Analyzing the Shifts of Land Use for Agricultural Land Planning under Climate Change– A Case Study of Northern Yilan County, Taiwan

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1.Background

According to the Intergovernmental Panel on Climate Change (IPCC), Taiwan is threatened by global warming, changes of rainfall pattern, sea level rising and high frequency and influence of extreme weather, which will result in great impacts to agriculture industry and the future of food security.

2.Concept

1) Identifying the 10-year changes of agricultural lands of northern Yilan county, and to further investigate the spatial distribution of agricultural land changes.

2) Spatial analysis techniques such as multi-distance spatial cluster analysis (Ripley's K Function) and point pattern analysis (Kernel density) are employed to analyze the spatial clustering of changes.

3) The spatial analysis results overlays with climate change related and hazard risk maps, such as flooding, landslide, soil liquefaction, to support the decision making of future agricultural land planning and agriculture development zoning plan.

3.Findings

1) The most significant changes are buindings and constructions landuse.

2) The reasons of these changes are vary depending on the developmental attributes of different townships.

3) Many landuse changes from low-density farm land to high-density development sites are ignoring the facts of hazard risks. It is a high risk development under the threat of extreme weather causing by climate changes.
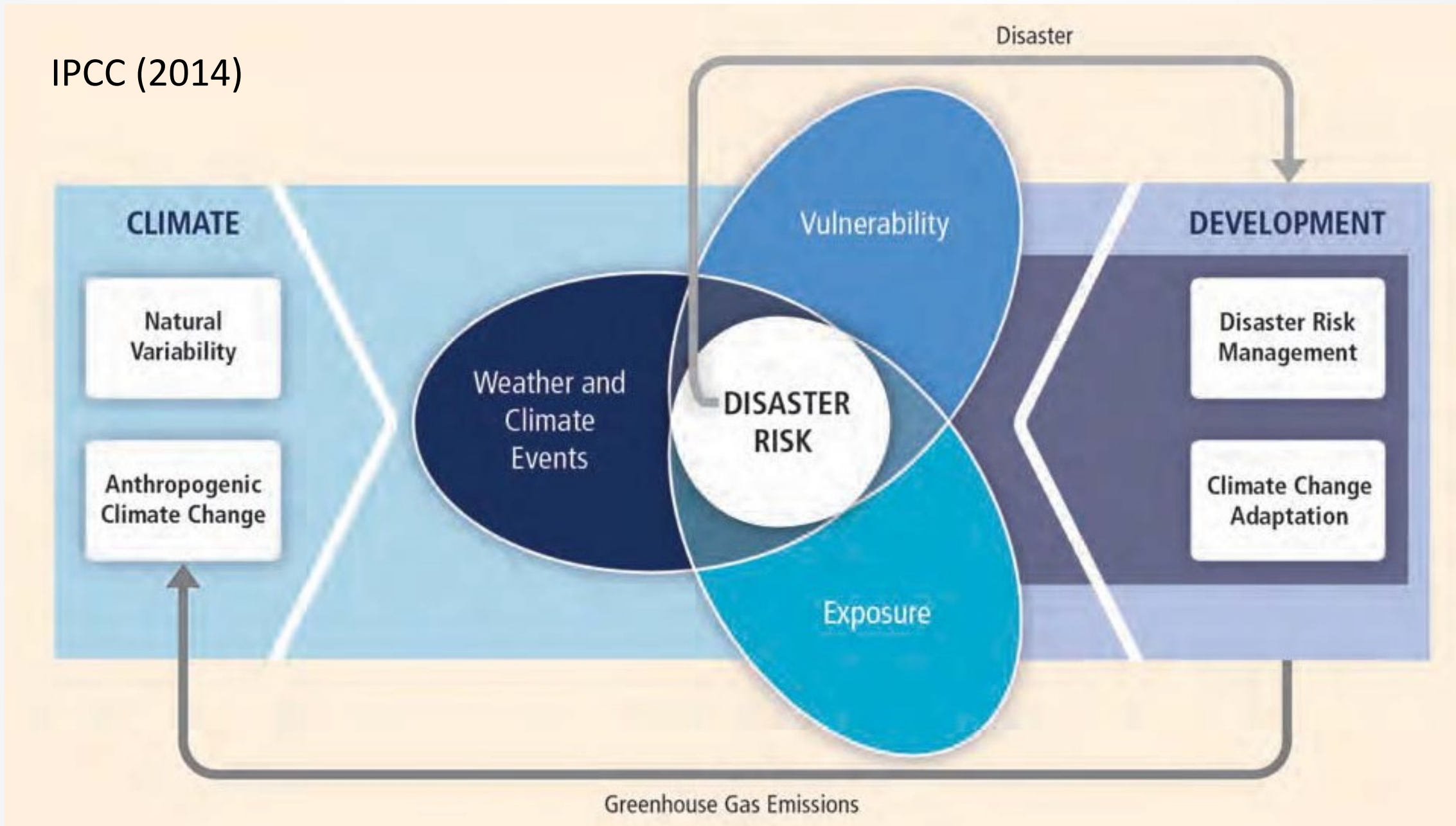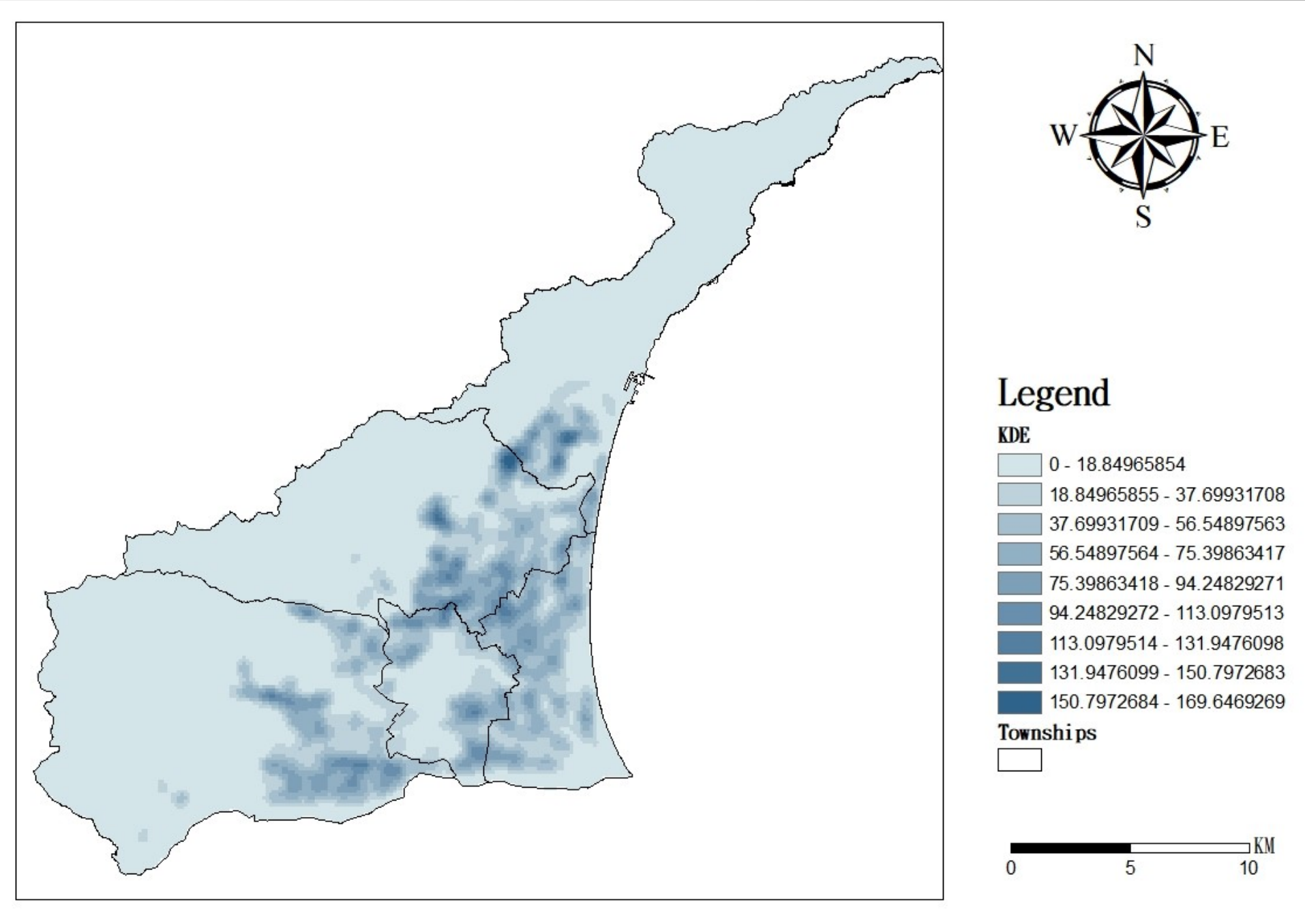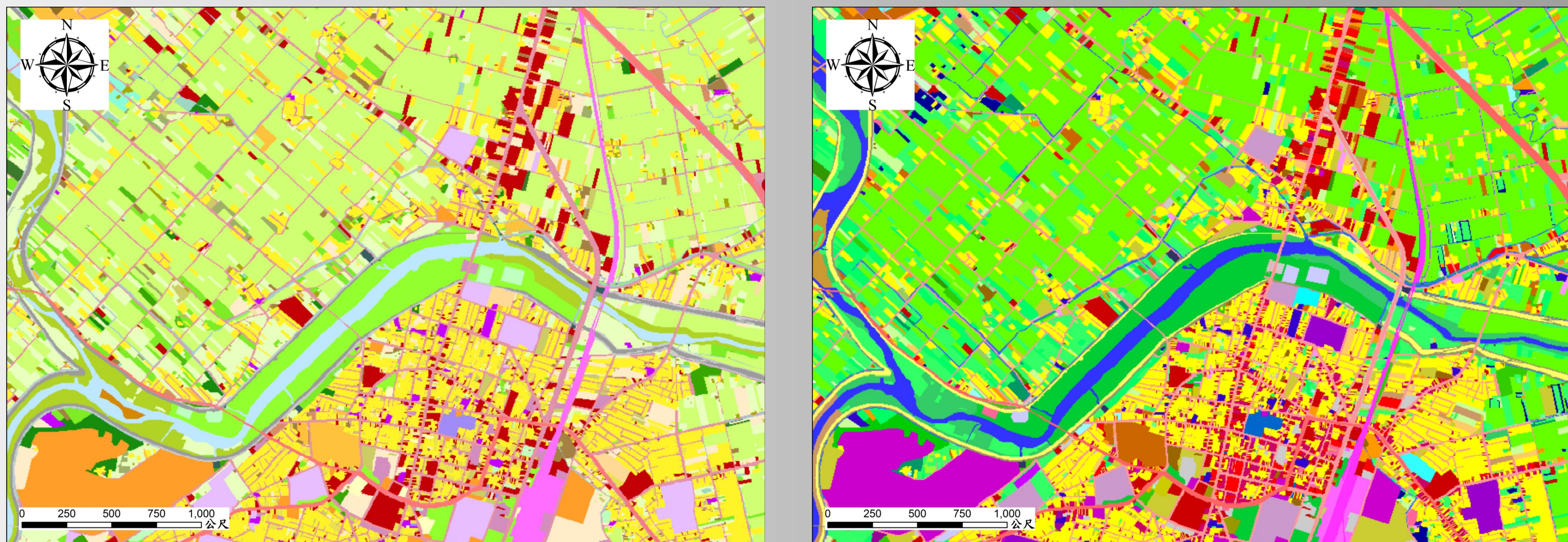

