equally to our forest officials, frontline staff, Eco-Development Committee members and the community-based organisations that have continuously supported conservation initiatives in the landscape," Ms. Ete said.

Local MLA Oken Tayeng said that the tiger's return indicated a "healthy sign" and improving ecological conditions in the sanctuary. He stated it could improve tourism prospects and create employment opportunities for youth living in fringe villages around the protected area.

- **Key Terms and Explanations**

- **Camera Trap:** An automated digital camera triggered by a motion or infrared sensor. In wildlife biology, these are "non-invasive" tools used to document elusive species without human interference.
- **Protected Area (PA):** A clearly defined geographical space, recognized and managed through legal means (like the Wildlife Protection Act, 1972) to achieve long-term conservation of nature.
- **Critically Endangered (CR):** A category in the IUCN Red List indicating a species faces an extremely high risk of extinction in the wild. *Example: The Chinese Pangolin mentioned in the text.*
- **Eco-Development Committee (EDC):** A village-level institution that aims to reduce the dependence of local communities on forest resources by providing alternative livelihoods, thereby ensuring participatory conservation.
- **Fringe Villages:** Human settlements located on the periphery of protected forests. These areas are critical for managing "Man-Animal Conflict."
- **Resilience of Ecosystem:** The capacity of an ecosystem to respond to a perturbation or disturbance by resisting damage and recovering quickly. The return of a top predator like the tiger is a primary indicator of such resilience.

- **Main Arguments and Substantive Parts**

- The core thesis of this development is that **the return of an apex predator signifies the successful ecological restoration of a formerly degraded or "lost" landscape.**
- **The Return of the Apex Predator:** The tiger's presence after 20 years suggests that the food chain has stabilized. A tiger requires a healthy "prey base" (deer, wild boar), which in turn requires healthy vegetation.
- **The Power of Persistence:** The article highlights that earlier surveys failed, but "renewed intensity" in monitoring eventually paid off. This underscores the importance of long-term data collection in conservation.
- **Co-occurrence of Rare Species:** The sanctuary isn't just a tiger habitat; the presence of the **Chinese Pangolin** and **Hispid Hare** indicates a high-biodiversity hotspot that requires multi-species management strategies.
- **Community-Led Conservation:** A major argument is that this success isn't just a "Forest Department" win; it's a collective achievement involving Eco-Development Committees and local organizations.
- **Economic Potential:** The presence of charismatic megafauna like tigers acts as a "pull factor" for eco-tourism, which can transition local economies from extraction to preservation.

- **Historical Evolution of the Issue**

- The timeline of tiger conservation in India and this specific region reflects a shift from "protection by exclusion" to "protection by inclusion."
- **Pre-1970s:** Era of hunting and habitat loss. Tigers were seen as "vermin" or trophies.
- **1972-1973:** Enactment of the **Wildlife Protection Act** and launch of **Project Tiger**. Focus was on "Core-Buffer" models.
- **The "Silent" Decades (2000s):** D'Ering Sanctuary was largely ignored in the national tiger narrative as sightings dried up, leading to the belief that the species was locally extinct.
- **The Reform Era (2005-Present):** Post the Sariska tiger crisis, the **National Tiger Conservation Authority (NTCA)** was formed. Monitoring became "evidence-based" using the M-STrIPES protocol and camera traps.
- **Present Day:** The rediscovery in D'Ering aligns with the national trend of tiger range expansion into the Northeast hills, moving beyond the traditional strongholds of Central India.

- **Way Forward**

- **Transboundary Cooperation:** Establish "Safe Corridors" between Arunachal and Assam (Pabitora/Kaziranga landscape) to allow genetic flow.
- **Incentivized Conservation:** Direct the revenue from future eco-tourism back into the fringe villages to ensure they are the primary beneficiaries.
- **Smart Patrols:** Use AI-integrated camera traps that provide real-time alerts for both animal movement and human intruders.
- **Community Education:** Formalize the role of local youth as "Wildlife Ambassadors" or "Forest Friends" (Van Mitra).

- **All Previous Years' UPSC and APSC Questions**

- **UPSC Prelims (2020):** Among the following Tiger Reserves, which one has the largest area under 'Critical Tiger Habitat'? (Concept of PA management).
- **UPSC Mains (GS III, 2019):** "Coastal sand mining, whether legal or illegal, poses one of the biggest threats to our environment." (General threat to ecosystems/Arunachal context: Riverbed mining).
- **UPSC Mains (GS III, 2023):** Dam failures and their impact (Relevant to Arunachal's hydro-projects and their impact on sanctuaries like D'Ering).
- **APSC (Mains):** Discuss the potential of Eco-tourism in the Northeast as a tool for sustainable development.



1 KEY TERMS & CONCEPTS

1. CAMERA TRAP

(Motion sensor, low-impact monitoring)



2. APEX PREDATOR

(Top of food chain, indicator of ecosystem health)



3. IUCN RED LIST:

Chinese Pangolin (CR), Hispid Hare (E)



CR

E

4. ECO-DEVELOPMENT COMMITTEE (EDC)

(Community-based conservation)



5 CHALLENGES & WAY FORWARD



Poaching



Infrastructure (Roads)



Man-Animal Conflict

LEGAL

WPA 1972 & BDA 2002 mandate, PA enforcement



ETHICAL

Rights of nature vs. community rights 'Duty of Care'



SOCIAL

Community pride, local stewardship



POLITICAL

Ering Commission's legacy, Decentralized governance



INTERNATIONAL

Global Tiger Forum (GTF) & CBD commitments



ECONOMIC

Eco-tourism potential
New livelihoods (homestays)



Transboundary Corridors

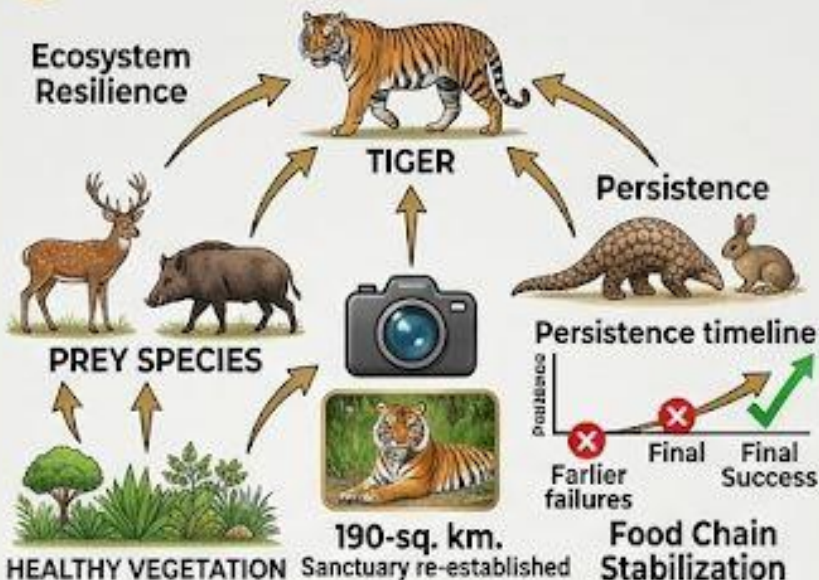
Incentivized Conservation (Revenue to EDCs)

Smart Patrols (AI cams)



4 MULTIDIMENSIONAL ANALYSIS

2 MAIN ARGUMENTS & EVIDENCE



3 HISTORICAL EVOLUTION



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5 CHALLENGES & WAY FORWARD

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'Dragonfly, damselfly species missing in the Western Ghats'

Snehal Mutha
MUMBAI

A recent study has revealed an "alarming gap" in biodiversity across the Western Ghats, with researchers able to document only about 65% of the dragonfly and damselfly species historically recorded in the region, pointing to a potential shortfall of nearly 35% of these ecologically critical insects.

The survey recorded 143 Odonata species – 76 dragonflies and 67 damselflies – of which 40 were endemic to the Western Ghats. The study was carried out across 144 sites spanning five States, namely, Maharashtra, Kerala, Karnataka, Goa, and Gujarat between February 2021 and March 2023.

Three species – *Elatoneura souteri*, *Protosticta sanguinostigma*, and *Cyclogomphus ypsilon* – are currently classified as vulnerable, while most of the observed species fall under the "data deficient" and "not evaluated" categories on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, indicating significant gaps in scientific understanding.

Emphasising the urgency of expanding research, Pankaj Koparde, Assistant Professor, MIT-World Peace University Pune, said, "This study is a result of one of the most extensive Odonata surveys across the Ghats. Our surveys could recover only 65% of the known Odonata fauna of the Ghats, indicating plausible loss of species and habitats."

The Western Ghats is a 1,600-km mountain chain along India's west coast and a globally recognised biodiversity hotspot. The survey team, headed by Professor Koparde, suggests the Odonata species are highly sensitive to environmental changes as they depend on freshwater ecosystems for reproduction, and are widely regarded as "indicator taxa," meaning their presence, or absence,



The study was carried out across 144 sites spanning five States. SUSHIL KUMAR VERMA

directly reflects the ecological health of water bodies. So, the missing species may be early indicators of deeper ecological stress.

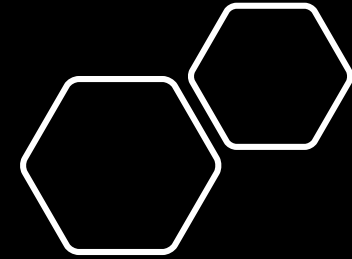
The study claimed there are multiple threats across the Western Ghats, including linear infrastructure development, hydropower projects, severe pollution, large-scale land-use changes, unregulated tourism, recurring forest fires, and growing impact of climate change which is further fragmenting and degrading these ecosystems.

Key findings

According to the IUCN Red List, of the 143 recorded species, 100 species are classified as 'Least Concern,' 22 species as "data deficient" and 16 as "not evaluated". Two species fall in the "near threatened" category, while two others are listed under "vulnerable" category.

The presence of 22 species listed under "data deficient" category suggests the need for extensive surveys across the Western Ghats to uncover the status and distribution of many lesser known species.

The study also uncovers the richness of Odonata species in several localities across the five States, many of which were previously unexplored. The findings demonstrate that the diversity and degree of endemism are greater in the southern Western Ghats compared to the northern part of the region. This can largely be attributed to the availability of suitable microhabitats and perennial streams in the southern Western Ghats.



