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Research Article

Urban Heat Islands and Climate Change in Indian Cities: A Geospatial Perspective

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Abstract

Indian cities have changed a lot because of people moving to cities and buildings being constructed. One big problem that has come up is the development of Urban Heat Islands. This is when cities like Delhi, Mumbai and Bengaluru get hotter than the areas around them. Urban Heat Islands are connected to climate change the way we use land, and losing spaces. This paper looks at what causes Urban Heat Islands how they affect people and the environment and where they are found in India. We used maps and satellite images to understand how heat is distributed in cities for example Hyderabad and Chennai. We found that as cities grow heat stress gets worse affecting people's health the environment and the economy. In this research paper discussed about ways to make cities cooler like planting trees using roofs that reflect heat and planning cities in a way that considers the climate.

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1. INTRODUCTION

Urbanisation is a process that is changing the world. India has grown a lot in the few decades because of industries, economy people moving to cities and building more roads and houses. While urbanisation helps the economy it also creates problems like air pollution, not enough water, waste and hotter temperatures. Urban Heat Islands are a concern in Indian cities.
One of the problems is the Urban Heat Island effect. This happens when cities like Mumbai and Bengaluru get hotter than the areas around them because they have buildings, roads and less green spaces. The heat waves in India are getting worse. It's really important to study Urban Heat Islands in cities.
Geographers are important in understanding how the environment changes in areas. They use maps and satellite images to see how temperature is distributed, how land is used and which areas are most affected. This study presents how urbanisation affects the temperature in cities like Delhi and Hyderabad.

2. OBJECTIVES

1. To see how urbanisation affects temperature in cities like Bengaluru and Chennai and how maps and satellite images can help us study Urban Heat Islands in India.
3. To know how Urban Heat Islands affect people and the environment in cities and suggest some ways to make cities like Mumbai and Delhi more sustainable.

3. RESEARCH METHODOLOGY

Data has been collected from government reports, academic papers, satellite images and other published work. information from institutions like the Ministry of Earth Sciences and the National Remote Sensing Centrehas been collected. approach is used to understand Urban Heat Island patterns and what they mean in Indian cities.

Conceptual Framework of Urban Heat Islands

Urban Heat Island is the difference in temperature between cities like Hyderabad and rural areas. Many things contribute to this, including:
green spaces in cities like Delhi.

1. More buildings in cities like Mumbai.
2. Using energy in cities like Bengaluru.
3. Trucks emitting things in cities like Chennai.
4. Industrial activities in cities like Hyderabad.

Cities being too dense. Not allowing air to move in cities like Mumbai.
The intensity of Urban Heat Islands varies depending on the city size how land is used how many people live there and the climate in cities.

Urbanisation and Land-Use Change in India

Cities have grown really fast. Agricultural lands, wetlands and forests have been turned into areas. This changes the surface. Affects how heat is absorbed in cities like Delhi and Bengaluru. When cities grow, we see:
More roads in cities like Mumbai.

1. Less green spaces in cities like Hyderabad.
2. Hotter temperatures in cities like Chennai.
3. More energy being used in cities like Bengaluru.
4. Bad things being emitted in cities like Delhi.

Big cities like Delhi, Mumbai, Bengaluru, Chennai and Hyderabad have changed a lot because of urbanisation and Urban Heat Islands.

Role of GIS and Remote Sensing

Maps and satellite images have changed the wayof earlier do research. They help us analyse datasets easily in cities. These can be used in the following
Map the temperature in cities like Hyderabad.

1. Monitor city growth in cities like Mumbai.
2. Identify areas that'll vulnerable to heat in cities like Delhi.
3. Analyse green spaces in cities like Bengaluru.
4. Plan for climate change in cities like Chennai.

Satellite data helps us identify hotspots and monitor change in cities.
Impacts of Urban Heat Islands

On Human Health

Temperatures can cause heat stroke, dehydration, heart problems and breathing problems in Indian cities. Old people, kids and people who work outside are most affected by Urban Heat Islands.

On the Environment

Urban Heat Islands contribute to energy being used bad air quality, less biodiversity and changed weather patterns in Indian cities.

On the Economy

Heat stress reduces productivity. Increases energy demand in Indian cities. Urban Heat Islands are a concern for the economy in India.

Urban Heat Islands in Major Indian Cities

Delhi gets really hot because it has a lot of buildings, cars and not enough green spaces. Mumbais growth and development near the coast have changed its temperature. Bengaluru is getting hotter because it has lost lakes and green spaces. Hyderabads growth and industries have made its Urban Heat Island effect worse. Chennais growth and land-use changes have increased its temperature.

Climate Change and Urban Heat Islands

Climate change and Urban Heat Islands are connected. Rising global temperatures make local heat worse in cities. Heat waves are getting more frequent and severe in India. City people are exposed to temperatures so we need to adapt to climate change in cities.

Sustainable Solutions

Planting trees and green spaces can reduce temperature in cities. Green roofs with plants can absorb heat. Insulate buildings in cities like Delhi. Cool roofs with materials can reflect heat and

reduce energy use in cities like Mumbai. Sustainable urban planning can help cities like Bengaluru and Hyderabad.

Public Awareness

People need to know about climate change and Urban Heat Islands to adapt effectively in cities. need to tell people about the problems of Urban Heat Islands and how to make cities cooler.

4. RESULT AND DISCUSSION

The study shows that urbanisation and temperature are connected in cities. Cities with buildings and green spaces get hotter. Maps and satellite images help us identify areas and plan better in cities. Urban Heat Islands are not just issues, but social and economic concerns in India.There is a need to work to address them in cities.

Urban Heat Islands are a problem incities. Urbanisation land-use change and climate change have made cities hotter in India. Maps and satellite images can help us understand and manage this problem in cities. There is need to plan cities expand spaces use cool technologies and make policies that consider climate change, in Indian cities. This will help build resilient cities in India.

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