SmartSOIL

Sustainable farm Management Aimed at Reducing Threats to SOILs under climate change

SmartSOIL
Overview and results

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www.smartsoil.eu

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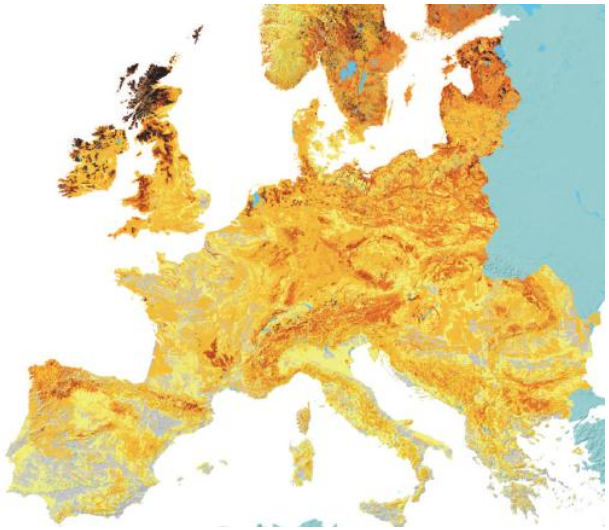
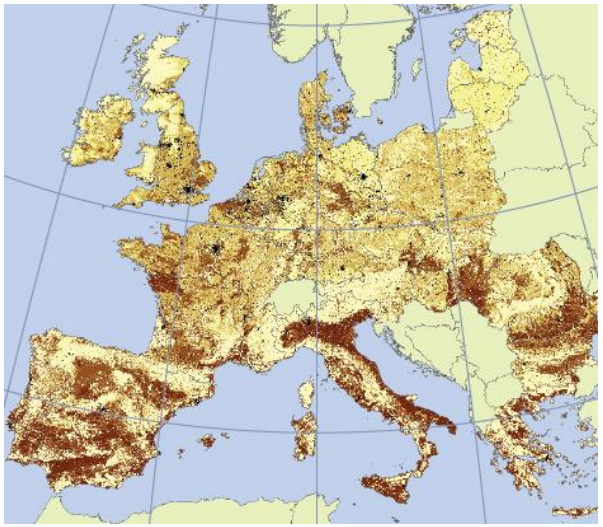
Issues

- Changes in soil C contributes to the GHG balance (positively or negatively)
- Soil C affects soil functioning and thus productivity
- These issues are not (fully) incorporated in farm management practices, policies or incentives for agriculture

