# SUPERVISED CLASSIFICATION

Magura, Bangladesh (2020-2025)

AZRAF TAOHID AKIB
202330044
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# Introduction

This report evaluates Land Use and Land Cover (LULC) dynamics across Magura District, Bangladesh, covering a total area of approximately 1,045.8 $km^2$.

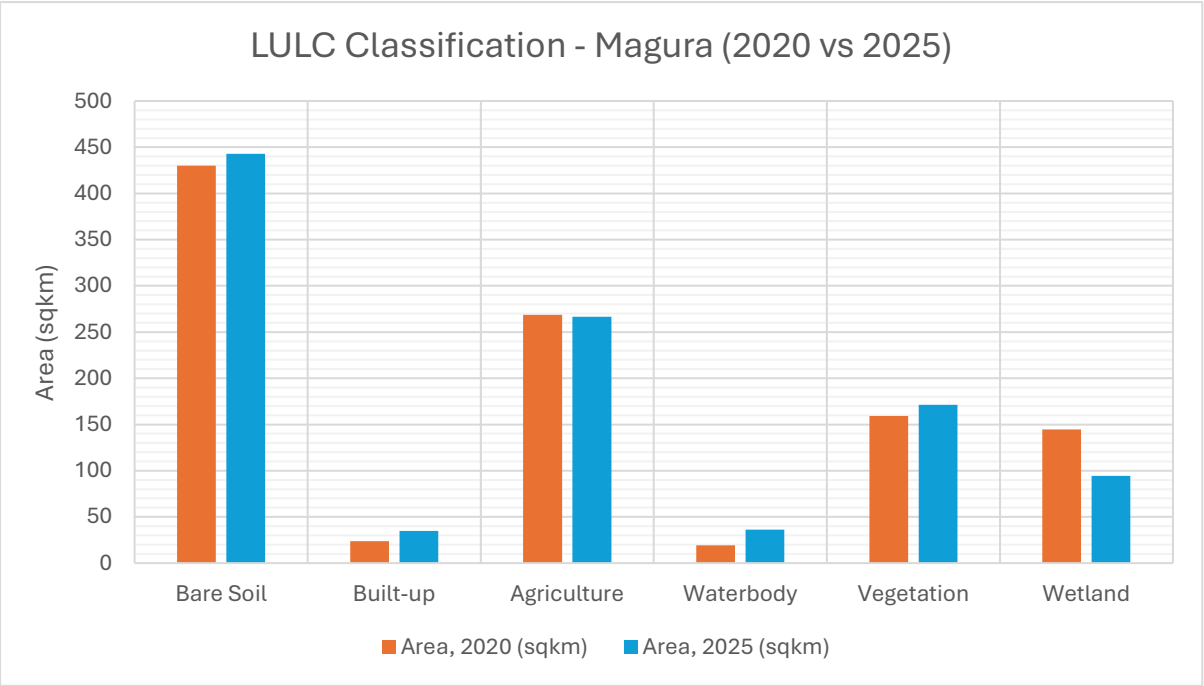
- **Data acquisition:** Satellite imagery was obtained from USGS EarthExplorer's Landsat 8/9 dataset. The selected periods are February 2020 and February 2025.
- **Training calibration:** Training samples for supervised classification were trained with ground truth data obtained from Esri World Imagery Wayback.
- **LULC classes:** Six target classes were produced: Bare Soil, Built-up, Agriculture, Waterbody, Vegetation, and Wetland.

# Result

| Class | Area, 2020 (sqkm) | Share, 2020 (%) | Area, 2025 (sqkm) | Share, 2025 (%) | Change (sqkm) | Relative Change (%) |
|---|---|---|---|---|---|---|
| **Bare Soil** | 430.0 | 41.1% | 442.7 | 42.3% | 12.7 | 3.0% |
| **Built-up** | 23.8 | 2.3% | 34.7 | 3.3% | 10.9 | 45.7% |
| **Agriculture** | 268.7 | 25.7% | 266.7 | 25.5% | -2.0 | -0.7% |
| **Waterbody** | 19.3 | 1.9% | 36.2 | 3.5% | 16.9 | 87.2% |
| **Vegetation** | 159.2 | 15.2% | 171.3 | 16.4% | 12.1 | 7.6% |
| **Wetland** | 144.8 | 13.8% | 94.3 | 9.0% | -50.5 | -34.9% |
| **Total** | 1045.8 | 100.0% | 1045.8 | 100.0% | | |

