

Effects of vegetation restoration on soil quality in degraded karst landscapes of southwest China

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Vegetation restoration was implemented to control soil erosion in the karst regions of southwest China. It is essential to assess the soil function and quality scientifically during this process and to adopt suitable management practices for this area. However, few studies have been conducted to comprehensively evaluate the effect of vegetation restoration on soil quality in this severely eroded karst area. By taking 302 soil samples from 11 vegetation types, this study investigated the influence of different types of vegetation restoration on soil quality using an integrated soil quality index (SQI) and a generalized linear model (GLM). Vegetation types had a significant effects on soil properties and thus on soil quality. SQI was developed by using TN, TP, TK, AP, and clay content; TN had highest weighting values (0.58), which indicated that it contributed the most to final SQI. The highest and lowest SQI values was observed for primary forest and cropland, respectively. Overall, vegetation restoration (e.g., natural restoration, artificial forests and artificial grassland) improved soil quality significantly. A GLM model explained 73.20% of the total variation in SQI, and vegetation type explained the largest proportion (46.39%) of the variation, which implies that the vegetation restoration practices can greatly enhance the soil quality in karst landscapes of southwest China. The results of this study may be used to improve implication of ecological restoration and management in degraded regions.