

Carbon Farming: Enriching tropical farm soils with organic matter



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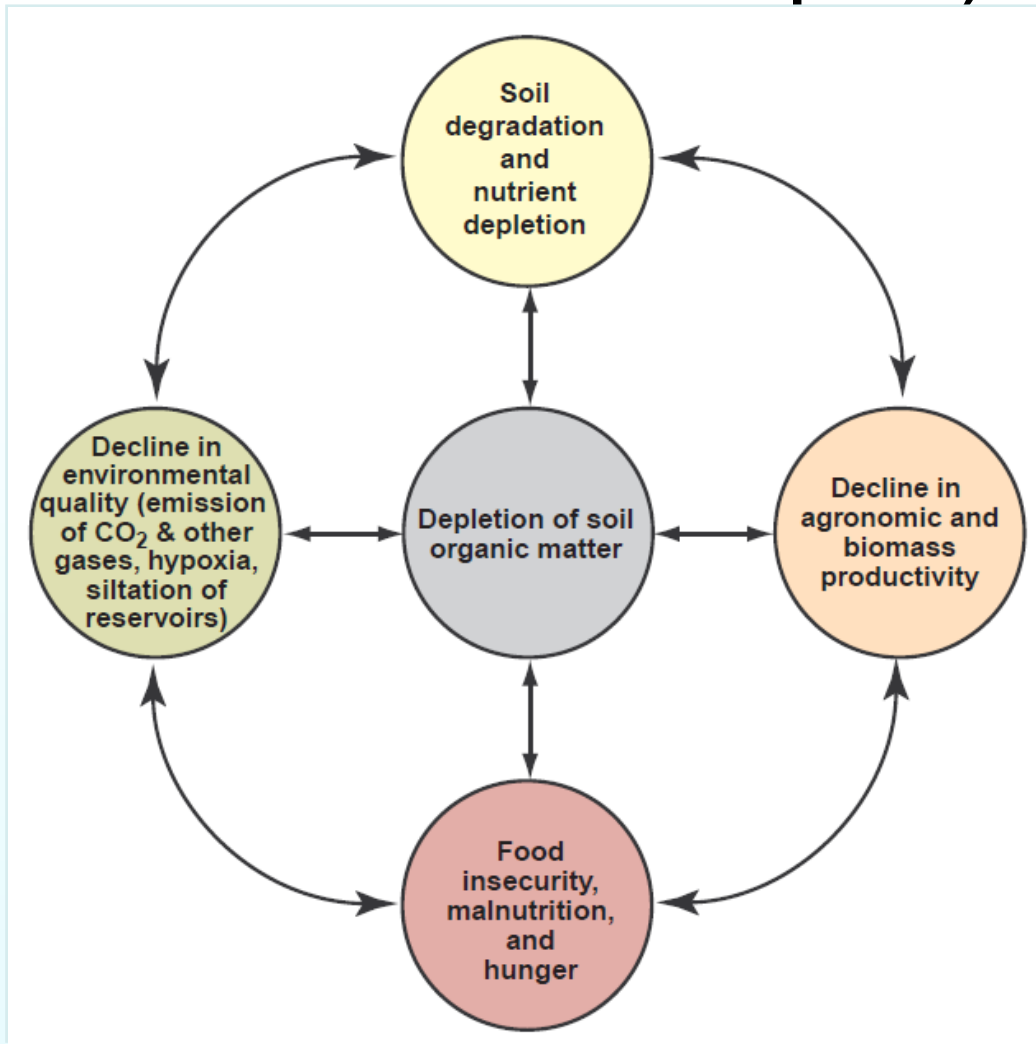
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A worldwide problem (specifically severe in the Tropics)



Soil Carbon Sequestration Impacts on Global Climate Change and Food Security

R. Lal, *et al.*

Science **304**, 1623 (2004);



&

Carbioma

Carbon-optimized Land Management in Southern Amazonia



*sistema
agrosilvipastoril*



Objectives (Carbiocial vs. CC/GHG):

- 1** Innovative land management strategies
- 2** Adaptation of land management
- 3** Specific cultivation systems
- 4** Trade-offs between land management, societal demands, biodiversity /ecosystem functions
- 5** Socio-economic consequences

