

## UPSC Daily Current Affairs| Prelimbits 24-06-2025

### Ambubachi Mela

#### *Prelims : Current events of national and international importance*

#### Why in News?

*Thousands of devotees have arrived in Assam for the Kamakhya Temple's annual Ambubachi Mela.*

- It is one of the largest religious gatherings in **Northeast India**.
- The festival is held during the monsoon, generally in June, at the Kamakhya Temple in Nilachal hills in **Guwahati, Assam**.
- It is a shrine to the **Goddess Kamakhya** and one of the most important centres of **Tantrik Shaktism**.
- The period of Ambubachi is believed to be the period of the goddess's annual menstruation, and the shrine is closed for this.
- At the end of the period, the shrine's doors are opened ceremonially, and devotees flock for darshan of the deity.
- The festival is associated with fertility, with the onset of monsoon, and the common historical association across cultures of the Earth as a fertile woman.
- The name 'Ambubachi' itself translates to water flowing.
- Ambubachi Mela is not an image of the Goddess but rather a process, a formal process of menstruation.
- It is believed that during monsoon rain the creative and nurturing power of the menses of mother Earth becomes accessible to devotees at this site during Ambubachi.
- During this period, there is an entire cessation of all ploughing, sowing and other agricultural activities.
- Fragments of cloth stained with the blood-mark of the Goddess are distributed to the devotees and pilgrims preserve these in their houses as protective amulets.

#### Reference

[The Indian Express | Ambubachi Mela](#)

### Air Bubbles Trapped in Ice as a Message Storage System

#### *Prelims: Science and technology Current events of national and international importance*

#### Why in news?

*Recently, a team of researchers from China and Czechia has developed a novel method of storing information using air bubbles trapped in ice.*

- The technique offers an alternative for storing messages in extremely cold environments, where traditional storage methods fail.
- **Inspiration** - The idea is inspired by natural air bubbles preserved in **glaciers**, which have held ancient atmospheric samples for thousands of years.
- Recognizing the ability of ice to trap and preserve air, researchers explored controlled bubble formation to encode information.
- **Working principle** - Freezing air bubbles to store data when water freezes, it traps air bubbles.
- The shape, size, and arrangement of these bubbles depend on the freezing speed.
- By controlling freezing speed, scientists can create bubble patterns representing data, similar to:
  - Morse Code (dots and dashes)
  - Binary Code (0s and 1s)

*Morse code is a telecommunications method which encodes text characters as standardized sequences of two different signal durations, called dots and dashes.*

- **Types of bubbles formed** - Researchers identified two primary bubble shapes:
  - Egg-shaped bubbles
  - Needle-shaped bubbles
- By measuring bubble height and width, regions within the ice could be categorized as:
  - Egg-shaped only
  - Both egg and needle-shaped
  - Needle-shaped only
  - No bubbles
- **Creating information layers** - Scientists induced rapid temperature changes to **control freezing speed**, generating bubble layers at precise locations.
- Multiple bubble layers can be created in a single ice slice by repeating the temperature control process.
- **Message encoding process** - The storage process involves:
  - Converting the desired message (letters/numbers) into a temperature-control pattern.
  - Using the pattern to guide the freezing process and form bubble layers.
  - Scanning the ice slice with a camera.
  - Using a computer algorithm to interpret light and dark bands in the image as encoded information.
- **Potential applications** - Storage of information in extremely cold places, where electronics or paper are impractical in,
  - Arctic and Antarctic regions
  - Moon or Mars missions
- Long-term information preservation in glacial environments or space exploration.

