According to the Kyoto Protocol, land use (LU) planning must consider strategies to maximize soil C stock (SCS) through LU change and management practices. This research presents a land evaluation tool (Carbosoil) for predicting soil capacity for storing organic carbon, as a new component of MicroLEIS DSS. The pilot study area was a Mediterranean region (Andalusia, Southern Spain) during 1956-2007. Input data were obtained from different data sources and include 1689 soil profiles from Andalusia (S Spain). Previously, detailed studies of changes in LU and vegetation carbon stocks, and soil organic carbon (SOC) dynamic were carried out. Previous results showed the influence of LU, climate (mean temperature and rainfall) and soil variables related with SOC dynamics. For instance, SCS decreased in Cambisols and Regosols by 80% when LU changed from forest to heterogeneous agricultural areas. Taking this into account, the input variables considered were LU, site (elevation, slope, erosion, type-of-drainage, and soil-depth), climate (mean winter/summer temperature and annual precipitation), and soil (pH, nitrates, CEC, sand/clay content, bulk density and field capacity). The available data set was randomly split into two parts: training-set (75%), and validation-set (25%). The model was built by using multiple linear regression. The regression coefficient (R2) obtained in the calibration and validation of Carbosoil was >0.9 for the considered soil sections (0-25, 25-50, and 50-75 cm). The validation showed the high accuracy of the model and its capacity to discriminate the most suitable areas for maximizing C sequestration under different climate, LU and soil management scenarios.