- **Key Terms and Explanations**
- **Odonata:** An order of carnivorous insects encompassing dragonflies and damselflies. They are unique because they require both aquatic (larval stage) and terrestrial (adult stage) habitats to survive.
- **Indicator Taxa:** Species whose status provides information on the overall condition of the ecosystem. Because Odonata are sensitive to water quality and flow, their absence signals a "sick" river or wetland.
- **Endemism:** The state of a species being found only in a single defined geographic location. For example, a "Western Ghats endemic" dragonfly is found nowhere else on Earth.
- **IUCN Red List Categories:**
 - **Data Deficient (DD):** Insufficient information to make a direct or indirect assessment of a species' risk of extinction.
 - **Vulnerable (VU):** High risk of extinction in the wild.
 - **Least Concern (LC):** Species that are pervasive and abundant.
- **Linear Infrastructure:** Man-made structures that follow a line, such as roads, railways, and power lines. These are particularly damaging as they fragment wildlife habitats into smaller, isolated "islands."
- **Microhabitats:** Small, specialized areas within a larger ecosystem (like a specific shaded pool under a rock) that provide unique conditions for certain species.

- **Main Arguments and Substantive Parts**
- The core thesis of recent research posits that the Western Ghats is experiencing a "**silent extinction**" or significant displacement of its Odonata fauna, with a documented gap of 35% compared to historical records.
- **The "Alarming Gap":** Only 143 species were recorded out of a much larger historical pool. This 65% recovery rate suggests that nearly one-third of the region's dragonflies are either missing or in such low numbers they cannot be easily detected.
- **Geographic Asymmetry:** There is a clear "Latitudinal Gradient" in diversity. The Southern Western Ghats (Kerala, Southern Karnataka) show higher richness and endemism due to perennial (year-round) streams, whereas the Northern Ghats (Maharashtra, Gujarat) are more seasonal and less diverse.
- **Sensitivity to Freshwater Health:** The study argues that the decline in Odonata is a proxy for the decline of freshwater ecosystems. Since these insects are predators, their loss triggers a "trophic cascade," potentially leading to an explosion of pest populations like mosquitoes.
- **The Knowledge Vacuum:** A substantive portion of the argument focuses on the "**Data Deficient**" status of these insects. We cannot protect what we do not understand, and the lack of data masks the true extent of the ecological crisis.

- **Historical Evolution of the Issue**
- **Pre-Independence Era:** Odonatology in India began with British naturalists (e.g., Fraser) documenting species for taxonomic purposes. The focus was on "collection" rather than "conservation."
- **Post-Independence (1950s–1980s):** Rapid industrialization and the "Green Revolution" led to the damming of rivers and heavy pesticide runoff. The Western Ghats saw massive land-use changes, though the impact on insects went largely unmonitored.
- **The "Biodiversity Hotspot" Recognition (1988):** Norman Myers identified the Western Ghats as a global hotspot. This shifted the focus toward protecting "charismatic megafauna" (Tigers, Elephants), often ignoring smaller "invertebrate" indicators.
- **The Madhav Gadgil vs. Kasturirangan Reports (2011–2013):** These reports highlighted the fragility of the Ghats. While they sparked political debate over "development vs. environment," they laid the groundwork for recognizing the need for landscape-level protection.
- **Modern Era (2020–Present):** Shift toward "Citizen Science" and integrated surveys (like the 2021–2023 study). There is a growing realization that climate-induced changes in monsoon patterns are the new primary threat to freshwater biodiversity.

- **Way Forward**
- **Mainstreaming Invertebrates:** Amend the Wildlife Protection Act to give greater protection to endemic Odonata species.
- **Blue-Green Infrastructure:** Instead of "Linear Infrastructure," promote designs that maintain the "connectivity of streams" (e.g., eco-ducts for water flow under highways).
- **Citizen Science:** Launch a "National Odonata Portal" to involve trekkers and local youth in documenting sightings, bridging the "Data Deficit."
- **Ecological Buffers:** Create "Odonata Sanctuaries" in the Southern Western Ghats where perennial streams are protected from sand mining and pesticide runoff.
- **Integrated EIA:** Make "Invertebrate Impact Assessment" a mandatory part of Environmental Impact Assessments for projects in the Western Ghats.

- **Previous Years' UPSC Questions**
- **Prelims (2020):** "With reference to India's biodiversity, Ceylon frogmouth, Coppersmith barbet, Gray-chinned minivet and White-throated redstart are..." (Answer: Birds). *Note: A similar question could be asked about *Elattonaura souteri* and *Cyclogomphus ypsilon*.*
- **Mains (GS 3, 2018):** "What is a biodiversity hotspot? Describe the main characteristics of the Western Ghats as a biodiversity hotspot."
- **Mains (GS 3, 2017):** "How does biodiversity vary in India? How is the Biological Diversity Act, 2002 helpful in conservation of flora and fauna?"
- **Mains (GS 3, 2023):** Questions regarding the impact of climate change on biodiversity and the "loss of habitat."

Odonata Study Profile

Feb 2021 to Mar 2023



Critical Gap

ALARMING GAP:
Only **65%** documented (143/Historical), **35%** shortfall.



Survey Findings



IUCN Red List Status



Why Odonata?



Multiple Threats



Geographic Trend



Way Forward

- Expanded scientific surveys
- Policy for Data Deficient species
- Habitat restoration
- Water quality standards
- Targeted conservation for Vulnerable species

UPSC Connection

Issis issue on the syllabus:

- GS Paper 3: Biodiversity, Environmental Degradation
- GS Paper 1: Physical Geography
- GS Paper 4: Ethics

Previous years' question themes:

- Biodiversity hotspots
- Ecosystem services

What is India's first orbital data centre satellite?

What is an orbital data centre? Why are global firms interested? What does the Pixxel-Sarvam partnership involve?

Jacob Koshy

The story so far:

Pixxel, a Bangalore-based imaging satellite company, said that it would partner with the AI firm Sarvam to launch what is being described as India's first 'orbital data centre' satellite, named Pathfinder. This is expected to be a 200 kg-class satellite scheduled for orbit by the fourth quarter of 2026. It will carry datacentre-class CPUs (application processing units) alongside Pixxel's hyperspectral imaging camera, the company's bread and butter business.

What is an orbital data centre?

It is a constellation of satellites carrying the same kind of CPUs located in terrestrial data centres. It can train and run AI models in orbit rather than only ingesting data to ground stations. Such a centre can do more demanding work than the low-power 'edge' processors that conventional satellites use for tasks like signal compression. Edge computing in orbit refers to the practice of running computation close to where data is generated rather than in a centralised cloud, and the same logic, applied in orbit, is what space-based compute promises to deliver.

Pixxel's Pathfinder is being built as a single-satellite demonstrator, designed to test whether ground-grade hardware can be made to function reliably in the harsh, hot environment of low Earth orbit.

An orbital data centre can do three demanding work than the low-power 'edge' processors that conventional satellites use for tasks like signal compression

Why are global firms such as Nvidia interested?

Three factors have converged in the past two years, prompting large tech companies to arrive towards

making such centres real. Data centres are being constrained by limits on energy availability, land, water, and local population, all of which have been amplified by the demands of AI. In the right orbit, solar power is effectively unlimited and offers free electricity, which proponents regard as the strongest argument for moving computation to space.

Earth observation satellites also generate detailed, heavy image files that are expensive to download, processing the data in orbit and beaming down only the conclusions has long been seen as a way to ease that bottleneck.

The third factor is competitive positioning. SpaceX's Starlink, Elon Musk, said on 8 in 2023 that "steeply scaling up Starlink V2 satellites, which have high-speed laser links, would work. SpaceX will be doing this." He also argued that "Microsoft (the company's most powerful backer) could deliver 3000/year to high earth orbit within five to five years if we can solve the other parts of the equation." Amazon founder Jeff Bezos' Blue Origin, Microsoft's Azure Space, and Luxembourg Data Holdings have already begun pilot deployments. None of these efforts has yet produced a commercial-scale orbital data centre.

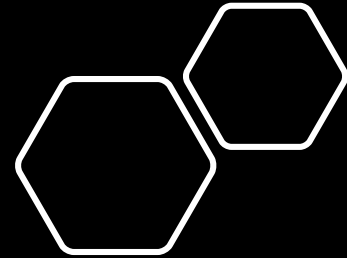
What are the challenges?

The CPU chips powered by electricity from solar panels become hot. Some space may be cold, and engineers worry about a natural sink for the heat. However, space is also empty and the vacuum eliminates convection. This is the mechanism by which water air on earth is usually carried away from terrestrial sources. In orbit, a hot CPU chip is effectively an oven unable to get rid of its extra waste energy, which has to be carried off. The only solution is this is radiation, which requires that heat be pumped through atomically filled layers in deployable panels, where it can be radiated as infrared light into space. The history of crewed spaceflight is etched with reminders of how unglorious this regime can be.

Radiation damage is the second problem, and one that has shaped the design of every long-duration mission down to date. 'Bit flips' — where bits and bytes of computers randomly change — and long-term semiconductor degradation are caused by cosmic rays, and collisions with orbital debris, which prevent most space hardware, typically big commercial CPUs by years. Power requires storage for eclipse periods, and redundancy is effectively impossible without robotic servicing, so redundancy must be designed in from the start.

What does the Pixxel-Sarvam partnership actually involve?

The Pathfinder satellite will be designed, built, launched, and operated by Pixxel. Sarvam, an Indian AI firm will provide what it describes as the AI backbone, with its own language models being run on the satellite's CPU layer for text training and inference. Pixxel's hyperspectral camera will be carried on the same platform, giving the mission an immediate use case: imagery captured in orbit can be analysed in orbit, with only the conclusions transmitted to Earth. The Pixxel team has several experts who have worked with the Indian Space Research Organisation and have experience in thermal management in space.

