



## **The role of land rehabilitation by landless farmers and impacts on soil properties in Hawzen, North Ethiopia**

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The northern Ethiopian highlands have suffered from severe land degradation for which the subsistence farming system with farming on steep slopes, grazing and wood harvesting was an important cause. Consequently, both the environment and the livelihoods of the smallholder farmers have been under continuous deterioration. To minimize the further fragmentation of farmlands, the government stopped further reallocation of farmlands in 1991. However, to improve the livelihood of landless farmers (or farmers owning minimal farmland) and rehabilitate degraded areas, highly degraded hillsides were allocated to the landless farmers in recent decades for tree planting purposes. The objective of this study was to examine the effect of hillside reforestation by landless farmers on key soil properties in the area of Hawzen. Soil samples ( $n=18$ ) were taken randomly from both degraded and rehabilitated hillsides. Moreover, farmers ( $n=30$ ) were interviewed about their perception on the major differences observed between degraded and rehabilitated hillside soils. The findings showed that hillsides that were managed by landless farmers have a higher organic matter content ( $p<0.001$ ), total nitrogen ( $p<0.001$ ), available phosphorus ( $p<0.001$ ) and potassium ( $p<0.001$ ), compared to adjacent degraded hillsides. However, there was no significant ( $\alpha=0.05$ ) difference on pH-value and electrical conductivity of the soils between the degraded and rehabilitated land. Bulk density of the managed hillsides was significantly ( $P<0.001$ ) lower than the degraded hillsides. Local communities reported that unlike the treated hillsides, the degraded hillsides have still poor drainage system, dense outcropping and white/yellow soil color. The study thus shows improvement on physical and chemical soil properties in land rehabilitated by landless farmers, implying that household level tree growing enhances sustainable land management of the degraded landscapes of northern Ethiopia. Therefore, allocation of degraded hillsides to landless farmers for tree planting should be scaled-up to other regions where extreme shortage of land and soil erosion challenges the rural livelihoods.

Key words: degraded hillsides, tree planting, soil properties, northern Ethiopia.