DAILY CURRENT AFFAIRS 20-01-2025

GS-1

1. **Ghost island**
2. **Electrokinetic mining**

GS-3

3. **Brain Rot**
4. **Utricularia**
5. **Torres Investment Scam**

Ghost island

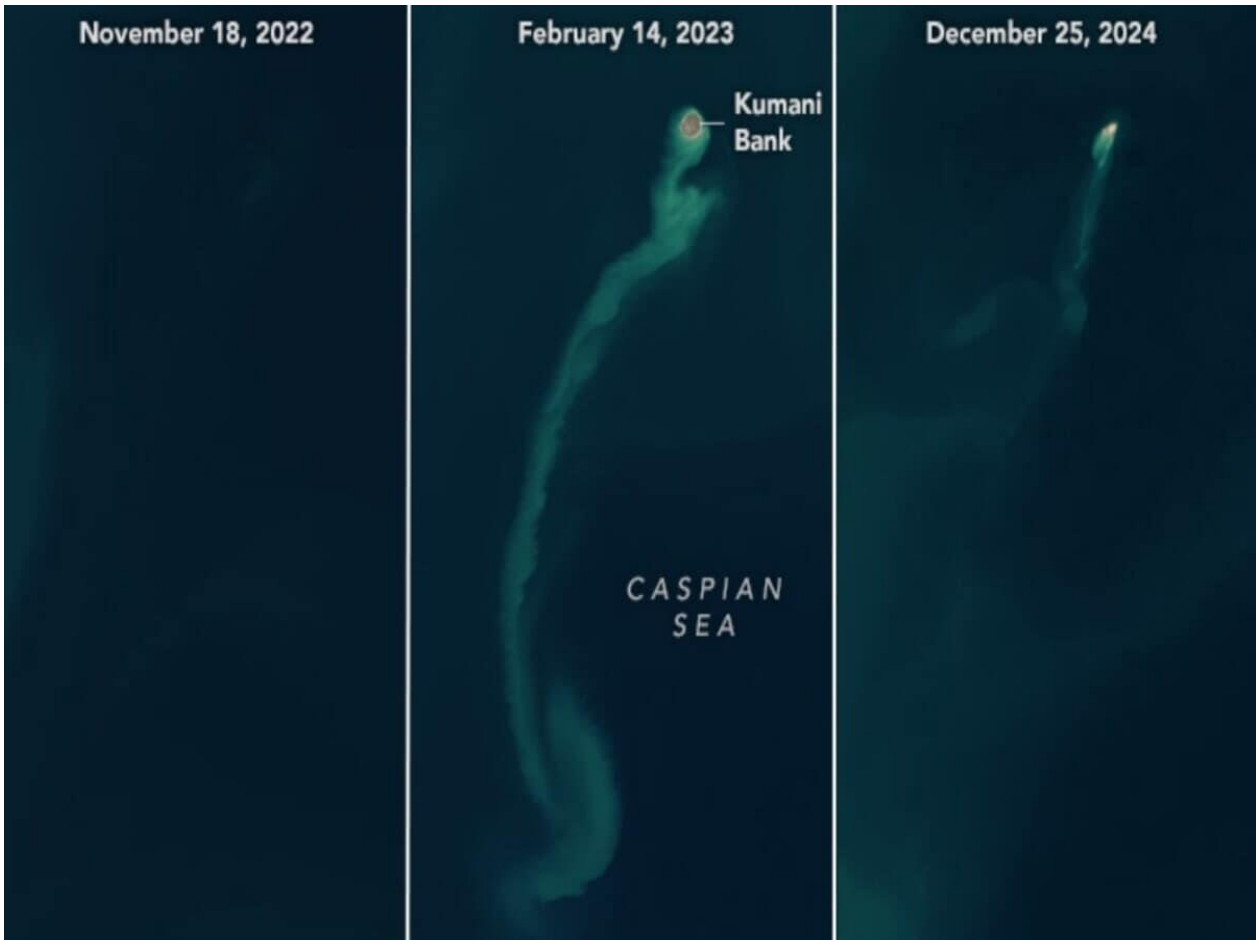
Syllabus: GS-1; Geography

Context

- ‘Ghost island’ appears and disappears in Caspian Sea

About

- The emergence and disappearance of the "ghost island" created by the Kumani Bank mud volcano in the Caspian Sea is a fascinating reminder of Earth's dynamic geological processes.



