

## Technology and Innovation Report 2025 released by UN Trade and Development (UNCTAD)

Report provides a roadmap for ensuring AI (Artificial Intelligence) drives **inclusive growth** rather than **deepening divides**.

### Key Findings of the Report

- **Potential of AI:** Globally, AI is expected to reach **\$4.8 trillion** in market value by 2033.
- **Impact on jobs:** AI could impact **40% jobs** worldwide, offering productivity gains along with concerns regarding automation and job displacement.
- **Market dominance at National and Corporate Levels:**
  - ⊕ **40% of global corporate R&D spending** stems from 100 firms mainly in US and China.
  - ⊕ US accounts for **70% of global AI private investment**.

### Way Forward on Inclusive AI

- **Promoting AI Adoption in Developing countries:** By redesigning AI solutions around **locally available digital infrastructure**, lowering the **skill barriers**; building international partnerships, etc.
- **Adopting Worker Centric Approach:** Job workflows and tasks should be **rearranged** to integrate AI effectively.
- **Role of the Government:** Assessment of the **national AI capacities** across the three leverage points of **infrastructure**, **data** and **skills**.

### India Related Findings

- **Readiness for Frontier Technologies' Index (UNCTAD):** India was ranked **36th** in 2024.
- **Large Talent Pools:** Around **13 million Github** (platform for open-source projects) developers (2023).
- **Government Measures:** **India AI mission (2024)** for inclusive AI ecosystem, etc.
- **Case Study:** **Tata Steel** implemented around 250 machine learning systems across various production processes).

## First successful De-extinction of Dire Wolves executed

**Colossal Biosciences** used both **cloning and gene-editing** based on **2 ancient samples of dire wolf DNA** to birth three pups.

- Instead of traditional cloning, scientists used a less invasive method involving **endothelial progenitor cells (EPCs)** from gray wolves, the dire wolf's closest living relatives.
- These cells were gene-edited to match dire wolf DNA, leading to the first successful de-extinction of **Dire wolf**, extinct for over **10,000-13,000 years**.
  - ⊕ Colossal Biosciences is also working to bring back the extinct **pink pigeon** (native to Mauritius) by tapping into the fertilized egg of a pink pigeon to extract **primordial germ cells (PGCs)**.
    - ◆ PGCs are embryonic precursors of sperm and egg that pass on genetic and epigenetic information from one generation to the next.

### What is Cloning?

- **Cloning** means **making an identical copy**. There are 2 types of cloning:

- ⊕ **Reproductive cloning:** The **deliberate production of genetically identical individuals**. E.g. 1st cloned animal, **Dolly, the sheep (1996)**

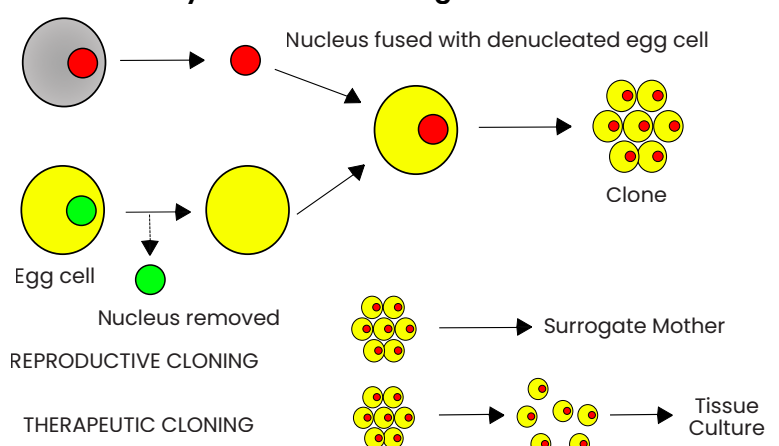
- ⊕ **Therapeutic cloning (embryonic cloning):** It involves cloning of embryos for **research** purposes.

- **Methods:** Somatic cell nuclear transfer (SCNT), embryo splitting.

