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Watershed safety and quality control by safety threshold method

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Taiwan was warned as one of the most dangerous countries by IPCC and the World Bank. In such an exceptional and perilous island, we would like to launch the strategic research of land-use management on the catastrophe prevention and environmental protection. This study used the watershed management by "Safety Threshold Method" to restore and to prevent the disasters and pollution on island. For the deluge prevention, this study applied the restoration strategy to reduce total runoff which was equilibrium to 59.4% of the infiltration each year. For the sediment management, safety threshold management could reduce the sediment below the equilibrium of the natural sediment cycle. In the water quality issues, the best strategies exhibited the significant total load reductions of 10% in carbon (BOD5), 15% in nitrogen (nitrate) and 9% in phosphorus (TP). We found out the water quality could meet the BOD target by the 50% peak reduction with management. All the simulations demonstrated the safety threshold method was helpful to control the loadings within the safe range of disasters and environmental quality. Moreover, from the historical data of whole island, the past deforestation policy and the mistake economic projects were the prime culprits. Consequently, this study showed a practical method to manage both the disasters and pollution in a watershed scale by the land-use management.