An Approach for Determination of Crop Management Parameter in Erosion Risk Mapping Using Remote Sensing Technique

Norsahida Said, Mazlan Hashim
University Technology Malaysia
Faculty of Geoinformation Science & Engineering, Skudai, Johore Bahru, Malaysia
mazlan@fksg.utm.my

Abstract

The Universal Soil Loss (USLE) is an empirical-base analysis that is widely used in predicting long-term erosion risk mapping from specific field areas in specific cropping and management systems. The average annual soil loss is the ultimatum output for the prediction, and the accuracy of such prediction is very much dependent of parameters localized to the environmental settings of the area of interest. These include rainfall patterns (R), soil types (K), length and slope steepness (LS), crop management (C) and conservation practices (P). The first three parameters are related to topographic and environmental setting of the area of study, whilst the latest linked to utilization of land and its conservation. The cropping management factor represents the ratio of soil loss from a cropping or covers condition to soil loss from tilling, rainfall and other continuous fallow condition for the same soil and slope. It is one of the most important parameters of the USLE since it measures the combined effect of all interrelated cover and management variables and this factor is most easily changed. The evaluation of the C factor is often difficult because of the many cropping and management systems. Crops can be grown continuously or rotated with other crop, rotations are of various lengths and sequences, soil may be clean tilled or one of several conservation tillage systems may be used. In most erosion risk mapping using USLE, particularly in developing countries, the C factor have been arbitrarily adopted from other studies cited carried out elsewhere. This resulted in only relative analysis of erosion risk be understood, however, the credibility of such studies has ever seen be doubted as an only absolute amount of soil loss is required for any area of interest. Predicted soil loss might vary from in-situ measurement for many reasons but the relationship between the two values is very critical in operational applications. Consequently, this study is carried out to establish C factor derived from remote sensing technique for Malaysia. Algorithms related to spectral transforms that could be linked to indexing or extraction of the ground leaving radiances from various known LU/LC were examined and analysed. Cross tabulation between the indices derived and the reference LU/LC are performed to determine the best technique in obtaining C factor, later used for determining soil loss for control test site where the in-situ soil loss have been measured to reconfirm the validity of the derived C factor for various types of LU/LC.