

Effect of check dams on sediment concentration in a watershed during a heavy rain event

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Abstract

Understanding the changes of sediment concentration (SC) in rivers is of great significance for correctly evaluating the effectiveness of soil and water conservation measures. By comparing the variation of SC in a typical watershed at the multi-year and the flood event scale, as well as the field investigations of sediment retained in check dams during a heavy rain in the Loess Hilly Area, the effect of check dams on SC were analyzed in this paper. Results showed that the check dam retained 56% of the eroded sediment in the watershed during the heavy rain on July 26, 2017, and greatly reduced the sediment transport to the downstream. Under the heavy rain condition, the slope measures (afforestation, grassing and terraces) had limited effect on reducing sediment yield, and can not stop the occurrence of hyperconcentrated flow. The average SC of runoff in the dam-controlled catchments was 438 kg/m³, while it was only 148 kg/m³ at the watershed outlet. The gully measures (check dams) played an important role in altering the characteristic of hyperconcentrated flow at the outlet of the watershed. In order to control the transport of hyperconcentrated flow to the downstream, more attention should be paid to the construction of check dams while carrying out vegetation ecological construction in the Loess Hilly Area.

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