SOIL DEGRADATION IN OLT COUNTY BY THE PROCESS OF HYDRIC EROSION

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ABSTRACT

This paper presents some problems related to soil erosion, which are today among the most studied and researched topics issues soil specialist institutes the country and abroad. Soils in the studied area are specific to the climatic regime and soil and are numerous and vary from one place to another, each floor having its personality. There are some areas of particular soils located on slopes that are highly exposed to erosion and even landslides.

Comparing the two erosion models shows that the best results against the erosion process were given by the cultivation model of annual grasses and perennial plants.

Soil protection against erosion can be achieved by agricultural crops and agricultural technology specific as described before. Knowing of crops, depending on the level of protection that they provide to the soil erosion models and knowledge of land with slopes leading to the choice of different culture systems to prevent their erosion.

INTRODUCTION

Hydric soil erosion represents “a physical phenomenon” resulting from the destruction or disposal of soil and rock particles from the action of water, wind, ice and gravity forces.

Soil erosion is one of the most negative phenomena, whatever it comes from the wind (wind erosion) or from water (hydric erosion).

As it is known, one of the most important components of the biosphere is the soil which is the loose, soft and reliable layer, that is found on the surface of crust and together with the atmosphere constitute the living environment of the plants.

Water erosion is a complex phenomenon of degradation which affects the productivity of agricultural land and involving participation of several processes that change discrete or violent the physiognomy landscape. In the last period of history, the natural conditions that favor the emergence of such a process or added the massive deforestation were carried out at present. Only 26,7% of Romanian’s surface is covered by forest and about 43% (6,4 million hectares) of total agricultural land is subject to soil erosion and associated processes, and as the amount of sediment that is eroded on the surface of agricultural land amounts to 106,6 million tons per year.

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Soil, as a natural body which is formed after long pedogenetic processes, represents a real and effective complex laboratory for remediation, neutralization, recycling of waste.

The purpose of this paper is to analyze the process of erosion by water and measures to be taken for control and combat this phenomena erosion, which develops on agricultural territory in Olt County, regarding the following issues:

- knowledge of the natural conditions in which the land degradation by water erosion and landslides.

- establishing the criteria for mapping the areas degraded by erosion and landslides in order to subordinate all ensemble cause
- effect and concept of ecological rehabilitation,
- increasing performance of the rehabilitation of degraded land and differentiation of technical solutions based on classes favorability morphologic,

Suprafețele erodate sunt influențate de o multitudine de factori ce caracterizează morfologic suprafața de teren, existând din partea cercetătorilor un consens cu referire la calculul cantității de sol ce se erodează de pe o suprafață de teren denumit Ecuația Generală a Transportului de sol (EGTS), sau ecuația RUSLE, sau ABAG în limba germană, sau ecuația mai este denumită și Ecuația Universală a Pierderilor de Sol (EUPS).

MATERIAL AND METHOD

In 2011, we made a pedological study in Olt county , and set a correlation between slope and amount of soil eroded for low rainfall up to 10 mm and a duration of one hour and slope up to 255 m. Observe the amount of eroded soil increases from "0" up to 264 t / ha. On slopes over 46% and rains with low intensity, the amount of eroded soil is very high as in the following figure.

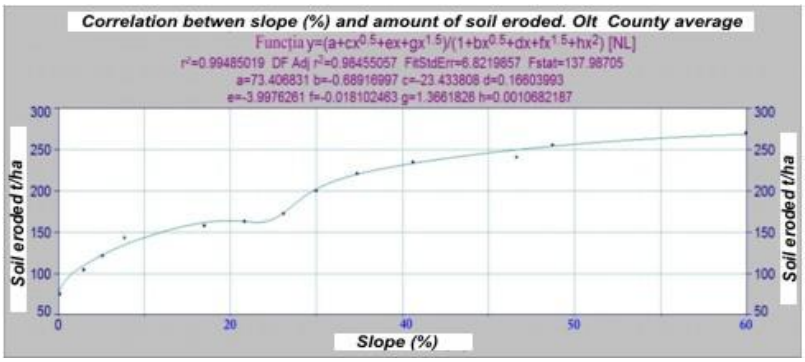

Fig. 1. Loss of soil by washing under light rain in Olt County.

With the amount of fallen water from 87 to 95 mm within an hour, drained soil from the eroded surfaces can reach up to 4,500 tonnes per hectare, as shown below.

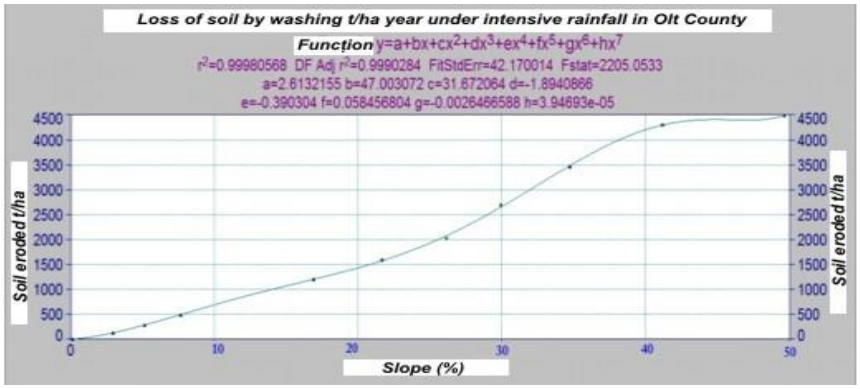

Fig.2. Loss of soil by washing under intensive rainfall in Olt County.

