

Today's Prelims Topics

Excess fluoride' in Sonbhadra's groundwater

Context

Uttar Pradesh 2nd largest district Sonbhadra, is facing a big problem related to fluoride contamination in drinking water.

Reason ?

- **Granite rocks** found in this region naturally release fluoride into the water.
- Since most villagers rely on **borewells and hand pumps** for drinking water, they are unknowingly consuming high levels of fluoride.

About Fluoride

- Fluoride is a naturally occurring mineral found in soil, water, plants and rocks.
- **Chemical Nature:** It is the ionic form of fluorine, a highly reactive element.
- **Sources:**
 - **Natural:** Groundwater and volcanic emissions.
 - **Artificial:** Added to water supplies, dental products like toothpaste and some pharmaceuticals.
- **Uses of Fluoride**
 - **Dental Health:** Strengthens Tooth Enamel & reduces cavities.
 - **Industrial Applications:** Used in the manufacturing of aluminum, pesticide, and refrigerants.
 - **Public Health:** Added to drinking water to reduce dental decay, known as **water fluoridation**.
- **Health Concerns:**
 - **Fluorosis:**
 - **Dental Fluorosis:** Overexposure to fluoride during childhood can lead to white spots or streaks on teeth.
 - **Skeletal Fluorosis:** Prolonged high fluoride intake can cause joint pain, stiffness and damage to bones.
 - **Neurotoxicity:** High levels of fluoride exposure may impair cognitive development in children.
 - **Thyroid Function:** Excess fluoride affects thyroid function.

Fluoride Contamination in India

- **Permissible Limit:**
 - **Bureau of Indian Standards (BIS)** - 1-1.5 mg /l. It is believed that levels above or below this could cause dental decay.
 - **WHO** - 1.5 mg/L
- Fluoride levels exceeding permissible limits have been detected in isolated pockets across **370 districts in 23 states**.
- **Rajasthan, Andhra Pradesh, Telangana, Tamil Nadu, Gujarat and West Bengal** are the relatively high-fluoride-contaminated states in India.

Source:

- [Indian Express - Fluoride contamination](#)

Record Child Adoptions in FY 2024-25

Context

India has witnessed a significant improvement in child adoptions in FY 2024-25, with 4,515 adoptions recorded, marking the highest figure in 12 years.

About Adoption Process

- Adoption is the formal process through which a child is permanently separated from their biological parents to become the lawful child of their adoptive parents.
- **Legislations that deal with the adoption of a child:**
 - The Hindu Adoption and Maintenance Act, 1956 (HAMA)
 - The Juvenile Justice (Care and Protection of Children) Act, 2015
- **Stakeholders Involved:**
 - **CARA:** Oversees the adoption process and issues guidelines.
 - **SARA:** State-level nodal body for adoption and non-institutional care.
 - **SAA:** Specialised Adoption Agencies place children for adoption.
 - **AFAA:** Authorised Foreign Adoption Agencies facilitate international adoptions.
 - **DCPU:** District Child Protection Units identify children eligible for adoption.

Source:

- [PIB - Record 4,515 Child Adoptions](#)

CENTRAL ADOPTION RESOURCE AUTHORITY (CARA)



- It is a statutory body established under the Juvenile Justice (Care and Protection of Children) Act, 2015.
- Nodal Ministry: Union Ministry of Women & Child Development
- It deals with adoption of orphan, abandoned and surrendered children through its associated/recognised adoption agencies
- CARA is designated as the Central Authority to deal with inter-country adoptions in accordance with the provisions of the *Hague Convention on Inter-country Adoption, 1993*



CARINGS

A database of children and registration of prospective parents is done on a centralised Child Adoption Resource Information and Guidance System (CARINGS), which is maintained by CARA

Rajya Sabha passes Bill for airline-lessor disputes

Context

Recently the Rajya Sabha passed 'The Protection of Interests in Aircraft Objects Bill, 2025', which seeks to turn into law the provisions of the Cape Town Convention and Protocol.

Key Provisions of the Bill

- **Legal Implementation of CTC in India:**
 - **Section 3:** The Convention and Protocol shall have the force of law in India.
 - The **Directorate General of Civil Aviation (DGCA)** will be the **regulatory authority** for implementation.
- **Responsibilities of Debtors (Airlines):**
 - Airlines must **maintain and submit records of dues related to aircraft and engines.**
 - Ensures **transparency in financial transactions** between airlines and lessors.
- **Rights of Creditors (Lessors & Financiers):**
 - Creditors can **exercise asset recovery rights** under CTC.
 - Before taking action, the **DGCA must be notified** about any airline **default.**
- **Handling of Aircraft During Airline Insolvency:**
 - The **resolution professional** can **keep aircraft assets for 60 days**, provided that **usage and maintenance charges are paid.**
 - This provision is **controversial** as the **aircraft leasing industry prefers immediate asset repossession.**
- **Exclusion from the Insolvency and Bankruptcy Code (IBC), 2016:**
 - As per Ministry of Corporate Affairs notification (April 2024), aircraft should not be part of insolvency proceedings.