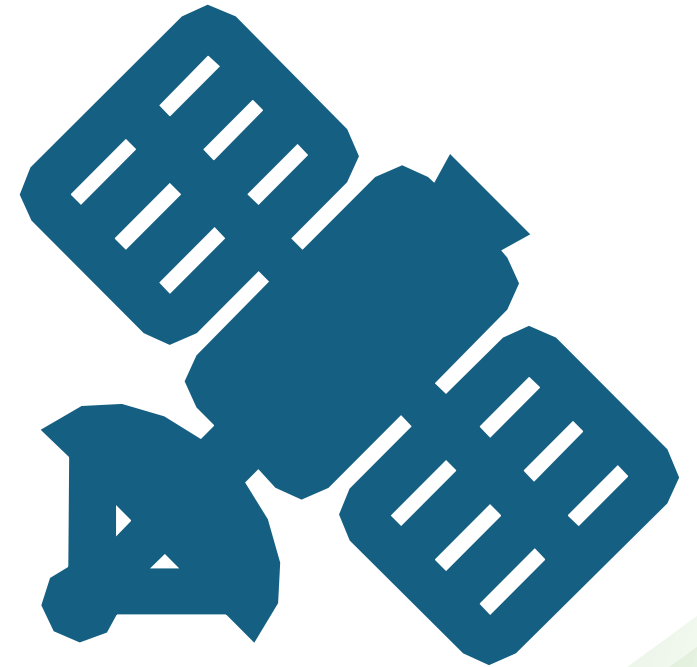


- **Key Terms and Explanations**

- **Orbital Data Centre:** A satellite or constellation equipped with high-capacity GPUs (Graphics Processing Units) capable of processing and storing data in space, rather than just acting as a relay station to Earth.
- **Hyperspectral Imaging:** Unlike a standard camera that sees three primary colors, hyperspectral sensors capture hundreds of narrow spectral bands. This allows for identifying the "chemical fingerprint" of objects (e.g., distinguishing a healthy crop from a diseased one).
- **Edge Computing (Space-based):** Processing data at the "edge" of the network—in this case, on the satellite itself. Instead of sending a massive raw image file to Earth, the satellite processes it and sends only the relevant insight (e.g., "Fire detected at coordinates X,Y").
- **GPU (Graphics Processing Unit):** Highly efficient processors designed for parallel tasks. While originally for gaming, they are now the backbone of AI training and inference due to their ability to handle massive datasets simultaneously.
- **Convection vs. Radiation:** On Earth, servers are cooled by fans (convection—air moving heat away). In the vacuum of space, there is no air, so heat must be moved via infrared waves (radiation) using specialized loops and panels.

- **Main Arguments and Substantive Parts**

- The core thesis is that **data processing must migrate to orbit** to bypass the physical and logistical bottlenecks of Earth-bound infrastructure.
- **The Power Argument:** Terrestrial data centres are under fire for their massive consumption of land, water (for cooling), and electricity. In orbit, solar energy is practically limitless and uninterrupted.
- **The Bandwidth Bottleneck:** Modern satellites generate "heavy" data. Downlinking terabytes of raw imagery is slow and expensive. Processing this data in situ (in orbit) reduces the "data-to-decision" latency.
- **Testing Commercial Viability:** The Pathfinder mission serves as a "proof of concept" to see if standard, high-performance GPUs—which are delicate—can survive the radiation and thermal extremes of Low Earth Orbit (LEO).



- **Historical Evolution of the Issue**

- The journey from "simple "beeping" satellites to orbital AI has been rapid:

- **Pre-2000s (Relay Era):** Satellites were primarily "bent-pipes," receiving a signal and bouncing it back to a different location on Earth (Telecommunications focus).

- **2000–2015 (The Rise of Earth Observation):** Improved sensors led to massive data generation. The "bottleneck" problem began as downlink speeds couldn't keep up with sensor resolution.

- **2015–2023 (Miniaturization & SpaceX Effect):** The advent of CubeSats and lower launch costs via SpaceX made it feasible to send heavier, more complex hardware into orbit.

- **2024–Present (The AI Convergence):** India enters the fray with Pixxel. The focus shifts from "seeing" to "thinking" in space, moving from radiation-hardened (but slow) chips to commercial (but fast) GPUs.

- **Way Forward**

- **Regulatory Framework:** India needs a robust legal framework to govern "Data in Transit" and "Data in Orbit."

- **Public-Private Partnership:** ISRO's expertise in thermal management should be shared with startups like Pixxel through IN-SPACe.

- **Sustainability:** Development of "De-orbiting" technologies to ensure that decommissioned data centres do not become hazardous space debris.

- **Previous Years' Questions (PYQs)**

- **UPSC Mains 2022 (GS3):** "Discuss India's achievements in the field of Space Science and Technology. How has the application of this technology helped India in its socio-economic development?"

- **UPSC Prelims 2016:** Question on the "Bhuvan" portal and its role in remote sensing.

- **UPSC Mains 2015 (GS3):** "What do you understand by 'Standard Positioning Systems' and 'Precision Positioning Systems'?" (Context: IRNSS).

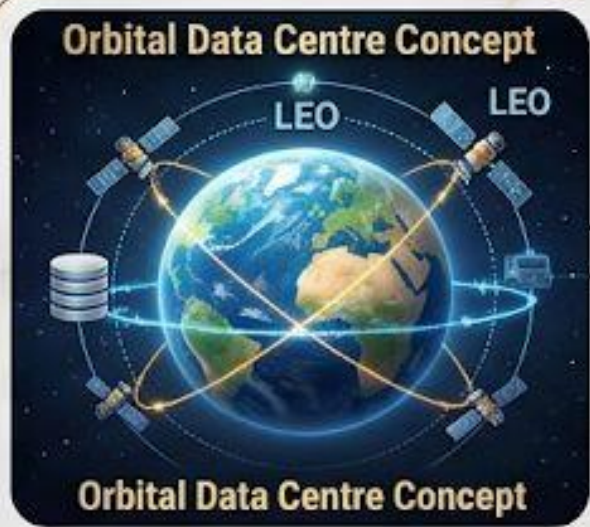
AXIA IAS ACADEMY: ADVANCED SCI-TECH ANALYSIS - ORBITAL DATA CENTRES



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Analysis of Space-Based Cloud Computing & Orbital Data Centres (e.g., Pathfinder Mission)



1. Terrestrial Limitations Limitation (Land, Power, Water) → 2. Conceptual Shift to Orbit

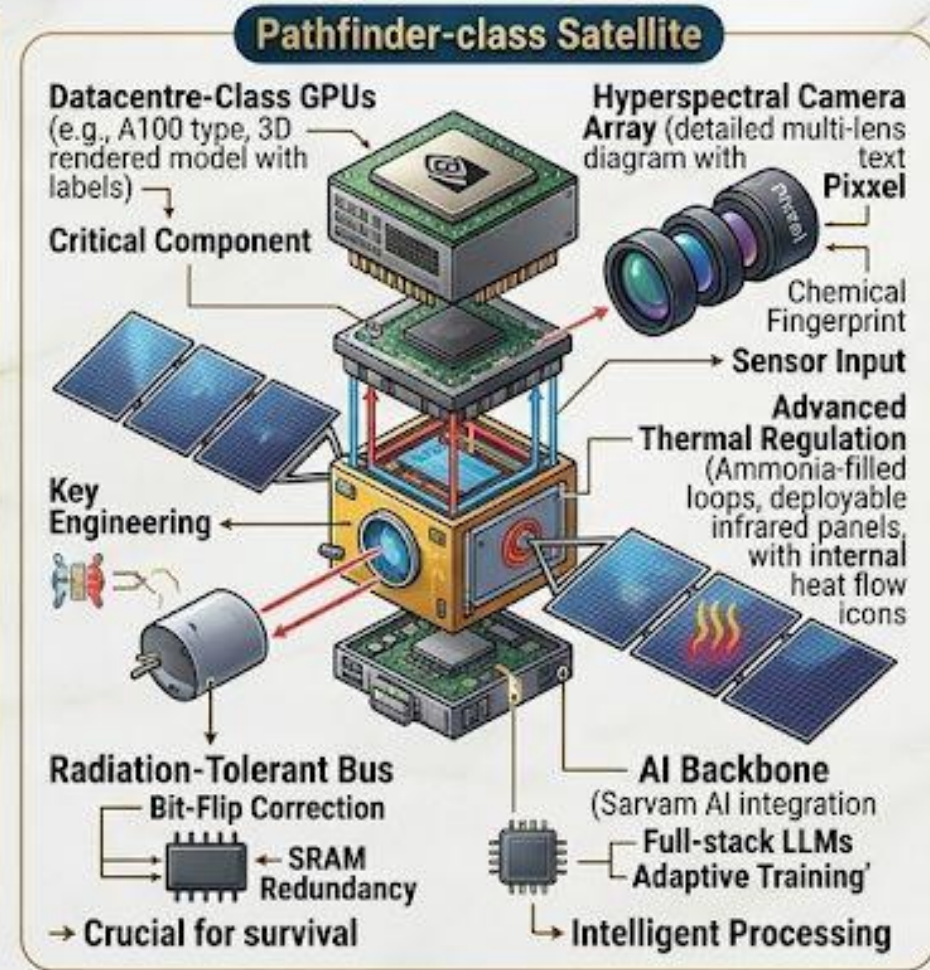
1. Terrestrial Limitations (Land, Power, Water) → 2. Conceptual Shift to Orbit

3. Continuous Solar Power & Free Space → 4. Reduced Downlink Bottleneck & Real-time Action

3. Continuous Solar Power & Free Space Bottleneck & Real-time Action

5. Autonomous On-Orbit AI Training & Inference

6. Result: Planetary-Scale Intelligence & Enhanced Strategic Surveillance (Force Multiplier).



What is the Governor's role in a hung Assembly?

Why did the Governor refuse to swear in TVK party president Vijay as the new Tamil Nadu Chief Minister for many days? What is the primary objective of the Governor in such situations? What has the Supreme Court ruled in the past? Is the floor test the best way of proving majority?

Krishnasdas Rajagopal

The story so far:

Despite the Tamilaga Vetri Kathagam (TVK) emerging as the single largest party in the 2026 Assembly elections in Tamil Nadu, Governor Rajendra Arlekar refused to swear in party president C. Joseph Vijay as the new Chief Minister for several days. The Lok Bhawan insisted that Mr. Vijay prove majority by handing over physical letters of support from at least 100 MLAs in the 234-seat Legislative Assembly. On May 9, Mr. Vijay met the Governor for the fourth time and staked claim to form the government. He is scheduled to take oath at 10 a.m. on Sunday.

What is the role of the Governor in the formation of a new government if there is a hung Assembly following an election?

The Governor appoints the Chief Minister under Article 164 of the Constitution. The Constitution does not provide a settled procedure for a Governor to choose a Chief Minister in a hung Assembly though constitutional conventions dictate that the Governor's actions must be guided by sobriety.

The primary objective of the Governor, as a constitutional head of the State, is to ensure the formation of a stable government. To this end, the Sarkaria Commission; the five-member Committee of Governors appointed by the President pursuant to the decision taken at the Conference of Governors held in New Delhi in November 1970; and conventions evolved through successive Supreme Court rulings provide that the personal bona fide or any ipse dixit of Governors is irrelevant.

The Lok Bhawan must proceed legally and explore all possibilities with political parties,

The Supreme Court has time and again held that the House, and not Lok Bhawan, is the place where democracy is in action.

groups, and independent MLAs within a reasonable time to maintain the constitutional machinery in the State. Only if all alternatives fail, and to avoid any violence to correct constitutional practice, should a Governor, as a last resort, initiate the process for declaration of President's rule in the State under Article 256 of the Constitution.

