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Mains Practice Questions

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Q. What do you understand by 'dust storms'? Discuss the reasons behind their formation and their impact. (150 words)

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Approach:

- Define dust storms
- Explain formation of sand storm
- State impacts

Dust Storms

- Sand and dust storms are common meteorological hazards in arid and semi-arid regions. They are usually caused by thunderstorms – or strong pressure gradients associated with cyclones – which increase wind speed over a wide area.
- Sand and dust particles are distinguished by their grain size. Storms carrying bigger particles are known as Sand Storm whereas those carrying smaller are called dust Storms.
- Marginal dry lands are increasingly a source of major dust storms. These areas have fragile, delicately balanced ecosystems. Their degradation, called desertification, makes the soil less resilient to wind during prolonged drought.

Formation of Dust Storms

- Sand and dust storms usually occur when strong winds lift large amounts of sand and dust from bare, dry soils into the atmosphere.
- Once released from the surface, dust particles are raised to higher levels of the troposphere by turbulent mixing and convective updrafts.
- They are transported by winds for lengths of time, depending on their size and meteorological conditions, before being pulled back down to the surface again.
- As larger particles sediment more quickly than smaller ones, there is a shift toward smaller particle sizes during transport.
- Areas which have higher moisture witness thunderstorm and areas relatively devoid of moisture suffer from dust storms.

Impact of Dust Storm

- Airborne dust presents serious risks for human health. Particles larger than 10 µm can damage external organs – mostly causing skin and eye irritations, conjunctivitis and enhanced susceptibility to ocular infection.
- Surface dust deposits are a source of micronutrients for both continental and maritime ecosystems which can cause algal bloom.
- It also reduces crop yields by burying seedlings, causing loss of plant tissue, reducing photosynthetic activity and increasing soil erosion.

- Indirect dust deposit impacts include filling irrigation canals, covering transportation routes and affecting river and stream water quality
- Reductions in visibility due to airborne dust also have an impact on air and land transport. Such as takeoff and landing of planes.
- Dust can impact on the output of solar power plants, especially those that rely on direct solar radiation. Dust deposits on solar panels are a main concern of plants operators.