

## Exploring Coexisting Opportunity of Earthquake Risk and Urban Growth

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**Abstract :** Earthquake is an unpredictable natural disaster and intensive earthquakes have caused serious impacts on social-economic system, environmental and social resilience, and further increase vulnerability. Due to earthquakes do not kill people, buildings do. When buildings located nearby earthquake-prone areas and constructed upon poorer soil areas might result in earthquake-induced ground damage. In addition, many existing buildings built before any improved seismic provisions began to be required in building codes and inappropriate land usage with highly dense population might result in much serious earthquake disaster. Indeed, not only do earthquake disaster impact seriously on urban environment, but urban growth might increase the vulnerability. Since 1980s, 'Cutting down risks and vulnerability' has been brought up in both urban planning and architecture and such concept has way beyond retrofitting of seismic damages, seismic resistance, and better anti-seismic structures, and become the key action on disaster mitigation. Land use planning and zoning are two critical non-structural measures on controlling physical development while it is difficult for zoning boards and governing bodies restrict development of questionable lands to uses compatible with the hazard without credible earthquake loss projection. Therefore, identifying potential earthquake exposure, vulnerability people and places, and urban development areas might become strongly supported information for decision makers. Taiwan locates on the Pacific Ring of Fire where a seismically active zone is. Some of the active faults have been found close by densely populated and highly developed built environment in the cities. Therefore, this study attempts to base on the perspective of carrying capacity and draft out micro-zonation according to both vulnerability index and urban growth index while considering spatial variances of multi factors via geographical weighted principle components (GWPCA). The purpose in this study is to construct supported information for decision makers on revising existing zoning in high-risk areas for a more compatible use and the public on managing risks.

**Keywords :** earthquake disaster, vulnerability, urban growth, carrying capacity, /geographical weighted principle components (GWPCA), bivariate spatial association statistic

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