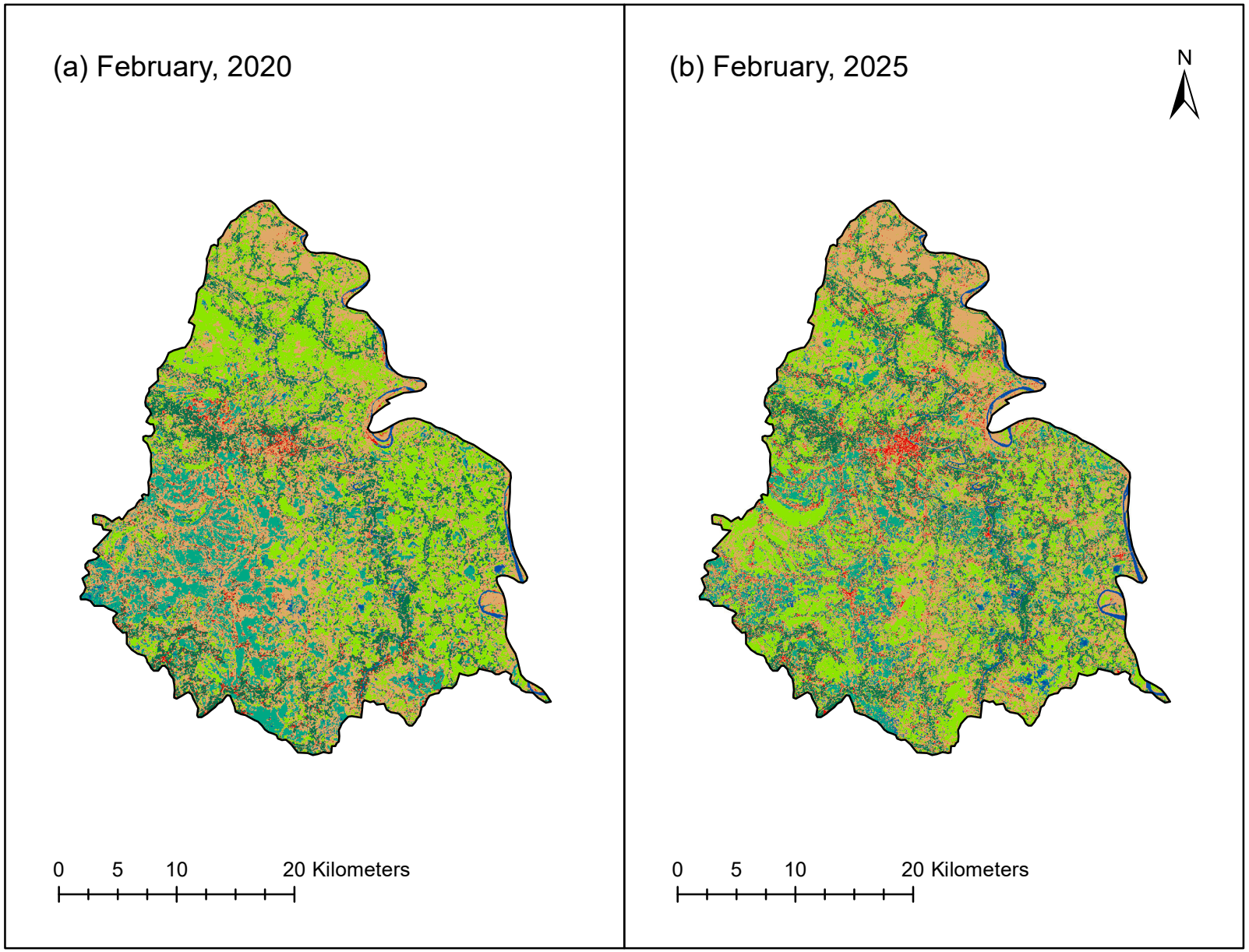
**Summary:**

1. **Built-up (+45.7%):** Built-up areas increased by approximately 10.9 $km^2$, reflecting the expansion of settlements and paved surfaces.
2. **Wetland (-34.9%):** Wetland areas decreased by approximately 50.5 $km^2$. This decline may be associated with the drainage and filling of wetlands for agricultural activities, housing development, and fish cultivation.
3. **Waterbody (+87.2%):** Permanent waterbodies increased by approximately 16.9 $km^2$, likely due to the conversion of seasonal wetlands into deeper, embanked ponds, for fish farming.
4. **Vegetation (+7.6%):** Vegetated areas increased by approximately 12.1 $km^2$, may be linked to homestead vegetation, fruit orchards, and roadside tree-planting initiatives.




5. **Bare Soil (+3.0%):** Bare soil increased slightly by approximately 12.7 $km^2$. This change may largely reflect seasonal agricultural practices, as cultivated fields are often left exposed after plowing and before the establishment of the next crop.
6. **Agriculture (-0.7%):** Agricultural land remained relatively stable, with only a 2.0 $km^2$ decrease. This suggests that, despite changes associated with seasonal cultivation and land conversion, the overall extent of active cropland has remained largely consistent.

# Land Use / Land Cover Classification: Magura, Bangladesh (2020 vs 2025)




## Legend

- Agriculture
- Bare Soil
- Built-up
- Vegetation
- Waterbody
- Wetland

## Metadata

Author: Azraf Taohid Akib
Student ID: 202330044
Data Source: Landsat 8/9 OLI (USGS)
Spatial Resolution: 30 meters
Method: Maximum Likelihood (MLC)