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A meta-analysis of the effects of agricultural management on soil physical quality for different farm typologies across Europe

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Despite important research efforts directed towards increasing our understanding of the links between agricultural management practices and environmental degradation and crop yield decline, current knowledge is still insufficient to provide an integrated approach for untangling relationships with soil quality from a chemical, biological and physical perspective. (Davis et al. 2012). Within the European project CATCH-C (ten Berge 2011) a practical tool is being developed for analyzing the sustainability of soil management practices for a wide range of farm typologies across European. As a partner of CATCH-C, the Spanish team aims at assessing physical soil quality by using meta-analysis techniques, previously used to assess other aspects of agricultural management (van den Putte et al. 2010; González et al. 2012; Quemada et al. 2013).
As a first step, key indicators for characterizing soil physical quality such as bulk density, resistance to penetration, hydraulic conductivity, runoff and sediment yield have been identified. A literature review of the performance of these indicators was carried out. Data extracted from literature, was integrated in an online database developed by Plant Research International (Wageningen, UR). After an exploratory data analysis, a meta-analysis of the indicators with baseline treatments allowed a proper interpretation of the indicators to elucidate relationships between agricultural management and soil physical quality.

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