

Classification of Effective Soil Depth by Using Multinomial Logistic Regression Analysis

ABSTRACT

Classification of effective soil depth is a task of determining the slopeland utilizable limitation in Taiwan. The “Slopeland Conservation and Utilization Act” categorizes the slopeland into agriculture and husbandry land, land suitable for forestry and land for enhanced conservation according to the factors including average slope, effective soil depth, soil erosion and parental rock. However, site investigation of the effective soil depth requires a cost-effective field work. This research aimed to classify the effective soil depth by using multinomial logistic regression with the environmental factors. The Wen-Shui Watershed located at the central Taiwan was selected as the study areas. The analysis of multinomial logistic regression is performed by the assistance of a Geographic Information Systems (GIS). The effective soil depth was categorized into four levels including deeper, deep, shallow and shallower. The environmental factors of slope, aspect, digital elevation model (DEM), curvature and normalized difference vegetation index (NDVI) were selected for classifying the soil depth. An Error Matrix was then used to assess the model accuracy. The results showed an overall accuracy of 75%. At the end, a map of effective soil depth was produced to help planners and decision makers in determining the slopeland utilizable limitation in the study areas.

Key point: slopeland, soil depth, multinomial logistic regression