



## **Variation in the sediment yield on slopes with different land uses from rainfall simulation**

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Recent changes in land use of Spanish rural areas (agricultural intensification and/or abandonment) have significantly altered the hydrological behaviour of catchment and erosion rates on hillsides. The rainfall simulation represents a very effective tool to estimate soil losses associated with these changes.

This paper gives information about sediment yield with different land uses: intensive crops of vineyards, abandoned terraces and abandoned sloping fields. The vineyards are located in the Ebro basin, on gently sloping hillsides. The abandoned terraces are in the Iberian System (La Rioja), and the abandoned sloping fields are located in the Central Pyrenees.

Runoff and sediment yield were studied using rainfall simulation tests. Sixteen simulated rainfall were conducted on vineyards, twelve in terraced fields and sixty in abandoned sloping fields. The median rainfall intensity used in our experiments was 51.1 mm h<sup>-1</sup> in vineyards (return period to 20 years), 61.9 mm h<sup>-1</sup> (24 years of recurrence) in terraces and 53.4 mm h<sup>-1</sup> (recurrence period of 60 years) in sloping fields. In each experiment rainfall was simulated for a period of 30-45 min. A range of parameters was recorded during the experiments: time until runoff began (s), runoff (mm h<sup>-1</sup>), runoff coefficient (%), mean sediment concentration (g L<sup>-1</sup>), and erosion rate (g m<sup>-2</sup> h<sup>-1</sup>).

The results indicate that the vineyards produce the least runoff (11.2%) but significant sediment production, with average rates of erosion of 15.6 g m<sup>-2</sup> h<sup>-1</sup>. Tillage allows the development of permeable soils with high infiltration capacity, but also with a lot of loose material to be evacuated. The terraces show higher runoff coefficients (26.2%) and moderate erosion rates (11.9 g m<sup>-2</sup> h<sup>-1</sup>), due to the lack of tillage, the trampling by livestock and the high density of vegetation cover. Finally, the sloping fields have the highest runoff coefficients (30%) and sediment yield, with an average erosion rate of 29.8 g m<sup>-2</sup> h<sup>-1</sup>. This is explained by the different state of conservation (geomorphological processes and vegetation cover) in relation to the time passed since their abandonment.

Key words: erosion, rainfall simulation, soil uses, agricultural abandonment