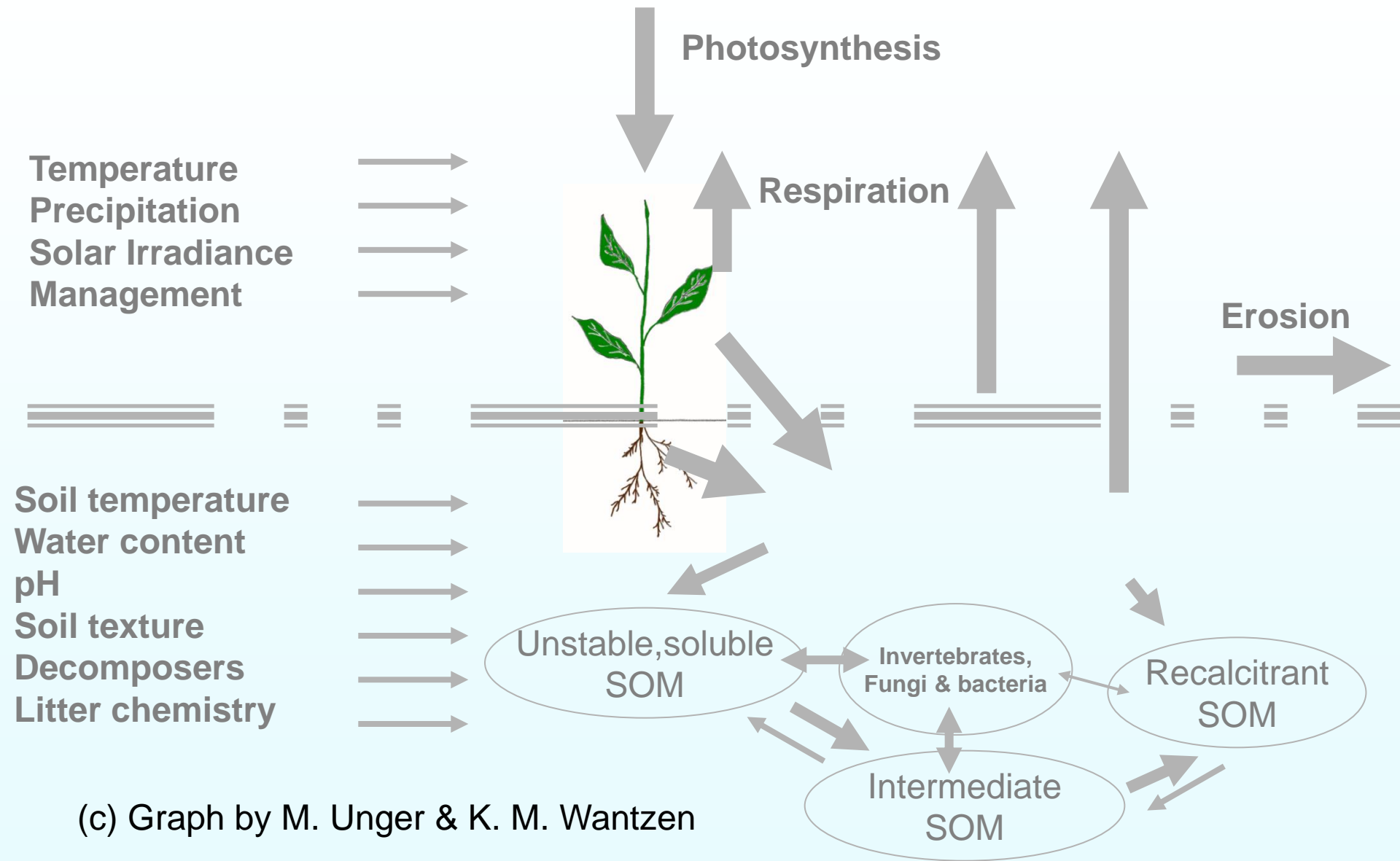


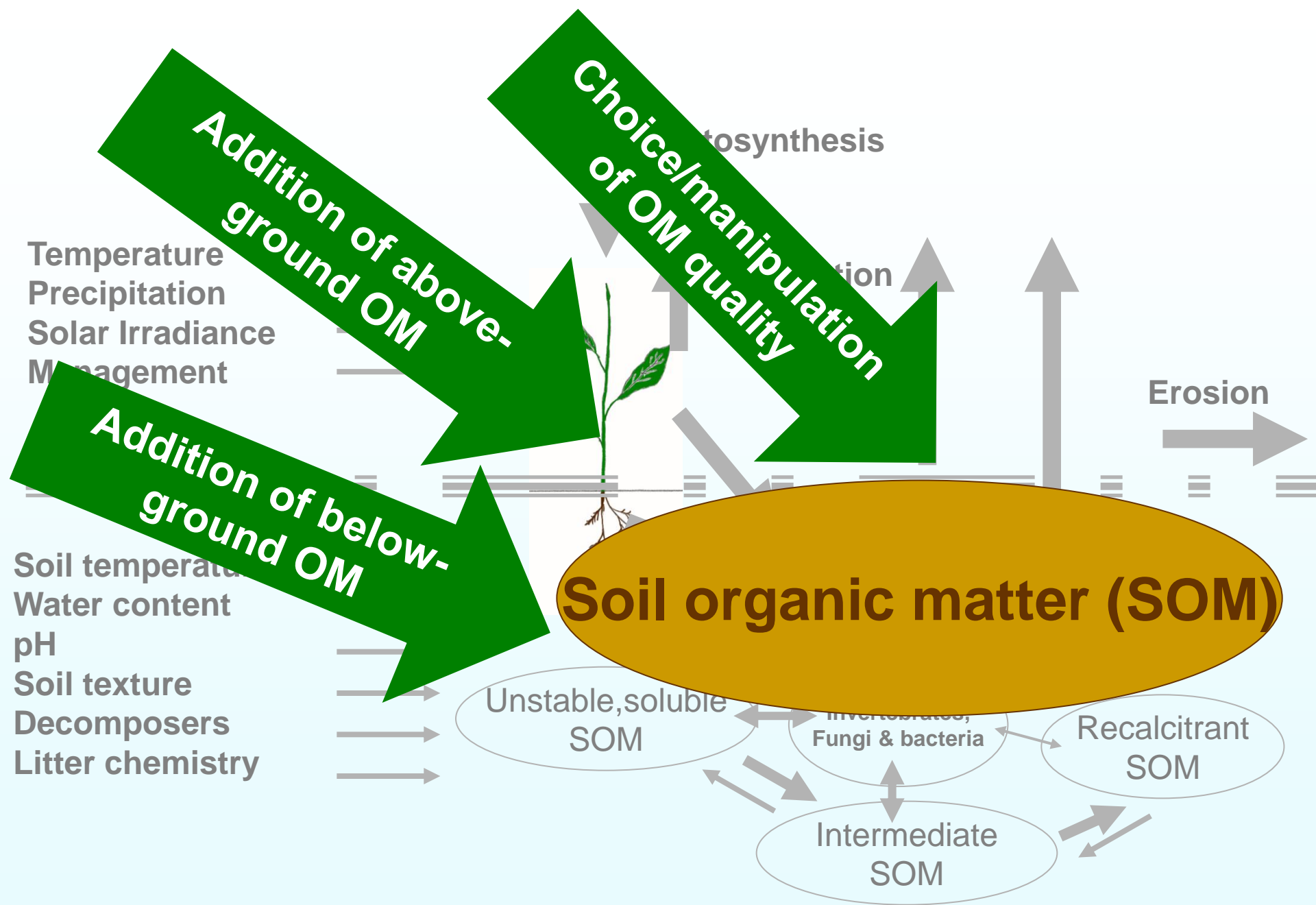
see talk by Gerhard Gerold, session 18. 15:00!

