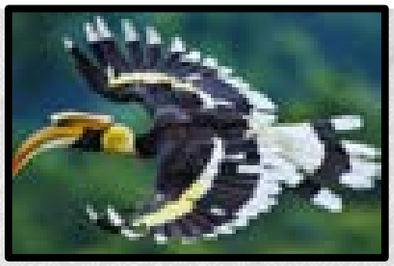

1. **The Great Hornbill :** Recently, in a rare ecological occurrence, the **Great Hornbill,** the majestic bird was spotted far from its typical forested habitat, in the coastal region of Kakkampara near Ezhimala in Kannur district.
   - **About Great Hornbill :** Referred to as the **"gardeners" or "farmers of the forest"** due to their crucial role in dispersing seeds of tropical trees.
     - These large, fruit-eating birds are commonly seen around **fleshy-fruited trees**, aiding forest regeneration.
     - Also called the **Concave-casqued Hornbill, Great Indian Hornbill**, or **Great Pied Hornbill**, is a large and prominent species belonging to the hornbill family.
     - **Nagaland's Hornbill** Festival is named after the hornbill bird, which symbolizes fidelity, beauty, and grace in Naga folklore.
     - It is the **State Bird of both Kerala and Arunachal Pradesh**.
     - It inhabits the upper canopy of tall trees found in the Western Ghats, the northeastern states, and the Himalayan region.
     - Hornbills are distributed across **tropical and subtropical regions of Africa and Asia**.
   - **Conservation Status: IUCN Red List:** Vulnerable
     - **Wildlife Protection Act, 1972 (India):** Schedule I (providing the highest level of protection)
     - **CITES:** Appendix I (restricts international trade)
2. **Nyangai Island :** Recently in the southern waters of Sierra Leone, **Nyangai Island**, once a thriving coastal settlement, has come dangerously close to vanishing. In less than a decade, the island has lost nearly two-thirds of its landmass, now reduced to just 200 by 100 metres.
   - **About Nyangai Island :** A small island located approximately 100 kilometres south of Sierra Leone's capital, Freetown.
     - **Impact of Rising Sea Levels:** The encroaching Atlantic Ocean continues to **erode the island**, leading to the **destruction of homes, farmlands, and essential infrastructure**.
     - **Sharp Population Decline:** The population has plummeted from around **1,000 residents to just 300**, as families are forced to relocate or live in overcrowded, deteriorating conditions.
     - **Loss of Cultural Heritage:** The ongoing environmental devastation is threatening **centuries-old fishing traditions, community practices, and the islanders' way of life**.

- **About Sierra Leone:** A tropical nation located in West Africa along the Atlantic coast.
  - **Borders:** It shares its northern and eastern borders with **Guinea**, its southern border with **Liberia**, and is bounded by the **Atlantic Ocean** to the west.

3. **Japonica Rice:** Recently, in a landmark step towards sustainable agriculture, scientists at the National Institute of Plant Genome Research (NIPGR) in Delhi successfully used CRISPR-Cas9 technology to genetically edit **japonica rice**. This will enhance its ability to absorb and transport **phosphate**—one of the key nutrient limitations in Indian soils.
   - The gene-edited rice lines showed up to **20% higher yields** under normal phosphate application, and up to **40% yield boost** even when just **10% of recommended phosphate fertilizer** was used.
   - **About japonica rice (Oryza sativa japonica) :** One of the two main types of Asian rice (other type is Indica rice). It originally came from northern and eastern China and is now grown in many Asian countries.
     - **Characteristics :** The grains are short to medium in size and don't break or fall off easily.
       - ✓ They are thicker, harder, and stickier than regular white rice.
       - ✓ They have low to medium starch (amylose) content—between 0% and 20%.
     - **Famous Varieties:** Some popular types are sushi rice and glutinous rice. (Glutinous rice is sticky but gluten-free.)
     - **Best Climate for Growing:** It grows well in cooler parts of subtropical and temperate areas.
     - **Mostly Grown** : Japan, China, Korea, Vietnam, and Indonesia.
   - **About CRISPR :** Stands for **Clustered Regularly Interspaced Short Palindromic Repeats** and Cas9 refers to the associated **protein 9.**
     - A **powerful genome editing tool** that allows scientists to precisely alter DNA sequences at specific locations in the genome.
     - **How It Works:** Functions like a **cut-and-paste mechanism** on DNA strands.
       - ✓ The targeted genetic code is identified.
       - ✓ The **Cas9 protein** acts as a molecular scissor to cut the DNA at the desired location.
       - ✓ This enables insertion, deletion, or modification of genes.
   - **Applications:** Gene editing in embryos & treatment of genetic disorders like **sickle cell** disease.

- ✓ Modifying crop genes to improve **yield, resilience, and nutrient use efficiency**.
- ✓ Creating models to study diseases and test new drugs.

- **Significance:** Offers a **precise, efficient, and cost-effective** method for genetic engineering with vast implications for medicine, agriculture, and biotechnology.

