Applicability Assessment of Drone Mapping for Causal Analysis in Landslide Damage Sites

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ABSTRACT

As climate change accelerates in South Korea, the frequency of weather events has dramatically increased, leading to a rise in casualties caused by landslides. Heavy rainfall is the primary cause of these landslides, and specific triggering factors vary depending on site characteristics such as topography, soil composition, vegetation, and unplanned development. To prevent landslide recurrence, it is crucial to identify and improve controllable factors beyond rainfall, necessitating accurate site information collection and causal relationship analysis. Current disaster damage investigation heavily rely on manpower, and the diverse conditions of landslide damage make it challenging to accurately estimate the scale, imposing temporal and spatial limitations. To address these issues, drones equipped with high-resolution sensors have emerged as valuable tools for rapid and extensive damage assessments. Data collected by drones allow precise measurements of distances, volumes, and the representation of terrain attributes. This study applies drone surveying to landslide-prone areas affected by concentrated rainfall, exploring effective drone mapping methods for causal analysis. Through drone flights considering mountainous terrain and utilizing collected data, high-quality drone mapping results were obtained, depicting the topography of landslides. Additionally, collapsed volumes were calculated and quantitative measurements provided a summarized representation of site conditions and collapse triggers. Ultimately, combining information acquired by investigators on-site with drone mapping data enables enhanced causal analysis. This approach presents a strategic method for effectively utilizing drones in landslide prevention and response.

Keywords: Landslide, Drone, Mapping, Disaster investigation