

Elucidating Urban Heat Island in an Industrial Town/s: A Case Study of Jamshedpur Urban Agglomeration

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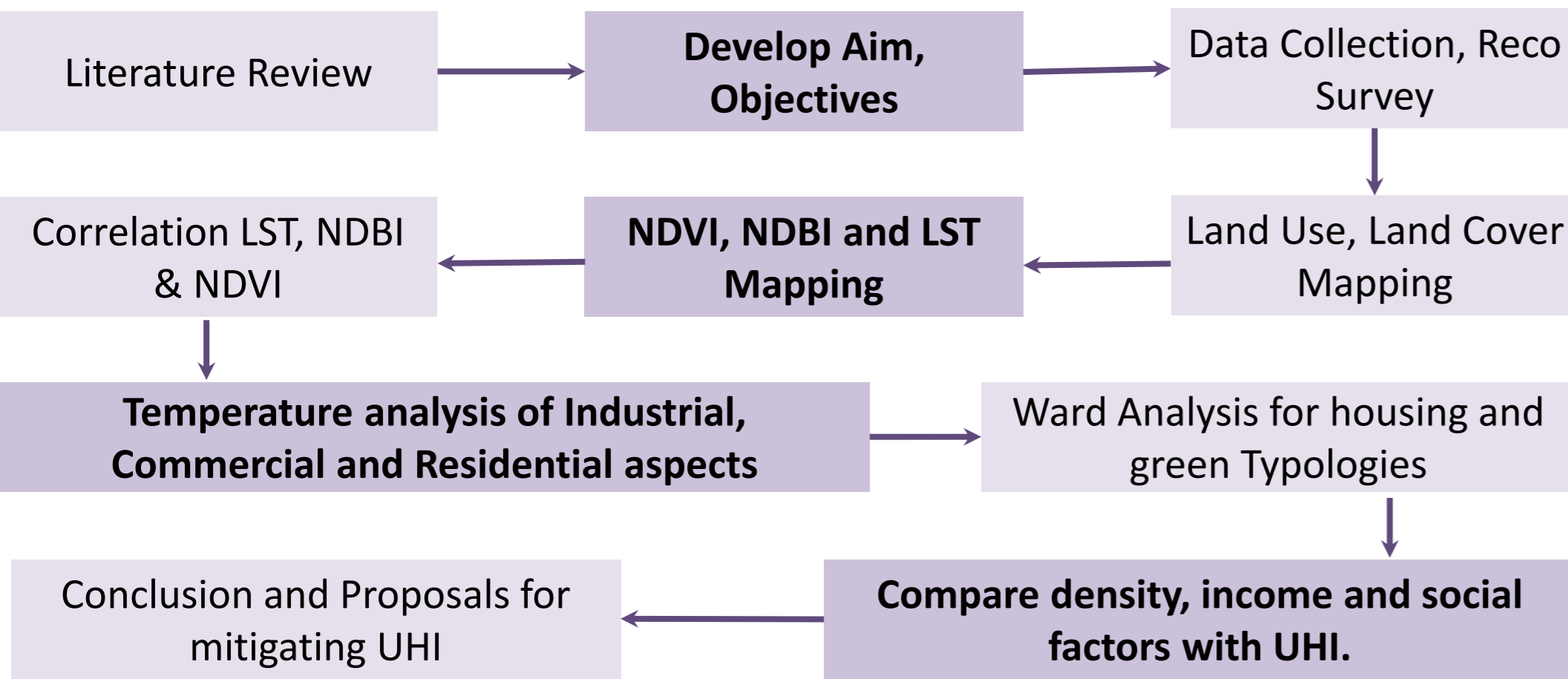
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INTRODUCTION & AIM

A city becomes an **Urban Heat Island** when it gets hotter there than in the neighbouring rural areas. Heat accumulated and released in the urban environment results in a higher urban ambient temperatures compared to the surrounding urban environment.

The aim is to investigate Urban Heat Island phenomenon in an Industrial Area and variations of urban parameters on local climate.

