

### EARTH DAY 2025



- It is observed annually on **April 22**.
- The official theme for Earth Day 2025 is “**OUR POWER, OUR PLANET**”.
- This year's message focuses on the need to shift rapidly to renewable energy, urging individuals, businesses, and governments to triple clean energy production by 2030.
- **History of Earth Day:**
  - The **first Earth Day** was celebrated on **April 22, 1970**, initiated by U.S. Senator **Gaylord Nelson** as a **national teach-in on environmental issues**.
  - The event witnessed more than 20 million Americans—10% of the U.S. population—taking to the streets, parks, and auditoriums to demand a healthy, sustainable environment.
  - Earth Day **went global in 1990**, mobilizing over 200 million people across 141 countries.
  - Since then, it has become one of the largest civic observances in the world, promoting climate action and eco-conscious living.
  - Earth Day serves as a powerful reminder of our collective responsibility to protect the environment.

### CROP (COMPREHENSIVE REMOTE SENSING OBSERVATION ON CROP PROGRESS)



The Indian Space Research Organisation (ISRO) has estimated that India's wheat production from eight major wheat-producing states will reach 122.724 million tonnes as of March 31, 2025, by using advanced satellite-based remote sensing technologies.

- **CROP** stands for **Comprehensive Remote Sensing Observation on Crop Progress**.
- It is a **semi-automated** and **scalable framework** developed by the **National Remote Sensing Centre (NRSC)**, a part of the **Indian Space Research Organisation (ISRO)**.
- The primary objective of **CROP** is to enable **near real-time monitoring** of **crop sowing, growth, and harvesting** across different seasons, especially during the **rabi season** in India.

### Technological Components

- **CROP** integrates data from **multi-source remote sensing satellites**, including:
  - **EOS-04 (RISAT-1A)** – provides **Synthetic Aperture Radar (SAR)** data,
  - **EOS-06 (Oceansat-3)** – provides **optical remote sensing data**, and
  - **Resourcesat-2A** – used for **high-resolution optical imaging** of agricultural areas.
- It uses both **Optical** and **SAR datasets** to accurately monitor **crop progress** under varying weather and light conditions.

### Major Wheat-Producing States Identified

- The eight primary **wheat-growing states** covered by the ISRO study are **Uttar Pradesh, Madhya Pradesh, Rajasthan, Punjab, Haryana, Bihar, Gujarat, and Maharashtra**.
- These states are crucial for ensuring **national food security** and contribute the bulk of India's **rabi wheat harvest**.

### BEAT THE HEAT WITH PEOPLE-CENTRIC RESPONSES

- As temperatures inch closer to the human body's average of 37°C, **the body's ability to regulate heat diminishes, leading to heat stress**.
- This condition is not just about discomfort; **it affects major organs including the kidneys, liver, and brain**, and can result in severe illness or death.
- **Humidity and wind speed further exacerbate this impact**. While the health consequences are grave, they only scratch the surface of the heatwave crisis in India.

## The Need for Improved and Inclusive Heat Action Planning

- **Localized and Data-Driven Planning**
  - HAPs must incorporate **local vulnerability assessments**, accounting for both temperature and humidity.
  - **Comprehensive data collection** on heat-related mortality and morbidity is **essential for targeted interventions**.
- **Sophisticated Alert Systems:** Inspired by countries like the UK, **Indian cities should adopt Heat Health Alert systems** that consider both daytime and nighttime temperatures and provide detailed guidance on thermal comfort levels and safer activity windows.
- **Infrastructure and Urban Design**
  - Building codes must promote **heat-resilient infrastructure using reflective materials** and designs that enhance ventilation.
  - Public spaces should be adapted with more **shaded areas, parks, and accessible water points**.
- **Support for Informal Workers**
  - Governments must consider **financial aid for informal sector workers** during extreme heat events.
- **Public Health and Workplace Adaptations**
  - Municipalities should ensure the **availability of drinking water and oral rehydration solutions**.
  - Workplaces should implement **staggered shifts and provide flexibility for early morning or late evening work** to avoid peak heat hours.
- **Cooling Infrastructure and Innovation**
  - More cities should introduce **summer shelters**, akin to winter shelters, especially for the homeless and outdoor workers.
  - Initiatives like the **cool roof policy** being developed by some states should be scaled up nationwide.

