Collection of Practice Abstracts

C5

carbon cycle

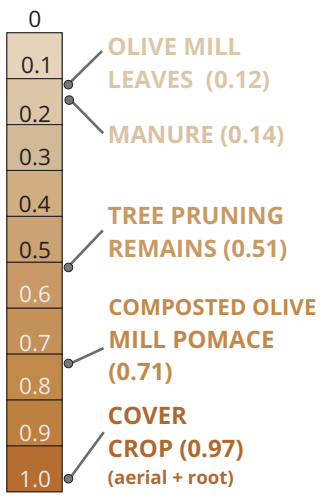
A CARBON-DEPENDENT FUTURE

THE RESULTS OF SUSTAINOLIVE

SUSTAINOLIVE.EU

MAIN SOURCES OF ORGANIC CARBON

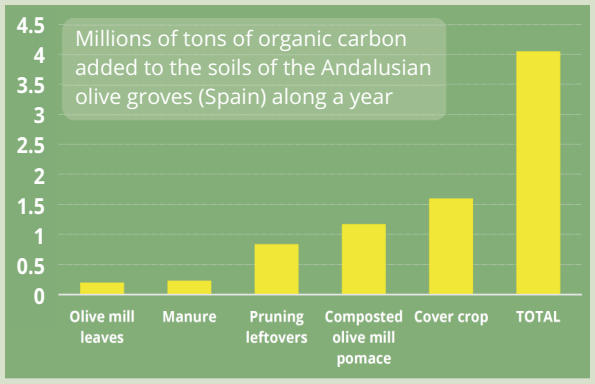
Let's see the amount of organic carbon (as tons per hectare) that different types of plant residues and organic matter amendments could contribute to the soil.



Annual values for 12 Spanish olive farms studied in SUSTAINOLIVE that apply management practices which boost soil organic carbon accumulation. The contributions per hectare range from 120 kg of organic carbon for the olive mill leaves to circa one ton for the cover crop.

THE POTENTIAL

What would happen if the sources of organic matter in the image above were added to all the about 1.6 millions hectares covered by olive groves in Andalusia?



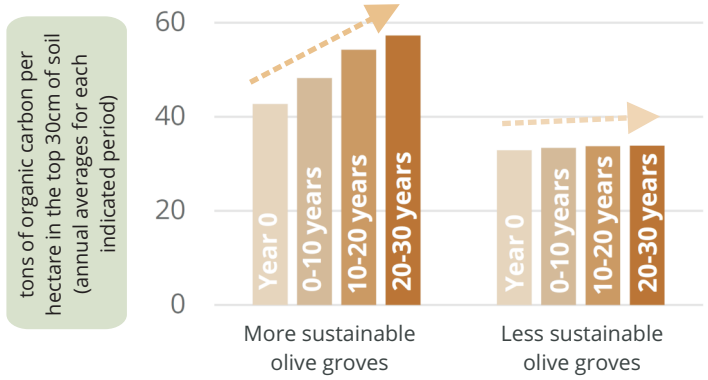
TIME FOR REFLECTION

If all Andalusian olive groves took **full advantage of the different sources of organic matter available** (mostly free sources of nutrients and many microelements), their soils could **capture an amount of CO_2 equivalent up to about 7% of CO_2 emissions released in the entire region of Andalusia during year 2019.**

THE GOOD PRACTICES

In SUSTAINOLIVE we have compared the forecasts in the evolution of soil organic carbon contents of 12 pairs of olive groves in Spain. For each pair, one olive grove was managed using different sources of organic matter (shredded tree pruning, composted olive mill pomace, remains of herbaceous cover, manure, olive mill leaves...) while the other did not or did so at a very small scale. Let´s check the results:

extra info

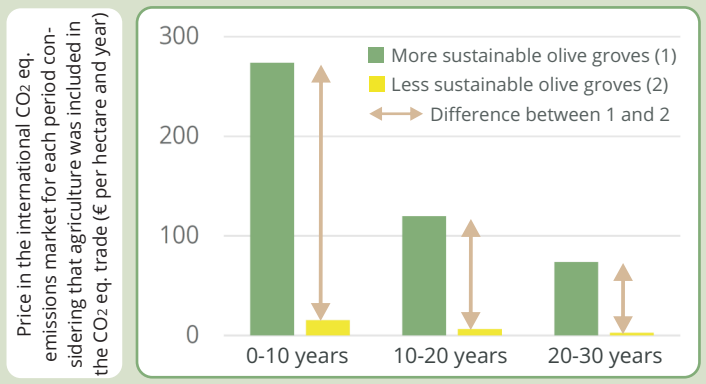


After 30 years, **soil organic carbon is forecasted to be 55% higher in the olive groves applying organic matter to the soils** (53 tons per hectare) compared to the control business-as-usual ones (34 tons per hectare).

While the most sustainable olive groves are forecasted to show a **growing trend of organic carbon accumulation in the soil and increased their initial carbon stocks by 34%**, carbon in the soils of the least sustainable olive groves will barely improved.

THINKING AHEAD

To what extent olive farmers who progressively improve the content of soil organic carbon would benefit once agriculture is considered in the international CO_2 emissions market ?



SOME OLIVE FARMERS WILL EARN SOME MONEY

The least sustainable olive groves were forecasted to maintain, on average, a positive balance in their annual income per hectare, although this would overall be very low (between €15 in the first decade to €2.5 in the second one). This is a result of their limited capacity to capture and retain CO_2. Nothing comparable to the expected income for farmers who make the most of the available sources of organic matter, which would end up earning from €258 to €71 per hectare and year in the same periods. In other words, **the most sustainable olive groves could expect an average annual income per hectare that would be €150 higher than that of the least sustainable ones.**

BUT OTHERS WILL HAVE TO PAY

Farmers in some of our experimental olive groves do not add any type of organic matter to the soil. In these cases, our model forecasts a progressive reduction in soil organic carbon levels (an average of 14% for the next 10 years), which entails **a positive net emission of CO_2 into the atmosphere**. This could potentially translate into an **annual payment of almost €200 per hectare** for each farmer during the abovementioned period.

KEEP IN MIND THAT...

olive farmers can count with multiple sources of organic matter to improve the carbon stocks of their farm soils in the medium to longer term. The progressive enrichment of soil organic carbon involves both significant ecological and economical benefits. **It is therefore a win-win strategy.**

extra info

PRIMA PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

Co-funded by the Horizon 2020 Framework Programme of the European Union

This project is part of the PRIMA program supported by the European Union

SUSTAINOLIVE: Novel approaches to promote the sustainability of olive cultivation in the Mediterranean. Research project 2019-2023
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