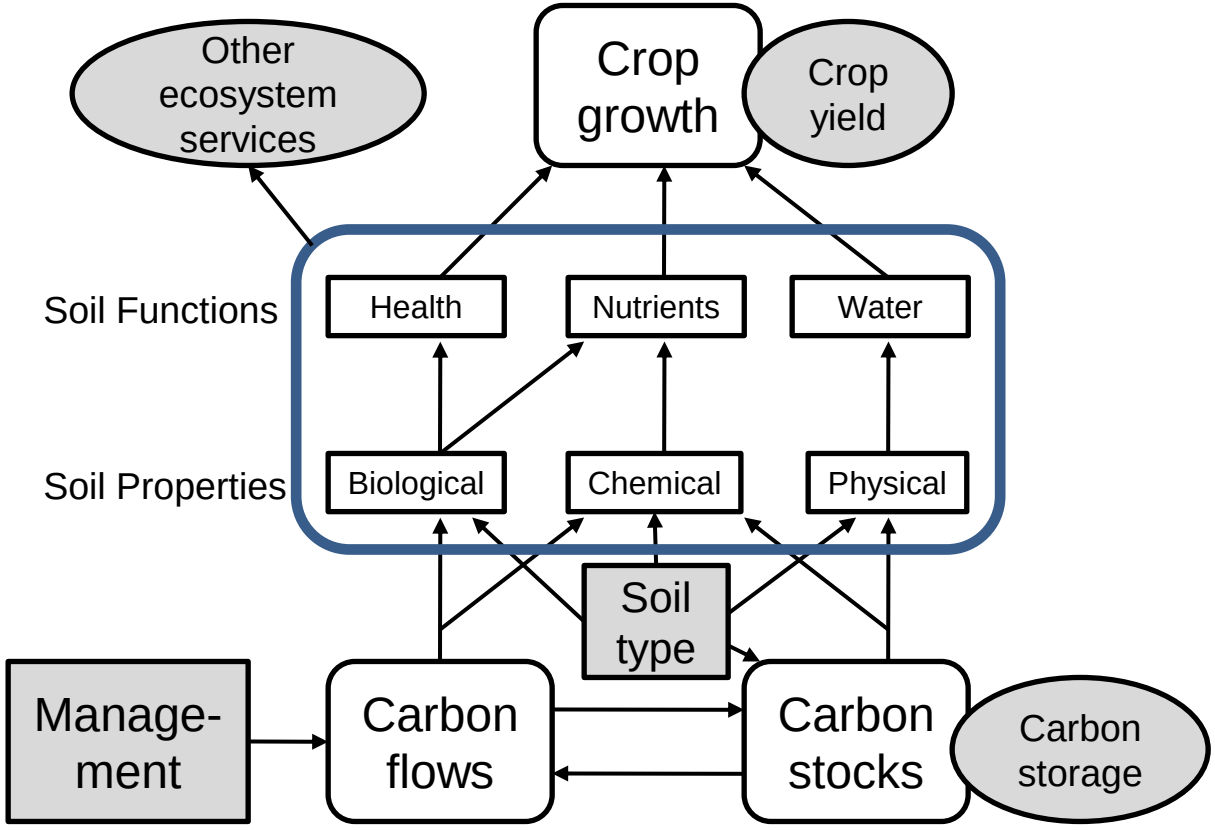


Soil C contents

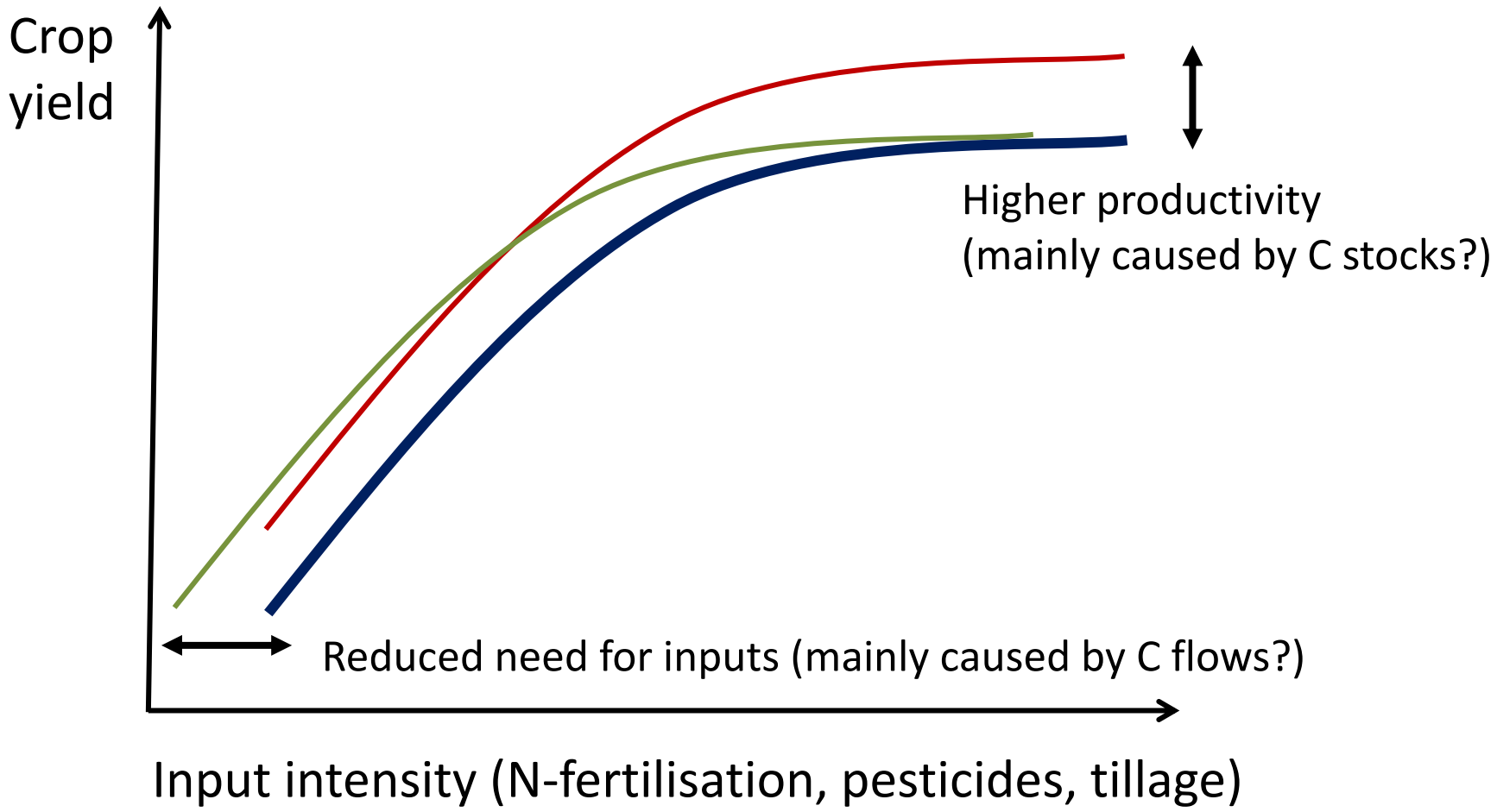


Soil C loss potentials

SmartSOIL concept



SmartSOIL hypothesis



Spring barley yield related to N-input

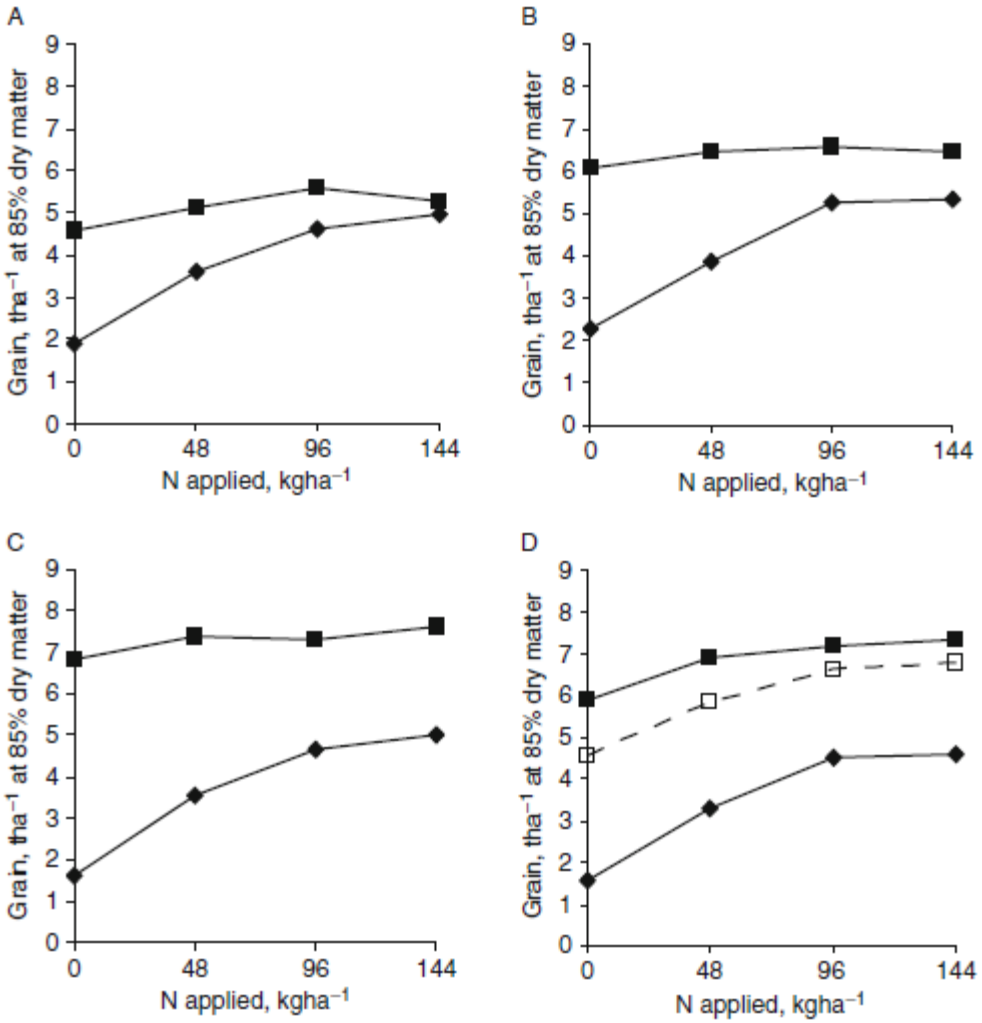


Figure 10 Yields of spring barley grain (t ha^{-1}) Hoosfield Continuous Barley, Rothamsted. Annual treatment 1852–2006: PK fertilizers, ◆; 35 t ha^{-1} FYM, ▪; annual treatment only from 2001 to 2006: 35 t ha^{-1} FYM, □. (A) *cv.* Julia, 1976–1979, (B) *cv.* Triumph, 1988–1991, (C) *cv.* Cooper, 1996–1999, and (D) *cv.* Optic 2004–2007.

