# UPSC Daily Current Affairs| Prelimbits 16-06-2025

## Black boxes

### *Prelims: Current events of National and International Importance*

### Why in News?

*After the Air India plane (AI171) crash, the search for the flight's black box continues, which is crucial equipment to find out what happened moments before the disaster.*

- A black box is simply a flight recorder from the early 1950s.
- Black boxes ***record data during flights*** without interruption and hold crucial information in plane crashes, such as fatal accidents.
- It was launched for commercial operations in 1952, but saw major accidents in its initial years.
- In modern aircraft, there is a Cockpit Voice Recorder (CVR) and a Digital Flight Data Recorder (DFDR).
- Generally, they are called black boxes even though they are painted with bright orange colour to ensure high visibility.
- In some aircraft, the two recorders are integrated.




- DFDRs are ***coated with bright orange colour***, treated with reflex material for high visibility, and securely connected with automatically activated signalisation for localisation underwater, .
- The CVR records radio transmissions and other sounds in the cockpit, such as conversations between the pilots and engine noises.
- The flight data recorder records more than 80 different types of information, such as altitude, airspeed, flight heading, vertical acceleration, pitch, roll, autopilot status, etc.
- The development of flight data recorders evolved over a period of time.
- It started with the use of metal foils for recording data, and later, they were replaced with magnetic tapes.
- At present, ***solid-state chips*** are used in the flight data recorders.

**Reference**

The Hindu | Black boxes

## Merchant Discount Rate

***Prelims: Current events of National and International Importance | Economy***

**Why in News?**

*The Union Finance Ministry dismissed reports of the government planning to levy a merchant discount rate (MDR) on large-ticket UPI transactions.*

- The Merchant Discount Rate (MDR) is a fee that businesses, including merchants, must pay to payment processing companies for facilitating transactions.
- It is done through digital payment methods such as credit cards, debit cards, and Unified Payments Interface (UPI).
- This fee serves to compensate various entities involved in the payment process, including the bank that issues the card, the bank that provides the Point of Sale (PoS) terminal, network providers, and payment gateways for their respective services.
- The MDR encompasses all associated charges and taxes related to electronic or digital payments, typically expressed as a percentage of the transaction amount, which generally ranges from 1% to 3%.
- The specific rate applied can vary based on factors such as the
    - Volume of business transactions,
    - The types of cards used (debit or credit), and
    - The average transaction value, often referred to as average tickets or average sales.
- Before merchants can accept card payments, they must establish this service and agree to the applicable MDR rate.
- Merchants need to factor these fees into their overall business expenses and pricing strategies.
- Notably, MDR charges are automatically deducted from the merchant's account during the settlement of transaction batches.
- Furthermore, according to regulations set by the Reserve Bank of India (RBI), ***business owners are prohibited*** from passing these MDR charges onto their customers, ensuring that the cost remains a part of the merchant's operational expenses.

**Reference**

MoneyControl | Merchant Dicount Rate

## Statins

### *Prelims: Current events of National and International Importance | Health*

### Why in News?

*Study finds statins, which lowers cholesterol, could bring down death rate in patients with sepsis.*

- Statins are a class of ***medications designed to lower cholesterol levels*** by inhibiting a specific enzyme in the liver responsible for cholesterol production.
- These drugs are commonly prescribed to help mitigate the risk of cardiovascular diseases, including heart attacks and strokes, which can arise from elevated cholesterol levels in the bloodstream.

- Excess cholesterol can lead to the formation of plaque on arterial walls, resulting in the narrowing or hardening of these blood vessels over time.
- Certain statins have been shown to reduce low-density lipoprotein (LDL) cholesterol, often referred to as "bad" cholesterol, by 50% or more, as high levels of LDL can obstruct blood flow by accumulating in the arteries.
- In addition to lowering cholesterol, statins have been associated with a decreased risk of heart disease and stroke, and they may also play a role in reducing the likelihood of certain blood clots.
- However, it is important to note that statins can interact with other medications, potentially leading to serious side effects, such as muscle damage.
- Beyond their cholesterol-lowering effects, statins possess anti-inflammatory, immunomodulatory, antioxidative, and antithrombotic properties.
- It may help to alleviate excessive inflammatory responses, restore endothelial function, and exhibit potential antimicrobial activities.

