



Assessing the impact of soil management on soil erosion in vineyards in La Rioja (Spain): La Sierra de Los Agudos

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La Rioja is a predominantly agricultural region located in the northwestern corner of the Ebro Basin in Spain. In this region, vineyards are a crop of historical and economical importance and large extension that traditionally has been relegated to marginal lands, mainly glaciais, high fluvial terraces and slopes linking different levels of terraces and glaciais. It is well known that vineyards are among the land uses affected by largest soil erosion losses. Surprisingly, many farmers still apply non-conservative practices that contribute to an increase of soil erosion. In spite of the environmental and economic consequences, very little research on this topic has been undertaken in the region. In this study, we assessed the impact of vineyards and soil management practices on soil erosion in La Sierra de Los Agudos, a heavily eroded area located on quaternary silt loam and clay glaciais, where vineyards represent 30% of the agricultural land. For this purpose we used an adapted version of the RUSLE model: R was estimated using data from two nearby weather stations following the methodology of Arnoldus and Fournier for a lapse time of five years; K was assessed from 28 soil samples analyzed by the National Institute of Soil Erosion, and the edaphic map of La Rioja which includes 32 taxa; C was calculated from catastral data, the Information System of Land Occupation, and by a detailed study of each subfactor; LS was obtained from a 10 meters/pixel scale DTM from which the slope length and the percentage of inclination of the slopes was calculated; and P was established by observing different tillage practices in each of the plots. Low erosion values ($<0,001-2 \text{ Mg ha}^{-1}\text{year}^{-1}$) were estimated for the 43 % of the area, while the 37% was affected by moderate ($2-12 \text{ Mg ha}^{-1}\text{year}^{-1}$) and high erosion values ($>12 \text{ Mg ha}^{-1}\text{year}^{-1}$) which exceed the soil loss tolerance (T value) established by Renard (1996). In this study we showed that the current support practices accelerate soil degradation and could lead to an unsustainable viticulture. We proposed alternative conservative practices that could decrease soil erosion to moderate and low values.