Mapping and Monitoring Urban Expansion in Makurdi, Nigeria (2001–2020) Using Remote Sensing

This project analyzes LULC changes, with a specific focus on urban expansion, in Makurdi, Benue State, Nigeria, from 2001 to 2020, using remote sensing data.

Team Members:

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Affiliation:

University of Leicester

Course:

GY7705: Advanced Remote Sensing

Technologies & Skills Used
✅ **Remote Sensing** | ✅ **GIS** | ✅ **QGIS/ArcGIS Pro** | ✅ **Satellite Data Analysis**

Data Sources: Landsat imagery (ETM, OLI)

Tools: QGIS, ArcGIS, ERDAS IMAGINE, ENVI, Google Earth Engine (GEE)

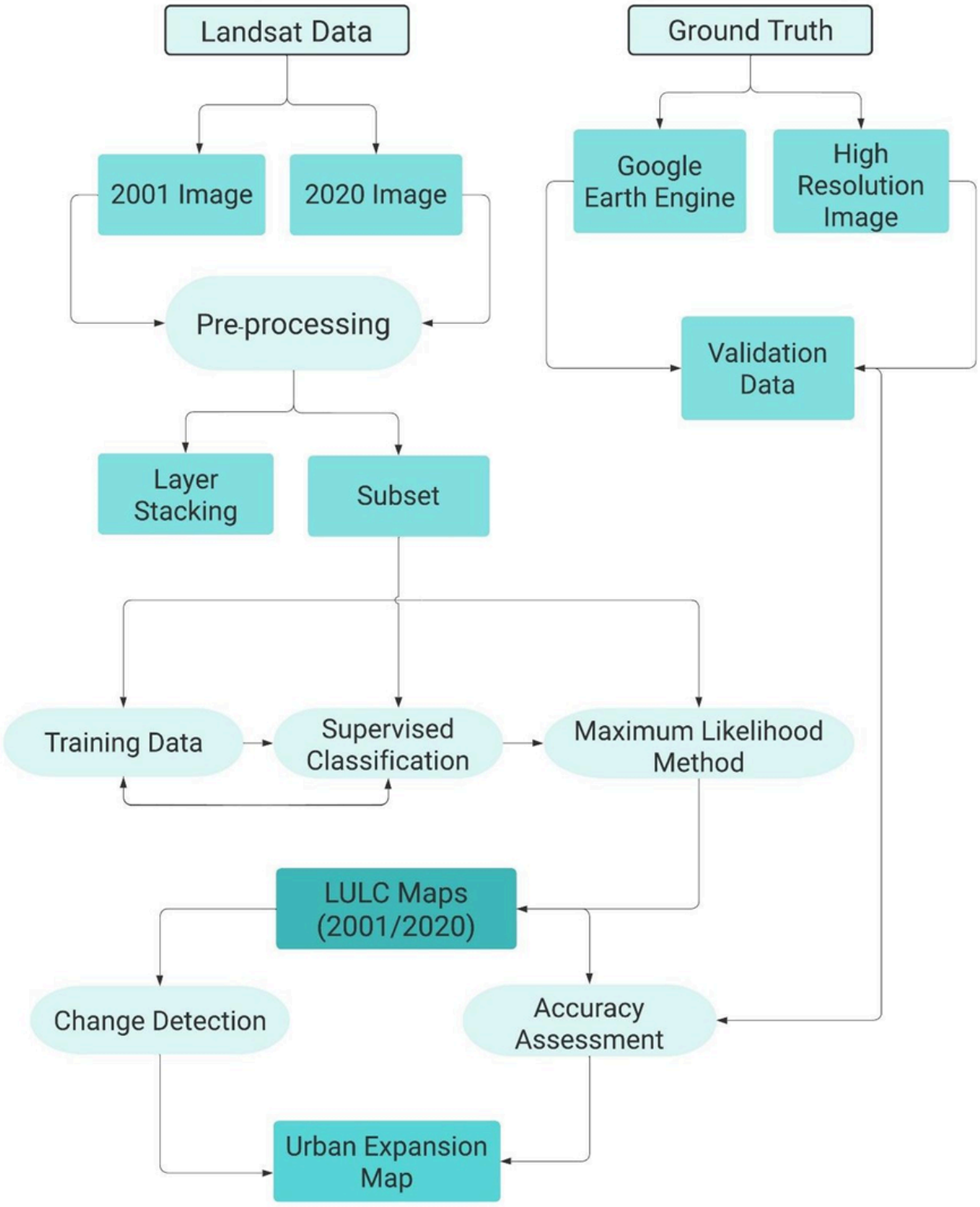
Techniques Used: Supervised classification, change detection analysis

