

**01 – 12 – 2022**

- News: 160–200 mn Indians could be exposed to lethal heat waves annually:  
World Bank report
- From 2030, 160 million to 200 million people can be exposed to lethal heatwaves in India every year, and nearly 34 million Indians will face job losses due to heat stress related productivity decline. By 2037, the demand for cooling is likely to be eight times more than the current level, the World Bank has said in a report.

## **Heat Waves**

- A Heat Wave is a period of abnormally high temperatures, more than the normal maximum temperature that occurs during the summer season in the North-Western parts of India.
- Heat Waves typically occur between March and June, and in some rare cases even extend till July.
- The extreme temperatures and resultant atmospheric conditions adversely affect people living in these regions as they cause physiological stress, sometimes resulting in death.

The Indian Meteorological Department (IMD) has given the following criteria for Heat Waves:

- Heat Wave need not be considered till **the maximum temperature of a station reaches at least 40°C for Plains and at least 30°C for Hilly regions.**
- When the normal maximum temperature of a station is less than or equal to **40°C** Heat Wave Departure from normal is 5°C to 6°C Severe Heat Wave Departure from normal is **7°C or more.**
- When the **normal maximum temperature of a station is more than 40°C** Heat Wave Departure from normal is 4°C to 5°C Severe Heat Wave Departure from normal is 6°C or more
- When the **actual maximum temperature remains 45°C or more irrespective of normal maximum temperature, heat waves should be declared.**
- Higher daily peak temperatures and longer, more intense heat waves are becoming increasingly frequent globally due to climate change.

### **Health Impacts of Heat Waves**

- The health impacts of Heat Waves typically involve dehydration, heat cramps, heat exhaustion and/or heat stroke.

The signs and symptoms are as follows:

- **Heat Cramps: Ederna (swelling) and Syncope (Fainting) generally accompanied by fever** below 39°C or 102°F.
- **Heat Exhaustion:** Fatigue, weakness, dizziness, headache, nausea, vomiting, muscle cramps and sweating.
- **Heat Stoke: Body temperatures of 40°C / 104°F** or more along with delirium, seizures or coma.
- This is a potential fatal condition.

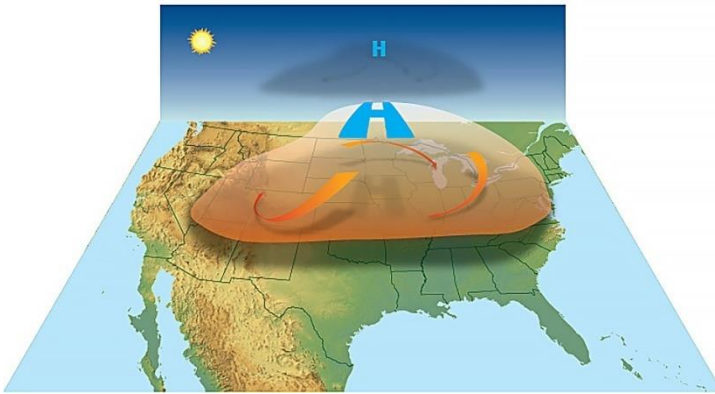
# Heat Domes

- High-pressure circulation traps hot ocean air like a lid or a cap trapping heat at the surface and favouring the formation of a heat wave.
- Higher daily peak temperatures and longer, more intense heat waves are becoming increasingly frequent globally due to climate change.

## Effects of Extreme Heat

- According to the World Health Organization (WHO), extreme heat can exacerbate pre-existing health conditions, including respiratory diseases, heart conditions and kidney disorders.
- The immediate effects on the human body are heat cramps, dehydration and even potentially fatal heat strokes.
- It can also have a severe impact on agriculture and forests.
- It either causes vegetables to wilt and die or encourage the spread of plant diseases.
- It causes wildfires which lead to forest cover reduction and death of fauna.
- It affects infrastructure too by straining power grids and causing blackouts. It can ground planes, melt roads and cause the inside of vehicles to overheat to dangerous levels.

- Recently, **Death Valley (USA)** registered a **temperature** of  $54.4^{\circ}\text{C}$  which, once verified, could be the highest temperature in more than a century.
- The temperature has been termed as preliminary and not final as it awaits verification.



# Marine Heatwaves

- Marine heatwaves are periods of extremely high temperatures in the ocean.
- These events are linked to coral bleaching, seagrass destruction, and loss of kelp forests, affecting the fisheries sector adversely.
- Study showed that 85% of the corals in the Gulf of Mannar near the Tamil Nadu coast got bleached after the marine heatwave in May 2020.
- The most common drivers of marine heatwaves include ocean currents which can build up areas of warm water and air-sea heat flux, or warming through the ocean surface from the atmosphere.
- Winds can enhance or suppress the warming in a marine heatwave, and climate models like El Niño can change the likelihood of events occurring in certain regions.

## Impact of Marine Heatwaves

### Affect Ecosystem Structure

- Marine heat waves affect ecosystem structure, by supporting certain species and suppressing others.

- It has been **associated with the mass mortality of marine invertebrates**, and may force species to change behaviour in a way that puts wildlife at increased risk of harm.

### **Change Habitat Ranges of Certain Species**

- Marine heatwaves can **change the habitat ranges of certain species**, such as the spiny sea urchin off southeastern Australia which has been expanding southward into Tasmania at the expense of kelp forests which it feeds upon.

### **Economic Losses**

- Marine heatwaves can **cause economic losses through impacts on fisheries** and aquaculture.

### **Affect Biodiversity**

- Biodiversity can be drastically affected by marine heatwaves.
- In **2016, marine heatwaves across northern Australia led to severe bleaching of the Great Barrier Reef.**

## Increase the Risk of Deoxygenation and Acidification

- Often they occur alongside other stressors such as **ocean acidification, deoxygenation, and overfishing.**
- In such cases, MHWs not only further damage habitats, but also **increase the risk of deoxygenation and acidification.**