'Carbon farming'

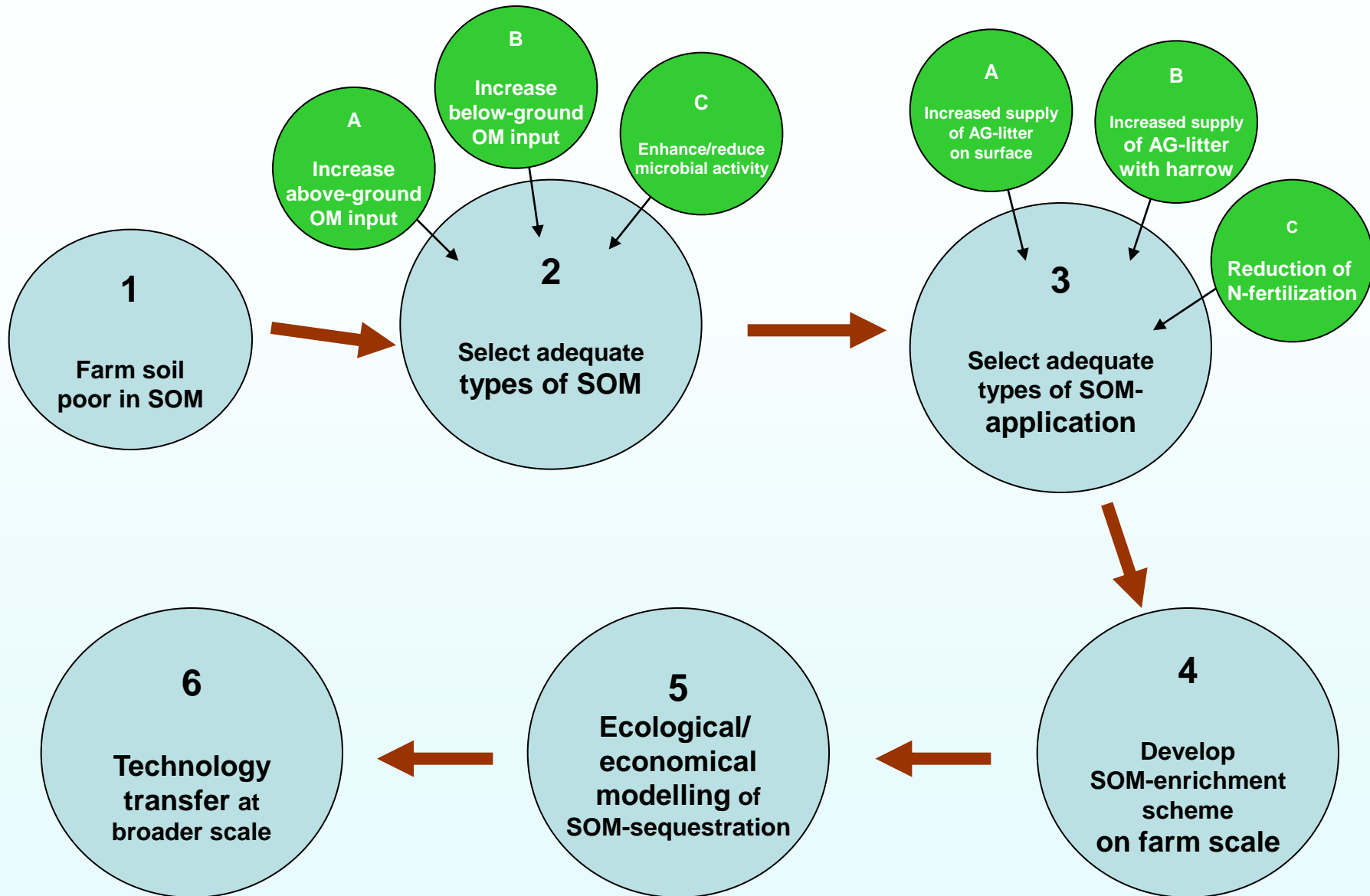
- *"Low carbon farming"*: reduce C-emissions (SOC losses), e.g., by no-till management
- ***Active enrichment of farm soils*** by adding carbon sources:
 - *Charcoal/Terra preta* (not treated here)
 - *Sistema agrosilvipastoril*: intercrops and trees produce root biomass (CARBIOMA)
 - ***Crude organic matter*** from agricultural/forestry processes (CARBIOCIAL)
 - ***"Carbon awareness"***

