

# Inventory of sustainable Soil Management Practices

Considerations for selecting soil management practices to tackle multiple soil related challenges

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**EJP SOIL**  
European Joint Programme

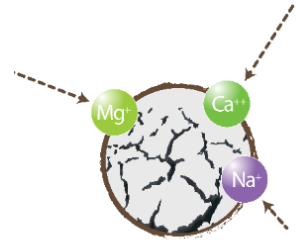
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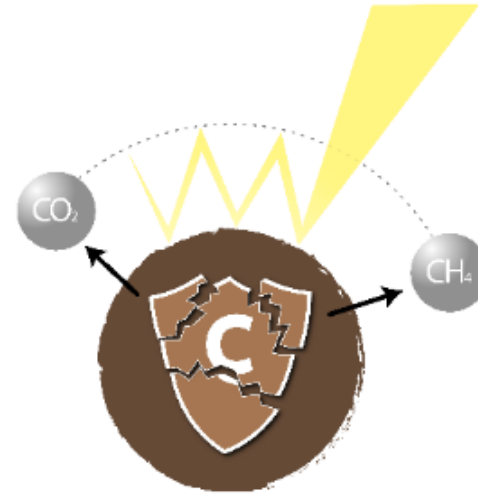
# Agricultural soils face many challenges



Erosion



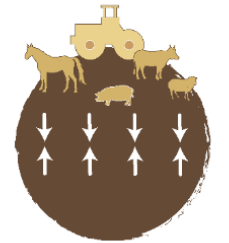
Salinization  
& sodification



Organic matter loss



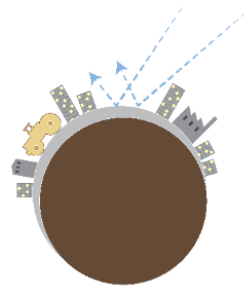
Contamination



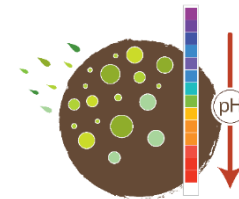
Compaction



Nutrient  
imbalances



Sealing

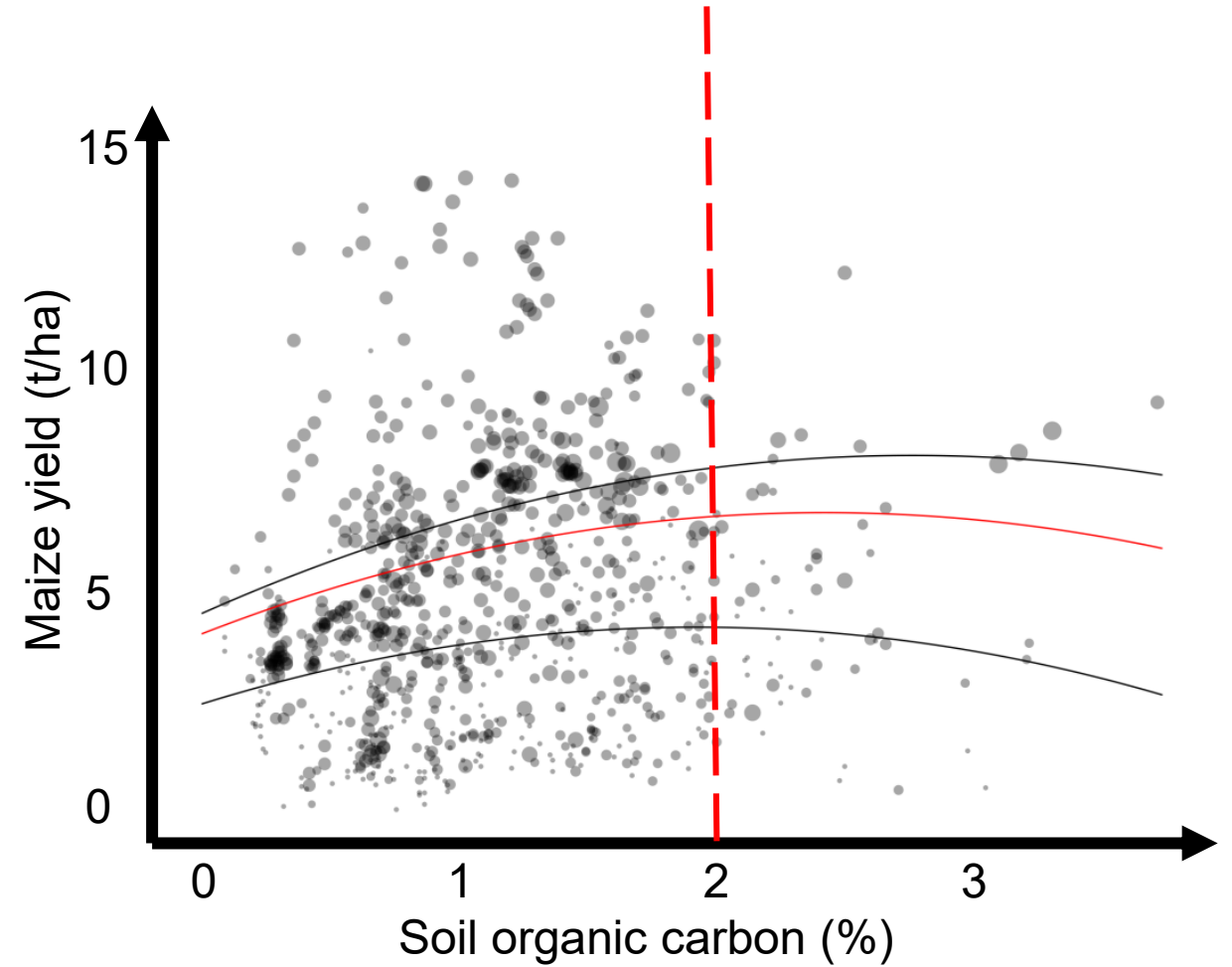
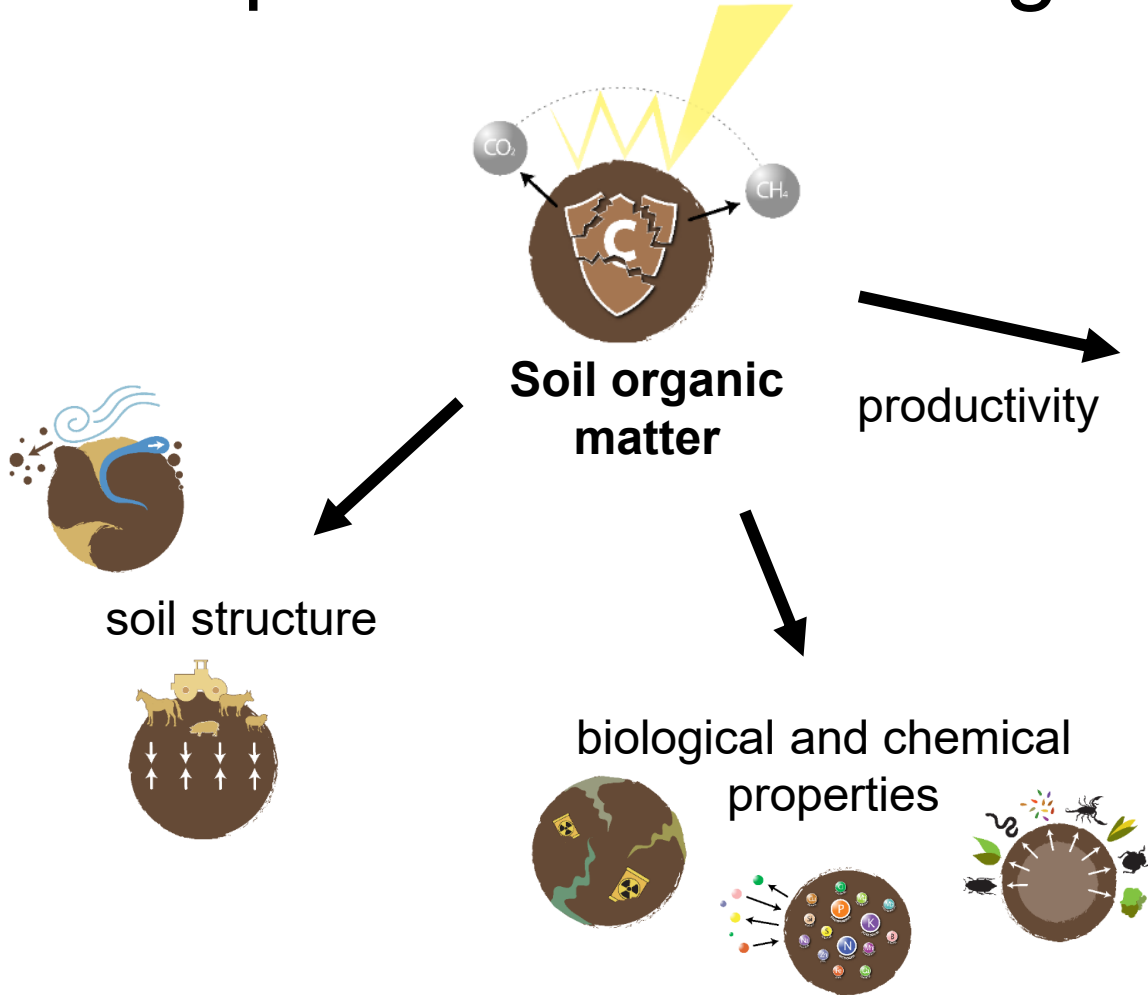