Key Highlights

1. **Formation and Dissipation:**

- The island formed between January 30 and February 4, 2023, following the eruption of the Kumani Bank mud volcano, and was approximately 400 meters (1,300 feet) across.
- By the end of 2024, the island had eroded almost entirely, leaving only a small portion of the volcano visible above the water.

2. **Historical Context:**
   - The Kumani Bank volcano has a history of producing transient islands, with eruptions dating back to 1861.
   - The most significant eruption in 1950 created a 700-meter-wide island that persisted longer than most others.
3. **Mechanism and Hazards:**
   - Mud volcanoes, driven by subsurface pressures in tectonically active regions, expel mud, sediments, and flammable gases such as methane.
   - Eruptions can result in towering flames, posing risks to surrounding areas.
4. **Scientific Significance:**
   - The study of these phenomena offers insights into Earth's tectonic and sedimentary processes.
   - Similar geological structures on Mars suggest potential parallels in planetary processes.
5. **Regional Importance:**
   - Azerbaijan, with the world's highest concentration of mud volcanoes, provides a natural laboratory for studying these enigmatic features.
6. **Global Context:**
   - Events like the Kumani Bank eruption help scientists draw comparisons between Earth and extraterrestrial environments, enhancing our understanding of planetary geology.

Broader Implications:

- The fleeting nature of such islands underscores the volatile and transient characteristics of Earth's geological features.
- Insights gained from studying these processes contribute to natural hazard assessments and planetary exploration missions, particularly in understanding the evolution of landscapes on Mars and other celestial bodies.

The Kumani Bank mud volcano and its transient islands serve as a testament to the interplay of Earth's tectonic activity, sedimentation, and surface transformations, offering a captivating glimpse into the dynamic nature of our planet.

Electrokinetic mining

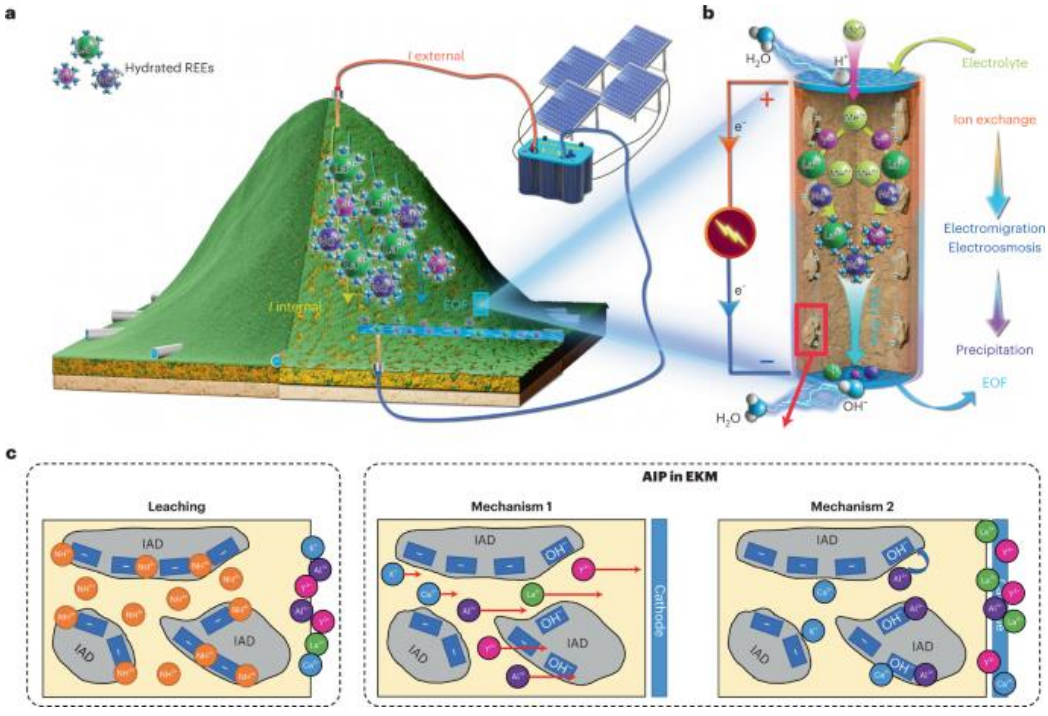
Syllabus: GS-1; Geography

Context

- A team of metallurgists and geochemists at Guangzhou Institute of Geochemistry, working with a mechanical engineer from the Chinese Academy of Sciences, has improved their previous electrokinetic mining technique by scaling it up to industrial levels.

