



Integrating Flood Susceptibility and Deforestation Mapping for Climate Vulnerability Assessment: A Geospatial and AI-Based Approach.



Climate Change AI

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Introduction

- The global climate system has intensified floods and droughts, the most destructive climate-induced disasters worldwide.
- In Nigeria, floods causes 80% of natural disasters while droughts pose severe risks to food security.
- A geospatial approach is necessary because these dual climate hazards are fundamentally spatial problems where vulnerability must be precisely located.
- This research aims at turning this national crisis into an actionable, location-specific map to get the Climate Vulnerability Index(CVI) map that guides targeted resource allocation and policy interventions across the country.



Figure 1: Image of drought and flood occurrences in Nigeria.

Materials and Methods

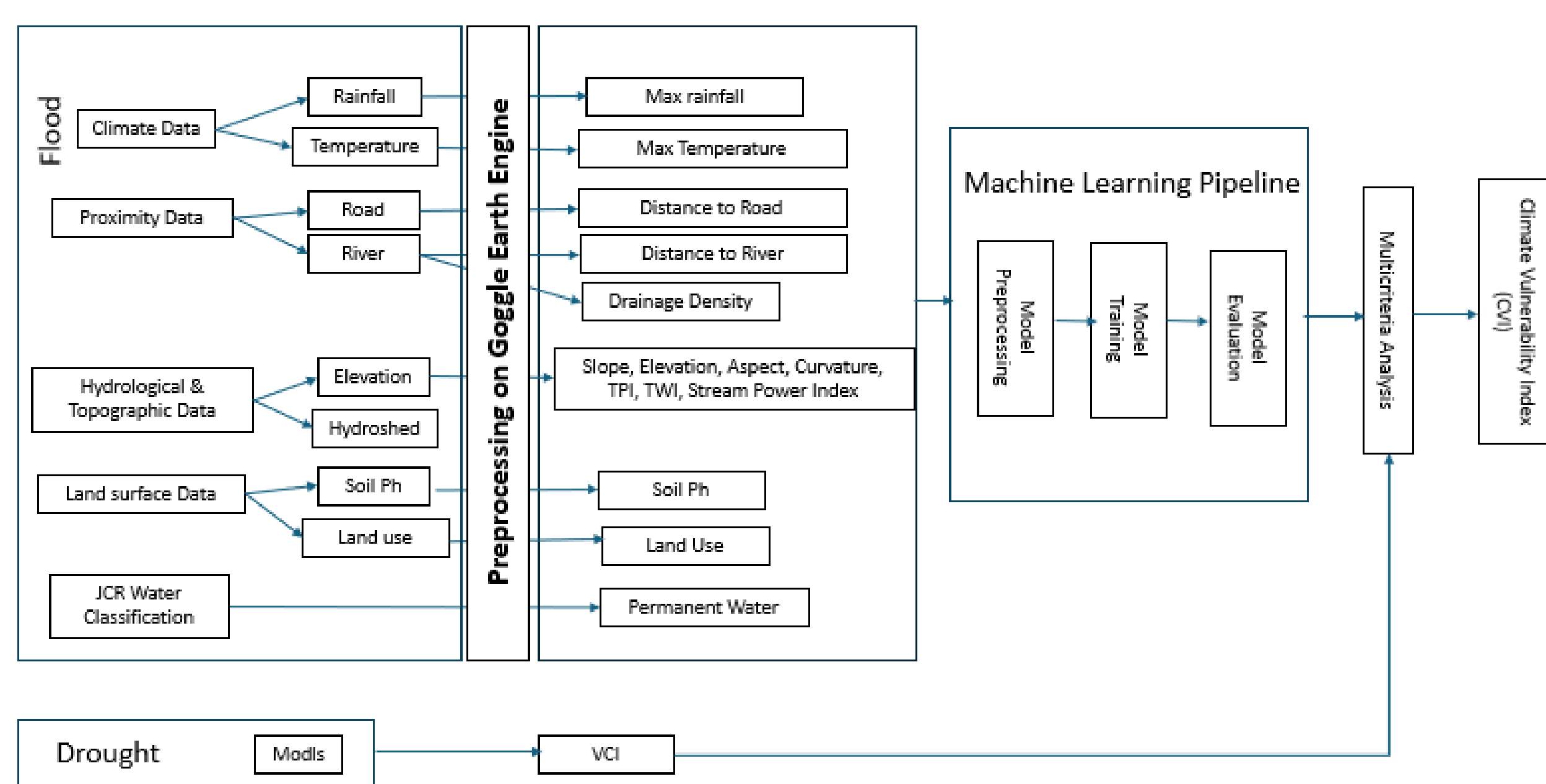


Figure 2: Methodology Flowchart.

