

19th June DSC

Current Affairs 19th June 2025.

ED Officials Increasingly Broadening Powers, Suggests Madras HC

Central Issue

Allegation: The Enforcement Directorate (ED) reportedly **sealed private premises** — both a residence and an office — that were locked at the time of their attempted search.

Key legal question: Does the PMLA give ED the authority to **bar access to premises in the absence of an active search or seizure?**

Relevance: GS 2 (Separation of Powers), GS 4 (Ethics — Probity and Transparency)

Judicial Criticism

Executive Overreach Satirized

Justice M.S. Ramesh quipped that ED officials appear to be “**evolving**,” rather than simply the law (PMLA).

Absence of Legal Basis

The Court asked which section of PMLA permits the “**sealing**” of locked properties. By pasting notices and blocking re-entry, the ED **effectively sealed** premises without conducting a valid search — restricting owners’ access without lawful authorization.

Rights Violated

Such actions potentially infringe on **Article 21 (Right to Life & Livelihood)** as they restrict property usage without proper due process.

Relevant Legal and Constitutional Aspects

PMLA, 2002 — Section 17

Authorizes search and seizure, including breaking locks — but contains **no clear authority** for sealing a property that was never searched.

Due Process Principle

Any restriction on property or liberty must be **just, fair, and reasonable**.

Sealing notices without permission breach this procedural fairness.

Governance and Oversight Concerns

Executive Excess

Raises serious alarms about unchecked discretionary powers held by investigative bodies.

Importance of Institutional Checks

Emphasizes the need for all agencies to remain within their **statutory limits**, with judicial review ensuring accountability.

Public Trust and Rule of Law

Such **arbitrary tactics** and coercive measures can erode public faith in justice and the legal system.

Recap — ED Basics

Establishment: ED was formed in **1956** as the ‘Enforcement Unit’ under the Department of Economic Affairs.

Parent Ministry: Revenue Department, Ministry of Finance.

Mandate: Enforces financial laws and probes economic crimes.

Primary Statutes Administered

- **FEMA (1999)** — Civil law dealing with foreign exchange.
- **PMLA (2002)** — Criminal law targeting money laundering.

Key Functions

Investigation of money laundering, foreign exchange violations, attachment/confiscation of crime-related property, and launching prosecutions under PMLA.

PMLA Powers

Searches, seizures, arrests, asset freezes, filing complaints — all conducted with “**reasons to believe**” formally documented.

The Third Nuclear Age — A Shift Towards Coercive Signalling

Overview

The **Third Nuclear Age** is defined by a shift away from traditional Cold War-style deterrence and toward increased **strategic signalling and coercion** with nuclear arms. This period is characterized by a decline in established nuclear treaties and heightened nuclear modernization — making deliberate or inadvertent use more probable.

Relevance: GS 2 (International Relations), GS 3 (Security Issues)

Historical Progression

First Nuclear Age (Cold War)

- U.S. vs. USSR relying on **Mutually Assured Destruction (MAD)**.
- Peak stockpiles of nearly 70,000 warheads.
- Arms control treaties like SALT and START.

Second Nuclear Age (Post-Cold War)

- Arms control treaties & hopes for disarmament (e.g. NPT, CTBT).
- Emergence of new nuclear states — India, Pakistan — resulting in **asymmetric regional deterrence**.

Third Nuclear Age (Current)

- Shift to **multipolar tensions** with unpredictable risks.
- China expands its arsenal (~600 warheads), Russia moves tactical nukes to Belarus, NATO members contemplate autonomous deterrents.

- **Israel's strike on Iran** and nuclear threats surrounding Ukraine indicate that nukes are now tools of **strategic pressure**, rather than mere deterrence.

Erosion of Norms

Israel's action against Iran broke long-held NPT expectations without serious international censure.

Russia's nuclear threats around Ukraine show that **coercion, not deterrence**, may define modern nuclear strategy.

Strategic Rivalries

China aims to balance U.S. dominance.

Russia uses nuclear saber-rattling for leverage.

U.S. under Trump reduced multilateral leadership; Europe explores independent deterrents. Modernization is surging globally (e.g. U.S. spending \$1.5–2 trillion).

