Mitigation and Adaptation to Climate Change: Inventories for Agronomic Practices & Soil Carbon

❑ Introduction

In order to increase knowledge on the consequences concerning farm management practices, it is advisable to account and parameterize such consequences. The IPCC 2006 Guidelines provide standardized methodologies and large scale default values for estimating carbon stock changes (and their associated emissions and sinks) from living biomass and dead organic matter, as well as in soils, where the two previous are closely interlocked. However, it would be desirable to develop site-specific factors, especially those for Mediterranean region, which are poorly accounted.

❑ Objectives

The main goal of our project is to produce site-specific agricultural inventories and emission factors for the **Mediterranean** agricultural systems, as well as provide guidance on how to apply them. The improvement of accounting methods will result in a better approach for evaluating the soil organic carbon (SOC) balance, and also in a tool for improving agricultural practices.

❑ Methods

For the purpose of improving IPCC default values (table 1), with a special focus on increasing SOC in soil, and taking advantage of existing information (maps, studies, see figures 1, 2, 3 & 4 as examples), we will focus on:

1) Mapping soil carbon stocks
2) Accounting for soil loss (erosion)
3) Characterizing organic fertilizer sources and SOC and its effects on soil C stocks
4) Providing more specific factors for land use changes

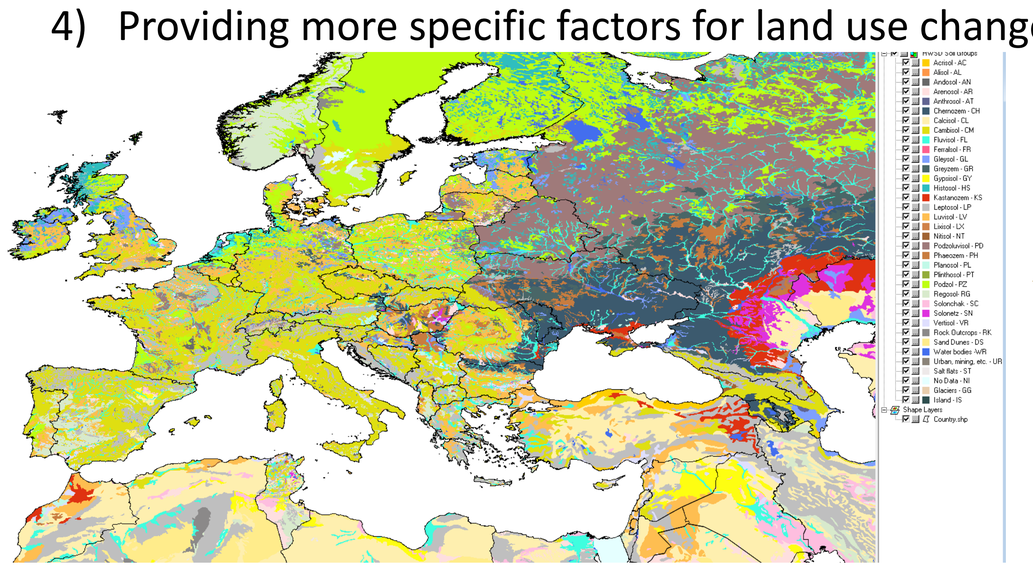
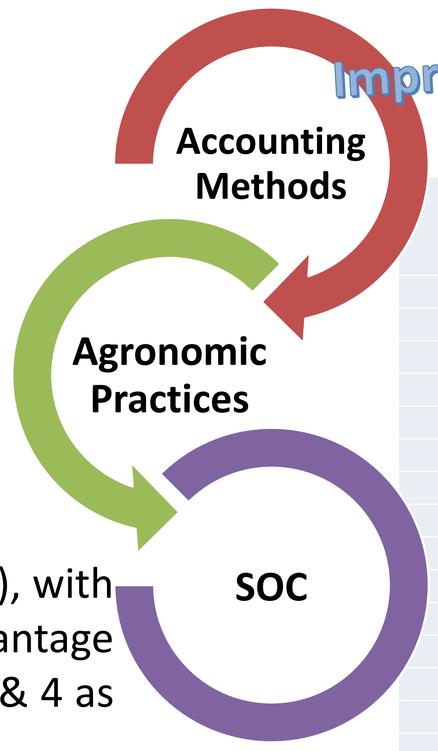


Figure 1. Harmonised World Soil Database (FAO 2012)



		Warm temperate, dry	Warm temperate, moist
HAC soils	*tonnes C/ha in 0-30 cm depth*	38	88
LAC soils	*tonnes C/ha in 0-30 cm depth*	24	63
Factor	**Management option**		
Land use (FLU)	Long-term cultivated	0,80	0,69
Land use (FLU)	Paddy rice	1,10	1,10
Land use (FLU)	Perennial	1,00	1,00
Land use (FLU)	Set aside (<20 years)	0,93	0,82
Tillage (FMG)	Full	1,00	1,00
Tillage (FMG)	Reduced	1,02	1,08
Tillage (FMG)	No-till	1,10	1,15
Input (F1)	Low	0,95	0,92
Input (F1)	Medium	1,00	1,00
Input (F1)	High without manure	1,04	1,11
Input (F1)	High with manure	1,37	1,44

