No Snow January in Himachal Pradesh

Why in news?

Records from the India Meteorological Department (IMD) suggest Himachal Pradesh has registered its driest January since 1901, with a 99.7% shortfall in January rain compared to what is normal.

What is snow?

- **Snow** - Snow is precipitation that falls in the form of ice crystals.
- The ice crystals are formed individually in clouds, but when they fall, they stick together in clusters of snowflakes.
- Snowflakes develop different patterns, depending on the ***temperature and humidity of the air.***
- Snow requires temperatures at the ground to be near or below freezing—***less than 0 degrees C (32-degrees Fahrenheit).***

  Precipitation is any type of water that forms in the Earth's atmosphere and then drops onto the surface of the Earth.

- **Formation of snow** - Water vapor, droplets of water suspended in the air, builds up in the Earth's atmosphere.
- Water vapor collects with other materials, such as dust, in clouds.
- Precipitation condenses, or forms, around these tiny pieces of material, called ***cloud condensation nuclei (CCN).***
- Clouds eventually get too full of water vapor, and the precipitation turns into a liquid (rain) or a solid (snow).

What is the reason for the lack of snowfall?

- **Fall in the number of Western Disturbances** - Western Disturbances (WDs) are storms that originate in the ***mid-latitude regions*** and travel thousands of kilometres to bring rains across northern India.
- This is a non-monsoonal precipitation pattern driven by the ***Westerlies.***
- When the temperatures are low, they result in snowfall and water being available as snow melt.
- Usually, 5 to 7 WDs affect Northwest India in the period from December to January, but this winter, there have been none.
- As a result, the Western Himalayan Region received 80% less rain than normal.

- **El Niño conditions over the equatorial Pacific Ocean** - El Niño is the warming of sea waters in Central-east Equatorial Pacific that occurs every few years (***Warm phase off the coast of Peru***).
- During El Niño, surface temperatures in the equatorial Pacific rise and this weakens the trade winds that blow near the Equator.
- In India, an El Nino event is strongly linked to suppressed rainfall.
- **Absence of a strong jet stream** - Jet streams are relatively narrow bands of strong wind (250 to 320 km/hr) in the *upper levels of the atmosphere* (about 12 km above mean sea level).
- Within jet streams, the winds blow from west to east, but the band often shifts north and south because jet streams follow the boundaries between hot and cold air.
- The ***western cyclonic disturbances*** which enter the Indian subcontinent from the west and the northwest during the winter months, originate over the Mediterranean Sea and are brought into India by the ***westerly jet stream.***
- The arrival of these disturbances is often indicated by a rise in the night temperature.

Phenomenon	Effect on India
Western Disturbances	Gives rain
El Niño	Suppress the rain
Strong jet stream	Gives rain

References

1. National Geographic | Snow formation
2. The Hindu | Himachal Pradesh's rainless January