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Assessing the economic impact of the co-benefits of increasing Soil Organic Matter with carbon farming

Author

Andrea Ferrarini, *Università Cattolica del Sacro Cuore (UCSC)*

Key messages

Key messages of the discussions held within the Focus Group 1.2 are:

- There is no scientific consensus on the quantitative economic benefit of Soil Organic Matter (SOM) increase obtained with carbon farming (CF) due to lack of scientific targeted evaluations (confusing terminology of which are these co-benefits, wrong endpoint of evaluation and indicators measured, most of existing soil and farm data collected cannot be converted into a real economic value).
- There are no available accounting frameworks to quantify the economic value of SOM that can be easily adopted by CF operators and especially that can be considered applicable within the context of the Carbon Removals and Carbon Farming (CRCF) Regulation.
- A clear distinction must be made between co-benefits to be reported with CRCF (e.g., water quality) which have a societal value and the private ones for farm profitability (e.g., irrigation savings). The latter are vital since the return on investment (ROI) value of CF increases and becomes a top reason for farmers in participating in CF programs if the farm profits of SOM increase are supported by quantitative evaluations.
- In addition to the minimum sustainability criteria requirements, to ensure CF delivers sustainability benefits, the CRCF shall be connected with soil health directive. Related to this, a statement in CRCF should emerge whether the soil health co-benefits need to be monitored

and reported as mandatory or voluntary and especially who does that (program developer or farmers) and how (qualitatively or quantitatively).

Introduction

Carbon (C) sequestration value and the profits generated for farmers from C credit markets are often considered the only benefits of adopting carbon farming. For every ton of C sequestered in the soil there are almost 2 tons of Soil Organic Matter (SOM) that are built-up and support the farm profitability. However, rarely agronomic benefits of SOM or societal benefits as ecosystem services are quantified in economic terms to support the hidden potential of carbon farming. Decarbonization solutions in agriculture are often C-centred and they underestimate the financial payoff value of SOM increase.

When SOM-co-benefits are calculated as estimated productivity improvement, nutrient replacement value, or reduced fuel consumption for soil tillage, the return on investment (ROI) value of carbon farming increases and becomes a top reason for farmers participating in carbon programs. If well understood and declined, this concept might help certification methodologies validated by the Carbon Removals and Carbon Farming (CRCF) Certification Framework also support soil health business models and embrace ecosystem markets and contemporary help track on-farm the ROI of investing in soil health promoted by Carbon Farming (CF) adoption.

In this regard, we have to distinguish between co-benefits to be reported with CRCF (e.g., N_2O emission reduction due to minimum tillage) which have a societal value and the private ones for farm profitability (e.g., fertilizers and fuel savings). These are models in which carbon farmers become regenerative farmers and can be paid for the non-marketed services, the additional co-benefits, they generate (i.e., more economic value to the certified carbon removals). Ecosystem markets turn carbon farming practices into commodities, which gives farmers more profit and empowers them into the decarbonization roadmap. The discussion of this Focus Group centred on identifying which evidence (academic and on-farm research) and accounting methodologies are available in soil health economics to support CF program advisory services and CRCF voluntary co-benefits reporting and verification.

Regulatory framework

Assessing the economics of soil health is the way forward to provide a real and profitable option for farmers to 1) first understand the **real farm ROI of adopting CF**, 2) decide to be part of the decarbonization journey in agriculture and for this be rewarded with C or ecosystem markets. Data and accounting methods on soil health economics might also help **CF program developers** to deliver those missing advisory services when, in the enrollment phase, *ex-ante* estimations of C removals are translated into result-based metrics/payments such as €/ton CO_2.

The practice-based effect on the economics of SOM co-benefits is a missing advisory service within many CF programs. Wordy sentences such as "*this practice improves overall soil health, leading to better XX and reduced YYY*" are often heard, with *XX* and *YY* co-benefits never translated into monetary terms. Assigning euro values to soil health metrics can vary greatly and there is not a clear common accounting methodology and expertise on this topic. This hampers the ability to talk with farmers and provide quantitative evaluation of soil health ROI if CF is adopted.

A paradigm shift in soil health economics is raised by this FG. A farm-centred and scientifically sound **joint research effort** between agronomists, farm advisors, farmers, agricultural economists is needed to bridge the gap between soil health measures and the short- and long- term ROI of increasing SOM with CF. Furthermore, this would help address the private vs societal value issue when within CRCF a CF program developer needs to monitor and report mandatory or voluntary co-benefits.

Recommendations

If CF is adopted, soil health makes sense, but does it boost profits for farmers and/or to whom else? Starting from this sentence the Focus Group has identified the following recommendations.

Recommendation 1

More holistic and pragmatic on-farm experiences must emerge and be shared. It would be beneficial to kickstart a joint applied research effort around the “additional” soil health ROI generated by implementing CF. To achieve that, new private or public funding calls could facilitate the gathering of farm data, link indicators with measurable co-benefits, and support the economic quantification of co-benefits generated by CF. A common knowledge and database would support the farmers (e.g., via dedicated EU or local advisory networks), CF program developers and investors in raising awareness and start considering in a quantitative way the soil health ROI beyond the C certificates value.

When **robust practice-based and context-specific evidence** is available, local actors can translate them into specific recommendations and contribute to build new rewarding mechanisms (offsetting, insetting) and public policy instruments. This process might lead to turning this evidence into new ecosystem markets or simply be a game changer for farmers to start considering shifting to CF. This is a key step within a CF program when in the enrollment phase are discussed which and why CF practices are going to be adopted.

Recommendation 2 (reinforcing the one provided by another CREDIBLE policy brief [1])

There is a need for the **CRCF to include soil health-related sustainability criteria** or integrate them in new or existing financing and certification mechanisms that enable soil health impacts monitoring. This would facilitate ecosystem market demand and make schemes more financially attractive for farmers. In its current conception, CF program developers are asked to monitor and report the mandatory soil health co-benefits, but cost of sampling and analysis need to be financed. Promoting the integration of soil health directive monitoring systems within CRCF in a simple but pragmatic way could support actors in obtaining the relevant data. It is important that the CRCF will clearly state if soil health co-benefits need to be reported as mandatory or voluntary, and how. If this happens, then a **cost-efficient soil health co-benefit accounting approach** needs to be drafted to support the on-farm monitoring and reporting of these co-benefits by the farmers, any advisor or by the project developer itself. The continuous dialogue happening within this Focus Group could contribute to drafting this accounting framework.

Background information

Assigning euro values to soil health metrics can vary greatly. The two ways to view soil health economics: a) the impact of the CF/soil health practices in reducing operating expenses; b) the effect on improving the soil's biological, physical, and chemical attributes (namely the soil functions/processes that can be measured with a soil health indicator). Some potential simple approaches to estimate SOM-co-benefits are estimated productivity improvement, economic costs of erosion, value of a ton of topsoil, value of nutrients (nutrient replacement value, nitrogen losses and efficiency, value potentially nutrient available in SOM build up) or reduced fuel consumption for soil tillage.

[1] McDonald et al. (2024) *Ensuring carbon farming delivers sustainability benefits Recommendations for carbon farming certification methodologies. Ecologic Institute.* https://www.ecologic.eu/19889

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