## Reference

[The Hindu| Air Bubbles Trapped in Ice as a Message Storage System](#)

## DGCA's Comprehensive Aviation Safety Audit

### *Prelims: Current events of national and international importance*

#### Why in news?

*The Directorate General of Civil Aviation (DGCA) has launched a comprehensive safety audit across India's aviation sector following tragic crash of Air India flight AI-171 in Ahmedabad.*

- **Safety Audit** - It is a systematic, independent, and documented examination to evaluate the effectiveness of safety management systems and give recommendations for corrective actions to enhance safety.
- **Previous DGCA' safety audits** - Different DGCA directorates conducted independent, area-specific safety checks (pilot licensing, aircraft maintenance, airport safety) without coordination, often planned or unplanned.
- **Lack of holistic oversight** - The isolated approach led to poor cross-department coordination, missed systemic risks, and limited focus on proactive, comprehensive safety assessment.
- **New comprehensive aviation safety audit** - DGCA launched a 360-degree Special Safety Audit, moving beyond fragmented checks to a holistic, ecosystem-wide evaluation to detect systemic vulnerabilities and enhance safety.
- **Aim** - To enhance safety, operational efficiency, and regulatory compliance in line with global standards.

#### Key Features of the Safety Audit

- **360-Degree evaluation** - The audit will assess the entire aviation ecosystem: safety management, operations, and regulatory adherence.
- **Multidisciplinary teams** - Teams will include experts from:
  - Flight Standards
  - Air Safety
  - Airworthiness
  - Licensing
  - Air Navigation Services
  - Aerodrome Standards
- **Surprise inspections** - Special audits and inspections can be conducted without prior notice.
- **Categorisation of Findings**
  - Level-1: Immediate Corrective Action required for critical safety risks.
  - Level-2: Short-Term Corrective Action for less urgent but necessary improvements.
- **Compliance with global standards** - The audit aligns with the International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs).
- **Significance** - It supports India's commitment to a world-class, safe, and efficient aviation system.
- Establishment of India as a global benchmark for aviation safety oversight

- It looks to restore the public confidence post-Ahmedabad crash

## Reference

[The Hindu | DGCA's Comprehensive Aviation Safety Audit](#)

## Fighting Antimicrobial Resistance (AMR) with Insect-Based Livestock Feed

*Prelims: Sustainable development | Current events of national and international importance*

### Why in news?

*Recent studies have shown that the use of insect-based feed can be more cost-effective because it provides better digestible proteins than fishmeal- or soybean-based feeds.*

- **Antibiotic overuse in livestock** – Animal husbandry accounts for over 50% of global antibiotic use, expected to reach 200,000 tonnes by 2030, a 53% rise from 2013 levels.
- Antibiotics are used to treat diseases and promote growth, but overuse fosters AMR.
- **AMR in Livestock** – Antibiotic residues in livestock intestines lead to bacteria acquiring resistance genes, which then spread to soil, water and ultimately to humans.

*By 2050, antibiotic-resistant infections could cause 10 million deaths annually, up from 700,000 in 2014.*

- Human over-exposure to such antibiotics can cause kidney disease, cancer, aplastic anaemia, etc.
- **Insect-Based Feed** – Insect-based feed is more cost-effective than traditional feeds like fishmeal or soybean meal.
- It acts as natural diet for many aquatic and terrestrial animals.
- It provides better digestible proteins, improving growth and immunity in livestock.
- Insects like Black Soldier Flies, House Crickets, Mealworms, etc., are rich in digestible proteins, fats, fibres and micronutrients (zinc, calcium, iron).
- **Nutritional Benefits** – 1 kg fishmeal (standard protein source) can be replaced with:
  - 0.76 kg Crickets
  - 0.85 kg Black Soldier Flies
  - 0.91 kg Locusts
- **AMR mitigation through insect feed** – Healthier livestock require fewer antibiotics for growth promotion or disease prevention, lowering the risk of AMR development.
- **Improves gut health of livestock** – Some insect-based feeds promote better gut microbiota balance, enhancing immunity naturally.
  - It reduces dependence on non-essential antibiotics in livestock production.
  - It limits environmental release of antibiotic-resistant bacteria.
  - It supports safer, more sustainable food chains.
- **Environmentally sustainable** – Insect farming produces far fewer greenhouse gases,

uses less land and water, and converts organic waste into high-quality protein.

- **Indian Initiatives** - ICAR-CIBA (Central Institute of Brackish water Aquaculture) in partnership with private firms, is promoting insect-based feeds for aquaculture (shrimp, seabass) and livestock.

