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Current Affairs - 13 October 2025

INDIA-UK CONNECTIVITY AND INNOVATION CENTRE (CIC)



• It is a **strategic partnership** between India and the United Kingdom launched at India Mobile Congress 2025.

- The initiative aims to **advance digital inclusion** and shape the future of **secure, innovative, and resilient communications between the two nations.**
- It will be **implemented under the UK-India Technology Security Initiative, jointly delivered by the UK Research and Innovation (UKRI) and India's Department of Telecommunications (DoT).**
- The Centre will bring together the complementary strengths of India and the UK in **advanced connectivity, linking cutting-edge university research with lab testing, field trials** and pathways for market deployment.

Over the next four years, a critical phase for shaping the technological and commercial contours of 6G – the Centre will focus on **three strategic areas:**

- **Transforming Telecom with AI:** Using advanced artificial intelligence tools to optimise networks, enhance efficiency, and enable new digital services.
- **Non-Terrestrial Networks (NTNs):** Developing **satellite and airborne systems** to deliver high-speed, reliable connectivity to rural and remote regions.
- **Telecoms Cybersecurity:** Strengthening network resilience through open, interoperable, and **secure communication** systems for businesses and consumers.
- **Funding:**
 - **Both nations have jointly committed an initial £24 million (approximately ₹250 crore) over four years** to drive the initiative.
 - The funding will **support applied research through collaborations** between academic and industry partners, establishment of joint testbeds, and participation in global standards development for emerging telecommunications technologies.



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EXERCISE AUSTRAHIND



Exercise AUSTRAHIND

- It is an **annual joint military exercise** held between **India and Australia**.
 - This edition, Indian Army contingent is being led by a **Battalion of Gorkha Rifles** along with troops from other arms and services.
 - It is aimed at **enhancing military cooperation**, improving **interoperability** and providing a platform for participating armies to exchange tactics, **techniques and procedures** in the domains of sub conventional warfare in **urban/ semi urban terrain**.
 - It will focus on **joint company level operations** in **open and semi desert terrain**, wherein troops will undertake missions ranging from joint planning, tactical drills and special arms skills.
 - It will offer a valuable opportunity to hone operational capabilities, integrate emerging technologies and operate jointly in a combat environment.
 - Other Exercises between India and Australia are **AUSINDEX, and PITCHBLACK**.
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MAITRI II STATION



MAITRI II STATION

- It is India's **newest research station** proposed to **come up in eastern Antarctica**.
 - It will be **larger than Maitri I**, with plans to design it as a green research base.
 - The proposal includes using **renewable energy sources** — solar power for summer expeditions and wind energy to harness the strong Antarctic winds — to run the station's operations.
 - It is planned to **deploy automated instruments** onboard Maitri II which will keep recording data and relay it to mainland India, even if the station **remains unmanned for some period**.
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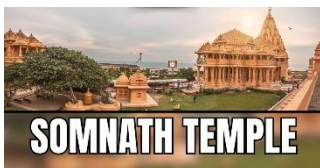
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- The construction of the research station is expected to be **completed by January 2029**.
- **Nodal Agency: National Centre for Polar and Ocean Research (NCPOR)** under the Ministry of Earth Sciences (MoES) is the nodal agency responsible for operating and organising missions to Antarctica and the Arctic.

Key Facts about Maitri Station

- It has been hosting **researchers since 1989**, and is located along the **Schirmacher Oasis**, a 20 km-long ice-free **landmass in East Antarctica**.
- It comprises the main building, a **fuel farm**, a **fuel station**, a **lake water pump house**, a summer camp, and several smaller containerised modules.
- Maitri can **accommodate between 25 and 40 scientists**, depending on mission requirements and season.
- **India's other research base in Antarctica: Dakshin Gangotri** (first base in Antarctica), operated for a few years. **Bharati** which is operational since 2012.

SOMNATH TEMPLE



SOMNATH TEMPLE

- It is a **Hindu temple** dedicated to **Lord Shiva**.
- It is located in Prabhas Patan near Veraval in **Saurashtra** on the **western coast of Gujarat**.
- It is the **first of the 12 jyotirlinga shrines** in India that are regarded as the manifestation of the Lord Shiva Himself.
- The site of Somnath has been a pilgrimage site from ancient times on account of being a **Triveni Sangam**: the **confluence of three rivers, namely Kapila, Hiran, and Saraswati**.
- The ancient temple's timeline can be **traced from 649 BC** but is believed to be older than that.



