

(Re)Detecting & (Re)Examining Heat Vulnerability Index (HVI)

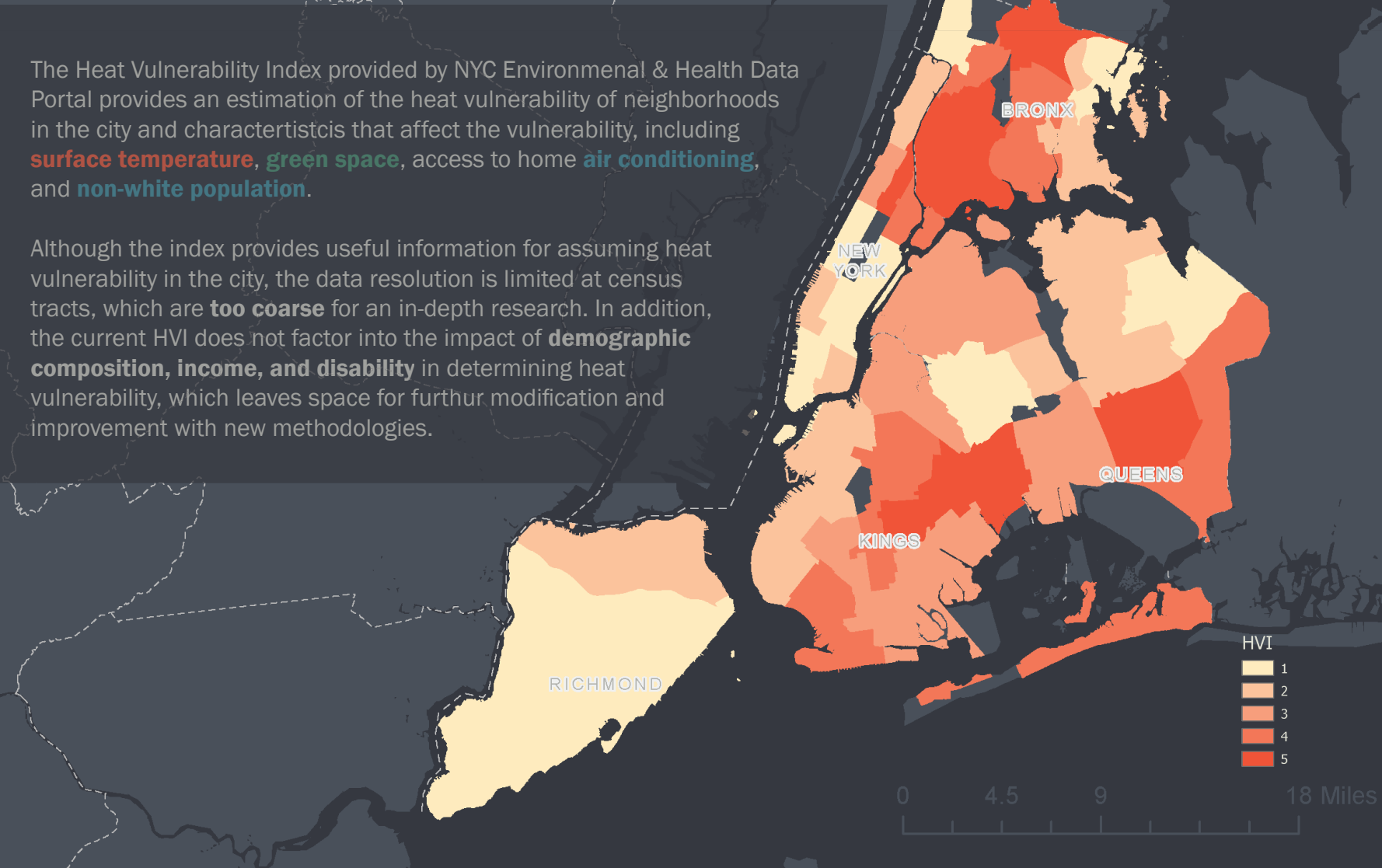
