

3. ABSTRACTS

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Effectiveness of land and water management interventions in reducing runoff and soil erosion in the northwestern highlands of Ethiopian.

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Human induced changes in runoff, sediment and nutrient flows is directly affecting the benefits that ecosystems can provide. This study was conducted in Gomit watershed to investigate the effectiveness of land and water management (LWM) practices in reducing runoff and soil erosion. Within the Gomit watershed, two nested watersheds located in the upstream (196 ha) and downstream areas (163 ha) were selected. In both watersheds, LWM practices were implemented to harvest water, and reduce soil erosion. Over 80% of the upstream watershed is covered with exclosures, while the downstream watershed is dominated by cultivated and grass land (57%). Leptosols and Luvisols are the dominant soil types in the upstream and downstream watersheds, respectively. Runoff, sediment yield, and sediment associated nutrient concentrations were determined during the 2015 rainy season. Considerable differences in runoff and sediment yield between the two watersheds were observed. The seasonal runoff in the upstream and downstream watersheds were 10.4 (1.5% of the total rainfall) and 58.6 mm (8.8%), respectively whereas the sediment yield was 1 and 4 t ha⁻¹. The loss of sediment associated phosphorus and nitrogen in the downstream watershed was estimated at 0.2 and 7 kg ha⁻¹ whereas 0.1 and 1 kg ha⁻¹ for the upstream watershed, respectively. The low runoff in both watersheds could be attributed to the implemented conservation measures, low rainfall and possible transport of water out the watersheds through fissures. The relatively larger sediment yield in the downstream watershed could be resulted from disturbance due to tillage and existence of gullies in cultivated land. Differences in the amount of loss of soil nutrients could be related to agricultural practices and differences in direct runoff of the watersheds. The results support that integrating exclosures with LWM practices is effective in reducing runoff and soil erosion and enhancing the productivity of degraded landscapes.

Keywords: Ecosystem services, land and water management, landscape, exclosures, nutrient loss