



EP Intergroup Climate Change,  
Biodiversity & Sustainable Development

## Nature-based solutions to increase carbon sinks on land

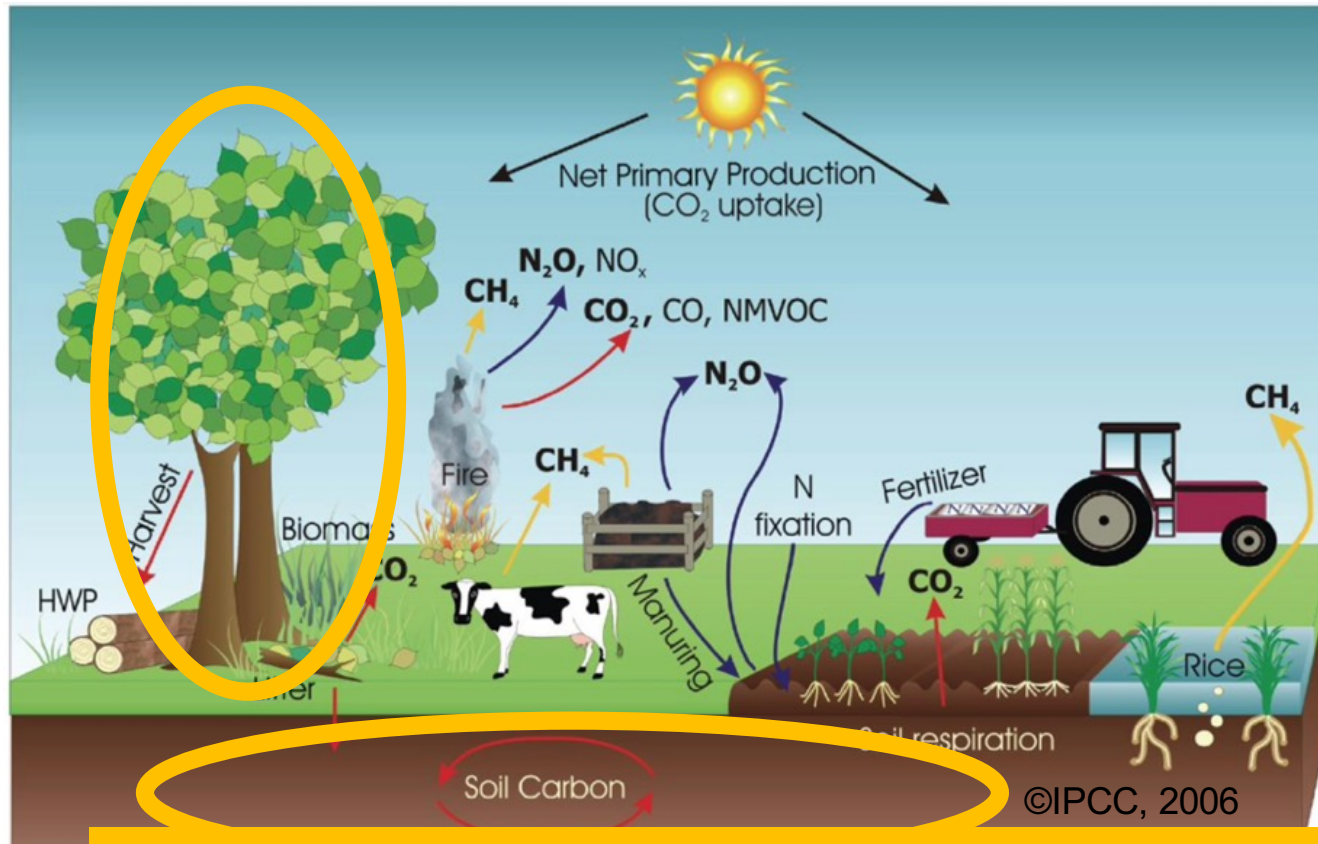
European Parliament, Brussels Sept 21th 2023