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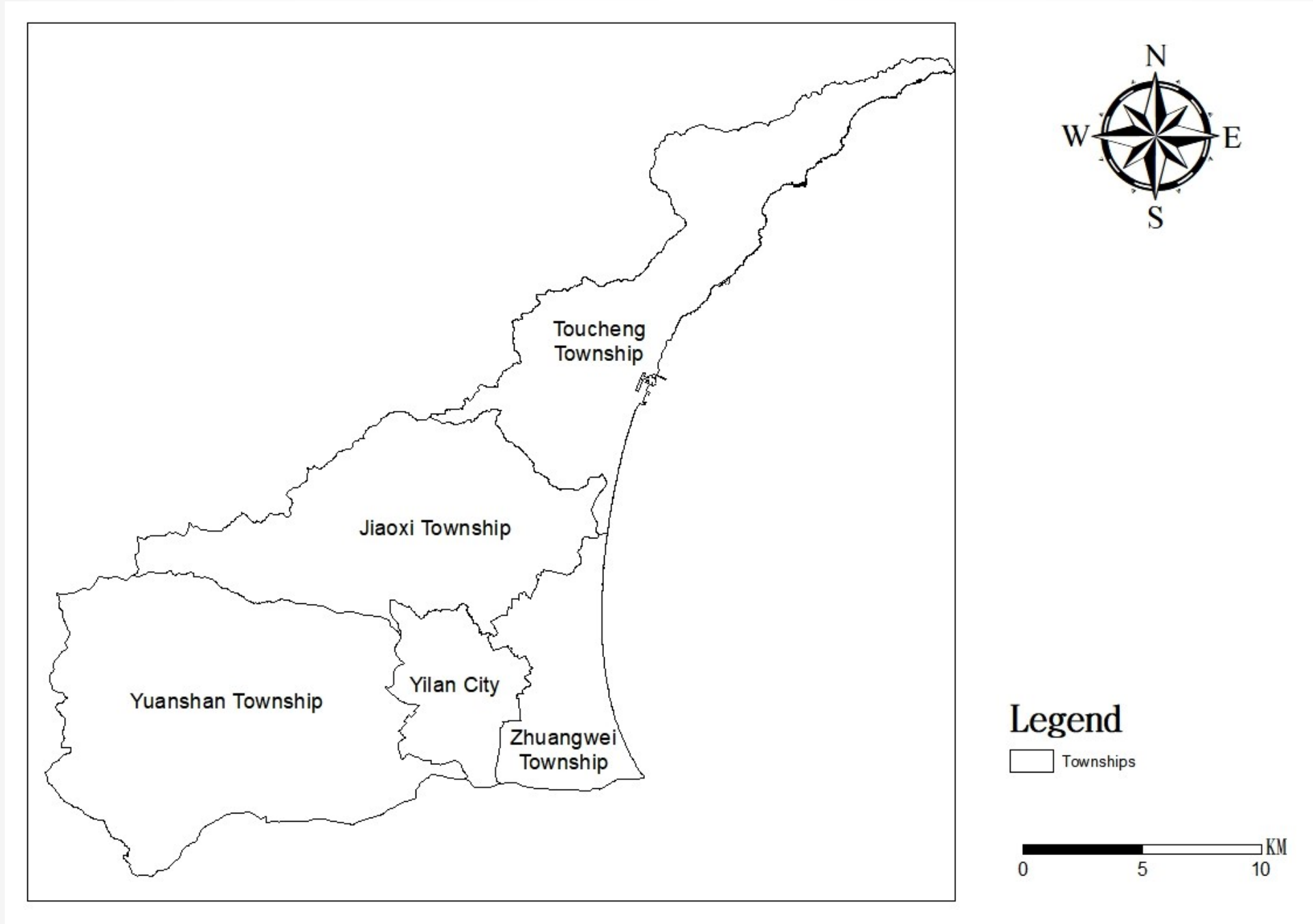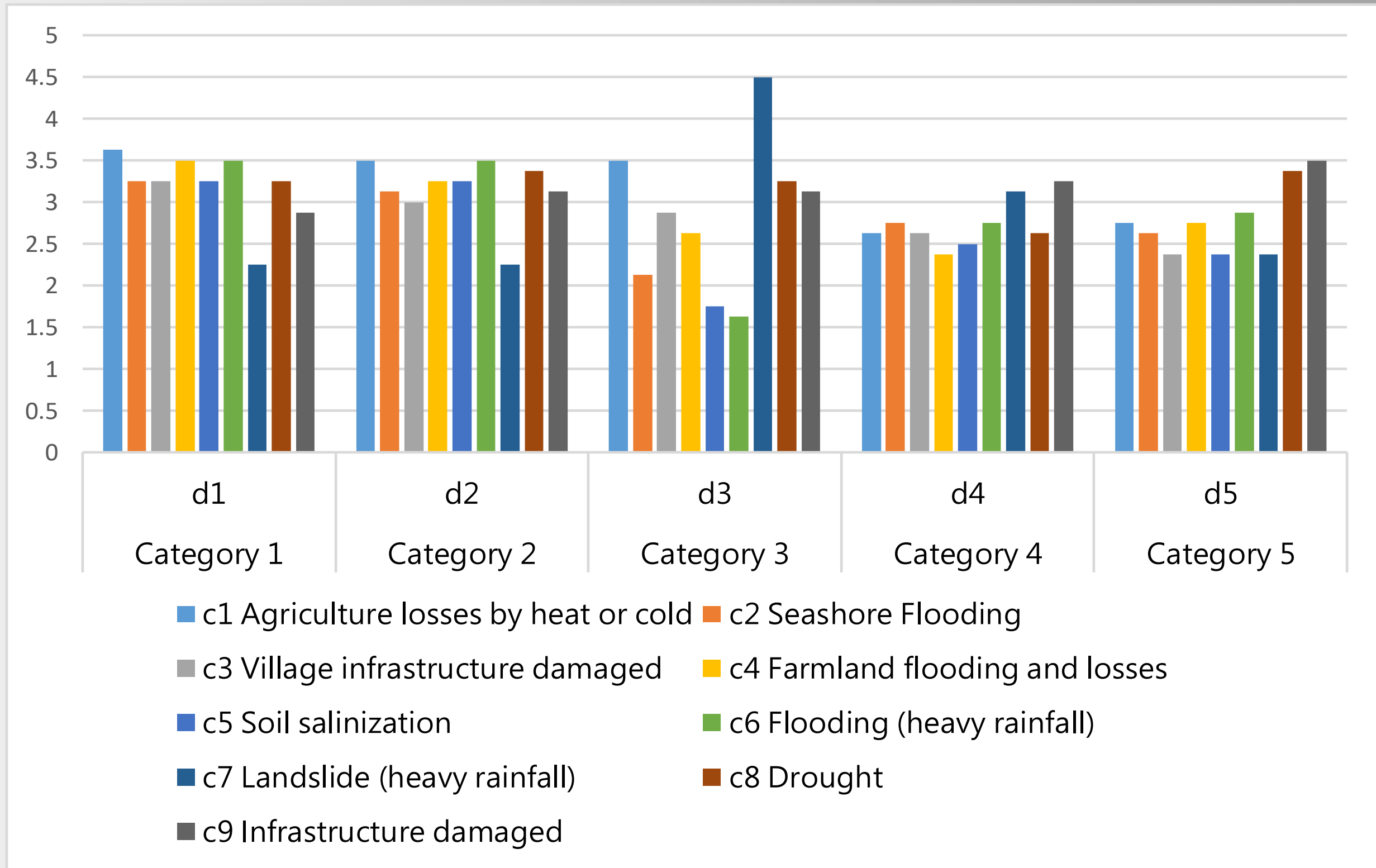

