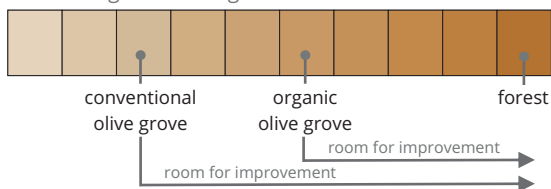




## AN INSUFFICIENT STOCK

It is common for conventional olive groves to find soil organic matter contents below 1.5%, a figure that contrasts with the 2-3% that are usually measured in soils of organic olive groves.

Increasing scale of organic matter content in the soil



## IN ADDITION...

the increase in temperatures forecasted under the different climate change scenarios may probably drive towards higher decomposition rates of soil organic matter, reducing soil organic carbon contents (SOC). Thus, **olive farmers should immediately begin to implement nature-based agronomic practices that improve the current levels of organic matter in their soils.** The sooner they act, the better prepared they will be to be competitive and resilient in a warmer future.

[extra info](#)

## DID YOU KNOW THAT...

achieving a long-term increase of 1% in the organic matter content of an olive grove soil (with an apparent density of 1.4 grams per cubic centimeter) would be equivalent to **adding circa 60 tons of organic carbon per hectare** in the 20 top centimeters of soils? Thus increasing the levels of SOC ought to be considered as a **long-distance race.**

## A GREAT INITIATIVE



It has been estimated that annual carbon emissions to the atmosphere (9891 million tons in 2021) are equivalent to about 4% (0.4%) of the amount of carbon stored in the worldwide soils. **The 4% initiative**, launched by the French government during the COP 21 in Paris, **proposes to annually increase the amount of carbon in agricultural and forest soils by the same percentage, with the intention of "compensating" for the anthropogenic greenhouse emissions.**

[extra info](#)

