

## Quantifying the Impacts of Climate Stress on Vegetation and Land Use in Sylhet Through Geospatial Analysis

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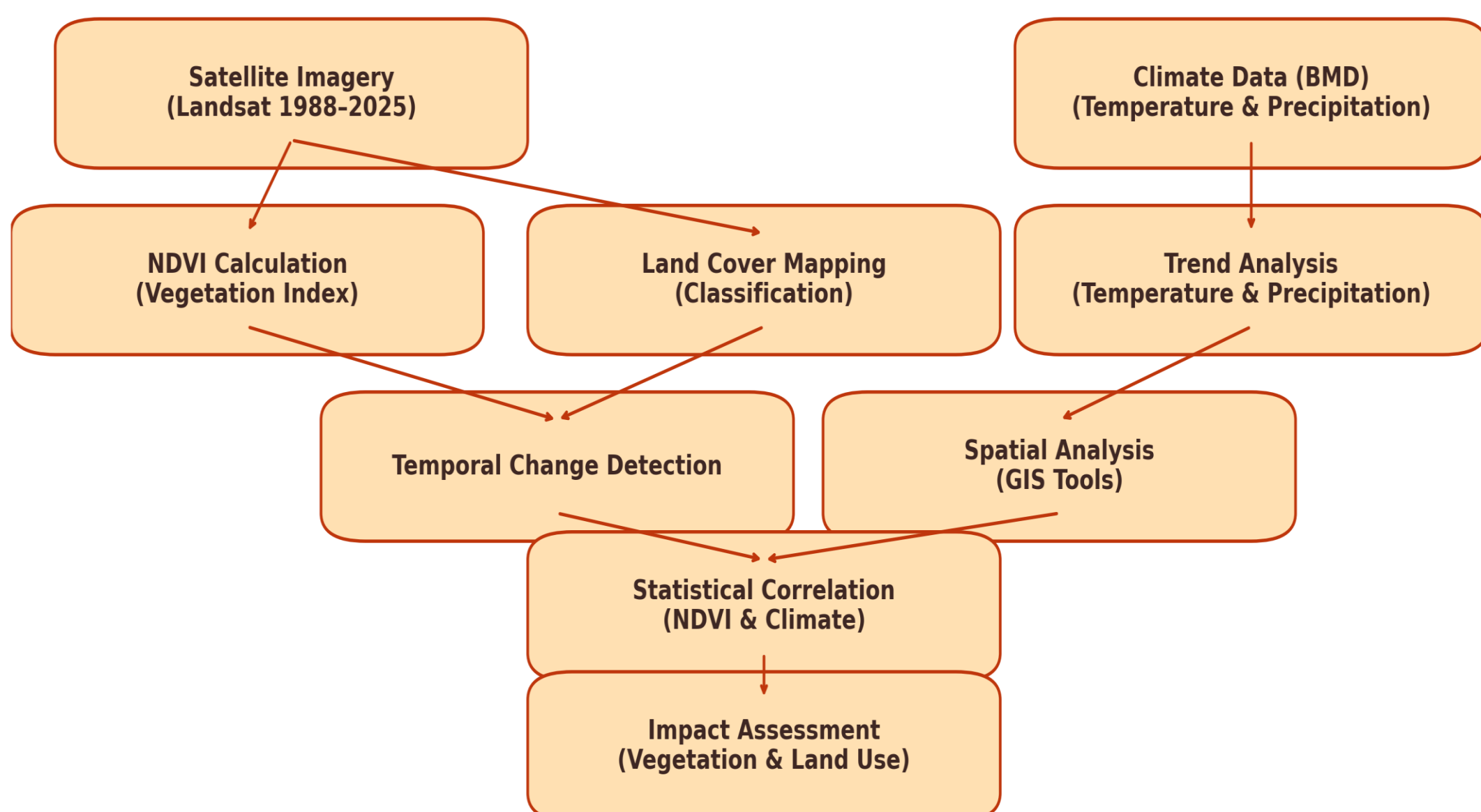
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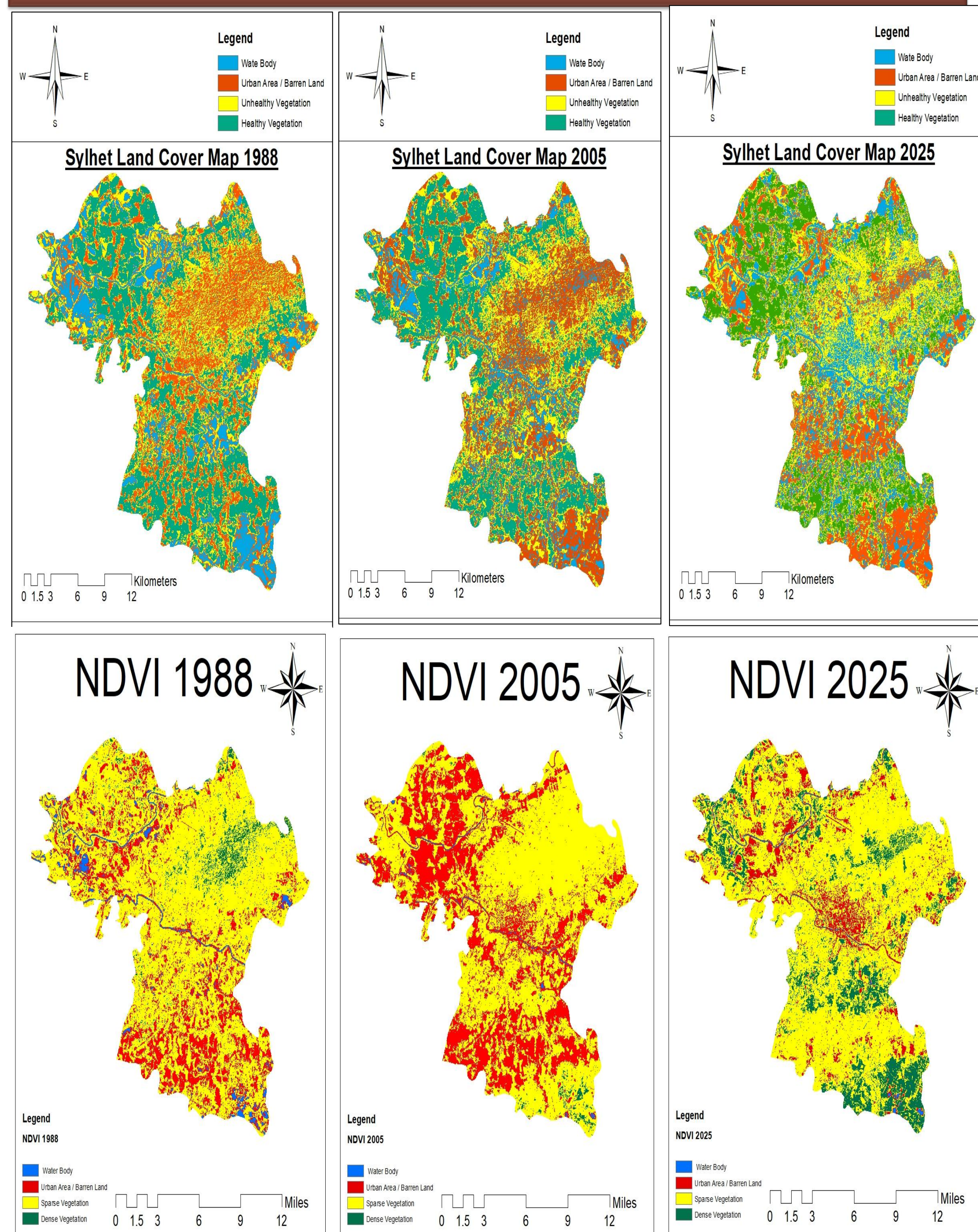
### INTRODUCTION