Johnston et al. (2009)

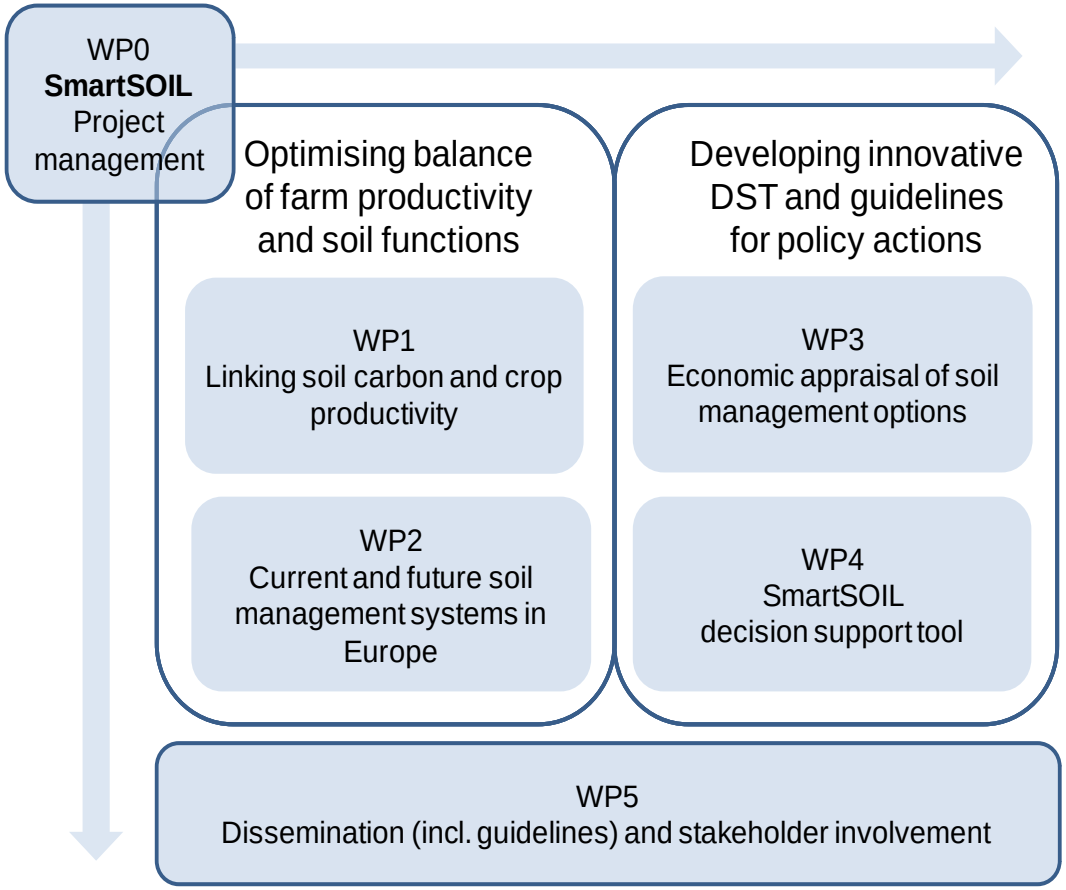
Applying the SmartSOIL concept

- Test, quantify and verify the hypothesis
- Develop simplified (flow-stock based) model
- Quantify effects of technologies and management
- Address effects on ecosystem services across Europe
- Identify improved technologies and measures
- Analyse socio-economic effects
- Address barriers (and opportunities) for adoption of technologies and management
- Develop decision support and dissemination

