EDAPHOS ENGINEERING

ISO 14064-2

Carbon sequestration in soils

ISO 14064-2:2019 is an international standard for quantifying, monitoring and reporting on greenhouse gas – GHG emission reductions or removals.

Soils: main carbon sinks on a global scale

The Federal Law on Environmental Protection (EPA) defines soil as "the layer of loose soil of the earth's crust where plants can grow" (art 7, paragraph 4bis). In other words, this "layer of soil" represents the fertile part of the soil that allows vegetation to grow and flourish.

On a global scale, this fertile part of the soil stores more than 1500 billion tons of carbon. This makes it the main carbon reservoir on the planet after the hydrosphere (i.e. all the areas where water is present: oceans, lakes and rivers).

Soils therefore store more than three times more carbon than all terrestrial vegetation and can play a major role in reducing the amount of CO2 in the atmosphere.

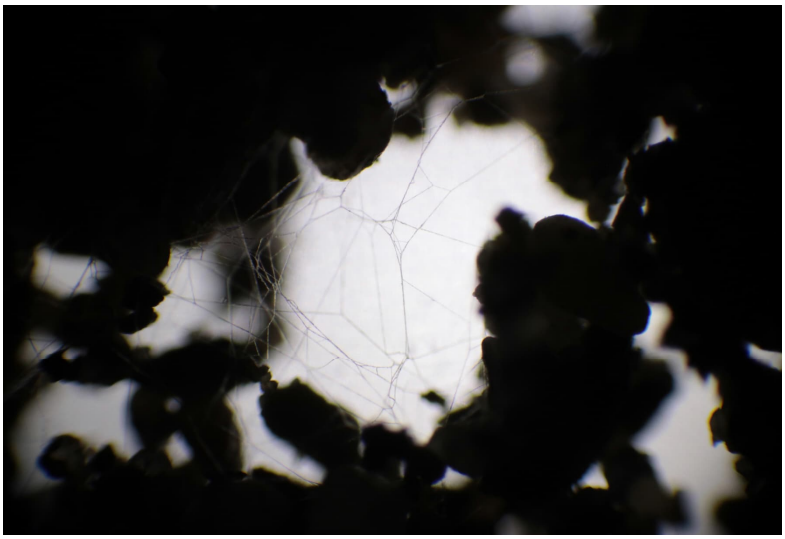
According to the IPCC report, 5 billion tons of carbon are added each year to the 800 billion tons of carbon in the atmosphere.

As a 'carbon sink', soils can thus play a major role in climate change mitigation strategies.

Soil fertility and carbon sequestration

The quality of a soil has a direct and immediate consequence on the soil's ability to store carbon.

The quality of the soil, i.e. its level of fertility, is expressed according to three principles:



- **Chemical quality of the soil.** This quality represents the state of pollution of the soil and its ability to store and deliver nutrients to plants. Healthy soil plays a key role in many environmental components.
- **Physical quality of the soil.** The physical characteristics of the soil have consequences on the ability of water and roots to infiltrate, store and release over time.
- **Biological soil quality.** Biological quality represents the diversity and dynamism of the living compartment of the soil. Soil biodiversity is essential to ensure long-term fertility and carbon storage.

Improving the biological quality of the soil can increase soil fertility in the short, medium and long term. This phase of improvement necessarily involves the regeneration and/or restoration of the living compartment of the soil and particularly of microorganisms, invisible workers but with a fundamental role in maintaining a healthy soil.

Principle of biological carbon sequestration

Biological carbon sequestration refers to a positive environmental externality induced by the improvement of the biological quality of a soil.

Specific engineering processes known as "soil engineering" or "biological engineering" are used to strengthen certain living organisms in the soil in a targeted manner.

In particular, the strengthening of certain bacteria and fungi makes it possible to create a virtuous circle that quickly transforms a soil that is not or not very fertile into a qualitative and functional soil.

The mechanisms of carbon sequestration in the soil respond to complex dynamics. Under the action of living organisms, the organic particles in the soil will tend to "aggregate" with the mineral particles to form "organo-mineral aggregates". This aggregation phenomenon leads to a stabilization of the carbon contained in the organic matter because the latter is then "sequestered" in contact with mineral particles, especially clay particles.

Sequestration mechanisms of carbon in the soil

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Restoration of degraded soils and sequestration of carbon in soils in Switzerland and Europe

Edaphos Engineering's projects are carried out entirely in Switzerland or Europe in urban, industrial or agricultural areas on poor or degraded soils.

Soil revitalization projects not only create and strengthen the intrinsic capacity of soils to be carbon sinks, but also restore soils to their ancillary environmental functions: improvement of the water cycle, capacity to support vegetation, ecological functions and biodiversity.

Soil is a non-renewable resource, yet it is subject to continuous degradation. The projects carried out in Switzerland thus contribute to the implementation of sustainable and integrated management of the valuable soil resource in the territory and as close as possible to the emission centres.

Edaphos Engineering's approach is part of the Swiss Soil Strategy (2020), which has the general objective of restoring and recovering degraded soils wherever possible.

The calculation of project emissions, sequestration and measurement methods for sequestration projects are carried out in accordance with international rules and requirements in this area, with control and certification by an independent external body.

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