1. **Nano-Sensor Device For Infection Detection** : Recently, researchers at the National Institute of Technology (NIT) Calicut have developed a portable and cost-effective **nano-sensor device** that can rapidly detect life-threatening infections like **sepsis** within minutes at the patient's bedside.
   - **About Nano-Sensor Device :** 8 sensor models developed, 7 using electrochemical detection and 1 using optical detection;
     - **Use of Functionalized Nanomaterials**: Gold atomic clusters or nanoparticles, CuO & Cu nanoclusters Molybdenum disulfide (MoS_2), Reduced graphene oxide and Carbon nanotubes (CNTs).
     - **Detection Mechanism:** Selective detection of **Lipopolysaccharide (LPS)** using: **LPS-binding aptamers** or **Polymyxin B**.
     - Successfully detected endotoxin in: **Whole blood**, **Pharmaceutical samples** (e.g., Biphasic isophane insulin) & **Fruit juices** (e.g., grape juice)
       - ✓ Endotoxin recovery showed **<2% error**.
     - Two electrochemical platforms also enabled **detection of Gram-negative bacteria (E. coli)** in **water samples**.
     - Core of a portable diagnostic device for rapid endotoxin detection.
   - **Key Features** : **User-Friendly Interface**: Operates via an Android smartphone.
     - **Quick Results**: Detects infections in blood serum or juice samples within 10 minutes.
     - **High Accuracy**: Less than 2% error margin across varied samples (including insulin and fruit juices).
     - **Strong Selectivity**: Employs aptamers or polymyxin B for specific binding to endotoxins.
   - **About Sepsis:** A critical and potentially fatal condition caused by infections, particularly those from Gram-negative bacteria.
     - **High Risk**: If left undiagnosed or untreated, sepsis can rapidly lead to multiple organ failure, septic shock, and even death.
     - **Urgency in Detection**: Early identification of these biomarkers is essential for initiating timely treatment and significantly improving patient survival rates.
2. **Vice President :** Recently, following the resignation of the Vice President of India, the Election Commission of India (ECI) has initiated the process for electing a new **Vice President**.

- **About Vice President of India :** Elected by an **Electoral College** comprising **members of both Houses of Parliament** (Lok Sabha and Rajya Sabha).
  - The election follows the **system of proportional representation** through the **single transferable vote**, and voting is conducted by **secret ballot**.
  - **Electoral College Composition**: Unlike the presidential election, which includes elected members of Parliament and State Legislative Assemblies, the Vice President is elected **only by MPs**—both elected and nominated members of Lok Sabha and Rajya Sabha.
  - **Eligibility Criteria**: To contest the election for Vice President, a person must: Be a **citizen of India**
    - ✓ Be at least **35 years of age**
    - ✓ Be **qualified for election as a member of the Rajya Sabha (Council of States)**
    - ✓ **Not hold any office of profit** under the Government of India, State Government, or any local/subordinate authority
  - **Tenure** : **5 years** from the date of assuming charge.
  - **Conduct of the Election**: The **Secretary-General** of either House of Parliament is usually appointed as the **Returning Officer**, on a rotational basis.
    - ✓ Candidate must be nominated by at least **20 MPs as proposers** & **20 MPs as seconders**.
    - ✓ A **security deposit of ₹15,000** is required to contest the election.

3. **Financial Inclusion Index (FI-Index):** Recently, the Reserve Bank of India (RBI) released the latest Financial Inclusion Index (FI-Index), indicating a significant rise from 64.2 in March 2024 to 67 in March 2025.
   - **About FI-Index :** A comprehensive metric developed by the RBI in consultation with the government and sectoral regulators, measuring the extent of **access, usage, and quality** of financial services.
     - **Coverage**: Incorporates data from **banking, insurance, investments, pensions, and postal services**, offering a broad view of financial accessibility and inclusion.
     - **Index Scale**: Ranges from **0 to 100**, where: **0** represents **complete exclusion**, and **100** indicates **full inclusion**.
     - **Structure and Weights**: **Access** – 35%, **Usage** – 45% and **Quality** – 20%

- The index uses a total of **97 indicators** to compute these dimensions.
- **Unique Feature** : Captures the **effectiveness** of inclusion in terms of:
  - ✓ **Financial literacy**
  - ✓ **Consumer protection**
  - ✓ **Service deficiencies and inequalities**
- **No Base Year**: The FI-Index reflects the **cumulative progress** of financial inclusion over time rather than changes from a fixed starting point.

