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1. Pellet Guns and Law Enforcement: Balancing Crowd Control and Human Rights

Key Highlights & Summary

- The Supreme Court of India observed that the use of pellet guns by police in exceptional circumstances forms part of a graded police response to break civilian protests, while refusing a blanket ban.

- The Bench, headed by Chief Justice Surya Kant, emphasized that the state must address student and civilian protests with non-violence and restraint rather than brutality.
- The petition, filed by former IPS officer Yashovardhan Azad and pellet injury victims, argued that projectile-activated guns (PAGs) fail the constitutional tests of necessity, proportionality, and reasonableness.
- The apex court chose to examine particular incidents of alleged arbitrary or indiscriminate use of pellet guns rather than imposing a blanket prohibition on their deployment.
- The judiciary flagged serious concerns regarding the potential hijacking of genuine student protests by unscrupulous elements, which can drive peaceful assemblies into spirals of violence.

Essential Definitions

- **Pellet Gun:** A non-lethal or less-lethal weapon that discharges multiple metallic or lead pellets spread over an area, intended to incapacitate crowds without causing fatal injuries, though it frequently results in severe trauma, blinding, and permanent disabilities.
- **Graded Response:** A standardized protocol of law enforcement actions that escalates progressively—starting from verbal warnings, water cannons, and tear gas to non-lethal projectiles and, only as a last resort, lethal force.

Legal and Constitutional Framework

- **Article 21 (Right to Life and Personal Liberty):** Guarantees the right to life with human dignity, which can be severely compromised by indiscriminate use of kinetic impact projectiles on civilian populations.
- **Doctrine of Proportionality:** A key administrative and constitutional principle dictating that state action and police force must not exceed what is strictly necessary to achieve a legitimate objective (such as maintaining public order).
- **International Human Rights Standards:** United Nations Basic Principles on the Use of Force and Firearms by Law Enforcement Officials mandate that law enforcement agencies should apply non-violent means before resorting to force and use firearms only in self-defense or defense of others against the imminent threat of death or serious injury.



Conclusion

The debate surrounding pellet guns underscores the perpetual challenge in constitutional democracies of balancing state security and public order maintenance with the protection of fundamental human rights. While the judiciary acknowledges the utility of graded tactical responses during extreme public disorder, it remains imperative for enforcement agencies to strictly adhere to international human rights standards, absolute necessity, and strict proportionality to prevent grave injuries and uphold the sanctity of life.

UPSC Relevance

This issue is highly relevant for the UPSC Civil Services Examination under General Studies Paper II (Indian Constitution, Governance, Polity, and Social Justice) and General Studies Paper III (Internal Security, Role of State and Non-State Actors in Creating Internal Security Challenges,

and Maintenance of Law and Order). It directly tests an aspirant's understanding of police reforms, human rights jurisprudence, the application of constitutional doctrines, and the management of civil protests in a democracy.

2. PM CARES Fund Transparency Debate and Accountability Challenges

Key Highlights & Summary

- Activists and transparency advocates have raised serious concerns as the Prime Minister Citizen Assistance and Relief in Emergency Situations (PM CARES) Fund has withheld public audit statements since the financial year 2022-23.
- Established in March 2020 as a public charitable trust to support relief efforts during public health emergencies like COVID-19, the fund is chaired by the Prime Minister and funded entirely through voluntary contributions.
- The last publicly available audited financial statements for FY 2022-23 revealed an opening balance of ₹5415.65 crore, voluntary contributions of ₹909.64 crore, total receipts of ₹6723.07 crore, total payments of ₹439.38 crore, and a closing balance of ₹6283.68 crore as of March 31, 2023.
- Transparency activists argue that the fund was presented as being set up by the Union government—with government employees contributing from their salaries—making it function in practice like a public authority.
- Critics emphasize that PM CARES remains outside the direct ambit of the Right to Information (RTI) Act, parliamentary scrutiny, and audit by the Comptroller and Auditor General (CAG), sparking a debate on institutional accountability.
- Former information commissioners and transparency advocates maintain that because the trustees are Union ministers acting as public servants, any entity associated with the Prime Minister should inherently be open to public scrutiny.

Essential Definitions

- **Public Charitable Trust:** A legal arrangement recognized under trust laws where property is transferred to trustees to be held and managed for the benefit of the public or a specific section of it, aiming at relief of poverty, education, medical relief, or advancement of objects of general public utility.
- **Right to Information (RTI):** A statutory right empowering citizens of India to secure access to information under the control of public authorities, promoting transparency and accountability in the working of every public authority.

Legal and Constitutional Framework

- **Right to Information Act, 2005:** Section 2(h) defines a public authority to include any body established or constituted by the Constitution, by law made by Parliament, or by notification issued or order made by the appropriate government. The core legal contention centers on whether PM CARES qualifies as a public authority under this provision.



- **Comptroller and Auditor General (Duties, Powers and Conditions of Service) Act, 1971:** Governs the audit mandate of the CAG over government funds, bodies, and authorities substantially financed by public revenues.
- **Article 19(1)(a) Read with Article 21:** Supreme Court jurisprudence implies that the right to know and transparency in governance are integral components of the freedom of speech and expression and the right to life, strengthening the argument for institutional accountability.

Conclusion

The ongoing withholding of audit statements by the PM CARES Fund highlights the critical tension between discretionary emergency response mechanisms and statutory accountability frameworks in a democracy. While such trusts facilitate swift mobilization of resources during crises, aligning their governance structures with established transparency norms, RTI oversight, and independent CAG audits is vital to maintaining public trust and upholding democratic accountability.

UPSC Relevance

This topic is highly relevant for the UPSC Civil Services Examination under General Studies Paper II (Indian Constitution, Polity, Governance, Transparency, Accountability, and Statutory/Regulatory Bodies). It provides crucial case-study material for evaluating the balance between executive efficiency during crises and the fundamental tenets of administrative transparency, public auditing, and the Right to Information.

