DAILY CURRENT AFFAIRS 06-11-2024

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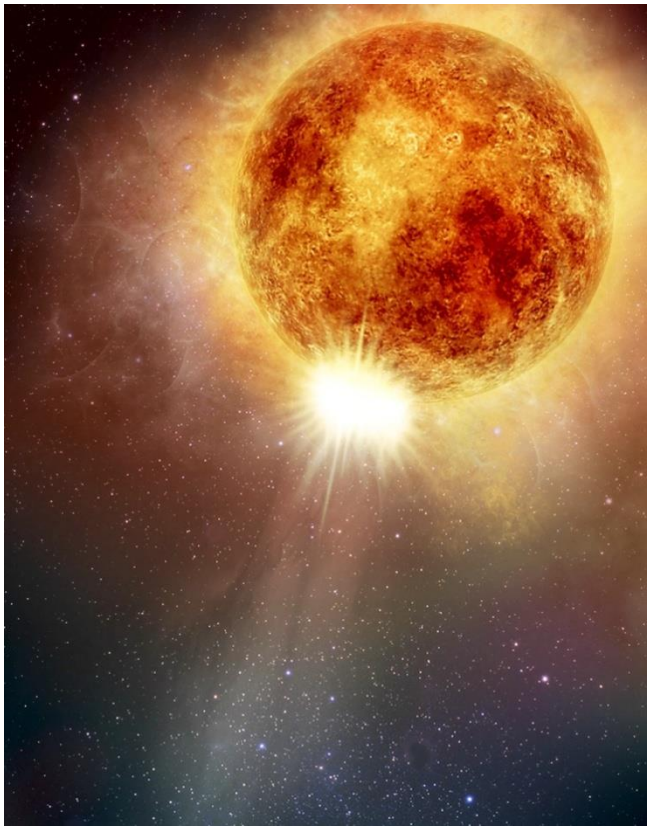
Betelgeuse

Syllabus: GS-1; Geography

Context

- Betelgeuse, one of the brightest stars predicted to explode, hides a tiny sun
- Betelgeuse, a red supergiant about 1,00,000 times brighter than our sun, exhibits two distinct pulsation patterns: a short-term cycle of about a year and a longer six-year cycle.



About

- Betelgeuse, also known as Alpha Orionis, is a red supergiant star in the constellation Orion and one of the brightest stars in the night sky.

Key Characteristics

- **Location and Type**: Betelgeuse is located approximately 642.5 light-years from Earth. It is a red supergiant, which means it has expanded significantly due to the exhaustion of hydrogen in its core.

- **Size and Brightness**: The star has a radius roughly 1,000 times that of the Sun. Its brightness varies, making it a semi-regular variable star. At its peak, Betelgeuse is among the top ten brightest stars visible from Earth.
- **Lifespan and Stage**: Betelgeuse is in the late stages of stellar evolution and is expected to explode as a supernova. This process could happen anytime within the next million years, an extremely short time in astronomical terms.

Scientific Significance

- **Supernova Prediction**: Betelgeuse's eventual supernova is highly anticipated in the scientific community, as it would offer an opportunity to study the death of a massive star up close.
- **Observation of Variability**: The star's unpredictable dimming events, especially the "Great Dimming" observed in late 2019 to early 2020, sparked considerable interest. Scientists concluded that a dust cloud partially blocked its light.

Astronomical Research

- **Surface and Structure**: Advanced telescopes like Hubble have allowed astronomers to study Betelgeuse's surface directly, observing massive convective cells and providing insights into the dynamics of late-stage stellar evolution.
- **Impacts on Astronomy**: As one of the few stars with visible surface features, Betelgeuse offers insights into red supergiants' physical properties, contributing to the understanding of stellar life cycles and end-of-life behavior.

Global TB report

Syllabus: GS-2; Health- Report & Indices

Context

The Global TB Report 2023 by the World Health Organization (WHO) highlights India's ongoing challenges with tuberculosis (TB) despite progress in diagnosing and treating the disease.

Key Points from the Report

- **Rising Diagnosis and Reporting**:

- Although India saw a **slight decline in the estimated number of TB cases**, reported cases increased, suggesting improved diagnosis rates.
- The country, along with **Indonesia**, was among the top contributors to the global increase in diagnosed TB cases from 2021 to 2023, collectively making up **45% of this rise**.

