

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. 1001
TO BE ANSWERED ON FEBRUARY 07, 2020**

HEAT WAVES

1001. SHRI G.M. SIDDESHWAR:

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether it is a fact that there has been an increase in heat waves in the country during the last three years and if so, the details thereof and the reasons therefor;**
- (b) the details of mechanism adopted by the Government to track heat waves and also changes in temperature that would be classified as heat wave; and**
- (c) the effects of heat waves on labour productivity, public health and disaster events?**

ANSWER

**MINISTER FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES
(DR. HARSH VARDHAN)**

- (a) Latest studies show an increase in temperatures as well as occurrence of Heat Waves in many parts of country during the recent years. One of the reasons for the increase in heat waves is global warming associated with the increase in greenhouse gasses like Carbon dioxide, Methane etc. in the atmosphere.**

In India, rise in maximum temperatures as well as Heat Waves are found to be more in the months of April, May & June. Core Heat-wave Zone (CHZ) is the most prone area for Heat Wave (HW) & Severe Heat Wave (SHW) with highest frequency of occurrence during the month of May. The CHZ covers States of Punjab, Himachal Pradesh, Uttarakhand, Delhi, Haryana, Rajasthan, Uttar Pradesh, Gujarat, Madhya Pradesh, Maharashtra, Chhattisgarh, Bihar, Jharkhand, West Bengal, Odisha, Andhra Pradesh and Telangana.

The Heat Wave events happened during last three years, viz. 2017, 2018 & 2019 are given in the table below:

| States | Heat Wave events |
|-----------------------|------------------|
| Year 2017 | |
| Andhra Pradesh | 1 |
| Jharkhand | 2 |
| Maharashtra | 6 |
| Odisha | 8 |
| Telangana | 12 |
| West Bengal | 1 |
| Year 2018 | |
| Uttar Pradesh | 2 |
| Maharashtra | 5 |
| Jharkhand | 1 |
| Kerala | 3 |
| Chattisgarh | 1 |
| Year 2019 | |
| Maharashtra | 15 |
| Kerala | 6 |
| Bihar | 4 |
| Rajasthan | 1 |

- (b) **India Meteorological Department (IMD) uses temperature data from surface observatories to track heat waves. IMD also uses various numerical weather prediction models to track and predict occurrence and intensity of Heat Waves.**

In India the latest criteria used for defining the HW are based on the climatological values for the period of 1971–2000 and are given below:

Criteria for declaring heat wave based on maximum temperature (T_{max}):

Heat wave over a station is declared only when the actual T_{max} of the station is 40°C for plains and 30°C for Hilly regions. However, when the T_{max} is 40°C for coastal stations and 45°C for other stations, conditions are declared as heat wave.

The following criteria are used for defining severity of the heat wave:

When normal T_{max} is less than or equal to 40°C and

- i. Actual T_{max} is greater than Normal T_{max} by 5°C / 6°C: heat wave**
- ii. Actual T_{max} is greater than Normal T_{max} by 7°C: severe heat wave**

When normal T_{max} is greater than 40°C and

- i. Actual T_{max} is greater than Normal T_{max} by 4°C / 5°C: heat wave**
- ii. Actual T_{max} is greater than Normal T_{max} by 6°C: severe heat wave**

**Note: Normal T_{\max} – Average maximum temperature of the day.
Actual T_{\max} – observed maximum temperature of the day.**

Criteria for Hot day

Whenever, the maximum temperature remains 40°C or more and minimum temperature is 4.5°C or more above normal, it may be defined as Hot Day, provided it is not satisfying the heat wave criteria given above.

- (c) A large section of mostly daily wage labourers and others engaged in outdoor work and/ or exposed to indoor heat in Indian cities are more likely to be affected by heat waves. In addition to cities and villages, specific industrial operations (e.g., mining, thermal power, furnace, refineries) emit as well as absorb considerable heat. With the majority of workplace settings in developing countries being heavily influenced by outdoor temperatures, it can be expected that both indoor and outdoor workers will experience increased heat stress. Even relatively modest increase in ambient temperatures could be expected to tip large worker populations over the threshold into the realm of heat stress related health risks and thereby impact the productivity.**

Four Common heat health impacts resulting from excessive exposure to heat waves include dehydration, cramps, exhaustion and heatstroke. It is also learnt that there is a sharp rise in number of cases of acute gastroenteritis and food poisoning due to spoilage of food and reduction of its shelf life due to high temperatures. There is also rise in number of cases of anxiety, palpitations, nervousness and behavioural change linked to extreme temperature rise. The occupational profile of most of the victims was ascertained as agricultural labourers, coastal community dwellers, and people living below poverty line (BPL) category with mostly outdoor occupations.

Taking these onto notice, Government has adapted Heat Action Plan in different States to tackle the impact of Heat Waves.

Heat Action Plan is a comprehensive early warning system and preparedness plan for extreme heat events. The Plan presents immediate as well as long-term actions to increase preparedness, information-sharing, and response coordination to reduce the health impacts of extreme heat on vulnerable populations.

IMD in collaboration with local health departments has started preparing/implementing Heat Action Plan in many parts of the country to forewarn about the heat waves and also advising action to be taken during such occasions. Heat action plan became operational in the year 2013.
