

Heat islands and their impacts on well-being and livelihoods of the urban poor and gig workers

Introduction

Urban heat island (UHI) is a phenomenon in which urban areas experience significantly higher temperatures compared to their surrounding rural or natural environments. This temperature difference is primarily caused by human activities and the built environment. Heat islands have become a common feature of urban areas worldwide. These can have various impacts on the local climate, environment and public health. They have a particularly significant impact on low-income and underserved communities.

Some key factors that contribute to the formation of heat islands in urban spaces are:

Urban infrastructure: Buildings, roads, and concrete structures in cities absorb and retain heat during the day. This leads to an increase in surface temperatures, especially in areas with high building densities and little vegetation.

Reduced green spaces: Urban areas often have limited green spaces, parks and trees. These vegetation-rich areas help to cool the surroundings through evapotranspiration. However, in areas with less greenery, this cooling effect is diminished.

Waste heat: Activities such as industrial processes, air conditioning, and vehicular traffic produce waste heat that further contributes to the warming of urban environments.

Albedo effect: Urban surfaces, such as asphalt and concrete, have lower albedo (reflectivity) compared to natural surfaces like grass and forests. This means they absorb more sunlight and convert it into heat, elevating local temperatures.

Human activity: The concentration of human activity in cities generates additional heat due to energy consumption through processes such as transportation.

Urban heat islands (UHIs) are a significant issue in India, particularly for low-income communities. Here are some key points:

Health hazards: The relatively warmer temperature in urban areas, compared to the suburbs, may contain potential health hazards due to heat waves, apart from pollution. UHIs increase heat-related mortality and morbidity, especially for vulnerable groups such as senior citizens and low-income communities.

A recent study from IIT Kharagpur called “Anthropogenic forcing exacerbating the urban heat islands in India” noted that the mean daytime temperature of surface urban heat island (UHI Intensity) going up to 2 degrees C for most cities, as analyzed from satellite temperature measurements in monsoon and post-monsoon periods. Other researchers have also noticed a similar rise in daytime temperatures in Delhi, Mumbai, Bengaluru, Hyderabad and Chennai.

Addressing the issue of UHIs is crucial for promoting environmental justice and improving the quality of life for all residents. Some of the ways in which the impacts of UHIs can be mitigated are as discussed below.

Increase vegetation: Planting more trees and increasing green spaces in cities can help absorb heat and reduce the overall temperature. This can also improve air quality and provide shade, making outdoor spaces more comfortable.

A vernacular model of low-cost housing: Planning low or mid-rise high-density housing below tree heights and ensuring shading by trees and self-shading can be part of the strategy. Use of thermally efficient locally available material (e.g., thatch and clay tiles), with courtyards as public places, etc. can also play an important role. The aim is to hybridize modern technologies with traditional materials and approaches.

Cool roofs: Cool roofs reflect more sunlight and absorb less heat than standard roofs. They can be particularly effective in reducing indoor temperatures in buildings without air conditioning.

Cool pavements: Replacing normal pavements with cool pavements, which reflect more sunlight and absorb less heat, can help reduce the heat absorbed by urban areas.

Water bodies and blue green infrastructure: Preserving or constructing water bodies in urban areas and harvesting rainwater can help cool the surrounding areas. There is a need to plan for blue green infrastructure instead of concretization. This has the added co-benefit of ecosystem services.

Public transport: Encouraging the use of public transport can reduce the number of vehicles on the road, thereby reducing heat emissions.

How can this be addressed?

Strategies to mitigate the effects on UHI should be tailored to the specific needs and conditions of each community. It is also important to involve community members in the planning and implementation process. This will ensure that the solutions are equitable and effective.

Addressing heat islands is crucial for maintaining urban liveability, improving public health, and mitigating the effects of climate change on densely populated areas. By implementing appropriate strategies, cities can effectively counteract the impacts of heat islands and create more sustainable urban environments.

- **Suggest solutions for a typical ward in a densely populated city in India keeping the above information and factors in mind.**
- **Suggest a thermally efficient low-cost temporary shelter model in dense areas of the city, that can be used as temporary resting spots by labourers, construction workers, delivery boys, etc.**