



The plot size effect on soil erosion on rainfed agriculture land under different land uses in eastern Spain

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Soil erosion at slope scale is dependent on the size of the plot. This is because soil erosion is a scale-dependent process due to the spatial variability in infiltration, the potential for sediment to be captured by vegetation and other roughness components, and the changes in erosion rates and processes with increasing amounts of runoff. The effects of plot size may also vary with land use, as plot size may be less important in areas with a more homogeneous plant cover or bares soils; meanwhile the soil transmission losses will higher on vegetation covered soils and on patchy distributed plants. A series of study plots were established in 2003 at the El Teularet experimental Station in the Sierra de Enguera in eastern Spain. The overall goal is to assess runoff and erosion rates from different land uses at different spatial scales. Thirteen sets of plots have been established, and each set consists of five adjacent plots that vary in size from 1 m² (1 x 1 m), 2 m² (1 x 2 m), 4 m² (1 x 4 m), 16 m² (2 x 8 m) and 48 m² (3 m wide x 16 m length). Each set of plots has a different land use, and the land uses being tested in the first year of this study are fallow, ploughed but unplanted, untilled oats and beans, tilled oats and beans, straw mulch, mulched with chipped olive branches, a geotextile developed to control erosion on agricultural fields, scrub oaks (*Quercus coccifera*), gorse (*Ulex parviflorus*), and three herbicide treatments—a systemic herbicide, a contact herbicide, and a persistent herbicide. From those plots, three plots were selected to analyse the effect of the size of the plot on the soil erosion assessment. Herbicide (bare), Catch crops (oat) and scrubland were selected to analyze the soil losses during 2004 and 2005. The results shows that sediment delivery is highly dependent on the land use and land management as the scrubland contributed with null sediment yield, meanwhile the herbicide reached the largest soil loss. The soil erosion was higher at the smallest plots what demonstrated a relevant contribution of the reinfiltration of the surface runoff. The proportion of rainfall that was transformed into runoff decreased with increasing plot size. There was not a clear variation in sediment concentrations with plot size, but soil erosion rates were generally higher on the smaller plots.

Key words: Scale, Soil, Erosion, Spain, Land Management, Slope, Agriculture, Rainfed.