Soil Organic Carbon Dynamics





Flowchart CARBIOICIAL SP06



A farmscale experiment



Choice of organic matter type

- locally available
- by-products, not otherwise used
- in future: multiple-use buffer zones for OM



residuals from sugarcane
("torta de filtro")



sawdust



tree bark

"Decomposability"

Experimental sites



Design of the Carbon Enrichment Experiment

Rio Engano (Campo Verde):

3 Organic matter types:

- 1) Sawdust
- 2) Sugar cane residuals
- 3) Wood chips of Eucalyptus

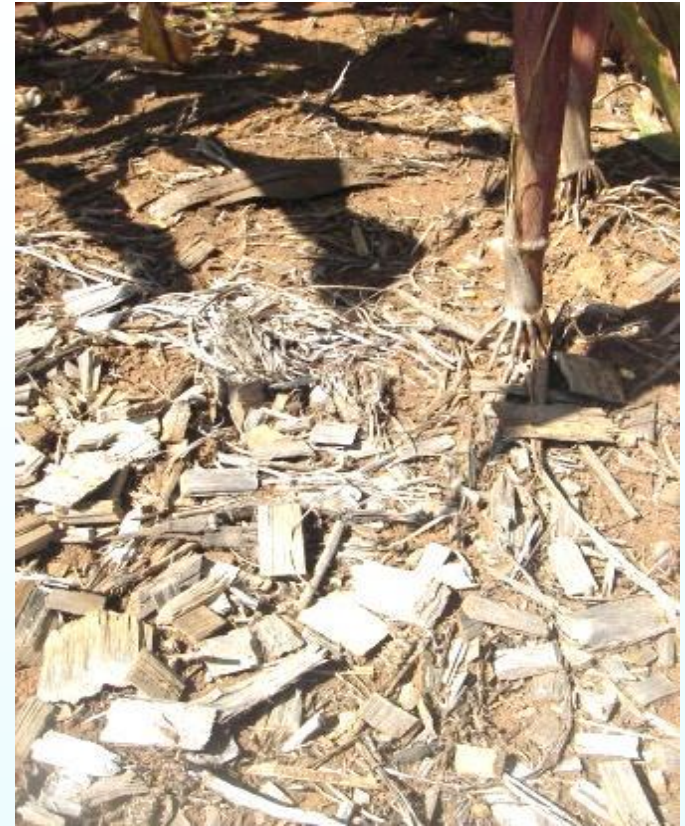
Quantities: 6, 12, and 18 t/ha

São Valentim (Sinop):

4 Organic matter types:

- 1) Sawdust
- 2) Passion fruit residuals
- 3) *Crotalaria* (root biomass)
- 4) *Crotalaria* plus *Brachiaria*

