How to make carbon farming a success for climate, environment and farmers?

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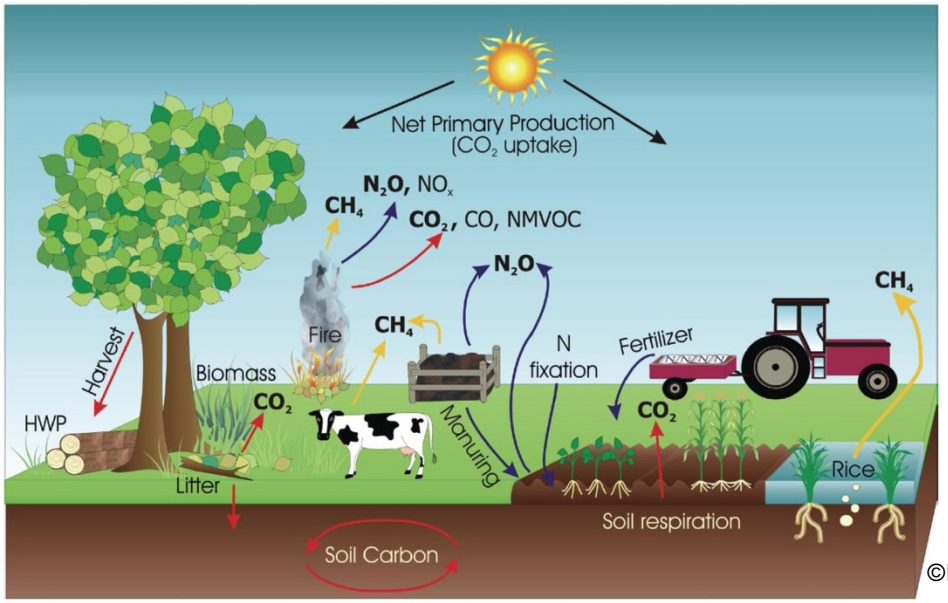
Carbon farming = managing carbon pools, flows and greenhouse gases at farm level to mitigate climate change



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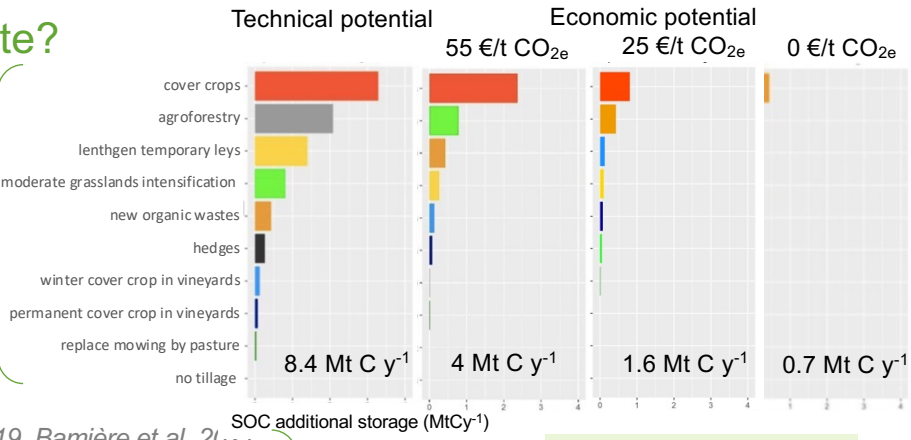
Success for climate?

Diversity of options



Incentives needed

France *Pellerin et al. 2019, Bamière et al. 2021*

31 Mt CO_2e y^{-1} in 2030
41% French agricultural emissions

European Union *Lugato et al. 2014*

23.1 - 57.9 Mt CO2 eq. yr^{-1} by 2050
5 to 12.5% of 2019 EU agricultural emissions

Large technical potential

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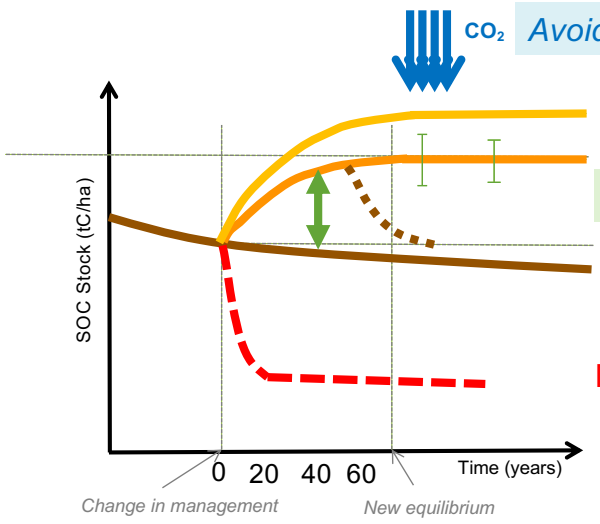
Success for climate ?