**Reference**

The Hindu | Statins

## Wildlife Watchers Initiative

***Prelims – Environment and Ecology***

***Mains – (GSIII) Conservation***

### Why in news?

*Recently launched grassroots conservation effort in Pune's Purandar taluk, by 40 local volunteers have recorded over 350 wildlife sightings across 60+ species within six months.*

- **Wildlife Watchers** – It is a community-driven conservation initiative launched in Purandar taluk of Pune district, Maharashtra.
- **Launched by** – The Grassland Trust (Pune-based NGO).
- The project is supported by Ashreya Hastha Trust.
- **Objective** – To empower local communities mainly farmers and herders to systematically monitor, document, and protect wildlife in non-protected grassland and scrubland ecosystems.
- **Key features –** Farmers and herders from Saswad and Morgaon villages were trained to monitor grassland and scrubland wildlife.
- They are equipped with field kits including torch, sack, shoes, water bottle, cap, and a local language field guide.
- They record wildlife sightings and incidents using a custom mobile app and receive incentives like binoculars or camera traps for verified reports.
- **Impact** – In just six months, volunteers reported over 350 verified sightings covering 60+ species, including grey wolf, hyena, jackal, Bengal fox, and over 40 bird species.
- Around 30 of these reports resulted in direct conservation actions, such as preventing poaching or confirming breeding of rare species.

- Children and other community members are also getting involved, showing increased awareness and reporting sightings actively.
- **Significance** – The grasslands in Pune are the only region in India where leopards, hyenas, and Indian grey wolves coexist in human-used landscapes.
- This model empowers local people to act as custodians of biodiversity using traditional knowledge alongside scientific training.
- The initiative promotes coexistence and provides an alternative to top-down conservation by valuing local insights and participation.
- It triggered conservation actions, improved local awareness, and built a skilled community of grassroots naturalists.

**Reference**

The Hindu| Wildlife Watchers' programme

## Global Gender Gap Index 2025

***Prelims: Current events of National and International Importance***

### Why in news?

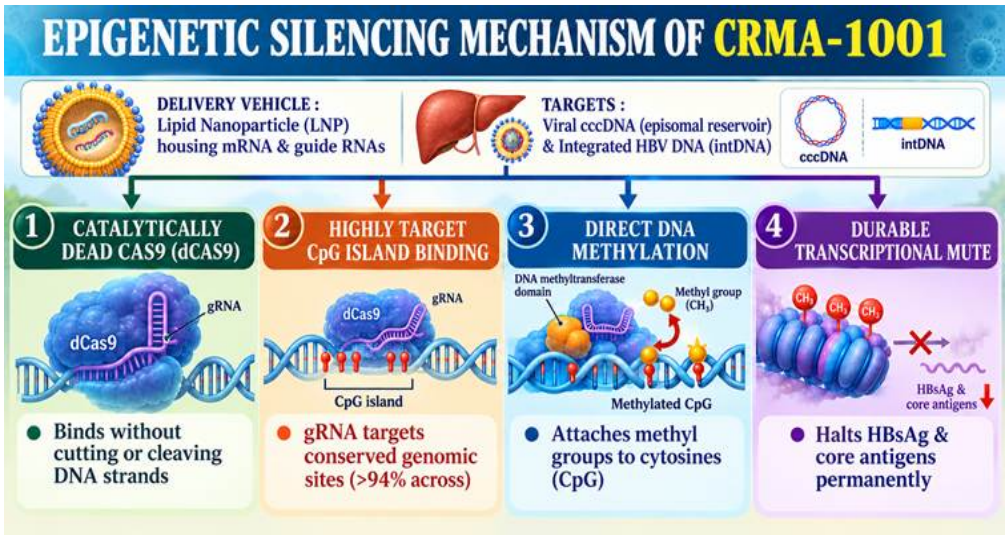
*World economic forum recently released the 2025$^{th}$ edition of Global Gender Gap Index.*

- **Global Gender Gap Index** – It is an annual report to measure the extent of gender-based disparities across countries.
- The Global Gender Gap Index measures gender parity across four key dimensions: Economic Participation and Opportunity, Educational Attainment, Health and Survival, and Political Empowerment.
- **Published by –** World Economic Forum (since 2006)
- Latest Edition is 2025 (19th edition)
- **Total Countries Covered - 148**

### Pillars of the Index

- **Economic Participation and Opportunity**
  - Labour force participation
  - Wage equality
  - Estimated earned income
  - Representation in leadership roles
- **Educational Attainment**
  - Literacy rate
  - Enrollment in primary, secondary, and tertiary education
- **Health and Survival**
  - Sex ratio at birth
  - Healthy life expectancy
- **Political Empowerment**
  - Women in Parliament