The Constitution has not defined the 'reasonable time' a Governor could take to explore possibilities for forming a responsible and stable government. But the Governor cannot wait indefinitely, and in the process, lay the field open for horse-trading. In fact, the Supreme Court has interpreted in the *S.R. Kapur* (2006) and *Rameshwar Prasad* (2006) judgments that the Governor could dissolve a Legislative Assembly under Article 174(2)(b) even before the first meeting of the State Legislature, to avoid a breakdown of the constitutional machinery due to parties' inability to stake claim to form a meaningful government for want of requisite strength. The Governor cannot be in limbo, neither being able to appoint a government nor exercise the power of dissolution.

What is the hierarchy or order of preference to extend an invitation to form a government?

The Sarkaria Commission Report of 1988, endorsed by the Supreme Court, has recommended that a Governor should first invite the pre-poll alliance which has won a majority. However, in Tamil Nadu, no such alliance has a clear majority. The next option is to invite the single largest party that could demonstrate majority support.

A nine-judge Bench in the *S.R. Bommai* judgment (1994) reasoned that the Constitution does not create an obligation that the political party forming the government should necessarily have a majority in the Assembly. "Minority governments are not unknown. What is necessary is that that government should enjoy the confidence of the House," the Supreme Court said.

The third in the order of preference is a post-poll alliance of parties that can demonstrate a majority in the Assembly. The use of this third option has become more frequent in recent times, with coalition governments becoming the norm. The Court had found nothing wrong in ideologically similar parties engaging in mutually convenient post-poll alliances to cross the Rubicon of the 'golden majority' in the House.

If none of these options work, the Governor can recommend President's rule, although this is an extreme measure. The Court has advised

that a "constitutional machinery in the State should, as far as possible, be maintained". This advice has assumed new relevance in recent years, with Governors seen as using their discretionary powers to recommend President's rule to "promote the political interests of the party in power at the Centre."

Has the floor test been a constant, objective means to prove majority?

Critics have said Governor Arlekar's insistence on physical letters of support is the sole reason for the deadlock in Tamil Nadu. A writ petition has been filed in the Supreme Court, arguing that the Governor is "duty-bound" to invite Mr. Vijay to form the new government, swear him in, and immediately subject his claim to a trust vote on the floor of the Assembly.

The Committee of Governors had also concluded that the test of confidence in the government should normally be left to a vote in the Assembly.

Though the *S.R. Bommai* judgment includes a paragraph indicating that a floor test should be confined to testing the strength of an incumbent Chief Minister who is alleged to have lost majority support, and not used in the formation of a new government after elections, successive Supreme Court precedents have nevertheless relied on the floor test as the most objective and transparent way to ascertain majority. These judgments also highlighted that the fate of the electorate's mandate must not be left to the personal discretion of the Governor.

What are some instances where floor tests rescued the constitutional machinery in States?

Repeated occasions of the Court ordering floor tests to assess a claim to govern, whether by an existing or incoming government, has made it the touchstone for ensuring a stable government. In 2017, the Court declined to stay the swearing in of the Bharatiya Janata Party's Manohar Parrikar as Goa Chief Minister at the head of a post-poll alliance, but reduced the 15-day window allowed to him to prove majority over the Congress, which was the single largest party, and ordered a floor test in 48 hours. Mr. Parrikar won the floor test. The Court intervened in Karnataka the next year after the Governor invited B.S. Yediyurappa to form the government while giving him 15 days to prove majority. On a challenge by the Congress-Janata Dal (Secular) combine, the Court allowed the swearing in but cut short the time for the floor test to 24 hours and said it must be conducted on live camera and not by secret ballot. Mr. Yediyurappa resigned before the trust vote.

The Supreme Court has held that the House, and not Lok Bhawan, "is the place where democracy is in action." That is, the decision on who should govern must not be left to the subjective satisfaction of the Governor but be determined on the floor of the House.



TVK chief Vijay meets Tamil Nadu Governor Rajendra Arlekar at Lok Bhawan in Chennai on Friday. PTI

- **Key Terms and Explanations**

- **Hung Assembly:** A situation where no single political party or pre-poll alliance secures an absolute majority (50% + 1) of the seats in the Legislative Assembly.
- **Article 164:** The constitutional provision stating that the Chief Minister shall be appointed by the Governor, and other Ministers shall be appointed by the Governor on the advice of the CM.
- **Constitutional Discretion:** The power of the Governor to act according to their own judgment in certain circumstances, rather than on the advice of the Council of Ministers (Article 163).
- **Floor Test (Trust Vote):** A constitutional mechanism used to determine if the executive (the CM and Cabinet) enjoys the confidence of the Legislative Assembly. It is conducted in the House, not the Governor's office.
- **Sarkaria Commission:** A commission set up in 1983 to examine the relationship and balance of power between state and central governments. It provided the "Order of Preference" for inviting parties to form a government.
- **Iipse Dixit:** A Latin term meaning "he himself said it." In legal terms, it refers to an unproven statement that rests solely on the authority of the person who made it. The courts argue that a Governor's decision should not be a mere *ipse dixit*.

- **Main Arguments and Substantive Parts**

- The core of the issue lies in the tension between **Administrative Discretion** and **Democratic Mandate**.
- **The Stability Mandate:** The Governor's primary objective is to ensure a stable government. The article argues that while the Governor has discretion, it is not absolute. They must explore all possibilities—pre-poll alliances, the single largest party, and post-poll coalitions—to maintain the constitutional machinery.
- **The Floor Test Doctrine:** The most substantive argument is that the Legislative Assembly, not the Governor's office, is the appropriate "laboratory" for testing a majority. The Governor's role is to make a *prima facie* (at first sight) assessment, not to conduct a final adjudication of numbers via physical letters.
- **Prevention of Horse-Trading:** While a Governor must take "reasonable time" to ensure stability, indefinite delays are criticized for opening the door to political defections and "horse-trading," which undermines the electoral verdict.
- **President's Rule as a Last Resort:** Imposing Article 356 should only occur after all avenues for forming a government have been exhausted. Using it prematurely is viewed as a "violence" against constitutional practice.

- **Historical Evolution of the Issue**
- **Pre-1967 Era:** One-party dominance (Congress) meant the Governor's role was largely ceremonial, as majorities were clear.
- **Post-1967 (Coalition Era):** The rise of regional parties led to frequent hung assemblies and the first major instances of controversial gubernatorial discretion.
- **1988 (Sarkaria Commission):** Provided the first structured "Order of Preference" to limit arbitrary decisions by Governors.
- **1994 (S.R. Bommai Case):** The Supreme Court's landmark ruling established that the floor of the House is the only place to test a majority, significantly curbing the misuse of Article 356.
- **2006 (Rameshwar Prasad Case):** The Court ruled that a Governor cannot dissolve an Assembly just because they fear "unethical" post-poll alliances. The focus must be on whether a government *can* be formed.
- **2017-2026 (Modern Precedents):** Cases in Goa (2017), Karnataka (2018), and Maharashtra (2019) have seen the Judiciary intervene to shorten the timeframe for floor tests, ensuring that the "subjective satisfaction" of the Governor is quickly validated by an objective vote.

- **Way Forward**
- **Codification of Norms:** The "Order of Preference" for inviting CMs should be formally incorporated into the Manual of Governance or the Constitution itself.
- **Time-Bound Decisions:** Set a clear constitutional limit (e.g., 7 days) for a Governor to invite a party and a limit (e.g., 48-72 hours) for the floor test.
- **Punchhi Commission Implementation:** Follow the recommendation that a Governor should be an "eminent person" from outside the state with no active political ties for at least five years.
- **Automaticity:** Explore a "constructive vote of confidence" where the House elects a leader directly, removing the Governor's subjective choice altogether.

- **Previous Years' UPSC Questions**
- **Mains (2019):** "The exercise of executive power by the Governor is subject to the aid and advice of the Council of Ministers." Discuss the discretionary powers of the Governor.



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GOVERNOR'S OPTIONS IN HUNG ASSEMBLY

S.R. BOMMAI (1994)
PRECEDENCE:

GOVERNOR'S PRIME DIRECTIVE:
ENSURE STABILITY

Option 1

Pre-poll Alliance
(Clear Majority)

Option 2

Single Largest Party
(Test Majority Support)

Option 3

Post-poll Alliance
(Test Majority Support)

TEST ON THE FLOOR
OF THE ASSEMBLY
(NOT RAJ BHAVAN)

LAST RESORT:
PRESIDENT'S RULE
(Art 356)

THE FLOOR TEST & JUDICIAL GUIDELINES

~~RAJ BHAVAN~~ (गुवर्नर आवास)
- PAST PRACTICE



CRITICIZED
AS SUBJECTIVE
limBO

THE FLOOR TEST -
CONSTITUTIONAL PRACTICE



TRANSPARENT, OBJECTIVE ASSESSMENT

Sarkaria
Commission
Order of Preference

B.R. Kapur
(2001) - Early
Dissolution

Rameshwar Prasad
(2006) - Prevent
Indefinite Waiting

UPSC SYLLABUS LINKAGES

- **GS Paper 2:** Government processes in legislative Assembly near abnormal legislative assembly, minimum property, and the governor commission of the Legislative of local government.
- **Essay:** The emergence of single largest party compliance, constitutional assembly on to governor related to government of the conventioned party the's legislative Assembly.

DEFINITIONS

- **Article 164** - Constitutional assembly receives the terms of provision to basic structure
- **Basic Structure** - Constitutional morality - confined basic basic structure
- **Constitutional morality** - Constitutional morality of the consider



**CONSTITUTIONAL
MACHINERY**

Duty to avoid breakdown



**GOVERNOR &
ASSEMBLIES**

NEUTRAL UMPIRE vs. AGENT
vs.
COOPERATIVE FEDERALISM



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Why is hantavirus drawing global attention?

What is hantavirus? What happened on the expedition cruise ship MV Hondius early this month? How does hantavirus spread? Why are health agencies monitoring recent cases? What are the symptoms and treatment options? How concerned should the public be?

Athira Elssa Johnson

The story so far:

Following a hantavirus outbreak on the MV Hondius expedition cruise ship in early May, in which three deaths were reported and at least five others were infected, global attention has once again turned to the group of viruses. Hantavirus had made headlines last year following the passing of Betty Hackman, wife of renowned American actor Gene Hackman.

What happened on the ship?

The Dutch expedition cruise ship was travelling from Ushuaia in Argentina across parts of the South Atlantic towards Cape Verde and the Canary Islands when cases were identified among both the passengers and the crew.

