

## **Effects of different land use changes on SOC stocks: From Mediterranean forest to agricultural land and vice versa**

Beatriz Lozano-García (1), Rosa Francaviglia (2), Gianluca Renzi (2), Luca Doro (3), Luis Parras-Alcántara (1), Luigi Ledda (3), and M. Concepción Benítez (1)

(1) University of Córdoba, Department of Agricultural Chemistry and Soil Science, Spain (beatriz.lozano@uco.es), (2) Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Centro di ricerca per lo studio delle Relazioni tra Pianta e Suolo, Via della Navicella 2-4, 00184 Rome, Italy, (3) Università di Sassari, Dipartimento di Agraria, Sezione di Agronomia, Coltivazioni erbacee e Genetica, 07100 Sassari, Italy

During the past century there has been a general trend to alter ecosystems based on both the conversion from forest to agricultural land and the intensification of agriculture. The land use change (LUC) from forest to agricultural land is the origin of serious and direct soil problems, such as soil losses and degradation but there are other indirect problems as the decrease of soil carbon storage worldwide. Therefore, the deforestation involves an important loss of soil carbon, its emission to the atmosphere and a high contribution to the global warming.

In addition, it is important to point out that due to the low yields and the high cost of modern tillage equipments, frequently the agricultural lands are abandoned, suffering a secondly LUC. This abandonment can exacerbate soil degradation, but in some cases gives the soil the opportunity to restore by revegetation (naturally in some cases, and induced in others). Thus, by reforestation/revegetation these soils can increase their capacity of storage soil organic carbon.

To determine the effects both of deforestation and revegetation on SOC stock is highly important to consider the quantification of SOC stock in the hole profile, taking into account the surface layer and the subsurface horizons, since many research have shown the importance of the amount of C stored in depth and its significance in the role of soil as C sink.

The main goal of this research was to assess the effect of a double LUC in the SOC stocks along the soil entire profile.

After LUC from the agroforestry system to agricultural lands there were different situations. The first one in which the SOC stock did not suffer changes (when the land use was hay crop and pasture). There was no change in SOC stock both in the surface layer and in the subsurface. However, when the LUC was toward vineyards, both tilled and no tilled vineyards, the SOC stock decreased considerably in the topsoil.

In the second land use change considered, derived from the abandonment of vineyards and the creation of semi-natural ecosystem, the SOC stock increased reaching values similar to the original Mediterranean forest.

Therefore, in this case, the LUC resulted in the increase of SOC reaching in the long-term similar values to those initials.