One of the main causes of ecological and land surface changes in tropical regions is climate variability. Rapid urbanization and shifting climatic patterns have had a major impact on vegetation health and land use changes in the northeastern Bangladeshi Upazila of Sylhet and South Surma in recent decades. Environmental resilience and sustainable regional planning depend on an understanding of these dynamics. The purpose of this project is to measure how climate stress, particularly temperature increases and rainfall variability, affects changes in plant cover and land use in Sylhet between 1988 and 2025. We evaluated trends in vegetation loss, urbanization, and hydroclimatic changes using satellite-based indices such as the NDVI, and cover classifications, and long-term meteorological data from the Bangladesh Meteorological Department. This study offers spatial and temporal insights into how anthropogenic and climatic influences are changing the Sylhet environment by combining remote sensing and GIS approaches.

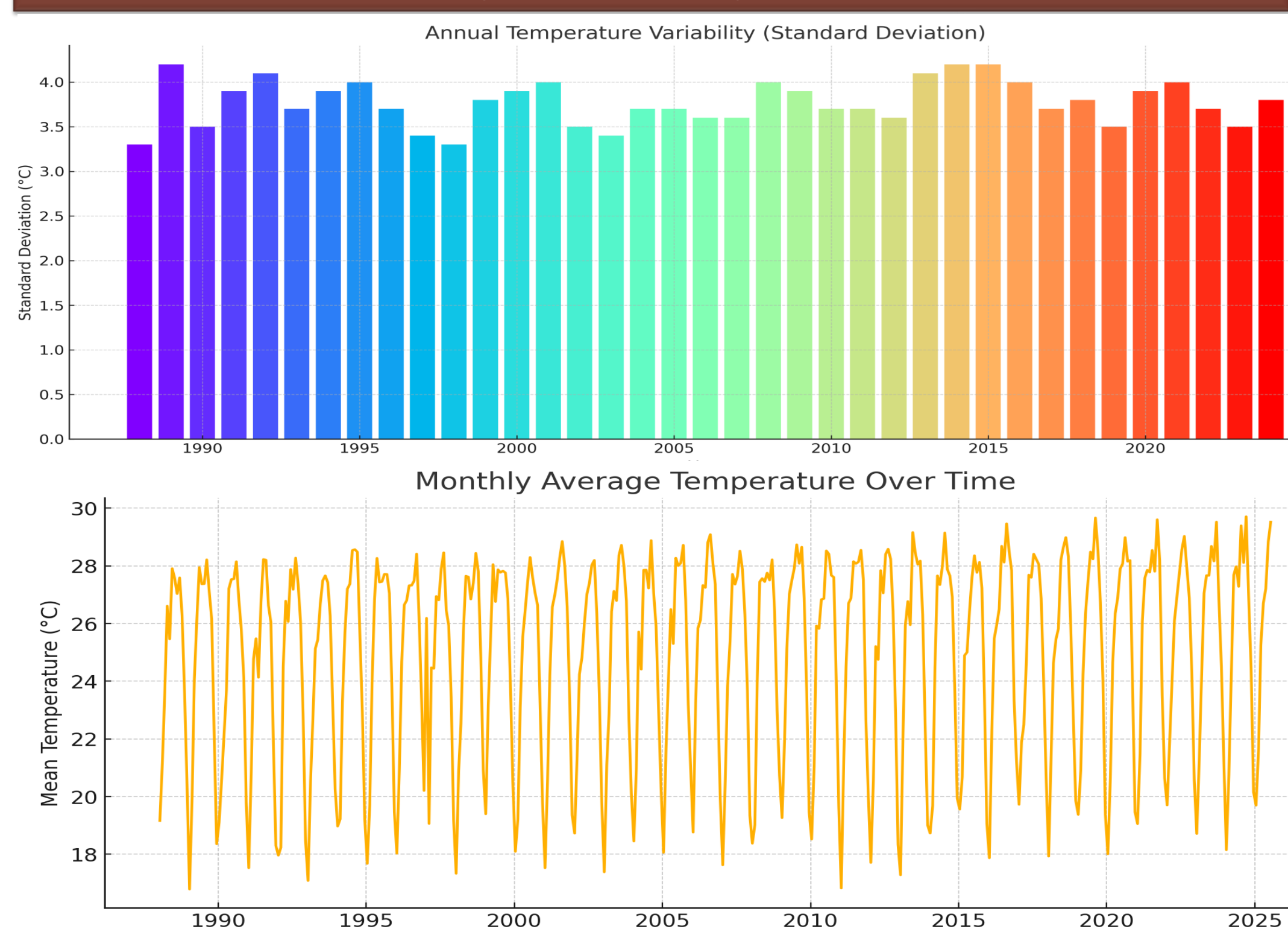
### METHOD



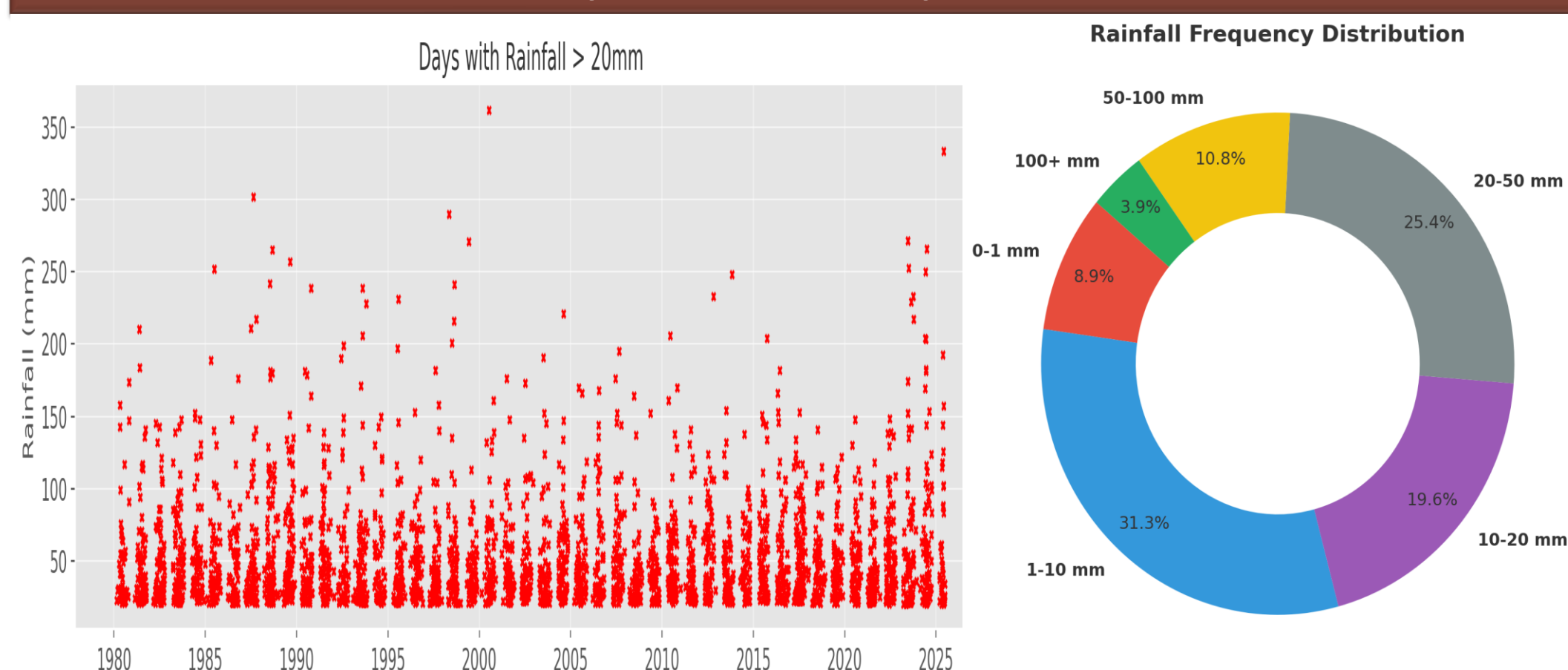