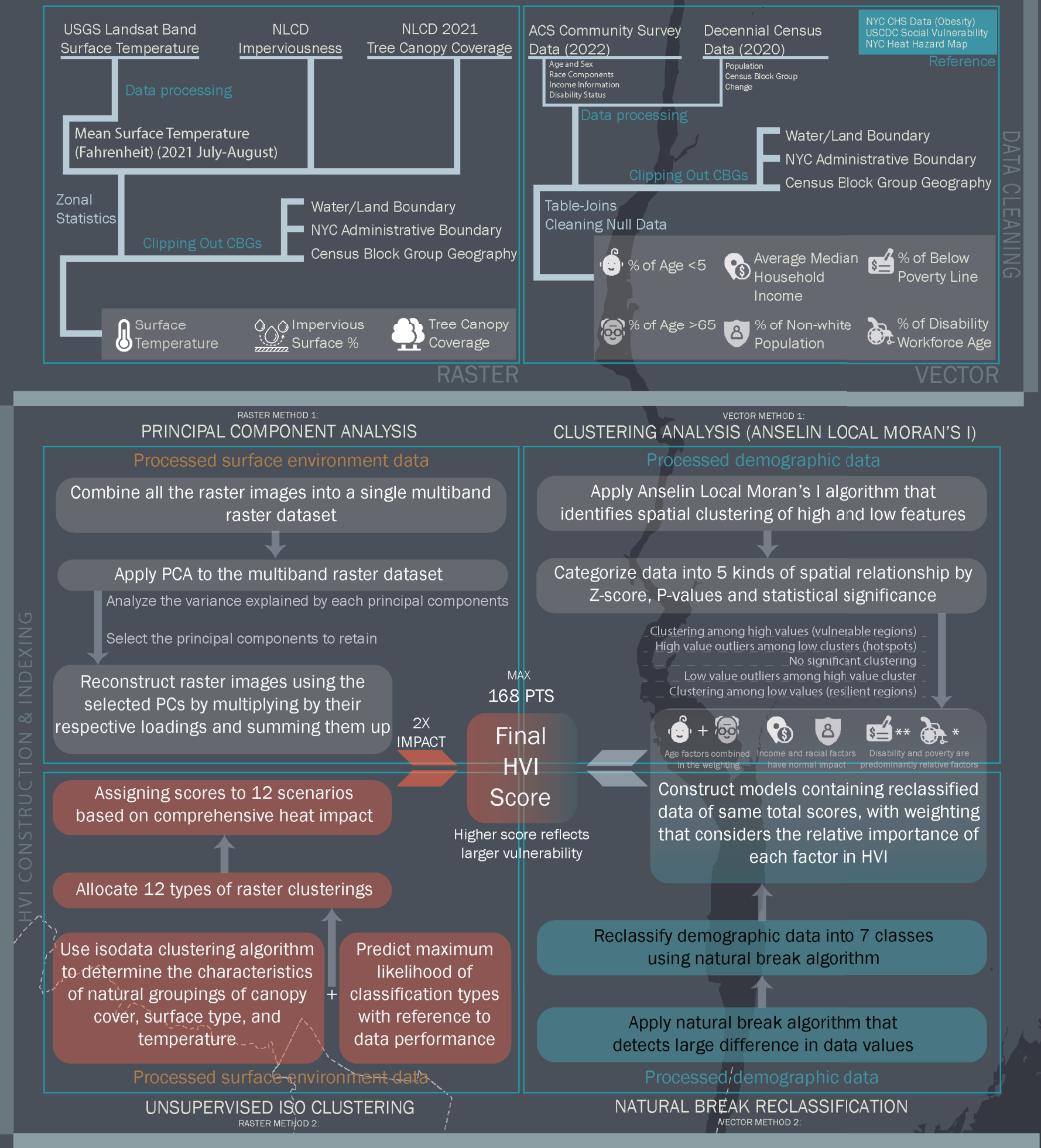
Mapping Vulnerability and Adaptive Capacity in New York City