- **High Global Burden**:
  - With **28 lakh cases**, India accounted for **26% of the global TB burden** in 2023, the largest share worldwide.
  - The **mortality due to TB** in India also remains significant, though there was a slight decline from **3.31 lakh deaths in 2022 to 3.2 lakh in 2023**.
- **Progress Towards Targets**:
  - India aims to eliminate TB by **2025**, five years ahead of the global target. However, as of 2023, it has achieved:
    - An **18% decline in TB cases** (target: 50%).
    - A **24% reduction in TB deaths** (target: 75%).
  - India also shoulders **27% of the global burden of multi-drug-resistant TB**.
- **Funding Challenges**:
  - Funding for TB remains a critical issue. Globally, only **$5.7 billion of the $22 billion** target was available in 2023.
  - In India, funding has reduced significantly from **$432.6 million in 2019 to $302.8 million in 2023**, with domestic funding dropping from **$345.9 million to $253 million**.
- **Catastrophic Health Costs**:
  - For the first time, the report estimated the **catastrophic health costs** (spending more than 20% of household income). In India, **nearly 20% of the population** faced these costs due to TB.
  - Comparatively, **Thailand** reported about **1%**, **Pakistan 5%**, and **Bangladesh 25%** of their populations facing similar costs.
  - Globally, **49% of households with TB** faced catastrophic costs, far exceeding the WHO's zero-target for such financial burdens.

India's strong performance in **diagnosing and treating TB cases** and achieving **85% treatment coverage** positions it among the leading countries in high treatment coverage. However, meeting the 2025 TB elimination goal will require enhanced funding, effective multi-drug-resistant TB management, and strategies to mitigate catastrophic health costs for affected households.

The burgeoning expenditure of elections

Syllabus: GS-2; Elections

Context

- The article discusses about- What is the difference between the election expenditure limits for candidates and political parties in India? How does the U.S. handle election financing, and what role do Super PACs play? Why is curbing the illegal distribution of cash to voters crucial?

Estimated Expenditure in Upcoming Elections:

- **U.S. Presidential and Congressional Elections (November 2024):** Estimated at $16 billion (~₹1,36,000 crores).
- **India's Lok Sabha Elections (2024):** Estimated expenditure by political parties around ₹1,00,000 crores, according to the Centre for Media Studies (CMS).

Election Expenditure Limits in India

- **Candidates' Expenditure Limits:**
  - **Lok Sabha Constituency:**
    - ₹95 lakh in larger states
    - ₹75 lakh in smaller states
  - **Legislative Assemblies:**
    - ₹40 lakh in larger states
    - ₹28 lakh in smaller states
- **Political Parties:** No limits on expenditure during elections.

International Standards

- **United States:**
  - Financing primarily through individual contributions, corporations, and Political Action Committees (PACs).
  - Individual and PAC contributions are limited, but Super PACs can spend unlimited amounts.
  - Estimated spending: $5.5 billion for presidential election; $10.5 billion for Congressional elections.
- **United Kingdom:**
  - Political party spending limit: £54,010 per constituency; total limit for all constituencies: £35 million.

- Candidate spending limits:
  - Average of £46-49,000 during long campaign (5 months before elections).
  - £17-20,000 during short campaign (post-election announcement).

Challenges

- **High Costs of Elections:** Increasing expenditures create a dependency on large donations, fostering a nexus between politicians and donors.
- **Breaches of Spending Limits:** Major parties in India (e.g., BJP, Congress) often exceed declared limits. For example, declared spending in 2019 was ₹1,264 crores (BJP) and ₹820 crores (Congress), while actual spending was estimated at ₹50,000 crores.
- **Corruption:** 35% of election funds were reportedly spent on campaigns, while 25% were illegally distributed among voters, perpetuating corruption.

Possible Reforms

- **State Funding of Elections:**
  - Proposed by the Indrajit Gupta Committee (1998) and the Law Commission (1999).
  - Government partially funds expenditures of candidates from recognized political parties, though feasibility is in question.
- **Simultaneous Elections:**
  - Could reduce election costs but raises constitutional and federalism issues. May not significantly address illegal cash distribution to voters.
- **Specific Legislative Reforms:**
  - Amend laws to include that any financial assistance from political parties to candidates must count within the candidates' expenditure limits.
  - Establish ceilings on political party expenditures, calculated as a multiple of candidates' limits.
  - Increase the number of judges in High Courts for faster resolution of election-related cases, acting as a deterrent against violations.
- **Bipartisan Political Support:**
  - Necessary for implementing reforms efficiently.

Conclusion

- The escalating costs of elections in both India and internationally underline the need for reforms to ensure transparency and fairness in the electoral process.

- Addressing the challenges associated with election financing will require significant political will and collaborative efforts among all stakeholders.