# How to make nature-based solutions for carbon removal on land a success for climate, environment and farmers?

Claire Chenu  
INRAE – AgroParisTech  
claire.chenu@inrae.fr



## Nature-based solutions for C removal on land



Sequestration :  
net uptake of  
atmospheric  
CO<sub>2</sub>

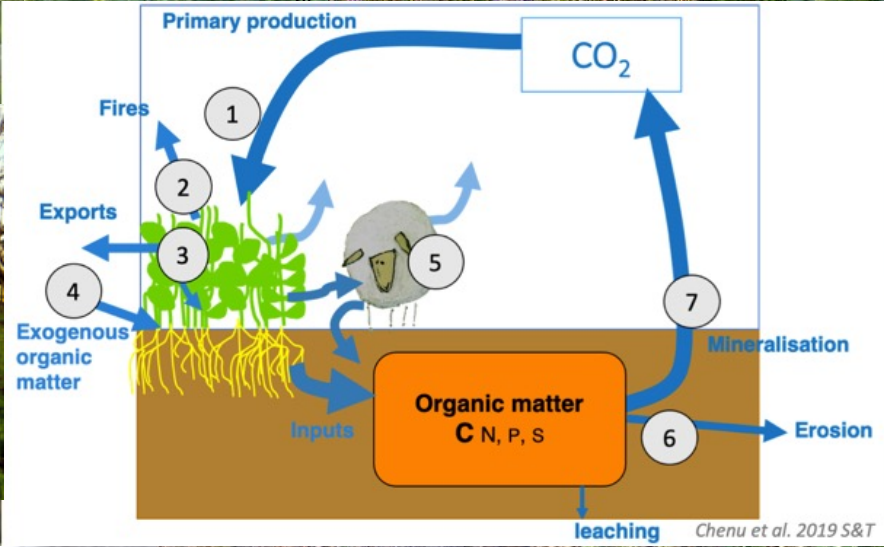
*Olson et al. 2014*

Preserving and increasing:

- tree biomass (afforestation, agroforestry, hedges)
- soil organic carbon stocks

A success for climate?