## Reference

[The Hindu| Fighting AMR with Insect-Based Livestock Feed](#)

## Debt Mutual Funds

*Prelims: Indian Economy| Current events of national and international importance*

### Why in news?

*RBI has recently started a rate-cutting cycle and FD rates declining, which makes investors shifting to debt funds.*

- **Debt Mutual Funds** - Investment funds that pool money to buy **fixed-income securities** like government bonds, corporate bonds, treasury bills, etc.
- **Regulated by** - Securities and Exchange Board of India (SEBI).
- **Lower risk** - It generates steady returns with lower risk compared to equities.
- It is popular among risk-averse investors and those looking for diversification.
- **Categories of Debt Funds as per SEBI,**
  - Liquid Funds
  - Ultra-Short Duration Funds
  - Short Duration Funds
  - Gilt Funds
  - Dynamic Bond Funds
  - Credit Risk Funds

## Significance of Debt Mutual Funds

- **Stable returns** - It offers more predictable and stable returns compared to equity funds.
- **Diversification for investors** - They provide an opportunity to diversify portfolios, balancing risk especially for conservative investors or those nearing financial goals.
- **Better tax efficiency** - Debt funds that held for more than 3 years can enjoy indexation benefits, reducing the tax liability compared to fixed deposits.
- **Liquidity** - Most debt mutual funds offer higher liquidity than traditional fixed deposits, allowing investors to redeem investments partially or fully.
- **Relationship with interest rates** - The debt fund performance is closely tied to the Monetary Policy stance of the RBI's Monetary Policy Committee (MPC) and is in inverse relationship with interest rates that means,
  - When interest rates fall, bond prices rise and Debt fund returns increase.
  - When interest rates rise, bond prices fall and Debt fund returns decline.
- **Reason** - Existing bonds offer higher fixed returns than newly issued bonds during

falling interest rates, making them more attractive.

- During rising interest rates, new bonds offer better yields, reducing demand and price for existing bonds.

## Reference

[The Hindu| Debt Mutual Funds](#)

### One Liners 24-06-2025

#### Geography

##### **Lightning Strikes**

Tragically, **13 people died from lightning strikes in Bihar** in last week . The **Bihar government announced Rs4 lakh ex-gratia** for each bereaved family and urged adherence to safety guidelines.

- **What is Lightning?** - Is a **natural electrostatic discharge** from thunderstorm clouds, generating extreme heat and thunder.
- **Prone Regions in India - Eastern and Northeastern states**, including Bihar, Jharkhand, and West Bengal, are particularly vulnerable.
- **How it occurs** - It results from charge separation in thunderclouds, leading to electrostatic build-up and a violent discharge when the electric field strength exceeds air's insulating capacity.
- **Deadly Hazard** - Lightning is a major natural disaster killer in India, causing over 2,000 deaths annually, disproportionately affecting outdoor workers.
- **Key Indian Initiatives** - India uses the Damini App for real-time alerts, a Lightning Detection Network, and IMD forecasts to mitigate risks.
- **Safety & Awareness** - The Lightning Resilient India Campaign and NDMA guidelines aim to reduce deaths through education and infrastructure.

#### International Relations and Issues

##### **Operation Midnight Hammer**

In a recent stunning move, the U.S. launched Operation Midnight Hammer against Iran's nuclear infrastructure, announced by President Donald Trump.

- **Precision Strikes** - The operation targeted Fordow, Natanz, and Isfahan, aiming to severely degrade Iran's nuclear weapons capacity.
- **Covert Execution** - A highly classified mission, it involved B-2 Spirit stealth bombers launching from the U.S., employing deception tactics.
- **Coordinated Infiltration** - After an 18-hour flight with multiple refuelings, bombers linked with escort and support aircraft over the Middle East.
- **Pre-Strike Deception** - A U.S. submarine launched Tomahawk cruise missiles, coinciding with fighter aircraft maneuvers to confuse Iranian defenses.
- **Flawless Strikes** - All three sites were struck with pinpoint accuracy, with no U.S. casualties or retaliation.
- **Strategic Success** - The Pentagon hailed the mission as a "masterclass in stealth warfare," demonstrating U.S. power and precision.



