

A NEW APPROACH USING ECOSYSTEM SERVICE MAPPING FOR WATERSHED ECOLOGY DEGRADATION STUDY DUE TO DEFORESTATION

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ABSTRACT

Soil particles are one of the most important elements in maintaining and sustaining the productivity of the entire ecosystem. However, activeness of anthropogenic activities through the centuries had broken the nature rules of the ecological routine which resulted in accelerated soil loss in both developed and developing countries thus threaten the human well-being itself which expected to be more critical in future. Owing to the crucial role of soil as the growing medium, natural water filter, and also habitat for billions of living organisms, continuous land degradation could be the key parameter leading toward food security crisis in 21st century. Response to the global industrialization trend, Malaysia had cleared more than 5 million hectare of forest cover since 1980s. In addition, the rate of deforestation is increasing in current 10 years although it is restricted by the local government. This situation grabbed attention of public as well as the policy maker due to the frequent occurrence of landslide, flash flood and water crisis in this few years in the country even over Pahang watershed, largest watershed in Peninsular Malaysia. Since annual soil loss is the most basic parameter reflects the ecology degradation occurrence, a study was conducted using soil loss as the medium to investigate the ecology degradation due to modification of large watershed landscape features especially forest removal in Pahang watershed from 2000 to 2010. Against this, universal soil loss equation, USLE was selected with MODIS NDVI product data as an input. Meanwhile, forest cover change detection was done using remote sensing data and technique. Although dominated forest is reserved forest, results showed significant decrease of total forest cover through the years and most of it had being replaced by agricultural land, commercial plantation and built-up area which are more beneficial to the economic development of the country. Unfortunately, removal of forest seems to affect the land quality where total annual soil loss estimated showing drastic increase ($> 10\text{Ktons/ha/year}$) every 5 years compare to 2000 and predicted to be higher in coming years. Consequently, worsen the water supplementary, landslide and floods problem. For the time being, agricultural productivity may appear to be lower because of topsoil nutrients lost. In short, sustainable forest land management is essential in minimizing land quality degradation to ensure the productiveness of the whole ecosystem services.

Keywords: watershed, deforestation, soil loss, ecology degradation