# UPSC Daily Current Affairs| Prelimbits 05-08-2025

## First Private Test facility for heavy water

***Prelims –*** *Current events of National and International Importance | General Science*

## Why in News?

*Recently, India's 1st private test facility for heavy water upgrade opened.*

- **Pressurized Heavy Water Reactor (PHWR)** – It is a ***type of nuclear reactor*** that uses heavy water (deuterium oxide) as both a coolant and moderator.
- This design allows the reactor to utilize natural uranium as fuel, without the need for expensive fuel enrichment facilities.
- The heavy water is kept under pressure to prevent boiling, allowing for higher operating temperatures.
- D2O needs to be 99.9% pure for working efficiently.
- But with time, it gets contaminated with light or regular water, requiring the depleted D2O to be upgraded back to 99.9% using a distillation process.
- **Test facility done by -** TEMA India, a Mumbai-based private company.
    - **BARC –** Previously testing was done by the country's main nuclear research, Bhabha Atomic Research Centre (BARC).
- **Technology transfer –** BARC has transferred the indigenous technology to TEMA to build the vacuum distillations columns for upgradation of depleted heavy water.
- TEMA India will manufacture the components required for the distillation process and also test them to ensure they produce the right results.
- **1st Deployment** - The first batch of tested distillation column sections for deployment at Unit 8 of the Rawatbhata Nuclear Power Plant (RAPP-8) in Rajasthan.
- The company will also manufacture and test distillation equipment for the upcoming 4 nuclear reactors at *Gorakhpur in Haryana* and two at *Kaiga in Karnataka.*
- **India's nuclear Goals** - India has a goal to achieve 100 GW of installed nuclear energy capacity by 2047.
- To achieve 22.4 GW of installed capacity by 2032.
- The government launched *Nuclear Energy Mission* to develop Small Modular Reactors.

*There are 24 nuclear reactors operational in India, with an installed capacity of 8,780 MW.*

**Reference**

Heavy water | Test facility for Heavy water

## Naval prowess of Rajendra Chola I

***Prelims*** **-** *Current events of national and international importance | History of India*

### Why in news?

*Recently, PM visited Gangaikonda cholapuram released a Commemorative coin marking 1000 years of Rajendra chola I's Gangetic expedition.*

> ***The Cholas*** *($9^{th}$ and $13^{th}$ centuries CE) were one of the 3 major Tamil dynasties, along with the Cheras and Pandiyas.*

- **Rajendra chola I (1014 – 1044 AD)** – He was one of the most powerful Emperor of chola dynasty succeeded his father Rajaraja chola I.
- He pioneered India's first overseas military campaigns, spreading Chola dominance across South and Southeast Asia.
- **Art & Artichecture –** He Built a temple dedicated to lord shiva which named as ***Gangaikonda cholisvarar.***
- He shifted his capital from Thanjavur to the newly founded city of Gangaikondacholapuram.
- Inscriptions bearing the title **Tirumanni Valara,** linked to Rajendra Chola, were discovered near Polonnaruwa in Sri Lanka.
- The presence of temples built in Tamil Chola architectural style and dedicated to gods like Shiva, Vishnu further illustrates the strong Chola influence in the region.
- **Administration -** One of the defining features of the Chola dynasty during his reign was the *encouragement of Local self-governance.*
- **Military Expedition –** He had control over the Chera and Pandya territories.
- He defeated Jayasimha II of the Western Chalukyas, establishing the Tungabhadra River as the northern boundary of his empire.
- **Conquest of Pala Dynasty –** He defeated Mahipala of pala dynasty.
- In order to commemorate his victory over the pala king, he assumed the ***title of Gangaikonda*** and founded the city of Gangaikonda Cholapuram.
- **Naval Expedition –** Rajendra chola has the existence of a well-organised fleet of ships and boats of various grades in Chola's navy, serving both commercial and military purposes.
- **Campaign against Elamandalam (Srilanka) –** Rajendra Chola launched a naval campaign against the Sinhalese ruler *Mahinda V* and emerged victorious in the year 1017.
- **Southeast Asia campaign –** He extended his influence over south and southeast Asia.
- In 1025 CE, he led a naval expedition against the kadaram (Srivijaya Empire)

Sangrama Vijayottungavarman and securing control over trade through the Malacca Strait.
- Inscriptions on the *Tiruvalangadu copper plates* mentioned the conquest of Kadaram.

