



## **DAILY CURRENT AFFAIRS 05-06-2025**

### **GS-1**

1. Discovery of Ancient Astrolabe at Raigad Fort
2. Mount Etna Volcano

### **GS-3**

3. Aravalli Green Wall Initiative
4. Himachal's First Solar Model Village – Raja Khas
5. Antarctic Ice Sheet Nears Tipping Point

## **Discovery of Ancient Astrolabe at Raigad Fort**

**Syllabus: GS-1; Medieval Indian History**

### **Context**

A significant historical discovery has emerged from ongoing excavations at Raigad Fort, where researchers have uncovered a Shivaji-era navigational device known as 'Yantraja,' an ancient astrolabe.



### Key Details of the Discovery:

#### 1. Location & Context:

- a. The astrolabe was discovered at **Raigad Fort** in Maharashtra, the capital of **Chhatrapati Shivaji Maharaj's Maratha Empire**.
- b. Raigad was a major administrative and military center in the 17th century.

#### 2. What is an Astrolabe?

- a. An **astrolabe** is an ancient astronomical instrument used for:
  - i. Measuring celestial altitudes.
  - ii. Navigation, timekeeping, and astrology.
  - iii. Determining latitude for sea voyages.
- b. It was widely used by **Islamic, Persian, and European scholars** and later adapted in India.

#### 3. Historical Significance:

- a. The discovery suggests **Maratha engagement with advanced scientific tools**.
- b. Possible **influence of Persian or Portuguese technology** (since Shivaji's navy had interactions with European traders).
- c. Indicates **cross-cultural exchanges in medieval India**.

### Practice Question:

*"The discovery of an astrolabe at Raigad Fort underscores the Maratha Empire's engagement with scientific advancements. Discuss its historical significance."*

## Mount Etna Volcano

### Syllabus: GS-1; Geography

#### Context

Italy's Mount Etna has erupted, with large plumes of ash seen rising from the volcano.

#### Know more

#### 1. Location & Basic Facts

- **Location:** East coast of **Sicily, Italy** (Europe's tallest active volcano, ~3,357 m).
- **Type:** **Stratovolcano** with near-constant activity.

- **UNESCO World Heritage Site (2013)** – Recognized for its geological and eruptive history spanning **500,000 years**.



## 2. Recent Eruption (2024)

- **Type of Eruption:**
  - **Strombolian:** Moderate explosions ejecting rock fragments, ash, and lava (named after Stromboli volcano).
  - **Debate:** Some volcanologists argued it was **Plinian** (more explosive, reaching stratosphere).
- **Impact:**
  - No injuries or major damage.
  - Minimal disruption to flights (unlike 2010 Eyjafjallajökull eruption).
  - Ash cloud rose **several kilometres** into the sky.

## 3. Volcanic Features

- **Craters:** 5 summit craters + 300+ flank vents.
- **Eruption Frequency:**

- **Summit eruptions:** 2006, 2012, 2018, 2021.
- **Flank eruptions:** 2001, 2002-03, 2008-09.
- **Cause:** Gas pressure buildup in magma chamber → explosive release.

#### 4. Scientific & Global Significance

- **Monitoring:** Tracked by **INGV (Italy's National Institute of Geophysics)** using seismometers, satellites, and gas analysis.
- **Hazard Mitigation:** Case study for **disaster preparedness** due to advanced warning systems.
- **Climate Impact:** SO<sub>2</sub> emissions can affect atmospheric conditions.

#### 5. Socio-Economic Aspects

- **Benefits:**
  - Fertile volcanic soils → Agriculture (wine, olives).
  - Geothermal energy and tourism.
- **Risks:**
  - Threat to cities like **Catania**.
  - Ash clouds disrupt aviation and air quality.

#### Practice Question

**Q.** "Mount Etna's eruptions pose minimal risks despite high activity." Critically analyze this statement with reference to recent eruptions.

## Aravalli Green Wall Initiative

**Syllabus:** GS-3; Biodiversity conservation, desertification, and climate change

#### Context

- PM Modi launches Aravalli Green Wall Project, expands 'Ek Ped Maa Ke Naam' campaign.

#### About

- The **Aravalli Green Wall (AGW) Initiative** is an ambitious ecological restoration project aimed at combating land degradation, desertification, and air pollution in the Aravalli range, which spans across **Haryana, Rajasthan, Gujarat, and Delhi**.



- This initiative is inspired by Africa's **Great Green Wall** and aligns with India's commitments under the **UN Convention to Combat Desertification (UNCCD)**.



### Key Objectives of the Aravalli Green Wall Initiative

- **Combat Desertification:** Restore degraded land and prevent the eastward expansion of the Thar Desert.
- **Enhance Biodiversity:** Revive native flora and fauna in the Aravalli region.
- **Improve Air Quality:** Mitigate dust storms and pollution in the National Capital Region (NCR).
- **Water Conservation:** Recharge groundwater and revive rivers originating from the Aravallis.
- **Climate Resilience:** Strengthen ecological sustainability against climate change.

### Implementation Strategy

- **Afforestation & Reforestation:** Planting native species like **Anogeissus pendula (Dhok)**, **Acacia senegal (Kumat)**, and **Ziziphus mauritiana (Ber)**.
- **Community Participation:** Involving local communities, NGOs, and tribal groups in conservation efforts.
- **Use of Technology:** Satellite monitoring, GIS mapping, and drone surveillance for effective implementation.
- **Policy Support:** Coordination between central and state governments under schemes like **Green India Mission (GIM)** and **National Afforestation Programme (NAP)**.