Cape Town Convention (CTC) - 2001

- CTC is an international treaty that standardizes transactions involving:
 - Movable property such as aircraft, engines, and helicopters
 - Legal protection for creditors, financiers and lessors
 - Rules for asset recovery during airline defaults or insolvencies
- **India's Status in CTC**
 - Signed in 2008 but not ratified, so provisions were not legally binding.
 - The **new bill gives the Convention and Protocol the force of law in India**, ensuring compliance with international aviation financing norms.

Importance of Aircraft Leasing in India

- **86% of the nearly 850 aircraft in India's domestic airline fleet are leased** rather than purchased outright.
- Leasing aircraft helps airlines **preserve liquidity** by avoiding heavy capital investment.

Source:

- [The Hindu - CTC](#)

Silicon-Carbon (Si-C) Batteries

Context

Several top Android smartphone brands have incorporated Si-C batteries into their flagship devices

What are Silicon-Carbon (Si-C) Batteries?

- Silicon-carbon batteries are an **advancement over lithium-ion batteries**, maintaining the same **lithium-based cathode** while replacing the conventional **graphite anode with a silicon-carbon composite**.
- **Key Difference from Lithium-Ion Batteries:**
 - ✓ **Higher Energy Density** → Holds **more charge per gram**, improving battery life.
 - ✓ **Smaller & Lighter** → Can be **made thinner while storing more energy**.
 - ✓ **Faster Charging** → Allows **quicker power replenishment**.

Challenges of Silicon-Carbon Batteries

- **Silicon Swelling Issue:** Silicon expands by up to **300%** during charging, which can lead to:
 - Structural **damage and cracking**.
 - Reduced **battery lifespan**.
 - Faster **performance degradation** compared to lithium-ion batteries.
- **Higher Manufacturing Costs:** Silicon-carbon anodes are **more expensive** to produce than graphite anodes.
- **Practical Energy Density Variations:** Although **theoretical energy capacity is higher**, real-world performance **varies based on device and usage**.



Source:

- [Indian Express - Silicon batteries](#)

Places in News

Taiwan Strait

- Recently China completed a two-day **military drill** named "Strait Thunder-2025A" in the middle and southern parts of Taiwan Strait.



- Location:** China's Fujian Province (west) and Taiwan (east).
- It is a **110-mile-wide (180 km) waterway** separating **mainland China** and **Taiwan**.
- It is also called **Formosa strait**.
- One-third of the world's shipping traffic** passes through the Taiwan Strait.
- It connects the **South China Sea** and the **East China Sea**.
- Rivers draining:** Jiulong and Min.
- Major Ports of Taiwan:** Kaohsiung, Anping, Keelung, Suao.

Source:

- [The Hindu - Taiwan Strait](#)

News in Shorts

Abel Prize - 2025

- The **Abel Prize for Mathematics 2025** has been awarded to **Masaki Kashiwara**, a **78-year-old Japanese mathematician**.
- He was honored for his fundamental contributions to algebraic analysis and representation theory, particularly for developing the **theory of D-modules** and discovering **crystal bases**.



About the Abel Prize

- It is the world's highest honors in mathematics.
- Named after **Norwegian mathematician Niels Henrik Abel (1802-1829)**.
- It was established in **2001 by the Norwegian government**.
- It is Awarded annually by the **Norwegian Academy of Science and Letters**.
- Abel prize is considered an alternative to the **Nobel Prize**, which does not include a category for **mathematics**.

Source:

- [NDTV - Abel Prize](#)

Prime Minister's National Relief Fund (PMNRF)

- Recently PM has announced an ex-gratia from PMNRF to Fire Factory explosion victims in Gujarat's Banaskantha.

About PMNRF

- **PMNRF** was established in **1948** by **Jawaharlal Nehru** to provide **financial assistance** to victims of:
 - **Natural disasters** (earthquakes, cyclones, floods, etc.)
 - **Major accidents** (fire incidents, industrial explosions, etc.)
 - **Medical treatment for serious diseases** (heart surgeries, kidney transplants, etc.)
- The fund is managed by the **Prime Minister** and operates with voluntary donations from individuals and institutions. **(No Budgetary Support)**.
- Contributions to PMNRF are **exempt from Income Tax under Section 80(G)**.
- PMNRF is **audited** by an independent auditor outside the Government. **(Not CAG)**

Source:

- [PIB - PMNRF](#)

Editorial Summary

Addressing the Threat of AI-Generated CSAM

Context

The **Department for Science, Innovation and Technology** of the **British Government**, along with the **AI Security Institute**, released the **International AI Safety Report 2025**

More In News

The report highlights the imminent risk posed by AI tools in generating, possessing, and disseminating **child sexual abuse material (CSAM)**.