METHODOLOGY



SITE CONTEXT

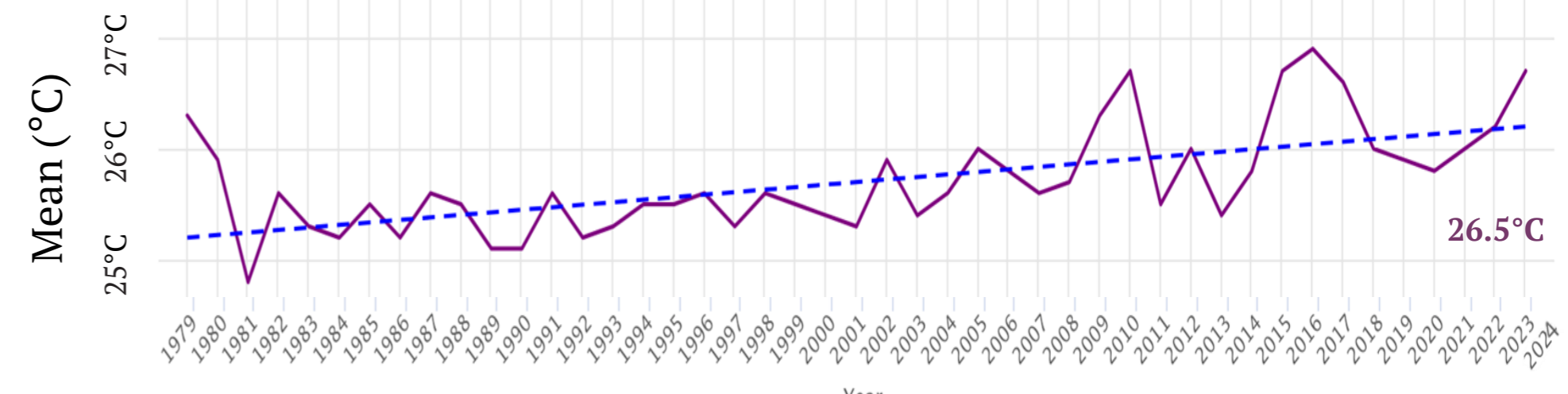
Fig: Administrative structure of JUA



Jamshedpur Urban Agglomeration (JUA) consist of Jamshedpur, Adityapur and Mango notified areas, Jugsalai municipality and 8 villages.

The study area is partly spread over two administrative districts of East Singhbhum and Saraikeela - Kharasawan within Jharkhand. Jamshedji Tata in 1907 discovered Sakchi village in Chota Nagpur plateau region and decided to build the first steel plant of India.

Fig: Temperature Trend (1979 - 2023)



Temperature has risen from **25.2°C** in 1979 to **26.6°C** in 2025, indicating a positive trend attributed to climate change, with a variation of **1.4°C**.

ANALYSIS

Fig: Land Use Land Cover Maps and Land Surface temperature maps for year 1990 and 2025

