1. **Candida Tropicalis:** Recently, Candida tropicalis, a major fungal pathogen prevalent in India and globally, has raised serious concerns among clinicians.
   - **About Candida Tropicalis :** Traditionally treated with azole-class antifungals such as fluconazole and voriconazole, infections caused by this pathogen are associated with a high mortality rate of 55–60%.
     - **Environmental Driver**: A recent study published in *PLoS Biology* has identified a critical environmental factor contributing to this resistance: the widespread use of **tebuconazole**, an azole-based fungicide commonly used in Indian agriculture.
     - **Cross-Resistance**: Lab-exposed strains to tebuconazole showed resistance to medical antifungals, indicating a farm-to-clinic resistance pathway.
     - **Haploid Strains and Resistance Spread**: Another significant finding of the study was the discovery of **stable haploid strains** of C. tropicalis for the first time.
       - ✓ These strains can undergo mating, enabling genetic recombination and the spread of resistance traits..
     - **Public Health Risk**: India faces high fungal burden, especially post-COVID-19, with unregulated fungicide and antifungal use worsening the threat.
     - **ICMR Warning**: The 2024 Indian Council of Medical Research report flagged antifungal resistance as a rising health crisis, especially in Maharashtra, Karnataka, and Andhra Pradesh.
2. **Sustainable Development Report (SDR) :** Recently, India achieved a significant milestone by securing the 99th position out of 167 countries in the **Sustainable Development Goals (SDG) Index 2025**, according to the latest **Sustainable Development Report (SDR)** released by the **UN Sustainable Development Solutions Network (SDSN)**.
   - **Key Highlights from the Sustainable Development Report 2025: Finland, Sweden, and Denmark** retain the **top three positions**, reaffirming Europe's dominance in SDG performance.
     - **19 out of the top 20** SDG-performing countries are from **Europe**, reflecting sustained investment in **social welfare** and **green transitions**.
     - **190 out of 193 UN member states** have submitted **Voluntary National Reviews (VNRs)**, indicating broad global engagement on SDGs.

- **East and South Asia** have shown the **fastest SDG progress** since 2015, driven by rapid **socio-economic development** and **targeted policy measures**.

- **About the UN SDSN:**Works under the **auspices of the UN Secretary-General** to advance the **Sustainable Development Goals (SDGs)** and the **Paris Agreement**.
  - **Established in 2012** by former UN Secretary-General **Ban Ki-Moon** and economist **Jeffrey Sachs**.
  - **Mobilizes global academic institutions** including universities, think tanks, and national laboratories for SDG-related action.
  - Focuses on **integrated approaches** through: **Education**, **Research**, **Policy analysis** and **Global cooperation**
  - Bridges the gap between **scientific evidence and policy-making**, helping turn ideas into actionable development strategies.

3. **Enhanced Rock Weathering (ERW) :** Recently, Enhanced Rock Weathering (ERW) has gained significant global attention as a promising solution to combat climate change.
   - **About ERW :** involves spreading finely crushed, fast-weathering rocks (like **basalt**) over **farmlands**.
     - Aims to **accelerate natural carbon sequestration** by speeding up the Earth's natural weathering process.
     - **Effectiveness of ERW: U.S. Study**: Applying **50 tonnes of basalt per hectare annually** could sequester up to **10.5 tonnes of CO_2 per hectare over four years**.
     - **Additional Benefits: Improves soil health** as it increases **soil pH**, enhances **nutrient availability** and supports **crop productivity**
     - **Environmental impact**: May help **reduce ocean acidification** by preventing the flow of acidic soil runoff into water bodies.
   - **Risks and Limitations:** Overestimated carbon removal may lead to **inaccurate carbon credits** and **false emissions offsets**.
     - Inhalation of **fine basalt dust** can pose **respiratory risks** without proper protective measures.
     - Some rock types may contain **toxic elements**, requiring careful **screening before application**.

4. **Type 88 Surface-to-Ship Missile:** Recently, Japan conducted its first-ever missile test within its own territory, signaling a significant shift in its defence posture.
    - The Japan Ground Self-Defense Force (GSDF) launched a Type 88 surface-to-ship missile from the Shizunai Anti-Air Firing Range in Hokkaido, the country's northernmost main island.
- **Key Highlights :** Reflects Japan's **military buildup** and pursuit of **strike-back capabilities**
    - Aims to deter **China's growing naval presence** and **joint China-Russia military activity** near Japanese coasts
    - Japan broke from its **self-defense-only posture** in 2022 under a new **five-year national security strategy**
- **Missile Development : Type 88**: Developed by **Mitsubishi Heavy Industries**, Range: **~100 km (62 miles)** and mounted on trucks for mobility.
    - **Type 12 (under development)**: Range: **~1,000 km (620 miles)** and will provide **10 times the range** of Type 88
    - **Tomahawk Missiles**: Japan will begin deploying **U.S.-made Tomahawk cruise missiles New Missile Range**:
5. **Water Purification System :** Recently, a team of Indian researchers from the **Institute of Nanoscience and Technology (INST), Mohali**, under the **Department of Science and Technology (DST)**, developed a **biodegradable, eco-friendly, and low-cost water purification system**.
    - This innovative system uses **sunlight, vibrations, and artificial intelligence (AI)** to effectively remove harmful dyes from **industrial wastewater**.
- **About System :** The system relies on a **3D-printed scaffold made of Polylactic Acid (PLA)**—a biodegradable polymer—**coated with Bismuth Ferrite ($BiFeO_3$)**, a known **piezo-photocatalyst**.
    - **Sunlight:** Activates the catalyst for pollutant degradation.
    - **Vibrations:** Mechanical stress boosts efficiency even in low sunlight conditions (e.g., cloudy weather).
    - **AI Models:** Trained using **Artificial Neural Networks** to **predict performance**, helping optimize purification under varying conditions.

