

# Soil Degradation and Erosional Behaviour triggered by Land Use Change and Agricultural Policies in SE Alentejo, Portugal

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## Abstract

Agricultural Policy has been a major driver of Land Use Changes in Portugal, especially the south-eastern Alentejo: the commons division in the early 20<sup>th</sup> century, autarkic policies from the fascist regime, and subsidies for forestry, cereal, and cattle production since joining the common market. This study focuses on the Serra de Mértola, an area with poor soils historically subject to land degradation. Data from the Vale Formoso Erosion Centre (1961-present) was used to compute erosion rates under different land uses representative of the study area. Higher values were found in vertical Fallow (964kg/ha/yr), Wheat (90kg/ha/yr) and horizontal Fallow (66kg/ha/yr), with lower values associated with Spontaneous Vegetation (3kg/ha/yr), Quercus (4kg/ha/yr), and Pines (7kg/ha/yr). Analysis of trends in Landsat NDVI values allowed to discriminate between land cover change and natural oscillations in weather and vegetation growth: in dry years NDVI values decrease for winter and spring, maintaining lower values throughout the year, while natural vegetation recovery shows a slow but steady increase until it stabilizes or breaks due to human action. Breaks in NDVI values were correlated with occasional ploughing in pastureland and spontaneous vegetation as well as the different moments in the agricultural year for cereal production. Three tendencies were observed: in Cultivated areas, ploughing provides higher sediment availability in valley floors, resulting in aggradation; Pastureland shows rock fragments on slopes and lower sediment availability, leading to incision on valley floors; Spontaneous Vegetation/Abandoned Land leads to a sharp decrease of sedimentary yield, with incision until its natural growth stabilizes hillslope processes.

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