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Soil erosion measurements by means of experimental plots to determine best land management strategies in vineyards and olive orchards

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In order to design sustainable land management there is a need to have accurate information on the impact this land management strategies have on water and sediment dynamics. This is especially important when a proper management is designed to reduce the soil losses due to the complex interaction of mechanisms that interact within the soil erosion process. Soil erosion is an non-linear process, both spatially and temporally, and as a consequence of that only well-monitored and accurate measurements can give insights in the processes and how these processes can be influenced by management to reduce soil losses (Cerdà, 2007; Ligonja and Shrestha, 2015; Nanko et al., 2015; Seutloali and Beckedahl, 2015). This is necessary at different scales: pedon, slope, and watershed because the governing processes differ at different scale (Keesstra, 2007; Jordán and Martínez Zavala, 2008; Borrelli et al., 2015).
Soil erosion plots can give information about the temporal and spatial variability of soil losses. We present here a strategy developed by the Soil Erosion and Degradation Research Group from the University of Valencia to assess the soil erosion rates in Eastern Spain. In 2002 the Soil Erosion Experimental Station in El Teularet-Sierra de Enguera was installed, to assess soil losses in rainfed agriculture orchards, and 73 plots of 1, 2, 4, 16 and 48 m2 were installed. In 2005 6 plots of 300 m2 were installed in the nearby Montesa soil erosion station to assess soil losses in citrus orchards. In 2011 16 plots of 2 m2 where installed in Les Alcusses to determine soil losses in olive orchards, and in 2015 8 plots in Celler del Roure vineyard to assess the impact of land management in vineyards and 8 plots in the El Teularet to study the impact of straw mulch on soil erosion rates. All erosion stations are located in several kilometres distance from each other. This research which we developed since 2002 is complementary to previous research where we used rainfall simulation experiments to assess soil properties under different management (Cerdà, 1997; Cerdà, 1998a; Cerdà 1998b; Cerdà, 2001). The results from the soil erosion plots monitoring demonstrate the positive impact of vegetation to reduce soil loss. In addition, we proved that the use of straw, chipped pruned branches and rock fragments as surface cover reduces soil losses (Cerdà et al., 2015, Pereira et al., 2015; Prosdocimi et al., 2016).

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