

Waiting for Soil Carbon to Change

(while missing out on other soil benefits)



Marshall McDaniel

Associate Prof. in Soil-Plant Interactions | Agronomy | ISU

Relative Soil Organic Matter (%)

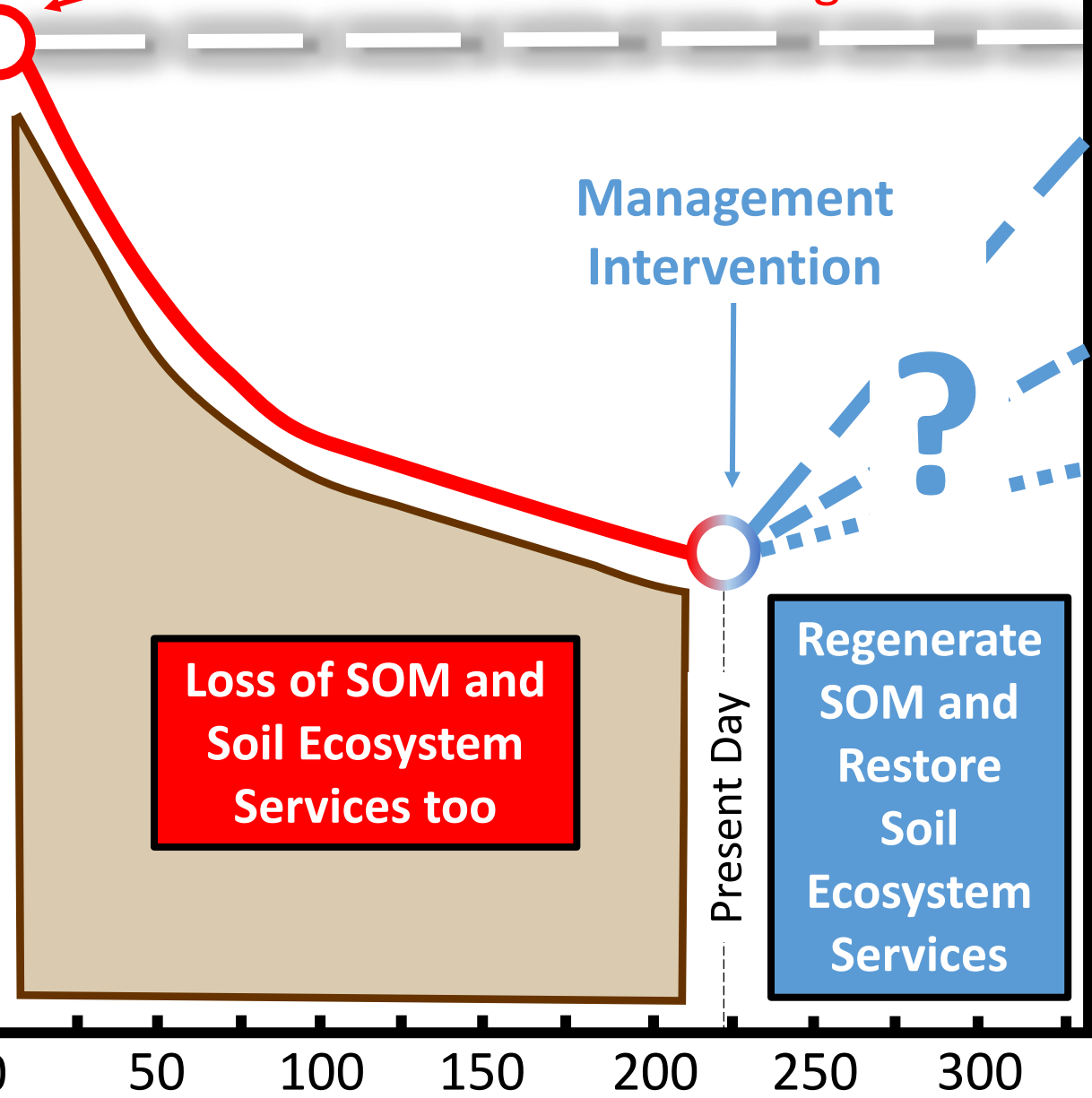
SOM built
>10,000 years
prior to
Euro-American
(E-A)
cultivation in
the Des Moines
Lobe



