



Role of the check dam in land development on the Loess Plateau, China

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Check dam is one of the most effective measures to reduce flow connectivity, which can retain soil and water, and increase land productivity. More than 100,000 check dams have been built on the Loess Plateau since 1950s. However, quantifying the effect of check dams on water resources and water environments remains a challenge. In this study, an in-depth field investigation together with a credible statistical analysis was carried out in two representative catchments on the Loess Plateau, Nanxiaohegou Catchment and Jiuyuangou Catchment, to assess the effectiveness of check dams in soil, water and nutrients conservation. The results show: (1) Check dam plays an important role in conserving water, soil, and nutrients on the Loess Plateau. About half of the total transported water and more than 80 % of the total transported soil and nutrients, had been locally retained in the selected catchments. Hence check dams had a significant benefit to improve soil fertility in the small watersheds, and reducing water pollution downstream of dams. (2) Compared to terrace farmlands, forest lands and grasslands, check-dam lands were much more important in conserving water, soil and nutrients in the catchments. Nearly 50% of the reduced water and more than 70% of the stored soil and nutrients in the study catchments were solely retained by the check dams, whereas the area of the dam lands was less than 7% of the total conservation land area. (3) Check dams are still effective in large storms even if dams were damaged by floods. It is often assumed that check dams could only retain sediment in small flood events whereas most of the stored soil may be washed out as the dams may be destroyed in a disastrous flood. Furthermore, if a major check dam, namely the key project dam, was built in the gully outlet, the flood could be controlled, and thereupon the dam-break can be also avoided. We suggest that a compensation and incentive policy be implemented on dam building to realize the sustainable development of local economy and ecological environment.