3. Cauvery Water Dispute and CWMA Upholds Release Order

Key Highlights & Summary

- The Cauvery Water Management Authority (CWMA) upheld the Cauvery Water Regulation Committee (CWRC) order directing Karnataka to release 3,500 cusecs of water daily to Tamil Nadu for 15 days.
- CWMA is the apex body mandated to monitor the implementation of water release as per the final verdict of the Supreme Court of India.
- Karnataka challenged the directive, citing acute hydrological distress and a cumulative inflow deficit of 65.65% across its four major reservoirs in the Cauvery basin due to the super El Nino effect.
- Karnataka Chief Minister convened an all-party meeting to deliberate on the legal and political strategy following the rejection of its appeal to keep the order in abeyance.
- The dispute highlights longstanding federal friction between riparian states over equitable water sharing during distress years when monsoon deficits strain agricultural and drinking water needs.



Essential Definitions

- **Riparian State:** A state or administrative unit through which or along which a natural watercourse, such as a river, flows or is situated, establishing legal rights and claims regarding the utilization of its waters.
- **Cusec:** A unit of water flow rate representing one cubic foot of water per second, equivalent to approximately 28.317 liters per second.

Legal and Constitutional Framework

- **Article 262 of the Constitution of India:** Empowers Parliament to provide by law for the adjudication of any dispute or complaint with respect to the use, distribution, or control of the waters of any inter-state river or river valley.
- **Inter State Water Disputes Act, 1956:** Enacted under Article 262 to provide for the constitution of ad hoc tribunals for the adjudication of water disputes between states, under which the Cauvery Water Disputes Tribunal was established.
- **Supreme Court Framework (2018 Verdict):** The apex court declared water a national asset and finalized the allocation of Cauvery waters among Karnataka, Tamil Nadu, Kerala, and Puducherry, while directing the creation of the CWMA and CWRC for continuous oversight.

Conclusion

The Cauvery water sharing dispute exemplifies the complex governance challenges surrounding inter-state river management in India, particularly during meteorological anomalies like El Nino. While statutory mechanisms like the CWMA and CWRC provide institutional forums for technical evaluation, lasting resolution requires cooperative federalism, advanced water-use efficiency, and dynamic distress-sharing formulas that balance the competing agrarian needs of riparian states.

UPSC Relevance

This topic is highly relevant for the UPSC Civil Services Examination under General Studies Paper II (Inter-state Relations, Federalism, Statutory and Regulatory Bodies, and Judicial Pronouncements) and General Studies Paper III (Water Resource Management, Infrastructure, and Disaster Management). It tests the aspirant's understanding of constitutional mechanisms for resolving resource conflicts and the nuances of cooperative federalism.

4. Assam Flood Relief Package and Disaster Management Framework

Key Highlights & Summary

- Assam Chief Minister Himanta Biswa Sarma demanded a dedicated support package from the Centre for relief, rehabilitation, and infrastructure restoration following unprecedented floods that claimed 78 lives and affected over 3 lakh people.

- The demand was placed before the Inter-Ministerial Central Team (IMCT), which concluded its four-day on-ground assessment tour of flood-devastated Upper Assam districts including Sivasagar, Charaideo, Jorhat, and Golaghat.
- The State government urged the Centre to recognize the Upper Assam deluge as an atypical, high-intensity, rapid-onset event, requesting flexible norms for damage assessment and financial assistance.
- Assam sought relaxation of documentation and eligibility norms under Central and Centrally sponsored schemes to enable affected households to access hassle-free support for housing, infrastructure, and livelihoods.
- The ongoing crisis highlights recurring annual vulnerabilities in the Brahmaputra and Barak river valleys, necessitating robust structural and financial mechanisms for disaster mitigation.



Essential Definitions

- **Rapid-Onset Disaster:** A hazard that emerges quickly or unexpectedly, such as flash floods, severe riverine floods, or cloudbursts, leaving little or no time for advance warning or evacuation.
- **State Disaster Response Fund (SDRF):** The primary fund available with state governments for immediate relief to disaster victims, constituted under the Disaster Management Act of 2005 with contributions shared between the Centre and states.

Legal and Constitutional Framework

- **Disaster Management Act, 2005:** Provides the legal architecture for the institutional setup of disaster management in India at national, state, and district levels, establishing the National Disaster Management Authority (NDMA) and State Disaster Management Authorities (SDMA).
- **Finance Commission Recommendations:** Governs the allocation, categorization, and utilization guidelines for the State Disaster Response Fund (SDRF) and National Disaster Response Fund (NDRF), determining criteria for central financial assistance during severe calamities.
- **Seventh Schedule of the Constitution:** Public health, sanitation, drainage, and embankments fall primarily under the State List (Entry 6), while disaster management spans concurrent operational responsibilities requiring active center-state fiscal and administrative coordination.

Conclusion

The recurring deluge in Assam underscores the limits of reactive relief and highlights the critical need for long-term structural resilience, comprehensive flood forecasting, and flexible financial architectures. While central assistance through specialized teams provides immediate fiscal cushion, sustainable mitigation requires integrated basin-wide water management and administrative adaptability to address rapid-onset climate disasters effectively.

UPSC Relevance

This topic is highly relevant for the UPSC Civil Services Examination under General Studies Paper III (Disaster Management, Mitigation Strategies, and Management of Floods) and General Studies Paper II (Centre-State Relations and Federal Governance). It provides essential insights into disaster financing, institutional mechanisms under the Disaster Management Act, and the administrative challenges of recurring natural calamities in vulnerable regions.