Native
American
cultivation
for
~3-4,000
years

*(no agronomic
data on SOM
impacts)*

Euro-American cultivation begins



Management
Intervention

Loss of SOM and
Soil Ecosystem
Services too

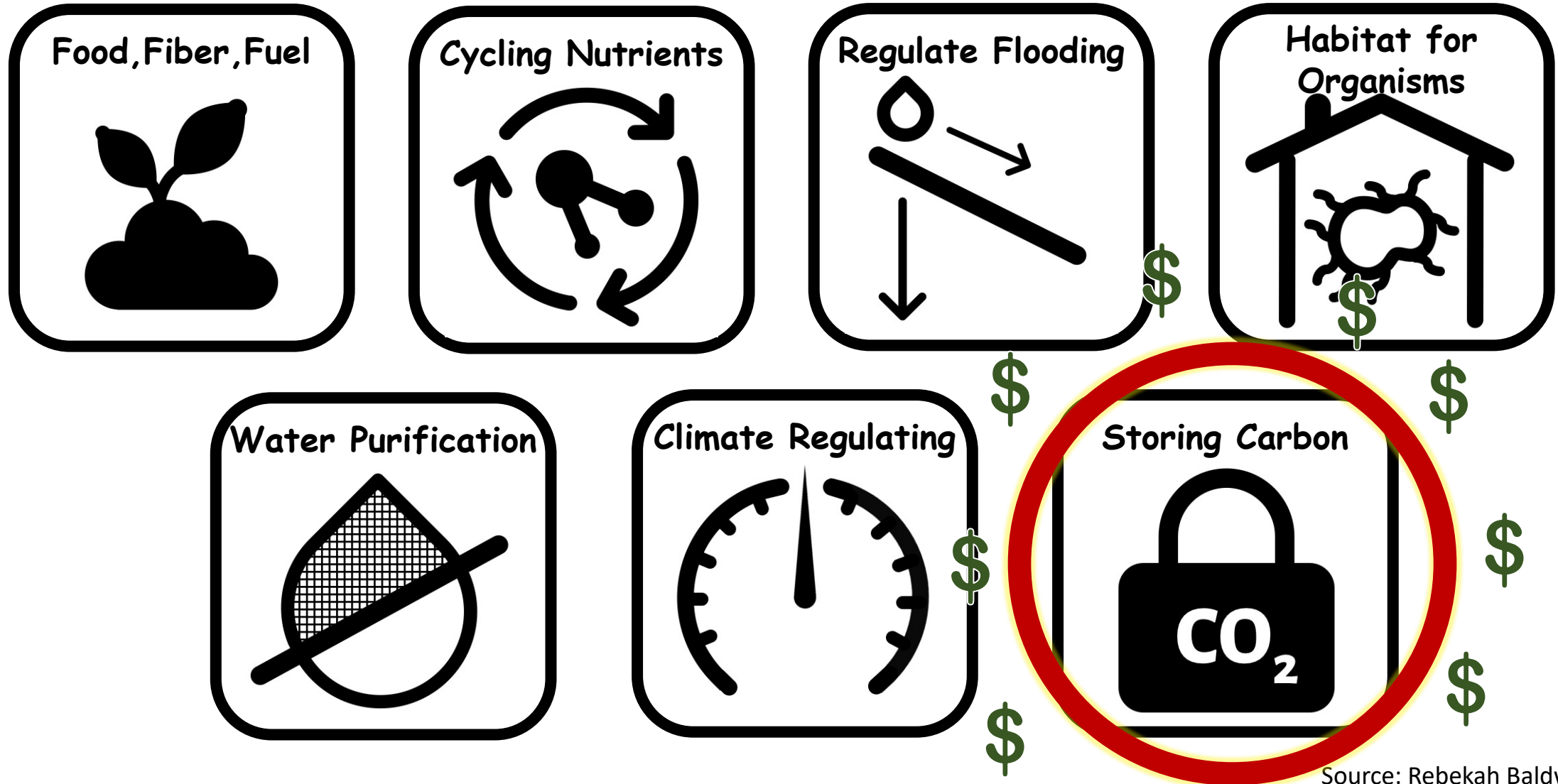
Present Day

Regenerate
SOM and
Restore
Soil
Ecosystem
Services

Prior to E-A Cultivation

Years After E-A Cultivation

Seven Soil Ecosystem Services



Marsden Agroecosystem Diversification Experiment

(*>38 peer-reviewed publications*)

