

Risk management of debris flow disaster in Taiwan

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Owing to the steep topographical features, young and weak geological formations, earthquakes and typhoons, debris flows which often cause extensive life and property losses have become one of the most serious geological hazards in Taiwan. According to the Disaster Prevention and Protection Act, the Soil and Water Conservation Bureau (SWCB), Council of Agriculture, is the national level department in charge of the debris flow disaster management. Realizing the importance of debris flow disaster management, the SWCB has devoted to establishing the comprehensive countermeasures against debris flows since 2002. Traditionally, the engineering constructions are the primary approach to deal with debris flows. However, due to the climate change impact, the Taiwanese government turn to the non-structural strategies recently including the debris flow hazard mapping-potential

debris flow torrents, a rainfall-based debris flow early warning model and a web-based decision support system.

On August 8, 2009, the most devastating typhoon named Morakot struck Taiwan with a violent southwest monsoon. Intense rainfall induced by Typhoon Morakot caused severe flash floods, landslides and debris flow disasters, especially in southern Taiwan leaving 665 people dead and 34 others missing, and roughly US\$4.4 billion losses. During Typhoon Morakot period, 9,100 residents living in the dangerous areas were evacuated by local governments to the safe shelters according to the debris flow warnings issued by the SWCB. Among them, at least 1,046 people escaped from the possible casualties in terms of the post disaster investigation. The above-mentioned non-structural countermeasures provide an effective way for evacuation operation especially during typhoon period and have been proven to make a good contribution to debris flow hazard mitigation in Taiwan.