# Management options are identified

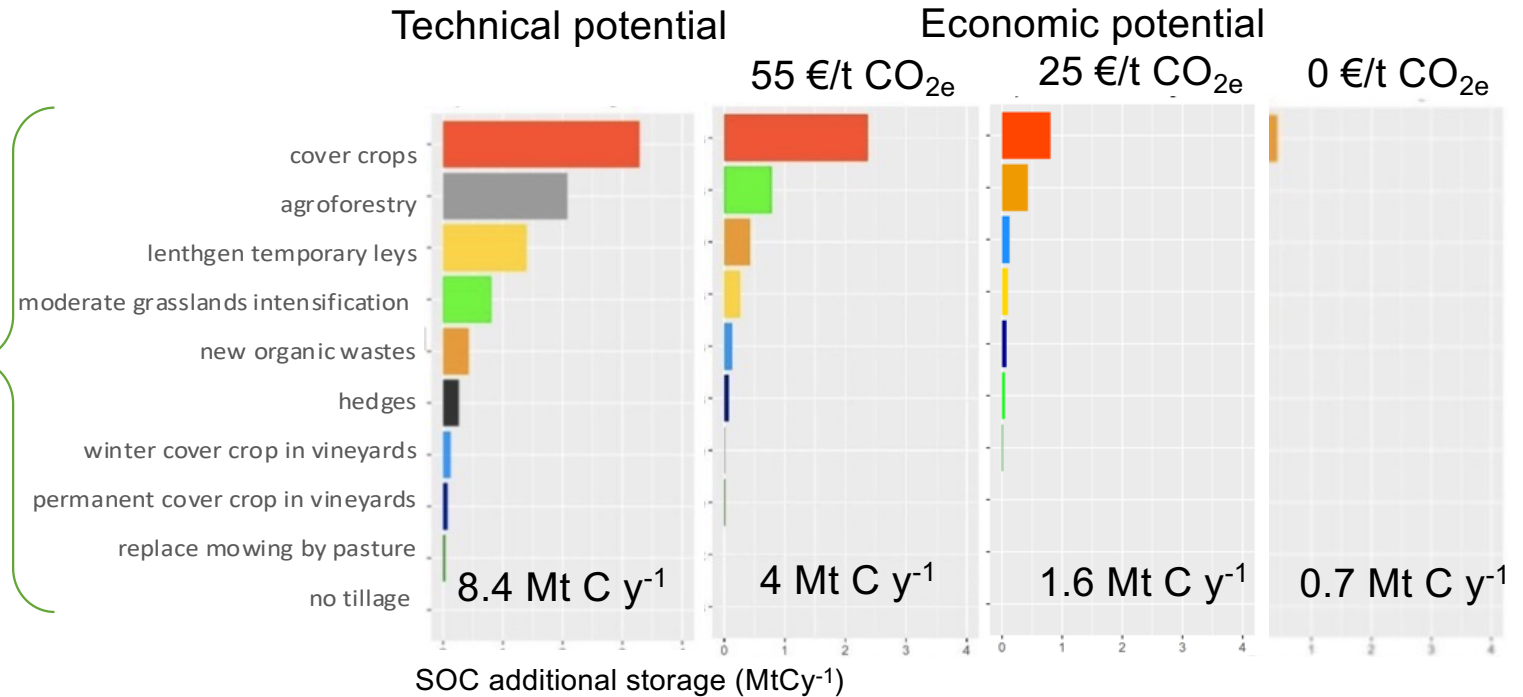


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# How much?

## Diversity of options



**France** *Pellerin et al. 2019, Bamière et al. 2021*  
41% French agricultural emissions

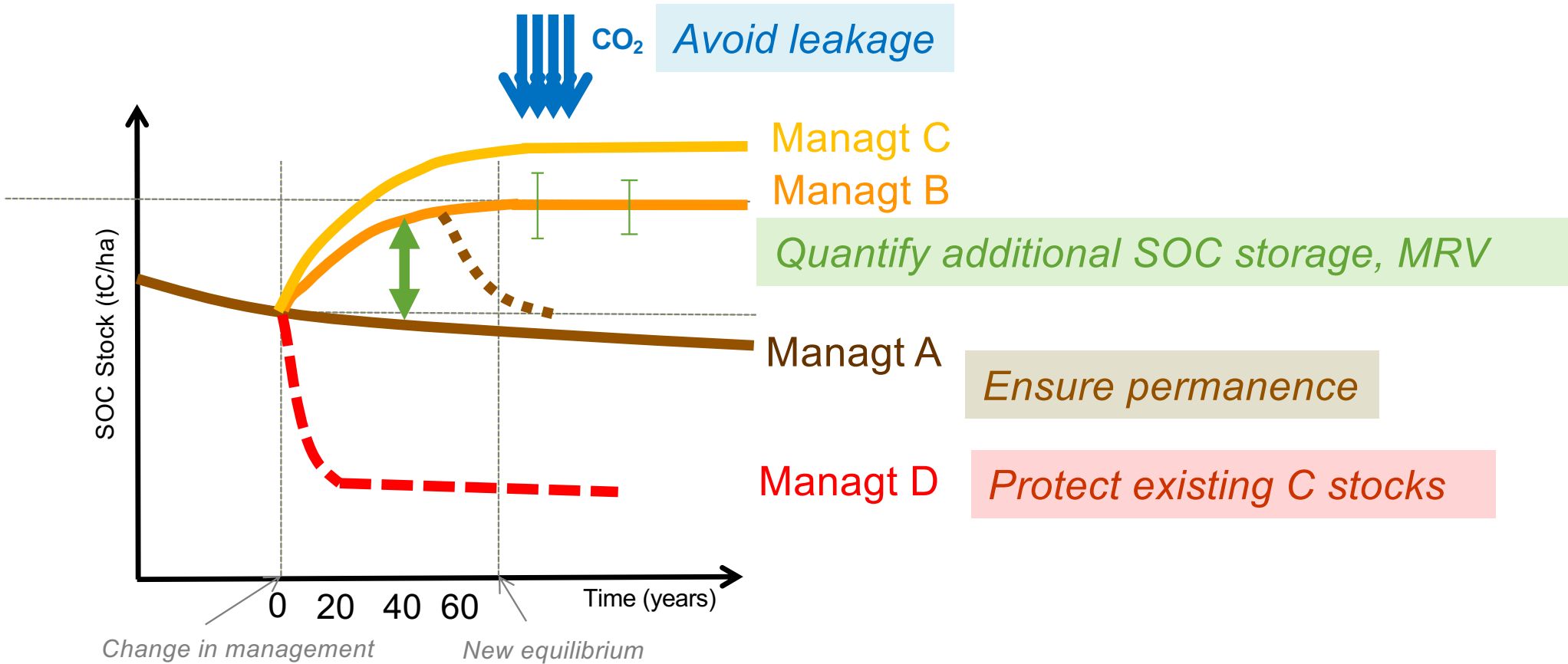
**European Union** *Lugato et al. 2014*  
5 to 12.5% of 2019 EU agricultural emissions