    - Women in ministerial roles
    - Years with a female head of state (in last 50 years)
- **Scoring System** – Score Range is 0 to 1 where 1 = Perfect Gender Parity and 0 = Complete Disparity
- **India's rank** – India ranks **131st out of 148** countries the 2025th edition of Global Gender Gap Index.
- It slipped 2 places from 129 in 2024.
- **India's parity score in 2025** - 64.1%
- **India is** the **lowest-ranked** in South Asia.
    - Bangladesh - 24
    - Nepal - 125
    - Sri Lanka - 130
    - Bhutan - 119
    - Maldives - 138
    - Pakistan - 148




- **Global Gender Parity** - 68.8% closed globally in 2025 – highest improvement since COVID-19.
- It is estimated to take **123 years** to achieve the **Full Gender Parity** globally at current pace.
- **Top 5 Countries**:
    - **Iceland** (1st for 16th year)
    - Finland
    - Norway
    - United Kingdom
    - New Zealand

**Reference**

The Hindu| India slips to 131st position in Global Gender Gap Index 2025

### Yoga Connect

*The Ministry of Ayush is hosting 'Yoga Connect', a hybrid global summit, on June 14, 2025, at Vigyan Bhawan, New Delhi, as a key lead-up to the 11th International Day of Yoga (IDY).*

• **Yoga Connect** – Aims to *unite yoga gurus, policymakers, health experts, and global influencers*.
• **Theme** – 'Yoga for One Earth, One Health', emphasizing holistic well-being.
• **Participants** – Coordinated by the *Central Council for Research in Yoga and Naturopathy (CCRYN)*.
• Over 1,000 in-person participants will join, alongside virtual attendees from leading international yoga institutions.
• Experts from countries like Bahrain, USA, UK, and South Korea are participating.
• **Thematic Sessions** – The summit will cover *diverse sessions including Yoga for Non-Communicable Diseases,* Yoga-Tech, Yoga and Women's Health, and Yoga Commerce and Industry.
• It will feature participation from notable luminaries such as Swami Baba Ramdevji and HR Nagendraji.
• **Significance** – 'Yoga Connect' marks ten years of India's global yoga movement since the UN declared June 21 as IDY in 2014.
• The event reinforces Yoga's recognition by UNESCO as India's gift to the world, promoting health, balance, and unity.

### Aircraft Accident Investigation Bureau (AAIB)

*The AAIB is the primary agency investigating the recent Air India plane crash in Ahmedabad.*

• **Aircraft Accident Investigation Bureau (AAIB), India** – Is an *attached office* under the Government of India's *Ministry of Civil Aviation*, crucial for aviation safety.
• It was established on July 30, 2012, to fulfil India's obligations under Annex 13 to the Convention on International Civil Aviation.
• **Mandate and Objectives** – AAIB's sole objective is the *prevention of accidents and incidents*, not to apportion blame or liability.
• It is *responsible for classifying 'Safety Occurrences'* in Indian Airspace into Accidents, Serious Incidents, and Incidents.
• **Scope of Investigations** – AAIB *investigates all Accidents and Serious Incidents involving aircraft* with an All-Up Weight (AUW) over 2250 Kgs or Turbojet aircraft.
• It may also investigate other serious incidents or incidents if deemed expedient.
• **Investigation Process & Reporting** – After investigation completion and Director General's acceptance, reports are made public on the AAIB website.
• Accepted 'Final Investigation Reports' are *forwarded to the International Civil Aviation Organization (ICAO)* and participating States.
• **Safety Recommendations & Studies** – AAIB conducts safety studies and issues recommendations from its investigation reports.
• These recommendations are forwarded to the DGCA, India, or other ICAO Contracting States' Civil Aviation Regulatory bodies for implementation and follow-up.
• **Coordination Role** – AAIB *also facilitates the investigation and administrative work of Courts or Assessors* appointed by the Central Government under relevant Aircraft Rules.

## International Relations and Issues

### Reko Diq Project

*The International Finance Corporation (IFC) and World Bank (WB) recently approved a USD 700 million concessional loan to fund Pakistan's Reko Diq project.*

• **Reko Diq project** – A *major mining initiative* in mineral-rich Balochistan province of Pakistan.
• This approval marks a significant victory for Pakistan's resource development sector.
• It is *jointly owned by Barrick Gold and the federal and Balochistan governments*.
• **Project Scope** – A recent feasibility study has upgraded the project's scope significantly.
• The mine life is revised to 37 years due to higher throughput, though it could extend to 80 years with unaccounted minerals.
• **Strategic Significance** – The project's advancement boosts Pakistan's economic standing and its efforts to secure vital investments.
• The World Bank also plans to invest USD 2 billion annually in Pakistan's infrastructure over the next decade.