Key Concepts

- **Definition**: It is a technique that employs electric fields to move and extract valuable metals or minerals from ores, mine tailings, or contaminated soils.
- **Mechanism**:
  - Electrodes are inserted into the material to create an electric field.
  - Ions of target metals migrate toward oppositely charged electrodes (anode or cathode) via processes like electrophoresis and electro-osmosis.
  - Metals are collected and further refined for use.



Advantages of Electrokinetic Mining

- **Eco-Friendly**:

  - Minimal use of chemicals compared to traditional mining.
  - Reduces the environmental footprint by avoiding the large-scale excavation of land.
  - Potential to remediate contaminated sites (e.g., mine tailings) while extracting valuable resources.
- **Energy-Efficient**:
  - Operates at lower energy levels compared to smelting and other intensive processes.
  - Uses renewable energy sources like solar or wind to power electric fields.
- **Cost-Effective**:
  - Can be deployed in situ (on-site), eliminating the need for costly transportation of ore.
  - Lowers the cost of tailing management and remediation.
- **Recycling Potential**:
  - Enables the recovery of rare and precious metals from waste materials or electronic waste (e-waste).
- **Reduced Water Usage**:
  - Consumes less water compared to conventional mining techniques, making it suitable for arid regions.

Applications of Electrokinetic Mining

- **Extraction of Metals**:
  - Useful for metals like copper, zinc, nickel, rare earth elements, and even gold.
- **Mine Waste Remediation**:
  - Extracts residual metals from mine tailings, reducing toxicity and environmental hazards.
- **Urban Mining**:
  - Recovery of metals from e-waste (e.g., lithium from batteries, gold from electronic devices).
- **Environmental Cleanup**:
  - Removes heavy metal contaminants from polluted soils and water bodies.

Challenges and Limitations

- **Efficiency Issues**:
  - Effectiveness decreases in materials with low conductivity.
  - Extraction rates may vary depending on the type of metal and the composition of the material.
- **Technical Constraints**:

- Requires precise control over electric field parameters.
- Electrodes may degrade over time, increasing maintenance costs.

- **High Initial Costs**:
  - Setting up electrokinetic systems requires significant upfront investment.
- **Scalability**:
  - Currently more suited for small-scale operations or niche applications rather than large-scale mining.

Way Forward

- **Research & Development**:
  - Increased funding for R&D in electrokinetic mining to make it more efficient and cost-effective.
- **Public-Private Partnerships**:
  - Collaboration between government bodies, research institutions, and private firms to pilot projects.
- **Policy Support**:
  - Include electrokinetic mining in policies promoting green technologies and sustainable resource management.
- **Awareness Campaigns**:
  - Educate stakeholders, including industries and communities, about the benefits of this technology.

Brain Rot

Syllabus: GS-3; Science & Tech

Context

- 'Brain rot' named Oxford Word of the Year 2024

About

- **Brain Rot** is a term generally used to describe the degeneration or impairment of mental faculties, often in a metaphorical or satirical context.
- However, it is not a medical term officially recognized in scientific or clinical literature.

Contextual Understanding of Brain Rot

1. **As a Metaphor in Media and Culture:**
   - Refers to the perceived negative impact of overexposure to certain media, entertainment, or online platforms on cognitive abilities or critical thinking.
   - Often linked to excessive screen time, low-quality content consumption, or addiction to social media and video games.
2. **Psychological Implications:**
   - While not a clinical diagnosis, "brain rot" might be related to phenomena such as:
     - **Digital Dementia**: A term describing the deterioration of cognitive functions due to over-reliance on digital devices.
     - **Information Overload**: The inability to process or make sense of excessive amounts of information.
     - **Attention Span Reduction**: Studies suggest that the constant barrage of notifications and distractions in the digital age reduces attention span.
3. **Public Health Concerns:**
   - In debates about mental health, it is used to highlight issues like:
     - Lack of mental stimulation leading to cognitive decline.
     - Rise in mental health disorders like anxiety, depression, or stress due to unhealthy digital habits.
4. **Neurological Considerations:**
   - Though the term is non-scientific, similar neurological issues may stem from:
     - **Neurodegenerative Diseases**: Conditions like Alzheimer's or Parkinson's that result in actual brain deterioration.
     - **Addiction and Substance Abuse**: Prolonged use of drugs or alcohol may lead to brain damage.
5. **Educational Relevance:**
   - Raises concerns about modern education systems relying heavily on digital tools and reducing focus on creative, analytical, and critical thinking.