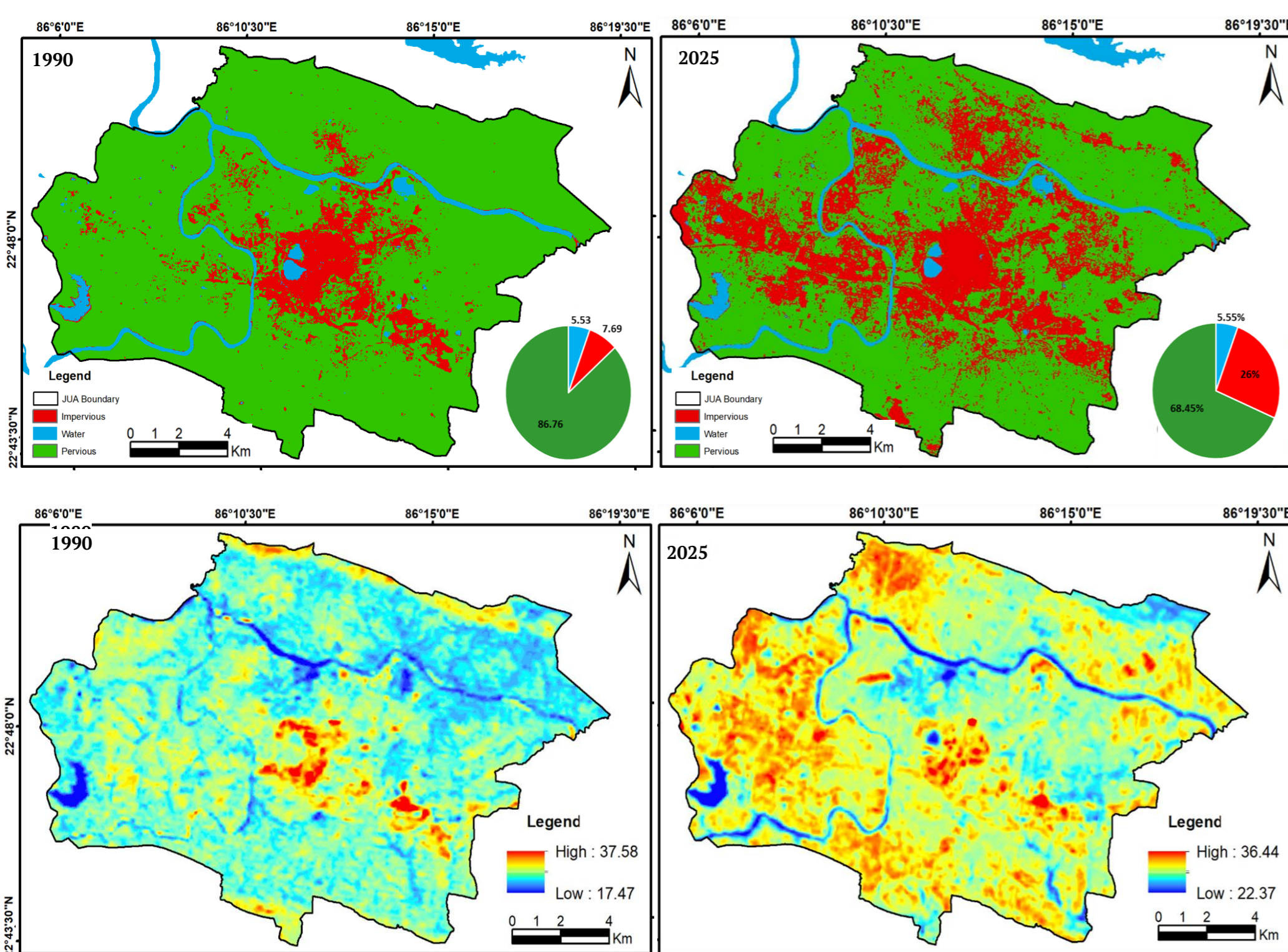


Fig: Urban Heat Island Map for year 1990 and 2025

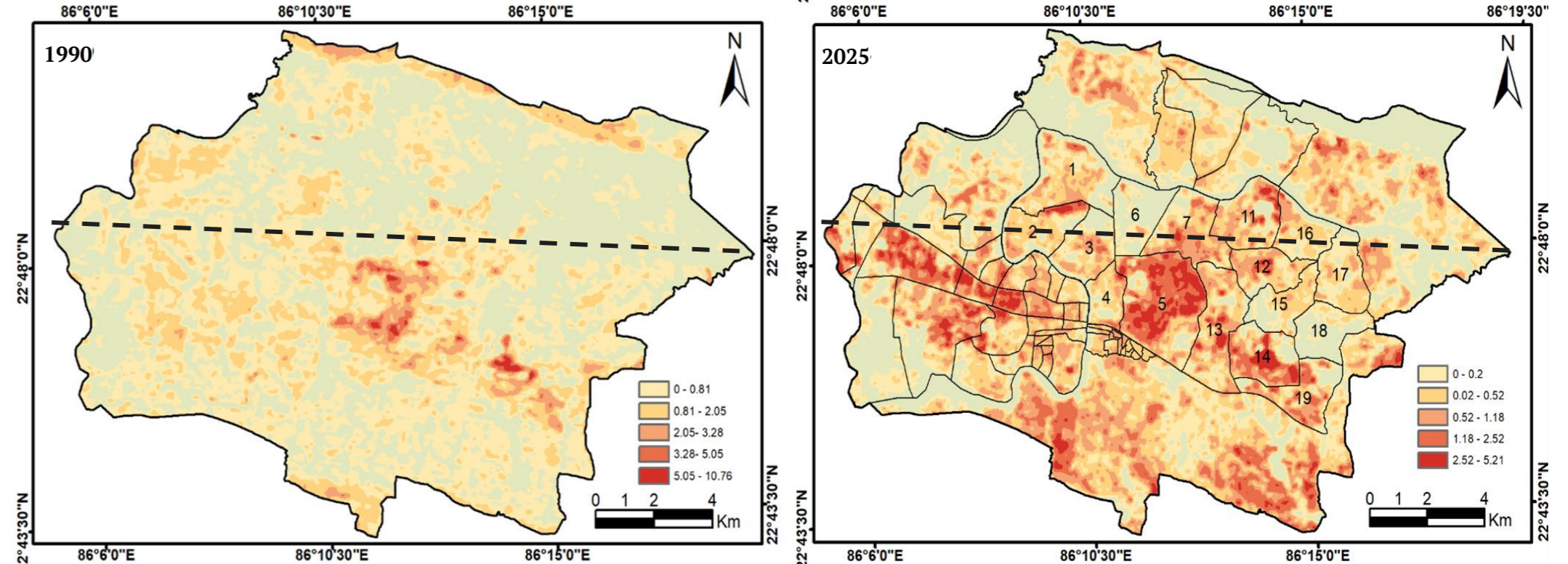


Fig: Cross Section - Spatial Variability of Urban Heat Island

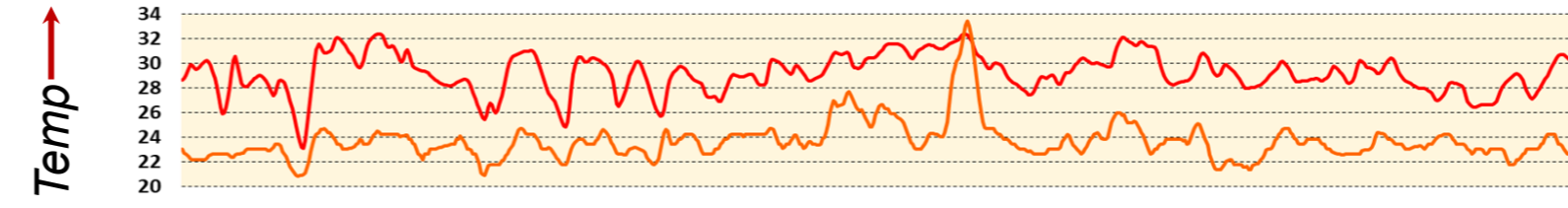


Fig: LST NDVI Correlation 1990 & 2025

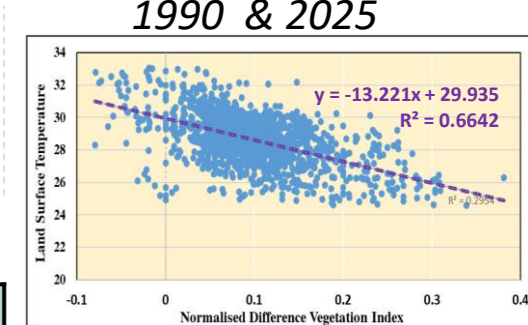


Fig: Land Cover wise Temperature in °C for 1990 and 2025

Temp./LULC	1990			2025		
	Min	Max	Mean	Min	Max	Mean
Impervious	17.47°C	37.55°C	25.29°C	19.34°C	36.44°C	28.67°C
Pervious	18.78°C	29.92°C	23.05°C	19.54°C	31.41°C	23.57°C
Water	17.47°C	27.93°C	21.53°C	17.67°C	28.07°C	24.15°C

