

General Studies-1; Topic: Urbanisation – problems and remedies

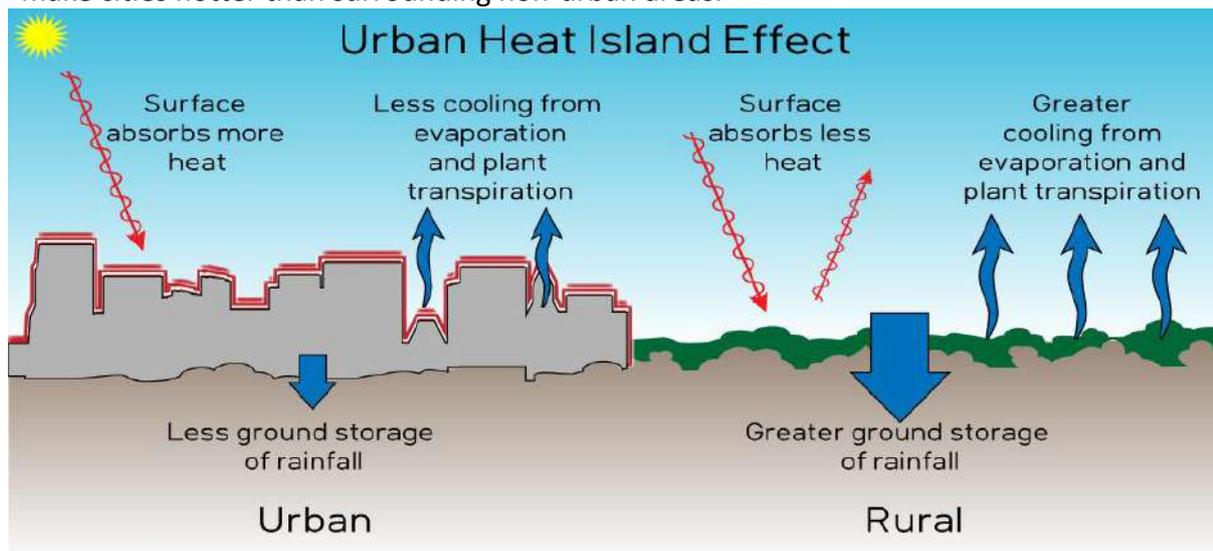
The Urban Heat Island Effect

1) Introduction

- Urban heat island (UHI) means urban areas getting significantly warmer compared with the surrounding areas.
- UHIs are formed as vegetations are replaced by asphalt and concrete for roads, buildings and other structures to meet the growing population.
- The temperature difference usually is larger at night than during the day
- UHI is most noticeable during the summer and winter.

2) Causes

- Rapid and unplanned urbanisation of cities
- Reduction in vegetation, water bodies and crop fields.
- Changes in land use pattern
- Heavily built-up areas and concrete structures
- Concrete and asphalt have low albedo value causing absorption of more heat.
- Dense high-rise buildings provide multiple surfaces for reflection and high absorption of solar radiation.
- Presence of atmospheric aerosols over the urban areas
- Buildings, road, footpaths and other constructions absorb heat and release it later, which increases the temperature of the surroundings.
- Use of tar and cement also triggers thermal changes
- Heat from automobiles, air conditioning, industry, and other sources also contributes to the UHI.
- All the losses mentioned negatively impact the thermal and radiative properties of the surface and make cities hotter than surrounding non-urban areas.



3) Consequences

- Most cities in India and in the world are warmer than surrounding non-urban areas due to the urban heat island effect.
- Delhi is 4-12°C warmer due to the urban heat island effect.

- Urban dwellers may suffer from excessive changes to heat and rainfall patterns
- Rise in air pollution and heat-related biohazards.
- Increase in the use of air-conditioners in the city with increase in power consumption.
- Impact of the Urban Heat Island Effect on human health includes heat stroke, headache and tiredness.
- It will double the cities' costs for tackling global warming.
- It can make sweltering workers less productive
- Research shows that urban heat island effect contributes to climate warming by about 30%.
- Plants growth can be effected.
- High rooftop surface temperature can heat storm water runoff, which when flows into lakes and ponds raise the water temperature.
- The increase in water temperature affects aquatic life, especially the metabolism and reproduction of aquatic species.

4) **Way Forward**

- With proper environmentally sound town planning we can minimise the impacts.
- Include passive cooling measures such as increased tree cover and increased ventilation in buildings.
- Use of sustainable building materials that absorb less heat during the day.
- Setting up a kitchen garden and using high solar reflective index paint helps in reducing the Urban Heat Island Effect.
- Painting rooftops white is a common strategy to reduce the heat island effect.
- The government must provide discount in property tax for residents taking environment-friendly measures
- Generating awareness to use more and more renewable resources.
- The policy makers should strike a balance by providing equal opportunities at village & town levels thereby checking migration & concentration of population at urban areas.