## Agriculture

### Agrivoltaics

*Bihar farmers have initiated food and energy production through an agrivoltaics site in Gaya district, marking a significant step in sustainable agriculture.*

• **Agrivoltaics** – *Combines agriculture and solar power generation*, preventing competition for land between food and energy production.
• It involves *growing shade-tolerant crops beneath solar panels*.
• This allows farmers to simultaneously produce food and generate electricity from the same land area.
• **Bihar's First Agrivoltaics Site** – The Tata Cornell Institute for Agriculture and Nutrition (TCI) and Preservation and Proliferation of Rural Resources and Nature (PRAN) established this site in Nawada village, Gaya of Bihar.
• Built with assistance from Jain Irrigation Systems, it is Bihar's pioneering agrivoltaics installation.
• **Benefits and Operation** – The 20-kilowatt solar array powers a grain mill and micro-irrigation systems, ensuring reliable and affordable irrigation for farmers.
• This enables dry season cultivation and reduces water usage through drip and sprinkler systems.
• Farmers co-financed and collectively own the installation, generating additional income from grain mill services.
• **Environmental and Economic Impact** – The project helps *lower greenhouse gas emissions* from farming while increasing overall productivity.
• It is expected to *expand production to include high-value crops*, significantly increasing farmer incomes.
• This initiative is part of TCI's Zero-Hunger, Zero-Carbon Food Systems project, aiming to reduce agricultural emissions and improve livelihoods.

## Environment

### Jim Corbett Tiger Reserve

*Villages near the Jim Corbett Tiger Reserve are strongly opposing a proposal to open a new ecotourism zone, citing a concerning rise in tiger attacks and increased human-wildlife conflict.*

• **AJim Corbett National Park** – Also known as Corbett Tiger Reserve, is *India's oldest* and one of its most prestigious national parks, located in the *Nainital district of Uttarakhand*.
• **Recent Conflict Incidents** – Kyari village recently experienced its first tiger fatality in 50 years.
• Between March 2024-2025, the Ramnagar forest division recorded 12 tiger attacks.
• Locals fear increasing ecotourism negatively impacts animal behavior, escalating conflict.
• **Ecotourism Zones and Revenue** – Jim Corbett and its buffer zones host *15 ecotourism zones*, generating Rs 2,000-3,000 crore annually.
• This industry supports hundreds of local resorts, drivers, and guides, providing significant livelihoods.
• **Proposed New Zone and Opposition** – Terai West proposed a new ecotourism zone in *Chandani*, drawing strong local opposition due to lack of consultation.
• Residents protested, even filing a High Court petition which temporarily halted the proposal.
• **Causes of Conflict** – High tiger density in Ramnagar (estimated 80 tigers; 20 per 100 sq km) is a major factor.
• NTCA reports development and resorts *cause "loss of connectivity" for animal movement*, leading to negative interactions.
• Increased wildlife populations and human expansion into forests also contribute.
• **Community Concerns and Livelihoods** – Villagers face *crop damage* from wild animals and restricted forest access for fodder/firewood.
• Many rely more on forest resources than seasonal tourism income, expressing fear of forced displacement.

## Security

## Kusha

*The Defence Research and Development Organisation (DRDO) recently announced significant progress on Project Kusha, with trials for its variants expected soon.*

• **Project Kusha** – An *indigenous air defence system*, with phased induction into the armed forces expected by 2030.
• This initiative aims to fortify India's air defence capabilities with *long-range, home-grown solutions*.
• **Kusha Variants & Capabilities:**
  - **Kusha M1** – Equipped with *short-range missile systems* for intercepting incoming aircraft and missiles (up to ~150 km).
  - **Kusha M2** – Features more than *medium-range surface-to-air missiles (MRSAM)* (250 km range approximately).
  - **Kusha M3** – Designed for a hit reach exceeding 400 kilometers (some reports suggest 350-400 km).
• *All three variants will use the same kill vehicle but different boosters* for varying ranges.
• **Operational Design** – Kusha is engineered to *provide multi-layered space protection*.
• One system can launch multiple interceptor missiles to cover a stretch between 100 to 200 kilometers against diverse aerial threats, including stealth jets, drones, and even ballistic missiles.
• **Development Timeline** – The first development trials for Kusha M1 are anticipated in September 2025, with potential induction by 2028.
• Kusha M2 trials will follow in 2026, and Kusha M3 trials are projected for 2027.
• DRDO aims to complete the induction of the entire Kusha system by 2030, enhancing *Aatmanirbharta in air defence*.

