REGIONAL MODELIZATION OF REPERCUSIONS OF NO TILLAGE IN 4per1000 INITIATIVE

Introduction

The 4perMille Initiative intends to compensate CO_2 emissions produced worldwide by fossil fuels, through the fixation of soil organic carbon (SOC). Its main objective is to increase the annual amount of C in soils of the world by 0.4%. A new study methodology focused on achieving the regional objectives of 4per1000 Initiative through No Tillage (NT) potential application in annual crops is presented. It has been based on the modelling of Carbon Sequestration (CS) in Carbon Benefits Project (CBP) to 0-30 cm depth. NT includes leaving plant residues as cover of soil.

Methods

CBP is a digital tool which allows to make an online modelling of the evolution of C stocks and GHG emissions, derived from using different soil management systems. The comparison between the annual CS through NT and the contents in SOC in annual crops, has allowed to calculate (Fig.1) the potential importance of NT, within the regional framework, of the 4per1000 Initiative.

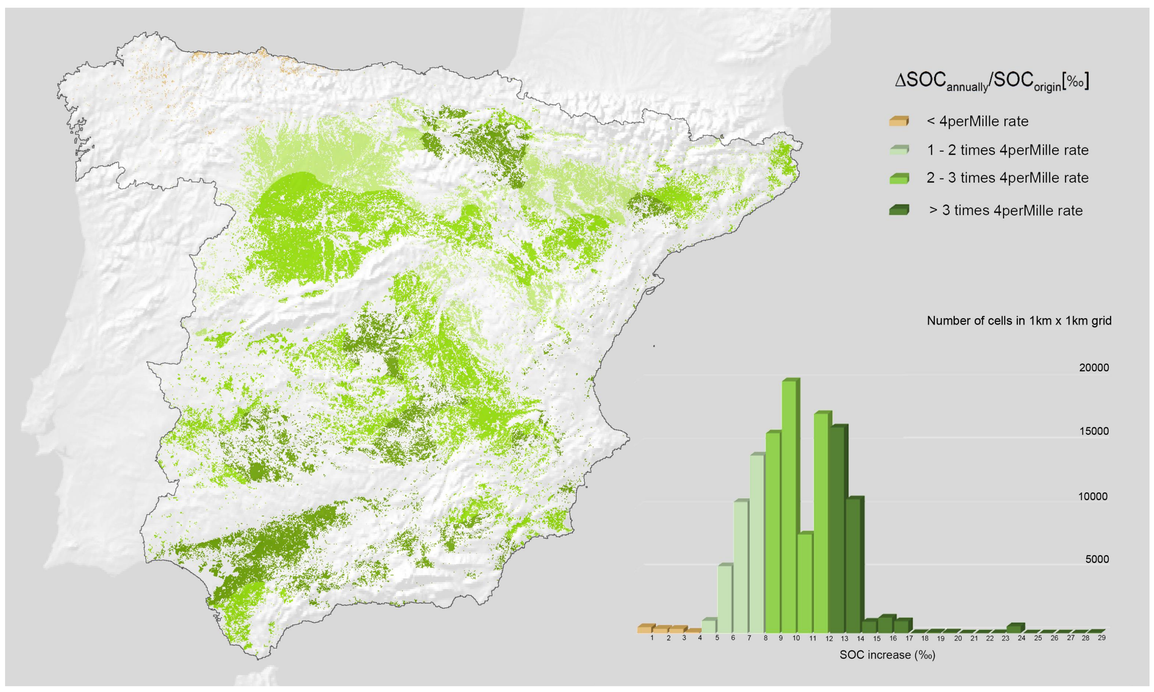

Fig. 2. Map with the increase in SOC in relation to the 4per1000 Initiative rate and distribution of these results by grids of the map.

