

# Soil erosion resisting efficiency of “Grain for Green” measures under extreme rainfall on the Loess Plateau, China

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**Abstract:** Soil erosion is one of the most serious environmental problems in the world. Erosion is especially pronounced on the Loess Plateau of China, where the soil erosion is generally caused by heavy rain or thunderstorms. To control soil and water losses and improve the environment of the Loess Plateau, the Chinese Central Government issued the “Grain for Green (GFG)” policy in 1999 to restore vegetation to previously farmed steep lands on the loess plateau. This study will explore the value of the “GFG” policy by examining the response of three different “GFG” vegetation rehabilitation strategies (naturally rehabilitated grassland, reforestation with ecology trees and reforestation with orchard trees) in controlling erosion from an extreme rainfall event in the Northern Shaanxi Province in China. The vegetation types, coverage, biological soil crust (BSC) coverage, plant species diversity, slope gradient and rainfall erosion intensity, and the soil erosion resisting efficiency of the different “GFG” measures under extreme rainfall were assessed using field surveys. It was found that the natural grassland and ecology forest are more effective at reducing soil erosion than the orchard. Furthermore, having a high surface vegetation cover and well developed BSC were the most important factors in reducing soil erosion. Therefore, this study shows that “GFG” measures are beneficial in reducing soil erosion on the Loess Plateau and that rehabilitation efforts should focus on grassland and/or ecology forests rather than attempting to achieve the dual goals of economic gain (from orchard crops) as it appears that currently established orchards are poor at controlling soil erosion.

**Keywords:** Surface vegetation; Biological soil crust; Plant species diversity; Grassland; Ecology forest; orchard

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