Adaptation the Urban Hazard Application Approach from Japan to Thailand

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Abstract

Historical urban areas are highly vulnerable to natural disasters due to aging infrastructure, dense populations, and limited adaptability to modern risk-reduction strategies, especially in Chiang Mai, Thailand. Moreover, Chiang Mai is one of historic areas with cultural assets on UNESCO's Tentative List and faces multiple risks, including floods, landslides, PM2.5 air pollution, and earthquakes. Despite past severe disasters and the production of simple damage maps after events, systematic hazard maps designed for mitigation and resident evacuation remain underdeveloped. Building on previous research and Japanese examples, this research was found a Japanese-derived framework in which hazard maps are structured around four factors: (1) General data; (2) Infrastructure; (3) Disaster risk information; and (4) Designated emergency evacuation sites. These factors were examined through content analysis and a questionnaire survey conducted in Chiang Mai, with responses analyzed using Principal Component Analysis (PCA) via SPSS. This aimed to evaluate vulnerabilities of urban hazard maps to propose hazard-mapping system in Chiang Mai Old Town. In summary, the analysis identifies five key components for creating effective hazard maps linked to urban planning, urban conservation, and community engagement: (1) Socio-cultural sustainability; (2) Temporary shelter; (3) Smooth and safe evacuation; (4) Building strength based on past disaster records; (5) Building types, which these components are layered to produce effective hazard maps and contributes an application approach to disaster planning in Chiang Mai where heritage preservation and resilience must be coexisted.

Keywords

Hazard Map, Historical Area, Chiang Mai Old Town, Principal Component Analysis.