Collection of Practice Abstracts

C3

carbon cycle

THE CARBON FOOTPRINT

THE RESULTS OF SUSTAINOLIVE

SUSTAINOLIVE.EU

THE CONCEPT

CARBON FOOTPRINT measures the capacity of any given activity to **release greenhouse gases** (GHGs) and, consequently, to **contribute to climate change**.

It considers both **direct and indirect GHGs emissions**. GHG from olive groves to be considered include those emitted directly through the combustion of diesel or electrical power spent by agricultural machinery and also those indirectly released through manufacturing of fertilizers and pesticides that are used.

ONE REMARK

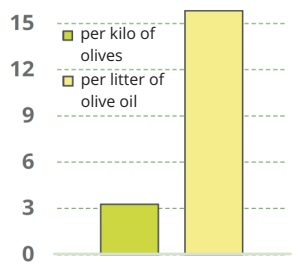
Despite of other GHG molecules (methane, nitrogen oxides, etcetera) having a much greater GHG effect than carbon dioxide (CO_2), the global ammount of CO_2 released turns it into the GHG contributing most to climate change.

SOURCE OR SINK

Carbon flows produced in olive groves are key factors in the capacity of these farming systems to capture or release CO_2. The **management solutions** implemented will largely determine the magnitude of such flows.

When an olive grove releases more GHGs (mainly CO_2) than it captures and stores, it behaves as a net **SOURCE of CO_2**, accelerating climate change. On the contrary, when it stores more CO_2 than it releases, it behaves as a net **SINK of CO_2**, helping mitigate climate change.

Future agricultural policies from the EU shall reward olive groves that act as CO_2 sinks, and penalize those that behave as net CO_2 contributors.



kilograms of CO_2 captured per hectare and year (more sustainable olive grove)

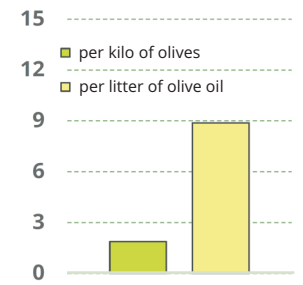
Carbon inputs onto the agroecosystem

Carbon re-entries onto the agroecosystem

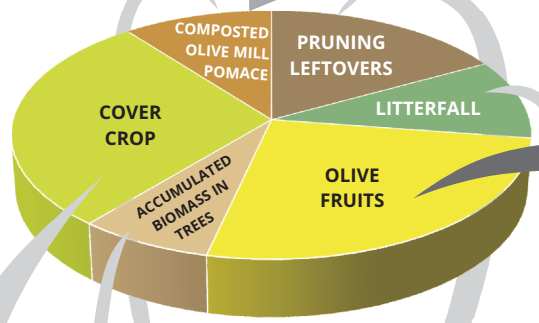
Carbon outputs from the agroecosystem

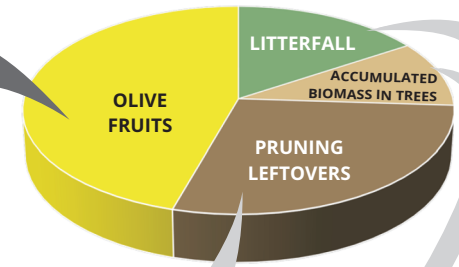
Comparative diagram of the main carbon flows in two experimental olive groves of SUSTAINOLIVE in Spain

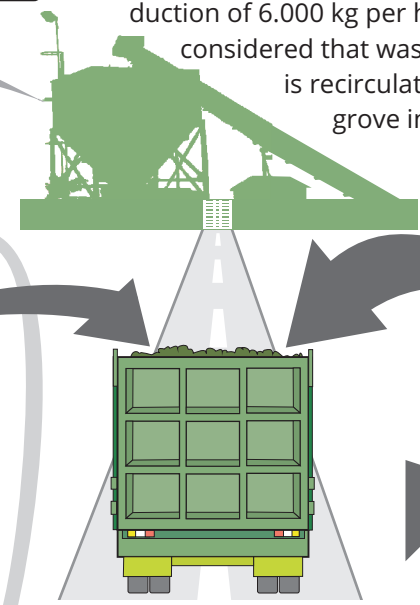
Carbon flows related to the amendment of olive mill pomace have been estimated by an olive production of 6.000 kg per hectare. Also, it has been considered that waste from harvested olives is recirculated within the same olive grove in the form of composted olive mill pomace.