### Ethical issues in cloning

- **Commodification of animals:** Violation of principle of **consent** and treating them as commodities for human use.
- **Violation of bioethics:** Cloning can be seen as **interference in the natural process** of procreation. E.g. Production of **designer babies** with '**desirable**' characteristics.
- **Kantian ethics:** The principles of **end-in-itself** and "**Act others as you desire to be acted**" consider cloning as unethical.

### Somatic body cell with desired genes



## Central Pollution Control Board (CPCB) revises Classification of Industries

In the new classification, CPCB has classified a total of **419 sectors** into **Red (125), Orange (137), Green (94), White (54) and Blue (9) category**.

- » CPCB has followed a **revised methodology** based on **Pollution Index (PI)** formulated in 2016 to harmonize criteria for classification of Industries) by assigning **equal weightage** to scores arising due to **Water, Air and Hazardous waste**.

### Key Features of the New Classification

- » **Blue category:** Under **Essential Environmental Services** for management of waste generated from **domestic/household activities**.
  - ⊕ **Essential Environmental Services** are those facilities which are essential to control, abate and mitigate pollution generated from **Domestic and Industrial activities**.
- » **Classification of Compressed Biogas Plants (CBP):** CBG plants based on various feedstock like municipal solid waste, agro-residue, energy crops/grass/weeds, etc having littering potential may be considered under **blue category**.
  - ⊕ CBG plants based on industrial or process waste will continue to be in **red category**.

- » **Incentives:** In the form of **extension of permits** for the successful implementation of environmental management measures.

### Criteria and Examples of Industries

Industry	Examples
<b>Red</b> (PI > 80)	Cement, manufacturing of automobiles, distilleries, etc.
<b>Orange</b> (55 ≤ PI < 80)	Brick manufacturing, dry cell battery, coal washeries, etc.
<b>Green</b> (25 ≤ PI < 55)	Manufacturing of Compact disc Computer (CD/DVD), chilling plants, etc.
<b>White</b> (PI < 25)	Assembly of air coolers, cardboard manufacturing, medical oxygen, etc.
<b>Blue</b> (based on CPCB formula)	Municipal Solid Waste Management Facility (Sanitary landfill/ Integrated Sanitary landfills, etc.) sewage treatment plants, etc.

## Government Pushes for Saline Aquaculture Hubs in Haryana, Punjab, Rajasthan, and Uttar Pradesh

### About Saline Aquaculture

- » **Meaning:** It refers to the **use of saline-affected lands** (often unsuitable for traditional agriculture) for inland saline aquaculture.
  - ⊕ Aquaculture is the farming of **aquatic organisms**, including fish, molluscs, crustaceans and aquatic plants for enhancing production.
- » **Significance:** Generate employment and livelihood opportunities by tapping the potential of **saline land resources for aquaculture**, Increase **Aquaculture productivity**, etc.
- » **Potential in India:**
  - ⊕ Only 2, 608 hectares of the 58,000 hectares identified saline area from the above 4 states is being currently **utilized**.
  - ⊕ India stands as the **second-largest producer of cultured shrimp globally**, earning **65% of its seafood export value** from shrimp alone, which can be **better realised** through Saline Aquaculture.

### Measures to tap the potential of Saline Aquaculture

- » **Policy Reforms:** Increasing the **area limit** from 2 hectares to 5 hectares, a **National Level Committee** to prepare a roadmap for the sustainable development of saline aquaculture in North Indian states.
- » **Improved marketing channels:** Recommendations for establishment of an **Integrated Aqua Park** in Sirsa to improve marketing channels to be considered.
- » **Dissemination of Technical Knowledge:** States to leverage **Krishi Vigyan Kendras (KVKs)** to identify new areas for saline aquaculture, and conduct outreach-based research.

### Key Challenges Faced by Farmers

<p><b>Policy Challenges:</b> Inadequate subsidy, high land lease rates, limitation on unit size to 2 hectares.</p>	<p><b>Input Challenges:</b> High set up cost, fluctuating salinity levels, absence of locally available high-quality seed, etc.</p>	<p><b>Output Challenges:</b> Absence of proper marketing infrastructure, low market prices for the products, etc.</p>
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## 10 years of the Pradhan Mantri MUDRA Yojana (PMMY)

PMMY, the Flagship Programme of the Prime Minister aimed at **Funding the Unfunded** micro enterprises and small businesses completes 10 years.

