1. **Bio-Fortified Potatoes** : Recently, in a major boost to India's food security and nutrition agenda, **bio-fortified potatoes** enriched with iron are set to be introduced into Indian markets. This development was announced by the Director General of the Peru-based **International Potato Center (CIP).**
    - Coinciding with this initiative is the launch of CIP's South Asia regional centre in Agra, which aims to enhance farmers' access to high-quality potato and sweet potato seeds across the Indo-Gangetic plains.
    - **About Bio-Fortified Potatoes :** Bio-fortified potatoes are specially bred to contain higher levels of essential micronutrients, especially iron.
        - Developed through **traditional breeding** (not genetically modified).
        - Aimed at addressing **iron-deficiency anemia** and improving nutritional outcomes.
        - May also contain **zinc** or **vitamin C**, depending on the variety.
    - **How Are They Developed:** High-yielding, disease-resistant, and good-tasting potato varieties are **crossed** with iron-rich ones. The resulting **progeny** are tested over multiple years.
        - The best-performing lines in terms of iron content, yield, and quality are selected.
        - **Significance : Nutritional Security**: Helps combat hidden hunger and iron deficiency.
            - ✓ **Farmer Benefits**: Offers high-yielding, disease-resistant varieties, enhancing productivity and resilience.
            - ✓ **Policy Alignment**: Supports national missions like **POSHAN Abhiyaan** and the **National Food Security Mission**.
2. **Ai-Designed Synthetic Proteins :** Recently, a landmark study published in Cell by researchers from Harvard University and collaborating institutions revealed a breakthrough in immunotherapy. The team successfully used **AI-designed synthetic proteins** to generate immune T cells at scale.
    - **About Ai-Designed Synthetic Proteins :** Used to **activate the Notch signalling pathway**, essential for generating T cells.
        - These proteins served as **soluble synthetic agonists**, replacing previous ineffective or inapplicable methods (like immobilised Notch ligands on culture dishes).
        - **Helps in** offering a major advance in immunotherapy and vaccine development.

- **Notch signalling**, essential for cellular differentiation and immune response, previously lacked effective molecular activators suitable for human therapy.
- Using these synthetic agonists, the team successfully **produced T cells at scale** in **laboratory bioreactors**, addressing the demand in **CAR-T cell therapies**.
- The technology also shows promise in: **Bridging T cells and cancer cells**.
  - ✓ Enhancing **T cell-mediated killing**.
  - ✓ **Neutralising immunosuppressive tumour microenvironments**.
- This innovation opens doors to **next-generation immunotherapies** and **cancer vaccines**.

- **About T-cells :** A type of white blood cell involved in the immune system.
  - There are **two main types** of T-cells: **Helper T-cells**: Coordinate and regulate the immune response.
    - ✓ **Killer T-cells**: Destroy infected or abnormal cells directly.
  - **Functions :** T-cells are essential for developing immunity against new pathogens.
    - ✓ T-cells manage responses to recurring or chronic antigens.

3. **Wildlife Institute of India (WII) :** Recently, a study by the **Wildlife Institute of India (WII),** published in **Nature Scientific Reports**, has highlighted alarming **bird mortality** rates caused by wind farms in the Thar Desert, particularly around Jaisalmer, Rajasthan.

- **Key Highlights :** The Jaisalmer region of Rajasthan hosts around **900 wind turbines** and is home to **over 270 bird species**, including the **critically endangered Great Indian Bustard (GIB)**.
  - **124 bird carcasses** were recorded during **seven multi-season surveys** around **90 randomly selected turbines**.
  - After adjusting for **detection errors and scavenging**, the **annual bird mortality rate** was estimated at **4,464 birds per 1,000 sq. km**.
  - **28 nearby control sites** (without turbines) showed **no bird carcasses**, indicating a direct link between **turbines and bird deaths**.
  - **Raptors** (e.g. eagles, vultures), which are **long-lived and slow to reproduce**, were the **most affected group**. Their **soaring flight patterns** make them highly susceptible to **collisions with rotating blades**.

- **Why Thar and Gujarat Are High-Risk Zones:** The **Thar Desert** lies along the **Central Asian Flyway**, a key migratory route for many bird species.
  - **Gujarat's coastal areas**, part of the **African-Eurasian Flyway**, are also under threat.
  - **Migratory birds** using these flyways are increasingly at risk from **wind turbines** and **power transmission lines**, leading to rising conservation concerns.
- **About WII :** Established in 1982, as an autonomous body under the **Ministry of Environment, Forest and Climate Change (MoEFCC)**. Recognised as an **internationally acclaimed institute** for wildlife research, training, and advisory services.
  - **Location**: Dehradun, Uttarakhand.
  - **Key Objectives:** Generate **scientific knowledge** on India's wildlife resources.
    - ✓ Offer **policy advice** and technical support on wildlife management issues.
    - ✓ **Collaborate internationally** on wildlife research and training.
    - ✓ Evolve as a **regional centre of excellence** in natural resource conservation.

4. India's First Ai-Enabled Anganwadi Centre : Recently, India's first AI-enabled Anganwadi centre was established in **Waddhamna village** of **Maharashtra's Nagpur** district, just 18 km from the city.

