

# Fostering innovative soil management practices across Europe (i-SoMPE)

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- Inventory of innovative soil management practices in Europe
- An interactive website reveals where different innovative soil management practices are currently adopted
- Assessing potential areas of adoption across Europe
- Information is available as maps, description, data and graphics

## INTRODUCTION

Sustainable agricultural soil management practices are key to restore, maintain and improve soil health. Several innovative soil management practices exist all over Europe.

This study compiled an inventory of soil-improving management practices relevant to European conditions, and used a survey among soil scientists to assess the current and potential levels of adoption of these practices in Europe. The research carried out aimed to assess the adoption of soil improving management practices and identified obstacles hindering this adoption.



Figure 1 / © Canva

## DESCRIPTION OF THE ISSUE

Introducing innovative soil management practices and alternative farming techniques in intensive agricultural systems might help to enhance agroecosystem resilience to soil threats or environmental stress and to preserve soils from degradation. With regard to this, many European farmers are open to introduce technological innovations and sustainable management practices to make their farms more climate-smart and sustainable. However, they need guidelines on effective pathways to do so. Moreover, innovative technical solutions (e.g. precision farming) are often not affordable for the farmers and other barriers can also occur (e.g. financial risks, climatic constraints or socio-cultural lock-ins).

In order to assess the potential and foster the adoption of soil-improving management practices, it is necessary to know (i) the current levels of adoption of the practices, (ii) socio-technical barriers influencing their adoption, and (iii) their biophysical limits.

**KEY MESSAGES FOR POLICY MAKERS**

**Recommendation One: A region and context-specific approach to foster the adoption of soil-improving management**

Many soil management practices, that can tackle soil challenges, exist but are only adopted on a low level. A region-specific approach is needed to identify, recognize and overcome socio-technical barriers and expand bio-physical limits. At EU and member state level appropriate guidelines, legislation, smoothly running networks and interaction between stakeholders are recommended. Furthermore, the impact of the practices in the site-specific context demand evaluation to avoid/minimize trade-offs.

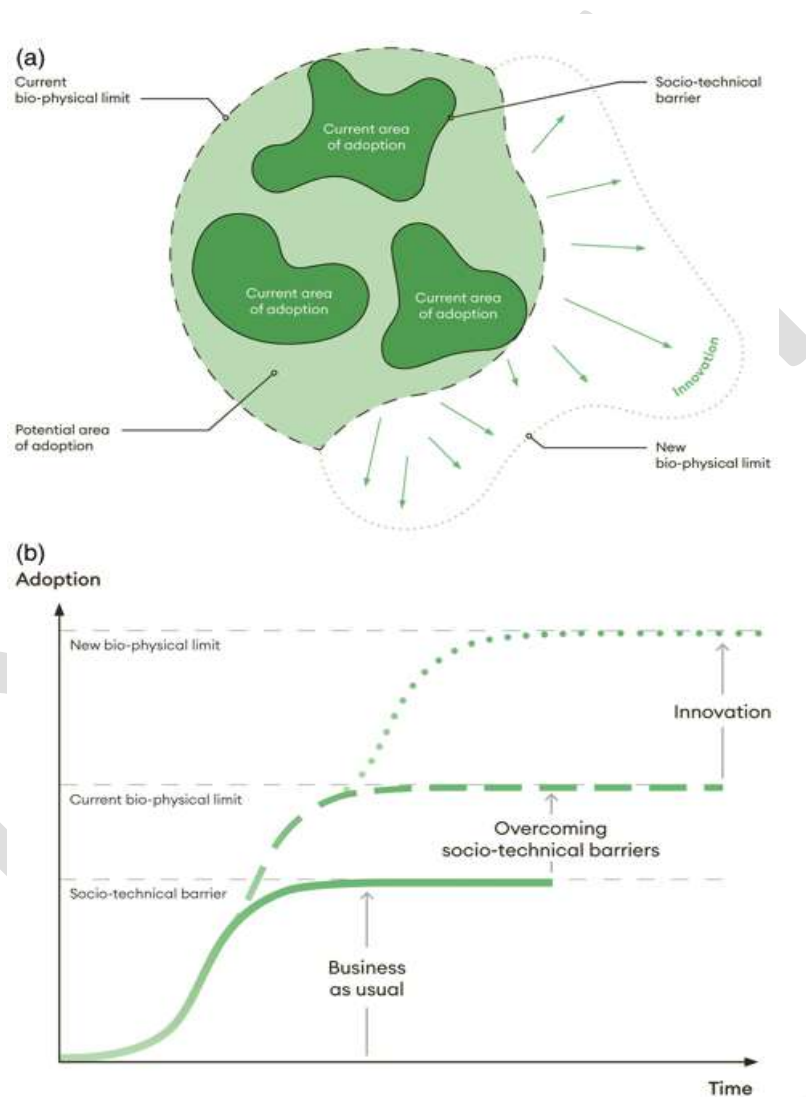


Figure 2 Conceptual illustrations of bio-physical limits and socio-technical barriers that constrain the adoption of a soil management practice. (a) Bio-physical limits restrain the area where a soil management practice can potentially be applied. The current area of adoption is further restricted by socio-technical barriers. (b) The adoption of a practice may increase without specific measures until the further spread of a practice is either hampered by socio-technical barriers or limited by its current bio-physical limits. The socioeconomic barriers can be overcome (dashed line) through changes in policies or utilization of other instruments (e.g., provision of knowledge, establishment of networks, increased availability of machinery, or financial incentives). Whereas innovation, research and development (e.g., new cultivars, new implements) are needed to move the bio-physical limits and expand the potential area of adoption to a new biophysical limit (dotted line).