Risks

- Tactical nukes are becoming central to doctrine.
- Arms control is vanishing as **New START expires in 2026**, with no successor in sight.
- Increased chance of **nuclear proliferation** across West and East Asia.

Hydraulic Systems — Principles and Practical Uses

Basics

Hydraulic systems work by **transmitting power through pressurized fluids** based on Pascal's law — where pressure exerted on a confined liquid is distributed equally in all directions.

Relevance: GS 3 (Technology)

Components

- **Pumps** produce hydraulic pressure.
- **Pipes** move hydraulic fluid.
- **Valves** control pressure and flow.
- **Actuators** (cylinders or motors) produce force or motion.
- **Reservoirs and Filters** store and clean fluid.

Principle of Force Transmission

A small force on a small piston generates high force on a larger piston — this **amplifies power** without increasing pressure.

Actuators

- **Linear cylinders:** Push/pull loads in cranes, excavators.
- **Rotary motors:** Drive machines like winches.

Advantages

- High power density
- Smooth, precise movements
- Ideal for **heavy-duty tasks**

Applications

Used across **mobile machinery** (excavators, landing gear), **stationary machines** (presses, turbines), and in **agriculture, defence, aerospace**.

Modern Trends

Integrating **electronic sensors** for predictive maintenance, automation, and condition monitoring — “smart hydraulics.”

Still faces **energy inefficiency (~30-40%)** and sustainability challenges.

Electric actuators are emerging, but hydraulics remain indispensable for large-scale force requirements.

India's Nuclear Warhead Count Rises to 180 — SIPRI Report 2025

Context

SIPRI's 2025 report highlighted a **revival of the arms race** and weakening treaties.

Nine nuclear states — U.S., Russia, China, India, Pakistan, Israel, North Korea — have all been expanding arsenals.

Relevance: GS 2 (International Relations), GS 3 (Defence Technology)

India's Status

- Total warheads: 180 as of January 2025, up from 172 in 2024.
- Development of new delivery systems — **canisterized missiles** allowing rapid deployment and eventually MIRVs.

Pakistan & Regional Tensions

- Pakistan holds at 170 warheads but is expanding its fissile material and delivery options.
- Increased India-Pakistan hostilities raise fears of a rapid **nuclear escalation**.

Risks and Future Outlook

- Rising prospects of nuclear use under crisis — especially amid border conflicts or misinformation.
- End of U.S.-Russia New START treaty in 2026 may trigger new arms build-ups worldwide.

Global Numbers

U.S. and Russia still top global stockpiles (~5,177 & 5,459 warheads).

China is modernizing rapidly.

Globally, about **12,241 warheads exist**, of which ~3,912 are deployed and 9,614 kept in reserve.

Only 70% of IPOs Listed at Premium in 2025 — Market Uncertainty Rises

Key Market Trends

In 2025, only **70% of IPOs listed at a premium** — the lowest rate since 2017.

In 2024, **85% of IPOs** saw listing gains.

Relevance: GS 3 (Economy)

Performance of IPOs

Of the 17 mainboard IPOs in 2025:

- 8 of 15 with data trade **below issue price**.
- 6 companies lost over **80% of value**, some priced under ₹1.

Listing Gains Collapse

Average first-day gain dropped to **~7%** from 45–49% in 2024 — showing poor post-listing returns.

Factors

- Heightened volatility triggered by:
 - U.S. tariff actions
 - Middle East conflicts
 - India-Pakistan border tensions
- Resulting **market nervousness** and profit booking after years of rally.

Decline in Offerings

- IPO volume dropped to 17 listings (~~₹29,000 crore~~ till mid-2025 vs. 32 listings (₹46,500 crore) in 2024.
- **Investor caution** and reduced risk appetite have slowed IPOs.

Rice Develops Cold Tolerance via Epigenetics, Not DNA Mutations — 2024 Study

Breakthrough Discovery

A **2024 study in Cell** reveals that rice (**Oryza sativa**) can rapidly adapt to cold through **epigenetic modifications**, not DNA sequence changes.

This heritable cold tolerance was passed to up to **five generations** — a novel mechanism

supporting **Lamarckian inheritance**.

