

33rd Annual NATIONAL NO-TILLAGE CONFERENCE

January 7-10, 2025 • Louisville, Ky.

Don't Start Planting Cover Crops Until.....

Adam S. Daugherty



Cover Crops
Our Roots Run Deep



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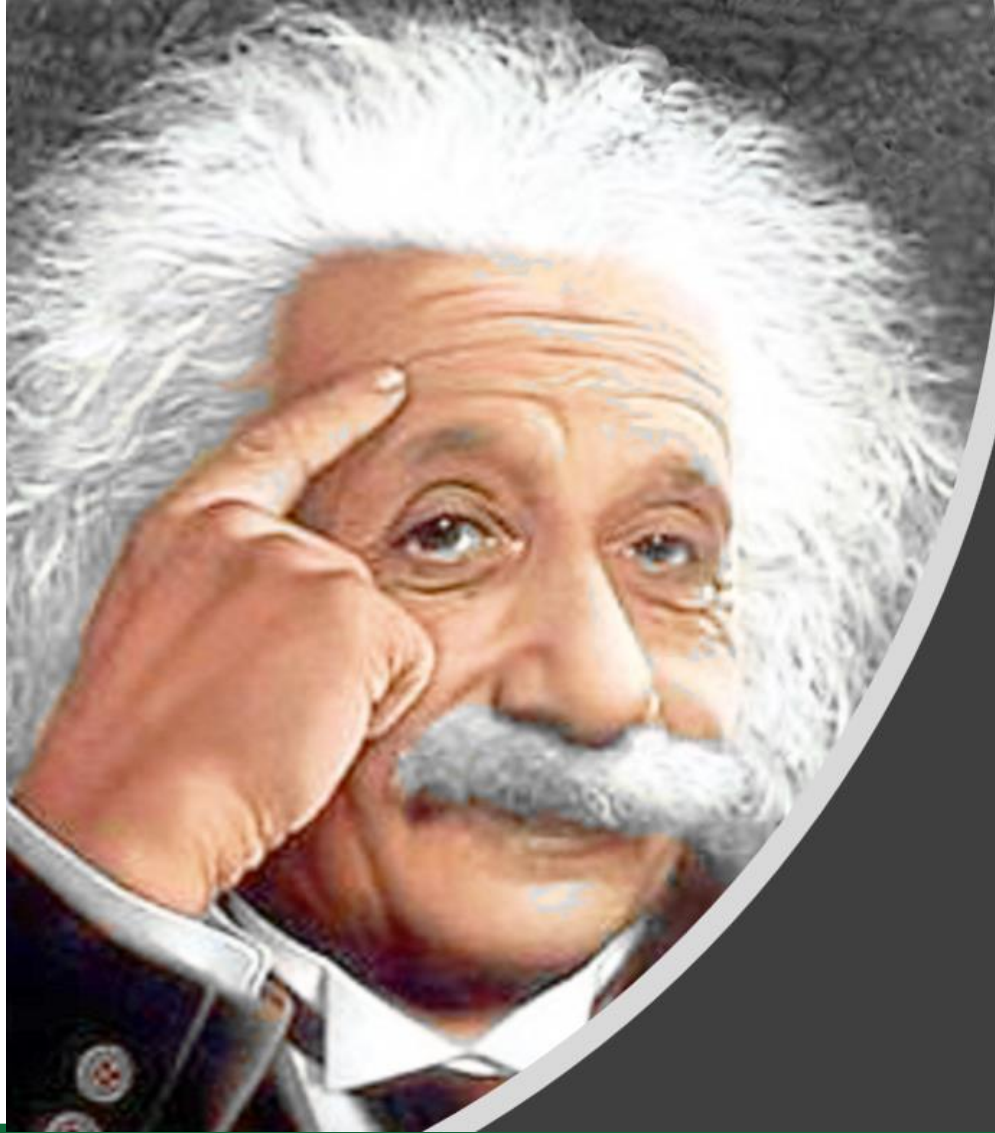


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ENVIRONMENTAL
TILLAGE SYSTEMS





This Is Where
the Silver
Bullet Lies



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THE POWER TO GET YOU MORE!
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ForGround
by Bayer



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The rejuvenation of your soil does not start with the implementation of principles but rather with the commitment to understanding ecological functions.