Utricularia

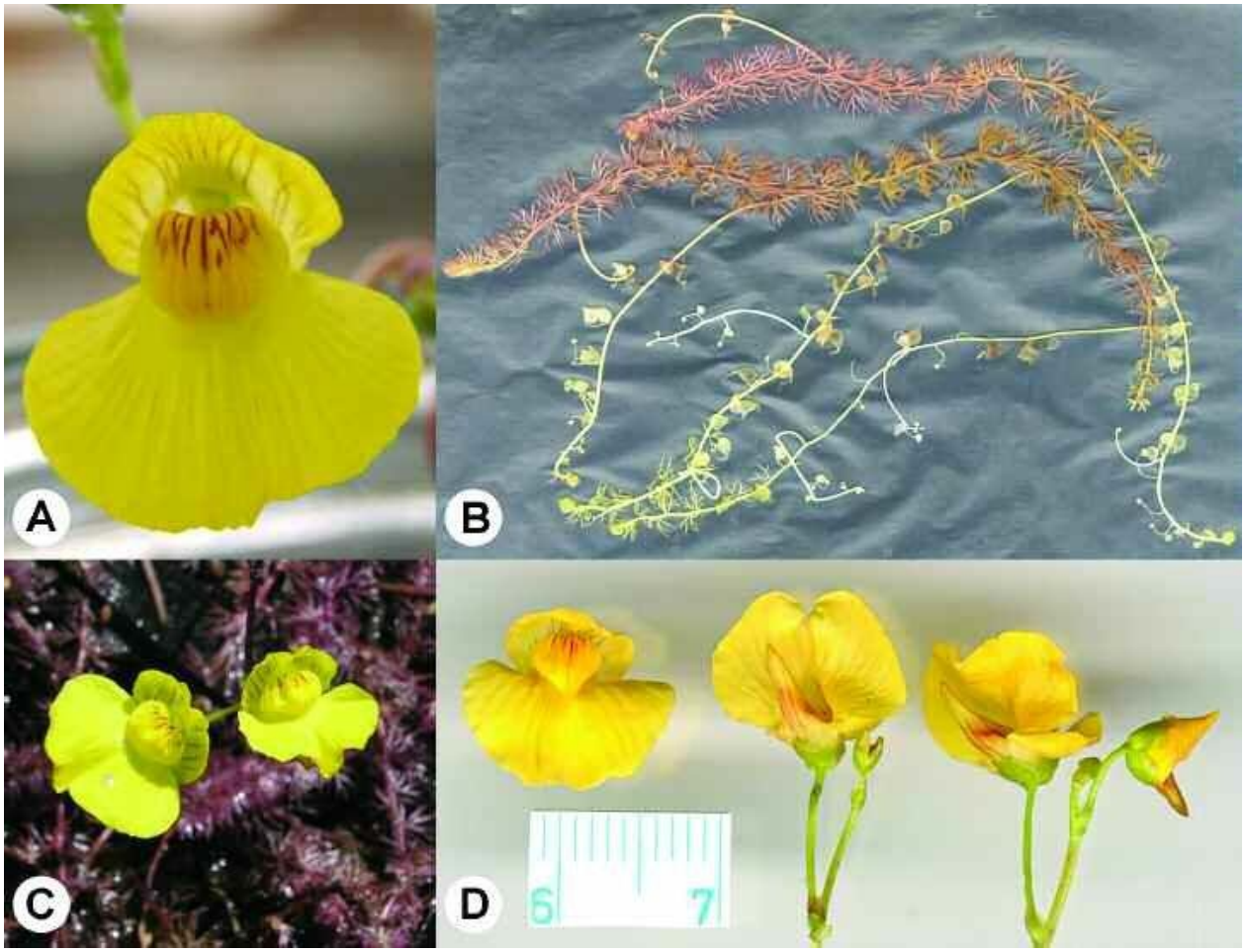
Syllabus: GS-3; Biodiversity- Plant species

Context

- Rare Carnivorous Plant Utricularia Spotted In Rajasthan's Keoladeo National Park

About

- **Utricularia** (commonly known as bladderworts) is a genus of carnivorous plants that belongs to the family **Lentibulariaceae**. They are notable for their unique and fascinating mechanism of capturing and digesting prey.



