



DATE: 1 JUNE 2026

## 1 Dust Storms (Source: The Indian Express)

Dust storms are meteorological events where extremely high winds lift up dust and soil from the ground, and transport them over long distances. These kinds of dust storms are quite common in arid and semi-arid regions.

### Causes

- **Natural Causes:** Droughts, arid conditions, low vegetation, and strong pressure gradients.
- **Human-Induced Factors:** Overgrazing, deforestation, unsustainable farming, and land degradation.

### Mechanisms For Formation

- **Saltation:** The process by which wind lifts particles, which then fall back to the ground, loosening smaller dust particles.
- **Suspension:** Extremely fine particles are lifted high into the atmosphere and can travel thousands of kilometers.



### Geographical Distribution

- **Global:** The Sahara Desert (source of "Harmattan"), the Gobi Desert, and the Middle Eastern deserts.
- **India:** Primarily the Thar Desert region (Rajasthan, Haryana, Punjab). In North India, these are locally known as Andhi or Loo (when accompanied by extreme heat).

### Impact

- **Environment:** Reduce albedo
- **Health:** Increases respiratory issues (Asthma, Bronchitis) and spreads particulate matter.
- **Economy**
  - Causes soil erosion and crop damage.
  - Disrupts aviation, road transport, and solar power generation (by coating panels).

### Management and Mitigation

- **Green Belts:** Planting shelterbelts and windbreaks to reduce wind velocity.
- **Soil Moisture Management:** Using drip irrigation and mulching to keep soil intact.
- **Early Warning Systems:** Using satellite data (like INSAT-3DR) for real-time tracking and alerts.
- **Global Initiatives:** The United Nations Convention to Combat Desertification (UNCCD) works specifically on Sand and Dust Storms (SDS) as part of land degradation neutrality.

## 2 Coal Gasification (Source: The Hindu)

Coal gasification is a process that transforms Coal into a Synthetic gas (Syngas), consisting of a mixture of gases such as Carbon monoxide (CO), Hydrogen (H<sub>2</sub>), Carbon dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), and Water vapor (H<sub>2</sub>O).

- Syngas can be used to produce a wide range of Fertilizers, Fuels, solvents, and synthetic materials.

### Process

- **Preparation:** Coal is crushed into a fine powder to increase its surface area and enhance the chemical reactions during the process.
- **Gasification Reactor:** The crushed coal is introduced into a high-temperature and high-pressure reactor along with limited oxygen or air and steam.
- **Chemical Reactions:** In the absence of sufficient oxygen for complete combustion, the coal undergoes a series of complex chemical reactions.
- **Gas Cleaning:** The raw syngas produced from the reactor contains impurities like tar, sulfur, and dust. These impurities need to be removed through a gas cleaning process before the syngas can be used further.

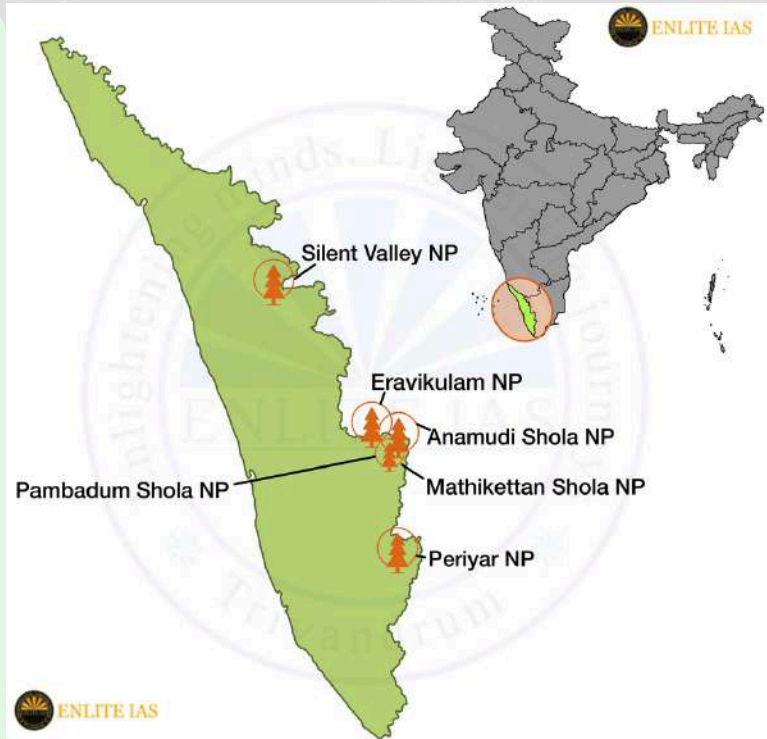
### Advantages

- Gasification boosts efficiency to 50%+ in integrated gasification combined cycle (IGCC) plants versus 30–40% in traditional coal plants, via gas turbine plus steam recovery.
- It cuts local pollutants (sulfur, particulates) through pre-use cleaning and enables >90% CO<sub>2</sub> capture potential.
- Applications include power, hydrogen, liquids (CTL), and chemicals, reducing oil import reliance



## 3 Shendurney Wildlife Sanctuary (Source: The Hindu)

- It is located in the Kollam District of Kerala.
- It was established in 1984 and covers a total area of 171 sq. km.
- The Shendurney River flows through this region.
- The wildlife sanctuary, which is part of the Agasthyamalai Biosphere Reserve, owes its name to the endemic species *Ghuta Travancorica*, locally known as 'Chenkurunji'.
- The region has **Tropical evergreen & semi-evergreen forests**
- Key species in the region are the Lion-tailed macaque (endangered), Indian bison, and Malabar giant squirrel.





DATE: 1 JUNE 2026

## 4 James Webb Space Telescope (Source: The Hindu)

*It is developed to examine every phase of cosmic history, from the Big Bang to the formation of galaxies, stars, and planets, to the evolution of our own Solar System.*

### Facts To Know

- It was jointly developed by NASA, the European Space Agency (ESA), and the Canadian Space Agency and was launched in December 2021.
- It is currently placed at the Sun-Earth L2 Lagrange point.
- It's the successor to the Hubble Telescope.

### Objectives

- To look back around 13.5 billion years to see the first stars and galaxies forming out of the darkness of the early universe.
- To compare the faintest, earliest galaxies to today's grand spirals and understand how galaxies assemble over billions of years.
- To see where stars and planetary systems are being born.
- To observe the atmospheres of extrasolar planets (beyond our solar system), and perhaps find the building blocks of life elsewhere in the universe.

