

1. **Cold wave:** The cold wave conditions signify a certain amount of fall of temperature at a given place with respect to normal climatological value. In India, the cold wave (CW) conditions are generally experienced during the period from November to March. However; the disaster data shows that the damages and casualties are associated with CWs during the months of December to March. It has a severe impact on human health, varying from **Cough and cold**, bronchitis and respiratory diseases, Blood pressure issues, Skin problems, and even Bone, joint, and muscle pain due to lack of sunlight. The health conditions, particularly of the poor people, are seriously affected, and in extreme cases even it causes casualty.

The criteria adopted by IMD to define Cold Wave is given below:

- (a) Cold Wave is considered when the minimum temperature of a station is 10°C or less for plains and 0°C or less for Hilly regions.

- (i) Based on Departure

Cold Wave: Negative Departure from normal is 4.5°C to 6.4°C

Severe Cold Wave: Negative Departure from normal is more than 6.4°C

- (ii) Based on Actual Minimum Temperature (For plain stations only)

Cold Wave: When minimum temperature is $\leq 04^{\circ}\text{C}$

Severe Cold Wave: When minimum temperature is $\leq 02^{\circ}\text{C}$

- b) Cold Wave conditions for coastal stations

When minimum temperature departure is -4.5°C or less over a station, "Cold Wave" may be described if the minimum temperature is 15°C or less.

Annual Disaster Weather Report published by India Meteorological Department reports the cold wave cases over India that caused hazards in terms of human death. Though actual cold wave cases were more, only the cases that caused human death were reported and are considered in our analysis. For each of four months and annual scale, there are two maps showing the total number of cold wave days that caused casualties to the humans, and the Normalized Vulnerability Index calculated for each district as per the formula mentioned in equation 1.