



eip-agri  
AGRICULTURE & INNOVATION

## Moving from source to sink in arable farming

### Which cost-effective farm management practices and tools could foster and ensure long-lasting carbon storage in arable farming, contributing to climate change mitigation?

Agriculture can significantly contribute to climate change mitigation by reducing greenhouse gas emissions and by storing carbon in plants and soils. Worldwide, soil contains about three times as much organic carbon as plants and twice as much as the atmosphere. However, arable soils, especially in the most intense cropping regions have lost much of their soil carbon. The knowledge on management practices to store carbon in soils is widespread among farmers. Still, more information is needed on the time and resources required to adopt these practices, and their impact on soil carbon storage.

The Focus Group on “Moving from source to sink in arable farming” identified the following management practices that capture CO<sup>2</sup> in agricultural soils in the long term, while improving soil quality:

- ▶ Keeping the soil covered: intercropping, cover crops, crop rotations (including perennials), agroforestry
- ▶ Increasing soil carbon by adding organic matter amendments from local sources
- ▶ Reducing organic matter decomposition by reducing soil disturbance: reduced tillage techniques and precision farming
- ▶ Controlling soil moisture by managing water use

The 20 Focus Group experts, including farmers, researchers and advisers, discussed success and fail factors for the adoption of these practices, and their transferability to different conditions. Finally they identified knowledge gaps and research needs with practical impact on the topic of the Focus Group.

The experts furthermore noted that a combination of these practices is likely to be more effective, and that the local climate would influence their effectivity. The Focus Group also considered it essential to increase awareness among farmers and consumers on the importance of capturing carbon, both to mitigate climate change and to increase soil health and fertility. To this end, the Focus Group identified possible soil carbon indicators to help assess the impact of agriculture practices on soil carbon content. Advances in remote sensing create opportunities to develop smart farming technologies to better monitor soil carbon content and further raise awareness on the impact of agricultural practices on soil carbon.

*“By increasing soil carbon content I benefit as a farmer, but so does the environment, the climate, biodiversity and the soil itself”*

- Alfred Grand (Austria), expert from the EIP-AGRI Focus Group on carbon storage in arable farming -

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## Ideas for Operational Groups

- ▶ Test and locally adapt decision support tools for farmers and advisers to assess soil C sequestration and its benefits.
- ▶ Test and locally adapt good practices of water management strategies to increase soil carbon content, especially in dry climates.
- ▶ Make crops more resilient to climate change by adapting them to rain-fed conditions.
- ▶ Find and test ways to integrate conservation agriculture with precision farming techniques and adapt these to local conditions.
- ▶ Develop and test cover crop mixtures for different farming systems and regions, assessing their impact on soil carbon and biodiversity.
- ▶ Test ways to encourage the use of local biomass by facilitating biomass exchange between farmers.

## Research needs

- ▶ Conduct life cycle assessments of local organic matter to optimise its use and analyse its effects in soil and plant fertility.
- ▶ Study the effects of biota, plant exudates, climate and farming practices on soil carbon levels.
- ▶ Analyse the value of soil organic carbon for farmers and society.
- ▶ Study the effects and benefits of associations between trees and different crops to optimise production and environmental benefits, including carbon storage.

## More ideas for Operational Groups and research needs available in the Focus Group report



### More information

<a href="#">Focus Group webpage</a>	<a href="#">EIP-AGRI brochure 'soil organic matter matters'</a>
<a href="#">Focus Group report</a>	<b>Inspirational ideas:</b>
<a href="#">EIP-AGRI video: AGRI challenge: soil fertility through carbon storage</a>	<ul style="list-style-type: none"><li>• <a href="#">Protecting soil organic carbon in Poland</a></li><li>• <a href="#">Looking after the soil to bring life and carbon back (Austria)</a></li><li>• <a href="#">Swedish organic farm leads the way in fighting climate change (Sweden)</a></li><li>• <a href="#">Increasing farm profitability while cutting carbon emissions, a toolkit developed by farmers for farmers (UK)</a></li><li>• <a href="#">Cutting atmospheric carbon: a central role for soils (France)</a></li><li>• <a href="#">Climate-friendly practices (Germany, Italy, Sweden)</a></li><li>• <a href="#">Agro-industrial waste put to good use as biofertiliser (Italy)</a></li><li>• <a href="#">A passion for permanent pasture (Portugal)</a></li></ul>
<b>Other EIP-AGRI Focus Groups</b> <ul style="list-style-type: none"><li>• <a href="#">'New forest practices for adaptation to climate change'</a></li><li>• <a href="#">'Grazing for carbon'</a></li><li>• <a href="#">Soil organic matter in Mediterranean regions'</a></li><li>• <a href="#">Agroforestry: woody vegetation</a></li></ul>	

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Register to [www.eip-agri.eu](http://www.eip-agri.eu) where you can find peers, projects, ideas and resources to catalyse innovation in agriculture, forestry and horticulture together.