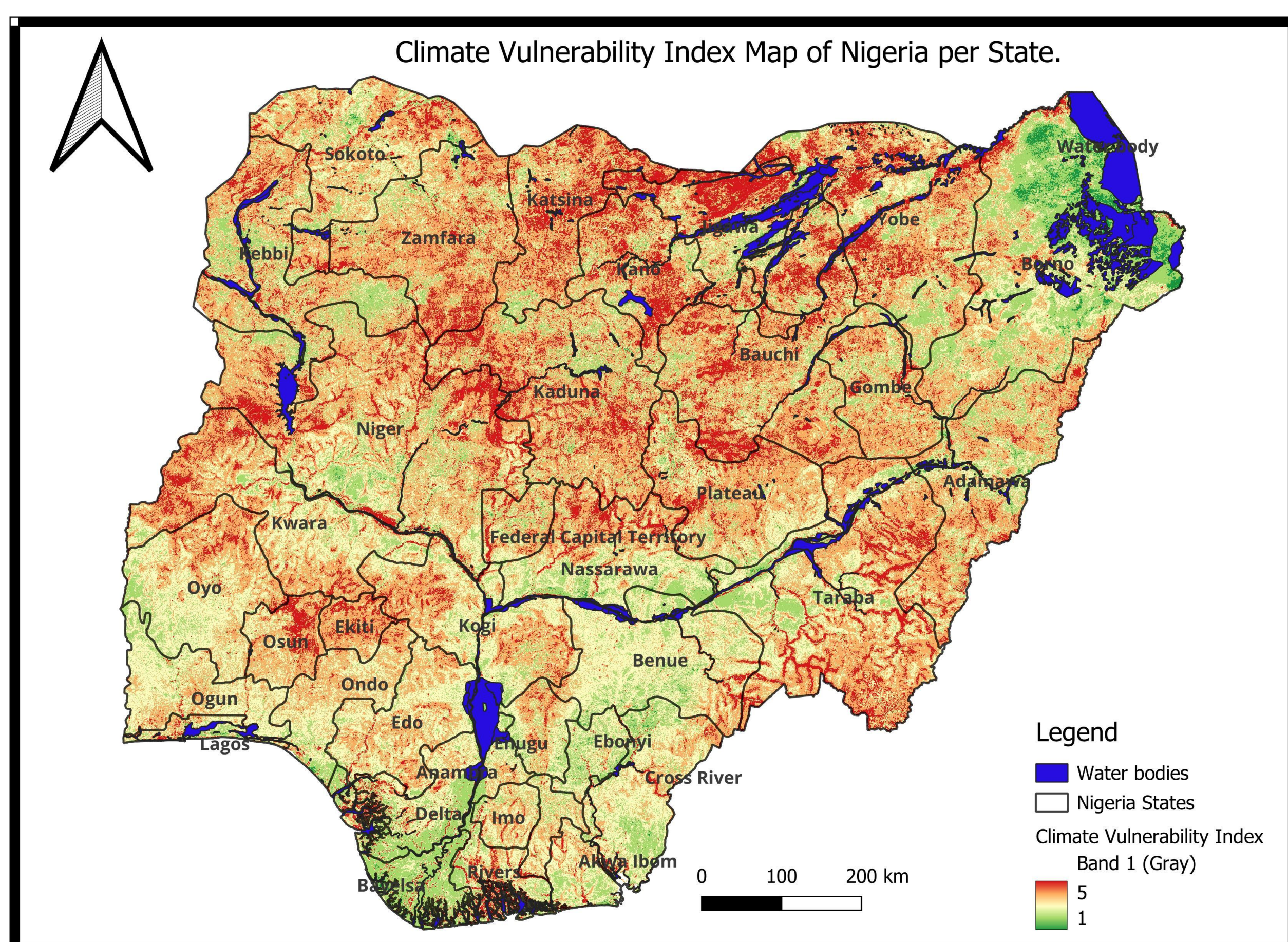


Figure 5: Climate Vulnerability Index(CVI) map of Nigeria, per State.