**World** *Zomer et al. 2017, Bossio et al. 2020, IPCC WG3 2022*  
1.8- 4.1 Gt CO<sub>2</sub>eq. yr<sup>-1</sup>

*Incentives needed*

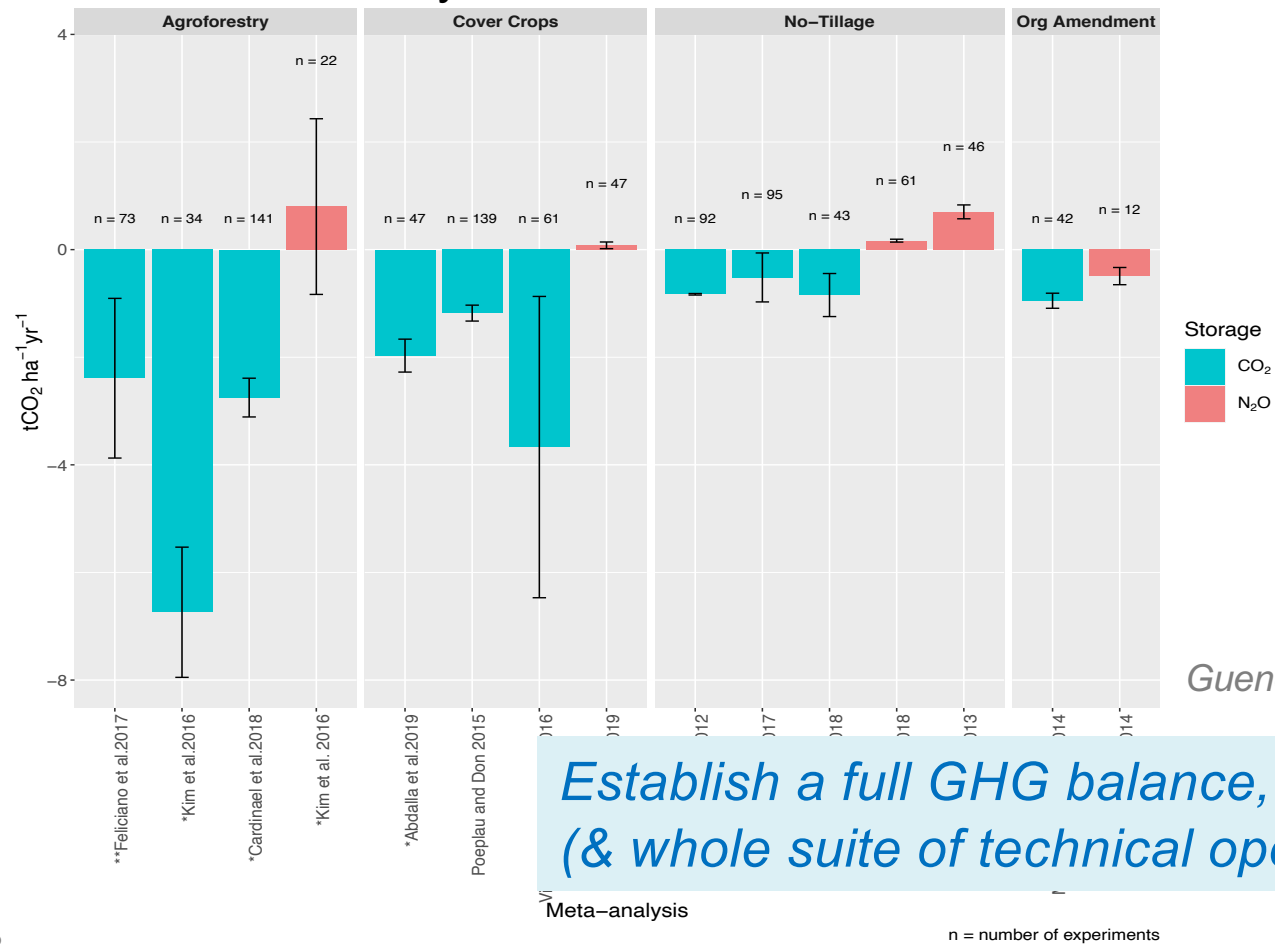
*Large technical potential*

# Limits and challenges for climate



# Limits and challenges for climate

Additional SOC storage, additional N<sub>2</sub>O emissions when implementing management options (in CO<sub>2</sub>eq). Review of meta-analyses.