5. Kerala UDF Stance on PM-SHRI Scheme and Federal Fiscal Dynamics

Key Highlights & Summary

- **Policy Shift on PM-SHRI:** The United Democratic Front (UDF) in Kerala revised its opposition to the Pradhan Mantri Schools for Rising India (PM-SHRI) scheme, a component tied to the National Education Policy (NEP).
- **Rationale of Federal Funds:** The shift was driven by the state's urgent necessity for central financial grants to sustain school education, with leaders arguing that a government cannot easily undo predecessor commitments due to fiscal obligations.
- **Political Allegations:** UDF convenor Adoor Prakash accused the ruling Left Democratic Front (LDF) of hypocrisy, claiming the previous LDF administration clandestinely signed a Memorandum of Understanding (MoU) with the Centre without wide consultations.
- **Controversy Over Saffronisation:** While the LDF previously opposed the scheme citing concerns over the ideological saffronisation of education, the UDF contended that this opposition was a political smokescreen.
- **Continuity in Governance:** The episode highlights the administrative dilemma where incoming or incumbent political coalitions must balance ideological opposition with pragmatic financial dependencies on the Union government.

Essential Definitions

- **PM-SHRI Scheme:** A centrally sponsored scheme aimed at upgrading select government schools across India to showcase policy implementation under the National Education Policy (NEP) 2020.
- **Centrally Sponsored Scheme (CSS):** Public welfare initiatives implemented by states or their agencies with varying cost-sharing ratios funded primarily by the Central Government.
- **Fiscal Federalism:** The financial relations and division of revenue-raising and expenditure responsibilities between different levels of government, primarily between the Union and the States in the Indian context.

Legal and Constitutional Framework

- **Article 246 and Seventh Schedule:** Education falls under the Concurrent List (Entry 25 of List III), empowering both Parliament and State Legislatures to legislate, though central policies backed by funding often exert strong persuasive pressure on state implementation.
- **Article 282:** Empowers the Union or a State to make grants for any public purpose, even if the purpose is not within the legislative competence of the Parliament or State Legislature, forming the legal bedrock for conditional central grants to states.

- **Conditionality of Funds:** The Union government often utilizes conditional grants through Memorandum of Understandings (MoUs) to nudge states into adopting national reform agendas, occasionally sparking center-state friction over administrative autonomy.

Conclusion

The political tussle in Kerala underscores the intricate balance between regional political autonomy, ideological opposition, and financial dependence on central transfers. While states possess valid concerns regarding central policy impositions, fiscal necessities often compel pragmatic alignment, highlighting the structural realities of Indian cooperative and coercive federalism.

UPSC Relevance

- **General Studies Paper II:** Functions and responsibilities of the Union and the States, issues and challenges pertaining to the federal structure, devolution of powers and finances up to local levels and challenges therein.
- **Polity and Governance:** Centre-state relations, implementation of central policies and schemes, and cooperative federalism dynamics in education.

6. BITS Pilani Low-Energy System for Biopharmaceutical Wastewater Treatment

Key Highlights & Summary

- **Innovative Technology:** Researchers at BITS Pilani, Hyderabad, developed a low-energy, integrated three-stage treatment system to disinfect biopharmaceutical wastewater while recovering reusable water and methane-rich biogas.
- **Collaboration and Support:** The lab-scale technology is advancing toward industrial deployment in partnership with Biological E. Ltd., with funding and backing from the Department of Science and Technology (DST).
- **Addressing Major Effluent Challenges:** Biopharmaceutical wastewater contains high loads of live production microorganisms, residual antibiotics, and antibiotic resistance genes, making conventional treatment through chemical methods or steam autoclaving extremely energy-intensive and costly.
- **Integrated Mechanism:** The newly patented core disinfection technology utilizes electrical pulses for disinfection combined with biological treatment and energy recovery, eliminating biosafety risks efficiently.
- **Core Research Team:** Led by Professor Sankar Ganesh Palani from the Department of Biological Sciences, alongside Professor Mithun Mondal and research scholar Ravindra Dnyanaba Kulal.

Essential Definitions

- **Biopharmaceutical Wastewater:** Effluent generated from fermentation and production processes in pharmaceutical industries that typically contains live microbial loads, complex organic compounds, and pharmaceutical residues.

- **Antibiotic Resistance Genes (ARGs):** Genetic elements that confer resistance to antibiotics, which if released untreated into water bodies, pose a severe public health hazard by accelerating antimicrobial resistance (AMR).
- **Biogas Energy Recovery:** The capture and utilization of methane-rich gases produced via anaerobic digestion of organic matter, transforming industrial waste into a renewable energy source.

Legal and Constitutional Framework

- **Water Prevention and Control of Pollution Act, 1974:** The primary legislative enactment establishing State Pollution Control Boards to regulate effluent discharge standards and prevent water pollution from industrial sources.
- **Environment Protection Act, 1986:** Empowers the Central Government to set national standards for the emission and discharge of environmental pollutants from industries, including pharmaceutical waste management guidelines.
- **Article 21 (Right to a Clean Environment):** Judicial interpretations of the Right to Life under the Constitution of India mandate clean water and a pollution-free environment, placing a strict legal duty on industries to treat hazardous effluents prior to discharge.

Conclusion

The development of a low-energy biopharmaceutical wastewater treatment system marks a significant milestone in sustainable industrial engineering. By successfully combining electrical disinfection with energy recovery, this innovation addresses critical environmental and public health hazards like antimicrobial resistance while lowering the economic and carbon footprint of industrial compliance.

UPSC Relevance

- **General Studies Paper III:** Conservation, environmental pollution and degradation, environmental impact assessment, and science and technology developments and applications in everyday life.
- **Governance and Public Health:** Management of hazardous industrial effluents, tackling antimicrobial resistance (AMR) through better environmental controls, and promoting indigenous research and industry-academia collaborations.

7. India's Next Digital Public Infrastructure: The Case for Democratising AI Intelligence

Key Highlights & Summary

- **Foundational Infrastructure Vision:** India has successfully built three pillars of Digital Public Infrastructure (DPI) in identity, payments, and data, and must now treat artificial intelligence as its fourth foundational utility.
- **The Extractive Trade Trap:** The global AI economy currently mirrors historical colonial trade patterns where India exports raw data, talent, and computational labour, only to import finished intelligence back as expensive, dollar-priced API tokens.