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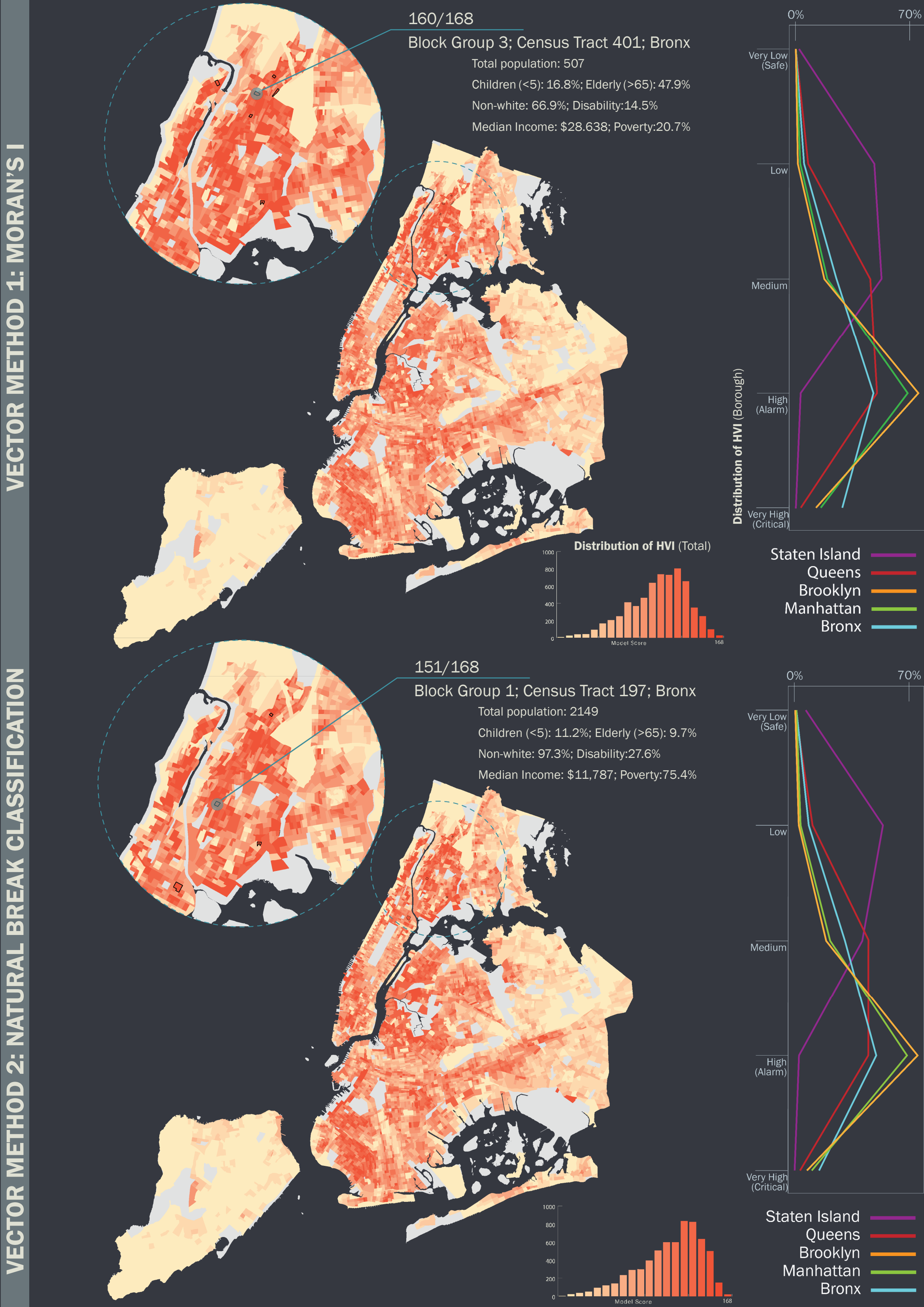
Research Questions

