



Unusually Colder and Wetter Winter

For Prelims: Western Disturbances, La Nina.

For Mains: Weather Patterns such as La Nina and their impact on India's weather.

Why in News

In India, especially in North India, the winter of 2021-22 has been unusually cold and unusually long. The days, in particular, have **felt colder and chillier than normal**.

Key Points

▪ About:

◦ Colder:

- Since December 2021, maximum temperatures across the North, Northwest and Central India regions have persistently remained below normal, resulting in “cold day” conditions. Technically, this means more than just a day that is cold.
 - A cold day is one in which **the maximum temperature falls below 16 degrees Celsius**, a phenomenon that is commonly seen during the winter months in the northern plains of India.

◦ Wetter:

- Light to moderate intensity rainfall is also commonly seen during winters in neighboring regions of North India.
- This January, however, has seen **widespread rain across the central, northwestern, northern, eastern, and northeastern** regions of India.
- As many as 24 states or Union Territories have recorded **rainfall varying from excess to large excess this month**.

◦ Less Fog than Normal:

- December and January are known for the formation of dense fog across North India.
 - In January 2022, the national capital remained affected by fog for 252 hours against a normal of 292 hours.
- IMD officials said the ongoing winter has recorded the **lowest fog hours since 1991-92 over Delhi**.

▪ Causes:

◦ Western Disturbances:

- Until 25th January 2022, **seven western disturbances had passed over India** — nearly all of them **strong enough to cause widespread rain, snowfall, and turbulent weather across large geographical areas** between Pakistan and Northeast India.
 - These systems caused hailstorms in northern Maharashtra, and heavy rainfall in Tamil Nadu.

◦ La Niña:

- Frequent and higher numbers of **western disturbances are associated with La Niña**.

- **At present, moderate intensity La Niña conditions** — which manifests itself as cooler than normal sea surface temperatures in the equatorial Pacific Ocean — are prevailing.
- **Cold Winds from Far North:**
 - After a western disturbance crosses India, **cold winds from the far north of the country penetrate to lower latitudes**, and can reach up to even Telangana and Maharashtra, leading to colder weather, and sometimes to cold wave conditions.
- **Low-lying Clouds and Moisture:**
 - The presence of low-lying clouds and the availability of moisture along the Indo-Gangetic plains made it favorable for cold day conditions and the additional chill factor experienced during the day time.
 - This was the longest and most intense spell of the season so far.

Western Disturbance

- **Western Disturbance (WD)**, labeled as an **extra-tropical storm** originating in the Mediterranean, is **an area of low pressure that brings sudden showers, snow and fog** in northwest India.
- The disturbance **travels from the “western” to the eastern direction**.
 - These travel **eastwards on high-altitude westerly jet streams** - massive ribbons of fast winds traversing the earth from west to east.
- **Disturbance means** an area of “disturbed” or reduced air pressure.
 - Equilibrium exists in nature due to which the air in a region tries to normalise its pressure.
- In the term “extra-tropical storm”, storm refers to low pressure. “Extra-tropical” means outside the tropics. As the WD originates outside the tropical region, the word “extra-tropical” has been associated with them.

La Niña

- **La Niña** events represent **periods of below-average sea surface temperatures across the east-central Equatorial Pacific**.
 - It is indicated by sea-surface temperature decreased by more than 0.9°F for at least five successive three-month seasons.
- The La Nina event is observed when the **water temperature in the Eastern Pacific gets comparatively colder than normal**, as a consequence of which, there is a strong high pressure over the eastern equatorial Pacific.
- In India, the La Nina is generally **responsible for cooler than normal winters and more than normal rainfall**.

Source: IE

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