General Characteristics

- **Habitat**: Utricularia species grow in a variety of wetland habitats, including bogs, marshes, and aquatic environments. They are found across various parts of the world, with many species native to tropical and temperate regions.
- **Structure**: These plants have highly specialized bladder-like traps, which are small, sac-like structures that can suck in tiny organisms such as protozoa, small crustaceans, and insects.
- **Leaf Structure**: The leaves of Utricularia are highly modified to form the traps. They are often threadlike and submerged in the water, making the plant appear like an underwater fern.

Carnivorous Mechanism

- **Bladder Traps**: The traps have a mechanism that creates a vacuum inside. The trap is typically surrounded by hairs or trigger mechanisms that, when touched, cause the trap to suck in water (and prey) rapidly. The prey is captured and digested by enzymes produced by the plant.
- **Nutrient Acquisition**: Utricularia primarily captures small organisms for additional nutrients, particularly nitrogen, phosphorus, and other minerals, which are limited in their aquatic environments. The traps help the plant supplement its nutrient intake, especially in nutrient-poor soils.

Significance in Ecology

- **Ecological Role**: Utricularia plays a crucial role in controlling populations of small aquatic organisms. It helps in maintaining the balance of ecosystems in water bodies.
- **Bioindicator**: As a sensitive aquatic plant, Utricularia species can act as bioindicators for water quality, particularly in monitoring pollution and eutrophication in water bodies.

Medicinal and Other Uses

- **Medicinal Properties**: Some species of Utricularia, such as *Utricularia bifida* and *Utricularia reticulata*, have been used in traditional medicine to treat various ailments, although further studies are needed to validate these claims.
- **Potential Applications**: The unique nature of Utricularia makes it a subject of interest for scientific research in plant biology, biotechnology, and ecology.

Torres Investment Scam

Syllabus: GS-3: Internal Security –Money laundering

Context:

- The Mumbai police Economic Offences Wing (EOW) on Thursday (January 10) searched six locations in the Torres Ponzi scheme case.

Mumbai Torres Investment Scam

Overview of the Scam

- **Case Details**:
  - Mumbai police Economic Offences Wing (EOW) conducted raids on January 10, seizing ₹3 crore and incriminating documents.
  - Total fraud: ₹1,000 crore involving 1.25 lakh investors.
- **Involved Entity**:
  - Torres, a jewellery store operated by Platinum Hern Pvt Ltd, incorporated in April 2023.
  - Showrooms located in Mumbai (Dadar, Grant Road, Kandivali), Thane (Kalyan), Navi Mumbai (Sanpada), and Palghar (Mira Road).

Modus Operandi

- **Investment Schemes**:
  - Investors were lured with high weekly returns (3-7%) for buying jewellery, primarily moissanite stones (American diamonds).
  - Initially delivered returns to build trust and encouraged reinvestment of profits.
  - Blended elements of Ponzi scheme (using new investors' money for payouts) and multi-level marketing (MLM).
- **Types of Ponzi Schemes**:
  - Investment options with weekly interest:
    - Gold (2%)
    - Silver (3%)
    - Moissanite stones with silver (4%)
    - Moissanite stones alone (5-6%).
  - Later raised rates to 11.5% to attract more cash investments.
  - Referral bonuses and incentives (cars, apartments, iPhones) for bringing new investors.
- **Collapse**:
  - Regular payouts stopped in November 2024.
  - Shut operations in December 2024, citing technical issues before closure.

How the Fraud Surfaced

- **Investor Concerns**:

- Defaults in interest payments led to inquiries.
- January 6: Investors discovered the company's closure.

- **FIR Filing**:
  - Vegetable vendor Pradipkumar Vaishya lost ₹4.55 crore, mobilizing others.
  - Four FIRs filed against the company.

Ongoing Investigation

- **Focus Areas**:
  - Money trail analysis to determine if funds were transferred abroad.
  - Recovery and return of investors' money.
  - Identifying negligence by police officers in earlier complaints.