- Pillars of the AI Token Economy:** The proposed national framework relies on massive GPU aggregation through the IndiaAI Mission, integrating compute planning into national grid policies, and making foundational models open-source public goods.
- Unified Intelligence Interface:** Proposes a UPI-inspired open API gateway to democratise access to inference, allowing any application to seamlessly call open or sovereign models with low switching costs.
- Socio-Economic Democratisation:** Making intelligence nearly free through state-backed token entitlements aims to make cognition accessible, transforming sectors like healthcare, education, and agriculture across vernacular languages.

The next DPI — how India can commoditise AI

India made identity, payments, and data free. Intelligence is next. No other country has ever done this. India's public infrastructure (PI) stack at India's large. Others have developed only pieces of this. Canada has a world-class digital identity system, but nothing comparable to UPI. Brazil's PIX is an excellent free payments rail, but it stands alone. Singapore has Singpass and SingNet, while Europe has open banking and data portability. India's genius claim to global leadership in public digital infrastructure lies in this unique combination. It distinguishes it not as single component, but the integration of Aadhaar, the Unified Payments Interface (UPI), and the (DEPA) Account Aggregator as interoperable public digital rails.

Between September 2016 and 2019, the cost of a gigabyte in India fell from about \$4 to under \$0.001, making it among the cheapest in the world. The result was not a telecom story. It was a foundational one: 500 million people came online in half a decade, powering India's digital economy such as payment vehicles, the startup ecosystem, the direct benefits transfers reaching the last village. Aadhaar enabled a billion people and turned identity verification from an expensive paper process to a low-cost API call. UPI made digital payments effectively free, processing around 20 billion transactions a month at near-zero cost. India made data free not by subsidising it, but by letting one player absorb the fixed costs of a nationwide 4G network, price marginal cost, and force every incumbent to match or die.

India should not be the capital race to the bottom which we would lose to hyperscalers, and to the intelligence equivalent of monopolising the telecoms. India crashed the price of data by engineering conditions and competition. So, the target is inference, not training. Inference takes down the cost of using a model. It released spectrum, created a demand shock, and let free-market competition do the rest. The state built the road and set the rules; the market crashed the price. A billion people came online not because data was free, but because it fell below the threshold of the dogma. And the case for making it free — or close to free — is a gigabyte of data — is not unique. It is the same case, run on the same playbook that worked three times before.

This is the model India should now apply to its fourth foundational utility: intelligence itself. Intelligence is no longer a luxury software product; it is foundational infrastructure.

The trade running against India. The global artificial intelligence (AI) race is currently operating under an extractive economic model, and India — despite its immense demographic dividend — is on the losing side of the trade. India serves as the world's digital



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digitised public life — languages, documents, transactions, behaviour — becomes training data. Its universalisation and dispersion towards a disproportionate slice of the research talent behind every major laboratory. Each day, Indians generate vast data. Indian engineers build Silicon Valley's frontier models, and Indian workers label datasets to make them safer. Yet, Indian startups must export their intelligence back to data-hoarding AI titans, subject to export controls and hoisted on distant servers. India exports talent, data, and usage, then imports the limited intelligence at high margin, per token prices on terms set in San Francisco. The pattern is familiar. Ship out the cotton, buy back the cloth. India recognised that trap in earlier centuries up. It should recognise it in intelligence now.

India's AI token economy should be built on the following pillars. First, making intelligence free is a state computer power. Through the IndiaAI Mission, backed by an outlay of about \$30,372 crore, the government is building a public-private partnership model — not a state-run data centre monopoly. By expanding private cloud providers and aggregating demand, it has subsidised over 26,000 GPUs, with plans to scale to 1,00,000. Eligible startups and researchers can access compute for about \$15 per GPU hour, a fraction of global market rates.

India's grid planning does not yet treat AI load as a category. The single highest-leverage intervention available to the government is beefing up transmission to data centres. Shunters, and dedicate renewable generation including nuclear, to inference the way it once dedicated coal linkages to steel. Cheap electricity is the new cheap spectrum.

Second, cheap compute is useless without models to run on it. Currently, the most capable foundation models are closed-source and owned by western tech giants. If Indian startups build their businesses on top of these proprietary APIs, they remain economically subservient. A single wrong change or policy shift in San Francisco can wipe out an entire sector in Bangalore. India must mandate that foundational AI models become public goods.

The government must leverage its most valuable assets: linguistic and demographic data. Data legal rulings, agricultural data, educational curricula in all 22 official scheduled languages) and make them available exclusively to researchers building open-source models. Further, any AI model developed using state-subsidised compute or public datasets must be released under an open-weight license. This mirrors the UPI philosophy: the government builds the rails, makes the protocol free, and lets

Language Models, India commoditises the "intelligence" layer. When foundational models are free and open, the economic value shifts from the model creators to the application builders — exactly where India's strength lies.

Third, the unified intelligence interface (UI) or interoperability. How does a rural farmer or a Tier-2 developer access this free intelligence? An API gateway built on the principles of DPI, a UPI for AI. UPI's genius was not free payments as such, it was interoperability. A common protocol for any application to any bank, and switching costs fell to zero. Intelligence needs the same: an open, standardised interface through which any application can call any model — sovereign or private, open or proprietary — with shared standards for identity, consent, billing and safety. Just as UPI abstracts away the complexity of inter-bank transfers, a national API gateway would abstract away the complexity of AI inference. Startups, government agencies, and educational institutions could plug into this gateway to access a suite of open-source models (translation, vision, text generation) for fractions of a penny.