### **Strait of Hormuz**

The Strait of Hormuz, a vital 33 km-wide chokepoint connecting the Persian Gulf and Gulf of Oman, faces threats of blockage amidst US-Iran tensions, impacting global energy.

- **Critical Energy Lifeline** - Over one-quarter of global seaborne oil (20 million barrels daily) and 83% of LNG trade transit the Strait of Hormuz.
- **Economic Fallout** - A blockage would trigger a sharp surge in global oil and gas prices, increasing shipping costs and destabilizing markets.
- **Iran's Dilemma** - While Iran has historically avoided full blockage, doing so would jeopardize its own oil exports, particularly to China, and alienate allies.
- **US Military Presence** - The U.S. 5th Fleet in Bahrain provides a rapid response capability, though military engagement risks severe shipping disruptions.
- **India's Vulnerability** - India, importing 84% of its crude oil through the Strait in 2024, would face significant energy insecurity and economic volatility.
- **Limited Alternatives** - Existing alternative pipelines from Saudi Arabia and UAE cannot fully compensate for the Strait's vast transport volume, ensuring widespread impact.

### **GENIUS Act**

The US Senate passed the GENIUS Act in June 2025, a landmark bill regulating stablecoins, signifying a major shift in US digital asset policy.

- **Stablecoin Overview** - Stablecoins, digital currencies pegged to traditional assets like the US dollar, boast a market capitalization of \$251.7 billion in 2025.
- **GENIUS Act Features** - The act mandates anti-money laundering (AML) compliance, full reserve backing, and monthly audits for stablecoins to ensure transparency.
- **Market Impact** - Following approval, Circle Internet Group shares surged 33.82%, reflecting strong investor confidence in the regulated stablecoin market.
- **Treasury Outlook** - US Treasury Secretary Scott Bessent forecasts stablecoin market growth to \$3.7 trillion by decade-end, reinforcing USD supremacy.
- **Policy Comparison** - Unlike the STABLE Act's narrower reserve focus, the GENIUS Act provides a broader framework for stablecoin regulation.
- **Global Strategy** - Amid de-dollarization talks, the GENIUS Act aims to solidify the US dollar's dominance by promoting dollar-pegged stablecoins globally.

### **Samson Option**

With Recent escalating regional conflicts, attention is on Israel's Samson Option, its presumed doctrine of massive nuclear retaliation against existential threats.

- **What is it?** - The Samson Option refers to Israel's unconfirmed but widely believed policy of nuclear retaliation if facing an existential threat.
- **Biblical Reference** - Named after the biblical Samson, it signifies a 'last resort' act of apocalyptic retaliation, even if it means self-destruction.
- **Policy of Ambiguity** - Israel maintains "amimut" (deliberate ambiguity) regarding its nuclear arsenal, which analysts estimate to be between 80 and 400 warheads.
- **Seymour Hersh's Role** - The term gained prominence with Seymour Hersh's 1991 book, *The Samson Option*, solidifying its place in public discourse.
- **Purpose** - It's designed to ensure Israel's survival, a last-resort use of nuclear weapons against a non-nuclear adversary to avert defeat.
- **Not First Strike** - The Samson Option isn't for deterring a nuclear first strike, as Israel is the region's sole nuclear power.

### **Fattah hypersonic missile**

In recent strikes on Israel, Iran deployed its Fattah hypersonic missile, demonstrating its capability to bypass advanced defense systems like Iron Dome and raising global security concerns.