Table 1. IPCC 2006. Default Values

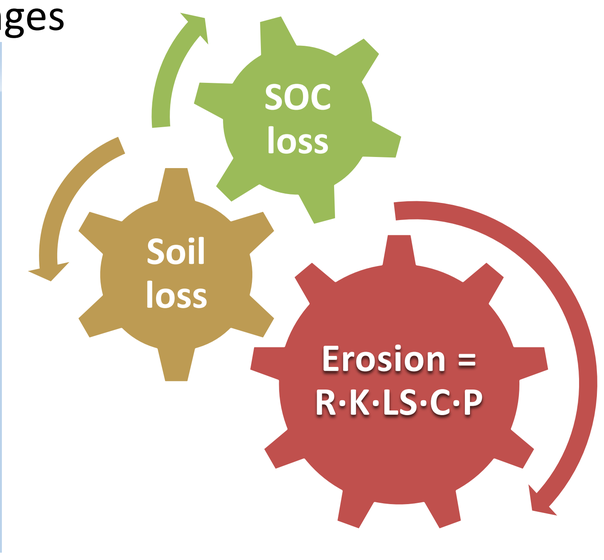


Figure 2. To link cultural practices to avoid erosion with SOC loss. (Nuñez et al 2013)

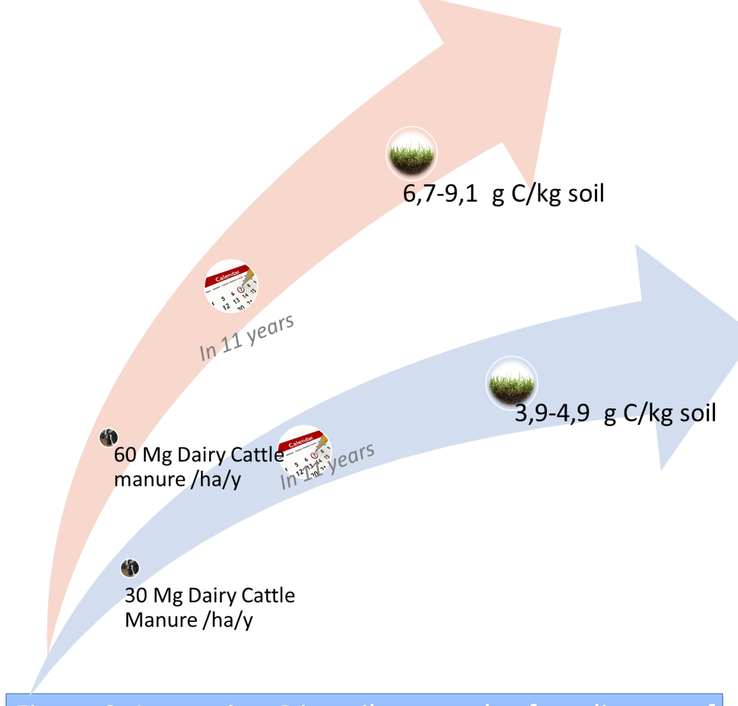


Figure 3. Increasing C in soil as result of applicaton of dairy cattle manure (Yagüe et al 2017)

References

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- *Nuñez, M.; Antón, A.; Muñoz, P.; Rieradevall, J. (2013). Inclusion of soil erosion impacts in life cycle assessment on a global scale: application to energy crops in Spain. The International Journal of Life Cycle Assessment 18:755-767*
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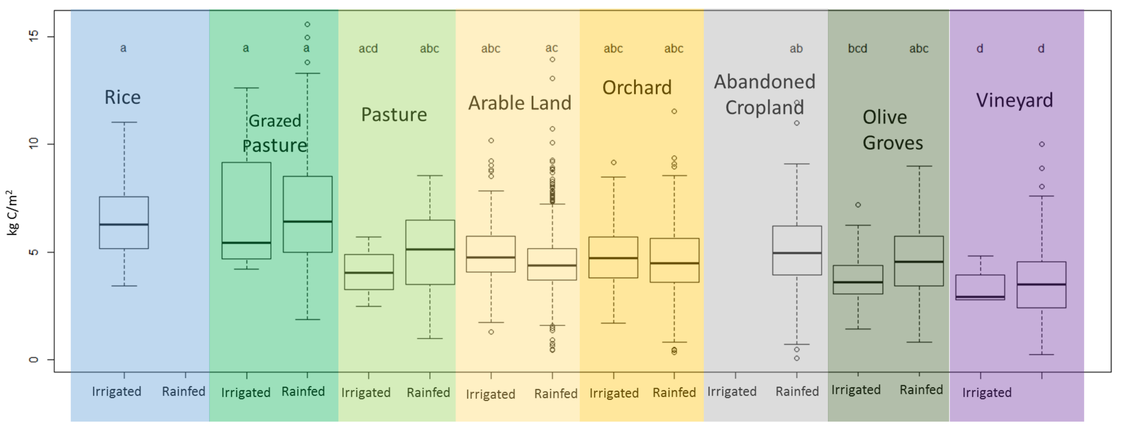

Figure 4. Estimation of SOC stocks (kg/m²) to 30 cm depth according to different cropland categories and water management regime based on soil data from 2816 soil profiles established in crop areas of Catalonia. (Funes et al 2017)

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