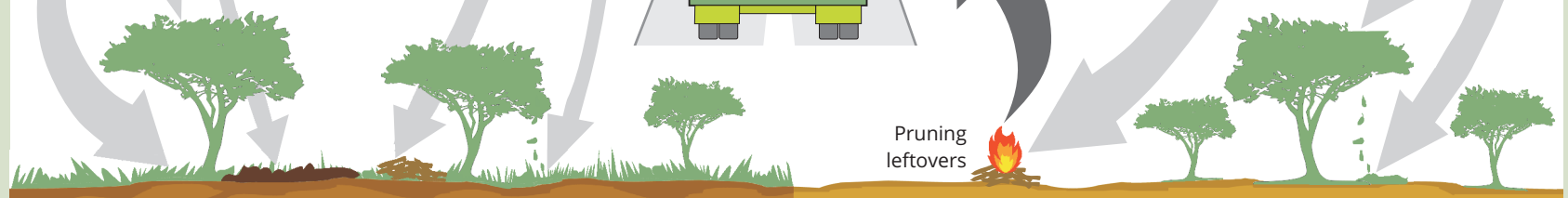


kilograms of CO_2 captured per hectare and year (less sustainable olive grove)







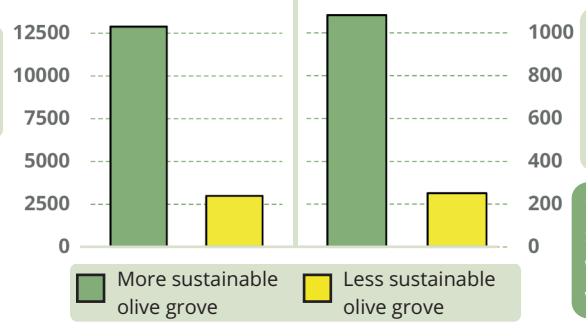


OLIVE GROVE **IMPLEMENTING SUSTAINABLE MANAGEMENT PRACTICES**

OLIVE GROVE **NOT IMPLEMENTING SUSTAINABLE MANAGEMENT PRACTICES**

Net balance between CO_2 inputs and outputs (expressed as kilograms of CO_2 captured per hectare and year)

The olive grove applying sustainable technological solutions annually captures **up to 10 tons more CO_2** per hectare than the one that do not apply them.

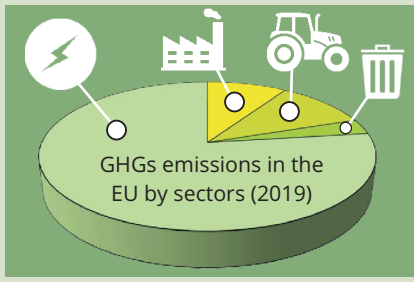


Euros per hectare that the farmer would receive if the CO_2 captured by the olive grove were listed on the international emissions market (reference price of €84 per ton as of January 2022)

Olive farmers applying sustainable technological solutions **would earn circa €1.080** per hectare whilst those applying conventional practices would only receive around **€250** per hectare.

The reader should consider that this scheme represents a simplified version of the complete carbon footprint of an olive grove, since some key carbon flows (decomposition of plant cover debris, pruning wastes and composted olive mill pomaces, as well as soil respiration and soil erosion) have not been considered.

KEEP IN MIND THAT...



In the EU, the agricultural sector is second in terms of net contributions to climate change (accounting for circa **11% of total GHGs emissions**), only surpassed by energy production.

Much of the impact of the agricultural sector to climate change could be offset through the implementation of better management practices and sustainable technological solutions. This can be exemplified for olive groves: assuming that the 2.5 million tons of pruning waste that are generated annually in Andalusian olive groves were burned entirely, this would result in the **release to the athmosphere of 4.22 million tons of CO_2**, which would be the equivalent of a **36% of the emissions of the entire Spanish agricultural, livestock and fishing sectors** along 2020. And that´s only considering the leftovers of pruning !!

extra info

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