- **Key highlights : Retrofitted with cutting-edge tools**: AI-integrated **smartboards** and **tablets**
  - **VR headsets** for virtual tours and experiential learning
  - Full **Wi-Fi connectivity** and **CCTV monitoring** for security and transparency
  - Activities include **drawing**, **singing**, **poetry recitation**, and **virtual tours**.
- **Impact on Learning Outcomes and Attendance:** Attendance rose from **10 to over 25 children** in a few months.
  - Children now **eagerly attend** the centre, showing heightened interest in learning
  - Gamified lessons help children **recognise shapes, animals, and alphabets**
  - **Adaptive learning platforms** adjust to the pace of each child—benefiting both slow and fast learners
  - Children's creative activities like drawing and singing are **digitally archived** to track developmental progress
  - Technology is used to **monitor nutrition and growth parameters**, with plans to integrate with the **Poshan Tracker platform**.

5. **Krasheninnikov Volcano** : Recently, in a rare geological event, the **Krasheninnikov volcano** in Russia's **Kamchatka Peninsula** erupted for the first time. The eruption was confirmed by the **Kamchatka Volcanic Eruption Response Team (KVERT)**.
   - **About Krasheninnikov Volcano** : **Location**: Eastern Kamchatka Peninsula, Russia, along the Pacific **"Ring of Fire"**.
     - **Type**: Active **stratovolcano**, part of a complex volcanic system.
     - **Elevation**: Reaches a height of **1,886 meters**.
     - **Structure**: Sits within a **9 km-wide collapsed caldera** formed by a massive eruption 39,600 years ago. Formed by two **eruptive cones** inside the caldera.
       - ✓ The **southern cone** has a crater **800 meters wide** and **140 meters deep**.
     - **Volcanic Activity History:** The region hosts **114 volcanoes** that have erupted since the **Holocene Epoch** (~12,000 years ago to present).
   - **Recent Activity**: The eruption occurred **three days after a magnitude 8.8 earthquake** in the vicinity and ash plumes rose to an altitude of **20,000 feet.**
     - The volcano last erupted around 1463, and since then, there had been no recorded activity—until its dramatic reawakening in 2025. This marks the first documented eruption in nearly six centuries, ending a long period of dormancy.
   - **About Stratovolcano:** Also known as **composite volcanoes**, characterized by: **Tall, steep, cone-shaped** structure. Built up from alternating layers of **lava** and **pyroclastic material**.
     - Commonly found above **subduction zones** (e.g., Pacific Ring of Fire).
     - Erupts mainly **andesitic and dacitic lava**, which are **cooler and more viscous** than basalt.
     - Due to high lava viscosity, **gas pressure builds up**, often leading to **explosive eruptions**.
     - **Crater at the peak** may contain water, ice, or a volcanic dome during dormant periods.
6. **'Matri Van' Initiative** : Recently, in a major step towards ecological restoration and urban sustainability, the **'Matri Van' initiative** was launched in **Gurugram, Haryana**.
   - **About 'Matri Van' Initiative** : A **theme-based urban forest** project, to be developed across **750 acres** in the **Aravalli hill region** along the Gurugram–Faridabad Road.
     - Part of the Government of India's **"Ek Ped Maa Ke Naam"** programme
     - It will serve as a: **Green lung and carbon sink** for the Delhi NCR region

- ✓ **Biodiversity restoration zone**, and **Community engagement space** with ecological, recreational, and cultural significance.
- ✓ Removal of **invasive Kabuli Kikar (Prosopis juliflora)**
- ✓ Plantation of native Aravalli species and long-rotation trees
- ✓ Creation of **theme-based groves**, including: **Bodhi Vatika** with Bargad, Peepal, Gular, and Pilkhan trees; **Pushp Vatika** for flowering trees; **Sugandh Vatika** with fragrant species; as well as dedicated spaces like a **Medicinal Plants Grove**, **Bamboosetum**, **Cactus Garden**, **Butterfly Garden**, **Nakshatra Vatika**, and **Rashi Vatika**.

o **Significance** : Play a crucial role in enhancing air quality, mitigating urban heat, promoting biodiversity, and fostering collective ecological stewardship, while also addressing the degradation of the ancient Aravalli range.

7. **Alpine Musk Deer :** A recent report by the **Central Zoo Authority** revealed a critical misidentification. Breeding programmes meant for the **Alpine musk deer** were mistakenly applied to the Himalayan musk deer.

- **About Alpine Musk Deer (Moschus chrysogaster)**: It is not a true deer; it belongs to a distinct family more closely related to Bovidae, which includes antelopes, sheep, goats, and bovines.
  - o **Behaviour**: Solitary and **crepuscular** (active during dawn and dusk).
  - o **Musk sac**: Males possess a **visible musk gland** between the testes; develop **fangs during mating season** for sparring.
  - o **Habitat**: Lives in **coniferous and deciduous mountain forests** at elevations between **3,000–5,000 metres**. Found across **India, Nepal, Bhutan**, and **China**.
  - o **Diet**: A **ruminant herbivore**, primarily a **browser**, feeding on forbs, grasses, lichens, moss, and shrub leaves/twigs.
  - o **Major Threat: Poaching for musk**, widely used in **cosmetics and perfumes**, poses the **greatest threat** to the species.
- **Conservation Status: IUCN Red List**: **Endangered**
  - o **CITES**: **Appendix I**
  - o **Wildlife Protection Act (India), 1972**: **Schedule I**