The World Health Organization (WHO) said 147 passengers and crew were onboard, and 34 passengers and crew had previously disembarked. It said that as of May 8, there were eight cases (six confirmed and two probable cases) reported. Three of them died (two confirmed and one probable) after contracting the Andes strain of hantavirus. Several others were hospitalised with symptoms including fever and breathing difficulties.



MV Hondius docks off Cape Verde's Praia port on May 4, as health authorities investigate suspected hantavirus cases. Reuters

WHO has stated that hantavirus does not spread easily between humans like airborne viruses such as influenza or SARS-CoV-2.

After confirmed and suspected cases had been identified among passengers after they left the ship and travelled to different countries, health authorities in Singapore, Switzerland, South Africa, Spain, and the U.S. began tracking and monitoring passengers.

What is hantavirus?

Hantaviruses are a group of viruses mainly carried by rodents such as rats and mice. Human beings can get infected after coming into contact with infected rodent urine, saliva, or droppings, especially while clearing or disturbing contaminated areas, which can release virus particles into the air.

Hantavirus infections can affect either the lungs or the kidneys. Some strains can cause hantavirus pulmonary syndrome, a severe respiratory illness, while others can lead to haemorrhagic fever with renal syndrome, affecting the kidneys and blood vessels. WHO states that even though most hantaviruses do not spread from one human to another, the Andes virus strain found in parts of South America has shown some human-to-human transmission, usually among close contacts.

Why are health agencies concerned now?

The outbreak linked to the MV Hondius cruise ship drew attention because passengers travelled across several countries before the infection was identified. WHO reported that cases were characterised by fever, gastrointestinal symptoms, pneumonia, respiratory distress, and shock. Reacting to fears of another pandemic, officials from WHO and the Disease Control and Prevention have stressed that hantavirus spreads very differently from viruses such as COVID-19 and is far less transmissible.

What are the symptoms?

WHO states that symptoms usually appear between one and eight weeks after exposure. Early symptoms are often flu-like and can include fever, muscle aches, fatigue, headache, chills, nausea, vomiting, abdominal pain, and dizziness.

In severe cases, the infection can affect the

lungs, causing coughing, chest tightness, breathing difficulty, and fluid build up in the lungs. Some forms of the disease can also affect the kidneys and blood vessels, leading to kidney complications or bleeding problems. Since the symptoms can resemble illnesses such as influenza, COVID-19, dengue, or pneumonia, diagnosis may sometimes be delayed. Even though infections remain rare overall, severe respiratory forms of hantavirus infection can be dangerous, particularly without early medical care.

Who is at risk?

People living or working in rodent-prone environments face the highest risk. Farmers, forestry workers, campers, construction workers, and people cleaning poorly ventilated or abandoned buildings are vulnerable. Health agencies also advise caution while handling pet rodents or entering rodent-infested spaces.

Is there a treatment or cure?

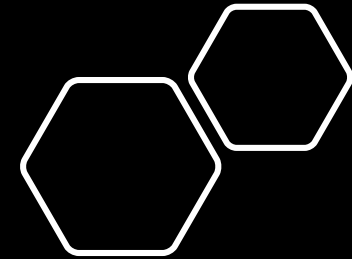
WHO notes that early diagnosis and timely medical attention can significantly improve outcomes. Prevention is important, particularly through rodent control, proper sanitation, and safe cleaning practices in potentially contaminated environments.

Currently, there is no specific antiviral cure or approved vaccine for hantavirus infection. Treatment mainly focuses on supportive medical care, including oxygen therapy, fluid management, and intensive care support during severe illness. Some patients may require mechanical ventilation.

Could this become another pandemic?

Public health agencies say current evidence does not suggest a COVID-19-like global pandemic scenario. WHO has repeatedly stated that the overall risk to the wider public remains low and that hantavirus does not spread easily between humans like airborne viruses such as influenza or SARS-CoV-2.

The outbreak has also drawn attention to zoonotic diseases – infections that spread from animals to humans – and highlighted the importance of staying prepared as global travel and human-animal interactions increase. At the same time, WHO and other health agencies have stressed that stronger surveillance, quicker reporting, testing systems, and coordination between countries are helping health authorities respond effectively.



- **Key Terms and Explanations**

- **Zoonotic Diseases:** Diseases that jump from animals to humans. Hantavirus is a classic example, as it resides in rodents without making them sick but causes severe illness in humans.
- **Andes Virus (ANDV):** A specific strain of Hantavirus native to South America. It is unique because, unlike most other strains, it has demonstrated a capacity for **human-to-human transmission**.
- **Hantavirus Pulmonary Syndrome (HPS):** A severe, sometimes fatal, respiratory disease in humans caused by infection with hantaviruses.
- **Haemorrhagic Fever with Renal Syndrome (HFRS):** A group of clinically similar illnesses caused by hantaviruses that primarily affect the kidneys and blood vessels, leading to internal bleeding and organ failure.
- **Vector/Reservoir:** The organism (in this case, rodents like deer mice or rice rats) that carries the pathogen.
- **Viral Aerosolization:** The process where dried rodent excreta (urine/droppings) are disturbed, causing virus particles to become airborne and easily inhaled by humans.

- **Main Arguments and Substantive Parts**

- The core thesis of the recent discourse centers on the **transnational risk of zoonotic outbreaks** in a hyper-connected world.
- **The Transmission Paradox:** While Hantavirus is generally considered non-contagious between humans, the **Andes strain** challenges this assumption. The MV Hondius incident highlights how cruise ships—closed environments with high mobility—can act as incubators for rare strains.
- **Global Health Surveillance:** The primary argument is that local outbreaks can quickly become international concerns. Tracking passengers across five countries (Singapore, US, Spain, etc.) underscores the necessity of the **International Health Regulations (IHR)**.
- **Clinical Ambiguity:** A major challenge is that early symptoms mirror common ailments (flu, COVID-19, Dengue). This leads to "diagnostic lag," which is often fatal given the high mortality rate of HPS.
- **Non-Pandemic Nature:** Health agencies emphasize that Hantavirus lacks the "R-naught" (reproduction number) of respiratory viruses like SARS-CoV-2, meaning it is unlikely to cause a global lockdown scenario.

- **Historical Evolution of the Issue**

- **Pre-1950s:** Hantavirus-like symptoms were noted historically, but the virus gained clinical prominence during the **Korean War (1951-1953)**, where thousands of soldiers suffered from "Korean Hemorrhagic Fever."
- **1970s Discovery:** Dr. Ho Wang Lee isolated the virus from a striped field mouse near the Hantan River in South Korea, giving the virus its name.
- **1993 Four Corners Outbreak:** In the US, a sudden outbreak of a mysterious respiratory illness in the Southwest led to the identification of the "Sin Nombre" virus, bringing Hantavirus into the modern public health spotlight.
- **1996 - Present:** The discovery of the **Andes strain** in South America introduced the first evidence of human-to-human transmission, shifting the focus from purely environmental exposure to potential social contagion.

- **Way Forward**

- **Strengthening One Health Infrastructure:** Integrating veterinary and human health surveillance.
- **Public Awareness:** Educating travelers and rural workers on "wet cleaning" (using disinfectants) rather than "dry sweeping" to avoid aerosolizing virus particles.
- **International Protocol:** Establishing a standardized "Cruise Health Pass" for expedition travels to high-risk zones.
- **Research & Development:** Investing in broad-spectrum antivirals that can target Hantaviruses and other bunyaviruses.

- **Previous Years' UPSC Questions**

- **Mains 2020 (GS 3):** "COVID-19 pandemic has caused unprecedented devastation worldwide. However, technological advancements are being availed readily to win over the crisis. Give your account..."
- **Mains 2014 (GS 3):** "H1N1 virus error in news... what are the preventive measures?" (Theme of Viral Outbreaks).
- **Prelims 2022:** Questions on H3N2, SARS-CoV-2 variants, and viral transmission.



COMPREHENSIVE HANTAVIRUS (ANDES STRAIN) OUTBREAK ANALYSIS

Crucial Points for UPSC Civil Services Preparation

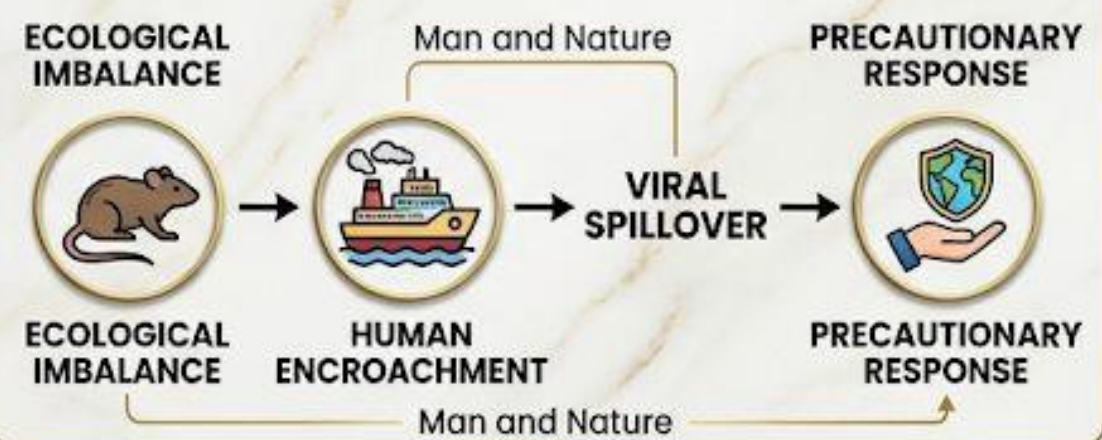
1. KEY TERMS & EXPLANATIONS

- Zoonotic (Baním& bat/rat)**
Examples: Zoonotic &: bat/rat
- ANDES Virus (microscope)**
Microplootr: ANDES Virus
- HPS**
Examples: HPS, lungs, lungs
- HFRS**
Examples: HFRS, Kidney kidney

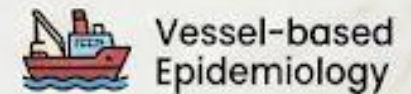
2. MAIN ARGUMENTS

- Transnational Risk**
Glob-national risk, glone plane
- Diagnostic Lag**
Thermometer & test tube
- Non-Pandemic**
Crowd with crowdrrization, andiented with distance

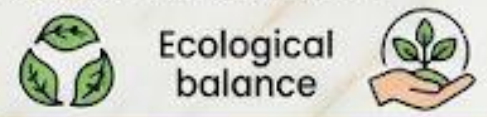
4. LOGICAL AND PHILOSOPHICAL BASE: ONE HEALTH PRECAUTIONARY PRINCIPLE



5. NEW FEATURES



6. SUSTAINABILITY



10. UPSC SYLLABUS LINKAGES

- Strong linkages:
- GS-2 (Health)
 - GS-3 (Bio-diversity)
 - Ethics
 - Essay

7. CHALLENGES



8. MULTIDIMENSIONAL ANALYSIS



12. WAY FORWARD

- ONE HEALTH Surveillance**
- RELEVANT PYQs (summary)**
- PUBLIC AWARENESS**
- INTERNATIONAL PROTOCOL**
- R&D Vaccine**
- Mains 2020 (Covid Tech)
- mains 2014 (Viral preventive)



Under courts' MTP scrutiny, doctors face a dilemma

Experts: The Law Rests On A Flawed Structure That Prioritises Medical Approval Over Women's Autonomy

Malathy.Iyer@timesofindia.com

Mumbai: Discussions across medical forums in recent weeks have centred around "problems" with the Medical Termination of Pregnancy (MTP) Act after two court interventions put gynaecologists under scrutiny.