Validation: Accuracy assessment using ground-truth/reference data

Project Overview

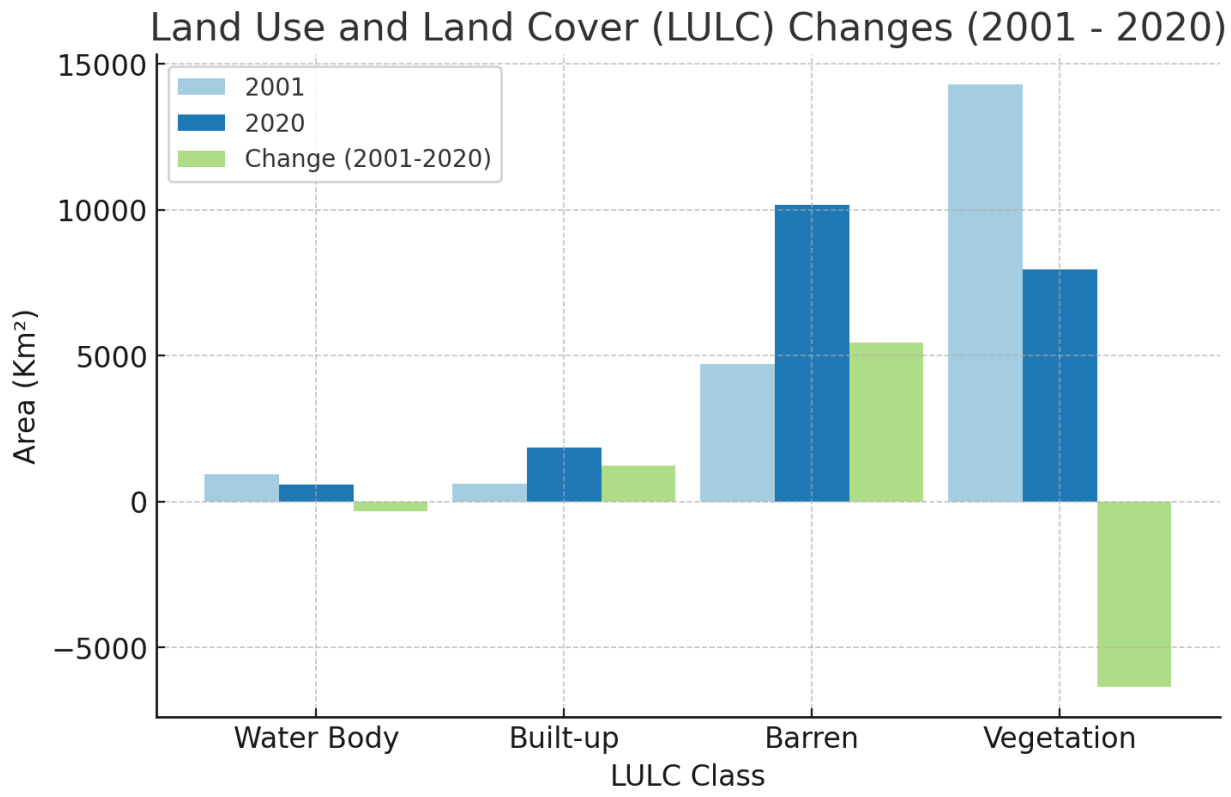
Rapid urban expansion is transforming landscapes worldwide, often at the expense of natural ecosystems. This study analyzes Land Use and Land Cover (LULC) changes in Makurdi, Benue State, Nigeria, between 2001 and 2020, using remote sensing and satellite imagery. By applying supervised classification techniques on Landsat data, the study maps urban growth patterns and assesses the extent of land transformation.

