SOIL LOSS CALCULATED UNDER DIFFERENT CROPS IN THE SÓSI CREEK WATERSHED, HUNGARY

Csaba Centeri, Szent István University (Centeri.Csaba@kti.szie.hu)
Viktória Vona, Szent István University
Márton Vona, Central Authority of Water and Environment
Károly Penksza, Szent István University

The Sósi Creek is situated approx. 48km from Budapest, Hungary. The watershed is in connection with 3 settlements: Gödöllő, Galgahévíz and Hévízgyörk. The Sósi Creek is one of the tributary streams of Galga Creek on its southern bank. Meteorological data is based on the average of the past 50 years. The average yearly temperature is 10.6°C, average yearly precipitation is 550-570mm, yearly days with sunshine is 1900-2000 days, number of days with frost is 100-110 days, number of days with snow cover is 25-30 days. 70.1% of the area is arable land and only 15.6% natural area. There are mainly brown forest soils on the watershed. Some area is dominated by sandy parent material, so there are Arenosols as well.

In the present research we used the USLE model (Wischmeier and Smith 1978) to calculate the effect of possible land use change on various slope angles. The well-known equation of the USLE model is as follows:

$$A = R \times K \times L \times S \times C \times P, \text{ where}$$

A = yearly average of soil loss per ha [t ha^{-1} y^{-1}],
R = rainfall erodibility factor [MJ mm ha^{-1} h-1 y^{-1}],
K = soil erodibility factor [t ha h ha^{-1} MJ^{-1} mm^{-1}],
L = length of slope [no dimension],
S = inclination [no dimension],
C = type of vegetation cover [no dimension],
P = factor of soil protection activities [no dimension].

Soil loss calculations were used for soil nutrient and economic loss calculations. This way a handbook could be put together for the farmers to be used during the planning of soil protection measures. Typical land cover, crop rotation, precipitation and slope angles were used for the preparation of the handbook, so the farmers can choose the necessary practice to avoid unwanted soil and nutrient loss.

The average P_2O_5 loss was in the range of 0.246 and 12.42 kg ha^{-1} y^{-1}. The average K_2O loss was in the range of 0.098 and 4.968 kg ha^{-1} y^{-1} on the watershed.

Results show the amount of soil and nutrient loss for 2 and 20 years return frequency of the precipitation. The comparison of the 35% slope angle with the 8% slope angle proved the nutrient loss to be 9.2 times bigger. The amount of the economic loss is the same for this comparison but farmers can find detailed data for their very special farmlands as well.