You have to know WHY before How





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The Andersons



Yetter
FARM EQUIPMENT
SINCE 1930



Precision Planting



Ag Leader



CLAAS



BioTill

Cover Crops
Our Roots Run Deep



Copperhead Ag
PRODUCTS



VULCAN EQUIPMENT



APACHE ET
SPRAYERS



MidWest Bio-Tech



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soil WARRIOR



EIS
ENVIRONMENTAL TILLAGE SYSTEMS



HORSCH



Martin Till



TTAN



LSW
Low Speed Technology



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**Soil
Warrior** **EIS**
ENVIRONMENTAL
TILLAGE SYSTEMS



HORSCH



Martin Till



TTAN



LSW
Low Soilwall Technology

Google: What Does Soil Need to Function



what does soil need to function



Functions of Soil - Plant and Soil Sciences eLibrary

<https://passel.unl.edu> > pages > informationmodule ▼

Question 1: An important **function** of **soil** is to store and supply **necessary** nutrients to plants. The ability of a **soil** to perform this **function** is referred to as the **soil** ...

Understanding Soil & It's Function - Miracle-Gro

<https://www.miraclegro.com> > en-us > library > garden-planning > underst... ▼

The **function** of **soil** is to anchor plant roots and provide water, air and all nutrients to plants to support growth. **Soil** is made up of weathered rock and mineral particles, like clay, sand and silt, and organic matter which is decomposing animal and plant material plus microorganisms.

Soil Functions - Soil Quality

soilquality.org > functions ▼

Soil **does** all this by performing five essential **functions**. ... For more information on how various scientists **have** classified **soil functions**, go to Alternative **Soil** ...

You visited this page on 12/15/19.

Soil functions - Wikipedia

<https://en.wikipedia.org> > wiki > Soil_functions ▼

Soil functions are general capabilities of **soils** that are important for various agricultural, ... Pore spaces within **soil** can also absorb water and hold it until plant roots **need** it. The **soil** also moderates temperature fluctuation, providing a suitable ...

Food and other biomass ... - Environmental interaction - Physical and cultural ...

PDF How Does Soil Function? - NRCS - USDA

<https://www.nrcs.usda.gov> > wps > PA_NRCSConsumption > download ▼

What do you know about **soil function**? What feeds soil microbes? ... habitat loss for the majority of the organisms **required** for healthy **soil**. The absence of living ...

You visited this page on 12/15/19.

Soil Functions - an overview | ScienceDirect Topics

<https://www.sciencedirect.com> > topics > agricultural-and-biological-sciences

Soil functions are inherent capabilities of the **soil** that include biomass and food ... can cause severe damage to crops (i.e., soybean), whereas others **have** an ...

What Do Soils Do? | Soil Science Society of America



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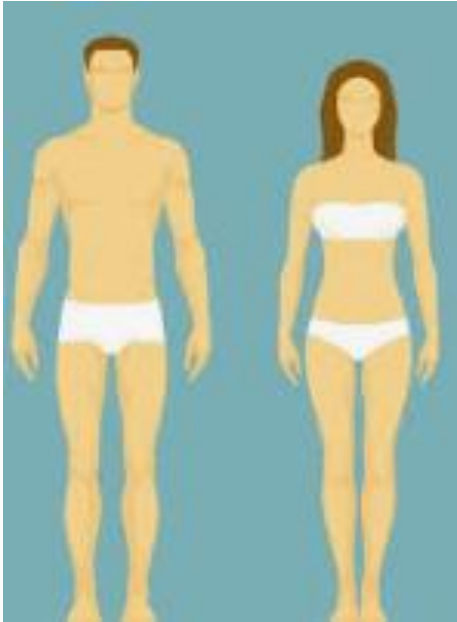


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TILLAGE SYSTEMS



Why is it so difficult to understand other living organisms? Why is it so difficult to understand it if a critter won't

and what all it can do and easily provided the



Why is our soil not functioning as it was designed?