Acidification



Biodiversity loss

# Importance of soil organic matter



# Soil management is key to tackle soil challenges



On-land ploughing



Cover crops



Drip irrigation



Liming



Reduced tillage



No-till



Agroforestry



Biochar

# Inventory of soil management practices



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# The i-SoMPE Project

## Goals

- Create European inventory of practices
- Summarise the impacts of practices
- Assess the current adoption of practices

## Methods

- Expert survey in 24 EJP SOIL countries
- Review of European research project

EJP SOIL Countries



Reviewed projects



[Heller et al. \(2024\)](#)



# Inventory: Number of practices

Category	#
Tillage and traffic	17
Crops and crop rotations	13
Organic matter and nutrient management	13
Water management	8
Crop protection	6
Landscape elements	4
Farming systems	4
Use of decision support tools	2
<b>Total</b>	<b>67</b>



# Inventory: Impacts of practices



# Inventory: Web-App

New !

<https://shinyapp.cra.wallonie.be/isompe-inventory/>

The screenshot displays the i-SoMPE web application interface. The header includes the logo and the text "i-SoMPE Innovative Soil Management Practices across Europe". Below the header, there are navigation links: "Welcome", "List of available practices", "Search engine", and "Information (selected practice)". A secondary set of links includes "Maps of adoption", "Data (maps)", and "User guide".

The main content area is titled "Soil management practices" and features a table with the following data:

id	category	name	definition
1	Tillage and traffic	Contour cropping	The practice of tilling sloped land along lines of consistent elevation in order to conserve rainwater and to reduce soil losses from surface erosion. (Source of definition: <a href="https://www.britannica.com/topic/contour-farming">https://www.britannica.com/topic/contour-farming</a> )
2	Tillage and traffic	Controlled traffic farming	The Global Navigation Satellite System (GNSS) enables controlled traffic farming (CTF) systems, where machinery drives along repeatable tracks with accuracy. (Source of definition: <a href="http://www.fao.org/faoterm/en/">http://www.fao.org/faoterm/en/</a> )
3	Tillage and traffic	Cover crop termination with no herbicides and ploughing	The shallow incorporation of plant residues or cover crops with a rotor, a cultivator or a skim plough. (Source of definition: Own)
4	Tillage and traffic	Deep Ploughing	Deep plowing is a plowing to a depth greater than 50 cm as compared to ordinary plowing which rarely exceeds 20 cm. (Source of definition: Baumhardt et al., 2008, doi: 10.2136/sssaj2007.0122)
5	Tillage and traffic	Dyker	A dyker is a tool that can be attached to the rear end of a potato planting machine. The dyker digs holes into the bottom of the furrows between the potato ridges to facilitate water infiltration. (Source of definition: Own)
6	Tillage and traffic	Lightweight autonomous field robot	The lightweight autonomous field robots are agricultural vehicles capable of doing field operations by working in fleets within a field. (Source of definition: Own)