3 cropping systems
Plots 60 ft × 276 ft
4 blocks

Established in 2001 near Boone, IA
by Dr. Matt Liebman (Agronomy)



MARSDEN Experimental Design

System

Crop Rotation

Fertilization

2-year



Corn



Soybean



Synthetic Fertilizer

3-year



Corn



Soybean



Oats + Red clover



Composted Cattle Manure

4-year



Corn



Soybean



Oats + Alfalfa

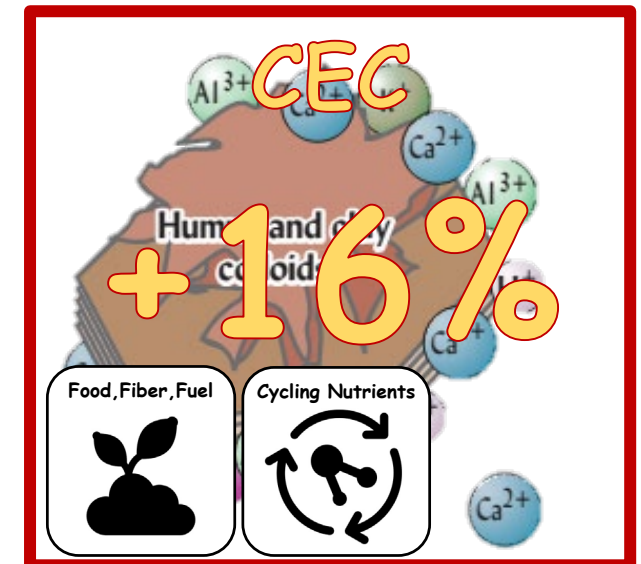
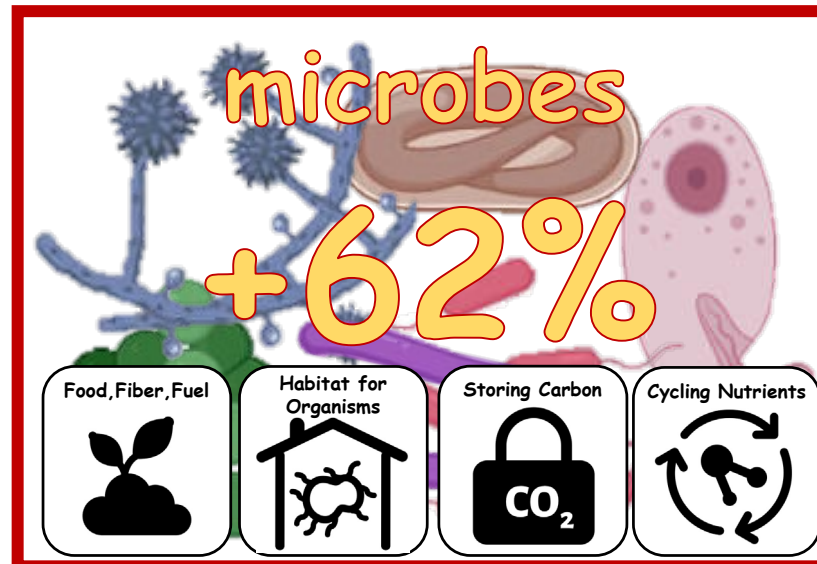
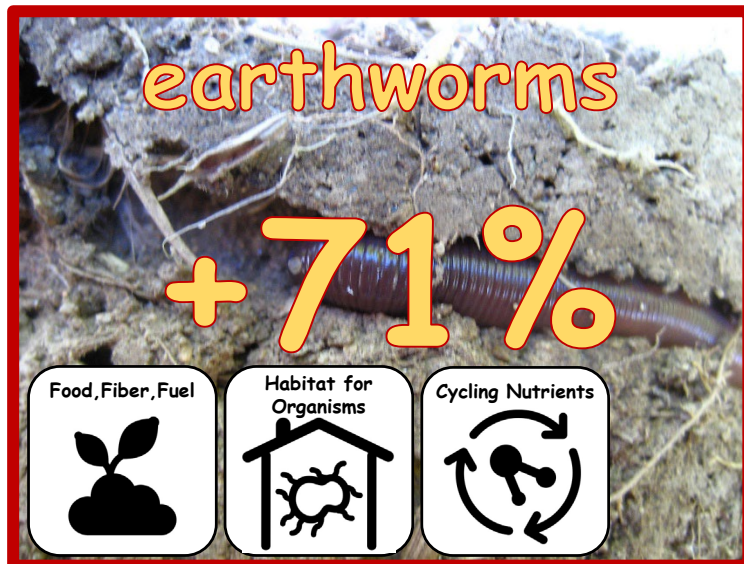
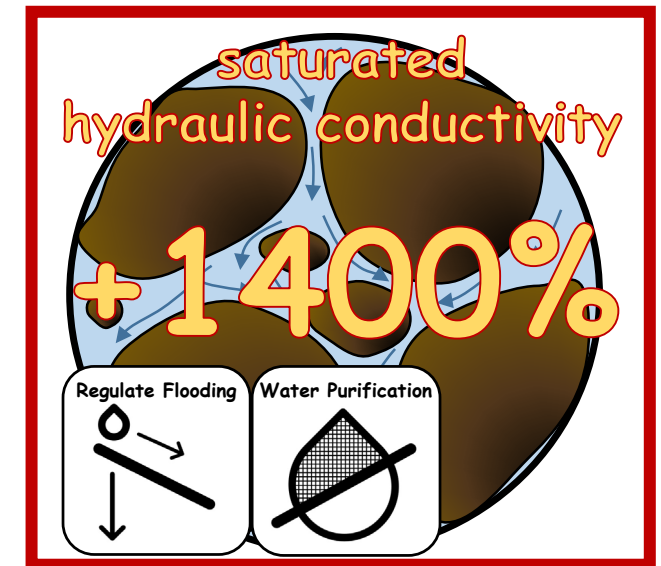
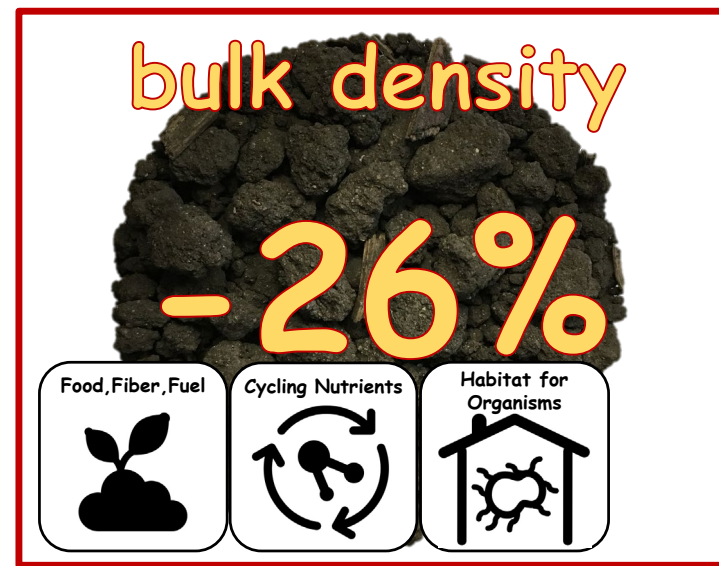