### JAL JEEVAN MISSION

- Launched in August 2019, the Jal Jeevan Mission (JJM) is the Government of India's ambitious initiative to provide **Functional Household Tap Connections (FHTCs)** to every rural household.
- Spearheaded by the **Ministry of Jal Shakti**, the mission aims to ensure equitable access to safe and adequate drinking water to all rural households by 2024.
- In the years since its launch, JJM has made remarkable strides but now faces funding constraints as it nears its final implementation phase.

### Overview of Jal Jeevan Mission

- **Vision and Objectives**
  - The mission's core objective is to ensure "**Har Ghar Jal**", water to every household, by provisioning safe and adequate drinking water through individual tap connections by 2024.
  - It aims to:
    - Provide **55 litres per capita per day** (lpcd) of water
    - Promote sustainable water supply systems
    - Ensure community participation and transparency
    - Integrate source sustainability and greywater management

### Role of States and Local Governance

- A defining feature of JJM is its emphasis on community participation.
- Village Water and Sanitation Committees (VWSCs) are responsible for operation, maintenance, and regular monitoring.
- Capacity-building efforts include training over 4 lakh women in water quality testing using field test kits.
- States are also required to prepare village action plans (VAPs) to ensure decentralised planning and execution.

### Challenges in Last-Mile Delivery

- **Geographical Diversity:** Hilly and tribal regions such as those in the Northeast and Chhattisgarh pose logistical challenges.
- **Water Source Sustainability:** In drought-prone areas, source depletion remains a critical issue.
- **Human Resource Gaps:** The mission has faced shortfalls in trained manpower at the village and block levels for technical and managerial roles.
- **Water Quality Issues:** Fluoride, arsenic, and iron contamination continue to affect the potability of water in certain states.

### INDIA'S MULTIDIMENSIONAL EMPLOYMENT CRISIS IN THE AGE OF AI - CHALLENGES AND THE WAY FORWARD

- In the past, **waves of innovation**, such as **assembly lines or steam engines**, have mostly affected low-skilled, blue-collar jobs.
- **The AI era**, however, is distinct. India is facing a **multidimensional employment crisis** - one that is both **visible and invisible**.

#### A Dual Employment Crisis:

- **Visible crisis:**
  - **Youth unemployment:** Over **80%** of unemployed Indians are youth, many with secondary or higher education.
  - **Disengagement:** 1 in 3 young Indians is disengaged from both work and learning.
  - **Job creation needs:** India must create **over 90 million new jobs by 2030**, many in yet-to-emerge fields.
- **Invisible crisis:**
  - **Changing nature of work:** Rise of **AI, automation, and data-driven systems** is reshaping work across sectors.
  - **Key concern:** Every worker must ask - **“How replaceable is my job with technology?”**

## AI Era - A Paradigm Shift in Job Disruption:

- The AI age **disrupts all levels** - from low-wage laborers to high-skill professionals (e.g., programmers, designers, artists).
- **Creative and analytical jobs** are increasingly at risk due to generative AI.

## The Core Competency - Adaptability through Learning:

- **Job security matrix:**
  - Low-skill, low-replaceability jobs may **survive**
  - High-skill or low-skill but high-replaceability roles are **most vulnerable**.
  - Reskilling and lifelong learning emerge as the only **durable edge**.
- **Essential skills:**
  - **Tech literacy:** Understanding digital systems, AI, automation.
  - **Data literacy:** Ability to interpret and act on large volumes of information.

## Strategic Imperatives for India:

- **Embed literacy in education:**
  - Integrate tech and data literacy from school to college.
  - **Train educators** to become facilitators of future-ready skills.
- **Promote lifelong learning:**
  - Encourage **accessible, modular upskilling** over traditional degree paths.
  - Support **micro-credential ecosystems** aligned with evolving job markets.
- **Foster cross-sectoral tech integration:**
  - Apply AI and data tools across arts, agriculture, healthcare, and policy-making.
  - **Enable personalised learning** pathways to prepare for jobs that don't yet exist.

## Conclusion - Shaping the Future of Work:

- The future of work is uncertain but within control.
- **India must cultivate problem-solvers, creators, and adaptive thinkers.**
- Focus should not just be on AI engineers, but on **empowered individuals** across sectors who can **lead in a tech-driven global economy**.