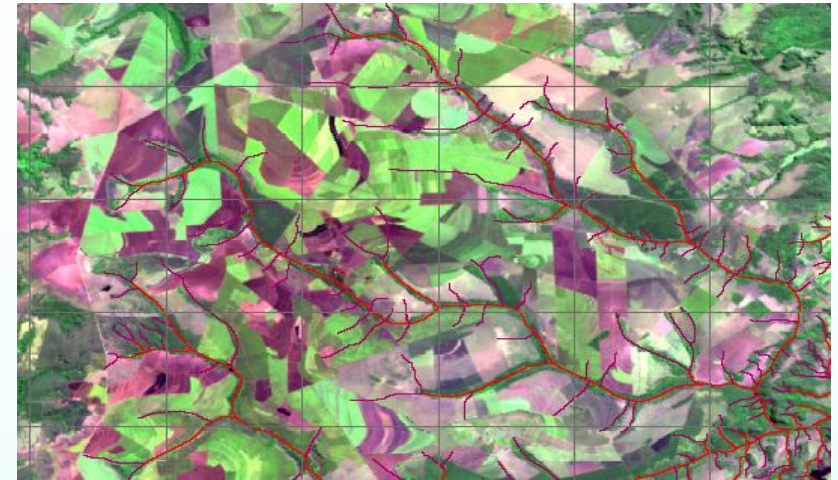
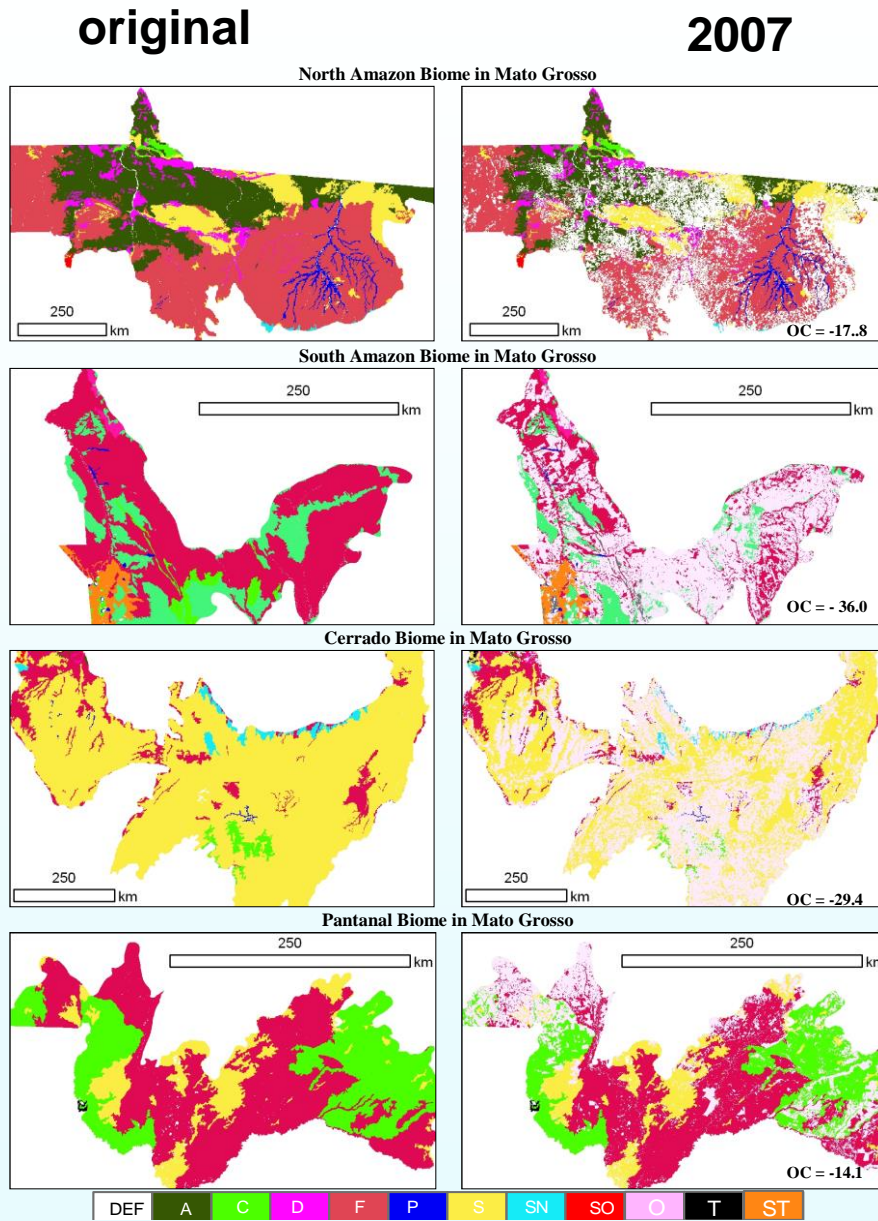
Quantities: 6 and 18 t/ha



Carbon awareness



What is left?



