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## SOIL CARBON SEQUESTRATION

*Soil carbon sequestration* happens when plants capture and store, or “sequester,” atmospheric carbon dioxide (CO<sub>2</sub>) in the soil, increasing the quantity of soil carbon stocks. Carbon dioxide is the primary greenhouse gasses (GHG) emitted through human activities, for this reason sequestering carbon in the soil could contribute to climate mitigation goals.

Carbon sequestration and maintenance in soils can improve climate resilience, considering that plants can cope with a healthy quantity of Soil Organic Carbon (SOC). SOC is crucial to soil health, fertility, ecosystem services, and food production.

Agriculture heavily contributes to climate change since it represents one of the most important anthropogenic activities responsible for CO<sub>2</sub> emissions. However, carbon may be removed from the atmosphere through soil rehabilitation in agricultural soils. Sustainable Soil Management (SSM) practices can mitigate the effect of climate change by reducing emissions from agriculture and other sources and by storing carbon in plant biomass and soils.

Thanks to the integrated use of data produced by earth observation (ref. EO) systems and field surveys (including through IOT - Internet of Things - sensors), it is possible to build advanced systems for monitoring and measuring soil organic carbon storage. This information can be related to specific agronomic practices for the various crop cycles practised by the farmer, evaluating the overall performance of the agricultural production carried out.

For each certified unit of organic carbon stored in the soil, the process of generating agricultural or soil-based carbon credits can be activated. This credit can be sold to any other entity that wishes to offset its own emissions, thus creating shared social value distributed through the value chain.

**UpToEarth** has developed a series of services to monitor, certify and encourage carbon sequestration in agricultural soils through the use of high resolution multispectral EO time series processed by software algorithms based on advanced machine learning techniques. Through its projects and activities UpToEarth aims to restore soil structures through sustainable land management in order to lock more carbon in soils and biomass.