

Potential risk to water erosion for soil planning, conservation, and management, for the Guatemalan Sugar Industry

ABSTRACT

The Universal Soil Loss Equation (USLE), associated with the geographic information system ArcGIS® 10 was used to predict the potential risk to water erosion of soils in the sugar industry. The R factor (rainfall erosivity) was determined by analyzing the records of 19 automatic weather stations that are operated by the Private Institute for Climate Change Research –ICC and located across the Pacific slopes. Besides generating the R values, exponential models for each station were also generated, since those explain the relationship between rainfall erosivity based upon daily precipitation data.

These models were used to estimate the R values of twenty nearby rain gauges (3.8 km, spatial dependence on rainfall, ICC 2016); with this information the data was interpolated to generate a map of erosivity by rainfall. The K (erodibility of soils), C (vegetation cover, value of 0.2258 for growing sugar cane), and LS (topographic, length and inclination of the slope) factors were taken from previous studies generated by ICC (2014). Due that the location and type of soil conservation practices implemented in the area were unknown, the P factor was considered with a value of 1.

According to the classification of soil loss proposed by FAO, UNEP-UNESCO (1981), out of the 294,461.25 hectares analyzed with sugar cane crops, 37.84% are in the category from slight erosion to zero (< 10 T/ ha/year), 18.33% are in the moderate category (10 – 50 T/ha/year), 31.60% are in the strong erosion category (50 – 200 T/ha/year), and 12.24% in the very strong category (> 200 T/ha/year). Sugar mills are using this information to generate and validate soil conservation and management plans in their sugar cane cultivation areas.

KEYWORDS: irrigation, potential water erosion, management and soil conservation, Sugar Industry, USLE, GIS.

Disclaimer: This abstract is a translation of its Spanish counterpart “*Riesgo potencial a erosión hídrica para la planificación del manejo y conservación de suelos de la Agroindustria Azucarera Guatemalteca*” published on the official website of the ICC. To view the original document, please visit <http://icc.org.gt/wp-content/uploads/2016/10/USLE2016.pdf>
