Dust Storms

A Dust Storm, otherwise known as a sandstorm, is a meteorological phenomenon that occurs frequently in arid and semi-arid regions. Apart from a gust of wind blowing loose sand and dirt from a dry surface, it also moves soil from one place to another.

Context: As per the Sand and Dust Storms Risk Assessment in Asia and the Pacific report, published by Asian and Pacific Centre for the Development of Disaster Information Management (APDIM), more than 500 million people in India and about 80% of the population of Turkmenistan, Pakistan, Uzbekistan, Tajikistan and Iran are exposed to the negative effects of dust storms.

This article will give more information about dust storms and also the environmental risk in the affected regions. The information will be useful in the Environment and Ecology segment of the IAS Exam.

What causes Dust Storms?

Force of dust passing over loose particles increases which causes sand particles to vibrate and move across the surface in a process called saltation. With repeated strokes on the ground, the particles become loose and break off into even smaller dust particles which begin to travel through the air. This process is called suspension.

A combination of arid conditions and high wind speeds cause particles to become loose. Wind gusts may be produced by a dry cold front with a dry air mass that produces no precipitation.

In desert regions, dust storms are commonly caused either by thunderstorms or by strong pressure which increases wind velocity. The extent of the dust or sand is largely dependent on the stability of the atmosphere above the ground as well as the weight of the particulates.

Drylands around North Africa and the Arabian Peninsula are the main sources of airborne dust. It is thought that poor management of drylands is increasing the strength and frequency of dust storms, impacting local and global climate in the process.

Environmental Impact of Dust Storms

Dust storms cause soil loss from the dry lands and even remove organic matter and nutrient-rich particles, thus reducing agriculture productivity. It also affects visibility, aircraft movement and road transportation and power supply

According to the Dust Storms Risk Assessment in Asia and the Pacific report:

- India, China and Pakistan suffered energy losses worth Rs 782 crore and exceeded $46 million and $37 million for China and Pakistan respectively

- Cotton production has also been negatively affected in Turkmenistan, Pakistan and Uzbekistan due to the frequency of dust storms.

- Large portions of farmland in Turkmenistan and Uzbekistan have been affected as the dust storms deposit salt content, making it toxic for plants. It reduces yield and affects production of irrigated cotton and other crops.

- Water supply in the Himalayan-Hind Kush mountain regions is also at risk due to dust being deposited there. It puts more than 1.3 billion people in the region at risk due to contamination of fresh water supply.

- Deposit of dust on glaciers further accelerates a warming effect that increases the melting of ice, this has a direct impact on society in terms of food security, energy production, flood regimes etc.

Sand and dust storms directly affect 11 of the 17 United Nations-mandated sustainable development goals (SDG):

- Ending poverty in all forms
- Ending hunger
- Good health and well-being
- Safe water and sanitation
- Industry innovation and infrastructure
- Sustainable cities and communities

It is not necessary that all the impacts of dust storms are negative. They can increase the nutrient content in terms of improved vegetation

Dust deposited in water bodies can alter their characteristics at the chemical levels, such as improving phytoplankton balance and marine food webs.

Frequently Asked Questions about Dust Storms

How harmful are dust storms to humans?

Dust storms may have adverse effects on your health and are especially harmful for people who already have breathing-related difficulties. Inhaling small or fine dust can get deep into the lungs and cause serious health problems.

Why are dust storms a problem?

Dust storms can cause air problems which can persist even months afterward, Dust storms can also cause the following problems:

- It can make it difficult for airplanes and ground vehicles to navigate as it will reduce visibility and cause mechanical problems.

- Breathing dusty air during dust storms can cause health problems - especially for those suffering from asthma