

## **Variation of Selected Soil Properties in Relation to Land Use Types and Slope Steepness in a Mountainous Watershed, Ethiopia**

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### **Abstract**

Deforestation of the native forests for crop production in the Gumara-Maksegnit watershed, located in the Lake Tana basin, Ethiopia, dramatically increases the vulnerability of the soil for rainfall driven erosion. Hence, the central task of the study is to investigate general links of land-use and topography related to selected soil properties. The 53.7km<sup>2</sup> watershed was divided into a 500m by 500m square grid to sample bulk density (pb), pH, soil organic carbon (SOC), total nitrogen (TN), available phosphorus (AP) and texture of the topsoil. Such properties were investigated with respect to the two main land-uses, forest and agriculture, and three different slope steepness classes, 0-10%, 10-30%, >30%. Descriptive statistics and correlation analyses were undertaken to explore potential dependencies of the obtained soil parameters according to land-use and slope steepness. The study indicates higher SOC and TN as well as higher silt and sand content in forest soils compared to agricultural soils, while solely pd is lower in the forest soil. Overall increases of SOC, TN, silt and sand content from the gentle to the steep slopes have been observed for all land-uses. In contrast, clay content and pd seem to increase from steep to gentle slopes on agricultural areas, which might be due to accumulation of particularly fine soil particles eroded from the steep areas. Basic correlations valid for all land-uses and slope steepness have not been detected. Nevertheless, the study suggests slope steepness as a tool to assess the potential drivers of soil depletion in the Ethiopian Highlands.

**Keywords:** Ethiopian Highlands, land-uses, slope steepness, soil properties