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Carbon Capture, Utilisation, and Storage (CCUS) (Source: The Indian Express)

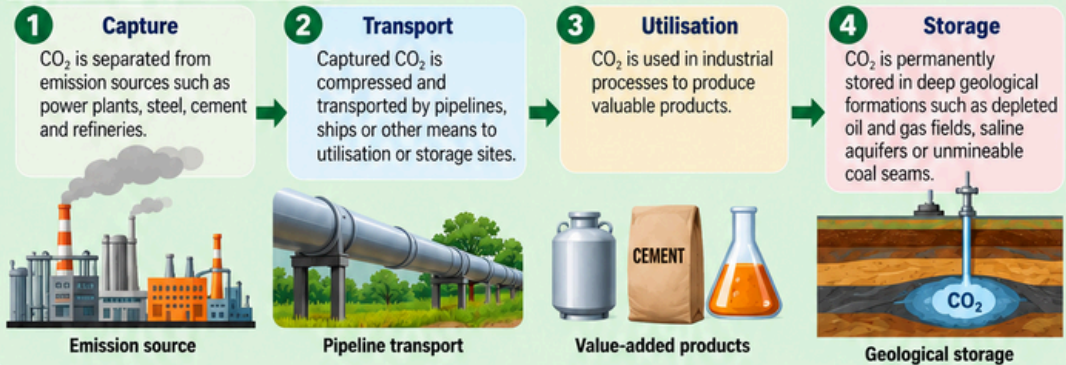
Carbon Capture, Utilisation, and Storage (CCUS)

What is CCUS?

- CCUS refers to a set of technologies that capture carbon dioxide (CO₂) emissions from large point sources, use it in value-added products or processes, and/or permanently store it in deep geological formations, thereby reducing greenhouse gas emissions.
- It is considered an important option to achieve net-zero emissions, especially for hard-to-abate sectors.



How CCUS Works?



Methods of CO₂ Capture

- Post-combustion capture**
 - Captures CO₂ from flue gases
 - Applicable to existing plants
- Pre-combustion capture**
 - CO₂ removed before combustion (e.g., in gasification)
 - Produces hydrogen with CO₂ capture
- Oxy-fuel combustion**
 - Fuel is burnt in pure oxygen
 - Produces concentrated CO₂ for easier capture
- Direct Air Capture (DAC)**
 - Captures CO₂ directly from ambient air
 - Useful for hard-to-abate sectors

Utilisation of Captured CO₂ (CCU)

- Enhanced Oil Recovery (EOR)**
 - CO₂ injected to increase oil extraction from mature fields
- Building Materials**
 - Use in cement, concrete and aggregates
- Chemicals & Fuels**
 - Production of methanol, synthetic fuels, urea and other chemicals
- Industrial Uses**
 - Food and beverage industry (e.g., carbonated drinks, dry ice)
 - Greenhouse cultivation

Storage of CO₂ (CSS)

- Depleted Oil and Gas Fields**
 - Well-characterised formations
 - Proven storage potential
- Deep Saline Aquifers**
 - Large storage capacity
 - Widely distributed
- Unmineable Coal Seams**
 - CO₂ adsorbed in coal seams
 - Potential for enhanced coal bed methane
- Basalt Formations**
 - CO₂ reacts with basalt to form stable minerals
 - Emerging option

Key Benefits

- Reduces greenhouse gas emissions
- Helps decarbonise hard-to-abate sectors (power, steel, cement, chemicals)
- Supports energy transition and net-zero goals
- Enables production of low-carbon products and circular economy

Challenges

- High cost of capture, transport and storage
- Energy intensive processes
- Need for CO₂ transport infrastructure (pipelines, ports)
- Regulatory, legal and liability issues for long-term storage

Global Initiatives

- Part of strategies to achieve net-zero emissions by 2050.
- Supported under the Paris Agreement and IPCC mitigation pathways.
- Several countries (US, EU, UK, Canada, Australia) have CCUS demonstration and commercial projects.
- Included in many countries' Nationally Determined Contributions (NDCs).

2 Periodic Labour Force Survey (PLFS) (Source: The Hindu)

Periodic Labour Force Survey (PLFS)

What is PLFS?

- Periodic Labour Force Survey (PLFS) is a nationwide household survey conducted by the National Statistics Office (NSO) under the Ministry of Statistics and Programme Implementation (MoSPI).
- It provides key estimates on labour market indicators such as employment, unemployment, labour force participation rate (LFPR) and worker population ratio (WPR) for persons of age 15 years and above.



Objectives

-  Measure key labour market indicators (LFPR, WPR, UR).
-  Provide estimates for different social and demographic groups (rural/urban, male/female, age).
-  Assess employment–unemployment situation and changes over time.
-  Generate data for evidence-based policy making and monitoring of SDGs and national programmes.

Conducting Agency



National Statistics Office (NSO)
Ministry of Statistics and Programme Implementation (MoSPI)

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Coverage



- All States and Union Territories.
- Both rural and urban areas.
- All usual residents of age 15 years and above (some indicators also for 15–59 years).

Sampling Design

-  Multi-stage stratified random sampling.
-  Based on census villages in rural areas and census wards in urban areas.
-  Household-based survey.
-  Rotational panel design (same households are surveyed for multiple rounds).

Frequency



- Conducted periodically throughout the year in quarterly rounds.
- Annual estimates are released by combining the four quarterly rounds.

Reference Period



- Usual Principal and Subsidiary Status (UPSS):** 365 days (for usual status).
- Current Weekly Status (CWS):** 7 days prior to the date of survey.
- Current Daily Status (CDS):** for time use and very short-term activities.

Major Indicators

-  **Labour Force Participation Rate (LFPR)**
Percentage of persons in labour force to total population (15+ years).
-  **Worker Population Ratio (WPR)**
Percentage of employed persons to total population (15+ years).
-  **Unemployment Rate (UR)**
Percentage of unemployed persons to total labour force.
-  **Employment–Unemployment characteristics**
By sector, status in employment, type of job, education level, etc.



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3 UN Loss and Damage Fund (Source: Down To Earth)

It is a climate finance mechanism under the UNFCCC to help vulnerable developing countries cope with unavoidable and irreversible climate impacts that cannot be addressed through mitigation or adaptation.

Development

- **2013:** Warsaw International Mechanism (WIM) on Loss and Damage established at COP19 to address loss and damage associated with climate change.
- **COP27 (2022, Sharm El-Sheikh):** Parties agreed to establish a dedicated Loss and Damage Fund.
- **COP28 (2023, Dubai):** Fund's governance, structure and initial capitalisation were finalised; the Fund became operational.

Note

- World Bank serves as the interim trustee/host for an initial period.
- Voluntary contributions, not mandatory assessed shares.

Loss and Damage

- **Loss**
 - **Economic Losses:** infrastructure, homes, crops, livelihoods, reconstruction costs.
 - **Non-economic Losses:** lives, health, biodiversity, ecosystems, cultural heritage, indigenous knowledge, territory.
- **Covers:**
 - **Extreme Events:** floods, cyclones, heatwaves, GLOFs.
 - **Slow-onset Events:** sea-level rise, desertification, salinisation, glacier retreat.