To kickstart the ecosystem, the government could offer a national "freemium" model. Verified Indian startups or students through Aadhaar-linked digital identity could get monthly free API quotas, subsidised by the state. When startups scale and become profitable, they move to a commercial tier, paying slightly more for compute, which subsidises the free tier. Additionally, a tenth of the fertilizer subsidy could be diverted to tokens for research and development institutions and schools. When intelligence becomes nearly free, sectors constrained by scarce human capital transform. A rural doctor, aided by AI trained on Indian data, can treat more patients with fewer errors. India's 200 million students get 24x7 personalised AI tutors in local dialects, a Karnataka farmer can consult a crop insurance claim by voice in Kannada, with AI accessing land records.

The next great equaliser. Free, open identity and cheap data did not make Indians rich; they made mass participation thinkable. Free intelligence can do the same. Nobody foresaw that near-free data would create the world's largest payments system, short-video platforms, and QVC-like vegetable vendors.

Near-free intelligence could be just as generative if the state primes it with token entitlements for students and teachers, citizens services in local languages, and affordable credit for 60 million small businesses. India's leadership in the AI economy is contingent on developing an open-source ecosystem with open weights so-called switch models that expand competition, choice, opportunities and innovation. The goal is not better chessbots, it is making cognition no longer a

Essential Definitions

- Digital Public Infrastructure (DPI):** Secure, interoperable, and foundational digital systems built on open standards that enable public and private service delivery at a population scale.
- Account Aggregator (DEPA):** The Data Empowerment and Protection Architecture framework that allows individuals to seamlessly and securely share their data across financial and digital institutions with consent.
- Inference:** The phase in artificial intelligence where a trained model is deployed to process new data and generate real-world predictions or outputs, which forms the primary ongoing cost driver of AI applications.

Legal and Constitutional Framework

- Article 21 (Right to Equality and Life):** The transformative use of AI for public service delivery and equal access to basic state resources builds upon the mandate for a dignified life and equitable opportunities.
- Information Technology Act, 2000 and Digital Personal Data Protection Act, 2023:** Statutory frameworks governing data privacy, secure processing, and consent management that regulate how anonymised datasets and AI models handle citizen information.
- Entry 25 of Concurrent List (Seventh Schedule):** Empowers both Parliament and State Legislatures to legislate on education, vocational training, and scientific research, providing the constitutional anchor for deploying AI in public education and healthcare.

Conclusion

India's pioneering journey with identity, payments, and data proves that lowering the cost of foundational utilities unlocks massive economic and civilisational productivity. By shifting focus from training to inference, commoditising open-weights models, and treating compute as basic grid infrastructure, India can break free from extractive global tech dependencies and transform intelligence into a universal public good.

UPSC Relevance

- **General Studies Paper III:** Science and Technology-developments and applications and everyday life; Awareness in the fields of IT, computers, and AI; Management of digital infrastructure and economy.
- **General Studies Paper II:** Government policies and interventions for development in various sectors and issues arising out of their design and implementation, plus issues relating to infrastructure.

8. India's SHANTI Framework: Securing the Bay of Bengal and Maritime Commons

Key Highlights & Summary

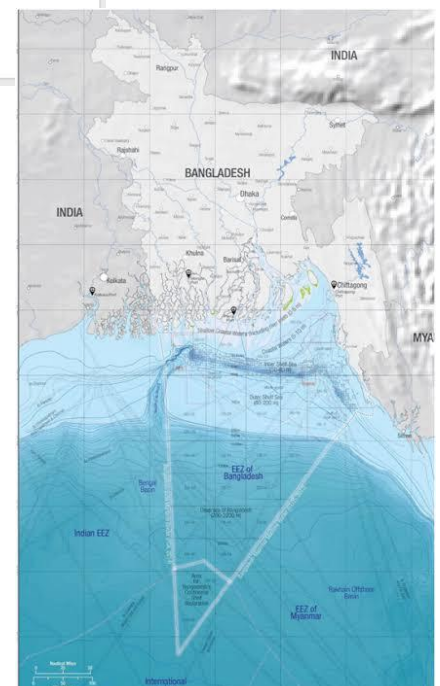
- **Introduction of SHANTI:** External Affairs Minister S. Jaishankar introduced the Securing Holistic Advancement through Norms, Trust and Integrity (SHANTI) framework while launching India's UNSC candidature for the 2028-29 term.
- **Evolution of Maritime Vision:** SHANTI acts as the operational grammar building upon SAGAR (2015) and MAHASAGAR (2025), shifting India's maritime approach from mere strategic intent and reach to concrete norm-building and institutional rules.
- **Strategic Centrality of the Bay:** The Bay of Bengal serves as a crucial bridge connecting India's Act East policy with ASEAN, linking vital global energy lanes, and managing geopolitical pressures like China's regional presence.
- **Addressing Non-Traditional Threats:** The framework targets transboundary challenges including climate-induced disasters, illegal fishing, cyber vulnerabilities, and supply chain disruptions through demand-driven cooperation.
- **Operationalisation via BIMSTEC:** The principles of SHANTI were operationalised at the July 2026 BIMSTEC NSA meeting in New Delhi, agreeing on joint maritime law enforcement, disaster relief, and an upcoming joint maritime security exercise.

Essential Definitions

- **SHANTI Framework:** A normative foreign policy framework focused on Securing Holistic Advancement through Norms, Trust and Integrity to govern shared maritime spaces.
- **SAGAR:** Security and Growth for All in the Region, an overarching maritime initiative launched by India in 2015 focusing on economic cooperation and security in the Indian Ocean.
- **Blue Economy:** Sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems.

Legal and Constitutional Framework

- **Article 51 of the Constitution:** Directs the State to promote international peace and security, maintain just and honourable relations between nations, and foster respect for



international law and treaty obligations, providing the philosophical backing for multilateral frameworks like SHANTI.

- **United Nations Convention on the Law of the Sea (UNCLOS):** The international legal regime establishing jurisdiction over maritime spaces, which underpins India's advocacy for a rules-based order and freedom of navigation in the Indo-Pacific.
- **BIMSTEC Charter:** The foundational legal instrument of the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation that institutionalises regional integration and security cooperation among littoral and adjacent states.

