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SOIL EROSION IN THE ČANČAR BROOK CATCHMENT (WESTERN SERBIA)

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Abstract

Soil erosion involves detachment and transport of soil particles from the upper parts of a slope and their deposition at its lower parts. Erosion causes soil degradation and reduces soil productivity. Soil eroded from the upland catchment causes depletion of fertile agricultural soil and the resulting sediment deposited at the river networks creates river morphological change and reservoir sedimentation problems. As regards the initiation of the wearing away of soil particles from the catchment slope, standard methods were used to quantify soil erosion. The aim of this study was to evaluate erosion factors in the catchment area of the Čančar brook, classified as a ravine. The annual erosion intensity is 113.23 m^3 km^{-2} of soil. Based on natural and anthropogenic factors, the Čančar brook catchment area belongs to erosion category IV, weak intensity, deep type, with the erosion coefficient of 0.40.

Keywords: *soil erosion, erosion intensity, sediment yield, soil, catchment, ravine*

Introduction

Land degradation and soil loss are global events. Human induced pressures on natural ecosystems are still in progress, along with conservation efforts (Hacisalihoğly et al., 2010). The main factor causing soil degradation worldwide is water erosion, which threatens 56% of the world's arable land (Oldeman et al., 1990).

Over 90% of the total land area in the Republic of Serbia suffers from different types and intensities of erosion (Djorović and Kadović, 1997). The erosion process can have both direct and indirect impacts, inducing permanent soil disappearance. The calculated value of the total annual sediment yield suggests that some 16.0 cm of soil are annually eroded off the 21,000 ha of land in Serbia (Spalević, 1997). In the Republic of Serbia (Central Serbia), there are 1.221 million ha of eroded soil, and 36,000 ha are in a steady state, now (Statistical Yearbook, 2008).

Erosion has mostly affected strongly sloping, deforested or cultivated shallow soils on slopes, formed on impermeable geological substrates, due to the effects of intense rainfall and fluctuating air temperatures (Spalević, 1997).

The tendency of air temperature to increase and of rainfall to decrease is quite evident in the region of Čačak (Šekularac, 2002). Climate change leads to degraded soil physical properties, increases soil erodibility and reduces the protective role of vegetation.

The above factors cause intensification of both surface and deep-cutting processes of erosion.

Given the above, the objectives of this study are quantitative assessment of soil erosion induced by a range of factors and estimation of sediment yield in one part of the catchment area of the Kamenica River (part of the Zapadna Morava catchment) i.e. its subbasin the Tinja, including its second order left-hand tributary the Čančar brook.