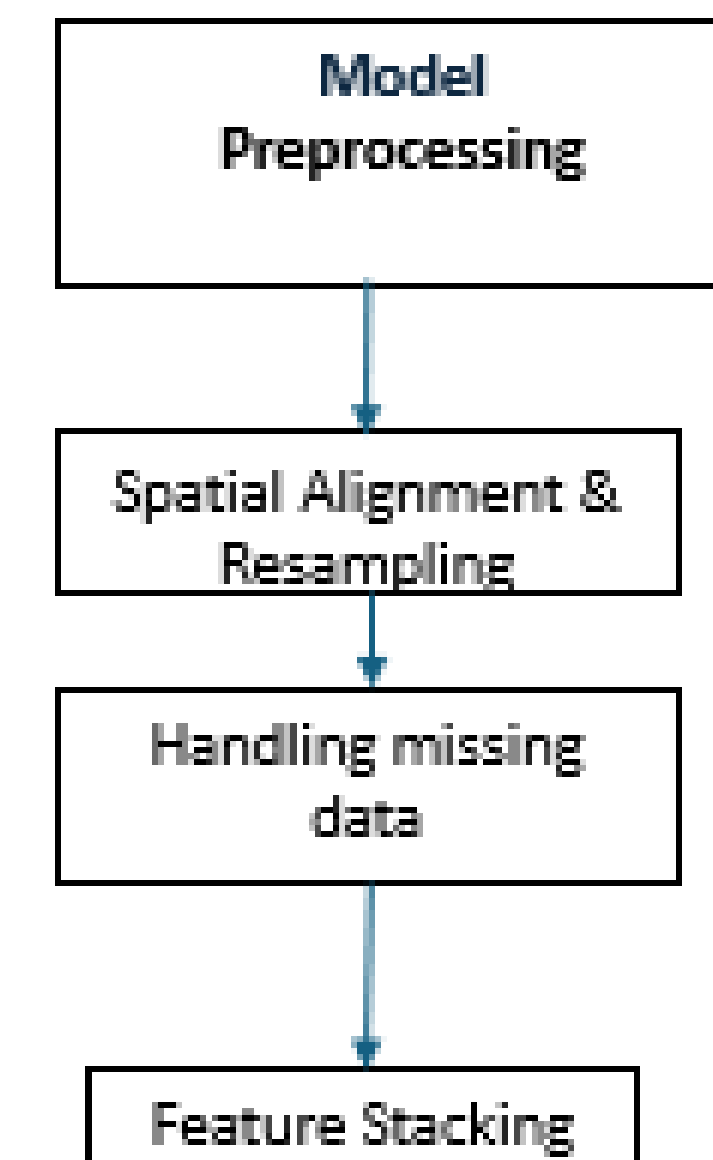


Figure 3: Image of flood dataset preprocessing for model training.

