Land Degradation Vulnerability Modeling: A Study on Selected Micro Watersheds of West Khasi Hills Meghalaya, India

Authors : Amritee Bora, B. S. Mipun

Abstract : Land degradation is often used to describe the land environmental phenomena that reduce land's original productivity both qualitatively and quantitatively. The study of land degradation vulnerability primarily deals with "Environmentally Sensitive Areas" (ESA) and the amount of topsoil loss due to erosion. In many studies, it is observed that the assessment of the existing status of land degradation is used to represent the vulnerability. Moreover, it is also noticed that in most studies, the primary emphasis of land degradation vulnerability is to assess its sensitivity to soil erosion only. However, the concept of land degradation vulnerability can have different objectives depending upon the perspective of the study. It shows the extent to which changes in land use land cover can imprint their effect on the land. In other words, it represents the susceptibility of a piece of land to degrade its productive quality permanently or in the long run. It is also important to mention that the vulnerability of land degradation is not a single factor outcome. It is a probability assessment to evaluate the status of land degradation and needs to consider both biophysical and human induce parameters. To avoid the complexity of the previous models in this regard, the present study has emphasized on to generate a simplified model to assess the land degradation vulnerability in terms of its current human population pressure, land use practices, and existing biophysical conditions. It is a "Mixed-Method" termed as the land degradation vulnerability index (LDVi). It was originally inspired by the MEDALUS model (Mediterranean Desertification and Land Use), 1999, and Farazadeh's 2007 revised version of it. It has followed the guidelines of Space Application Center, Ahmedabad / Indian Space Research Organization for land degradation vulnerability. The model integrates the climatic index (Ci), vegetation index (Vi), erosion index (Ei), land utilization index (Li), population pressure index (Pi), and cover management index (CMi) by giving equal weightage to each parameter. The final result shows that the very high vulnerable zone primarily indicates three (3) prominent circumstances; land under continuous population pressure, high concentration of human settlement, and high amount of topsoil loss due to surface runoff within the study sites. As all the parameters of the model are amalgamated with equal weightage further with the help of regression analysis, the LDVi model also provides a strong grasp of each parameter and how far they are competent to trigger the land degradation process.

Keywords : population pressure, land utilization, soil erosion, land degradation vulnerability

Conference Title : ICNRMBC 2022 : International Conference on Natural Resources Management and Biodiversity Conservation

Conference Location : New York, United States

Conference Dates : December 09-10, 2022