Source: Heller et al., 2024

**Recommendation Two: Improving the political and economic environment**

It is crucial to improve the political and economic environment to increase the adoption of soil-improving management practices. Therefore, financial incentives are essential as well as providing a market for products from soil-improving agricultural practices (e.g. labelling). Such a framework helps farmers to make investments (e.g. new technology or know-how).

**Recommendation Three: Support for knowledge networks and information**

To overcome soil threats and challenges it is essential to foster knowledge sharing and experience (e.g. organized field visits) for mutual exchange between stakeholders (farmers and researchers) and to learn/adopt skills. Networks of knowledgeable persons around the farmers (individuals and communities; other farmers, advisors, researchers, experts) and improving the science-practice interface support knowledge availability to better understand the agroecosystem (e.g. Living Lab network in Europe).

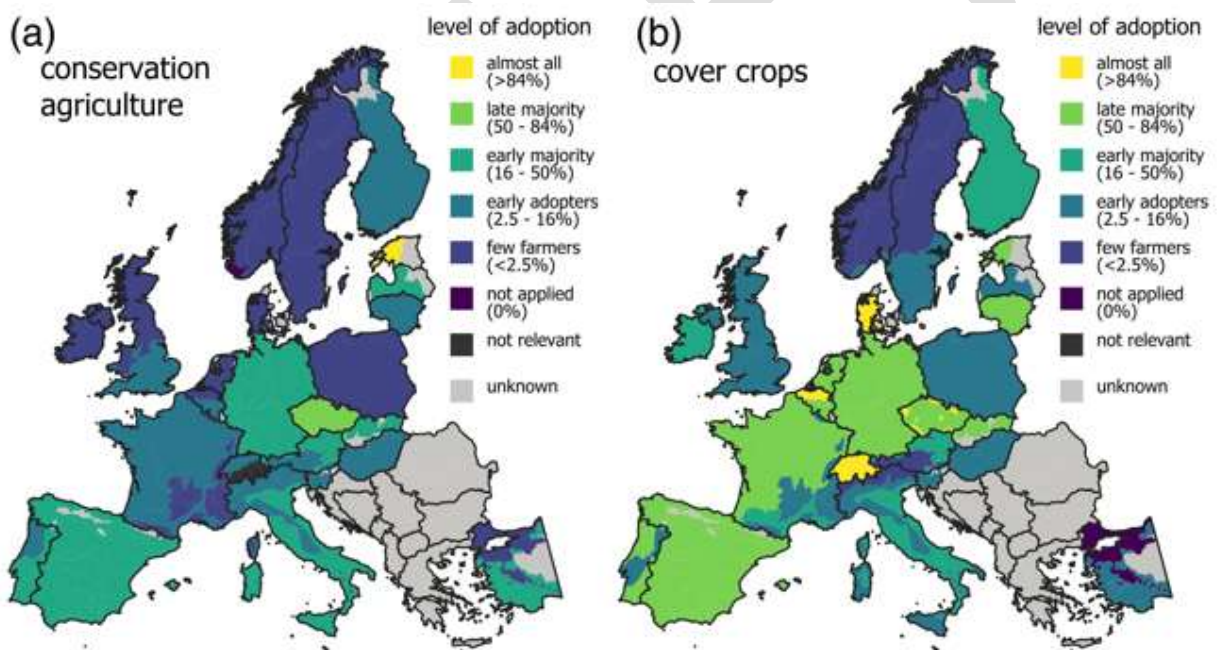


Figure 3 (a,b) Adoption level of conservation agriculture (a) and cover crops (b) in 55 environmental sub-zones, based on a survey with soil scientists from 24 European countries.

Source: Heller et al., 2024

## SUPPORTING POLICY

- The European Common Agricultural Policy (CAP, Reg. EU 2021/2116)
- New CAP 2023-2027 (first pillar: conditionality and voluntary eco-schemes; second pillar: agro-environmental measures and investment support)

## METHODOLOGY

In total, 53 soil management practices, were listed in an inventory (status 2021) that address one or several of the soil challenges occurring in Europe. This inventory includes a general description, an indication for potential area of application of a practice (considering climate factors, site and soil factors, land use and farming system) as well as the impacts of the practice with regard to their ability to address the soil challenges.

The adoption of most practices was low or spatially heterogeneous across Europe, highlighting region-specific limitations to sustainable soil management. Qualitative interviews were conducted to explore the importance of socio-technical aspects of adoption.

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