## carbon cycle

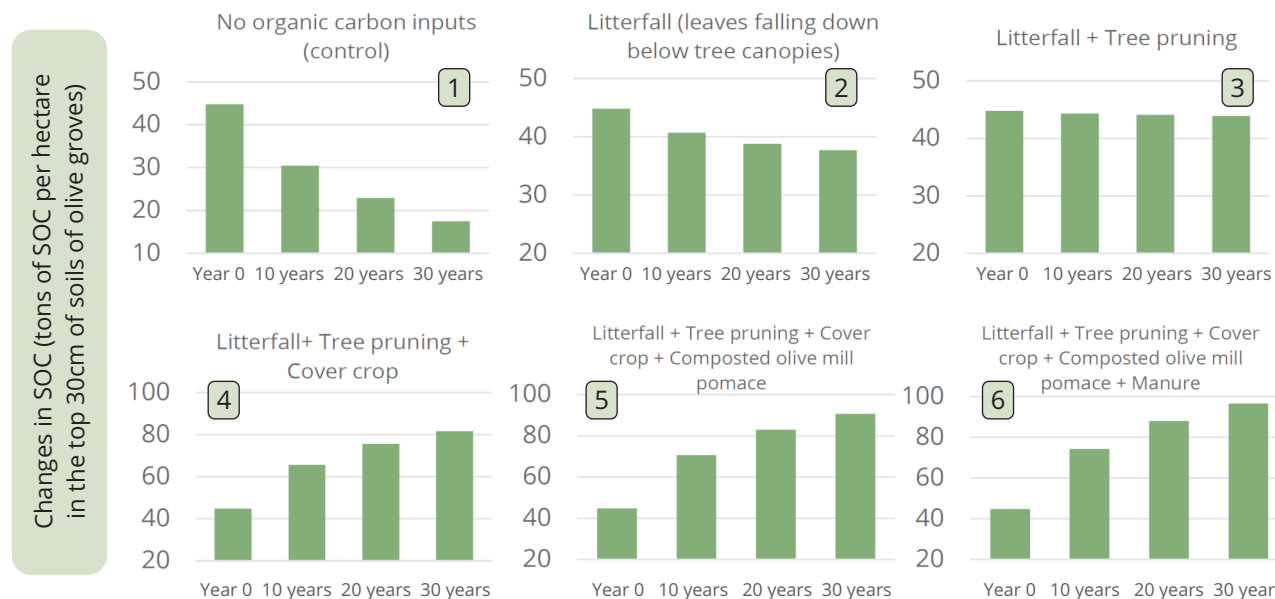
# ADDING UP TO THE CARBON TO THE SOIL



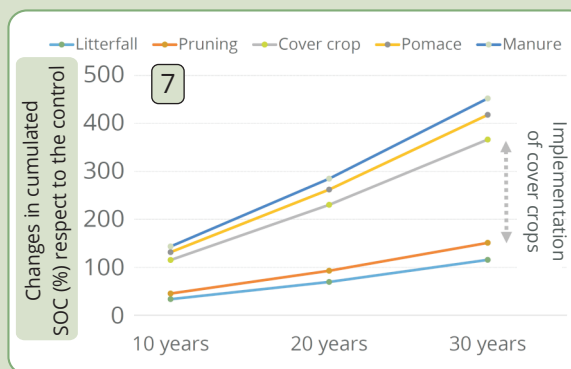
## THE RESULTS OF SUSTAINOLIVE

SUSTAINOLIVE.EU

### HOW TO INCREASE THE LEVELS OF ORGANIC CARBON: EVERY DETAIL ADDS UP

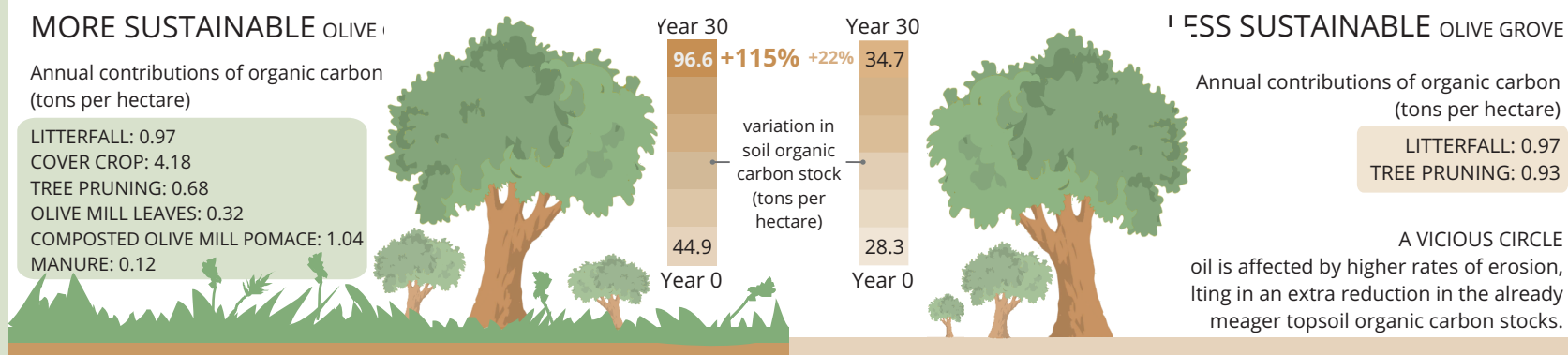


Note that carbon entries in the graphics above were all obtained from a single experimental olive grove, and thus they might vary across different olive groves



When the soil does not receive any organic carbon amendment other than litterfall (graph 2), SOC drops to 80% of its initial rate after 30 years. If tree pruning is shredded and applied to the soil along with litterfall, carbon loss is reduced circa 2% (graph 3). The presence of spontaneous cover crops (which was particularly high in this olive grove) is the factor that contributes most to increase the stocks of SOC in the long-term: up to 50% with respect to the initial levels (graphs 4 and 7). This positive effect is mainly, but not exclusively, due to the carbon in cover crops which was absorbed from atmospheric CO<sub>2</sub> ends stored in the soil once the cover crops wastes have been cleared and then spread. Finally, the application of composted olive mill pomace (graph 5) and manure (graph 6) would continue to improve further SOC levels, although in a less significant proportion than the herbaceous cover (graph 7). It is important to mention that litterfall, tree pruning, cover crops and composted olive mill pomace are sources of organic carbon that can all be produced within the olive grove. Therefore, by applying these management practices, olive farmers not only enrich their soils with organic matter but also significantly contribute to climate change mitigation by transferring atmospheric CO<sub>2</sub> to SOC.

### What changes can be expected when we compare our sustainable olive grove with another one that keeps the soil barren and thus, with limited organic carbon inputs?



### REALISTIC?

In our example, the annual application of 430 kg of manure and 3400 kg of composted olive mill pomace per hectare would improve the level of SOC by 18% over a period of 30 years. Therefore, **the 4% initiative does not seem overly ambitious.** In fact, the image above shows how the single continuous application of shredded tree pruning in the least sustainable olive grove (2600 kg per hectare and year) during 30 years would increase the soil organic carbon pool by 22%. **Thus, it is now only up for the farmers and other governance agents to act accordingly.**