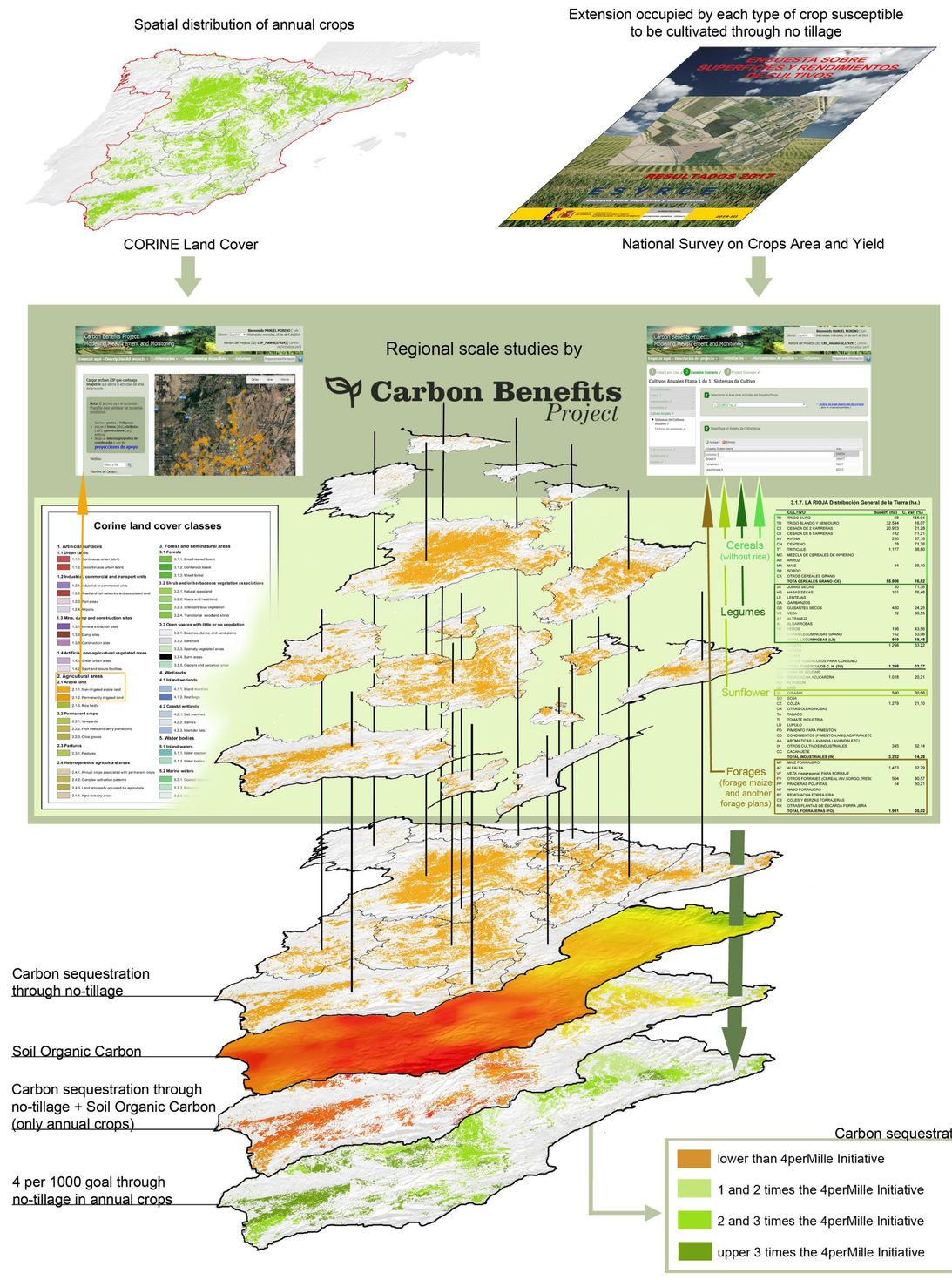

Fig. 1. Workflow of the methodology followed to choose the potential CS in each region.

Results

For the entire field of study (15 regions of Spain), the annual average of CS is 0.38 Mg of C ha^{-1} yr^{-1}. And the potential CS amounts are almost up to 3 Tg of C per year. There are large areas where the stored C could be 2 and up to 3 times over the reference values (Fig. 2). What entails that the potential application of NT would represent a significant percentage of the CS objectives of the 4per1000 Initiative (Fig. 3). This methodology for calculating the NT potential over the 4per1000 Initiative can be easily replicated in regions and countries around the world.

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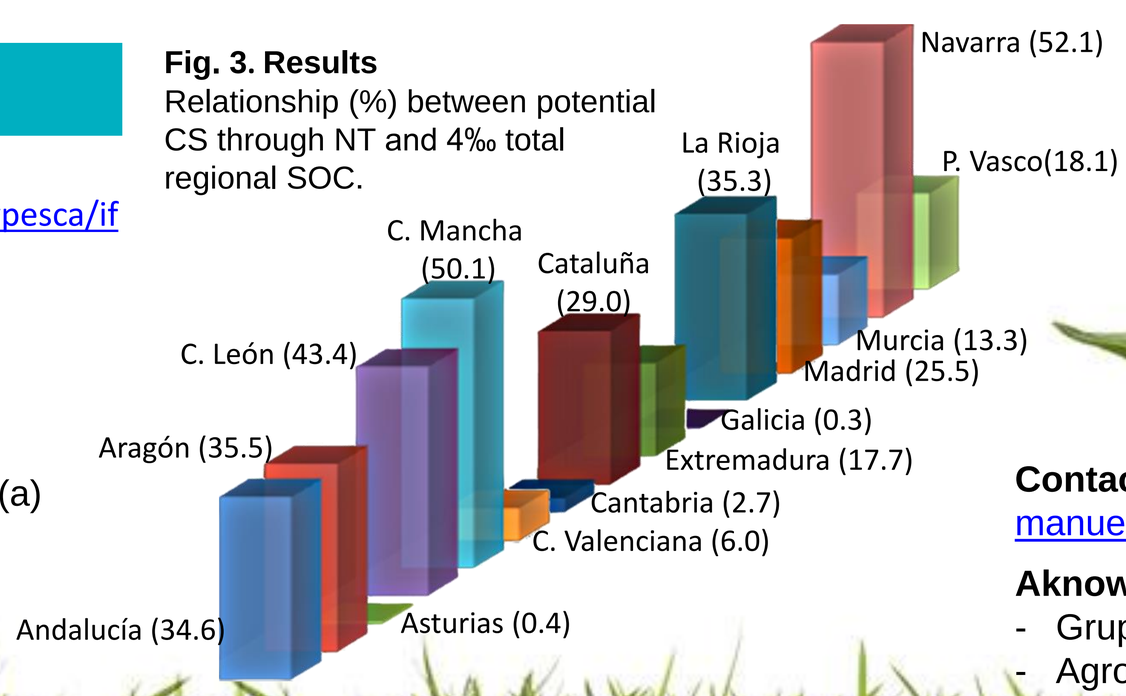
Fig. 3. Results
Relationship (%) between potential CS through NT and 4‰ total regional SOC.



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