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- The temple was **reconstructed several times** in the past after repeated destruction by multiple Muslim invaders and rulers, notably starting with an attack by Mahmud Ghazni in the 11th century.
 - The **present temple** was reconstructed in the Chalukya style of Hindu temple architecture and **completed in May 1951**.
 - The reconstruction was **completed by Vallabhbhai Patel**.
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SUNDARBANS NATIONAL PARK



- **Location:** It is located in the southeastern region of **West Bengal, near Kolkata**, and forms part of the Gangetic Delta.
 - It is part of the **larger Sundarbans mangrove forest**, one of the largest in the world.
 - It was established in 1973 under **India's Project Tiger initiative** to protect the endangered Royal Bengal Tiger.
 - It was designated as a **World Heritage Site by UNESCO in 1987** for its natural ecosystem and tiger habitat.
 - It was declared as a **Biosphere Reserve in 1989** by the Government of India.
 - In 2001, it was included in the **UNESCO World Network of Biosphere Reserves** for its role in biodiversity conservation and sustainable development.
 - In 2019, the Sundarbans Wetland was **recognized as a Ramsar Site**, adding its importance for migratory birds and environmental sustainability.
 - **Rivers:** The Sundarbans delta is formed by the coming together of three rivers, **Ganga, Brahmaputra and Meghna**.
 - **Flora:** Some of the common species of plants which are found include Sundari tree, Golpati, Champa, Dhundul, Genwa and Hatal.
 - **Fauna:** Royal Bengal Tiger, **fishing cats**, macaques, leopard cats, Indian grey mongoose, wild boar, **flying fox, pangolin**, and Indian grey mongoose.
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INDIA'S QUANTUM LEAP IN DIGITAL SECURITY

In a major advancement for cybersecurity, researchers at Bengaluru's Raman Research Institute have successfully developed and certified a quantum-based method for generating true random numbers.

Using a general-purpose quantum computer, the team experimentally demonstrated authentic randomness, a crucial element for creating unhackable encryption systems.

This marks the first time such a technique is ready for real-world deployment, potentially laying the foundation for next-generation, hack-proof digital security.

Random Numbers in the Quantum Computing Era

- Random numbers are the foundation of modern digital security, forming the basis for encryption keys, passwords, and authentication systems.
- Their strength lies in being completely unpredictable, ensuring data remains secure from hacking attempts.
- **Pseudorandom Numbers and Their Limits**
 - Currently, most systems use pseudorandom numbers — numbers generated through computer algorithms that only simulate randomness.
 - While these are nearly impossible to predict without knowing the algorithm and input seed, they are not truly random.
 - These pseudorandom systems are sufficiently secure for now; even with brute-force attacks, traditional computers would take centuries to break their encryption.
 - However, the **emergence of quantum computers**, which exploit quantum properties like superposition and entanglement, **poses new vulnerabilities to current encryption systems**.
 - Quantum computers can process data exponentially faster, potentially decoding existing cryptographic protections that rely on pseudo-randomness.



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Randomness in Nature and Its Role in Quantum Security

- Unlike algorithmic generation, **true randomness** exists in **natural phenomena** such as **radioactive decay**, **weather fluctuations**, and especially **quantum behaviour** of microscopic particles.
- **How Quantum Random Number Generators Work?**
 - A Quantum Random Number Generator (QRNG) uses this unpredictability.
 - For instance, when a stream of photons is measured for a specific property, outcomes are assigned as 0 or 1, creating a truly random binary sequence.
 - However, if the device is biased or faulty, the randomness can be compromised — introducing vulnerabilities that can be exploited by hackers.
- **The Challenge of Certification**
 - Even with quantum systems, verifying that numbers are **genuinely random** is difficult.
 - This **problem of certification** arises because external interference or internal defects can mimic randomness, making **authenticity uncertain**.
 - Thus, the aim is not merely to make systems hard to hack, but to make hacking theoretically impossible under known physical laws — a goal that quantum-certified randomness seeks to achieve.

