

Evaluation of environmental functions of tropical forest in Kinabalu Park, Sabah, Malaysia using GIS and remote sensing techniques: Implications to forest conservation planning

Abstract

Environmental functions of tropical forest can serve as criteria for forest conservation planning in the tropics. The objective of this study is to evaluate the environmental functions of tropical forest in Kinabalu Park, Sabah, Malaysia, using GIS and remote sensing techniques. Field data, statistical data, including weather data with geographic localities, maps and satellite image are collected. Linear regression models are developed for forests of different geological substrates, based on the relationships between altitude and biodiversity (Fisher's alpha index). Biodiversity conservation function map is derived with the statistical models and a digital elevation model. Coupling with extensive literature review, an evaluation matrix for evaluating soil and water conservation functions including landslide prevention, flood prevention and drought prevention functions, is constructed. To evaluate the soil and water conservation functions, a weighted linear combination method is used with GIS layers of topography, geology, soil depth, rainfall and slope. Forest areas in Kinabalu Park are derived with land cover mapping using Landsat-TM image. Areas having high values of biodiversity conservation, flood and drought prevention functions are covered with mainly lowland rain forest. On the other hand, areas with high values of the landslide prevention function are covered with mainly subalpine forests. Using the environmental functions, a conservation index is computed to represent forests that are important to conservation. Based on the *CI*, the lowland rain forest receives highest priority in protection. In fact, it is located in the boundary areas of the park and thus exposed to illegal activities.