Deriving land cover parameters for applications in land degradation studies in the tropics

D. P. Shrestha

Department of Earth Systems Analysis

Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente

Hengelosestraat 99, 7514 AE Enschede, The Netherlands

Abstract

While vegetation cover is an important parameter in many hydrological models for assessing runoff or for estimating how much soil will be lost the triggering factor in land degradation processes is often directly related to land cover changes. In inaccessible mountainous terrain, remote sensing data have proven to be very useful in getting information on vegetation parameters very quickly and/or for assessing land cover changes at watershed or regional scale.

Vegetation cover is generally estimated from normalised difference vegetation index (NDVI) which is computed from near infrared and red spectral bands. In the present study the cover estimates using NDVI are tested against field data in a watershed in Thailand. The results show that translating NDVI to vegetation cover estimation using established models for applications in semi-arid regions, cannot be directly implemented in the tropics. For application in hydrologic or erosion models it is still practical to use tabulated vegetation cover estimates based on land cover types if field based estimations are not available.

For mapping land cover changes in the mountainous areas, inherent effect of illumination variations caused by topography and seasonal effects needs to be removed in order to make the images comparable. For classification of previously obtained satellite data the problem of unavailable ground truth data can be solved by using a combination of spectral similarity and vegetation indices. The application of the method in a case study in Indonesia shows that the method has potential to be used for land cover change analysis.