

## **Impact of land use on soil organic carbon distribution in toposequences of the Central Rif, Morocco**

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Mediterranean mountain agroecosystems are sensitive areas to soil degradation mainly due to erodible soils, occasional heavy rainfalls and anthropogenic activities that have transformed large surfaces of natural forest into croplands. In the mountains of the central Rif (Morocco) the anthropogenic pressure by intensive agriculture on steep slopes and grazing practices is causing large impacts on soils. In the region soil losses have further indirect impact on water resources due to siltation of water bodies from canals, small check dams to large reservoirs. Besides the loss of the upper rich organic soil horizons containing the largest amounts of organic matter is causing decreases in soil fertility and losses in crop productivity.

Soil erosion affects the spatial variability of soil nutrients of which soil organic carbon (SOC) is one of the most important because is directly linked to soil quality and soil functions. The artificially emitted  $^{137}\text{Cs}$  has been found to effectively trace soil redistribution because of its associated movement with fine soil particles including the organic matter. To assess the contents of SOC under different land uses a set of transects were set up in the Sahla catchment that holds a reservoir and is representative of the Rif mountain agroecosystems. Along the transects soil sampling was done to collect soil cores extending until a depth of 25 cm that were sectioned at 5cm depth intervals. The SOC content (%) was measured by the oxidation method in the < 2mm fraction of the interval subsamples. The lateral and vertical variations of SOC contents were examined in combination with the  $^{137}\text{Cs}$  profiles to gain information on the nutrient content in the soils under the most characteristic land uses existing in the catchment. In general the SOC contents are low but the mean contents in the croplands are much lower than in the uncultivated lands that present the highest variations in the SOC percentages. In croplands the depth distribution of SOC is homogeneous and the SOC profiles match the vertical distribution of  $^{137}\text{Cs}$  revealing the mixing of the soil by tillage. The lateral and vertical distributions of SOC allowed to gain information on the status of soil degradation under the different land uses which is of interest to support management practices aimed to preserve the soils and maintain the sustainability of agroecosystems.