Conclusion

The SHANTI framework marks a paradigm shift in India's maritime diplomacy from traditional deterrence and crisis management to proactive governance of shared commons. By using the Bay of Bengal as a natural laboratory, India can establish credible regional stewardship based on trust and resilience, effectively countering fragmentation and securing long-term strategic stability.

UPSC Relevance

- **General Studies Paper II:** Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests; India's foreign policy, neighbourhood relations, and maritime security doctrines.
- **General Studies Paper III:** Security challenges and their management in border areas, and developmental issues related to the blue economy, disaster management, and infrastructure protection.

9. Demystifying Cloudbursts: Science, Governance, and Accountability

Key Highlights & Summary

- **IMD Definition:** According to the India Meteorological Department (IMD), a cloudburst is a highly localised weather phenomenon where an area of 20-30 sq. km receives 10 cm or more of rainfall within an hour.
- **Formation Mechanism:** Cloudbursts typically form through intense convection and orographic lifting in mountainous regions, where warm, moist air rises rapidly to form towering cumulonimbus clouds and strong updrafts suspend heavy water droplets before a sudden collapse.

- **Forecasting Challenges:** Cloudbursts are extremely difficult to predict due to their small spatial scale, rapid development, lack of dense monitoring stations in rugged terrains, and radar blockages by mountains.

- **Misuse of the Label:** Authorities frequently mislabel heavy downpours as cloudbursts to mask human negligence, shifting blame away from poor planning, illegal construction on riverbeds, and inadequate drainage infrastructure.
- **Technological Improvements:** India is advancing its disaster response capabilities through 'nowcasting' and the 'Mission Mausam' initiative, which aims to double the weather radar network and integrate artificial intelligence for hyperlocal forecasting.

How common are cloudbursts in India?

What counts as a cloudburst under the IMD's definition? How do they form over mountainous regions? Why are they so difficult to forecast? Can the term obscure the role of poor planning, inadequate infrastructure? What is India doing to improve forecasting and early warnings?

EXPLAINER

Vandana Mahapatra

The story so far: When a wall of water suddenly crashes from the sky and sweeps away homes and roads within minutes, one of the first words officials and the media in India reach for is 'cloudburst'. However, the term is often misused to a view that can distract from poor planning and crumbling infrastructure.

What counts as a cloudburst? According to the India Meteorological Department (IMD), a cloudburst occurs when a small area, around 20-30 sq. km, receives 10 cm or more of rain in an hour. To put this in perspective, India receives 1,602 mm of rain every year on average. A cloudburst could dump nearly 10% of this in 60 minutes.

Heavy rains are a common feature of the southwest monsoon, but a cloudburst is all an extraordinary amount of rainfall and much rarer. Because the water falls so quickly over a relatively small area, the ground cannot absorb all of it, leading to rapid and voluminous flooding.

Some scientists have also advocated for a category called 'mini-cloudburst', for a 5 cm of rain in an hour over the same area, as, depending on the local topography, this can be devastating as well.

How common are cloudbursts in India?

Although cloudbursts are relatively rare, global warming, in particular as the atmosphere warms and can hold more moisture, is making them more frequent. In response to a question, former Union Earth Sciences Minister Harsh Vardhan told Parliament in 2019 that between 1970 and 2016, the IMD had recorded only around 30 such incidents. However, many experts believe this number is an underestimate.

Counting them is not straightforward



Debris lies scattered after a cloudburst triggered flash floods, at Patnagarh in Assam, on July 12, 2019.

because most cloudbursts occur in remote, high-altitude regions, where rain gauges and weather stations are sparse. In fact, if a cloudburst occurs a few kilometres from a monitoring station, it may not be officially recorded as a cloudburst even if it causes large-scale destruction downstream.

Uttarakhand, Himachal Pradesh, and Jammu and Kashmir have, of late, reported a surge in events that locals have described as cloudbursts, especially in July and August.

How does a cloudburst form? A cloudburst typically begins with convection, where warm, moist air rises rapidly into the atmosphere. In mountainous areas, this is called orographic lifting, where monsoon winds are forced upwards by steep slopes.

For the air to rise, it cools and condenses into towering cumulonimbus clouds, which can be up to 15 km tall. Water droplets begin to form inside these clouds and, as they are heavier, they would normally fall as rain. However, if the currents of warm air moving upwards are very strong, they can keep raindrops suspended in the air for longer.

Eventually, the weight of the water droplets becomes too great for gravity and the updrafts to hold, or the updrafts

waken, sending the water plummeting down like an ocean descending on the ground.

Can the label obscure accountability? By calling a heavy downpour a 'cloudburst', authorities can turn it into a natural and unforeseeable act of nature, obscuring the role of human negligence.

That is, if the cause of a tragedy is said to be a 'cloudburst', the blame can be written off, which is harder to do when the real cause is 'heavy rain combined with poor drainage'.

In 2020, during the church floods in Uttarakhand, initial reports blamed a cloudburst. However, meteorological data later showed that the actual rate of rainfall was much lower than the threshold for a cloudburst.

The underlying cause were illegal construction on riverbeds, deforestation that had left soil vulnerable to erosion, and the absence of drainage infrastructure along new 'all-weather' roads.

Had the downpour indeed been a cloudburst, officials may have been able to avoid questions about why the State had allowed buildings to be constructed in high-risk zones and why early warning systems failed.

Last week, the IMD rejected reports

that Assam and Nagaland had experienced cloudbursts over the preceding few days and that they were responsible for the Upper Assam floods.

Are cloudbursts hard to forecast? Cloudbursts are very difficult to forecast. Meteorologists can usually say whether a region is at risk of heavy rain but cannot say precisely which patch of land will experience a cloudburst.