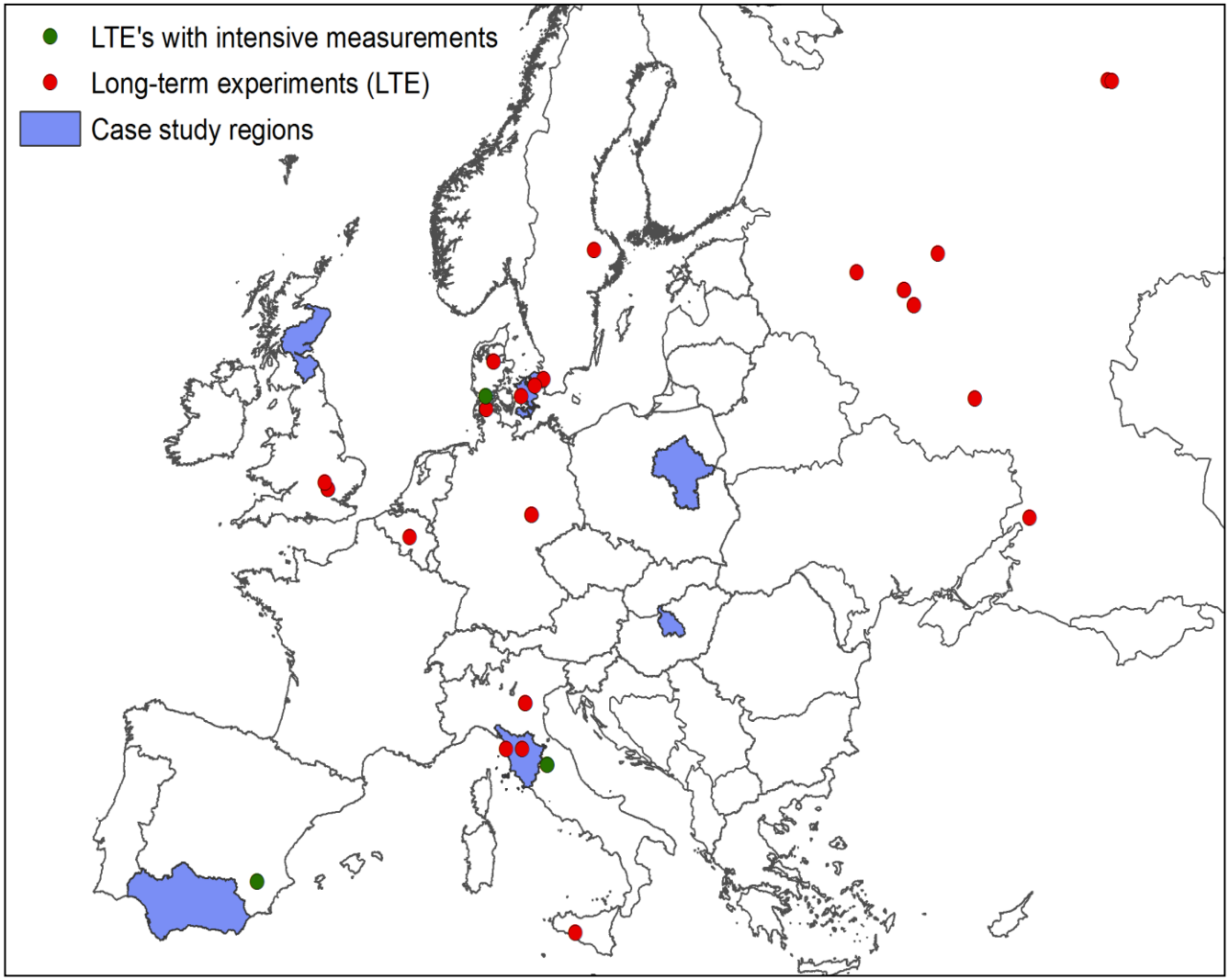
SmartSOIL Aims

- The application of a holistic approach **to identify farming systems and agronomic practices** that result in an **optimized balance between crop productivity, restoration and maintenance of vital soil functions** (fertility, biodiversity, water, nutrients cycling and other soil ecosystem services) **and soil carbon sequestration and storage**
- Development and delivery of the SmartSOIL **decision support tool and guidelines** to support **novel approaches, techniques, and technologies** adapted to **different European soils and categories of beneficiaries** (farmers, farm advisory and extension services, and policy makers)

Workpackages



Long-term experiments and case study regions



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Project has been running for 11 months

First results:

- Practitioners' preferences for DST formats identified
- Database of LTE data established and analyses starting
- Comprehensive overview of ecosystem services (related to soil) that can be derived from an arable landscape is completed

Main research priorities for the future

- Root derived carbon effects on soil carbon retention and soil functioning
- Links between soil carbon and other nutrients, in particular nitrogen and phosphorus
- The effects of heterogeneity in soils (including effects of tillage) on soil carbon protection, microbial processes and carbon and nitrogen fluxes
- Development of new cropping systems focused on no-tillage and perennial crops (e.g. for bio-refinery)