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Preserving and restoring soil functioning via agroforestry

Proper soil functioning is directly linked to the organic matter content of this substrate, 58% of which is organic carbon—a food source for a wealth of diverse organisms. This carbon enables recycling and enhances the supply of essential plant nutrients. Yet a third of the world's soils are considered to be degraded. The 4 per 1000: Soils for Food Security and Climate Initiative launched at COP21 (2015) has highlighted that soils are a pivotal element of global challenges. **Various agricultural practices can restore soil fertility and functioning, including agroforestry, or associations of trees and crops.** A recent report by CIRAD and INRAE⁽¹⁾ provides an updated review on the topic: leaf litterfall and tree root turnover boost the soil carbon content, while tree roots increase the soil porosity, promote water infiltration, and

take nutrients from deep soil horizons that are inaccessible to crops and cycle them to the surface. The so-called hydraulic lift also facilitates nocturnal soil water redistribution from wet to drier horizons, which is crucial for crops, especially in drylands. The presence of trees in agricultural plots enhances soil biodiversity, including macrofauna (especially earthworms) and microfauna, such as mycorrhizae. A recent publication by CIRAD and FAO⁽²⁾ on carbon storage in agroforestry systems and its role in climate change mitigation has helped the Intergovernmental Panel on Climate Change (IPCC) take this practice into greater account. IRD, CIRAD and INRAE are currently working on the topic, particularly in the framework of the DSCATT 'Agricultural intensification and dynamics of soil carbon sequestration' in tropical and temperate farming systems project.

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For further information

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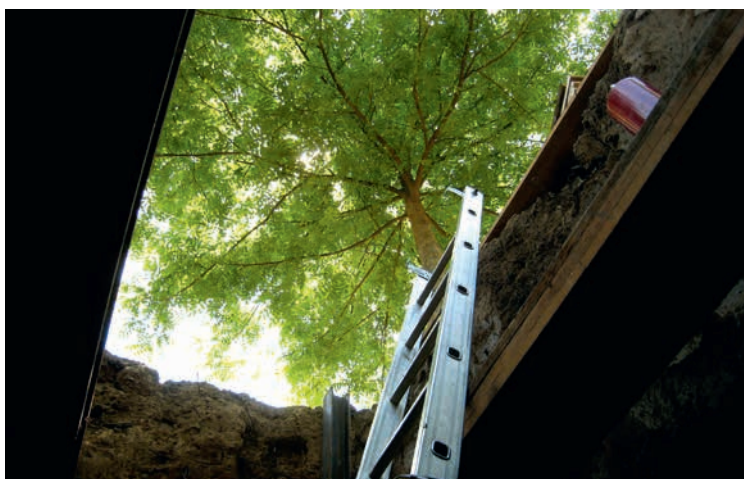
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• DSCATT Project, Soil carbon sequestration in farming systems: <https://dscatt.net/>



▲ Agroforestry system with hybrid walnut trees and durum wheat, France.

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▲ Study of soil and root profiles in a 4 m deep pit in an agroforestry system with hybrid walnut trees and durum wheat, France. © R. Cardinael/CIRAD