



Sand and Dust Storms

For Prelims: [United Nations Convention to Combat Desertification](#), [Sand and dust storms](#), [Agriculture](#), [Deforestation](#), [Aral Sea](#), [United Nations Food and Agriculture Organization](#).

For Mains: Sources of Sand and Dust Storms, Effective Ways to Minimize the Impacts of Sand and Dust Storms.

Source: DTE

Why in News?

The recent meeting of the [United Nations Convention to Combat Desertification \(UNCCD\)](#) shed light on the **far-reaching consequences of [sand and dust storms](#)** and proposed crucial policy recommendations to mitigate their effects.

What are Sand and Dust Storms?

▪ About:

- **Sand and dust storms** are meteorological events that occur when **strong winds lift large amounts of sand and dust particles** from the ground and transport them over long distances.
 - They mainly **affect arid and semi-arid regions**, but can also impact areas far from their source.
- Annually, over **two billion tonnes of sand and dust traverse extensive distances across the Earth's atmosphere**, creating a global phenomenon with profound implications.

▪ Sources of Sand and Dust Storms:

- According to the **UNCCD**, sand and dust storms are caused by **both natural and human factors**.
 - About **75% of global dust emissions originate from natural sources** in the world's drylands, such as **hyper-arid regions**, topographic depressions, and dry ancient lake beds.
 - The remaining **25% are attributed to human activities**, mainly agriculture.
- Some of the **Anthropogenic** Causes of Sand and Dust Storms are:
 - **Unsustainable Agricultural Practices:** [Agriculture](#) stands as a primary anthropogenic source, with activities like **tillage, land clearing, and abandoned croplands** contributing to dust emissions.
 - **Land Use Changes:** Alterations in land use patterns, including [deforestation](#) and [urbanization](#), contribute to the destabilization of surfaces, enhancing dust emissions.
 - **Water Diversion:** Excessive diversion of water from rivers for agricultural purposes can lead to the shrinkage of water bodies, creating new sources of sand and dust storms.
 - For example, **the excessive diversion of water from rivers in Central**

Asia over several decades towards agriculture has shrunk the [Aral Sea](#), a pre-existing lake between Kazakhstan to its north and Uzbekistan to its south.

- It has now become the **Aralkum Desert**, a significant new source of sand and dust storms.

- **Climate-Related Amplifiers:**

- **Aridity and Minimal Precipitation:** High air temperatures, minimal precipitation, and arid conditions act as drivers, amplifying the likelihood and intensity of these storms.
- **Extreme Weather Events:** Intensified wind patterns and **prolonged droughts due to [climate change](#)** exacerbate the severity and frequency of sand and dust storms.

- **Impacts:**

- **Environmental Impacts:**

- **Soil Degradation:** Sand and dust storms **strip away fertile topsoil, affecting soil quality and fertility.**
 - This degradation reduces the land's ability to support vegetation, impacting agriculture and leading to desertification.
 - The loss of fertile soil also **affects water retention and nutrient availability.**
- **Ecosystem Disruption:** These storms can alter ecosystems by burying vegetation, disrupting natural habitats, and affecting wildlife.
 - **[Invasive species](#) carried by the storms** might outcompete native species, leading to biodiversity loss and ecological imbalance.

- **Socioeconomic Impacts:**

- **Health Effects:** Health impacts are wide-ranging, **affecting respiratory health, causing allergies**, and exacerbating existing conditions like asthma.
 - Recent incidents, such as a **two-day storm in Mongolia in 2021**, illustrate the devastating impact on human lives, displacing thousands and causing casualties alongside substantial livestock losses.
- **Economic Losses:** Sand and dust storms cause substantial economic losses by **damaging infrastructure, reducing agricultural productivity, disrupting transportation**, and increasing healthcare costs.
 - These events can also **impact [tourism](#) and trade**, affecting local and regional economies.
- **Social Disruption:** Disrupted daily life due to these storms can lead to social unrest, migration, and displacement.

- **Global Implications:**

- **Transboundary Impact:** Sand and dust storms do not adhere to **geopolitical boundaries**; they can cross borders, affecting multiple countries.
- **Climate Feedback:** The transportation of dust particles globally due to these storms can **influence climate feedback loops**, impacting weather patterns and potentially contributing to climate change.

Note: Sand and dust storms also present a formidable challenge to **achieving 11 of the 17 Sustainable Development Goals**, according to the [United Nations Food and Agriculture Organization \(FAO\)](#) report Sand and dust storms: A Guide to Mitigation, Adaptation, Policy, and Risk Management Measures in Agriculture.

What are Effective Ways to Minimize the Impacts of Sand and Dust Storms?

- **Preventive Measures:**

- **Soil Moisture Management:** Implement effective water conservation methods to retain soil moisture and prevent desertification.

- **Regulatory Framework:** Enforce strict land-use regulations to **curb activities leading to soil degradation and dust emissions**, such as overgrazing or improper land development.
- **Eco-friendly Practices:** Promote sustainable **agricultural techniques like agroforestry and contour plowing** to preserve soil structure and reduce wind erosion.
- **Preparedness:**
 - **Early Warning Systems:** Developing and implementing **effective early warning systems to forecast sand and dust storms**. This allows communities to prepare and take necessary precautions.
 - **Education and Awareness:** Educating communities about the **risks, impacts, and protective measures** against sand and dust storms can help reduce vulnerability.
 - **Emergency Response Plans:** Establishing plans to respond effectively during and after sand and dust storms, including **providing shelter, medical care, and support for affected communities**.
- **Mitigation Strategies:**
 - **Infrastructure Development:** Building infrastructure like **windbreaks, barriers, or green belts** to reduce the speed and impact of wind carrying dust and sand.
 - **Technological Solutions:** Researching and investing in innovative technologies for **dust suppression and soil stabilization**.

What is the United Nations Convention to Combat Desertification?

- The **UNCCD is the only legally binding framework set up to address desertification and the effects of drought**.
 - There are currently **197 Parties** to the Convention, including **196 country Parties and the European Union**.
- The Convention based on the principles of participation, **partnership and decentralization**, is a multilateral commitment to mitigate the impact of land degradation, and protect our land so we can provide **food, water, shelter and economic opportunity to all people**.
- The Convention addresses specifically the **arid, semi-arid, and dry sub-humid areas**, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found.

UPSC Civil Services Examination, Previous Year Questions

Prelims

Q. What is/are the importance/importances of the ' United Nations Convention to Combat Desertification' ? (2016)

1. It aims to promote effective action through innovative national programmes and supportive international partnerships.
2. It has a special/particular focus on South Asia and North Africa regions, and its Secretariat facilitates the allocation of major portions of financial resources to these regions.
3. It is committed to a bottom-up approach, encouraging the participation of local people in combating desertification.

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (c)

Mains

Q. The process of desertification does not have climate boundaries. Justify with examples. **(2020)**

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