*The Karandai copper plates mention that the King of Kambhoja sent a victorious war chariot to Rajendra Chola as a gesture of friendship.*

- **Reign Extension** - Across India, Maldives, Burma, Thailand, Indonesia, Cambodia and Malaysia.
- **Titles – Mudikonda** chola (Crowned chola), Pandita cholan (Scholarly chola) Gangaikondan (conqueror of the Ganges), Kadaram kondan (Conqueror of kadaram).

**Reference**

The Hindu | Tracing the naval prowess of Rajendra Chola I

## Need for Conservation of Hoolock Gibbons

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

### Why in News?

*Addressing 30th Congress of the International Primatological Society (IPS) at Antananarivo in Madagascar, Indian representative underscored the urgency of a national-level Project Gibbon, noting its severe habitat loss.*

- **Issue** – Cases of local extinction have already been observed in fragmented forest patches of the northeast
- **Action plan Modelled on -** Project Tiger or Project Elephant.
- **Aim** - To promote the western hoolock gibbon as a flagship species to generate broader public and policy support for effective conservation.
- **Conservation actions** – This including the restoration of degraded habitats, creation of ecological corridors.
    - Scientific research
    - Capacity building for forest staff
    - Community engagement.

### Hoolock Gibbons

• Hoolock Gibbon is ***India's only ape species.***
• It is also known as '**Hoolocks or White browed Gibbons**' and *2nd largest of the Gibbon species*.
• It is among the of the world's 25 most endangered primates from Asia.
• **Family** – Hylobatidae.
• **Physical attributes** – Size 60 to 90 cm weigh 6 to 9 kg.
• **Diet** – Mainly of fruits, insects and leaves.
• **Behaviour** – Live together in *monogamous* pairs, *stake out a territory.*
- Calls serve to locate family members and ward off other gibbons from their territory.
• **Geographical distribution** – Extending from Assam to Myanmar, some populations (in each case few hundred animals), also in the eastern Bangladesh and in southwest China.
- **In India** - Restricted to the southern bank of the Brahmaputra River and east of the Dibang River across 7 northeastern States – Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, and Tripura.
• ***Diurnal and arboreal*** (living in tress), brachiating through the trees with their long arms.

- **Causes for habitat loss** – Encroachment,
  - Unregulated resource extraction
  - Infrastructure development
  - Tea plantations, shifting cultivation
  - Fragmentation, hunting, and the illegal wildlife trade.
- **Conservation status**
  - **IUCN** – Endangered
  - **WPA, 1972 -** Schedule 1.

***Quick facts***

**Other species**

- Banka slow loris (*Nycticebus bancanus*),
- Sangihe tarsier (*Tarsius sangirensis*)
- Pig-tailed langur (*Simias concolor*)
- Myanmar snub-nosed monkey (*Rhinopithecus strykeri*)
- Tapanuli orangutan (*Pongo tapanuliensis*).

**References**


1. The Hindu| Need for Conservation of Hoolock Gibbons
2. npcb.nagaland.gov.in| Hoolock Gibbons


## CLOVES Syndrome

***Prelims:*** *Current events of national and international importance| General science*

## Why in News?

*Recently, Researchers believed that PIK3CA causes CLOVES Syndrome by mutations in a gene order.*