Relevance: GS 1 (Environment & Ecology)

Mechanism

ACT1 gene was normally methylated in regular rice under cold, reducing its expression. In cold-exposed rice, ACT1 stayed **unmethylated**, allowing active expression and better tolerance.

Experimental Findings

Seed output and health were tracked across generations:

- Whole-genome scans showed **no DNA mutations**, only **epigenetic changes (~12,380)**.
- Demonstrated that epigenetic patterns — not DNA — enabled stress adaptation.

Theoretical Impact

Resolves a long-standing debate — showing acquired traits can pass on without genetic mutation.

This underscores the role of **environment-induced epigenetics** in evolution and adaptation.

Could improve **crop resilience** and inform breeding strategies against climate stress.

19th June 2025: Static MCQS

1. Question

Consider the following statements about the powers of the Enforcement Directorate (ED) under the Prevention of Money Laundering Act (PMLA), 2002:

1. The ED can seal private premises even if there has been no actual search or seizure.
2. Under Section 17 of the PMLA, the ED has the authority to break open locks while carrying out a lawful search.

Which of the above statement is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

Answer: b) 2 only

Explanation:

- Statement 1 is incorrect: PMLA contains no specific provision allowing the ED to seal a premises just because it is locked without conducting a proper search. The Madras HC also criticized this practice.
- Statement 2 is correct: Under Section 17 of PMLA, the ED can lawfully break locks during a valid search.

2. Question

Consider the following features of the Third Nuclear Age:

1. Transition from traditional deterrence to coercive nuclear posturing.
2. Emergence of new regional nuclear players such as India and Pakistan.
3. Decline of international nuclear norms and arms control agreements.

Which of the above are characteristics specifically associated with the Third Nuclear Age?

- a) 1 and 2 only
- b) 2 and 3 only
- c) 1 and 3 only
- d) 1, 2 and 3

Answer: c) 1 and 3 only

Explanation:

- Statement 1 is correct: The Third Nuclear Age emphasizes coercion and strategic signaling, not just passive deterrence.
- Statement 2 is incorrect: The rise of regional powers like India and Pakistan was a feature of the Second Nuclear Age.
- Statement 3 is correct: Erosion of international norms and treaties, including examples like Israel's strike on Iran, is part of current trends.

3. Question

The fundamental working principle of hydraulic systems is based on:

- a) Newton's Second Law
- b) Pascal's Law
- c) Bernoulli's Principle
- d) Hooke's Law

Answer: b) Pascal's Law

Explanation:

Pascal's Law states that any pressure exerted on an enclosed, incompressible fluid is transmitted equally in every direction — the primary principle behind hydraulic systems.

4. Question

According to SIPRI's 2025 report, which of the following statements reflect India's latest nuclear advancements?

1. India increased its nuclear warheads to 180 by 2024.
2. India is pursuing canisterized missiles and MIRV technology.
3. India has signed a successor treaty to New START with Russia.

Select the correct answer using the options below:

- a) 1 and 2 only
- b) 2 and 3 only
- c) 1 and 3 only
- d) 1, 2 and 3

Answer: a) 1 and 2 only

Explanation:

- Statement 1 is correct: SIPRI indicates India had 180 warheads as of January 2025.
- Statement 2 is correct: India is developing canister-launched missiles and MIRV-capable systems.
- Statement 3 is incorrect: India is not part of the U.S.–Russia New START treaty.

5. Question

The 2024 research on cold-tolerant rice supports which of the following?

1. Transmission of acquired traits without changes in DNA sequence.
2. Evolution driven only by DNA mutations.
3. Epigenetic adaptations to cope with environmental stress.

Choose the correct answer:

- a) 1 and 2 only
- b) 1 and 3 only
- c) 2 and 3 only
- d) 1, 2 and 3

Answer: b) 1 and 3 only

Explanation:

- Statement 1 is correct: The study supports inheritance of traits through epigenetic mechanisms.
- Statement 3 is also correct: Epigenetic changes help organisms adapt to stress.
- Statement 2 is incorrect: The research challenges the idea that only DNA mutations drive evolutionary adaptations.



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