



Soils and carbon credits in agriculture

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Biography :

Holder of an agronomist diploma specialized in agricultural development, Charlotte joined INRA in February 2018 as scientific officer of the research program of the "4 per 1000" initiative. The global initiative "4 per 1000: Soils for Food Security and Climate" of the Lima-Paris Action Agenda, was launched during COP21 in December 2015. It includes both an action plan and a research program, in order to increase food security, mitigate and adapt to climate change. In this position, Charlotte is in charge of the coordination of the research program through its four pillars (1. Estimating the potential. 2. Developing practices. 3. Defining and strengthening the enabling environment. 4. Monitoring, reporting and verification) and participates in consolidating and developing research actions of organizations and networks in connection with soil and climate issues.

Abstract :

Carbon is the main constituent of soil organic matter (over 58%). It plays a major role in maintaining and improving soil fertility and quality, as well as providing many ecosystem services. Although nearly half of agricultural soils are degraded, resulting in a potential loss of an important agricultural production, soil carbon sequestration represents an important hope in mitigating and adapting to climate change. Since global organic carbon stocks in soils are two to three times higher than in the atmosphere, small changes in these stocks are likely to have a major impact on the concentration of carbon dioxide in the atmosphere. 1.4 billion metric tons of carbon (Gt C) could be stored annually in agricultural soils, equivalent to an annual storage rate slightly above 0.4 % (rationale for the "4 per 1000" initiative) in top soil^{1,2,3}.

In order to encourage and promote actions aimed at reducing the concentration of greenhouse gases and increase the storage of carbon in soils, particularly in agricultural soils, a thinking on voluntary carbon credits can be conducted. Carbon credits are created by farmers implementing virtuous farming practices for carbon storage in the soil. Thanks to a method of quantification of carbon stored in the soil, a certification then permits to exchange these created credits with companies wishing to offset their emissions. Some examples of implementing carbon credits in the agricultural land sector have already emerged.

¹ Jean François Soussana and others, 'Matching Policy and Science: Rationale for the "4 per 1000 - Soils for Food Security and Climate" Initiative', *Soil and Tillage Research*, 2017, 0–1 <<https://doi.org/10.1016/j.still.2017.12.002>>.

² IPCC, *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (Eds.)]* (Geneva, Switzerland, 2007) <<https://doi.org/10.1256/004316502320517344>>.

³ IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K Pachauri and L.A. Meyer (Eds.)]* (Geneva, Switzerland, 2014) <<https://doi.org/10.1017/CBO9781107415324>>.