

SmartSOIL Overview and results

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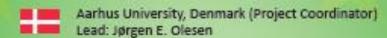
www.smartsoil.eu

SmartSOIL:

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

www.smartsoil.eu





University of Aberdeen, UK (Scotland)

University of Copenhagen, Denmark
Lead: John R. Porter

Alterra, Netherlands Lead: Peter Kuikman

University of Florence, Italy Lead: Marco Bindi

Ecologic Institute, Germany Lead: Ana Frelih-Larsen

Universidad Politécnica de Madrid, Spain Lead: Ana Iglesias

Scottish Agricultural College, UK (Scotland)
Lead: Dominic Moran

Countryside & Community Research Institute, UK
Lead: Julie Ingram

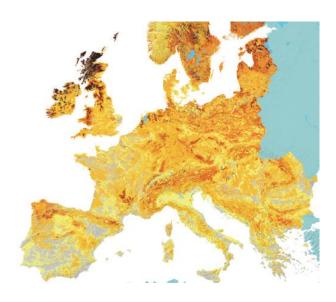
Warsaw University of Life Sciences (SGGW), Poland Lead: Zbigniew Karaczun

Le Groupe-conseil baastel sprl, Belgium Lead: Olivier Beucher

Research Institute for Agricultural Economics, Hungary
Lead: András Molnár

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

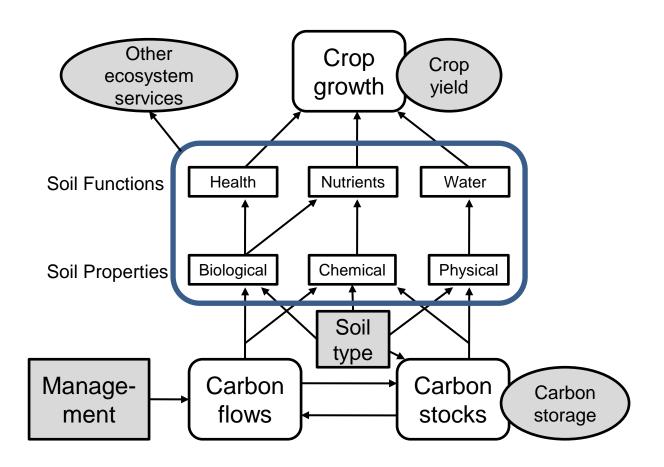


Soil C contents

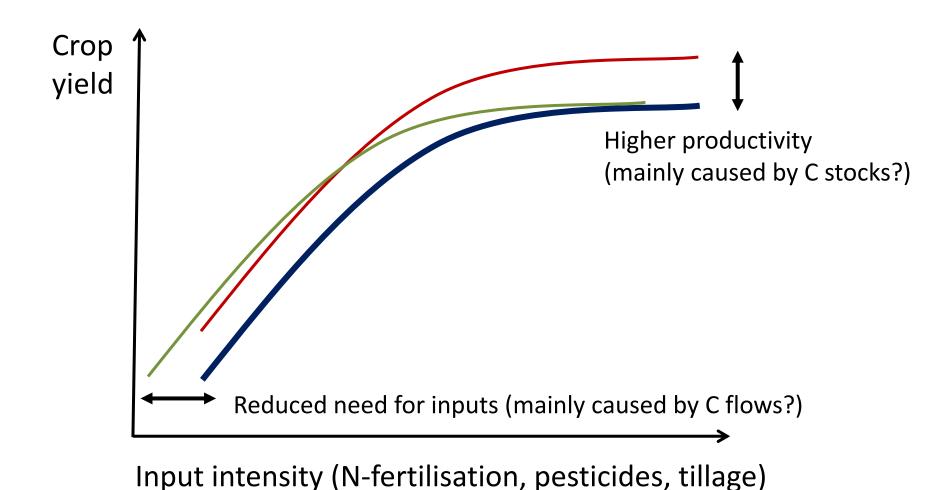


Soil C loss potentials

SmartSOIL concept



SmartSOIL hypothesis



Spring barley yield related to N-input

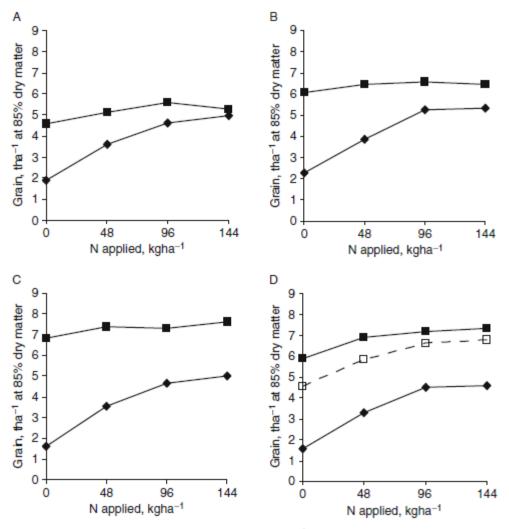


Figure 10 Yields of spring barley grain (t ha⁻¹) Hoosfield Continuous Barley, Rothamsted. Annual treatment 1852–2006: PK fertilizers, ♦; 35 t ha⁻¹ FYM, •; annual treatment only from 2001 to 2006: 35 t ha⁻¹ FYM, □. (A) *cv*. Julia, 1976–1979, (B) *cv*. Triumph, 1988–1991, (C) *cv*. Cooper, 1996–1999,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

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

WP0
SmartSOIL
Project

management

Optimising balance of farm productivity and soil functions

WP1 Linking soil carbon and crop productivity

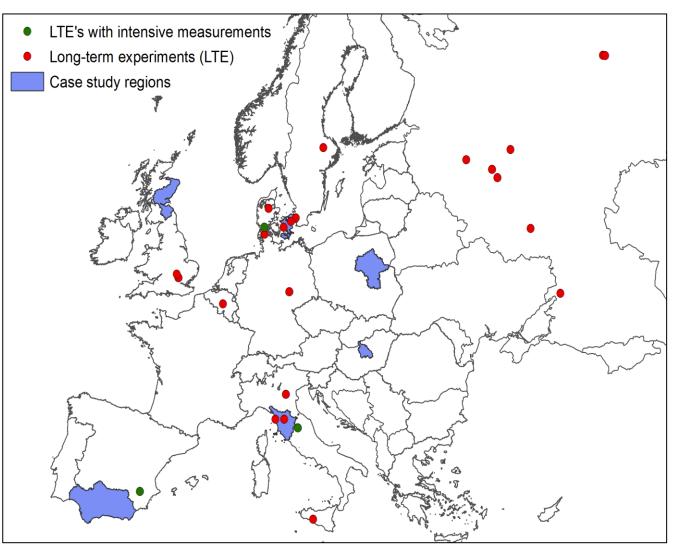
WP2 Current and future soil management systems in Europe Developing innovative DST and guidelines for policy actions

WP3
Economic appraisal of soil management options

WP4 SmartSOIL decision support tool

WP5
Dissemination (incl. guidelines) and stakeholder involvement

Long-term experiments and case study regions





Project has been running for 11 months <u>First results:</u>

- 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 notillage and perennial crops (e.g. for bio-refinery)