Research Title:

"Tracing the Thermal Footprint of Industrial Expansion: A Satellite-Based UHI Study in Savar, Bangladesh"

Research Aim:

To assess the environmental consequences of rapid and unregulated urban expansion in Savar, Dhaka, by analyzing changes in land surface temperature (LST), land use and land cover (LULC), and the spatial intensity of the Urban Heat Island effect using satellite-based remote sensing techniques.

Research Objectives:

1. To analyze land use and land cover (LULC) changes, urban expansion patterns, and urban compactness in Savar from 2013 to 2024 using multi-temporal Landsat satellite imagery.

2. To assess the spatial and temporal variation of land surface temperature (LST) and its relationship with land cover types, particularly built-up (NDBI), vegetated(NDVI), water bodies(NDWI), and Bareland(NDBaI) areas.

3. To quantify and map Urban Heat Island (UHI) and Surface Urban Heat Island (SUHI) intensities across Savar by comparing urban and rural LST values.

Research Methods:

1. Study Area Selection:
    - Savar, an emerging industrial area in the northwest part of the district of Dhaka, Bangladesh.

2. Satellite Data Collection:

Source	**USGS Earth Explorer**
Satellite	Landsat 5,7, 8 OLI/TIRS
Dates	Summer months (July–August, September 2013-2025)
Bands Used	Thermal bands, Red, NIR, SWIR

3. Data Processing, Analysis, and Mapping:

Tools	**Works**
Google Earth Engine	● LULC analysis (NDVI, NDBI, NDBAI, NDWI, and LST) using the MLC model. ● Applying Linear Spectral Unmixing for fractional image. ● Analysing Urban Expansion and Compactness. ● LST analysis by LSE and TB. ● Hot spot Analysis using hot spot (Gi).

4. Data Validation:
    - Collect ground station data from the Bangladesh Meteorological Department and Jahangirnagar University weather station.