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Post-land abandonment management through shrub clearing practices as a tool for enhancing soil quality and carbon storage.

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Land abandonment is outstanding as one of the main causes of soil degradation in Mediterranean mid-mountains. This process is closely linked to the rural exodus that took place in the middle of the last century, that led to the activation of natural revegetation mechanisms and massive shrub encroachment. Consequently, several ecosystem disservices have been identified, such as homogenization of landscape, loss of biological and cultural diversity, decrease in water-human-consume resources, reduction of agropastoral resources and higher wildfire risk. However, the effects on soil environment are multiple and controversial. Thus, a case study in the Leza Valley (La Rioja, Spain) has been selected to analyse the effects of post-land abandonment management through shrub clearing practices in soil quality, carbon dynamics and carbon sequestration, in order to give a second chance to these marginalised areas while fighting against Global Change.

For the soil sampling, 5 land uses have been selected: control pasture, 3 shrub clearing sites of different ages; and shrubland after cropland abandonment (6 replicates at different depths, 0-40 cm, have been collected at each study site). Physico-chemical and biological properties of the soil have been analysed in the laboratory, distinguishing between basic and acid soils. Furthermore, a theoretical map of hypothetical future shrub-cleared areas and its potential to sequester carbon has been created.

Preliminary results showed significant differences between post-land abandonment practices. Time since intervention has resulted a key factor in carbon dynamic evolution, and an increase in carbon storage and concentration with management has been recorded.

To sum up, management through shrub clearing has demonstrated to be an adequate strategy to offset carbon emissions to the atmosphere in soils of abandoned areas in the Mediterranean mid-mountains, offering socio-economic and ecological benefices while becoming an important tool against Global Change.

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