



A method to evaluate the overall performances of watershed conservation practices conducted after severe landslides-related hazards

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The Tseng-Wen Reservoir watershed is the largest and the most important reservoir in southern Taiwan. The watershed of the Tseng-Wen Reservoir suffered severe landslide-related hazards and deposits caused by Typhoon Morakot in August 2009. After the severe hazards, the government conducted many conservation practices, such as check dams, slit dams, ground sills, revetments, vegetation treatments and regulation work on torrents, in the Tseng-Wen Reservoir watershed. Since 2009 Typhoon Morakot, the government has carried on the program of conservation for three years. It is necessary to review and adjust the current situations of the conservation practices and restoration in order to plan the following conservative project. To evaluate the overall performances of conservation practices, we propose a method including five factors to reflect the performances of conservation practices. The five factors are (1) reduction of watershed sediment yield, (2) river-course recovery, (3) reduction of watershed landslide area, (4) reduction of peak discharge, and (5) amount of sediment directly stabilized by conservation practices. To compare the performances, we normalize the factors and present the five normalized factors in a radar-diagram. The results showed that the evaluated basins are restored well and close to the characteristics of watershed before Typhoon Morakot. The assessments from field investigation are corresponding to the evaluated results. The five factors can adequately normalize the differences of the characteristics before and after severe landslide-related hazards in the watershed, and furthermore they can enhance the inferior factors for the future conservation works.