- This unique integration of **piezo-photocatalysis + AI** offers a powerful and sustainable alternative to current chemical- and energy-intensive methods.
- The system removes **98.9% of Congo Red** and **74.3% of Methylene Blue**, harmful industrial dyes linked to environmental and health risks.

- **Applications: Industrial Wastewater Treatment**: Textile, pharma, paper,& leather industries.
  - **Rural Water Purification**: In areas with limited access to electricity or treatment plants.
  - **Smart Environmental Monitoring**: AI integration allows predictive maintenance and adaptive system control.

6. **Sound-Absorbing Aerogel** : Recently, scientists developed a revolutionary **sound-absorbing aerogel** (**Dual-Layer**) inspired by the **acoustic properties of owl feathers**, aiming to create next-generation noise-reduction materials.
   - **Why Owl:** Owls use **porous skin** and **fringed feathers** to suppress sound while flying.
     - This natural stealth inspired researchers to replicate owl anatomy for **sound-absorbing technology**.
   - **Dual-Layer Aerogel Technology:** Published in: **ACS Applied Materials & Interfaces**
     - **Structure: Bottom layer**: Made from **hexane droplets**, forming a **porous honeycomb** and it absorbs **low-frequency noise**
     - **Top layer**: Contains **nanofibers** mimicking owl feathers and dampens **high-frequency sound**
   - **Performance:** Absorbs **58%** of incoming sound waves
     - Reduces **automobile engine noise** from **87.5 dB to 78.6 dB**
     - **More effective** than conventional noise-absorbing materials
     - Survives **100 compression cycles** with **only 5% deformation**
   - **About Noise Pollution** : a **major public health hazard**, not just an irritant.
     - Linked to serious health issues: **Hearing impairment, cardiovascular disease**, **stress and anxiety**
     - It is a **Metabolic disorders** (e.g., **type 2 diabetes**)
     - **WHO ranks** noise pollution as the **second largest environmental health risk** in Western Europe, after air pollution.

7. **Integrated Biodiversity Assessment Tool (IBAT) :** Recently, the Integrated Biodiversity Assessment Tool (IBAT) Alliance—an initiative led by four major global environmental organisations—made a significant move toward global conservation efforts by announcing a **record investment of $2.5 million in 2024**, doubling its **2023 contribution of $1.2 million**.
   - **About IBAT :** A **web-based platform** launched in **2008** at the **IUCN World Conservation Congress** to support biodiversity mapping and reporting.
     - **Aim:** To help **governments, businesses, and civil society** integrate **biodiversity considerations** into **planning** and **risk management**.
     - IBAT enables users to **screen biodiversity risks**, **identify conservation priorities**, and **align development activities** with international commitments such as the **UN Sustainable Development Goals (SDGs)** and the **Kunming-Montreal Global Biodiversity Framework**.
     - The platform is supported by the **IBAT Alliance**, a coalition of four major global conservation organizations:
       - ✓ **BirdLife International**
       - ✓ **Conservation International (CI)**
       - ✓ **International Union for Conservation of Nature (IUCN)**
       - ✓ **UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)**
     - **HQ: David Attenborough Building in Cambridge, United Kingdom**,
8. **Gender Budgeting Knowledge Hub:** The **Central Government** has launched the **Gender Budgeting Knowledge Hub**, a **digital platform** to promote **gender-sensitive planning** across India.
   - **About Gender Budgeting Knowledge Hub:** A **centralised online portal** to help integrate **gender concerns** in planning and budgeting.
     - Aims to support **policymakers, researchers, and officials** at both **Central and State** levels.
   - **About Gender Budgeting:** A method to **apply a gender lens** to every stage of policy-making and budgeting. It involves: Gender-sensitive **policy formulation**, **Budget allocations** addressing women's needs and **Monitoring and evaluation** of gender outcomes.
   - **India's Progress:** First gender budget introduced in **2005–06**. Gender budget allocation grew from **₹0.98 lakh crore in 2014–15** to **₹4.49 lakh crore in 2025–26** (4.5 times increase).