- **Fattah** - Is a medium-range hypersonic ballistic missile developed by Iran's Islamic Revolutionary Guard Corps (IRGC), designed for precision strikes and evasion of air defense systems.
- **Developed** - In November 2022 and inducted into the IRGC's arsenal in 2023, it commemorates Hassan Tehrani Moghaddam.
- **Hypersonic Speed** - It travels at Mach 13 to Mach 15 (up to 15,000 km/h) with a range of 1,400 km, planned to extend to 2,000 km.
- **Advanced Evasion** - The Fattah boasts exceptional maneuverability, shifting direction mid-flight, and features a plasma shield for reduced radar detection and radio signal jamming.
- **Operational Use** - The missile was actively deployed by Iran in its 2025 strikes on Israel (Operation Honest Promise 3).
- **Future Variants** -An upgraded variant, Fattah-2, is currently under development with an extended range.

### **Environment**

#### **Reintroduction of king Cobra in Madhya Pradesh**

The recent death of a **king cobra** at Bhopal's Van Vihar zoo has spurred discussions on reintroducing them in Madhya Pradesh to curb snakebite fatalities, though the plan faces significant ecological and feasibility challenges.

- **King Cobra Traits** - King cobras (*Ophiophagus hannah*), reaching 15 feet, prefer humid, dense forests and are found in India's Western and Eastern Ghats, and Northeast.
- **Historical Absence** - No confirmed historical records exist in Madhya Pradesh's dry deciduous forests, which lack sufficient water and dense vegetation for a stable population.
- **Taxonomic Shift** - Recent genetic studies identify four distinct king cobra lineages, with the Western Ghats population now classified as a separate species, *Ophiophagus kaalinga*.
- **Hybridisation Risk** - Introducing non-local king cobras, like those from the Western Ghats, risks hybridization, which can dilute genetic integrity and undermine conservation.
- **Census Challenges** - A proposed snake census lacks established protocols, rendering it unfeasible and unnecessary for effective conservation.
- **Expert Concerns** - Many experts question the scientific basis of reintroduction plans, citing poor captive breeding success and potential unintended ecological consequences.

### **Security**



### INS Tamal

Indian Navy will commission INS Tamal, a Krivak/Tushil class stealth multi-role frigate, at Kaliningrad, Russia.

- **Pivotal moment** - Being the last foreign-built warship to join India's fleet, signifying a major leap towards naval self-reliance under 'Atmanirbhar Bharat'.
- **Key Commissioning** - INS Tamal, built at Russia's Yantar Shipyard, will be commissioned on July 1, 2025, by Vice Admiral Sanjay J. Singh.
- **End of Imports** - This commissioning ends a two-decade era of Russian warship imports, reinforcing India's 'Make in India' initiative
- **Advanced Capabilities** - The 125-meter, 3,900-ton frigate boasts stealth design, BrahMos missiles, and a crew of 250+.
- **Indigenisation Drive** - Starting with 26% indigenous content, the ship's Made-in-India systems have increased to 33%.
- **Domestic Construction** - Two sister frigates of the Tripur class are being built in India at Goa Shipyard Ltd, with Russian collaboration.
- **Strategic Impact** - INS Tamal joins the Western Fleet, symbolizing India's growing defence autonomy and integrating cutting-edge technology.

### Miscellaneous

#### International Olympic Day

**June 23** marks **International Olympic Day**, celebrating the birth of the modern Olympic Games and promoting the values of excellence, friendship, and respect through sport.

- **Origins in Paris** - Established in 1948, this day commemorates the International Olympic Committee's (IOC) founding on June 23, 1894, by Baron Pierre de Coubertin in Paris.
- **Global Significance** - More than symbolic, it promotes **physical activity**, sportsmanship, and inclusion, inspiring healthier lifestyles worldwide.
- **2025 theme**, "Let's Move?" - A joint IOC and WHO initiative, urges everyone to combat inactivity with simple, enjoyable movements.
- **Community Celebrations** - The day sees Olympic Day Runs, cycling events, yoga sessions, and fitness workshops fostering unity and wellness.
- **Educational Outreach** - Schools and community centers host workshops, quizzes, and competitions to educate on Olympic history and values.
- **Digital Engagement** - Millions participate digitally using **#OlympicDay** and **#LetsMove**, amplifying the message of an active lifestyle.



**SHANKAR**  
**IAS PARLIAMENT**  
*Information is Empowering*