

HEATWAVES IN INDIA

GEOGRAPHY OPTIONAL PAPER 1, ENVIRONMENTAL GEOGRAPHY: Principle of ecology; Human ecological adaptations; Influence of man on ecology and environment; Global and regional ecological changes and imbalances; Ecosystem their management and conservation; Environmental degradation, management and conservation; Biodiversity and sustainable development; Environmental policy; Environmental hazards and remedial measures; Environmental education and legislation.

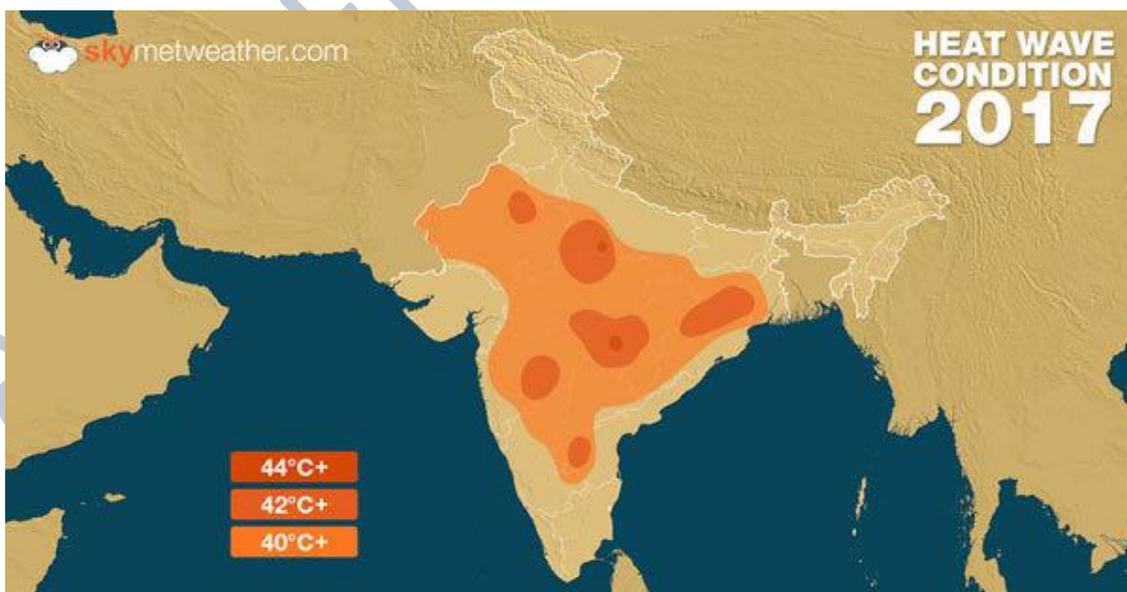
GEOGRAPHY OPTIONAL PAPER 2, CONTEMPORARY ISSUES: Ecological issues: Environmental hazards: landslides, earthquakes, Tsunamis, floods and droughts

HEATWAVE:

- 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.

STATISTICS AND IMPLICATIONS ON INDIA:

- From 2014-2017, the average length of heatwaves in India ranged from 3-4 days compared to the global average of 0.8-1.8 days



- Almost 153 billion hours of labour were lost globally in 2017 due to heat, an increase of 62 billion hours from the year 2000. Overall, across sectors India lost almost 75,000 million hours of labour in 2017, from about 43,000 million hours in 2000.
- The findings are significant for India as agriculture makes up 18% of the country's GDP and employs almost half the population. A recent World Bank report on South Asia's hotspots predicted a 2.8% erosion of the country's GDP by 2050, accompanied by a fall in living standards due to changes in temperature, rainfall and precipitation patterns.
- Agriculture sector is more vulnerable compared to the industrial and service sectors because workers there are more likely to be exposed to heat.

IMPACTS OF HEATWAVES:

- Health impacts: Heatwaves are associated with increased rates of heat stress and heat stroke, worsening heart failure and acute kidney injury from dehydration. Children, the elderly and those with pre-existing morbidities are particularly vulnerable.
- Transportation Impacts: Aircraft lose lift at high temperatures. Highways and roads are damaged by excessive heat. Stress is placed on automobile cooling systems, diesel trucks and railroad locomotives. This leads to an increase in mechanical failures. Train rails develop sun kinks and distort. Refrigerated goods experience a significant greater rate of spoilage due to extreme heat.
- Agriculture: Various sectors of the agriculture community are affected by extreme heat. Livestock, such as rabbits and poultry, are severely impacted by heat waves. Millions of birds have been lost during heat waves. Milk production and cattle reproduction also decreases during heat waves. High temperatures at the wrong time inhibit crop yields. Wheat, rice, maize, potato, and soybean crop yields can all be significantly reduced by extreme high temperatures at key development stages.
- Energy: The electric transmission system is impacted when power lines sag in high temperatures. The combination of extreme heat and the added demand for electricity to run air conditioning causes transmission line temperatures to rise.
- Water Resources: The demand for water increases during periods of hot weather. In extreme heat waves, water is used to cool bridges and other metal structures susceptible to heat failure. This causes a reduced water supply and pressure in many areas. This can significantly contribute to fire suppression problems for both urban and rural fire departments. The rise in water temperature during heat waves contributes to the degradation of water quality and negatively impacts fish populations. It can also lead to the death of many other organism in the water ecosystem. High temperatures are also linked to rampant algae growth, causing fish kills in rivers and lakes.

HOW TO BUILD RESILIENCE?

- The health effects were viewed as preventable to a large extent with improved forecasts, warnings, community preparedness and appropriate community based response.
- Identifying heat hot-spots through appropriate tracking of meteorological data and promoting timely development and implementation of local Heat Action Plans with strategic inter-agency co-ordination, and a response which targets the most vulnerable groups are the needs of the hour.
- A review of existing occupational health standards, labour laws and sectoral regulations for worker safety in relation to climatic conditions should be put in place.
- Creating heat preparedness plans, identifying vulnerable populations, and opening cooling centers during extreme heat.
- Using green roofs, improved building materials, and shaded building construction to reduce the urban heat island effect.
- Pursuing energy efficiency to reduce demand on the electricity grid, especially during heat waves.
- Shading and cooling livestock, breeding livestock selectively for heat tolerance, and switching to growing more heat-resistant crops.

PREVIOUS YEARS UPSC OPTIONAL QUESTIONS:

- "Climate change is a reality." Explain with suitable examples. (2017)
- Give a reasoned account on how the impact of Global Warming differs from one part of the Earth to the other. (2016)
- Discuss the significance of World Climate Research Programme (WCRP) and its core projects in the understanding of climatic change. (2016)
- "Man-induced famines are becoming more common than nature-induced ones." Comment.