## Project Vishnu

*India is preparing to test the Extended Trajectory-Long Duration Hypersonic Cruise Missile (ET-LDHCM), developed under DRDO's covert "Project Vishnu".*

**Key Capabilities of ET-LDHCM:**
• **Speed** – *Achieves a maximum speed of Mach 8* (about 11,000 km/h), making it extremely difficult for current radar and air defence systems to intercept.
• **Range** – Has a range of approximately 1,500 kilometers.
• **Payload** – Can deliver conventional or nuclear warheads weighing 1,000–2,000 kg to target enemy sites.
• **Propulsion** – *Utilizes a scramjet engine*, already successfully ground-tested for 1,000 seconds, for sustained hypersonic speeds.
• **Operational Features** – *Designed for low-altitude travel and mid-flight maneuvering*, unlike predictable ballistic missiles.
• Constructed with *heat-resistant materials* (up to 2,000°C) and oxidation-resistant coatings for extreme conditions.
• Offers adaptability with multi-platform launch capabilities: from land, air, or sea.
• **Strategic Significance** – Once operational, it will enable India to conduct deep, precise strikes within enemy territory rapidly.
• India joins an elite group of countries (including the US, China, and Russia) that have perfected hypersonic missile technology.
• *Designed at the Dr. APJ Abdul Kalam Missile Complex in Hyderabad* with commercial Indian defence companies, boosting Aatmanirbharta.
• **Broader Benefits of Hypersonic Technologies** – Beyond military applications, *these technologies can strengthen India's capacities in disaster relief and aerospace development*.
• The program is expected to create thousands of jobs and provide new opportunities for Indian MSMEs in the defence ecosystem.

## EXERCISE NOMADIC ELEPHANT

*The 17th edition of the India-Mongolia Joint Military Exercise NOMADIC ELEPHANT recently concluded at Ulaanbaatar, Mongolia.*

• **Participants** – The *Indian Army* contingent comprised 45 personnel, primarily from a battalion of the ARUNACHAL SCOUTS.
• They actively participated in the two-week-long joint exercise alongside the *Mongolian Armed Forces*.
• **Training Objective** – The primary focus was to *enhance interoperability between the two armies*.
• They trained as a combined task force for semi-conventional scenarios in semi-urban and mountainous terrain under a United Nations mandate.
• **Strategic Importance** – The conduct of EXERCISE NOMADIC ELEPHANT marks a significant milestone in India’s expanding defence diplomacy.
• It underscores the strategic importance of India's partnership with Mongolia in the defence sector.

## Multinational Exercise Khaan Quest

*The Indian Army contingent arrived in Ulaanbaatar, Mongolia, on June 11, 2025, to participate in the multinational military exercise Khaan Quest.*

• **Khaan Quest** – Began in 2003 as a bilateral initiative between the United States and the Mongolian Armed Forces.
• It evolved into a multinational peacekeeping endeavour from 2006 onwards.
• The current edition marks its 22nd iteration.
• **Aim & Scope** – The exercise aims to prepare participating armed forces for peacekeeping operations in a multinational setting.
• Its core focus is increasing interoperability and military readiness in peace support operations under Chapter VII of the United Nations Charter.
• **Tactical Drills** – The drills will include establishing static and mobile checkpoints, cordon and search operations, and patrolling.
• Other key activities involve evacuation of civilians from hostile areas, counter-improvised explosive device (IED) drills, combat first aid, and casualty evacuation.

# Science

**Novavax's COVID-Flu Combo Vaccine**

*Novavax has recently announced its experimental COVID-19-influenza combination vaccine and standalone flu vaccine in older adults.*

• **Vaccine Technology** – The Novavax vaccines *are protein-based vaccines*, a traditional technology.
• They *use purified viral proteins*, offering an alternative to newer mRNA vaccines. This is relevant for Science & Technology.
• **Trial Findings** – Trial data showed a *strong immune response*, comparable to existing approved vaccines.
• This indicates the vaccine's potential efficacy.
• Both vaccine candidates were well-tolerated with no new safety concerns.
• This is crucial for widespread acceptance and regulatory approval processes.
• **Regulatory Pathway** – Current data will show the design of future late-stage studies.
• This highlights the multi-phase process of vaccine development and approval, a key aspect of Government Policies.
• **Public Health Impact** – A combined COVID-flu vaccine could simplify vaccination campaigns and improve compliance.
• This would enhance protection against two major respiratory diseases, easing healthcare burdens.
• **Commercial Strategy** – Novavax is focusing on partnerships for further development and commercialization.
• This demonstrates the role of collaborations in pharmaceutical innovation and access to medicines.

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