### Land Cover and NDVI



### Analysis of Temperature



### Analysis of Precipitation



### CONCLUSION

The findings indicate that Sylhet's temperature is steadily rising, that the amount of dense vegetation is decreasing, and that the city is growing more quickly. While more than 140 km<sup>2</sup> of scant vegetation have been turned into urban and desolate land, NDVI trends show deteriorating vegetation health. These results highlight how land usage is shaped by manmade influences and the climate. To maintain ecological balance and promote sustainable development in Sylhet, ongoing observation and flexible planning are crucial.

### REFERENCES

- Fattah, M. A., & Morshed, S. R. (2022). Assessment of the responses of spatiotemporal vegetation changes to climatic variability in Bangladesh. *Theoretical and Applied Climatology*, 148(1), 285-301.
- Sarker, M. N. U., Ulfat, F., Siddique, M. Z. A., & Farah, T. (2021, March). Unsupervised Learning-based Vegetation change detection with Landsat 8 data. In *2021 international conference on artificial intelligence and smart systems (ICAIS)* (pp. 368-372). IEEE.
- Chowdhury, A. F. M. K., Ahmmed, S., & Chowdhury, M. A. I. (2012). Trends of climatic variables (rainfall and temperature) at Sylhet, Bangladesh. *SUST Journal of Science and Technology*, 19(5), 87-93.