

CARBON BALANCE IN OLIVE GROVES OF ALENTEJO UNDER DIFFERENT LAND MANAGEMENT PRACTICES.

AUTHORS

Rodríguez Sousa A.A.^{1,2}

Muñoz-Rojas J.³
jmrojas@uevora.pt

Brígido C.¹

García-Ruiz, R.⁴

Liétor J.⁴

Prats S.A.¹

INSTITUTIONAL AFFILIATION

1 MED - Mediterranean Institute for Agriculture, Environment and Development & CHANGE - Global Change and Sustainability Institute, Institute for Advanced Studies and Research, Universidade de Évora, Pólo da Mitra, Ap. 94, 7006-554 Évora, Portugal

2 Department of Statistics and Operations Research, Faculty of Mathematical Sciences, University Complutense of Madrid, Pl. De las Ciencias 3, 28040 Madrid, Spain

3 MED - Mediterranean Institute for Agriculture, Environment and Development & CHANGE - Global Change and Sustainability Institute, Departamento de Geociências, Universidade de Évora, Pólo da Mitra, Ap. 94, 7006-554 Évora, Portugal

4 Department of Animal Biology, Plant Biology and Ecology, University Institute of Research on Olive Groves and Olive Oils, Universidad de Jaén, 23071 Jaén, Spain

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Rural landscapes in Alentejo (Portugal) have changed greatly during the last 15 years, largely due to the expansion and technological intensification of olive groves. The application of agrochemicals (fertilizers and herbicides) along with crop intensification (increasing tree density) likely affect the C balance of these groves.

Hereby we assess the C contents of different farming system components and flows affecting the farm, tree and soil C balances during one hydrologic year. Seven olive groves were selected with different soil management practices and production models, including organic vs integrated, as well as contrasting tree densities, 100, 300 and more than 1000 trees per hectare. The annual C inflows comprise the C which accumulates annually in the trees, olive leaves/flowers, tree pruning, olive fruits and cover crop biomass, and also the inflow due to organic fertilizer applications, whereas annual C outflows comprise harvested olive fruits plus olive leaves, soil erosion and soil CO₂ emissions.

Preliminary results show that C balances are mostly positive mainly due to the accumulation of C in the tree permanent structure. Some of the farms showed negative farm C balances, indicating that more C was lost than entered. This was the case mainly in the farms which applied herbicide and, consequently, exhibited both lower annual CO₂ entries in the biomass of cover crops, and higher annual C erosion losses. Results indicate that: i) olive cropping contributes to climate change mitigation, and ii) there is a great potential to enlarge this contribution by, for instance, reducing herbicide application to allow positive C balances in the olive grove.

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