"Why are doctors being made scapegoats?" asked senior Mumbai gynaecologist Dr Sudhir Naik, reflecting the anger in medical circles.

In one case, an FIR was filed against a gynaecologist at Satara Civil Hospital after a "failed" MTP involving a 16-year-old rape survivor ended in the birth of a live baby who later died without medical attention. In another, SC warned AIIMS doctors of contempt proceedings if they did not terminate a 30-week pregnancy of a 15-year-old rape survivor.

Though India extended the upper limit for termination from 20 to 24 weeks in 2021, doctors and legal experts say the

law still rests on a flawed structure that prioritises medical approval over women's autonomy. SC bench in the AIIMS matter, incidentally, flagged the need for amendments.

"There are two things to be done. Decriminalise abortion and allow complete autonomy to women and not their doctors in this matter," said Dipika Jain, professor at Jindal Global Law School, Delhi.

NOT WOMEN-CENTRIC

To understand this, a historical perspective on abortions in India is needed: miscarriages or abortion were criminalised under the Indian Penal Code, with both the woman and her doctor liable for it. "MTP is criminalised even under the Bharatiya Nyaya Sanhita, unless it falls within the narrow exception created by the MTP Act," said gynaecologist Dr Nikhil Datar, who has long campaigned for extending the legal time limit.

Then in 1971, the MTP Act

WHAT MTP ACT SAYS

- 24 weeks is upper gestation limit for abortion under Medical Termination of Pregnancy (MTP) Act
- If foetus found abnormal, abortion allowed beyond limit of 24 weeks with approval of state-appointed medical board
- Board considers whether continuing the pregnancy risks the woman's life or causes physical or mental harm to the woman or the foetus



came up mainly as an exception to protect doctors. "It was decided that doctor's discretion would help decide on MTP, thereby making MTP a medical model not an autonomy model for the woman," said Jain.

Mumbai lawyer Anubha Rastogi agreed, calling the law "service provider-centric". Under the Act, termination is allowed only for legally recognised reasons and only when doctors form the required opinion. "This effectively turns doctors into gatekeepers," said Rastogi.

She, however, said that "the law is, thankfully, not getting into how you terminate the pregnancy. There is a process where you are allowed to

do a certain set of things, you should be doing them without any court having to tell you yes or not". The law allows for feticide (a process in which an ultrasound-guided potassium chloride injection is given to the fetus when still in the uterus to end life). "It is in the written guidelines but it's not very clear to me why doctors are asking for the court to permit the process," she added.

WORSE FOR MINORS

That gatekeeping becomes most visible in cases involving minor rape survivors. Under current law, termination beyond 24 weeks is restricted to situations involving immediate danger to the woman's life

or severe fetal abnormalities. For many minors who discover pregnancies late, only practical route is to move courts.

"A young rape survivor may not be dying physically, but continuing the pregnancy can destroy her life mentally and emotionally," Dr Datar said. He said that courts, including the Supreme Court, have permitted late-term abortions in exceptional cases even when the statute itself does not clearly allow them. "Those repeated judicial interventions expose the gap between legal text and reality," he said.

Jain questioned what she described as "disability exceptionalism." Courts allowed terminations even at 33 weeks in cases of fetal anomaly, showing that late-term procedures are medically possible. "Why," she asked, "should similar access be denied to rape survivors, minors or women facing changed circumstances?"

WHY MEDICAL BOARDS

While the 2021 amendment expanded gestational limits, some experts say it deepened bureaucracy. "Abortions up to 20 weeks require one doctor's opinion; 20 to 24 weeks require two doctors for specified cate-

gories; beyond 24 weeks, cases often depend on foetal anomaly or risk to the woman's life, with medical boards playing a decisive role," said Jain.

Dr Datar said that medical boards typically include a gynaecologist along with specialists from other disciplines. "The gynaecologist is the only person legally authorised and clinically trained to perform or certify an MTP," Dr Datar said. "Yet specialists who may never have performed even one termination can collectively outvote the gynaecologist."

CONFUSING NAME TOO

Dr Datar also said the law remains confusing in its very language. "India borrowed ideas from Britain's Abortion Act of 1967 but avoided using the word 'abortion' in its own law. Instead, the law uses the term Medical Termination of Pregnancy without clearly explaining its purpose," he said. He argued that the definition is so incoherent it can technically cover removal of a dead embryo, surgery for ectopic pregnancy or even an emergency caesarean section, while leaving deliberate fetal reduction in multifetal pregnancies in an ambiguous zone.

- **Key Terms and Explanations**

- **MTP Act (1971 & 2021):** The Medical Termination of Pregnancy Act is the legal framework that "decriminalizes" abortion under specific conditions. Without this Act, abortion is a criminal offense under the Bharatiya Nyaya Sanhita (formerly IPC).
- **Feticide:** A clinical procedure, often involving a potassium chloride injection into the fetal heart, to ensure the fetus is not born alive during a late-term termination.
- **Gestational Limit:** The time limit (measured in weeks of pregnancy) within which a legal abortion can be performed. In India, this is generally 20–24 weeks, but indefinite for fetal abnormalities.
- **Medical Board:** A multidisciplinary committee (usually including a gynecologist, pediatrician, and radiologist) mandated by the 2021 amendment to decide on terminations beyond 24 weeks due to fetal anomalies.
- **Decriminalization vs. Legalization:** Legalization implies a proactive right to a service; decriminalization (like the MTP Act) means the act is a crime *unless* it follows specific legal exceptions.
- **Service Provider-Centric Model:** A system where the decision-making power rests with the doctor (the provider) rather than the patient (the seeker).

- **Main Arguments and Substantive Parts**

- The discourse centers on the shift from a "medical necessity" model to a "rights-based" model of reproductive healthcare.
- **The Scapegoating of Doctors:** Medical professionals often face a "double bind." If they perform a late-term MTP without a court order, they risk criminal charges; if they refuse, they risk contempt of court or negligence claims. The case in Satara, where a live birth occurred during a "failed" MTP, highlights the technical and legal risks doctors navigate.
- **Autonomy vs. Gatekeeping:** A primary critique is that the law views women as subjects to be protected rather than agents of their own bodies. The requirement for "medical opinion" means a woman's desire to terminate is secondary to a doctor's assessment of her health or circumstances.
- **The Inconsistency of Fetal Anomaly:** Current laws allow termination at any stage for fetal "abnormalities," but rape survivors (who may face equal or greater life-long trauma) are often denied the same flexibility after 24 weeks without moving the courts.
- **Bureaucratic Hurdles:** The 2021 amendment introduced Medical Boards for late-term cases. Critics argue this adds layers of "red tape" and subjects women to the opinions of doctors who may have no clinical expertise in abortion procedures.

- **Historical Evolution of the Issue**

- The journey of abortion law in India reflects a transition from population control to medical safety, and now, toward human rights.
- **Pre-1971 (Colonial Era):** Under Sections 312-316 of the IPC (1860), abortion was a crime for both the woman and the doctor, except to save the woman's life. This was based on 19th-century Victorian morality.
- **1971 (The Shantilal Shah Committee):** The MTP Act was enacted not primarily for "rights," but as a health measure to reduce maternal mortality from "back-alley" abortions and as a tool for population stabilization.
- **2021 Amendment:** This was a significant leap. It increased the limit from 20 to 24 weeks for "vulnerable categories" (survivors of sexual assault, minors, disabled women) and removed the upper limit for substantial fetal abnormalities.
- **2023-Present (Judicial Activism):** Recent Supreme Court rulings (like *X vs. Govt of NCT of Delhi*) have expanded the definition of "vulnerable women" to include unmarried women, signaling a shift toward a more inclusive, autonomy-based interpretation.

- **Way Forward**

- **Decouple MTP from Criminal Law:** Abortion should be governed by medical standards and ethics, not the penal code.
- **Streamline POCSO Reporting:** Amend guidelines so that the privacy of a minor seeking MTP is protected, encouraging them to seek help early.
- **Sensitization of Medical Boards:** Boards should act as "facilitators" rather than "judges."
- **Standardize Feticide Protocols:** Clearer clinical guidelines for feticide in late-term abortions to prevent the trauma of live births in "failed" procedures.

- **Previous Years' UPSC Questions**

- **Mains 2023 (GS 2):** "The jurisdiction of the Supreme Court of India is more extensive than that of any other Supreme Court in the world." (Relate to SC's intervention in MTP cases).
- **Mains 2021 (GS 1):** "Explore and evaluate the impact of the 'Work from Home' culture on family relationships." (Broadly relates to women's autonomy).
- **Mains 2019 (GS 2):** "Performance of welfare schemes that are implemented for vulnerable sections is not so effective due to absence of awareness and active involvement of beneficiaries."