Avoid leakage

Managt C
Managt B

Quantify additional SOC storage, MRV

Managt A

Ensure permanence

Managt D

Protect existing C stocks

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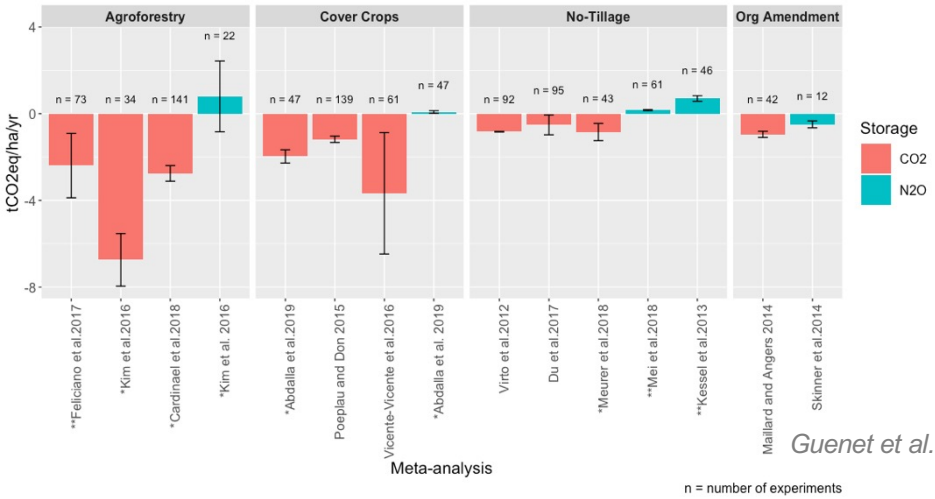
Success for climate?

Establish a full GHG balance, at the plot scale (& whole suite of technical operations)

Additional SOC storage, additional N_2O emisions when implementing management options (in CO_{2eq})



Guenet et al. 2020, GCB

Success for the environment?

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Soil organic matter contributes to ecosystem services & biodiversity

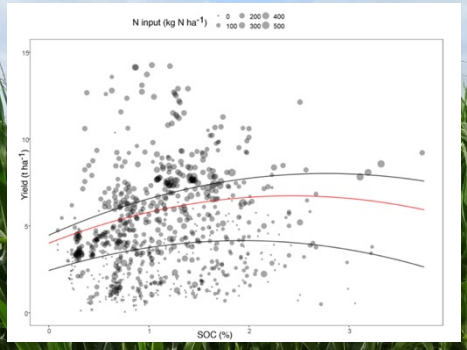
Water?

Nutrients?

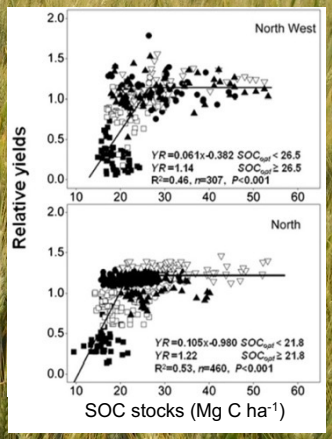
Biodiversity?

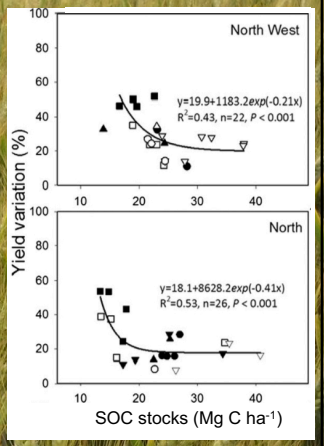
Address trade-offs. Protect natural resources

Success for farmers?



Oldfield et al. 2019





Zhang et al. 2016

Improve evaluation of « co-benefits »

Carbon farming has the potential to be a success for climate, environment and farmers

- Integrative view : not only carbon ! Leakage, trade-offs, systems change
- Results-based schemes: strengths, reduce uncertainty and costs
- Farmers are the stewards : co-construction, fair and functional tools

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