The left sidebar contains a "Category" dropdown menu set to "Tillage and traffic" and a "Practice (filtered)" dropdown menu set to "10 - Reduced tillage / Conservation tillage". The footer of the sidebar includes copyright information: "data - (C) 2021 i-SoMPE consortium", logos for i-SoMPE, EJP SOIL, and the European Union, and a note: "Application developed by FndVnW (CRA-W) based on 'inventr'".

## Features

- 67 practices
- definition and description
- summary of impacts
- search functions
- current level of adoption
- bio-physical limitations

# Inventory: Search for relevant practices

Filter for soil challenges



List of practices



Description & further information

Maintain optimal soil structure ▼

Choices :

-  0  +  ?

id	name	category	definition
2	Controlled traffic farming	Tillage and traffic	The Global Navigation Satellite System (GNSS) enables controlled traffic farming (CTF) systems, where machinery drives along repeatable tracks with accuracy. (Source of definition: <a href="http://www.fao.org/iaoterm/en/">http://www.fao.org/iaoterm/en/</a> )
4	Deep Ploughing	Tillage and traffic	Deep plowing is a plowing to a depth greater than 50 cm as compared to ordinary plowing which rarely exceeds 20 cm. (Source of definition: Baumhardt et al., 2008, doi: 10.2136/sssag2007.0122)
6	Lightweight autonomous field robot	Tillage and traffic	The lightweight autonomous field robots are agricultural vehicles capable of doing field operations by working in fleets within a field. (Source of definition: Own)
7	Low pressure in tyres	Tillage and traffic	Low-pressure tyres distribute the weight to the ground over a larger contact patch so that the weight of the tractor or trailer is spread out better. (Source of definition: <a href="https://blog.bridgestone-agriculture.eu/7-advantages-of-low-pressure-tyres-compared-to-normal-tyres/">https://blog.bridgestone-agriculture.eu/7-advantages-of-low-pressure-tyres-compared-to-normal-tyres/</a> )
8	No-til / direct seeding	Tillage and traffic	The practice of drill-seeding with no prior tillage of soil. (Source of definition: <a href="http://www.fao.org/iaoterm/en/">http://www.fao.org/iaoterm/en/</a> )
9	On-Land ploughing	Tillage and traffic	The tractor for ploughing runs on covered soil, as opposed to in-furrow ploughing. (Source of definition: WOCAT)
10	Reduced tillage / Conservation tillage	Tillage and traffic	Reduced or conservation tillage is a practice that leaves crop residues on the surface. It is a practice to reduce the effects of tillage on soils, however, it still depends on tillage as the structure forming element in the soil. (Source of definition: <a href="http://www.fao.org/iaoterm/en/">http://www.fao.org/iaoterm/en/</a> )
11	Reduced tillage in permanent crops	Tillage and traffic	Minimum tillage may be performed in alternated inter-row zones of permanent crops. (Source of definition: WOCAT)
12	Ridging	Tillage and traffic	The technology consists of shaping the land in small ridges. Ridges are the place where the plants are growing. (Source of definition: Own)

