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## The magnitude of soil erosion of small catchments with different land use patterns under an extreme rainstorm on the Northern Loess Plateau, China

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The characteristics of soil erosion under extreme rainstorm conditions can reflect the effect of ecological restoration measures and the rationality of land use patterns in the region. 12 dam-controlled catchments were selected after an extreme rainstorm event occurred in the northern Shaanxi Province on 25-26 July 2017 (called "7.26" rainstorm). Soil erosion intensity in the 12 catchments was obtained by digging up the sedimentation profiles and measuring the sedimentation areas. Using digital orthophoto map and digital terrain model by Unmanned Aerial Vehicle to obtain land-use types and their areas, slope gradients and the distance along the flow path to the edge of the downslope and dam-land. Stepwise regression method was used to analyze the main factors affecting catchment erosion intensity. The results showed that the average sedimentation thickness in the 12 damlands ranged from 0.16 m to 1.67 m and the intensity of soil erosion of the 12 catchments varied from 10295 t km<sup>-2</sup> to 49227 t km<sup>-2</sup>. Soil erosion caused by this rainstorm was 10-50 times of the allowable amount of soil erosion in the Loess Plateau region (1000 t km<sup>-2</sup>.a) issued by Ministry of Water Resource of the People's Republic of China (MWR). Stepwise regression analysis shows that, the closer the shape of a catchment to the circle is, the larger the area of slope-cropland in inter-gully land is or the closer the distance between slope-cropland and the dam-land is, the larger the erosion modulus in the catchment would be. What's more, the presence of cement road up the valleys shoulder line reduced the modulus of soil erosion. These findings indicated that the existing ecological conditions in the dam-controlled catchments are not able to resist extreme rainstorm erosion effectively. Optimizing the distribution of land use types in catchments should be the focus of soil erosion control.