# CROSS & CLIMB ROHTAK

Institute of Research Based Learning & Competition

## Current Affairs - 21 April 2025



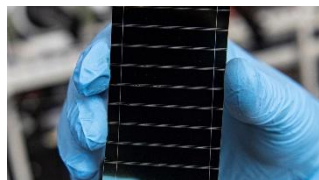
### ANTI-SATELLITE (ASAT) WEAPONS

- **ASAT weapons** are specialized technologies designed to **disable, destroy, or interfere with satellites** in orbit for **strategic or defensive purposes**.
- ASATs are a **key component of space warfare capabilities** and are used to **neutralize enemy satellites** that are used for **surveillance, communication, navigation, or early warning systems**.

ASAT weapons are broadly classified into **two categories**:

- **Kinetic Energy ASATs**: These involve **direct physical impact**, usually through **missiles** that collide with satellites to destroy them. The impact generates **orbital debris**, which can pose a long-term hazard to other space assets.
- **Non-Kinetic ASATs**: These use **non-physical means** such as **cyber-attacks, jamming, spoofing,** and **directed energy weapons like lasers** to **disrupt or blind** a satellite without physically destroying it.
- ASAT weapons can be **launched from ground stations, aircraft, or even other satellites**, making them versatile and difficult to detect in some cases.
- As of now, **four countries** — **United States, Russia, China, and India** — have demonstrated **operational ASAT capabilities** through tests.
- **India's ASAT Test (Mission Shakti)** was conducted in **March 2019**, where a **live satellite in Low Earth Orbit (LEO)** was destroyed by a **three-stage interceptor missile** at an altitude of **around 300 km** in a **"hit-to-kill" mode**.
- The global community, particularly the **European Union (EU)**, has expressed concern about the **space debris created by destructive ASAT tests** and has called for a **ban on such practices** under the **United Nations framework**.

### PEROVSKITE SOLAR CELLS



- Perovskite solar cells (PSCs) are a type of photovoltaic (PV) technology that uses crystal structures called perovskites for converting sunlight into electricity.
- These crystals share the structure of the mineral calcium titanium oxide ( $\text{CaTiO}_3$ ) and can be engineered to possess a wide range of optical, electrical, and semiconducting properties.
- The general chemical formula of a perovskite compound is  $\text{ABX}_3$ , where 'A' and 'B' are cations, and 'X' is an anion.
- They offer high power conversion efficiencies at a lower cost than traditional silicon-based PVs, but they suffer from shorter lifespan and stability issues.

#### Carbon-Based Perovskite Solar Cells (CPSCs)

- CPSCs are the first indigenous perovskite-powered niche product developed in India, aimed at improving device stability and reducing fabrication costs.
- However, humidity and thermal stress remain challenges for widespread commercialization.
- Indian scientists have enhanced thermal stability by incorporating Guanidinium iodide (GuI) and improved moisture resistance through surface passivation using 5-amino valeric acid iodide (5-AVAI).

#### How the New Recycling Process Works

- Sodium acetate is added to the recycling solution. Its acetate ions bind with lead ions, forming lead acetate, which dissolves easily in water.
- Sodium iodide and hypophosphorous acid are then introduced.
  - Sodium iodide helps in regenerating degraded perovskite crystals.
  - Hypophosphorous acid acts as a long-term stabilizer for the water-based recycling solution.





CROSS & CLIMB  
MAKING THE ELIGIBLE ENTITLED

# CROSS & CLIMB ROHTAK

Institute of Research Based Learning & Competition

## Current Affairs - 21 April 2025



CROSS & CLIMB  
MAKING THE ELIGIBLE ENTITLED

### EXERCISE DESERT FLAG 10



- Exercise Desert Flag is a premier multinational air exercise designed to simulate complex aerial combat scenarios, allowing diverse air forces to train together under realistic operational conditions.
- **IAF Aircraft Participation:** The Indian Air Force is deploying two frontline aircraft types in the exercise:
  - **MiG-29** – a versatile **air superiority fighter**, and
  - **Jaguar** – a **ground attack aircraft** known for deep strike capabilities.
- **Participating Nations:** Along with the **Indian Air Force**, the exercise involves air forces from Australia, Bahrain, France, Germany, Qatar, Saudi Arabia, South Korea, Turkey, the United Kingdom, the United States, and the host nation UAE.

**Objective:** The primary aim of **Exercise Desert Flag** is to conduct **complex and diverse fighter engagements**. It focuses on:

- Operational exchange of knowledge,
- Sharing best practices, and
- Enhancing air combat tactics among some of the most advanced air forces in the world.