

Current Affairs 28th July 2025 by Right IAS

Napne Waterfall

Napne Waterfall, also known as Sherpe-Napne Waterfall, is a beautiful, perennial waterfall located in the Konkan region of Maharashtra, India.

Maharashtra's first glass bridge has been built over Napne Waterfall, offering visitors a thrilling and immersive experience. This transparent bridge allows you to walk directly over the gushing water and enjoy panoramic views of the waterfall and the surrounding valley

The Hindu

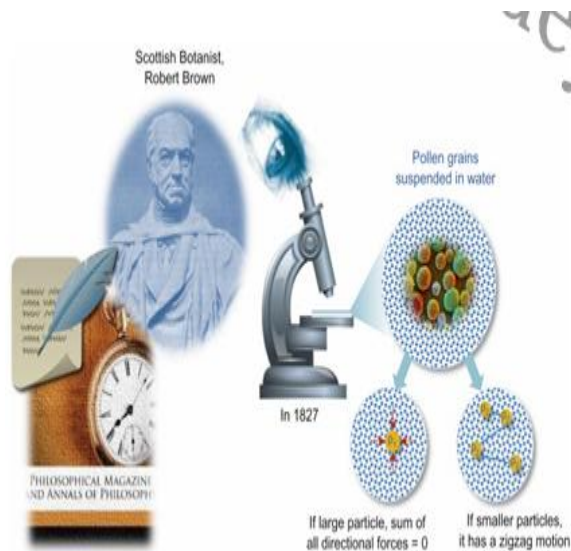
Brownian Motion and Einstein

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Mechanism and Technology In 1905, Albert Einstein explained Brownian motion, the random movement of small particles in a fluid due to collisions with surrounding molecules. This explanation was one of four groundbreaking papers in his annus mirabilis (miraculous year). Over a century later, scientists at the California Institute of Technology (Caltech) have achieved a technological breakthrough by developing a non-invasive imaging system that can record molecular motion in real-time at an unprecedented scale—down to Uses ultrashort laser pulses to illuminate the sample in a cuvette. Digital micromirror

device (DMD): Shapes the laser light beam. Works like assembling a jigsaw puzzle from a few pieces. Streak camera: Converts light photons to electrons. Captures streak patterns indicating pulse duration, revealing molecular size. Achieved imaging speeds of hundreds of billions of frames/seconds. Applications and Future Impact This new imaging method is expected to revolutionize various fields: Biomedical Research: Studying molecular interactions and disease mechanisms. Early Disease Detection: Observing changes in biomolecular structures. Drug Development: Monitoring drug delivery and molecular responses in real-time. Material Science: Designing and testing nanomaterials. Combustion and Atmospheric Science: Understanding particle behavior in gas environments.

tens of angstroms (1 angstrom = 0.1 nanometer). The research was published in the journal Nature Communications and co-led by Yogeshwar Nath Mishra, formerly of Caltech and currently at IIT-Jodhpur.

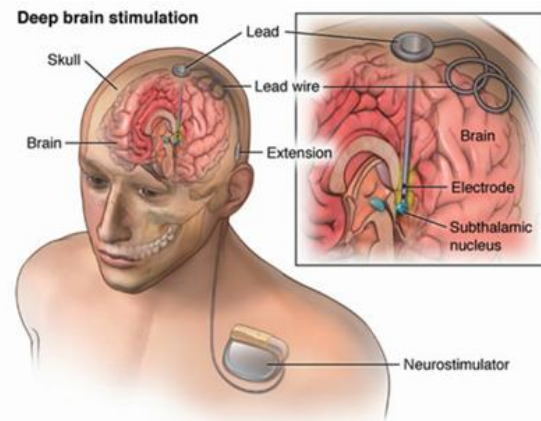


Deep-Brain Stimulation (DBS)

What is DBS?

