

EMBRACING THE DIGITAL ENVIRONMENT

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240-2 - Soil Carbon Dynamics with Intensification of Agricultural Systems



Tuesday, November 12, 2019



10:05 AM - 10:35 AM



Henry B. Gonzalez Convention Center - 305

Abstract

No-till is the key component of conservation agriculture adopted over 125 million hectares worldwide to address an ever-growing demand for soil and water quality, food security, and climate change adaptation and mitigation. Here we present the results of a global meta-analysis of studies assessing carbon storage and sequestration in no-till soils from the most important agricultural regions of the world. Overall, our results show that no-till soils store more carbon (up to one m depth) than tilled soils. The amount of carbon sequestration depended on the crop frequency and nitrogen inputs in association with decreased soil disturbance. Single cropping systems lack carbon inputs to maintain soil carbon throughout the soil profile. However, double-cropping systems led to a decrease in soil nitrogen that may constrain future carbon sequestration whereas the use of legumes alleviated nitrogen losses and supply extra nutrient to support carbon sequestration. A more detailed analysis of two long-term experiments in temperate and subtropical climates further suggested that increase C inputs are conserved in no-till systems to a depth of 1 m. Briefly, our findings indicate that no-till systems without intensification are a missed opportunity for mitigation, soil restoration, and food security. No-till systems with intensification can effectively mitigate climate change by either avoiding CO₂ emissions from tilled soils or by promoting soil carbon sequestration.

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