

Developing Carbon Offsets for Biochar Products

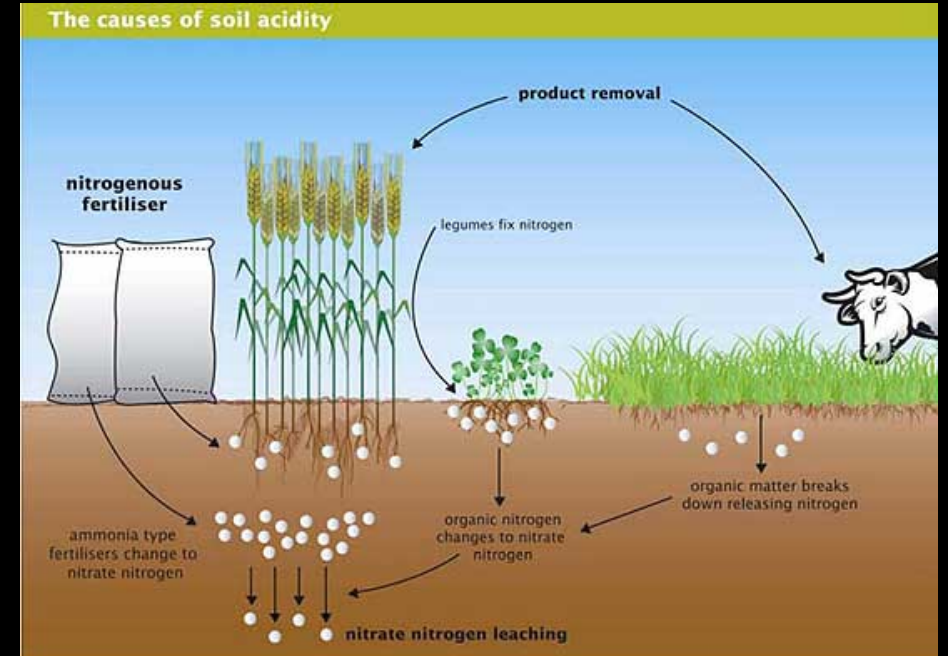


PermaMatrix® BSP
FOUNDATION

Cultivate Sustainability

Problem:

- Over fertilization
- Soil degradation
- Erosion
- Nitrate leaching

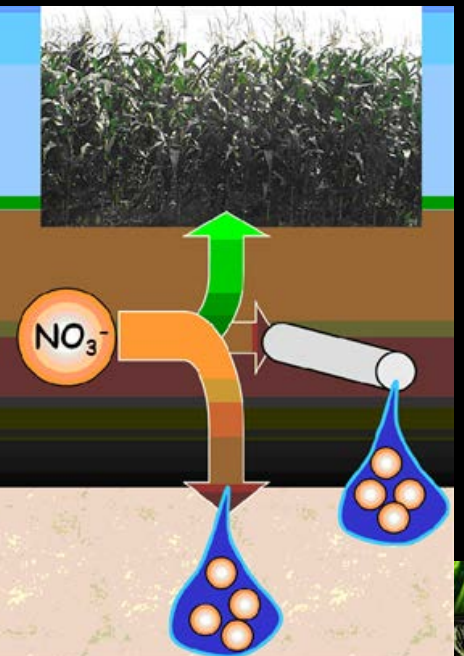


Nitrate (NO_3^-) retention in soils

Unlike phosphate, nitrate is very weakly held by soils

- Nitrate does not react to form new solids
- Nitrate is not held by oxide surfaces

If nitrate is not taken up by plants it is very likely to be lost from the soil



Water Quality:

- Blue Green Algae
- Water Temps 82 degrees
- High nutrient level, nitrogen and phosphorus in water




How soil can help water quality:

- Soil minerals are natural filters
- Mycorrhizae fungi grab ahold of nutrients like phosphorous
- Biochar retains nutrients and moisture
- Soil Organic Carbon (SOC) increase, improves water holding capacity
- Carbon Linking nutrients to plants increases yield.



