EJP SOIL
European Joint Programme

**Towards climate-smart sustainable management of agricultural soils**

# Deliverable 8.10

# Agricultural soil management topics needing increased scientific dissemination or new research

Due date of deliverable: 31.10.2022

Actual submission date: XX.10.2022

# GENERAL DATA

Grant Agreement: 862695
Project acronym: EJP SOIL
Project title: Towards climate-smart sustainable management of agricultural soils
Project website: www.ejpsoil.eu

Start date of the project: February 1st, 2020
Project duration: 60 months
Name of lead contractor: INRAE

Funding source: H2020-SFS-2018-2020 / H2020-SFS-2019-1
Type of action: European Joint Project COFUND

| | |
|---|---|
| DELIVERABLE NUMBER: | 8.10 |
| DELIVERABLE TITLE: | Agricultural soil management topics needing increased scientific dissemination or new research |
| DELIVERABLE TYPE: | Report |
| WORK PACKAGE N: | WP8 |
| WORK PACKAGE TITLE: | Science to Policy |
| DELIVERABLE LEADER: | Teagasc |
| AUTHOR: | Phillips, A., Wall, D. |
| REVIEWERS: | Chenu, C. |
| DISSEMINATION LEVEL: | PU |

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 862695

# Table of Contents



# List of acronyms and abbreviations

| | |
|---|---|
| WP | Work Package |
| EU | European Union |
| EEA | European Environment Agency |
| EUSO | European Union Soil Observatory |

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 862695

# 1. Introduction

This deliverable presents a concise list of agricultural soil management topics that WP8 Science to Policy has identified as requiring better dissemination or new research based on the analysis of policy needs identified in Deliverable 8.3 First Summary report on needs identified and Deliverable 8.9 Second summary report on needs identified. Discussions with agricultural soil policy stakeholders during workshops coupled with feedback received from survey instruments contributed to elaboration and clarification of this list of topics. The topics identified have relevance to the EJP SOIL expected impacts and to the current soil related policy climate across the EU. At the time of this deliverable, the impact assessment and the proposal for the EU Soil Heath Law were underway.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 862695

## 2. Concise List of Topics

| | |
|---|---|
| Topics that require better dissemination | Management practices that can be implemented by farmers to increase carbon sequestration. |
| | Verified greenhouse gas (GHG) emission and removal data for land managers. |
| | Policy options that provide a source of funding for activities that contribute to carbon sequestration. |
| | Sustainable soil management practices to avoid land degradation. |
| | Soil health indicators linked to soil function and soil ecosystem services. |
| Topics that require new research | Monitoring, reporting and verification methods for carbon farming schemes. |
| | Long-term outcomes of carbon farming schemes. |
| | Carbon sequestration rates linked with management practices and land use. |
| | Soil health indicator threshold levels that consider pedo-climatic differences. |
| | Identification of soil and agricultural management practices to help with adaptation to climate change. |
| | Establishing production chains and value chains that are key to promoting rewetting and paludiculture in peat soils. |
| | Socio-economic impacts of raising the water table and identification of incentives to encourage and support peat soil rewetting. |
| | Indicators for soil biodiversity. |

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 862695

# 3. Context and supporting information for these topics

## 3.1. Topics that require better dissemination

- **Management practices that can be implemented by farmers to increase carbon sequestration.** Scientific information detailing the rates of carbon sequestration that can be expected from various management soil and agricultural practices across different farming systems and climatic conditions. Scientific information from the EJP SOIL projects (CARBOSEQ, SOMMIT, AGROECOSeqC) that focus on aspects of C sequestration will be synthesised and disseminated through the National Hubs, by linking with EIP-AGRI network and other stakeholder engagements planned by the EJP SOIL and its projects in year 4 and 5. This information is required to support Carbon Farming initiatives at different scales.
- **Verified greenhouse gas (GHG) emission and removal data for land managers.** At national and regional scales scientific information and data evidence on the levels of GHG emissions (emission factors) and removals (C sequestration rates) is required to constrain national GHG inventories and policy monitoring, verification and reporting (MRV). The EJP SOIL projects (INSURE, ΣOMMIT, TRACE-SOILS) are developing scientific information that will help to verify and model GHG emissions and reductions at regional and national scales as is appropriate. This information will be disseminated through the National Hubs and to the relevant policy stakeholders connected to National GHG Inventories.
- **Policy options that provide a source of funding for activities that contribute to carbon sequestration.** Information stemming from in-depth and strengths, weaknesses, opportunities and threats (SWOT) analysis on the types of incentive structures and business models proposed for carbon farming initiatives is required by national policy stakeholders, and interested private industry and farmers representative groups. The EJP SOIL Road4Schemes project is connecting with current carbon farming initiatives and conducting a SWOT analysis. This information is being disseminated to policy, industry and farmer stakeholders.
- **Sustainable soil management practices to avoid land degradation.** Scientific information including practical consideration from management of soils that are under threat from degradation processes. The EJP SOIL projects (SCALE, SERENA, Soil CompaC) are focusing on building new understanding on the effects of different soil management practices on different land degradation processes and how soils can be protected. The EJP SOIL will also hold a specific workshop focused on Soil Degradation in November 2022 that will be open to a range of stakeholders from policy makers to scientists to land managers and farms. In addition, scientific information from the EJP SOIL projects (CARBOSEQ, AGROECOSeqC, EnergyLink) that focus on aspects of C sequestration will be synthesised and disseminated through the National Hubs and other stakeholder engagements planned by the EJP SOIL and its projects. This information is required to support Carbon Farming initiatives at different scales.
- **Soil health indicators linked to soil function and soil ecosystem services.** The EJP SOIL WP6 and projects MINOTAUR, SERENA & SIREN are working to identify suitable indicators for the various soil functions and ecosystems services that we expect agricultural soils to provide. This works includes important considerations such as the appropriateness of harmonisation of soil indicators sets or the threshold values related to different functions and ecosystem services