### About PMMY

- Launched in **2015** for providing loans (i.e., MUDRA loans) to the **non-corporate, non-farm small/micro enterprises**.
- PMMY ensures **collateral-free institutional credit** up to Rs 20 lakh is provided by Member Lending Institutions (MLIs).
  - ⊕ **MLIs** are Scheduled Commercial Banks, Regional Rural Banks, Non-Banking Financial Companies & Micro Finance Institutions.
- **Types of Loans**
  - ⊕ **Shishu:** Loans up to Rs 50,000
  - ⊕ **Kishor:** Loans between Rs 50,000 and Rs 5 lakh
  - ⊕ **Tarun:** Loans between Rs 5 lakh and Rs 10 lakh
  - ⊕ **Tarun Plus:** Loans above Rs. 10 lakhs and upto Rs. 20 lakhs.

### Achievements of PMMY

- **Entrepreneurship Revolution:** MUDRA laid the foundation for a new era of grassroots entrepreneurship. PMMY has sanctioned over **52 crore loans** worth **₹32.61 lakh crore**.
- **MSMEs Funding:** MSME lending surged from **₹8.51 lakh crore in FY14 to ₹27.25 lakh crore in FY24**, & is projected to **cross ₹30 lakh crore in FY25**.
- **Women Empowerment:** Women account for **68 %** of all Mudra beneficiaries, underscoring the scheme's pivotal role in advancing **women-led enterprises** across the country.
- **Financial Inclusion:** **50% of Mudra accounts** are held by **SC, ST & OBC entrepreneurs**. Furthermore, **11 % of Mudra loan holders** belong to **minority communities**.



### Also In News



#### Foreign Contribution Regulation Act (FCRA)

According to **Ministry of Home Affairs** anyone registered under **Foreign Contribution Regulation Act (FCRA)** needs to **obtain prior permission** for accepting any foreign contribution.

- The **validity period** for **receiving** foreign contributions shall be **3 years** and for **utilizing** the said contributions will be **4 years**.

#### About FCRA, 2010

- **Purpose:** To consolidate the law to **regulate acceptance and utilization of foreign contribution** or foreign hospitality & to **prohibit** foreign contributions for any **activities detrimental to national interest**.
- Enacted by repealing the **FCRA, 1976**.
- **The 2020 Amendment:** Prohibited domestic transfer of foreign funds, limited administrative expense of organizations receiving foreign funds to 20%, etc.
- **Prohibited from receiving foreign contributions:** Election candidate, MLA, Political Party; Public servants, Judges etc.



#### National Social Assistance Programme (NSAP)

**Parliamentary Standing Committee on Rural Development and Panchayati Raj** presented the Report on '**Impact of NSAP on the Poor and Destitute in the Villages**' recommending enhanced budget allocation and better implementation.

#### About NSAP

- **Genesis:** 1995
- **Type:** 100% centrally funded **Centrally Sponsored Scheme (CSS)**.
- **Objective:** Financial assistance to **old aged, widow and disabled persons** and to bereaved households after death of the breadwinner belonging to **Below Poverty Line (BPL)**.
- Comprises of **five schemes**:
  - ⊕ Indira Gandhi National Old Age Pension Scheme
  - ⊕ Indira Gandhi National Widow Pension Scheme
  - ⊕ Indira Gandhi National Disability Pension Scheme
  - ⊕ National Family Benefit Scheme
  - ⊕ Annapurna Scheme





### Project Varsha

INS Varsha, under Project Varsha to be operational by 2026.

#### About Project Varsha

- It is a classified **naval project** aimed at strengthening India's underwater nuclear capabilities.
- Objective:** To develop a **secure underground base** to house a fleet of over **12 nuclear-powered ballistic missile submarines (SSBNs)**.
- Location:** Coastal village Rambilli in Andhra Pradesh.
- Similar to Project Varsha from the east, Karwar base in Karnataka under **Project Seabird** safeguards the west coast.