Deep-Brain Stimulation (DBS) is a neurosurgical procedure where electrodes are implanted into specific regions of the brain. These electrodes are connected via wires to a neurostimulator (like a pacemaker), typically placed under the skin in the upper chest. DBS modifies neuronal communication, especially where faulty electrical signalling exists. Though the full mechanisms remain unclear, it appears to work at both cellular and network levels. How It Works: The device delivers controlled, mild electrical impulses to brain areas responsible for abnormal activity. It modulates brain circuits, helping restore balance and reduce symptoms. DBS does not destroy brain tissue, and its effects are reversible—stimulation stops when the device is turned off. Medical Uses: Most commonly used to treat movement disorders, especially: Parkinson's disease, Essential tremor, Dystonia. Also approved for obsessive compulsive disorder (OCD). Being researched for severe depression,

epilepsy, and other psychiatric/neuro disorders



Humboldt penguins (*Spheniscus humboldti*)

Humboldt penguins (*Spheniscus humboldti*) are a medium-sized penguin species inhabiting the coasts of Peru and Chile in South America. They are named after the cold Humboldt Current that flows through their habitat.

Conservation status and threats The Humboldt penguin is currently listed as Vulnerable on the IUCN Red List of Threatened Species. Their population has been declining since the 19th century.

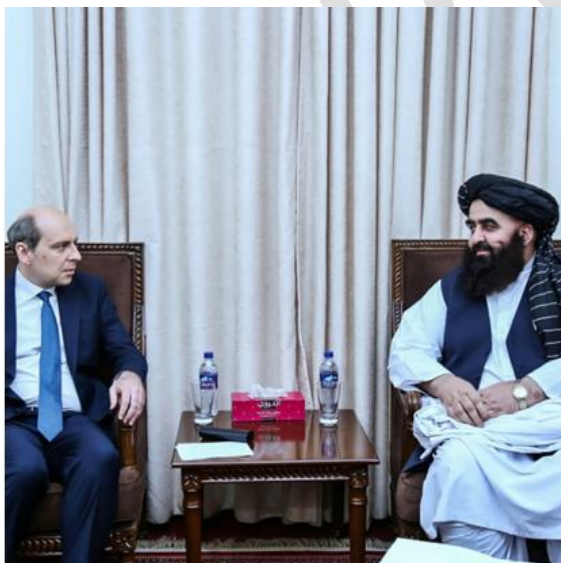
Major threats include: Overfishing: Commercial fishing of their primary prey species, like anchovies, reduces their food availability. Habitat destruction: The harvesting of guano (bird droppings) for fertilizer destroys their nesting sites. Climate Change & El Niño events: These events can disrupt the Humboldt Current. Habitat: Humboldt penguins prefer rocky coastlines and islands within the influence of the Humboldt Current. They create nests in burrows, often in guano deposits, and sometimes in caves or among rocks and boulders.

Diet: They are carnivorous and primarily feed on pelagic schooling fish such as anchovies, herring, and pilchards. They also consume squid and crustaceans. **Behavior:** Humboldt penguins are highly social birds, forming colonies that can range from a few dozen to thousands of individuals. They are mostly monogamous, nesting in the same location year after year leading to food shortages and impacting breeding success. **Entanglement in fishing nets:** Humboldt penguins can drown when they get caught in fishing nets.

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Russia's Recognition of the Taliban Government (IEA)

The Announcement (July 3, 2025) Russia officially recognised the Islamic Emirate of Afghanistan (IEA) by accrediting the Taliban's ambassador to Moscow, Gul Hassan. The Afghan Embassy in Moscow now flies the IEA flag, symbolising full diplomatic ties.



A Shift from the Past 1996–2001 (First Taliban regime): Russia did not recognise the Taliban government. Taliban supported

Chechen separatism, even recognizing the Chechen Republic of Ichkeria. Taliban trained an estimated 2,500 Chechen militants. Russia considered preventive strikes against Taliban camps.

Russia supported the Northern Alliance and participated in UN sanctions. It provided logistical support to the U.S.-led Operation Enduring Freedom (post 9/11). In 2003, the Taliban were declared a terrorist group under Russian law. **Changing Strategy (2010s–2020s)** As U.S. efforts in Afghanistan faltered, Russia: Opened unofficial contacts with the Taliban. Worked with Pakistan to safeguard security interests. Focused on fighting IS-K (Islamic State Khorasan Province) and drug trafficking.