- **CLOVES Syndrome –** Congenital, Lipomatous, Overgrowth, Vascular malformations, Epidermal nevi and Spinal/skeletal anomalies/Scoliosis.
- It is a ***rare overgrowth genetic disorder*** caused by mutations in a gene as a part of a larger group of similar disorders called PIK3CA-related overgrowth spectrum or PROS.
- This gene makes one of the proteins in an enzyme called PI3K.
- Mutations in the PIK3CA gene may cause the PI3K enzyme to become overactive, which may cause cancer cells to grow.
- These found in many types of cancer, including cancers of the breast, lung, ovary, stomach, brain, colon, and rectum.
- **1st discovered –** 1867.
- **Risk factors –** PIK3CA gene are believed to occur spontaneously in the womb.
- It is not hereditary and cannot be passed on. At present, there are no known risk factors.
- Mutations in the gene result in two sets of cells in the body (one set with the mutation and one set without) and the mutated cells lead to the formation of abnormal tissue.
- **Vulnerables -** It affects males and females equally regardless of their race or ethnicity.
- **Symptoms –** Babies are born with this condition, can range from mild to severe and may vary from child to child include:
    - Soft masses of fatty tissue on the abdomen, back, sides and buttocks.
    - Vascular or blood vessel anomalies such as dilated veins that may be seen in the chest, arms and legs and that may pose a risk of blood clots.
    - Large and wide hands or feet, with large gaps between fingers and toes, 'port wine stain' birthmarks.
    - Spinal problems such as scoliosis or a tethered cord.
    - Kidney problems, skin abnormalities such as raised bumps, and sometimes, intestinal problems and asymmetry in growth.
- **Diagnoses –** A detailed physical examination, medical history and through various imaging tests such as MRIs, CT scans, ultrasounds and X-rays.
- A confirmation of the diagnosis can be made with *molecular genetic testing for the mutation.*
- **Treatments –** There is no cure as yet, usually involves a multidisciplinary team of specialists.
- **Scenario in India -** A few cases of CLOVES syndrome have been documented in India.

**Reference**

The Hindu| CLOVES Syndrome

## One Liners 04-08-2025

### International Relations and Issues

**Chalo India Initiative**

*Global Diaspora Campaign encourages its non-Indian friends to visit India, every year.*

• **Launched in –** 2024.
• **Launched by –** Ministry of Tourism.
• **Objective –** To increase India's share in the global tourism market.
• To promote the tourist destinations and products of the India, including the lesser-known destinations and cultural heritage sites.

### Economy

**Saksham Niveshak**

• It is a 100-day national drive campaign to create *awareness about unclaimed dividends held by companies*.
• **Launched by** – The Investor Education and Protection Fund Authority (IEPFA).
• **Nodal ministry –** Ministry of Corporate Affairs.
• **Objectives –** Facilitate the resolution of cases.
• Support KYC and nomination updates for shareholders.
• Ensure direct dividend payouts from companies to the investors.

**The Investor Education & Protection Fund Authority (IEPFA)**

• **Established in –** 2016, under Companies Act, 2013.
• **Nodal ministry –** Ministry of Corporate Affairs.
• **Aim –** To promote financial literacy and to *protect unclaimed dividends and shares* across the country.
• **Role –** It *administers Investor Education Protection Fund (IEPF),* make refunds of shares, unclaimed dividends, matured deposits/debentures etc.
• **Initiatives –** Niveshak Didi, Niveshak Panchayat, and Niveshak Shivir.

### Environment

**Global Tiger Day 2o25**

*Global Tiger Day, also known as International Tiger Day.*

• **Celebrated on –** *July 29,* which began *since 2010* at the Saint Petersburg Tiger Summit in Russia.
• **Objectives –** To *prevent tiger extinction* and to *promote habitat recovery of tigers.*
• **2025 theme –** It is not yet released.
• **Past taglines** – "Roar for Tigers" and "Save Tigers, Save Forests, Save Life."
• **Significances of tiger –** They regulate food chains and maintain forest ecosystems.

**Pradhan Mantri Matsya Sampada Yojana**

• It is a scheme to bring about Blue Revolution through sustainable and responsible development of fisheries sector in India.
• **Aim –** To modernize and strengthen the value chain.
• To establish a robust fisheries management framework.
• To ensure the socio-economic welfare of fishers and fish farmers.
• **Implemented by –** Department of Fisheries under Ministry of Fisheries, Animal Husbandry and Dairying.
• **Implemented in –** All the States and Union Territories.
• **Period –** *5 years* from FY 2020-21 to FY 2024-25.
• **Finance –** Rs. 20, 050 crores.

