

Beyond implementation: assessing farmers' perception of the sustainability of soil and water conservation measures in central Ethiopia

Soil and water conservation (SWC) practices are critical for sustainable agriculture in erosion-prone regions like the Central Ethiopia Region, Alichu District, yet their long-term viability remains unknown. This study assessed farmers' perception of the sustainability of SWC measures through household surveys ($n = 355$), field observations, and ordered logit analysis. Findings reveal only 27.3% of existing SWC practices are fully functional, while 50.7% are partially damaged and 22% are non-operational or were never adopted. About 55.8% of farmers rated controlled grazing as moderately sustainable and mulch application (54.1%) as most effective, whereas check dams (63.1%) slightly sustainable and tree planting (22.3%) faced skepticism due to design mismatches and slow returns. Regression identified education level ($p = 0.01$), farm size ($p = 0.008$), and institutional support (extension services ($p = 0.008$)) as key sustainability drivers, while steep slopes ($p = 0.046$) and uncontrolled grazing ($p = 0.012$) were significant barriers. The farmers observed that about 36.8% of damage was deliberate, primarily due to oxen plowing interference (44.6%) and land productivity concerns (31.3%), underscoring farmer-resource conflicts. The study highlights a critical "maintenance gap," with over half of SWC structures deteriorating post-implementation due to inadequate follow-ups. To address the observed sustainability challenges, we recommend participatory redesign of SWC structures and community-based maintenance complemented by targeted extension services and economic incentives. A shift to lifecycle-based conservation is needed, integrating technical adaptations into challenging environments while balancing livelihoods and ecological benefits.