LiDAR

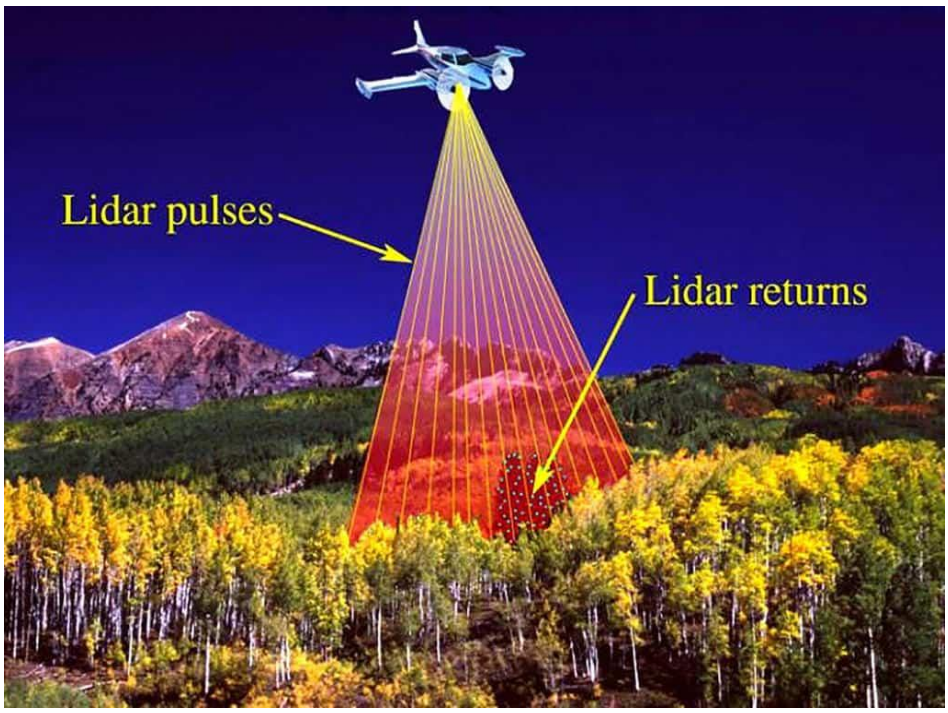
Syllabus: GS-3; Science & Tech

Context

- Scientists have detected a lost Mayan city, hidden for centuries by the dense Mexican jungle, using LiDAR.

What is LiDAR?

- LiDAR, which stands for Light Detection and Ranging, is a remote sensing technology that employs pulsed laser light to measure distances between a sensor—typically mounted on an aircraft—and the Earth's surface.
- This technology enables the creation of high-resolution three-dimensional models of ground elevation, achieving vertical accuracy of up to 10 cm, as noted by the U.S. Geological Survey.



How does LiDAR work?

The LiDAR system consists of three primary components: a laser, a scanner, and a GPS receiver. Here's how it operates:

- **Laser Emission**: The system rapidly emits laser pulses toward the ground, targeting various surfaces like vegetation, buildings, and other topographical features.
- **Reflection and Recording**: When the laser light strikes an object, it reflects back to the sensor. The time taken for the light to travel to the ground and back is recorded, allowing the system to calculate the distance to the surface.
- **Data Processing**: This distance information is then combined with data from the GPS and Inertial Measurement System (IMS) to create a detailed elevation map of the terrain.
- **Point Cloud Generation**: The data collected forms a "point cloud," which includes numerous individual points representing all features on the surface, including structures and vegetation. The varying intensity of the reflected light helps differentiate between these features. For instance, tree canopies might allow some light to penetrate, enabling the detection of ground surfaces beneath.
- **Digital Elevation Model (DEM)**: LiDAR data can be refined to produce a "bare earth" Digital Elevation Model by filtering out vegetation and man-made structures, revealing the underlying topography.

Why is LiDAR very useful for archaeologists?

- LiDAR has proven to be a valuable tool for archaeologists, providing precise three-dimensional data about the Earth's surface. This capability is not only beneficial for geographers, policymakers, and engineers but also for archaeological research. Traditionally, archaeologists had to survey land meticulously, often cutting through dense vegetation to uncover hidden structures.
- Recent advancements in LiDAR technology allow researchers to cover vast areas quickly and effectively from a distance.

Durgesh Aranya Zoological Park

Syllabus: GS-3; Biodiversity

Context

- The upcoming 'Durgesh Aranya Zoological Park' at Bankhandi in Kangra district would become India's first zoo to receive certification from the Indian Green Building Council for its sustainable and eco-friendly initiatives, Himachal Pradesh.

Key Features:

- **Location and Accessibility**: The park is situated in an accessible location, catering to both local visitors and researchers. It's known for integrating natural habitats with enclosures that prioritize animal welfare.
- **Eco-Friendly Certification**: The **Indian Green Building Council (IGBC) certification** recognizes institutions that incorporate sustainable and environmentally conscious practices.
- Durgesh Aranya Zoological Park will be the first zoo in India to earn this certification, marking a significant milestone in wildlife conservation with a focus on ecological sustainability.
- **Sustainable Infrastructure**: The zoo will feature eco-friendly designs that minimize environmental impact, focusing on energy efficiency, water conservation, waste management, and habitat-friendly construction materials.
- **Green Practices**: Initiatives at the park include rainwater harvesting, solar energy usage, and native plantation drives to enhance biodiversity within the zoo. These practices are designed to reduce the park's carbon footprint and create a natural environment that resembles the animals' native habitats.
- **Focus on Education and Conservation**: The park aims to educate visitors on wildlife conservation and sustainability. It will provide informational programs on the importance of biodiversity and ways to adopt sustainable practices.
- **Tourism Boost**: As India's first IGBC-certified zoo, Durgesh Aranya is expected to attract tourists, researchers, and conservationists interested in sustainable tourism and wildlife management.