



ICG2022-695, updated on 08 Jun 2023

<https://doi.org/10.5194/icg2022-695>

10th International Conference on Geomorphology

© Author(s) 2023. This work is distributed under the Creative Commons Attribution 4.0 License.



## Soil erosion response to land-use change in landscapes sensitive to desertification: a study case in Beira Baixa (Portugal)

Adélia Nunes<sup>1</sup>, João Gonçalves<sup>2</sup>, and Albano Figueiredo<sup>1</sup>

<sup>1</sup>Centre of Studies in Geography and Spatial Planning (CEGOT), Department of Geography and Tourism, University of Coimbra, Portugal

<sup>2</sup>Department of Geography and Tourism, University of Coimbra, Portugal

Soil erosion is the most important process of land degradation in Mediterranean Europe, resulting from the combination of intensive rainfall regime, during specific periods of the year, and the absence of vegetation cover, very often promoted by specific land use patterns.

This work aims to assess how changes in land use and land cover alter the risk of soil erosion in Mediterranean agricultural landscapes after recent significant changes in terms of land-use regime, namely due to the increase of intensive uses based on irrigation, which are replacing by traditional extensive uses. For this study, the Beira Baixa Region, one of the areas with the highest susceptibility to desertification, was used as reference.

During a first stage, the period of the year with higher susceptibility to erosion was identified based on the use of vegetation indices, aiming to assess the existence of differences in terms of vegetation cover considering different land uses. Such information was crossed with records of inter- and intra-annual intense rainfall episodes for the last 2 decades, aiming to identify the period of the year that is critical in terms of erosivity potential.

In order to evaluate the effective soil loss in the period with the highest risk of erosion (lowest vegetation cover + highest records of intensive precipitation), rainfall simulations were performed in different land uses at the end of the summer period, considering the most common land uses in the region, and trying to compare intensive and extensive land use systems.

The results obtained show that soil loss in intensive and super-intensive land uses, associated to crops installed in the last 5 years, with no or residual vegetation cover, is significantly higher compared to traditional extensive uses, which maintain an annual vegetation cover based on herbaceous communities, even dry. The results of the simulations also showed that the high values of erosion observed in intensive orchards might be mitigated through the implementation of a vegetative cover able to protect the soil from the direct impact of rainfall.