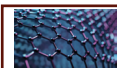


### Gas Hydrates

China is constructing the **world's first permanent undersea research station** to study gas hydrates, a potential energy source larger than the Persian Gulf's oil reserves.

#### About Gas Hydrates

- Gas hydrates are crystalline solids composed of water and gas, containing large amounts of methane.
- They are classified as **unconventional hydrocarbons** because extracting them requires **advanced and non-traditional technologies**.
- It exists in huge quantities in marine sediments in a layer several hundred meters thick directly below the **sea floor** and in association with **permafrost** in the Arctic.
- In India:** Huge quantities around the **Andaman Islands** and in **Krishna-Godavari** offshore.



### Graphene

IIT Kharagpur has developed an **energy-efficient graphene-based technology** for effective oil-water separation revolutionizing **oil spill management**.

#### About Graphene

- It is a **single atomic layer of graphite**, which is an **allotrope of carbon** that is made up of very tightly bonded carbon atoms organized into a **hexagonal lattice**.
- Properties:** Graphene is approximately **200 times stronger** than steel, lightweight and transparent.
  - Exhibits high elasticity, high thermal conductivity, flexibility, etc.
- Application:** In **electronics** (e.g. manufacture of microchips), **energy storage** (e.g., batteries), **biomedical fields**. etc.



### Volatility Index (India VIX)

Recently, Volatility Index (India VIX) registered its highest single-day spike ever.

#### About India VIX

- It is a measure of **market volatility** derived by the National Stock Exchange (NSE) using data from NIFTY options.
  - Beta is a **measure of a stock's volatility in relation to the overall market**.
- A higher VIX value indicates increased predicted volatility and uncertainty, while a lower VIX value reflects a calmer market.



### Organ-on-Chip

Researchers from Indian Institute of Science (IISc) Bengaluru have developed a **made-in-India Organ-on-Chip (OoC)** [currently imported by India] allowing them the study of **fluid and drug interactions**.

#### About Organ-on-Chip

- It is a **small, bioengineered device** made of **flexible polymers**, mimicking the structure and function of a human organ on a micro-scale.
  - Several models using different organs** like lungs on a chip, liver on a chip, etc., have been developed.
- They **contain tiny channels** where living human cells grow and interact, simulating real tissue environments.
- Fluids, like blood or drugs**, can be passed through them to study their effects on the cells.



### Small Hive Beetle (SHB)

Alien or non-native beetle, **Small Hive Beetle (Aethinatumida)**, was recorded for the first time in India in West Bengal.

#### About SHB

- Native:** Sub-Saharan Africa.
  - It seldom causes **harm in Africa** but creates havoc across other regions.
- Characteristics:** **Oval-shaped, reddish-brown, and 5-7 mm long**, its life cycle goes through different stages: eggs, larva, pupa and adult.
- Damage:** Females of SHB enter the beehives through cracks and crevices to **lay eggs**, which on **hatching feed voraciously** on the stored pollen, honey, and honeybee eggs and **defecate in the honeycombs** making it unfit for human consumption.

### Place in News



### Portugal (Capital: Lisbon)

The **President of India** is on an official visit to Portugal.

#### Political Features:

- Portugal is the **westernmost point of Europe** and lies on the **west coast of the Iberian Peninsula**.
- Boundaries:** Spain (north and east), North Atlantic Ocean (South and west).
- It includes 2 autonomous regions: the archipelagos of **Madeira and Azores**, in the **Atlantic Ocean**.
- Lisbon is **one of Europe's oldest cities**.

#### Geographical Features:

- Climate:** Maritime temperate; cool and rainy in north, warmer and drier in south.
- Terrain:** The west-flowing **Tagus River divides the country**; the north is **mountainous** while the south is characterized by **rolling plains**.
- Highest point:** Ponta do Pico (Pico or Pico Alto)



AHMEDABAD



BENGALURU



BHOPAL



CHANDIGARH



DELHI



GUWAHATI



HYDERABAD



JAIPUR



JODHPUR



LUCKNOW



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PUNE



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