

1. **Synthetic Aperture Radar (SAR)** : Recently, marking a significant milestone in Earth observation, the NASA-ISRO Synthetic Aperture Radar (NISAR) satellite arrived at India's spaceport in Sriharikota.
  - **About SAR:** A state-of-the-art radar-based imaging system capable of capturing high-resolution images regardless of lighting or weather conditions.
    - Uses microwave pulses and captures returning echoes from surfaces like land, water, ice, and cities.
    - **All-Weather, 24/7 Monitoring:** Can operate through clouds, smoke, haze, and light rain, making it ideal for continuous Earth observation both day and night.
    - **Wide-Area Coverage:** Can scan large areas — often hundreds of kilometers wide — in a single pass, enabling efficient monitoring of vast regions.
    - **Surface Composition Detection** Detects surface types and subtle changes by sensing differences in microwave reflections, unlike optical sensors.
  - **About NISAR Mission:** A collaborative Earth observation mission between NASA and ISRO, established under a 2014 bilateral agreement.
    - Set to launch in June 2025 from the Satish Dhawan Space Centre, Andhra Pradesh, aboard ISRO's GSLV Mk II rocket.
    - It is the first radar-based Earth observation mission jointly developed by the U.S. and India.
    - Map the Earth's entire surface every 12 days, allowing for frequent & accurate observations.
    - **Monitoring Objectives:** It will track ecosystem shifts, ice sheet movements, vegetation growth, sea level rise, and groundwater changes.
    - **Disaster and Hazard Detection:** The mission will help monitor and assess natural hazards like earthquakes, volcanic activity, tsunamis, and landslides.
2. **Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM JANMAN):** Recently, the Ministry of Tribal Affairs launched a large-scale outreach campaign covering over 1 lakh tribal-dominated villages across more than 500 districts.
  - The drive focuses on achieving benefit saturation and doorstep delivery of two flagship schemes — the **Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan (PM-JANMAN)** and the **Dharti Aaba Janjatiya Gram Utkarsh Abhiyan**.

- **About PM-JANMAN:** Focused upliftment of **Particularly Vulnerable Tribal Groups (PVTGs)** by addressing documentation, health, financial inclusion, and legal empowerment gaps.
  - **Launch Year:** 2023
  - **Key Components:** Delivery of **Aadhaar cards** and **Ayushman Bharat health insurance**.
    - ✓ Access to **banking services** like **Jan Dhan accounts** and **pension enrolment**.
    - ✓ **Land and forest rights** under the **Forest Rights Act (FRA)**.
    - ✓ Development of **infrastructure and services** specifically designed for PVTG needs.
- **About Dharti Aaba Janjatiya Gram Utkarsh Abhiyan :** A **Centrally Sponsored Scheme (CSS)** for tribal development. To enhance the **socio-economic conditions** of tribal communities by ensuring **saturation coverage** of tribal families in tribal-majority villages and **aspirational districts**.
  - **Launch Year:** 2024
  - **Named After:** Tribal icon **Birsa Munda** (Dharti Aaba, or “Father of the Earth”).
  - **Key Focus Areas:** Construction of tribal hostels and rural homes under PM Awas Yojana
    - ✓ Rural electrification and water supply access
    - ✓ Livelihood enhancement through support for livestock and fisheries
- 3. **Green India Mission (GIM) :** Recently, in a major move to address climate change and land degradation, the Ministry of Environment, Forest and Climate Change (MoEFCC) unveiled a revised strategy for the Green India Mission (GIM) for 2021–2030.
- **About GIM:** Introduced in **2014** (Centrally Sponsored Scheme) as one of the **eight core missions** under India’s **National Action Plan on Climate Change (NAPCC)**.
  - **Objective:** To integrate **climate adaptation and mitigation** through large-scale afforestation and ecosystem restoration.
  - **Key Goals:** Add **5 million hectares** of forest/tree cover on forest and non-forest lands.
    - ✓ Improve the quality of forest cover on another **5 million hectares**.
    - ✓ Improve **biodiversity, hydrological functions**, and **carbon sequestration** across 10 million hectares.
    - ✓ Boost **forest-based income** for around **3 million households** dependent on forests.