Moscow Format and intra-Afghan talks began, with Taliban participation, despite being outlawed. **Post-2021 Developments** Following the Taliban's 2021 return to power, Russia: Kept its embassy in Kabul open, unlike most other countries. Built good rapport with the Taliban leadership. Faced security setbacks, such as: Attack on Russian Embassy in Kabul (2022) Crocus City Hall attack in Moscow (2024) — blamed on IS-K **Legal and Symbolic Aspects of Recognition** Russia now considers the Taliban an "objective reality" and partners in counter terrorism. In April 2025, Russia suspended the ban on Taliban activities. However, the Taliban are still on Russia's federal list of terrorist organisations. Recognition is symbolic and may not yield immediate benefits for Russia. Russia still hopes to make Afghanistan a trade conduit to South and Southeast Asia. **Regional Implications** Russia's recognition might

influence Central Asian nations and China to follow suit. This could create a pragmatism-over-values template, ignoring human rights or inclusivity in Taliban governance.

Impact on India: India is unlikely to be adversely affected by Russia's decision. India has informal diplomatic ties with the Taliban and converging interests on Kashmir-related terrorism. However, India continues its "engagement without recognition" strategy: Ongoing humanitarian aid, diplomatic contact, and trade. No formal recognition of the IEA.



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Citizenship and electoral rolls in India

Basic Constitutional Provisions

Only Indian citizens can be registered as voters and contest elections. Article 326: Elections are based on adult suffrage, i.e., every Indian citizen aged 18+ can vote, unless disqualified by law. Article 324: Gives the Election Commission of India (ECI) full control over the preparation of electoral rolls and conduct of elections.

1. Role of the Election Commission of India (ECI)
2. The ECI has the constitutional duty to ensure only Indian citizens are
3. listed in the electoral rolls.

The revision of electoral rolls is a continuous process—not limited to election periods. If any non-citizen is found on the roll, the ECI must remove their name.

1. Relevant Laws: Representation of the People Act, 1950
2. Section 16(1)(a): Non-citizens are disqualified from being registered as voters.
3. Section 16(2): If such a person is included by mistake, their name must be deleted.

Section 15–24: Explain how electoral rolls are prepared, revised, corrected, and how appeals can be filed against wrongful inclusion/exclusion.

Disqualification from Contesting Elections

Article 102(1)(d) and Article 191: A person is disqualified from becoming a Member of Parliament or State Legislature if they are:

- Not a citizen of India,
- Have voluntarily acquired foreign citizenship,
- Pledged allegiance to a foreign country.

Citizenship Verification: If there is a complaint or doubt, the ECI is bound to verify citizenship status. Proof must be provided under the Citizenship Act, 1955. Overseas Citizens of India (OCIs) are not entitled to voter rights under Section 7B(2) of the Citizenship Act.

Supreme Court Ruling 1. In *Dr. Yogesh Bhardwaj vs. State of U.P.* (1990), the SC ruled that: Lawful residence is required for electoral inclusion. Staying in India illegally does not count as "ordinary residence."

Aadhaar is Not Citizenship Proof

Section 9 of Aadhaar Act, 2016: Aadhaar number does not confer citizenship.

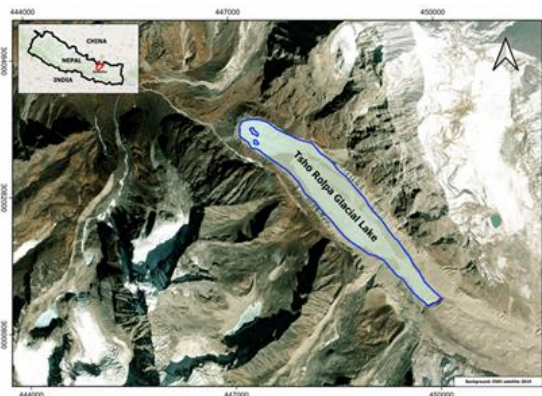
Section 3: Aadhaar is issued to any resident, not just citizens. Therefore, possession of Aadhaar alone is not enough

to claim the right to vote. Conclusion Only citizens of India are allowed to vote or contest elections. It is the ECI's constitutional and legal duty to ensure this. Aadhaar is not valid proof of citizenship. The presence of non-citizens in the electoral roll makes that part of the roll null and void.