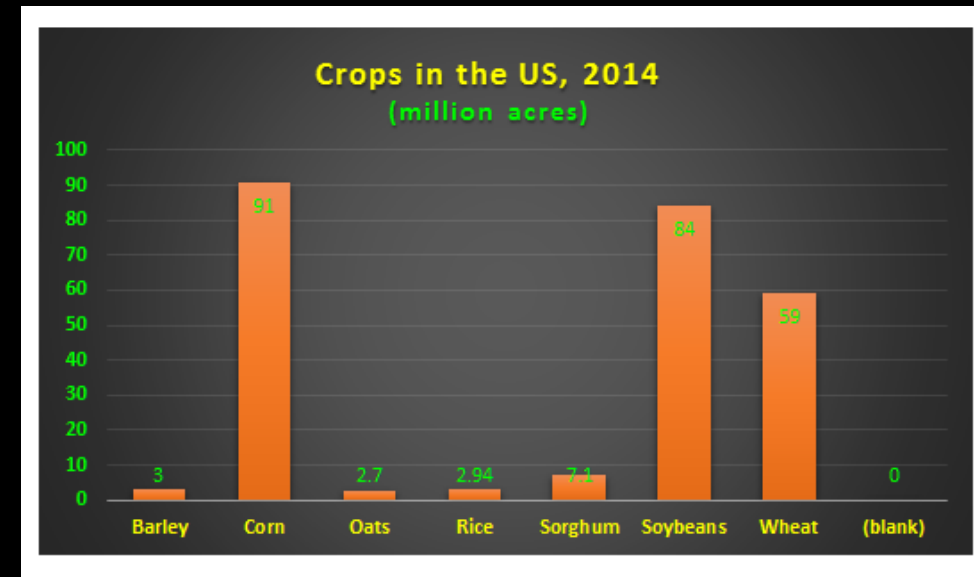


How soil can be a carbon sink?