Results and Discussion

Table 1: Comparative Model Performance using Area Under Curve (AUC)

Model	Area Under Curve (AUC)
Random Forest	0.85
XGBoost	0.79
LightGBM	0.76

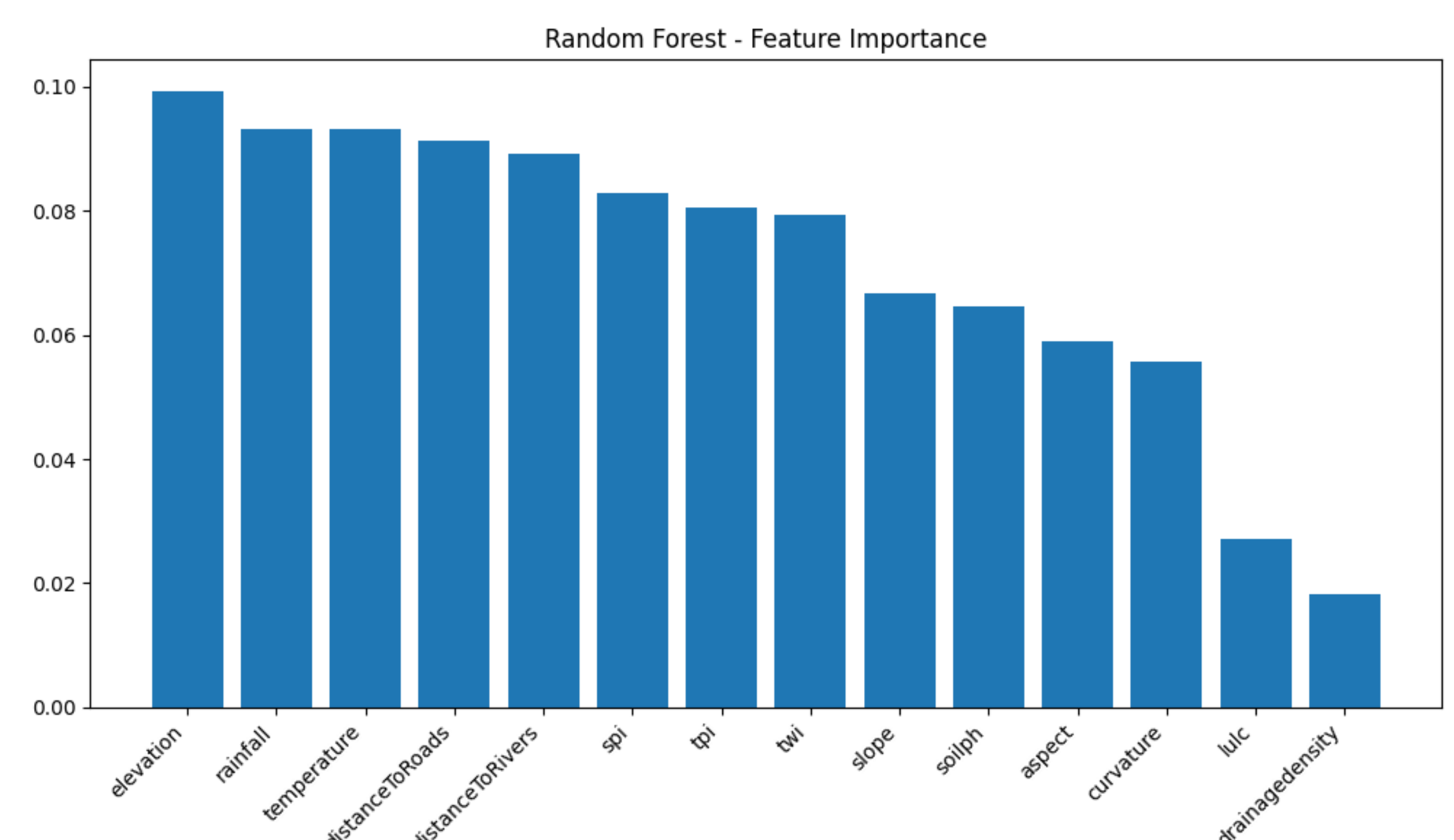


Figure 4: Feature importance for Random Forest

Conclusion

We successfully developed the Climate Vulnerability Index (CVI) by integrating flood and drought risk assessments using Google Earth Engine (GEE) and artificial intelligence. This innovation provides valuable insights for decision-makers and investors, enabling them to identify priority areas and strategically channel resources for effective emergency response and resilience planning.

REFERENCES

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- National Emergency Management Agency (NEMA). National disaster risk management policy2018. PDF report, 2018. Accessed: 2025-08-18.