First, climate weather models study the atmosphere in grids and estimate the average weather for each cell. A cloudburst, on the other hand, occurs over an area smaller than the size of each grid cell. To detect one, scientists need very high-resolution models, which in turn require immense computing power that is not always readily available.

Because of the mechanism through which cloudbursts form, they also develop and occur quickly. Cycles and monsoon systems, on the other hand, can be tracked for weeks or even months, giving scientists more data to work with.

Finally, mountains are challenging environments for weather monitoring, and cloudbursts have a greater propensity to occur there. For instance, Doppler weather radars work by emitting and receiving radar beams, which mountains can block, creating blind spots over many areas where cloudbursts are also more common.

Because the terrain is so rugged, there are also fewer automatic weather stations. If there are no sensors on the ground to tell a computer what is happening at a given moment, it cannot reliably predict what could happen in the next hour.

That said, the IMD is currently working on 'nowcasting', a technology that issues short-term alerts every few hours. Under the government's new 'Mission Mausam', India also plans to move from double to radar networks, from the current 40 to over 100, to better predict hyperlocal events.

That said, even with the best technology, a cloudburst is likely to remain very difficult to predict than a typical rainstorm.

THE GIST

A cloudburst is a highly localized weather event in which at least 10 cm of rain falls over 20-30 sq. km in an hour, making it difficult to forecast despite advances in nowcasting and radar coverage.

The term is often incorrectly used for heavy rainfall events, even though many disasters are exacerbated by poor drainage, deforestation, construction in high-risk zones and other human factors.

Essential Definitions

- **Cloudburst:** A localized, sudden, and very heavy rainfall event surpassing 10 cm per hour over a small geographical footprint of 20-30 sq. km.
- **Orographic Lifting:** The process where warm, moist air is forced to rise over elevated landmasses like mountain slopes, cooling and condensing rapidly to form heavy precipitation clouds.
- **Nowcasting:** Weather forecasting on a very short-term scale, typically ranging from a few minutes up to a few hours, used for issuing rapid, localized extreme weather alerts.

Legal and Constitutional Framework

- **Disaster Management Act, 2005:** Provides the legal and institutional framework for disaster management at the national, state, and district levels, mandating pre-disaster risk assessment and mitigation planning.
- **Article 21 (Right to Life):** Judicial interpretation obligates the state to safeguard citizens from preventable environmental hazards, making accountability for structural failures and illegal construction a constitutional imperative.
- **National Guidelines on Management of Floods and Flash Floods:** Issued by the National Disaster Management Authority (NDMA), these guidelines direct urban and regional authorities to enforce strict land-use zoning and resilient infrastructure norms.

Conclusion

While cloudbursts are formidable acts of nature driven by atmospheric moisture and topography, their destructive impact is frequently magnified by human-induced vulnerabilities. By moving beyond convenient labels of administrative absolutions and investing in robust forecasting, rigorous urban planning, and ecological preservation, India can better mitigate the catastrophic impacts of extreme weather events.

UPSC Relevance

- **General Studies Paper III:** Disaster and disaster management, conservation, environmental pollution and degradation, and science and technology developments in forecasting applications.
- **General Studies Paper II:** Government policies and interventions for development in various sectors and issues arising out of design and implementation of physical infrastructure.

10. Cauvery Water Dispute: CWMA Directive, Distress Management, and Federal Dynamics

Key Highlights & Summary

- **CWMA Directive:** The Cauvery Water Management Authority (CWMA) endorsed the Cauvery Water Regulation Committee (CWRC) order requiring Karnataka to release 3,500 cusecs of water to Tamil Nadu for 15 days, amounting to about 4.5 tmc ft.
- **Role of CWRC:** Constituted under the Jal Shakti Ministry notification in 2018, the CWRC monitors daily water levels, inflows, and storage across eight key basin reservoirs in Karnataka, Tamil Nadu, and Kerala, implementing the Supreme Court's 2018 modified award.
- **Assessment of Distress:** Decisions during deficit periods are made by analyzing hydro-meteorological conditions, reservoir live storage, long-term 30-year averages, and flows measured at Biligundulu, where recent deficits reached up to 90%.
- **State Reactions and Dissatisfaction:** Karnataka opposed the order due to scanty rainfall and lack of water for its own irrigation needs, whereas Tamil Nadu deemed the quantum insufficient for its kuruvasi and samba-thaladi agricultural requirements.
- **Need for a Distress Formula:** Experts and authorities emphasize the urgent necessity of developing a permanent, institutionalized distress-sharing formula between riparian states to mitigate recurring inter-state friction.



Essential Definitions

- **Cusec:** A unit of water flow rate equivalent to one cubic foot of water flowing per second, roughly equal to 28.317 liters per second.
- **TMC Ft:** Thousand Million Cubic Feet, a standard volumetric unit used in India to measure large quantities of water in reservoirs and river basins.
- **Riparian States:** States through which or along which a river system passes, creating shared legal and economic interests in the water resource management.

Legal and Constitutional Framework

- **Article 262 of the Constitution:** Empowers Parliament to provide by law for the adjudication of any dispute or complaint with respect to the use, distribution, or control of the waters of any inter-state river or river valley.

- **Inter-State River Water Disputes Act, 1956:** The primary statutory mechanism enacted by Parliament for constituting ad-hoc tribunals to resolve water disputes between states.
- **Supreme Court Verdict of 2018:** Modified the 2007 Cauvery Water Disputes Tribunal final award, establishing the Cauvery Water Management Authority (CWMA) and CWRC as permanent institutional bodies for binding water regulation.

Conclusion

The recurring friction over Cauvery water-sharing highlights the structural vulnerabilities in managing inter-state river basins during deficient monsoons. While institutional mechanisms like the CWRC and CWMA provide scientific evaluations, long-term harmony requires cooperative consensus, optimized water-use efficiency, and a mutually agreed distress-sharing formula that transcends short-term political frictions.