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Glacial Lake Outburst Floods (GLOFs)

Recent GLOF Events in Nepal On July 8, 2025, a GLOF in Lende river (Tibet to Nepal) washed away a China-built friendship bridge. The flood disrupted four hydropower plants, damaging 8% of Nepal's power supply. Another GLOF occurred the same day at a moraine dammed lake in Mustang district. In the last two years, Humla and Solukhumbu districts also witnessed significant GLOFs. Historical GLOFs: Cirenma Co (Tibet, 1981) released 20 million cubic metres of water. Digi Tsho (1985) and Tama Pokhari (1998) – caused severe infrastructure damage. Types of Glacial Lakes in the Indian Himalayan Region (IHR) Supraglacial lakes: Formed in depressions on glaciers. Highly prone to melt during summer. Moraine-dammed lakes: Formed at the snout of glaciers. Dammed by loose debris or ice-cores. Vulnerable to bursting due to instability.



Triggers of GLOF Events Landslides and ice avalanches (major causes). Excess meltwater pressure on moraine dams. Earthquakes and climate induced glacial melt. 2023–24 were among the hottest years, accelerating glacier melt. GLOF Risk in India. India has ~7,500 glacial lakes, mostly above 4,500 m elevation. Limited access, short summer window, and lack of monitoring stations make risk assessment difficult. Remote sensing is the only consistent method to observe changes. Vulnerable areas include infrastructure (bridges, hydropower), livelihoods, and biodiversity. Significant GLOF Events in India Chorabari lake GLOF (Kedarnath, 2013) – combined with cloudbursts, landslides. South Lhonak lake GLOF (Sikkim, 2023) – destroyed Chungthang dam, increased Teesta riverbed silting, raising flood risks. NDMA's GLOF Risk Mitigation Strategy Shift from post-disaster relief to risk reduction. Under Committee on Disaster Risk Reduction (CoDRR), coordinated national-level efforts. Launched a \$20 million programme covering 195 high risk glacial lakes (initially 56). Plans to scale up under 16th Finance Commission (FY 2027 31).

Five Key Objectives of NDMA Programme
Hazard assessment of glacial lakes.

Automated Weather and Water Stations (AWWS) installation. Early Warning Systems (EWS) for downstream areas. Engineering solutions: draw down water, retention structures. Community engagement: ensure local involvement and trust. Technological and Scientific Measures SAR Interferometry: Detects micro-changes in slope stability. Bathymetry: Measures lake water volume. Electrical Resistivity Tomography (ERT): Detects ice-core presence in moraine dams. UAV surveys: Maps terrain and slope features. Installed real-time monitoring stations in Sikkim. Challenges Absence of real-time early warning in remote areas. Lack of Indian innovation and tech firms in cryosphere risk reduction. Need for trans-boundary cooperation, especially with China for upstream lake warnings. Expeditions face weather, altitude, and cultural sensitivities (e.g., sacred lakes). Way Forward Scale up the national GLOF programme post-2026. Expand remote monitoring and EWS. Strengthen local institutions and scientific capacity. Promote regional collaboration (India–Nepal China) for real-time data sharing and alerts.



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India's first PPP airport

Cochin International Airport Limited (CIAL), the first Indian airport set up under a public-private partnership model, is embarking on a major expansion drive focused on green energy, smart tech and integrated growth

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Marine Heatwaves Record-breaking Intensity 2023

marine heatwaves were the most extreme ever recorded. Sea-surface temperatures remained above the 90th percentile for up to 120 days. 96% of the global ocean was affected by these prolonged heatwaves. Measure of Thermal Stress A total of 53.6 billion degree Celsius-days of thermal stress were recorded. This metric combines intensity and duration of heat exposure, impacting marine ecosystems significantly. Regional Triggers 1. 2. 3. 4. North Atlantic Ocean Caused by extra sunshine and a shallow mixed layer (upper ocean). Southwest Pacific Ocean Triggered by fewer clouds and stronger ocean currents. North Pacific Ocean Due to sustained heat gain over time. Equatorial East Pacific Driven by El Niño-related Ocean currents and flows



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