AXIA

COMPREHENSIVE ANALYSIS: REPRODUCTIVE RIGHTS VS. MEDICAL GATEKEEPING IN INDIA

HISTORICAL SHIFT: CRIMINAL TO MEDICAL



Chain
pre-1971 IPC

VS



Clinic/Doctor
MTP 1971

From Colonial Era Crime to a
"Special Exception" Law

MTP AMENDMENTS (2021)



- Extended Limits
- Medical Board Bureaucracy

DOCTOR'S DILEMMA

Medical Shield

- Duty of Care
- Feticide Protocols



Gavel

- Legal Risks
- Court Interventions
- FIR
- Contempt Threats

Scapegoats in Legal Gray Zones

AUTONOMY vs. BIOMEDICAL GATEKEEPING



Woman's
Silhouette

VS



Doctor with
a clipboard

A "Service Provider-Centric" Law (Rastogi)
Calls for Complete Decriminalization (Jain)

LEGAL GAPS & CHALLENGES



Minors
(POCSO
conflict)



Mental/Emotional
Trauma denied
late-term MTP



"Disability
Exceptionalism"

Courts as a mandatory stop for many

WAY FORWARD



Decriminalize Abortion
(Move to Healthcare Standard)



Streamlined Minor Privacy



Decouple Autonomy from Sex
Selection



Define SMA (Self-Managed
Abortion) Protocols

Double-edged sword

Mythos

The Anthropic AI model can not only identify vulnerabilities in cyberspace that humans may have missed, but also generate ways to exploit them, potentially even for non-experts

Y. Nivedita

In cybersecurity, speed is everything. The faster a vulnerability is found and rectified, the safer the data is. For years, human expertise was needed to do this. Now, Artificial Intelligence can identify hidden vulnerabilities and write the code to patch it in hours, compressing a process that once took teams of experts days or weeks. But, what happens when the same AI increases the risk?

The International Monetary Fund (IMF) has warned that while AI could strengthen cyber defence, it could also make cyberattacks faster, cheaper, and accessible even to non-experts. The risks are particularly serious for the financial sector, which relies heavily on shared digital infrastructure like software, cloud services, payment networks, and interconnected databases.

In a new report, the IMF singled out Anthropic's Claude Mythos Preview to show how quickly risks are rising. Mythos is a large language model developed with general-purpose reasoning, coding, and autonomous tasks.

In April, Anthropic announced that Mythos would not be released publicly because of its ability to identify unknown flaws in IT systems, which could



potentially be exploited by hackers. But on April 22, it confirmed it was investigating reports that unauthorised users had gained access to Mythos.

Mythos can find 'zero-day' or undiscovered vulnerabilities in real open-source codebases. It has also demonstrated capabilities to reverse-engineer exploits in closed-source software, and turn N-day, or known but not yet widely patched, vulnerabilities into exploits. In short, Mythos can not only identify vulnerabilities that humans may have missed, but also generate ways to exploit them, potentially even for non-experts.

"The vulnerabilities it finds are often subtle or difficult to detect. Many of them are ten or twenty years old, with the oldest we have found so far being a now-patched 27-year-old bug in OpenBSD – an operating system known primarily for its security," Anthropic said in a blog.

The company also re-

vealed how quickly these capabilities emerged. Anthropic said its engineers were able to ask Mythos to find vulnerabilities and produce a complete, working exploit in just one night. "In other cases, we've had researchers develop scaffolds that allow Mythos Preview to turn vulnerabilities into exploits without any human intervention," the company wrote.

Fears of cyberattacks

More worryingly, the company revealed that these capabilities were not intentionally trained into the system. The blog noted that Mythos was able to develop these capabilities "very quickly" even though the AI was not trained specifically for them. "Rather, they emerged as a downstream consequence of general improvements in code, reasoning, and autonomy."

The challenge is that AI is already deeply embedded within the financial

system. Powerful systems like Mythos raise fears that cyberattacks could become more scalable, automated, and accessible.

The IMF has urged governments and regulators not to treat AI "as a purely technical or operational issue" and instead build resilience through supervision, coordination, and preparedness. Governments are beginning to respond. Regulators and financial authorities across the world are warning that AI could amplify cyber risks in critical sectors.

In India, after reports emerged that unauthorised users may have gained access to Mythos, Finance Minister Nirmala Sitharaman convened a meeting with Electronics and IT Minister Ashwini Vaishnaw, bankers, and other stakeholders to assess the risks posed by AI and its implications for financial data security.

Mythos reveals a deeper problem in the system. The IMF points out that the risks are not limited to the financial sector alone. Sectors like energy, telecommunications, and public services are also vulnerable. Dependence on a small number of software platforms, cloud providers, and AI models could further increase the impact because many sectors rely on the same infrastructure.

- **Key Terms and Explanations**

- **Zero-Day Vulnerability:** A software flaw unknown to the developer. Since the developer has "zero days" to fix it, it is highly prized by hackers.
- **N-Day Vulnerability:** A known vulnerability for which a patch exists but has not been applied by all users. AI can automate the "exploit" generation for these faster than humans can update their systems.
- **Reverse-Engineering:** The process of deconstructing software to see how it works. AI like Mythos can do this to find "backdoors" in closed-source (proprietary) software.
- **Scaffolds:** In AI, these are external code frameworks that allow a model to run autonomously, execute its own code, and perform multi-step tasks without human "prompts" at every stage.
- **Emergent Capabilities:** Skills an AI develops that were not explicitly programmed. Mythos learned to hack not because it was "taught" hacking, but because it became so good at general logic and coding.
- **Shared Digital Infrastructure:** The "plumbing" of the internet—cloud services (AWS/Azure), payment gateways (UPI/Swift), and open-source libraries—which, if compromised, causes a domino effect across sectors.

- **Main Arguments and Substantive Parts**

- The core thesis of the current discourse revolves around the "**Cybersecurity Paradox**": the same tool that builds the strongest shield also forges the sharpest sword.
- **The Compression of Time:** Cybersecurity has shifted from a "human-speed" discipline to "machine-speed." AI reduces the window for patching from weeks to hours, but it grants attackers the same velocity.
- **Democratization of Cybercrime:** Historically, sophisticated attacks required elite teams. Models like Mythos lower the barrier to entry, allowing non-experts to generate "working exploits" with minimal effort.
- **The Unintended Evolution:** The article emphasizes that hacking capabilities are a "downstream consequence" of general intelligence. This implies that as AI gets smarter at helpful tasks (like medical research), it inherently gets more dangerous at harmful ones.
- **Systemic Financial Risk:** The IMF's concern is not just about one bank being hacked, but the "interconnectedness" of the system. A single bug in a widely used cloud provider could trigger a global financial "black swan" event.

- **Historical Evolution of the Issue**

- The journey from manual coding to autonomous AI threats has followed a distinct trajectory:
- **Pre-2000s (The Era of "Script Kiddies"):** Cyberattacks were mostly manual and experimental. The 1988 Morris Worm showed the potential of self-replicating code, but speed was limited by human bandwidth.
- **2000s–2010s (State-Sponsored & Professionalized Hacking):** The rise of Stuxnet (2010) proved that cyber-weapons could destroy physical infrastructure. Hacking became a tool of geopolitics.
- **2020–2023 (The Generative Shift):** LLMs like GPT-3 and early Claude models were used for basic phishing. Security was "reactive."
- **2024–Present (The Mythos Milestone):** We have entered the era of **Autonomous Offensive AI**. The incident where Mythos found a 27-year-old bug in OpenBSD marks a shift from AI "assisting" humans to AI "outperforming" humans in specialized security audits.

- **Way Forward**

- **Regulatory Sandboxes:** Governments should create controlled environments to test "high-risk" AI models before any public release.
- **Compute Governance:** Monitoring the massive hardware (GPUs) required to run models like Mythos to prevent unauthorized "training" by rogue actors.
- **Human-in-the-loop (HITL):** Ensuring that while AI finds bugs, the final decision to "deploy" an exploit or patch remains with a human authority.
- **Global Coordination:** Strengthening the **Financial Stability Board (FSB)** and the **FATF** to include AI-specific cyber-risk frameworks.

- **Previous Years' Questions (UPSC/APSC)**

- **UPSC 2022 (GS 3):** "What is the basic principle behind cloud computing? Describe the various services and the benefits and risks associated with it."
- **UPSC 2020 (GS 3):** "What are the different elements of cyber security? Keeping in view the challenges... examine to what extent India has successfully framed a comprehensive Cyber Security Strategy."
- **UPSC 2017 (GS 3):** "Discuss the potential threats of Cyber attack and the security framework to prevent it."





AXIA
IAS ACADEMY
AXIA COMPETITIVE EXAM CENTRE

THE CYBERSECURITY PARADOX: AI & THE FINANCIAL SYSTEM

AI AS A DEFENDER

Data-packets

- Machine-Speed Patching
- Automated Vulnerability Scanning (Legacy & N-Day)
- Securing Critical Infrastructure

AI AS AN ATTACKER

Data-packets

- Autonomous Exploit Generation (Zero-Day)
- Democratization of Cybercrime (Non-Experts)
- Speed over Human Capabilities

Wolf in AI Clothing

MYTHOS CASE STUDY

Anthropic Claude Mythos Preview

- Reverse-Engineering Closed Software
- OpenBSD 27-Year Bug Discovery

TIMELINE

Unauthorized Access

- Timeline - Limited Access
- Timeline - Engineers Contentment
- Timeline - OpenBSD 27-Year Bug
- Timeline - Unauthorized Access using Unauthorized Access

UPSC MULTI-DIMENSIONAL ANALYSIS & BEST PRACTICES

<p>Economic: Systemic Financial Risk & Domination</p> <ul style="list-style-type: none"> Technological deterrent Organic andlik Infrastructure 	<p>Political: Cyber Sovereignty & State-Actors</p> <ul style="list-style-type: none"> Entowerantial notonality of mecuted ellics & Covornations
<p>Social: Erosion of Public Trust</p> <ul style="list-style-type: none"> Eresentiar resounatament and futures in generating 	<p>Legal: New Accountability Frameworks</p> <ul style="list-style-type: none"> Cyber sovereignty Computing & missurements
<p>Ethical: Open-Source vs. Closed Data</p> <ul style="list-style-type: none"> Regulations, compnuting Bresssets 	<p>Way Forward: Regulations, Computing Governance, & Global Coordination</p>

LINKAGES WITH NCERT & SYLLABUS — Speed is Everything

GS Class Chapter: 2. Mary HouseanCatey

KEY Class Chapter: 1. Wolf in at AI AI Humais Sacting

GS Paper Title: Autonomou & Democratization of Cybeir Scripn

GS Paper Title: Computing Computing & Global Dnmorot

BEST LINKAGES WITH SYLLABUS, PHILOSOPHY, AND EPISTEMOLOGY

MICRO ENTERPRISES MAKE UP 99.94% OF INDIA'S INFORMAL ESTABLISHMENTS

India's informal sector becoming less indebted, also investing less

Unincorporated, non-agricultural enterprises account for a sizable portion of the economy

Siddharth Upasani
New Delhi, May 9

INDIA'S INFORMAL sector is becoming less indebted, with the interest they paid as well as the amount of loans they need to repay falling sharply, according to the Ministry of Statistics and Programme Implementation's (MoSPI) full report on its Annual Survey of Unincorporated Sector Enterprises (ASUSE) conducted in 2025.