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

A success for the environment?





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≈ 60% European soils are not healthy (JRC, 2021)

# Soil organic matter is key to soil health and biodiversity



Water?



Nutrients?



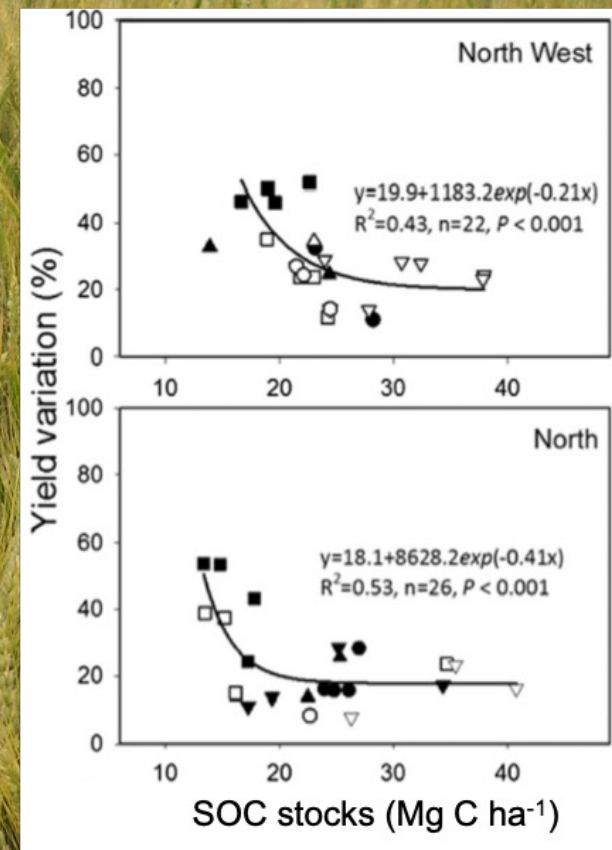
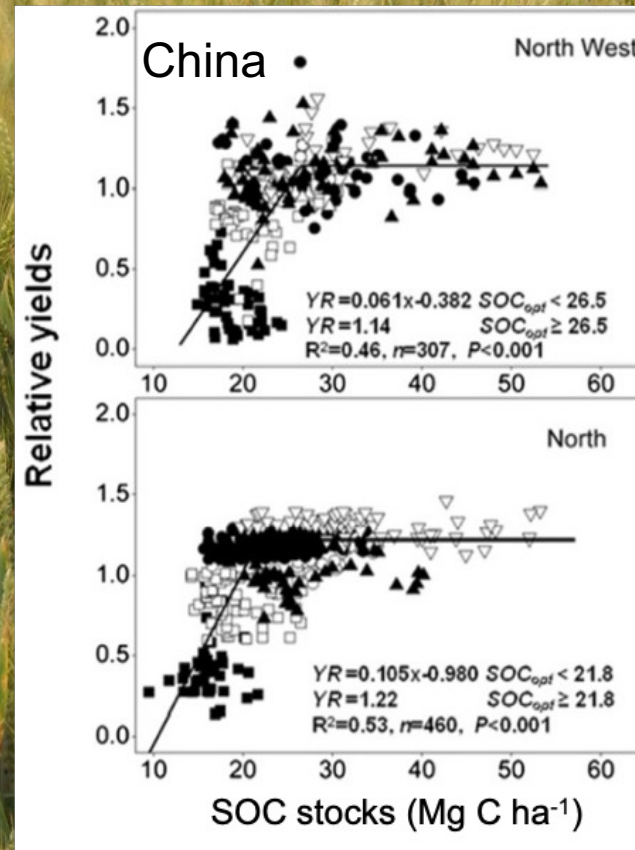
Biodiversity?