Global Significance and Future Potential

- The current achievement represents the first major globally relevant output from **India's National Quantum Mission**, aligning perfectly with its goals of advancing quantum technologies.
 - While still in the laboratory stage, the method could evolve into a commercial-grade system for hack-proof digital security with further support from government and private funding.
 - This marks a transformative step in quantum cryptography and cybersecurity, positioning India among global leaders in quantum technology innovation.
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INDIA'S ETHANOL REVOLUTION DRIVEN BY GRAINS

- India's **ethanol blending programme (EBP)**, launched to reduce crude oil imports and support sugarcane farmers, has undergone a remarkable transformation.
- Initially conceived to enable sugar mills to generate additional revenue and make timely payments to cane growers, the programme has evolved into a **multi-feedstock ethanol industry** powered largely by grains, especially **maize and rice**.
- This shift marks a major structural change in India's biofuel policy. What began as a sugarcane-linked project is now driven by **grain-based distilleries**.

Sugarcane as the Foundation

- Ethanol production in India began through the **fermentation of sucrose** from molasses, a by-product of sugarcane processing.
- Until 2017-18, sugar mills mainly used **C-heavy molasses**, the final by-product of sugar extraction.

The Shift from Sugar to Grain

- Starting from the **2018-19 fiscal year**, the government allowed ethanol production from grains such as **maize, rice, and damaged foodgrains**, setting differential ex-distillery prices for each.
- Initially, this was meant to help sugar mills operate their distilleries year-round by using grains during the **off-season (May-October)**.
- However, with attractive pricing and flexible feedstock regulations, **standalone grain-based ethanol plants** began proliferating across India, particularly in **Punjab, Haryana, Bihar, Andhra Pradesh, Madhya Pradesh, Maharashtra, Karnataka, Rajasthan, and Chhattisgarh**.
- By **2023-24**, this transition became strikingly visible. Out of the **672.49 crore litres** of ethanol supplied to OMCs, only **270.27 crore litres (40.2%)** came from sugarcane-based sources, while **402.22 crore litres (59.8%)** were grain-based, mostly maize and broken rice.



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Maize Becomes the Mainstay

- The current **2024-25 ethanol supply year** reflects the dominance of grains. Out of the **920 crore litres** likely to be procured, about **620 crore litres** are expected to come from grain-based sources, with **maize contributing nearly 420 crore litres**.
- Two main factors explain this shift:
- **Reduced Sugarcane Availability:** Droughts in 2023-24 and 2024-25 hit sugarcane production, prompting the government to restrict ethanol derived from cane juice and B-heavy molasses to safeguard sugar supplies for domestic consumption.
- **Pricing Advantage:** Ethanol from maize fetches **Rs. 71.86 per litre**, compared to Rs. 57.97 from C-heavy molasses, Rs. 60.73 from B-heavy, and Rs. 65.61 from cane juice/syrup. This made **maize ethanol more lucrative** for distillers.

Challenges and Sustainability Concerns

- **Excess Production Capacity**
 - With ethanol demand capped by blending limits (20% being the technical ceiling for current vehicles), the sector faces a looming **oversupply risk**. Balancing production capacity and consumption will require strategic planning to avoid price distortions.
 - **The Food vs. Fuel Debate**
 - India's ethanol policy now faces the global dilemma of diverting **food grains for fuel**. Producing 420 crore litres of ethanol from maize consumes about **11 million tonnes of grain**, roughly **26% of India's total maize output (42 mt)**.
 - Since maize is a critical input for **poultry, dairy, and livestock feed**, rising ethanol demand could pressure feed costs and food inflation.
 - **Environmental Considerations**
 - While ethanol is a cleaner-burning fuel that reduces greenhouse gas emissions, **large-scale grain diversion** raises sustainability concerns related to **water use, land allocation, and fertiliser intensity**, particularly in maize cultivation.
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IUCN'S WORLD COMMISSION ON PROTECTED AREAS



- It is **one of six technical commissions** of the International Union for Conservation of Nature (IUCN).
- It was **established in 1948** as a global network dedicated to the **conservation of nature and the sustainable use of natural resources**.
- **Functions:** It specialises in **protected area governance**, management, and policy, supporting the creation and effective management of protected areas globally, **including national parks, reserves, and marine protected areas**.

Key Facts about Kenton R. Miller Award:

- It was **established in 2006**.
 - It is presented **every two years** by the IUCN-WCPA for **Innovation in National Parks and Protected Area**
 - It was named after a former Director General of the IUCN.
 - The award recognises **individuals or teams** whose innovations in planning, management, finance, governance, monitoring, capacity building, and communication have a significant impact and peer recognition without prior international awards.
 - The Kenton Miller Award comes with a US **\$5,000 cash prize**.
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