INTERNATIONAL ACADEMIC CONFERENCE ON DEVELOPMENT IN SCIENCE, ENGINEERING, TECHNOLOGY AND MANAGEMENT (IACDSETM – 2026)

New Delhi, India on 8th August, 2026

CERTIFICATE NO : IACDSETM /2026/C0826818

A Geographical Analysis of Land Use, Built-Up Density, Vegetation Cover, and Surface Temperature Influencing The Urban Heat Island Effect in Shivamogga City

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ABSTRACT

The Urban Heat Island (UHI) effect is a significant geographical and environmental phenomenon in which urban areas experience higher temperatures than their surrounding rural regions. Rapid urbanisation, changes in land-use patterns, increasing built-up density, and declining vegetation cover are important factors contributing to this phenomenon. Shivamogga city in Karnataka has experienced urban development and changes in its physical landscape, making it an important area for studying urban temperature variations. Land-use and land-cover patterns influence the distribution of heat through the conversion of agricultural land, open spaces, and natural vegetation into residential, commercial, and industrial areas. Similarly, increasing built-up density and the expansion of concrete structures and asphalt roads enhance heat absorption and storage. Vegetation cover plays an important role in regulating urban temperatures through shading and evapotranspiration, while its reduction may increase surface heating. Surface temperature variations also depend on factors such as solar radiation, humidity, wind conditions, and seasonal changes. The study aims to examine the relationship between land use, built-up density, vegetation cover, and land surface temperature in Shivamogga city. Remote sensing, Geographic Information System (GIS), satellite imagery, and spatial analysis techniques can be used to identify urban heat zones and assess their geographical distribution. The findings may contribute to understanding urban climatic conditions and developing sustainable urban planning strategies, including green-space conservation, urban vegetation development, and effective environmental management.