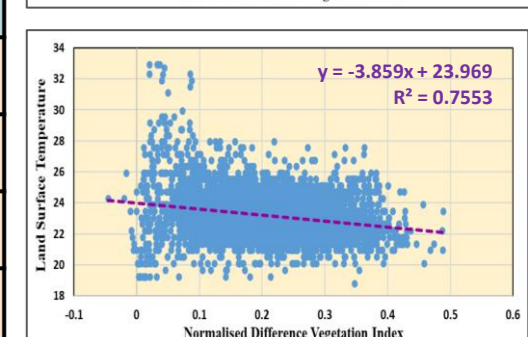
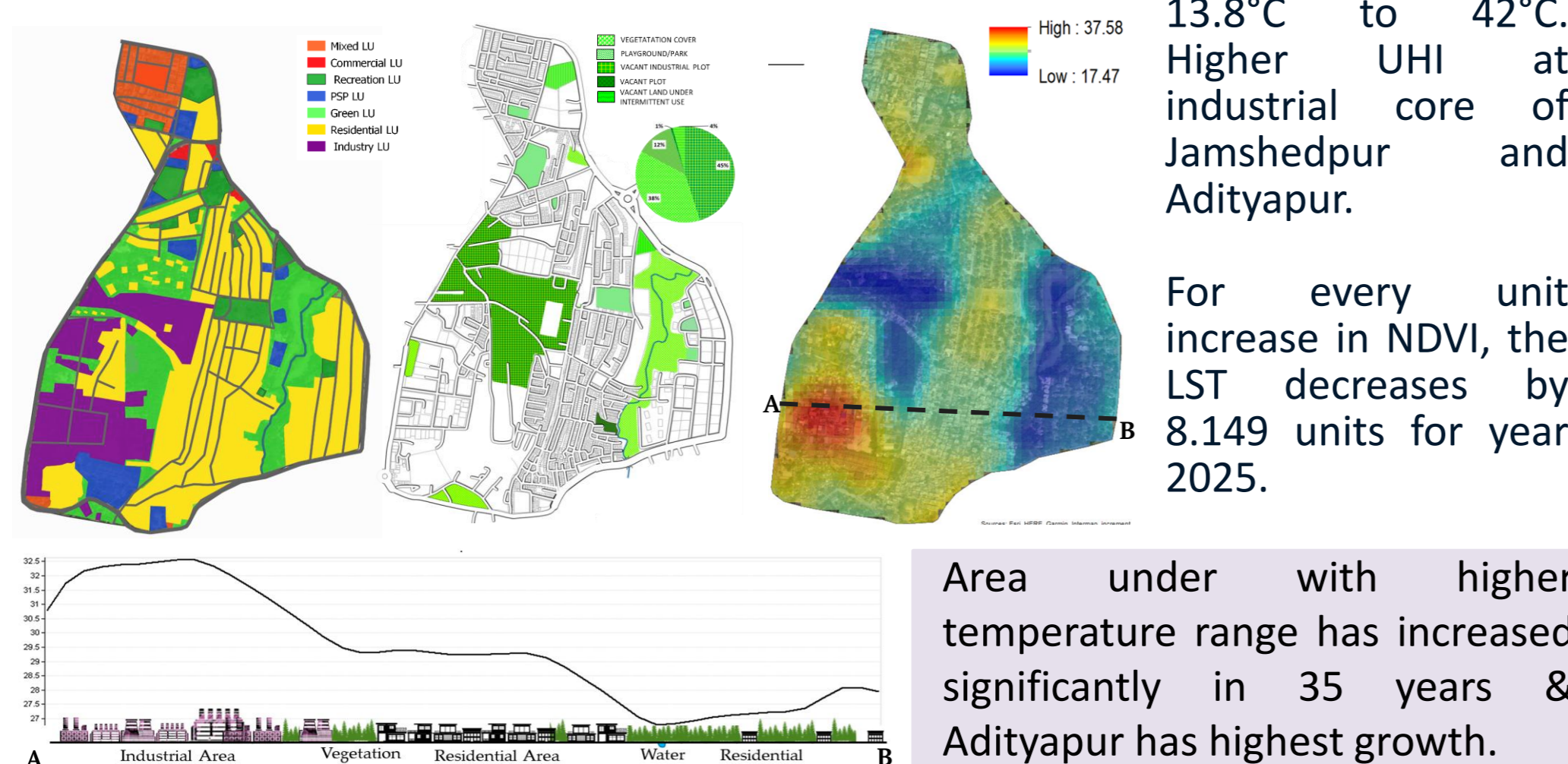


Fig: Neighbourhood Study (Population:19000, Area : 1.56 sq.km)



LST ranges from **13.8°C** to **42°C**. Higher UHI at industrial core of Jamshedpur and Adityapur.

For every unit increase in NDVI, the LST decreases by **8.149** units for year 2025.

Area under with higher temperature range has increased significantly in 35 years & Adityapur has highest growth.

PROPOSALS

Aspect	Block Scale	Neighbourhood	City Scale
Climate Effect	Street Canyon, Heating and Cooling, Pollutants circulation	Local heat Island, Park cool island effects.	Urban impact on weather patterns - air, circulations etc
Intervention	Public space design, building arrangements, greening	Street trees, traffic medians, private lands, pocket parks	Building codes (cool roof, material, color mandates), Incentives (FAR)

Black tar roof should be covered with green roof to reflect the heat. Trees to be planted at regular interval.

Fig: Intervention at Golmuri Residential Area

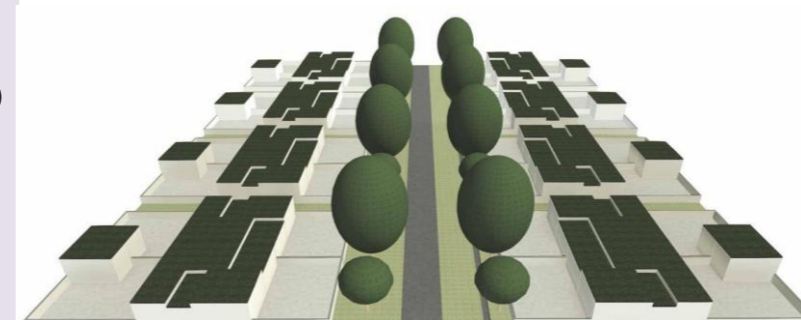


Fig: Commercial Road with green road and median

