



## **Erosion and Gully Formation in the Ethiopian Highlands: Physical Observations and Community Perspectives**

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The aims of this investigation are to analyze spatio-temporal variations in sediment transport to waterways in a small agricultural watershed by: (i) locating sediment sources using modeling and bio-physical scientific approaches, (ii) locating sediment sources and erosion processes through age- and gender-differentiated focus group discussions and transect walks, and (iii) linking sediment sources to changes in soil nutrient concentrations. The collected field measurements, modeling results, and community perceptions have been gathered on an area encompassing a previous study site (14 ha) on a currently larger scale (95 ha) in the Debre Mewi watershed to develop a fuller picture of the social and environmental conditions that are leading to induced or controlled erosion and gully formation. Farmers provided their perspectives on erosion processes and these were complemented by and compared to soil and water field measurements during the rainy season. Nine sites were selected for monitoring and measuring groundwater, soil nutrient changes, and soil depth change on the 95 ha study area, based on land use and slope angle – half represent grazing or fallow land and half are located on cultivated land. A set of stable gullies and actively forming gullies were monitored and measured simultaneously along hillslope locations in the top, middle and bottom areas. In addition, sediment concentration samples were collected at 4 weir locations in the 95 ha watershed and also at the final outlet to this watershed. Modeling efforts emphasize steep cropland as most vulnerable, whereas community members pointed out waterlogged black soils and lower areas as vulnerable. The data demonstrate that saturated pathways in the landscape provide areas for the development and widening of gullies and that flat cropland areas experience deposition rather than erosion, while soil nutrient concentrations are decreasing upslope and increasing downslope.