

## Spatial variability of Soil Functional Ability for groundwater recharge related with Land Use in a dry Mediterranean agro-forested catchment, southern Portugal

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The protection of water resources is important in what concerns the quality and availability of water. Groundwater recharge is defined as the quantity of freshwater derived from precipitation that infiltrates vertically downward from the land surface to below the root zone. At this point the water may move laterally to discharge in streams or downward to enter an aquifer. Soil Functional Ability to recharge aquifers (SFAgr) and Land use are essential to study the environmental sustainability and agricultural production capability once groundwater is a key component of a healthy watershed. The purpose of this study was to investigate the relationship between spatial continuity of Soil Ability for groundwater recharge and different Land Uses in a dry Mediterranean agro-forested catchment in Alentejo, Portugal. This will be achieved by building a SFAgr, generated with combination of four

properties related to water infiltration and percolation into the soil: depth, bulk density, saturated hydraulic conductivity, and drainable porosity. The results show that the spatial dependency of groundwater recharge was highest for bulk density and drainage porosity and smaller for depth. The spatial distribution of SFAgr in the watershed related to Land uses, indicated that the better situations are where soils have bulk density rounding 1,2 covered by oak more pasture or bulk density rounding 1,0 covered by pasture or annual crops. The worst situation are soils with bulk density greater than 1,5 even with oak trees more pasture.

### Keywords

Soil variability in space, Groundwater recharge, Land Use

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