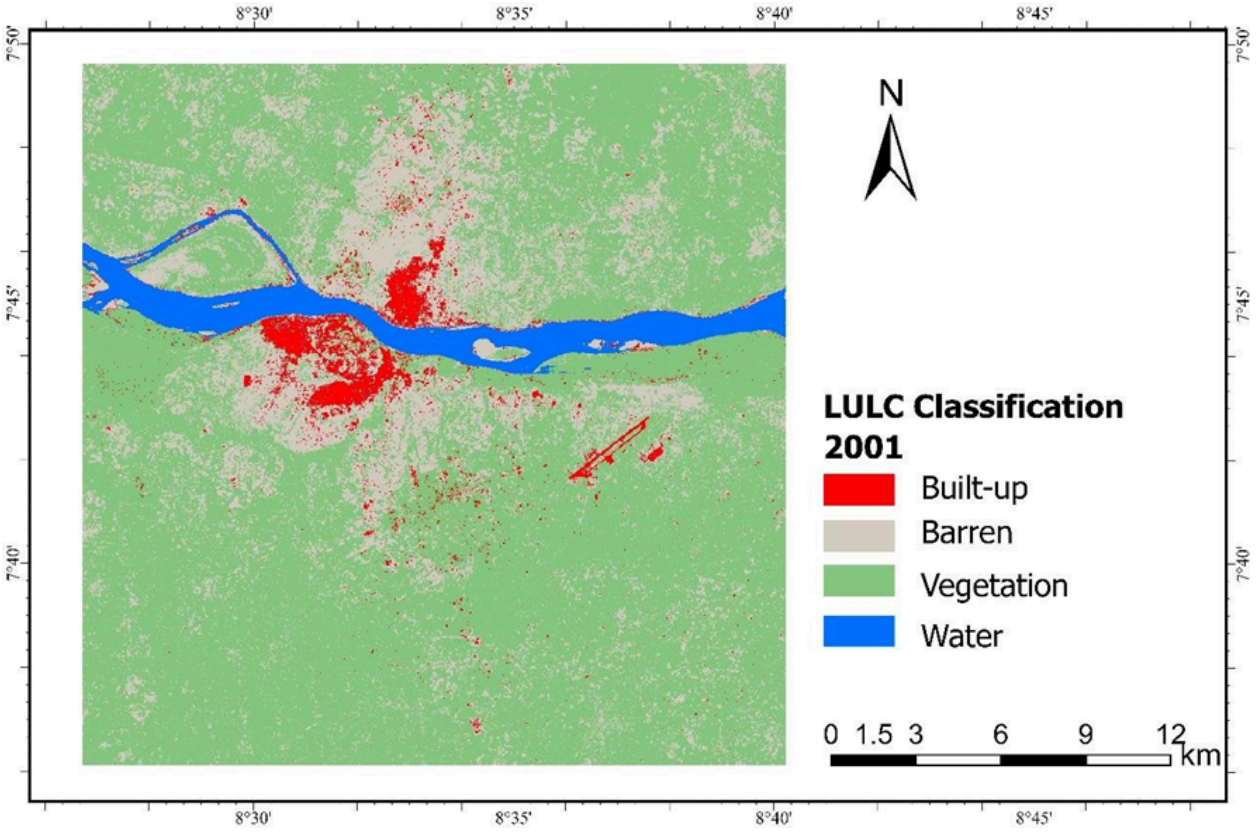
Methodology

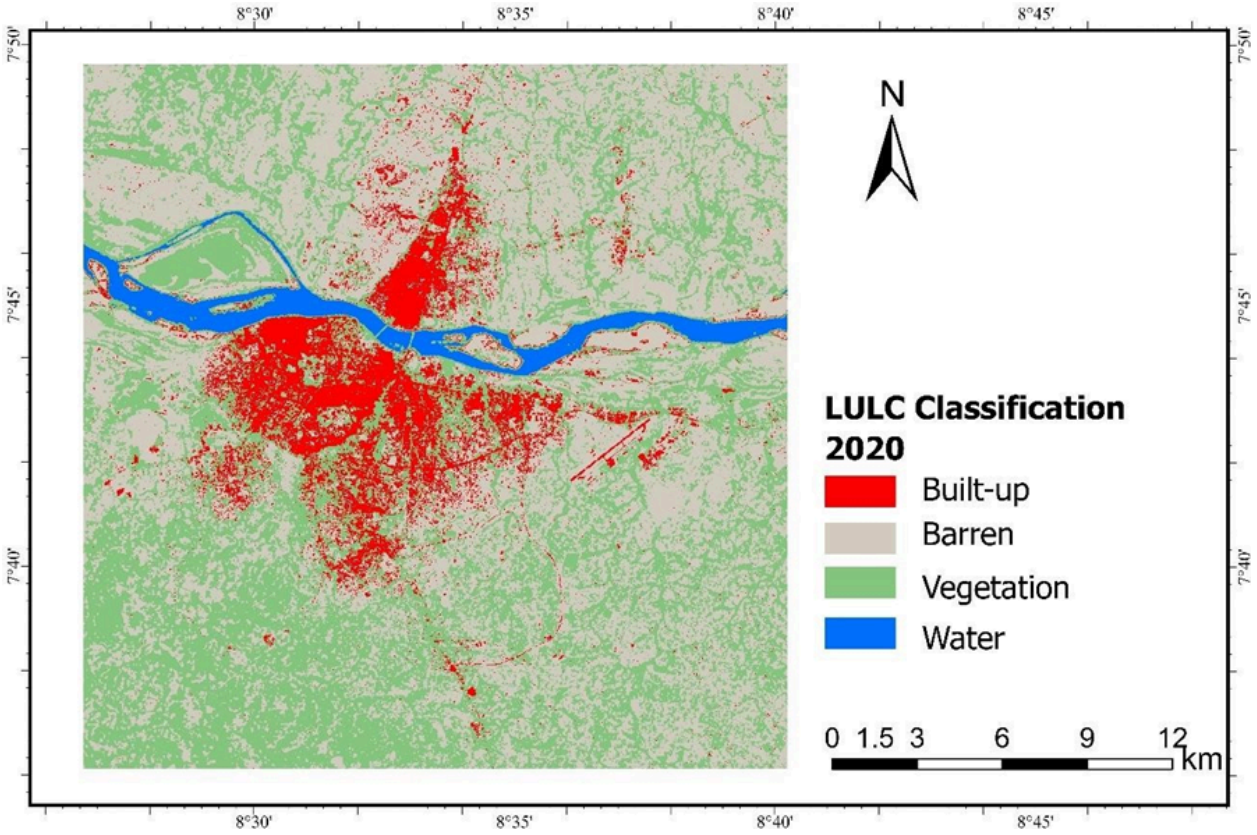


Key Findings

- Built-up areas expanded by **1,246.2 km²** between 2001 and 2020.
- Significant **loss of vegetation and barren land** due to urbanization.
- Potential impact on **water resources, biodiversity, and land use planning**.




8°30'
8°35'
8°40'
8°45'
7°50'
7°45'
7°40'
N
LULC Classification
2001
Built-up
Barren
Vegetation
Water
0 1.5 3 6 9 12
km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0 1.5 3 6 9 12
km

Impact & Future Implications

- Insights to assist urban planners in **sustainable development strategies**.

- Demonstrates the power of **remote sensing for monitoring urban growth**.

- Highlights the need for **data-driven policy-making in land use management**.