*Address trade-offs. Protect natural resources*

A success for farmers?

# Increasing soil organic matter for yield... stability

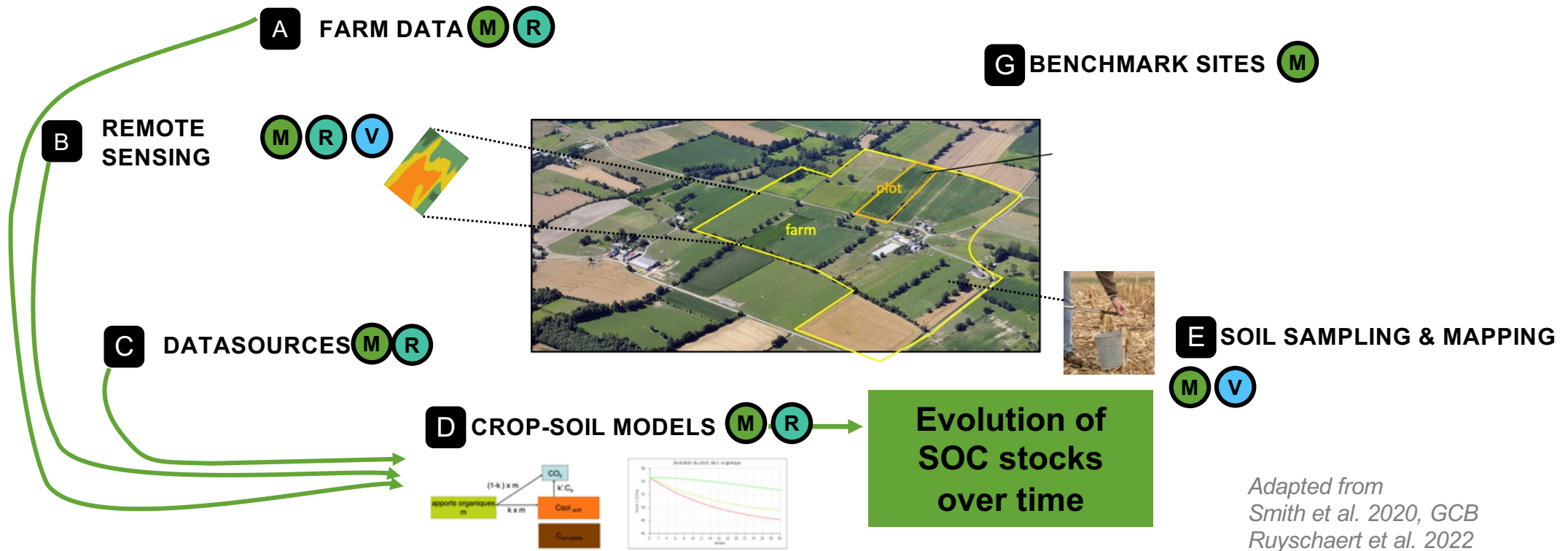


Zhang et al. 2016

# Need to change agricultural systems

*How to reward the pioneers?*

# Need for reliable, transparent hybrid Monitoring, Reporting and Verification systems



# Nature-based solutions for C removal on land have the potential to be a success for climate, environment and farmers

- Soil health is the benefit. Contribution to climate change mitigation is the co-benefit.
- Integrative view: not only carbon ! Trade-offs, systems change.
- Measuring Reporting & Verification systems, linked to soil monitoring
- Farmers are the stewards: co-construction, fair and functional tools

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