UPSC Relevance

- **General Studies Paper II:** Inter-state relations, mechanisms, disputes, and institutional bodies; functions and responsibilities of statutory authorities and cooperative federalism.
- **General Studies Paper III:** Conservation, environmental management, water resource utilization, and challenges in sustainable river basin governance.

11. Centre Defends CEC Selection Panel: Executive Discretion vs Judicial Scrutiny

Key Highlights & Summary

- **Centre's Defense in Supreme Court:** The Union government defended the Chief Election Commissioners and Other Election Commissioners Act, 2023, questioning the insistence on including the Chief Justice of India (CJI) on the Prime Minister's selection panel.
- **Argument on Executive Trust:** Solicitor-General Tushar Mehta argued that if the executive decisions of the Prime Minister cannot be trusted, consistency would demand an outsider or former judge to advise on Cabinet Minister appointments as well.
- **Judicial Concerns on Neutrality:** A Supreme Court bench led by Justice Dipankar Datta raised apprehensions about fairness, noting that a committee comprising two executive members and one opposition member tilts power in favour of one side, compromising neutrality.
- **Reference to Anoop Baranwal Judgment:** The petitions challenge the 2023 Act for allegedly undermining the 2023 Constitution Bench judgment in the Anoop Baranwal case, which had originally prescribed a panel consisting of the PM, Leader of Opposition, and the CJI.
- **Core Constitutional Debate:** The legal battle centers on maintaining institutional independence and ensuring that the appointment process of key electoral regulators not only remains fair in substance but also appears fair to the public.

Essential Definitions

- **Chief Election Commissioner (CEC):** The constitutional head of the Election Commission of India responsible for superintending, directing, and controlling free and fair elections to Parliament and State Legislatures.
- **Separation of Powers:** A core constitutional doctrine under which legislative, executive, and judicial powers of government are vested in separate bodies to prevent concentration of authority and ensure checks and balances.

Legal and Constitutional Framework

- **Article 324(2):** Empowers the President to appoint the Chief Election Commissioner and Election Commissioners, subject to provisions of any law made in that behalf by Parliament.
- **Chief Election Commissioners and Other Election Commissioners Act, 2023:** Statutory enactment that replaced the CJI with a Union Cabinet Minister nominated by the Prime Minister on the selection committee, altering the panel composition.
- **Anoop Baranwal v. Union of India (2023):** A Constitution Bench ruling that filled a legislative vacuum by directing that the CEC and ECs be appointed by the President on the advice of a committee comprising the PM, Leader of the Opposition, and the CJI, until Parliament enacted a substantive law.

Conclusion

The ongoing legal challenge regarding the CEC selection panel highlights the delicate tension between parliamentary sovereignty in legislation and judicial oversight to guarantee institutional independence. Ensuring the absolute neutrality of election authorities is vital for upholding democratic integrity, making balanced appointment mechanisms a critical pillar of India's constitutional democracy.

UPSC Relevance

- **General Studies Paper II:** Appointment to various constitutional posts, powers, functions and responsibilities of various constitutional bodies; basic structure doctrine, separation of powers, and judicial review of legislative enactments.

12. J&K Bank PAN-Linking Probe: Systemic Compliance Failures and Tax Evasion Risks

Key Highlights & Summary

- **Income Tax Probe Findings:** An extensive investigation revealed that 1.54 lakh accounts were opened with J&K Bank between 2021 and 2024 without linking any Permanent Account Number (PAN) details.
- **Massive Financial Volumes:** High-value transactions in these unlinked accounts involving 15 lakh rupees or more in a single financial year totaled an astounding 4.88 lakh crore rupees.



- **Categories of Unlinked Accounts:** The probe identified that out of these accounts, 32,498 were government-associated entities, while 1.25 lakh were private accounts, including 10,464 private accounts with credits exceeding 50 lakh rupees.
- **Loophole via Form 60:** Most of these accounts were savings bank accounts opened merely by submitting Form 60 declarations, bypassing mandatory PAN requirements and creating massive systemic vulnerabilities.
- **Regulatory Reporting:** The Income Tax Department termed the lapse a "systemic failure" and a significant red flag for tax evasion, with the bank submitting its compliance report to the Reserve Bank of India (RBI).

Essential Definitions

- **Permanent Account Number (PAN):** A ten-character alphanumeric identifier issued by the Indian Income Tax Department to track financial transactions and curb tax evasion.
- **Form 60:** A declaration form prescribed under the Income Tax Rules, 1962, to be filled by individuals who do not possess a PAN but undertake specified high-value financial transactions.
- **Systemic Failure:** A breakdown within an organization's internal controls, compliance frameworks, or regulatory protocols that permits widespread or repetitive protocol violations.

Legal and Constitutional Framework

- **Income Tax Act, 1961:** Mandates quoting and linking of PAN for specified financial transactions exceeding threshold limits to maintain an audit trail and prevent black money generation.
- **Prevention of Money Laundering Act (PMLA), 2002:** Imposes stringent obligations on banking companies to verify customer identity, monitor high-value transactions, and report suspicious activities to the Financial Intelligence Unit (FIU-IND).
- **Banking Regulation Act, 1949:** Empowers the Reserve Bank of India to regulate banking operations, penalize non-compliance with statutory guidelines, and mandate robust internal audit mechanisms.

Conclusion

The widespread omission of PAN-linking in J&K Bank accounts highlights critical vulnerabilities in institutional compliance and Know Your Customer (KYC) frameworks. Addressing such regulatory lapses through stringent enforcement and technological upgrades is imperative to safeguard the financial system against tax evasion and money laundering.

UPSC Relevance

- **General Studies Paper III:** Indian Economy and issues relating to mobilization of resources, growth, development, and employment; prevention of money laundering and black money generation.
- **General Studies Paper II:** Statutory, regulatory, and various quasi-judicial bodies; accountability and transparency in financial governance.

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