4. **Vitamin D :** Recently, a landmark study published in The Lancet Psychiatry has revealed a strong association between **neonatal vitamin D** levels and the risk of neurodevelopmental disorders.
   - Based on a comprehensive Danish dataset of nearly 89,000 individuals, the study highlights that vitamin D deficiency at birth may impact not only bone health but also brain development, an insight with significant implications for countries like India.
   - **Key Highlights :** Higher **neonatal vitamin D** levels were linked to lower risks of: **Schizophrenia** (18% lower risk), **ADHD** (11% lower risk) and **Autism Spectrum Disorder** (7% lower risk)
     - **Methods to Test Causality**
       - ✓ **Polygenic Risk Score (PRS):** Individuals with genetic predisposition for higher vitamin D had lower risk of neurodevelopmental disorders. Helped rule out reverse causation (i.e., mental illness causing low vitamin D).
       - ✓ **Mendelian Randomisation (MR):** Used genetic variants linked to vitamin D to suggest **causal relationship** with lower risk of ADHD, schizophrenia, and possibly autism. Limitations due to **pleiotropy** and genetic overlap acknowledged.
   - **Relevance for India:** AIIMS Rishikesh study: **74% of infants** and **85.5% of mothers** were vitamin D deficient
     - Bengaluru study: **92.1% of newborns** had deficiency
     - Bundelkhand study: Strong correlation between maternal and infant vitamin D levels
5. **Asian Development Bank (ADB) :** Recently, the **Asian Development Bank (ADB)** in its **Asian Development Outlook (ADO)** released on July 23, 2025, revised India's GDP growth forecast for FY26 to **6.5%**, down from the earlier estimate of **6.7%**.
   - **About ADB :** Established on December 19, 1966 and a Multilateral development bank.

- **Primary Role:** Serves as the leading international development finance institution for the Asia-Pacific region **; Headquarters:** Manila, Philippines
- **Vision:** To build a **prosperous, inclusive, resilient, and sustainable Asia and the Pacific**, with a continued focus on eradicating **extreme poverty**.
- **India's Role:** India is the **largest recipient** of ADB's financial commitments among developing member countries, accounting for **14%**, followed by China, Bangladesh, the Philippines, and Pakistan.
- **Key Priority Areas**: Focuses on six core sectors aligned with the UN SDGs: Education, Health, Transport, Energy, Finance and Climate Change

6. **Karenia Mikimotoi :** Recently, a severe bloom of **Karenia mikimotoi**, a toxic red-tide algae, has impacted South Australia's coastal waters, causing mass deaths of marine species and severely disrupting the local fishing and tourism industries.
   - **About Karenia mikimotoi :** A common red-tide forming dinoflagellate, especially prevalent in the eastern North Atlantic and around Japan.
     - It produces hemolytic and ichthyotoxic compounds, which are lethal to marine life, including fish, shellfish, crustaceans, and echinoderms.
     - Though not directly harmful to humans, its blooms can lead to massive marine die-offs.
     - As large populations die off, bacterial decomposition can create **anoxic conditions**, further stressing aquatic ecosystems.
     - It is considered less toxic compared to other harmful algal species but is more widespread, with blooms recorded in **Ireland, Norway, India, Japan, Korea, Australia, South Africa, Alaska, Texas**, and the **eastern U.S. coast**.
   - **Key Characteristics:** This photosynthetic dinoflagellate contains multiple yellow-brown chloroplasts with pyrenoids and a large ellipsoidal nucleus in its left hypothecal lobe.
     - It thrives in a wide range of environmental conditions, including varied light, salinity, temperature, and nutrient levels.
7. **Ashokan Pillar :** Recently, India unveiled a replica of the **Ashokan Pillar** at Waskaduwa Sri Subhuthi Viharaya in Sri Lanka, honoring Emperor Ashoka's historic role in the introduction of Buddhism to the island nation.

- **About Ashokan Pillars :** Erected during the **3rd century BCE** by **Emperor Ashoka**, following his transformation after the **Kalinga War**.
  - They marked the **first architectural expression of Dhamma**, serving as **moral and political communication tools** across India and parts of Asia.
  - Constructed from **monolithic sandstone**, primarily sourced from **Chunar and Mathura**.
  - Each pillar stands about **40–50 feet tall**, demonstrating remarkable craftsmanship and precision.
- **Capitals and Artistic Influences:** Most pillars are topped with **lotus bases** and intricately carved **animal capitals**, especially **lions**, symbolizing **purity, power, and sovereign dharma**.
  - The capitals show **Persian-Achaemenid artistic influence**, but were reinterpreted within a **Buddhist moral framework**.
  - The **Lion Capital at Sarnath** holds special significance, representing both the **Shakya clan (Buddha's lineage)** and **royal authority**. It is now adopted as **India's National Emblem**.

8. Lantana Camara : Recently, **Lantana camara** has been reported to infest nearly **3,25,282 hectares** of forest land in **Himachal Pradesh**. Originally introduced as an ornamental plant, it now poses a serious threat to the region's **native biodiversity**



- **About Lantana Camara:** An invasive alien species. Native to tropical and subtropical regions of **Central and South America**. Introduced in **India in the early 18th century** as an ornamental plant.

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  - **Spread and Growth:** A **pantropical weed** that spreads aggressively and forms a **dense mesh of bushes**, suppressing native vegetation. Gradually infesting **higher elevations** from lower regions.
  - **Ecological Impact:** Produces **allelochemicals** that inhibit the growth of other plant species under its canopy. Leads to **homogeneous vegetation**, replacing native flora.
  - **Utilisation:** Biomass can be used for **furniture making, fuelwood**, and **handicrafts**.
    - ✓ Can be processed into **organic compost and vermicompost**, offering an eco-friendly alternative to chemical fertilizers.
    - ✓ Promoting **economic use** of Lantana can support **control efforts** while creating **livelihood opportunities**.