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ANALYSING THE NEED FOR BUILDING CLASSIFICATION BASED ON LAND DEFORMATION IN SRI LANKA: A CASE STUDY FROM THE KANDY DISTRICT

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Land deformation poses significant challenges to buildings in Sri Lanka, particularly in urban areas with older, potentially vulnerable structures. This study highlights the necessity of a building classification system to evaluate risks from urban deformation, aiding decisions on rebuilding or modifying buildings for safety and resilience. Given Sri Lanka's ageing infrastructure and susceptibility to geophysical changes, systematic risk assessment is crucial. The research aimed to develop a classification system for buildings based on their vulnerability to urban deformation, enhancing urban planning and disaster preparedness. Utilizing remote sensing data and Geographic Information System technology, the study assessed land deformation impacts in Kandy, Sri Lanka. Sentinel-1 Synthetic Aperture Radar data was processed using Interferometric Synthetic Aperture Radar techniques to generate a deformation map. Concurrently, Sentinel-2 multispectral data, analysed using the Support Vector Machine method, produced a detailed building footprint map. The integration of these datasets, including building age and material type, facilitated the classification of buildings into risk categories. The Geographic Information System database, incorporating building numbers, deformation classification, and construction era, was developed using historical records and correlation analysis. Correlating deformation and building maps allowed the classification of buildings into high, moderate and low-risk categories based on deformation values. Findings revealed that 16.67% of buildings are high-risk, requiring immediate action; 50% are moderate-risk, needing structural upgrades, and 33.33% are low-risk, requiring minimal intervention. This classification system offers a clear framework for prioritizing resources and planning, which is crucial for urban development and disaster management. However, it is limited by the availability of high-resolution data, which may affect the precision of risk assessments. The database allows authorities to model scenarios, prioritize actions and plan for sustainable urban growth, improving disaster preparedness and response. This system aids in selecting building methods and designs resilient to deformation, enhancing urban resilience in Sri Lanka through data-driven risk assessment.

Keywords: Building classification, Geographic Information System database, Sentinel-1 SAR, Sentinel-2, Urban deformation