### Challenges

- **Encroachment & Illegal Mining:** Unregulated mining activities threaten the Aravalli ecosystem.
- **Water Scarcity:** Low rainfall and over-extraction of groundwater hinder afforestation.
- **Lack of Inter-State Coordination:** Requires cooperation between Haryana, Rajasthan, and Gujarat.
- **Funding & Long-Term Maintenance:** Ensuring sustained financial and administrative support.

### Government & International Support

- Part of India's **Bonn Challenge pledge** to restore **26 million hectares of degraded land by 2030**.
- Supported by **MoEFCC (Ministry of Environment, Forest and Climate Change)** and state forest departments.
- Linked with **National Action Programme to Combat Desertification (NAP-CCD)**.

## Himachal's First Solar Model Village – Raja Khas

**Syllabus: GS-3; Environment & Renewable Energy, GS-2; Governance**

### Context

- In a step forward towards becoming a green state, Himachal Pradesh is now taking measures to make its villages energy self-sufficient.
- Raja Khas, a village located in the Indora block of Kangra district, is set to become Himachal's first solar model village.



### About

- Raja Khas, a village in **Kangra district, Himachal Pradesh**, has been declared the **state's first Solar Model Village**.
- This initiative is part of the **Himachal Pradesh government's efforts to promote renewable energy** and reduce carbon emissions.

### Key Features & Objectives

1. **100% Solar-Powered Village:**
  - a. Every household in Raja Khas has been equipped with **1 kW solar power systems**.
  - b. The project ensures **24x7 electricity** without reliance on conventional power grids.
2. **Government Initiative:**
  - a. Implemented under the **Himachal Pradesh State Solar Policy** and **Central Government schemes** like PM Surya Ghar Muft Bijli Yojana.
  - b. Aims to make Himachal a "**Green Energy State**" by 2026.
3. **Benefits:**
  - a. **Reduced electricity bills** for villagers.
  - b. **Environmentally sustainable** – cuts down on diesel/petrol generator use.
  - c. **Employment opportunities** in solar panel installation and maintenance.
4. **Cost & Funding:**
  - a. The project cost around **₹25 lakh**, funded by the **state and central governments**.



### Why is it Significant?

- **First-of-its-kind** in Himachal, setting an example for other villages.
- Aligns with **India's target of 500 GW renewable energy by 2030**.
- Supports **Sustainable Development Goals (SDG 7: Affordable & Clean Energy)**.

## Antarctic Ice Sheet Nears Tipping Point

Syllabus: GS-3; Climate Change

### Context

- Recent studies by **NORCE Research, Northumbria University, and Potsdam University** indicate that the **Antarctic Ice Sheet** is approaching a **critical tipping point**, where melting may become **irreversible (hysteresis effect)** even if global warming is halted. This poses catastrophic risks for **global sea levels** and **climate systems**.

### Key Concepts & Findings

#### 1. Hysteresis in Ice Sheets

- **Definition:** A system's inability to return to its original state after external changes (e.g., ice keeps melting even if temperatures stabilize).
- **Implication:** Once a **temperature threshold** is crossed, Antarctic ice loss becomes **self-sustaining**, leading to **unstoppable sea-level rise**.

#### 2. Research Methodology

- Scientists used **advanced computer models** to simulate ice sheet behavior over **800,000 years** (covering past glacial & interglacial periods).
- Findings confirm that **current warming trends** could trigger **irreversible collapse**, particularly in **West Antarctica**.

#### 3. Drivers of Melting

- **Ocean Warming:** Even a **0.25°C increase** in ocean temperatures could cause **4 meters of sea-level rise** (Thwaites Glacier at high risk).
- **Atmospheric Warming:** Rising air temperatures accelerate surface melting.
- **Ice Shelf Instability:** Thinning ice shelves (e.g., Thwaites "Doomsday Glacier") lose their ability to hold back inland ice.
- **Feedback Loops:** Reduced reflectivity (albedo effect) exacerbates warming.

#### 4. Accelerating Ice Loss

- Historically, ice sheets responded over **millennia**, but modern observations (last **40 years**) show **rapid acceleration** due to human activity.

#### Potential Consequences

Impact	Details
Sea-Level Rise	Up to <b>4 meters</b> if West Antarctica collapses, flooding coastal cities (Mumbai, Kolkata, Shanghai).
Economic Disruption	Loss of infrastructure, agriculture, and livelihoods; <b>Sagarmala Project</b> at risk.
AMOC Weakening	Freshwater influx could disrupt <b>Atlantic Ocean currents</b> , altering global weather.
Biodiversity Loss	Threatens Antarctic ecosystems (krill, penguins) and marine food chains.

#### Mitigation Strategies

- **Immediate Climate Action**
  - Limit warming to **1.5°C** (Paris Agreement) to slow ice loss.
  - **Net-zero emissions** by 2050 critical to avoid tipping point.
- **Geoengineering (Debated)**
  - Proposals like **underwater barriers** to block warm water (high risk, unproven).
- **Global Cooperation**
  - Strengthen **IPCC recommendations**, climate finance for vulnerable nations.
- **India's Role**

- **Coastal resilience plans**, early warning systems, and **climate diplomacy** in Global South.

### Previous Year Questions (PYQs)

1. **2023**: Discuss the implications of polar ice melt on global sea levels and coastal communities.
2. **2021**: Explain the albedo effect and its role in climate change.
3. **2019**: How does ocean warming accelerate ice sheet melting in Antarctica?