Fragmentation and conservation of rural landscapes of Mato Grosso State, Brazil: the importance of “Legal Reserves”

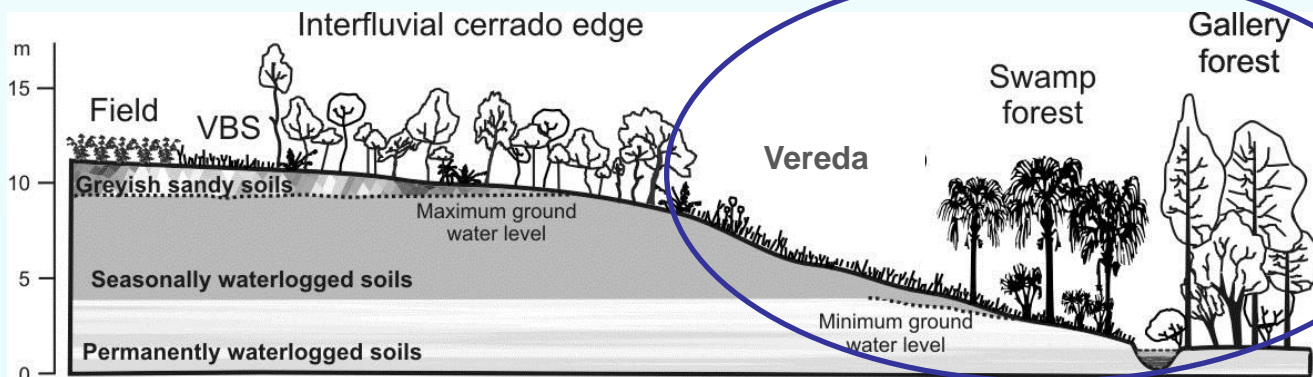
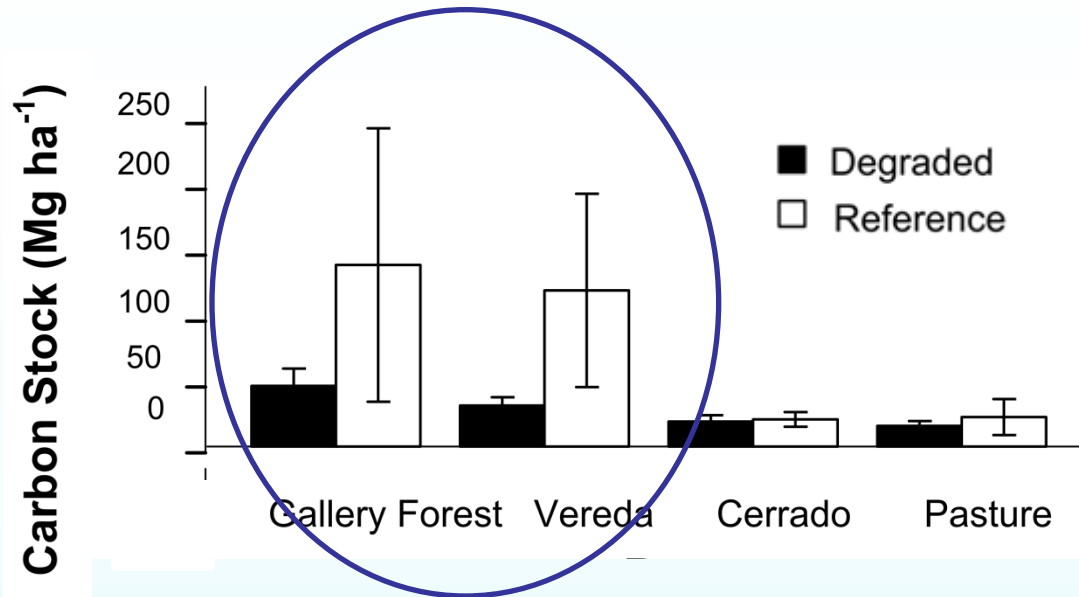
Auberto Siqueira^{*1}, Luisa F. Ricaurte², Guilherme A. Borges³, Gustavo M. Nunes⁴, Karl M. Wantzen⁵

under review

In a fragmented landscape, riparian corridors are the last natural remnants...



...having large but fragile, natural carbon stocks...



Conclusions/Outlook

- win-win-situation from Carbon Farming (productivity, water/nutrient balance, pesticide use)
- farms are more than farmland (carbon and biodiversity management on a landscape scale)
- farm = food production + conservation of biodiversity + maintenance of ecosystem functions (including carbon/water balance)