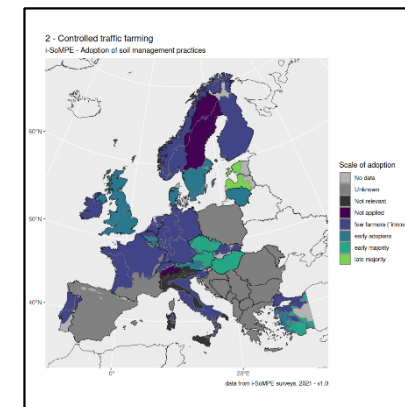
**"2 - Controlled traffic farming"**

**General description**

The Global Navigation Satellite System (GNSS) enables controlled traffic farming (CTF) systems, where machinery drives along repeatable tracks with accuracy.  
(Source of definition: <http://www.fao.org/iaoterm/en/>)

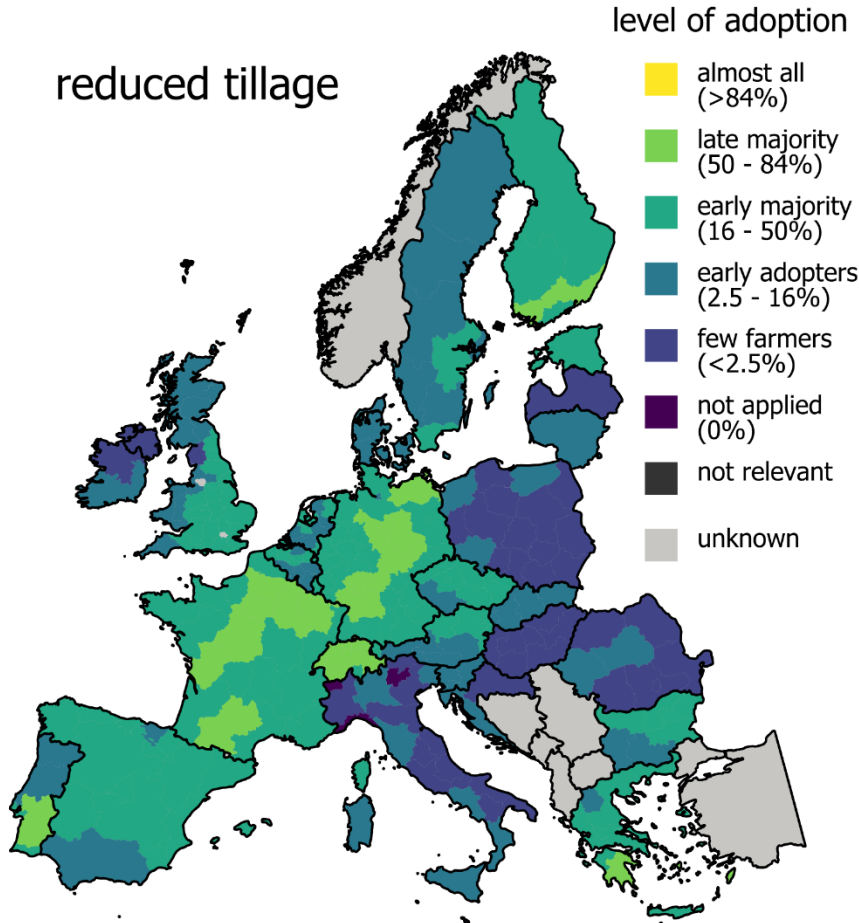
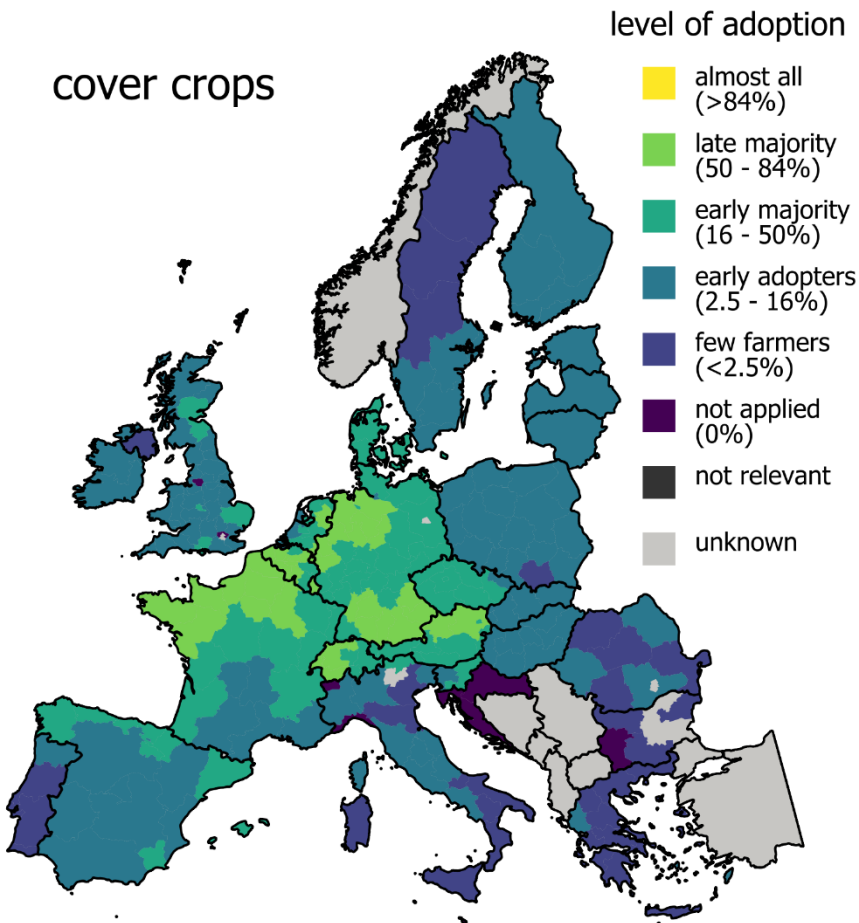
**Specificities or other description of the practice**