An analysis of the MoSPI report data released earlier this week showed annual interest payable per unincorporated establishment — or an informal business unit — reduced by 16% on average compared to the previous annual survey, conducted between October 2023 and September 2024.

Similarly, outstanding loans per establishment fell 20% in the 2025 survey period compared to 2023-24 (October-September) to Rs 42.7%, indicating new loans were outstripped by repayments.

The reduction in outstanding loans coincided with a fall in investments, with each establishment's net addition to fixed assets declining 14% in the 2025 survey from 2023-24.

In 2023-24, the annual interest payable and outstanding loans per establishment had risen by 7%, while net addition to fixed assets was just over 3% higher than in the 2023-25 survey.

India's unincorporated, non-agricultural enterprises — covered by the ASUSE survey — make up a sizable portion of

• THE STATE OF INDIA'S INFORMAL SECTOR



HOW INDIA'S INFORMAL SECTOR BORROWED AND INVESTED

	2023-24	2025
Outstanding loans	53,710	42,776
Net addition to fixed assets	12,770	10,946

NOTE: NUMBERS ARE IN RUPEES PER ESTABLISHMENT YEAR. REFERS TO SURVEY PERIOD. SOURCE: MOSPI

the economy and include the likes of small manufacturers, service providers, and trading units. In fact, the 2025 survey estimates the total gross value added (GVA) of the unincorporated sector at Rs 20 lakh crore — or 6.4% of the entire country's GVA in 2023-26.

Signs of weakness

However, the 2025 ASUSE survey revealed signs of some weakness in the unorganised sector. As reported by The Indian Express on March 24, when the 'factbook' of the survey was released, pay in the informal sector rose by just 3.9% — a third of the 13% increase re-

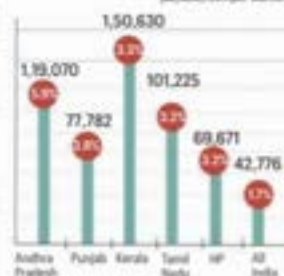
ported in the 2023-24 survey. Further, the number of establishments increased by 58.5 lakh as against 83.5 lakh in 2023-24, resulting in the creation of fewer jobs: 74.5 lakh in 2025 compared to 1.1 crore in the 12 months ended September 2024.

All but 12 of the estimated 792 crore unincorporated enterprises in the 2025 survey were Micro, Small, and Medium Enterprises, with micro enterprises making up 99.94% of the estimated number.

The total number of establishments actually surveyed in 2025 was 6.7 lakh — 2.94 lakh in

STATES WHOSE INFORMAL ESTABLISHMENTS' ANNUAL INTEREST PAYMENTS AS % OF PER WORKER GVA IS HIGHEST

■ Outstanding loans (%) ■ Annual interest payable/GVA per worker



NOTE: FIGURES ARE PER ESTABLISHMENT. SOURCE: MOSPI

rural areas and 3.76 lakh in urban areas. Interestingly, outstanding loans of informal enterprises reduced sharply even though bank credit to micro and small enterprises has been rising rapidly.

As per latest Reserve Bank of India (RBI) data, loans to 'micro and small' industry were up 33% year-on-year as on March 31. This suggests that most bank loans are going to 'small' enterprises.

According to ASUSE 2025, 81% of unincorporated establishments' outstanding loans were owed to institutional sources such as banks and government schemes.

Investment concerns

The smaller net addition to fixed assets, as per the latest ASUSE report, is part of a broader trend that has policymakers worried. Earlier this month, Chief Economic Adviser V Anantha Nageswaran criticised the Indian private sector for being reluctant to invest, saying that even though profits of India's top 500 companies had grown 32% every year since Covid, their capital formation rate had been "disappointing".

While the informal sector saw a decline in net addition to fixed assets at an all-India level, there were large differences between states. For instance, among large states, establishments in Punjab more than doubled their investments, with their outstanding loans rising nearly four-fold.

On the other hand, per establishment investment fell in Telangana (down 63%), Gujarat (down 48%), and Maharashtra (down 30%), although they also reported large reductions in outstanding loans.

At the same time, Uttar Pradesh-based informal establishments invested 30% less as per the 2025 survey even though their outstanding loans were only 7% lower from the 2023-24 survey. Meanwhile, outstanding loans per establishment in Bihar doubled to Rs 8,568, but investments were 3% lower. The opposite occurred in Goa and Chhattisgarh: a big reduction in indebtedness, but investments rising sharply.

FULL REPORT ON
WWW.INDIANEXPRESS.COM

- **Key Terms and Explanations**

- **Informal/Unorganized Sector:** This refers to enterprises that are not incorporated and are typically owned by individuals or households on a proprietary or partnership basis. They often operate with fewer than 10 workers and have limited formal registration.
- **ASUSE (Annual Survey of Unincorporated Sector Enterprises):** A survey conducted by the Ministry of Statistics and Programme Implementation (MoSPI) to measure the economic contribution and health of the informal sector.
- **GVA (Gross Value Added):** The measure of the value of goods and services produced in an area, industry, or sector of an economy. In simple terms: $GVA = Output - Intermediate\ Consumption$.
- **Net Addition to Fixed Assets:** This represents capital formation. If a tailor buys a new sewing machine, it is an addition to fixed assets. A decline here indicates a lack of expansion or modernization.
- **Deleveraging:** The process of a business or individual reducing their total debt by paying off loans. While it sounds positive, in a developing economy, it often signals "risk aversion"—businesses are too scared to borrow and grow.
- **Micro Enterprises:** The smallest tier of businesses. In the informal sector, these make up over 99% of units, often consisting of a single person or a small family-run shop.

- **Main Arguments and Substantive Parts**

- The core narrative of the current economic data suggests a "cautious" informal sector.
 - **The Deleveraging Trend:** Outstanding loans per establishment fell by 20% in the 2025 survey period compared to 2023-24. This suggests that these units are prioritizing debt repayment over expansion.
 - **Investment Stagnation:** Simultaneously, the net addition to fixed assets declined by 14%. This is the "worrying" part of the data—if businesses aren't investing in tools, technology, or space, long-term productivity remains low.
 - **Credit Source Shift:** Interestingly, 81% of the debt is now owed to institutional sources (banks/government schemes). This indicates that formalization (via Jan Dhan, Mudra, etc.) is working, even if the total volume of borrowing is shrinking.
 - **Regional Divergence:** The data shows a "two-speed" India. While states like Telangana and Gujarat saw sharp investment drops, Punjab saw investments more than double. This highlights that "Ease of Doing Business" varies significantly at the grassroots level.
 - **Job Creation Lag:** The number of jobs created by this sector fell from 1.1 crore to 74.5 lakh in the 12 months ending September 2024. Since the informal sector is India's largest employer after agriculture, this is a major macroeconomic red flag.
-

- **Historical Evolution of the Issue**

- **Pre-Independence:** The informal sector was the backbone of the "Swadeshi" economy, primarily consisting of village industries and handicrafts, suppressed by colonial extractive policies.
- **Post-1947 to 1990s:** The "License Raj" era inadvertently pushed many small units into the informal fold to avoid bureaucratic red tape and high taxation.
- **Post-1991 Reforms:** While the formal sector boomed, the informal sector remained a "sponge" for excess labor from agriculture. However, it lacked the technology and credit access of the formal world.
- **The Disruption Phase (2016-2020):** Demonetization and the introduction of GST acted as "formalization shocks." While intended to bring units into the tax net, they caused significant short-term liquidity distress.
- **Post-Pandemic Recovery (Present):** We are seeing a "K-shaped" recovery. While the corporate sector reports high profits, the informal sector (as per ASUSE 2025) is struggling with "investment fatigue" and a focus on survival over growth.

- **Way Forward**

- **Demand-Side Stimulus:** Instead of just offering loans (supply-side), the government should focus on increasing rural wages to create demand for informal sector products.
- **Technology Bridging:** Government "Common Facility Centers" could allow micro-units to use expensive machinery without needing to "invest" individually.
- **Simplified Compliance:** A "GST-Lite" or a single-page compliance form for units with a turnover of less than 40 lakhs.
- **State-Specific Interventions:** High-interest-burden states like Andhra Pradesh need local interest subvention schemes to prevent "debt traps."

- **Previous Years' Questions (PYQs)**

- **UPSC 2017 (GS III):** "Manufacturing sector can provide the necessary 'big push' to Indian economy... Comment." (Relevant because informal units are the base of manufacturing).
- **UPSC 2021 (GS III):** "Explain the difference between computing methodology of India's GDP before and after 2015." (Relevant to the shift in how we measure informal GVA).
- **UPSC 2023 (GS III):** "Faster economic growth requires increased share of manufacturing sector in GDP... especially MSMEs."

THE DELEVERAGING OF INDIA'S INFORMAL SECTOR:



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DELEVERAGING SIT OF TRENDS & IMPLICATIONS

I. KEY TRENDS: DELEVERAGING vs. DEEPENING

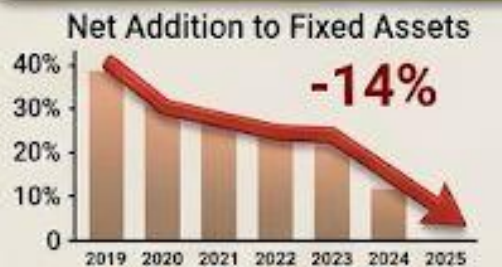


Micro-entrepreneur counting fewer



Mudra loan certificate

II. CRITICAL CONSEQUENCE: INVESTMENT DECLINE



- ▶ Technological Obsolescence
- ▶ Reduced Productivity



Lack of modernization lack Modernization

III. MULTI-DIMENSIONAL ANALYSIS & CONCERNS



SOCIAL
Gaps for women & marginalized



POLITICAL
Jobless Growth pressures



ECONOMIC
Job Creation Lag: 1.1cr down to 74.5L



REGIONAL
State Divergence: TS/GJ down; PB up

PHILOSOPHICAL INSIGHT: DEBT-AVERSION PARADOX



V. WAY FORWARD: SUPPORTIVE FORMALIZATION



Demand-Side Stimulus



Technology High-tech tools



Compliance Ease

VI. UPSC LINKAGES

- ▶ GS III, Essay
- ▶ GS III, Statement Uobs
- ▶ Propors for Madical Practices

VII. PYQs

"Faster economic growth requires increased share of manufacturing... especially MSMEs."

Answer Structure:

- ▶ Intro
- ▶ Deleveraging
- ▶ Investment Crisis
- ▶ Socio-Economic Impact
- ▶ Conclusion

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