Study site
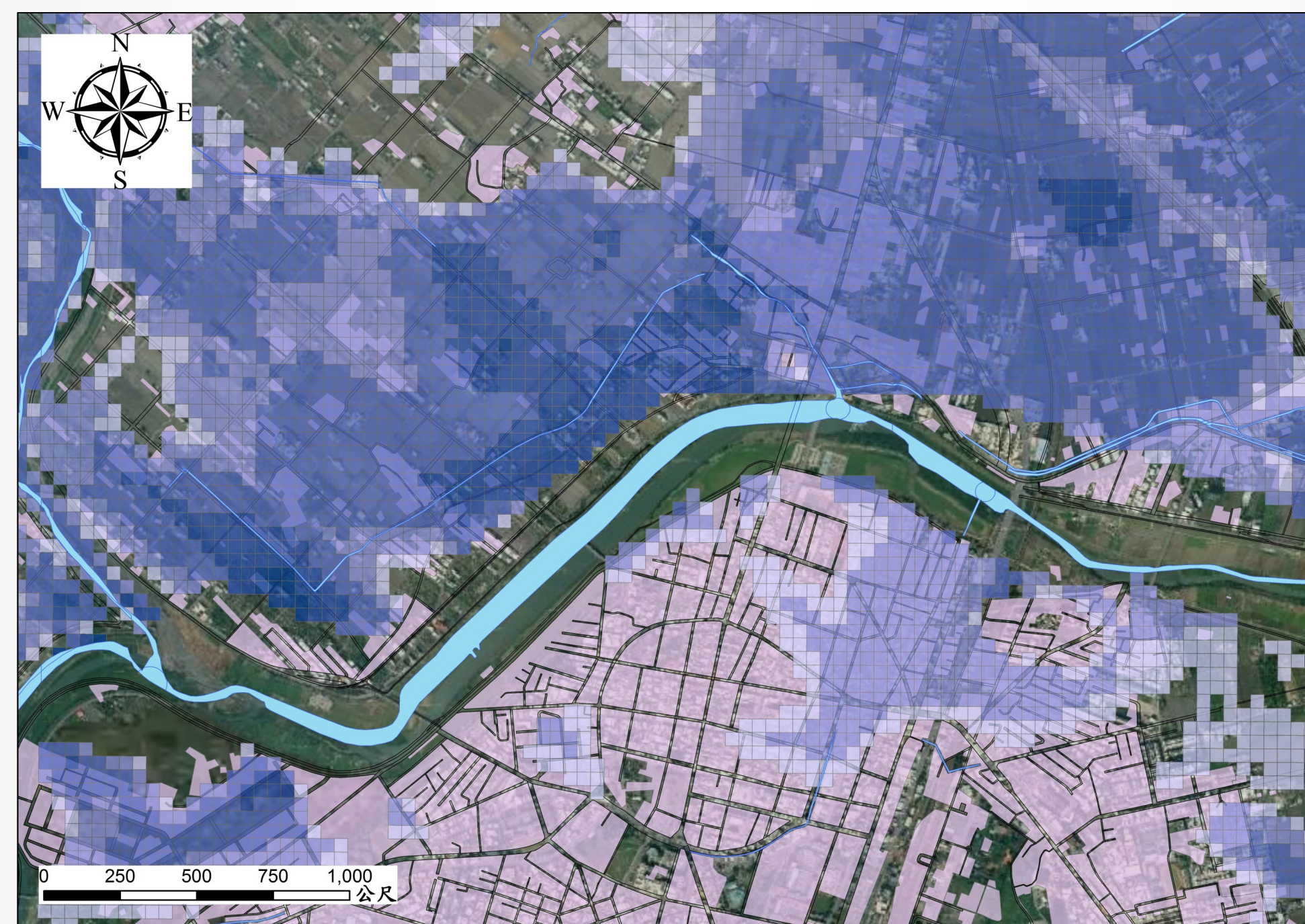
Flooding risk map

Kernel density estimation of the agriculture land use changes

Land use changes

Climate change impact analysis

c1 Agriculture losses by heat or cold   c2 Seashore Flooding
c3 Village infrastructure damaged   c4 Farmland flooding and losses
c5 Soil salinization   c6 Flooding (heavy rainfall)
c7 Landslide (heavy rainfall)   c8 Drought
c9 Infrastructure damaged