- **What Does Soil Have to Have to Function**

- **Food**
- **Moisture**
- **Static Address**



Why Not Functioning As Designed

Symptoms

- Starved
- Surface Erosion
- Vertical Erosion
- Low Infiltration
- Compaction
- No Biological Diversity

The Problem

- Sun Shines 365 cash crop Don't
- Nekkid Surface
- Nekkid Surface
- Nekkid Surface, Low Aggregation
- Lack of Aggregation
- Corn, Soybeans, Henbit, Chickweed, Butter Cup

Don't Address Symptoms, Fix Problems!!!!



**WHY- the cause,
reason, or purpose for
which know why you
did it that
is why you did it**

**HOW- in what way or
manner, by what
means**



4 Players Involved

Energy Food Factory Management

Sun
Plants
Soil
Humans

Livestock



We don't and are not going to change the soil, we only change the life in it!!!!

Adam Daugherty



Cover Crops
Our Roots Run Deep



About everything that goes
on in the ground is a
biologically regulated
process





Keep In Mind, We Will Continue to Defy What Nature Truly Wants, But We Can Work With Nature To Restore Function and Increase Potential



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There are no
“Reductions” or
“Eliminations” in
Agriculture, Only
Substitutions



	Field 1	Field 2
Total Microbial Biomass	11,465	2424
Diversity Index	1.653	1.452
Organic Matter %	4.75	1.92
Fungi %	18.77	2.54
Protozoan %	6.59	0.29
1 Day CO-2	338	64.1
Soil Health Calculation	47	12.5
Nitrogen lb/ac	100.1	54.7
Phosphorus lb/ac	112.4	22.9
Potassium lb/ac	209.9	33.9



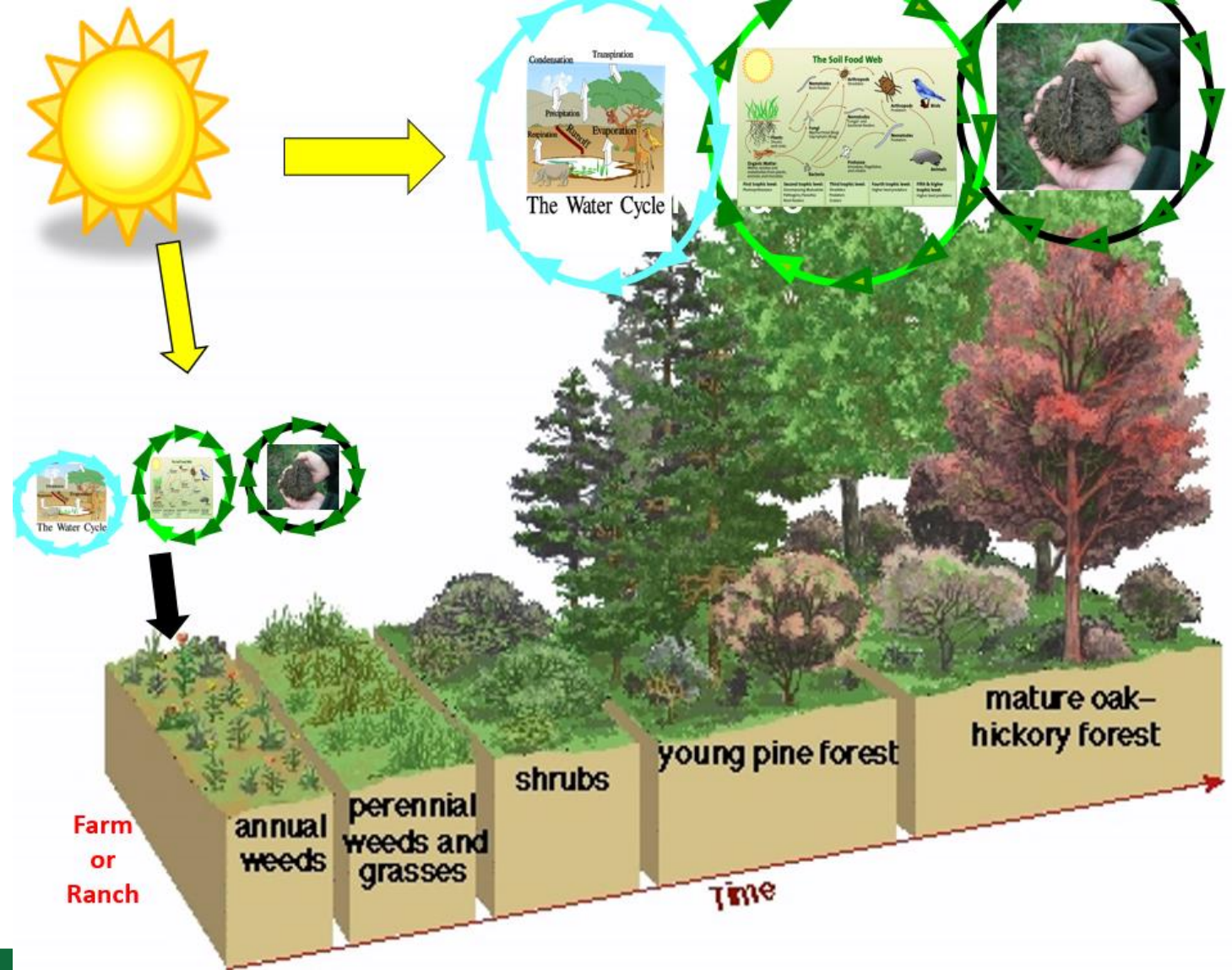
WHY When We Get the Soil Functioning as Designed we get these results

