Raising Heat Stress

Why in news?

The recent study by the Centre for Science and Environment (CSE) has highlighted the escalating problem of “heat stress” in India’s major cities.

What are the key highlights of the study?

- **Increasing heat stress-** India’s megacities of Delhi, Mumbai, Chennai, Bengaluru, Kolkata and Hyderabad are experiencing worsening “heat stress.
- **Rising relative humidity-** Over the past two decades, there has been a significant increase in relative humidity in these cities, with the exception of Bengaluru.
- **Humidity rise in cities-**Hyderabad experienced the highest rise in humidity (10%), followed by Delhi, Mumbai, Kolkata, and Chennai with increases of 8%, 7%, and 5%, respectively.
- **Urban heat island effect-** This effect causes city centers to be significantly warmer, particularly at night, than surrounding areas.

  Urban heat island phenomenon is caused by increased built-up- areas, reduced green cover, congestion, heat absorption by urban structures, and heat generated by human activities.

- **Warmer nights-** The study noted that land surface temperatures at night are not cooling as rapidly as they did a decade ago.
- Hot nights are especially dangerous as they prevent people from recovering from daytime heat, exacerbating heat stress.
- **Heat index-** The combination of high temperatures and humidity limits the body’s ability to cool itself through sweating, leading to higher heat indices and increased heat stress.

  Heat index is a measure of how hot it feels to the human body when the air temperature and the relative humidity are combined ability to cool itself by sweating

- **Heat stress in Delhi**- Delhi has seen a direct correlation between increased built-up areas and rising urban heat stress.
- The city's built-up area grew from 31.4% in 2003 to 38.2% in 2022, contributing significantly to the heat problem.

- **Monsoon period heat index-** The heat index during the monsoon period was higher than in the pre-monsoon period (March to May) in all cities studied.

Major cities	Monsoon period heat index
Delhi, Mumbai and Kolkata	Monsoon period become hotter
Chennai	Slight cooling effect previously seen during the monsoon has disappeared,
Bengaluru and Hyderabad	It remain somewhat cooler during this period.

What are the implications of the study?

- **Heat related illness**- Higher temperatures and humidity can lead to heat exhaustion, heat stroke, dehydration, and other heat-related illnesses.
- **Reduce work productivity-** Higher temperatures can reduce worker productivity, particularly in outdoor occupations such as construction, agriculture, and manual labor.
- **Ecosystem stress-** Elevated temperatures can stress urban vegetation and wildlife, leading to reduced biodiversity and the degradation of urban ecosystems.
- **Impact on infrastructure-**It can accelerate the deterioration of infrastructure such as roads, bridges, and buildings.
- **Energy costs-** The combined effect of higher energy bills and healthcare costs can significantly impact family budgets, reducing disposable income and increasing financial stress.
- **Invest in sustainable solutions-** To mitigate these costs, there is a growing need for investment in sustainable urban planning, such as increasing green spaces, improving building insulation, and promoting energy-efficient technologies.

What lies ahead?

- Raising public awareness about heat risks and promoting preparedness measures can help communities better cope with extreme heat events.
- Sustainable urban planning and development are crucial, emphasizing green infrastructure and the reduction of heat-absorbing surfaces to combat the urban heat island effect.

Reference

Indian Express – Heat stress in metro cities