## Fishing Regulations

• 'Fisheries' is a **State Subject.**
• **Fishing licenses –** Marine Fishing Regulation Acts (MFRAs).
• **Registration of vessels –** Merchant Shipping Act, 1958.
• **ReALCraft –** It is web enabled application which delivers online services for Vessel Registration and Fishing License
• **Prohibited fishing methods –** Bull or paired trawling and use of artificial light or LED light for fishing in the EEZ of India.
• **Turtle excluder devices (TEDs) –** It endorses sea turtle conservation by addressing interactions between sea turtles and trawl fishing gear.
• **Implementation of TED under –** PMMSY scheme with 100% financial assistance (60% Central + 40% State).

# Security

## *SIMBEX-25*

*Indian Naval Ship Satpura has arrived at Singapore to participate in the 32nd edition of the SIMBEX.*

• **SIMBEX** – Singapore-India Maritime Bilateral Exercise.
• This exercise of consists of harbour and sea phase.
• **Harbour phase –** Subject Matter Expert Exchanges (SMEEs), professional interactions, and operational-level discussions.
• **Sea phase –** Advanced naval operations.
  - Air defence exercises & Cross-deck helicopter operations.
  - Precision targeting with surface and aerial platforms.
  - Complex manoeuvring drills visit, Board, Search, and Seizure (VBSS) operations.
• **Significance –** It aligns with India's vision of 'MAHASAGAR' and the Act East Policy

# Science

## Sarcoidosis

*It is believed to be an exaggerated response of the immune system either due to a genetic disposition or due to environmental triggers.*

• It is a *chronic inflammatory condition* that can lead to permanent scarring of the affected tissues in several organs.
• **Symptoms –** Fatigue, shortness of breath, chronic cough, skin rashes, discolouration of the nose, cheek, lips or ears.
• It *affects heart function mainly in men*, and the skin and eyes are more prominently affected in women.
• **Spread –** An *estimated 1.2 million* across the world.
• **Challenges –** Low consciousness about sarcoidosis in India results in doctors misdiagnosing it as tuberculosis.

## Drug SB431542

*Scientists from ICMR and ICAR have jointly found that the drug SB431542, an ALK5 inhibitor is highly effective against the coronavirus.*

• **SB431542 –** It is originally developed to *block TGF-β (Transforming Growth Factor-beta)* signalling and commonly used in preclinical cancer, inflammation and fibrosis.
• **Need –** The coronavirus continues to mutate, and many existing treatments like Remdesivir and monoclonal antibodies will quickly lose effectiveness.
• **Working –** It first *blocks the virus from entering human cells* by targeting the TGF-β/Smad pathway.
• It *disrupts the ability of the virus to assemble* inside cells by interfering with ORF3a-related lysosomal dysfunction.
• It also *prevents the virus from killing the infected cell* (a process called apoptosis), which helps stop the virus from escaping and spreading to other cells.
• **Testing –** It was also tested against the chicken coronavirus (Infectious Bronchitis Virus or IBV) in specific pathogen-free chicken embryos.

## Kavach 4.0

*Indian Railways has commissioned indigenous railway safety system Kavach 4.0 on the Mathura-Kota section of Delhi-Mumbai route.*

• **Kavach** – It is an *indigenously developed train safety system* for speeds up to 160 kmph.
• **Started in** – 2015, which became operational in 2018.
• **Aim –** To prevent accidents by monitoring and controlling train speeds and enhancing the safety of passengers.
• **Target –** Nationwide implementation within 6 Years.
• **Safety level –** Safety Integrity Level 4 (SIL 4), is the highest level of safety design.
• **Components –** RFID tags, Telecom towers, Loco kavach, Station kavach, Optical Fibre Cable (OFC), Signalling system.

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