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 862695

within the EU or at regional scales. The methodologies for measuring and analysing indicators and how to interpret the values measured. This information is being disseminated to EUSO, EEA, JRC (LUCAS) and will be shared with national policy stakeholders who are involved in developing soil monitoring proposed under CAP, EU Soil Mission and EU Soil Strategy (and the proposed Soil Health Law).

## 3.2. Topics that require new research

- **Monitoring, reporting and verification methods for carbon farming schemes.** Research is required to conduct more in-depth assessment of potential technical approaches, temporal timing, cost and practicality of MRV for carbon farming schemes.
- **Long-term outcomes of carbon farming schemes.** The long-term outcomes of carbon sequestration in soils needs further investigation to assess and valorise potential associated issues and benefits for agricultural soils. These may be linked with soil threats, soil functions, and longer term social and economic impacts on the soil and farming systems
- **Carbon sequestration rates linked with management practices and land use.** National, regional and local scale scientific information is required to help spatial targeting of management practices on agricultural land to increase carbon sequestration rates and to improve the permanence of carbon storage in the longer term.
- **Soil health indicator threshold levels that consider geo-climatic differences**. Research is required to develop appropriate soli indicator critical threshold levels suitable for the geo-climatic differences that exist within and between countries and regions. This information is required by policy makers and land managers and farmers to help identify issues and the advancement of soil threats but also to implement remedial actions for sustainable soil management practices where needed.
- **Identification of soil and agricultural management practices to help with adaptation to climate change.** Much research have been conducted on management practices that mitigate GHG emission for agricultural soli and farming systems. However much less research has been conducted to date that investigates potential agricultural management practices or farming system changes that increase resilience to climate change. More specific scientific information on such climate change adaptation practices is required to enable stakeholders to select, promote, implement and incentivise such practices that are appropriate to their farming systems, land use and climatic region.
- **Establishing production chains and value chains that are key to promoting rewetting and paludiculture in peat soils**. In the case of peat soils higher level policy targets in many countries are moving towards rewetting in an effort to decrease GHG emissions from these areas. However, these targets present challenges for the land owners and farmers in these peat soil areas as to what options for production from these soils remain after they are re-wetted. Research is required to investigate potential agricultural production systems, including paludiculture, are available and what are the economic, social and regional consequences for such supply chain transitions away from traditional agricultural production systems.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 862695

- **Socio-economic impacts of raising the water table and identification of incentives to encourage and support peat soil rewetting**. Research is required to evaluate the social and economic consequences of rewetting or water table raising with the region and local communities associated with peat soils. The longer term implications on the local economy, rural dwelling and farming systems in these areas needs to be fully evaluated. This information will help to inform policy makers on appropriate incentives and social and economic consequences of these actions.
- **Indicators for soil biodiversity.** Research is required to link indicators in soil to biological communities (type, quantity) and biological function. This research will help to differentiate the effects of soil type, climate and management on soil biodiversity and inform policy and farm advisors of how management effects soil biodiversity in a negative or positive direction and to take actions to prevent soil biodiversity loss or enhance soil biodiversity in the longer term.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 862695

# 4. Conclusion

Much climate smart and sustainable soil management related research is available, or currently being conducted by the EJP SOIL projects. Suitable dissemination methods are required to maximise usefulness and impact of scientific findings among key stakeholder groups. Different methods for dissemination of science and information are available and need to be targeted towards appropriate stakeholder groups concerned with climate smart and sustainable soil management. The EJP SOIL WP8 Science to policy has consulted and evaluated methods of dissemination of scientific information to policy stakeholders. Policy stakeholders have indicated their preference for receiving concise scientific information and key messages in the form of policy briefs, short technical reports and also opportunities for discussions with experts e.g. workshops and panels. Further engagement and analysis of preferred dissemination methods with other stakeholder typologies needs to be conducted. This information will be used by WP8 and the wider EJP SOIL consortium to better target the dissemination methods for the scientific outputs being generated to the different stakeholder typologies.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 862695