About CSAM

- CSAM refers to **audio, video, or images** depicting **sexually explicit portrayals of children**.
- The **United Kingdom** is leading a legislative effort to target AI tools capable of producing CSAM.
- A **2023 World Economic Forum (WEF) paper** flagged generative AI's ability to create lifelike images, especially of children.
- The **Internet Watch Foundation (IWF) report (October 2024)** highlighted the proliferation of CSAM on the **open web**.
- Given these developments, **India must amend existing laws** to address AI-driven CSAM and ensure long-term effectiveness.

Recent Developments: UK's Pioneering Legislation

- The **UK's upcoming law** introduces a **tool-centric approach** rather than focusing solely on the perpetrator.
- **Key Provisions:**
 - **Illegal to possess, create, or distribute AI tools** capable of generating CSAM.
 - **Outlawing the possession of paedophile manuals** that guide individuals in using AI for CSAM.

Expected Benefits

- **Deterrence and Holistic Approach:** By criminalizing the possession of AI tools, the law strengthens preventive mechanisms.
- **Early Apprehension of Offenders:** Authorities can act at the **preparation stage** before harm occurs.
- **Reducing the Mental Health Impact on Children:** It addresses the **initial ripple effects** of CSAM proliferation.
- **Bridging Legislative Gaps:** Recognizes AI-generated CSAM even when no **real child** is depicted.

India's Readiness: Existing Gaps in Legal Framework

- **Increasing Cybercrimes Against Children:**
 - **National Crime Records Bureau (NCRB) Report 2022:** Cybercrimes against children saw a **substantial increase** from the previous year.
 - **National Cyber Crime Reporting Portal (NCRP):** Under the **Cyber Crime Prevention against Women and Children (CCPWC)** scheme, **1.94 lakh child pornography cases** were recorded as of **April 2024**.
 - **Collaboration with NCMEC (USA):** Since **2019**, India's NCRB has received **69.05 lakh cyber tip-line reports** from the **National Centre for Missing and Exploited Children (NCMEC), USA** (as of **March 2024**).
- **Legislative Shortcomings:** Existing laws **do not address AI-generated CSAM**.

- There is **no emphasis** on targeting **AI tools or platforms** that facilitate CSAM creation.

Existing Laws Addressing CSAM in India

- **Information Technology (IT) Act 2000:**
 - **Section 67B:** Punishes publication or transmission of **sexually explicit** material depicting children.
- **Protection of Children from Sexual Offences (POCSO) Act, 2012:**
 - **Section 13:** Prohibits using children for pornographic purposes.
 - **Section 14:** Criminalizes **storing child pornography** in any form.
 - **Section 15:** Criminalizes the use of **children for sexual gratification**.
- **Bharatiya Nyaya Sanhita (BNS):**
 - **Section 294:** Penalizes **sale, distribution, or public exhibition** of obscene materials.
 - **Section 295:** Makes it illegal to sell, distribute, or exhibit **obscene content to children**.

A Plan for India: Strengthening the Legal Framework

- **Expand the Definition of CSAM:** As per the **NHRC Advisory (October 2023)**, replace 'child pornography' in **POCSO Act** with **CSAM** to make it **more comprehensive**.
- **Define 'Sexually Explicit' in IT Act:** **Section 67B** should explicitly define '**sexually explicit**' to help **identify and block CSAM** in real-time.
- **Broaden the Definition of 'Intermediary' in IT Act:** Include **Virtual Private Networks (VPNs), Virtual Private Servers (VPS), and Cloud Services** to ensure they comply with **CSAM-related provisions**.
- **Legislative Amendments for Emerging Tech:** Laws should address risks from **AI, deepfake technology, and generative models** producing CSAM.
- **Adopt UN's Draft Convention on Cybercrimes:** India must actively support the **UN Draft Convention on Countering the Use of ICT for Criminal Purposes** at the **UN General Assembly**.
- **Integrate AI-Specific Provisions in Digital India Act:** The proposed **Digital India Act 2023** (to replace the IT Act 2000) should **incorporate AI-related CSAM provisions** based on the **UK model**.

Conclusion

India must **modernize its legal framework** to address **AI-driven CSAM threats effectively**. The **UK's upcoming AI law** offers a **progressive model**, shifting from an **accused-centric** approach to a **tool-centric** deterrence strategy. By adopting similar legal mechanisms, **India can strengthen child protection laws**, tackle **AI-generated abuse**, and **safeguard children's rights** in the digital era.

Source: [The Hindu: Digital child abuse, the danger of AI-based exploitation](#)