- **Revised Strategy of the GIM:**
  - **Carbon Sink Target:** Create an **additional carbon sink of 2.5 to 3 billion tonnes of CO<sub>2</sub>** equivalent.
  - **Forest Expansion:** Expand **forest and tree cover over 24.7 million hectares.**
  - **Priority Ecologically Vulnerable Regions** Aravalli Ranges , Western Ghats ,Mangrove Ecosystems , Indian Himalayan Region and Arid Zones of Northwest India
- 4. **Study on 'How Extreme Heat is Impacting India: Assessing District-level Heat Risk'** : A recent study by the Council on Energy, Environment and Water (CEEW) reveals that 76% of India's population across 417 districts faces very high risk from extreme heat, with rising humidity and warmer nights intensifying the crisis.
- **Key Findings: Widespread Heat Vulnerability**
  - **417 districts:** High to very high risk
  - **201 districts:** Moderate risk
  - **116 districts:** Low risk
  - Dry cities like Delhi, Chandigarh, Jaipur, Kanpur, and Varanasi are now recording **humidity levels of 40–50%**, compared to historical levels of 30–40%.
  - **70% of districts** saw more than **five additional very warm nights per summer** between 2012–2022 (compared to 1982–2011 baseline).
  - Major cities like **Delhi, Mumbai, Hyderabad, Ahmedabad, Bhopal, and Bhubaneswar** experience **intensified urban heat island effects.**
  - **Public Health Implications:** Increased risk of **heat strokes, dehydration, and cardiovascular issues**, particularly for **elderly, children, and outdoor workers** in vulnerable regions.
- **About CEEW** : Independent not-for-profit think tank and policy research institution
  - **Established:** 2010 : **Headquarters:** New Delhi, India
  - **Objective** : Aims to develop **integrated, evidence-based solutions** for India's balanced growth and sustainable development
    - ✓ Provides **independent, research-driven insights** to guide policymakers
  - **Key Research Areas:** Focuses on energy and resource efficiency, power sector reforms, industrial decarbonization, sustainable mobility and cooling, climate risks and adaptation, geoeengineering governance, air quality, water resource management, sustainable food systems, sustainable finance, and the interlinkages between energy, trade, and climate.

**5. Strait of Hormuz :** Recently, rising tensions between Israel and Iran have sparked concerns over potential disruptions in the **Strait of Hormuz**, a crucial oil transit route.

- For **India**, which depends on imports for **85% of its crude oil** and **50% of its natural gas**, any instability in the region could pose serious risks to its **energy security** and **economic stability**.
- **About Strait of Hormuz:** A strategic narrow channel separating **Iran** to the north from the **UAE** and **Oman's Musandam Peninsula** to the south.
  - It serves as a link between the **Persian Gulf** and the **Gulf of Oman**, playing a crucial role in global maritime trade.
  - Stretching about **167 kilometers**, the strait's width ranges from **39 km to 95 km**, accommodating the passage of even large oil tankers.
  - Due to its role in transporting roughly **25% of the world's oil** and nearly **30% of global LNG**, it is considered one of the most critical chokepoints in global energy supply routes.
  - Key islands like **Hormuz**, **Qishm**, and **Hengam** are located within the strait, enhancing its geopolitical sensitivity.



**6. Ozone Pollution :** A recent analysis by the Centre for Science and Environment (CSE) has revealed dangerously high levels of ground-level ozone pollution across Delhi-NCR during the summer of 2025.

- **Key Findings :** Ground-level ozone exceeded national safety limits on nearly all summer days across Delhi-NCR.
  - **Ozone Surpasses PM2.5:** Ozone became the lead pollutant in Delhi's AQI for an extended period, overtaking fine particulate matter.
  - **Persistent Night-Time Pollution:** Ozone levels stayed high into the night, averaging 14–15 hours of exceedance daily. **Gwal Pahari (Gurugram)** had the most night-time spikes.
  - **Health & Agricultural Risks:** Ozone exposure can trigger respiratory issues and worsen lung diseases. Ozone drifts into rural areas, potentially harming crop yields and food security.

- **About Ozone** : A gas made up of three oxygen atoms ( $O_3$ ) and it exists both in the upper atmosphere and at ground level.
  - **Good Ozone (Stratospheric Ozone)**: Located in the **stratosphere** (6 to 30 miles above Earth).
    - ✓ Forms the **ozone layer**, which protects life by blocking harmful ultraviolet (UV) rays from the sun.
  - **Bad Ozone (Ground-Level Ozone)**: Found in the **troposphere** (Earth's surface up to ~6 miles high).
    - ✓ Formed by chemical reactions between nitrogen oxides ( $NO_x$ ) and volatile organic compounds (VOCs) in sunlight.
    - ✓ A key component of **urban smog**.
    - ✓ Harmful to human health (causes respiratory issues) and damaging to crops, forests, and other vegetation.
- 7. **UN Convention to Combat Desertification (UNCCD)**: Recently, the United Nations Convention to Combat Desertification (UNCCD) raised a red flag over an escalating global land degradation crisis.
  - **Key Highlights**: Around **16 million sq km** of land globally (comparable to South America) could face severe degradation by 2050 without urgent action.
    - **Restoration Opportunity**: Restoring **1.5 billion hectares** of land can potentially create a **\$1 trillion** global restoration economy.
    - **Current Economic Loss**: Land degradation and drought are costing the global economy **\$878 billion annually—three times** more than total official development aid in 2023.
    - **Primary Causes**: Deforestation, unsustainable agriculture, urban sprawl—**intensified by climate change, poverty, and overconsumption**—are major drivers of land degradation.
  - **About UNCCD**: An international treaty focused on combating desertification and mitigating the effects of drought through sustainable land management.
    - **Establishment**: In 1994, effective from 1996 ; **Permanent Secretariat**: Bonn, Germany
    - **Origin**: Rio Conference's Agenda 21, 1992
    - **Principle**: Based on participation, partnership, and decentralization, a global commitment to combat land degradation and ensure food, water, shelter, and economic opportunity for all.