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The Contrasted Impact of Land Abandonment on Soil Erosion in Mediterranean Agriculture Fields

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ABSTRACT

Abandonment of agricultural land results in on- and off-site consequences on soil system and there is a need to evaluate the impact on soil erosion to understand the ecosystem's changes. The aim of this research is to assess the impact of abandonment in four Mediterranean crops (vineyards, almonds, citrus and olives) on soil and water losses. To achieve this goal, 105 rainfall simulation experiments were conducted in agriculture fields (vineyards in Málaga, almonds in Murcia, and citrus and olive in Valencia) and on the paired abandoned plots. After abandonment, soil detachment decreased drastically in the olive and citrus orchards, meanwhile vineyards did not show any difference and almonds registered higher erosion rates after the abandonment. Terraced orchards of citrus and olives recovered a dense vegetation cover after the abandonment, meanwhile the sloping terrain of almonds and vineyards enhanced the development of crusts and rills and a negligible plant cover that resulted in high erosion rates. The contrasted response of the abandonment is discussed.

Key Words: soil erosion, Mediterranean crops, abandonment, vegetation cover, terraces, rainfall simulation

INTRODUCTION

The abandonment of agricultural land results in on- and off-site consequences on soil system, although is mostly ignored by the scientific research in comparison to investigations carried out at watershed and slope scale approaches (García-Ruiz and Lana-Renault, 2011). The non-planned abandonment of the agriculture land took place in developed regions due to the intensification and mechanisation of the agriculture after social and economic changes along the 20th century. It is widely accepted that land abandonment results in a shift into the system behaviour that can enhance land degradation processes by increasing soil erosion by water (Keesstra et al., 2012; Ries et al., 2010), biodiversity reduction (Cammeraat et al., 2005), changes in river discharges (Plieninger et al., 2014) and soil quality (van Hall et al., 2017). The abandonment of the agriculture land is part of the dynamic change in the land uses in developed countries, and the Iberian Peninsula is a good laboratory to research the impact on the ecosystems (García-Ruiz et al., 2010).

During the second half of the 20th century, the Mediterranean belt of Europe has been affected by an intense process of land abandonment that resulted in the desertification of the rural areas due to the lack of population (Bell et al., 2010). The land abandonment is a consequence of biophysical and