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49. Rural landscapes and ES in Tropical countries (OPEN)

Modelling soil erosion in a watershed in the Atlantic Forest biome, Brazil

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We can find degraded landscapes around the world, many of them are a result of natural phenomena, but mainly are caused by disordered land use. The impacts of degradation on society occur not only on agricultural yields, farmers' income and food security, but also affect the provision of environmental goods and services. Soil loss due to water erosion is an important mechanism of land degradation that contributes greatly to soil and water degradation in many parts of the world, mainly in regions with great rainfall erosivity. Water erosion causes undesirable impacts not only where it occurs, but also where the sediments were transferred to, causing deposition of sediments in water bodies, reduction in water quality, and degradation of aquatic ecosystems. The knowledge of land erosion vulnerability is indispensable for land use planning and to promote practices of soil conservation and also to maintain the ecosystem services that depend on them. This work aims to estimate soil loss in the watershed of the Guapi-Macacu river, Rio de Janeiro, Brazil, an area of the Atlantic Forest biome. The InVEST (Integrated Valuation of Environmental Services and Tradeoffs) tool was applied to estimate annual soil loss, using the sediment retention module. This module allows calculating the average annual soil loss of each parcel of land, and how much sediment can reach a particular point. To identify the potential soil loss, the model employs the Universal Soil Loss Equation (USLE) in the pixel scale, integrating information about topography, rainfall, land use and soil properties. The results of this study indicate that, although there are limitations in the use of USLE, the model allowed the spatialization of soil loss classes with indications of areas considered more or less vulnerable to erosion, considering the available data and their scales. The main advantage of using InVEST to calculate the USLE is the possibility of integrating data in a single environment, reducing the possibility of data conversion errors. However, the major limitation found was the difficulty to obtain the necessary input data for the model.