The advent of high-precision positioning and auto-guiding systems has enabled the development of controlled traffic agriculture (CTA), which is a strategy for the circulation of agricultural equipment that confines all vehicles to the smallest possible area in permanent traffic lanes. CTF makes it possible to limit the surface of compacted soil during the circulation of vehicles in the field. A reduction in soil compaction could make cultivation processes significantly more efficient, more reliable and more productive, and improve soil functions such as infiltration and water retention (Holpp et al., 2013).  
CTF has been used since the mid-1990s on a large scale in cereal crops in Australia (Holpp et al., 2013). Even if studies concerning the environmental impacts of the CTF exist, it is still little implemented in Europe (Gasso et al., 2013; Anken et al., 2016; Etana et al., 2020).

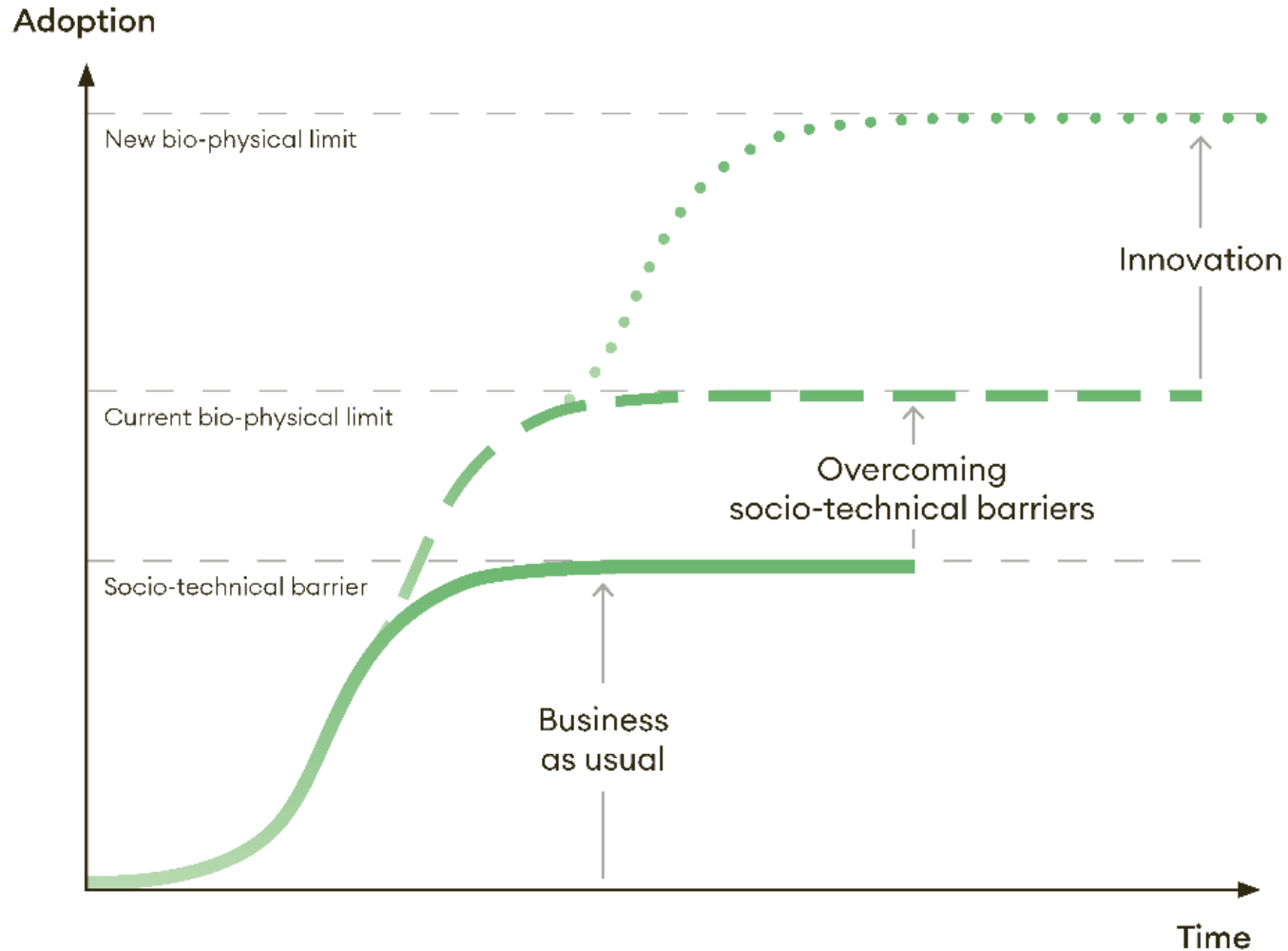


pictures and literature on demand

# There is potential for enhanced adoption

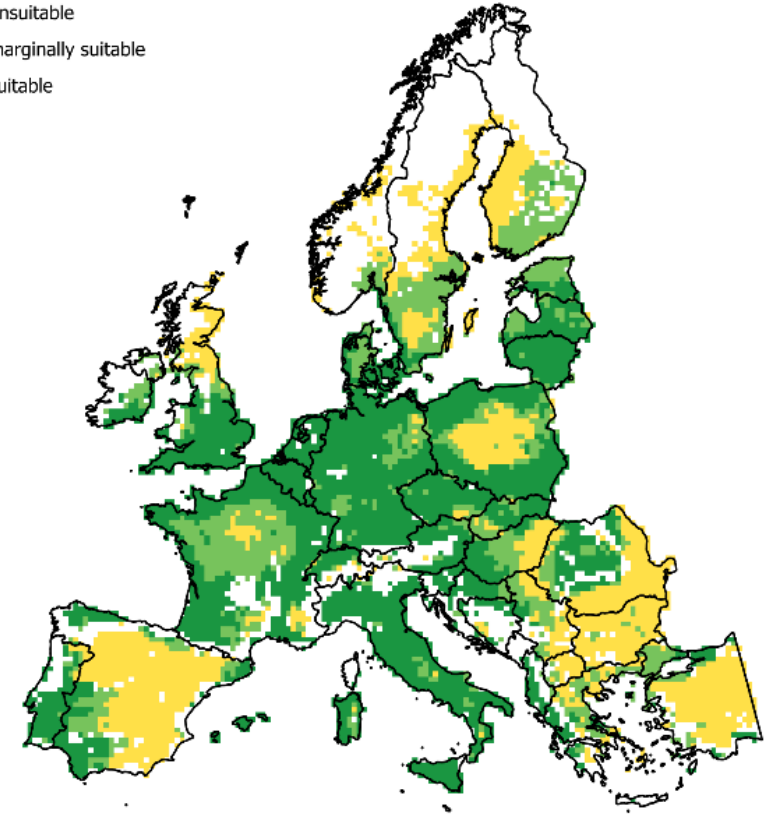


# Diffusion of innovations (and its barriers and limits)



climatic cover crop suitability

- unsuitable
- marginally suitable
- suitable



# Conclusion



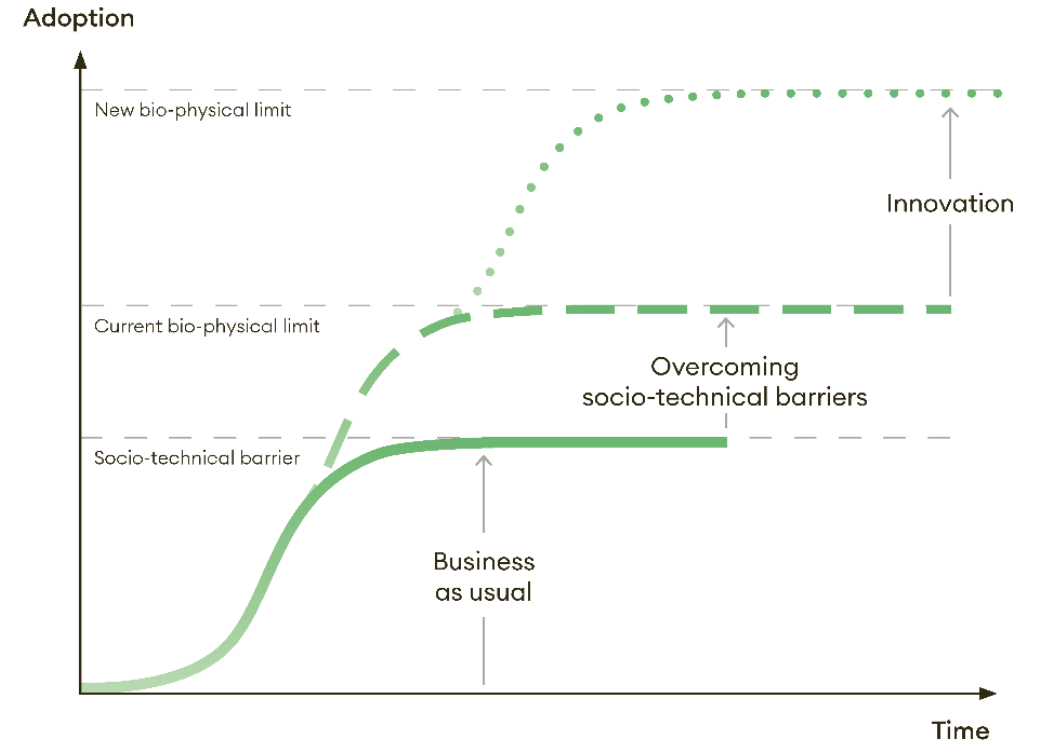
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# Tackle soil challenges by ...

1. Identifying regional soil challenges
2. Identifying promising practices
3. Evaluating synergies and trade-offs
4. Knowing the current adoption level
5. Identifying socio-technical barriers
6. Identifying bio-physical limits
- 7. Taking measures to foster adoption and/or innovation**



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# Q & A