We developed a model for Olt County erosion and, to calculate the model we used the universal equation of soil loss, adjusted for Romania by Berca Mihai and by us for Olt County. This model was calculated using a computer program.

$$A = R \cdot K \cdot L \cdot S \cdot C \cdot P$$

A = annual average amount of soil lost (t / ha) at the upper limit,
R = rainfall (effect) - and surface leakage factor [kJ/m2. mm / h] or [N / h]
K = soil erosion factor [(t/h/kJ/m2. Mm / h] or [t / ha / N / h],
L = the length of the slope factor,
S = the inclination of the slope factor, size of the slope,
C = factor reflecting the degree of coverage or tillage of soil,
P = capacity factor of soil erosion to protect themselves.

It was taken into account the effect of slope which was measured by SL indicator, a variable measuring the length and size of the slope. Rain energy was given by the indicator that expressed the energy of raindrops, and the results were presented in the following figure.

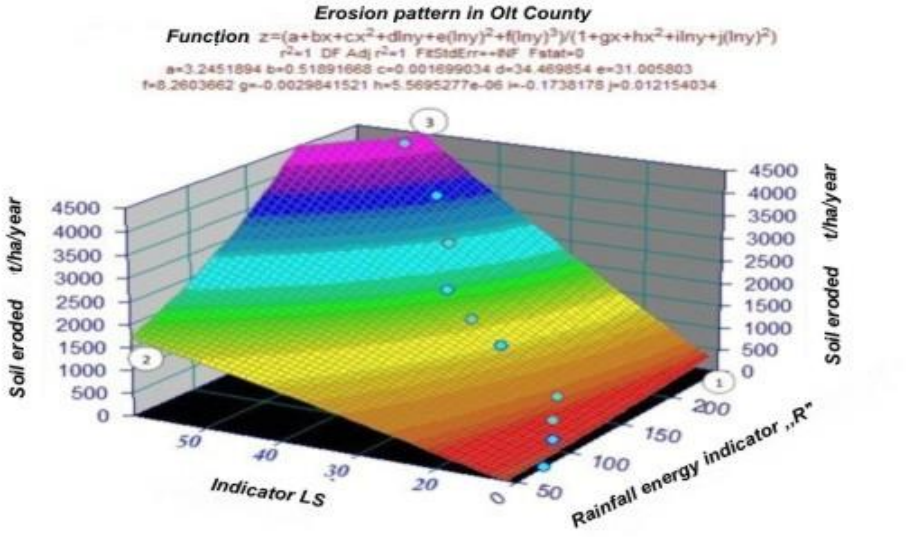

Fig. 3. Erosion Pattern in Olt County.

Figure 3 shows that no matter how large the kinetic energy of rain, if the slope approached zero the soil would remain in place not being driven by water from precipitation (point 1 on the figure). As the slope increased LS, both in length and the inclination, even at low values of rainfall energy index (R) soil loss could lead up to 1750 m3/ha, the second item on the figure.

If all elements meet together (long and steep slopes, high rainfall combined with energy) soil losses can reach up to the amount of 4575 m3/ha, which leads to a real landslide, as we found in Teslui, a locality of Olt County (point three on the figure)

RESULTS

Soils in the studied area are specific to the climatic regime and soil and are numerous and vary from one place to another, each floor having its personality. There are some areas of particular soils located on slopes that are highly exposed to erosion and even landslides.

Comparing the two erosion models shows that the best results against the erosion process were given by the cultivation model of annual grasses and perennial plants.

Soil protection against erosion can be achieved by agricultural crops and agricultural technology specific as described before. Knowing of crops, depending on the level of protection that they provide to the soil erosion models, they are classified into the following categories:

- very good protective - grasses (Lolium and Dactylis species) and perennial leguminous (alfalfa, clover, ghizdei);

- good protective - cereals (wheat, barley, oats, millet, Sudan grass, etc..)
- medium protective - annual leguminous (peas, vetch, soybean, lupins, beans, etc..)
- weak protection - hoes crops (corn, sunflower, potatoes, sugar beets, zucchini, vine, etc..)

On land with slopes over 10% culture system is applied in strips with grass strips, whose width varies depending on the slope:

a) slope of 7% -11% - strip width of 63-151 m;
b) slope of 9% -14% - strip width of 32-65 m;
c) slope of 14% -19% - strip width of 22-29 m;
d) slope over 24% - 21 m wide strip

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