4. **Impact Of Melting Of Glaciers On Volcanic Activity :** Recently, a scientific study presented at the **2025 Goldschmidt Conference** in Prague warned that melting glaciers and ice caps could trigger increased **volcanic activity** in several parts of the world.
   - The research highlights **West Antarctica** as the most vulnerable region, with nearly 100 volcanoes lying beneath thick ice sheets that are rapidly retreating due to rising global temperatures.
   - **Key Highlights : Glacial Pressure Suppresses Eruptions:** Heavy glaciers exert pressure on magma chambers, keeping volcanic activity in check.
     - **Melting Lifts Pressure:** As ice melts, the pressure is released, allowing gases and magma to expand, potentially triggering eruptions.
     - **Lower Melting Point of Rocks:** Reduced pressure lowers the melting point of rocks, encouraging magma formation deep underground.
     - **Water Infiltration Increases Risk:** Climate-driven precipitation can seep underground and interact with magma chambers, raising eruption likelihood.
   - **Case Study: Mocho Choshuenco Volcano, Chile**
     - **26,000–18,000 years ago:** Thick ice sheet suppressed volcanic eruptions, causing magma to build up 10–15 km below the surface.
     - **Around 13,000 years ago:** As the ice melted, **highly explosive eruptions** occurred.
     - Confirms that **ice loss can trigger dormant volcanoes** into eruptive activity.
   - **Climate Effects of Volcanic Eruptions:** Volcanic ash and SO_2 emissions form aerosols that block sunlight and reflect solar radiation, reducing surface temperatures for up to **three years**.
     - Large or sustained eruptions release **CO_2 and methane**, potent greenhouse gases that **intensify global warming.**
   - **Vicious Climate-Geology Feedback Loop:** Warming leads to ice melt → triggers volcanic eruptions → releases greenhouse gases → accelerates warming.

5. **International Solar Alliance (ISA) :** Recently, the **International Solar Alliance (ISA)** announced the convening of the Seventh Regional Committee Meeting (RCM) for the Asia and Pacific Region, aimed at enhancing solar collaboration under the theme: **"Advancing Solar Cooperation Across a Region of Diversity and Opportunity."**
   - **Key Highlights :** Expansion of **blended finance** and **de-risking tools** to promote large-scale solar investments.
     - ISA launched its "**Silicon Valley for Solar**" vision via a hub-and-spoke model, STAR Centres, the SolarX Challenge, and digital platforms to boost technical capacity.
     - Emphasis on **Green Hydrogen**, **Energy Storage Systems (ESS)**, and **Long Duration Energy Storage (LDES)**.
   - **About ISA :** It is an action-oriented, member-driven, collaborative platform for increased deployment of solar energy technologies as a means for bringing energy access, ensuring energy security, and driving energy transition in its member countries.
     - It was conceived as a **joint effort by India and France** to mobilize efforts against climate change through deployment of solar energy solutions.
     - It was first proposed by the PM of India in 2015 (**Suryaputra ("Sons of the Sun"))**
     - **Launched:** It was conceptualized at the 21st Conference of Parties (COP21), 2015.
     - **Headquarter:** Gurugram, Haryana (India).
     - **Vision:** "Let us together make the sun brighter".
     - **Objective**: Increase worldwide demand to drive down solar energy deployment costs.
       - ✓ Enhance research and development, focusing on efficient storage systems.
       - ✓ Advocate for standardized equipment and electricity generation processes.
6. **PARAKH :** Recently, the **Performance Assessment, Review, and Analysis of Knowledge for Holistic Development – Rashtriya Sarvekshan (PARAKH-RS),** formerly known as the National Achievement Survey (NAS), released its findings.
     - The report highlights the top-performing states and critical learning outcomes in school education for Grades 3, 6, and 9 across India.
   - **Major Findings : Grade 3**: Punjab, Himachal Pradesh, and Kerala ranked highest; Sahebganj (Jharkhand), Reasi & Rajouri (J&K) ranked lowest.

- **Grade 6**: Kerala, Punjab, and Dadra Nagar Haveli & Daman & Diu led; Garo Hills districts in Meghalaya performed the poorest.
- **Grade 9**: Punjab, Kerala, and Chandigarh were top performers; Shi Yomi (Arunachal Pradesh) and Garo Hills districts lagged behind.
- **Kendriya Vidyalayas**: Weak in Grade 3 Maths, but excelled in Grade 9 Language and overall subjects.
- **Government-aided and State-run schools** underperformed in Grade 6 Mathematics.

- **About PARAKH** : A dedicated unit set up under **NCERT in 2023**.
  - **Objective**: To establish **norms, standards, and guidelines** for student assessments.
  - To implement key assessment-related tasks as outlined in the **National Education Policy (NEP) 2020**.
  - **Mandate**: Create a **common assessment framework** across all State and Union Territory school boards.

7. Extended Range Anti-Submarine Rocket (ERASR) : Recently, successful user trials of the **Extended Range Anti-Submarine Rocket (ERASR)** were conducted from INS Kavaratti, marking a major milestone in India's journey towards self-reliance in defence capabilities.

- **About ERASR:** Designed specifically for the **Indigenous Rocket Launchers (IRLs)** on Indian naval ships. Serves as an **anti-submarine warfare rocket**, capable of targeting enemy submarines.
  - **Development Agencies**: Developed by **DRDO's Armament Research & Development Establishment (ARDE), Pune** in collaboration with **High Energy Materials Research Laboratory** and **Naval Science & Technological Laboratory.**
- **Key Features :** Equipped with a **twin-rocket motor configuration** to support a broad range of operational distances with high accuracy.
  - Utilizes an **indigenously developed Electronic Time Fuze** for enhanced precision.
  - **17 ERASR rockets** were successfully test-evaluated across various range scenarios.
- **About INS Kavaratti :** A potent stealth **Anti-Submarine Warfare (ASW) corvette**. Named after Kavaratti, the capital of the Lakshadweep Islands. Features a state-of-the-art weapons and sensor suite for submarine detection and engagement.