- Sequestered carbon in the form of biochar, is stable in soil, and will remain for centuries.
 - Biochar provides home for soil microbes.
 - Biochar retains nutrients and moisture.
 - Biochar products (PermaMatrix) improve soil tilth and plant growth.
 - With better nutrient delivery to plants, less is leached out of soil.
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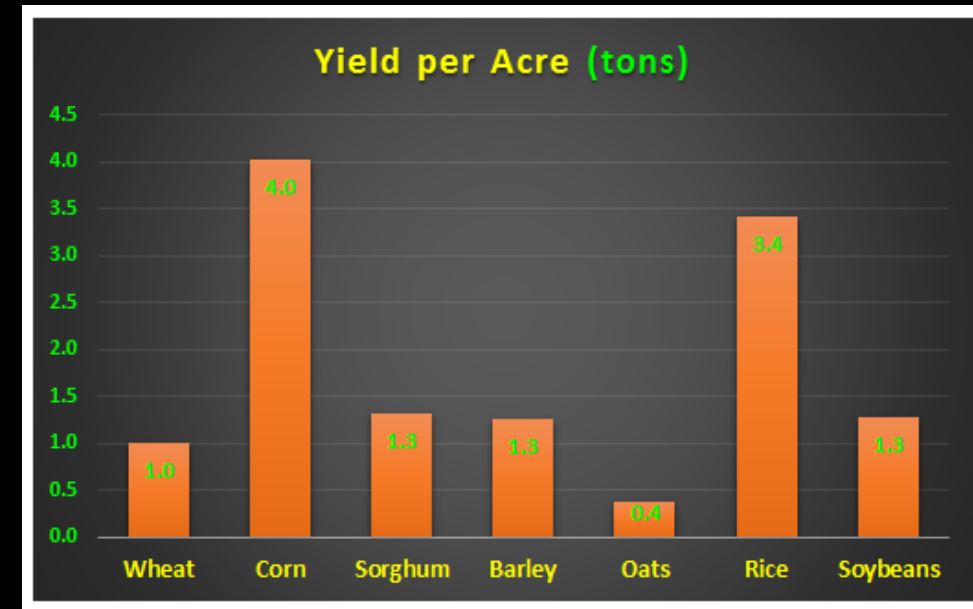
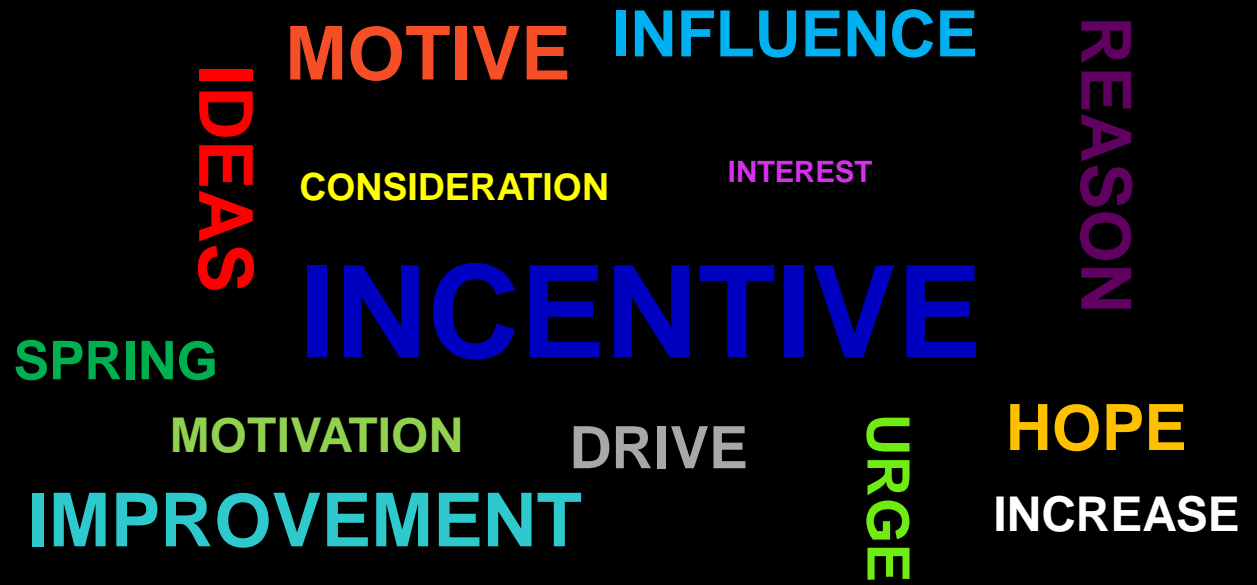
Opportunity:

- Million of acres in agriculture
- Biochar producers
- Biochar products
- Sustainable soils for future farmers
- Improved water quality for everyone



Incentive:

- For farmers and land managers
- Reduced inputs and cost
- Increased asset
- Improved yield





Developing Carbon Offsets

- Value to sequestered carbon.
- Value of reduced nitrate leaching into water bodies.
- Value of improved soil organic carbon
- Value of increased crop yield.
- Value of reduced inputs (less fertilizer, less herbicides)




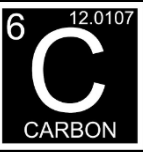


Precedence:

- Chevrolet launched a five-year plan to purchase 8 million tons of reduced carbon emission for around \$40 million in five years from several projects including 11 colleges.
- Chevrolet paid a price from \$5 to \$30 per ton of carbon emission depending on the quality

Challenges:

- There is no carbon methodology for a particular agricultural soil sector built.
 - Need more data on quality of carbon and value of sequestered carbon.
 - Need more data on biochar amended soils and nutrient retention.
 - Voluntary carbon offset market, raising awareness!
 - Currently, the price of carbon credit ranges from \$1 to \$ 25 per ton in the voluntary market.
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It all starts with Awareness!

Thanks



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