1. What is the impact of different geoprocessing techniques on the HVI?
2. How do different geoprocessing techniques influence the spatial distribution and accuracy of the HVI?
- To what extent do factors such as data resolution, interpolation algorithms, and modeling assumptions impact the construction and interpretation of the HVI?
 - How can the choice of geoprocessing technique affect the identification of high-risk areas and the prioritization of interventions to mitigate heat-related risks in urban environments?

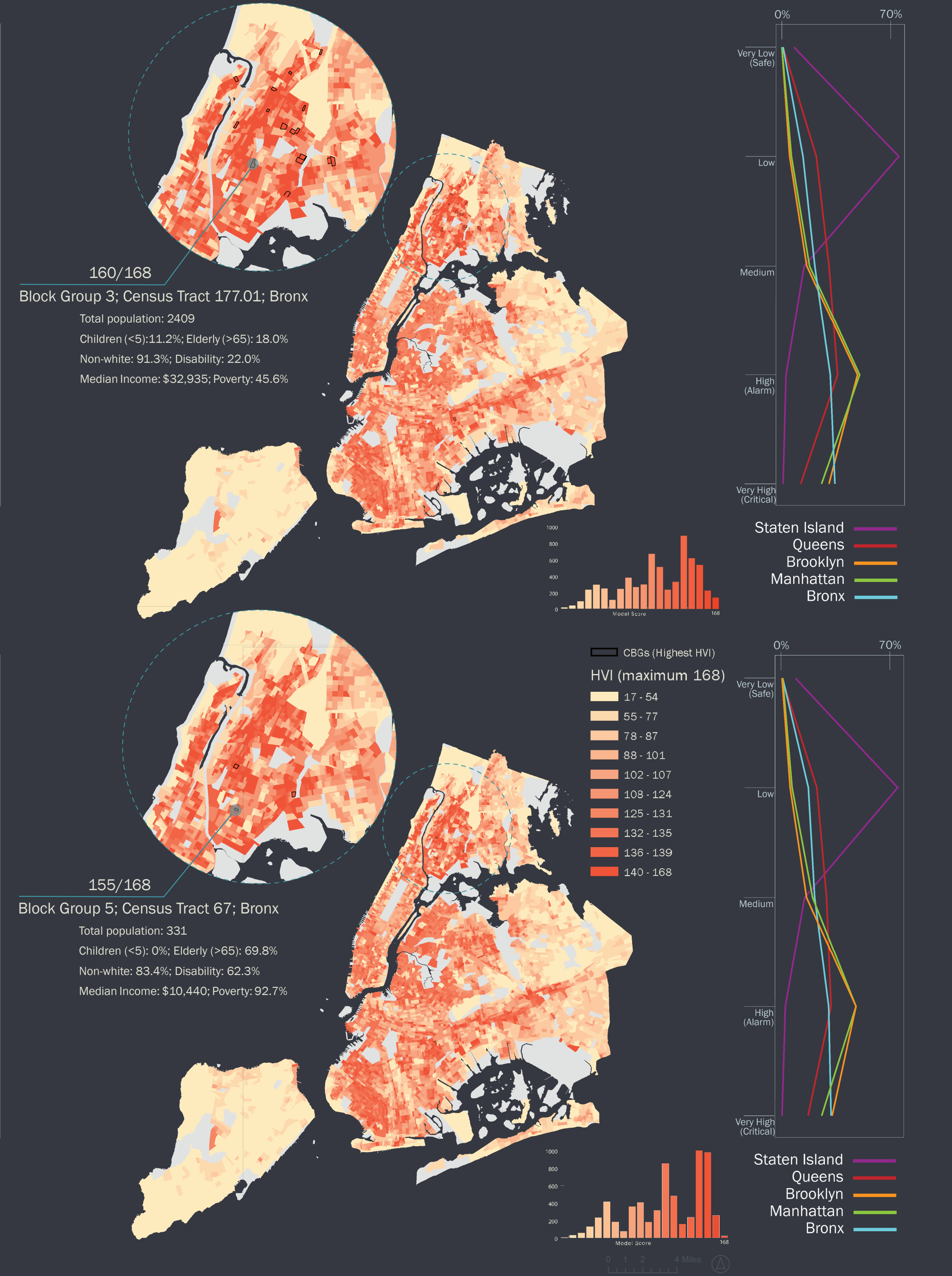
Methodology



RASTER METHOD 1: PRINCIPAL COMPONENT ANALYSIS



RASTER METHOD 2: ISO CLUSTERING



Conclusion

The pattern of heat vulnerability differs from existing social vulnerability indexes that cover the New York City area, providing a more accurate prediction and estimation of areas in NYC that are threatened by heat risks and extreme weather events. Using raster Land surface data with high resolution (15 x 15) and vector data in census block group level, the research designates multiple sets of HVIs with higher accuracy and precision compared to mainstream census-tract-based indices. The four sample indices, constructed from different methodologies, demonstrate similarities in regions with higher heat vulnerabilities, which can assist policymakers in better distributing resources to enhance local resilience. However, each of the index presents visible differences in extreme values and shows different distribution of census block group values, suggesting that different method selection and weighting mechanism are potentially biased towards certain characteristics.

geospatial methodologies, which are Principle Component Analysis (PCA), ISO Clustering, Anselin Local Moran's I, and Natural Break Reclassification. The poster also reflects data performance and characteristics of each indexing methodology and the distribution of HVI across the New York City.

Among the indices presented, the combinations between PCA and Natural Break Reclassification/ Local Moran's I present a clearer classification and more ordered distribution of HVI across census block groups in the city. While ISO Clustering analysis indices better differentiate block groups with low-to-mid HVI, these indices work less effectively in examining clusteirngs of high HVI values.

Planners and city officials are informed to compare multiple HVI results from a variety of methods and act at a larger scale to ensure equity and comprehensiveness during urban policymaking process.