

Geographical sciences

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## **ON THE EFFECT OF CORN CROPS ON SOIL EROSION IN THE AREA OF LATACUNGA, ECUADOR**

***Summary.** Studies were conducted in the equatorial Andes, in the region of the canton of Latacunga, Republic of Ecuador. A comparison was made of eroded soils on the slopes with corn crops and pasture areas. In the soil sectors occupied by corn, a low organic matter content of 0.31 - 0.82 % is revealed. Pasture soil soils have indicators of 1.67 - 1.71 %. It has been established that the cultivation of corn on steeply inclined slopes in the mountainous part of Ecuador leads to significant erosion degradation of land.*

***Key words:** erosion, soil, slop, corn, pasture.*

The slopes of the Andes are subject to active erosion processes due to the presence of basic prerequisites for the development of water-erosion processes. The slopes are often covered with easily broken rock and soils. Analysis of the impact of various crops on lands used in the economy is significant for identifying the development of erosion processes.

The authors conducted field research in the territory of the Republic of Ecuador in the province of Cotopaxi, in the canton of Latacunga. The key site is located in parroquia Aláquez. Height above sea level is 2700 - 3000 meters.

Location in the equatorial part of the Andes predetermines the main climatic characteristics. The average temperature is 12 ° C and varies little by month. The average annual rainfall is 500-700 mm. Precipitation falls in liquid form. The necessary materials for the research were cartographic sources, data on land use, meteorological indicators on the information of “Instituto Nacional de Meteorología e Hidrología del Ecuador”. Soil analysis was performed in the laboratories of Agrocalidad, Quito and laboratories of the Central University of Ecuador.

A number of studies [1-4] are devoted to studying the process of soil degradation in Ecuador in connection with agricultural development.

Previously, the authors investigated the effect of various crops in the area on soil erosion [2]. Soils were compared on sites with a slope of 10 ° degrees. It was found that corn crops have a significant impact on soil degradation as a result of erosion processes. A decrease in the content of organic matter and nitrogen in the soil was found. These comparative studies led to the need for a more detailed study of the effect of corn crops on soil erosion in the study area.

Figure 1 and 2 depict study sites



**Fig. 1. Corn agroecosystem in the study area**

The most important indicator is the organic matter content in the topsoil. The table shows the main indicators. Soils were compared in fields occupied by corn crops and control sites used for pastures.

Table 1

**Content of organic matter in the soils of key sites**

<b>Cultivation</b>	<b>Sector 1 Slope angle 8°</b>	<b>Sector 2 Slope angle 10°</b>	<b>Sector 3 Slope angle 12°</b>	<b>Sector 4 Slope angle 14°</b>
Pasture	1,71 %	1,68 %	1, 69 %	1,67 %
Corn	0,82 %	0,53 %	0,42 %	0,31 %



**Fig. 2. Pasture agroecosystem in the study area**

The length of the slope is 550 meters. The slope is straight. As can be seen from the data presented, in areas used as pastures, the soils are richer in organic matter than soils in areas occupied by corn. According to the interpretation of "Agencia Ecuatoriana de Aseguramiento de Calidad Agro", we used the following assessment of the organic matter content for the soils of the mountainous region of Ecuador: low level - less than 1%; average level - from 1 to 2%; high level - over 2%.

Thus, pasture soils are considered to have the average level of organic matter. It should be noticed that there is practically no decrease in organic matter, depending on the inclination of the slope. With an inclination of 8° it is 1.71 %; with that of 14 ° it is 1.67 %. Sectors occupied by corn crops have poor soil. In addition, as the angle of inclination increases, the organic matter content decreases to 0.31 %.

Long-term cultivation of corn, as a monoculture, on steeply inclined slopes in the Equatorial Andes leads to the loss of land for use in agriculture. In addition, field studies have revealed the presence of erosion furrows and delves in the sectors of corn cultivation. This is the beginning of gully formation. Prerequisites for the active development of linear forms of erosion are being created. This can lead to the complete loss of large areas of agricultural land.

Conclusions: Long-term cultivation of corn on steeply inclined slopes in the mountainous part of Ecuador leads to significant erosional land degradation. Changes in the nature of land use are needed, for example crop rotations. It is recommended to limit the cultivation of corn on the steeply inclined surfaces of the Andes unless a complex of erosion control measures is taken.

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