Alfalfa



Composted Cattle Manure

15 years later, the 4-year rotation...



15 years later, the 4-year rotation...



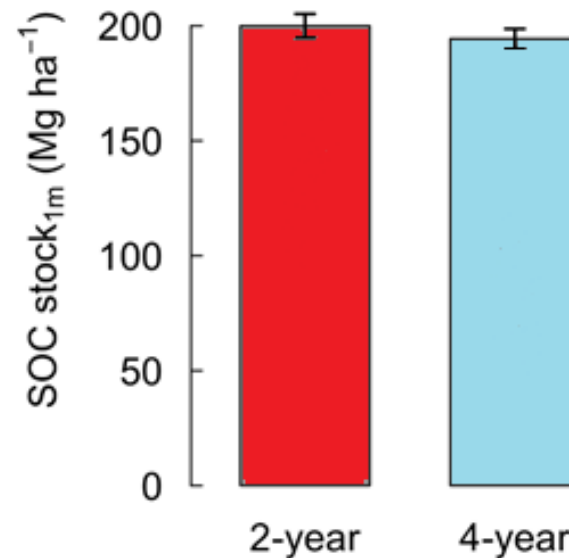
Dr. Steven Hall

Talk Title:

Reframing the Conversations
Around Agricultural Soil Carbon

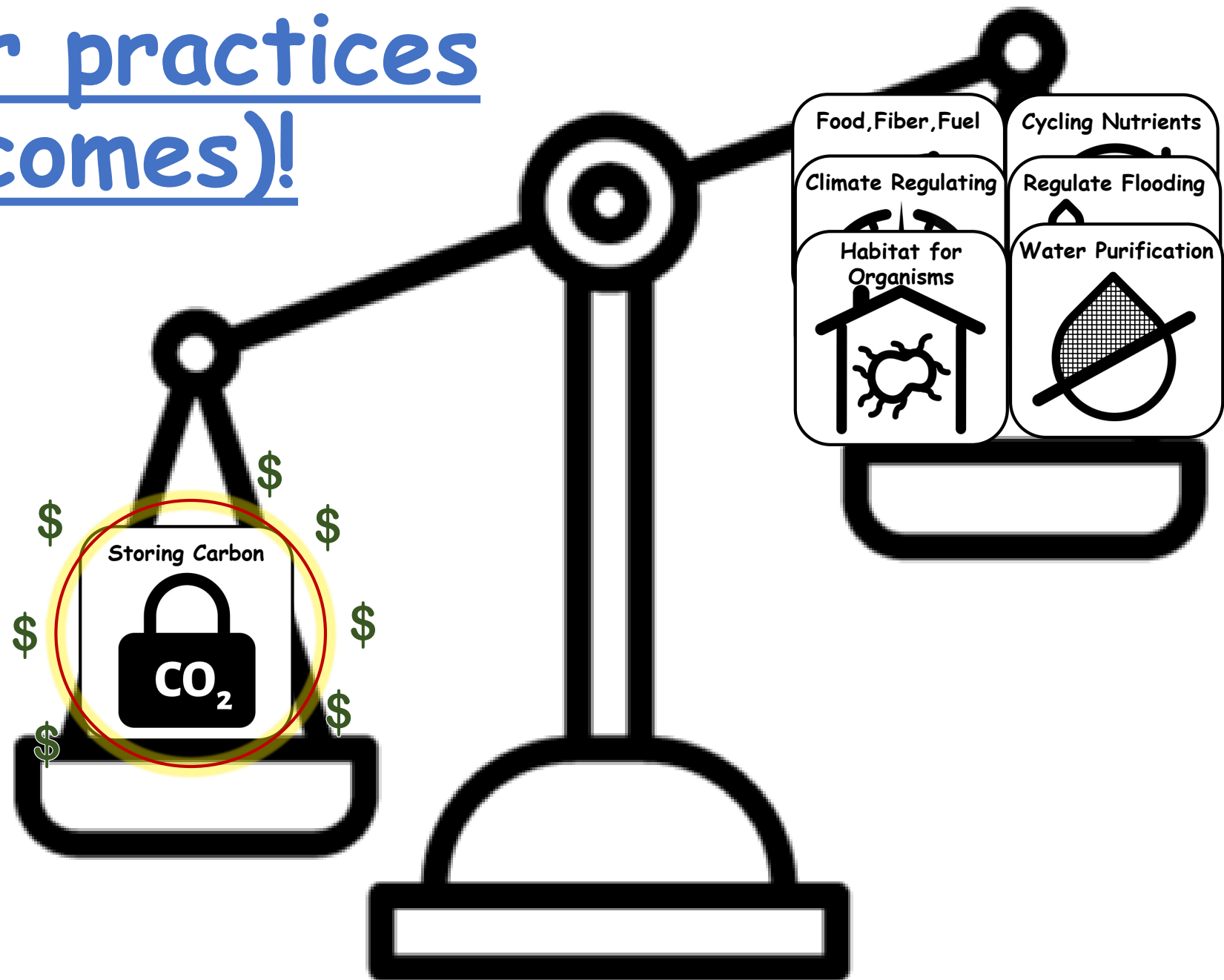
**Saturday Session 4, 2:30-3:30
(Room 167-179)**

More recently (19 years later)...



Data from Huang & Hall (2022)

Let's pay for practices (not outcomes)!





Questions?



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 [@Soil_Plant_IXNS](https://twitter.com/Soil_Plant_IXNS)