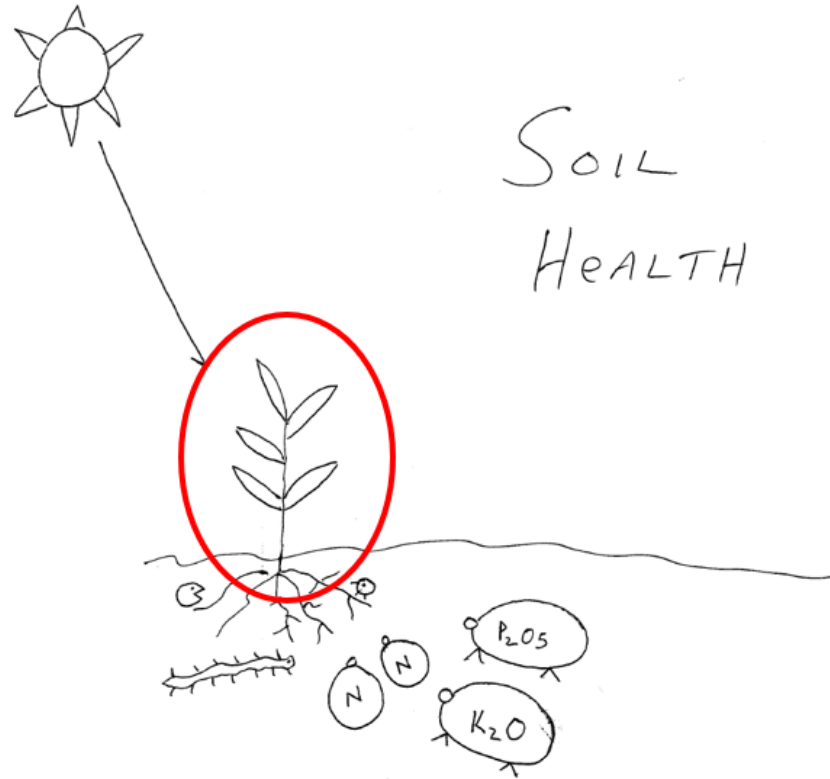
- Good Moisture
- Good Temperature
- Good Nutrient Flow
- Good Pest Resistance
- Good Infiltration
- Good Carbon Flow
- Good Microbial Populations
- Good Microbial Balance
- Good Stable Aggregation
- Good Filtering
- Good Buffering

**A Highly Functioning
Soil is a Resilient
Resource**



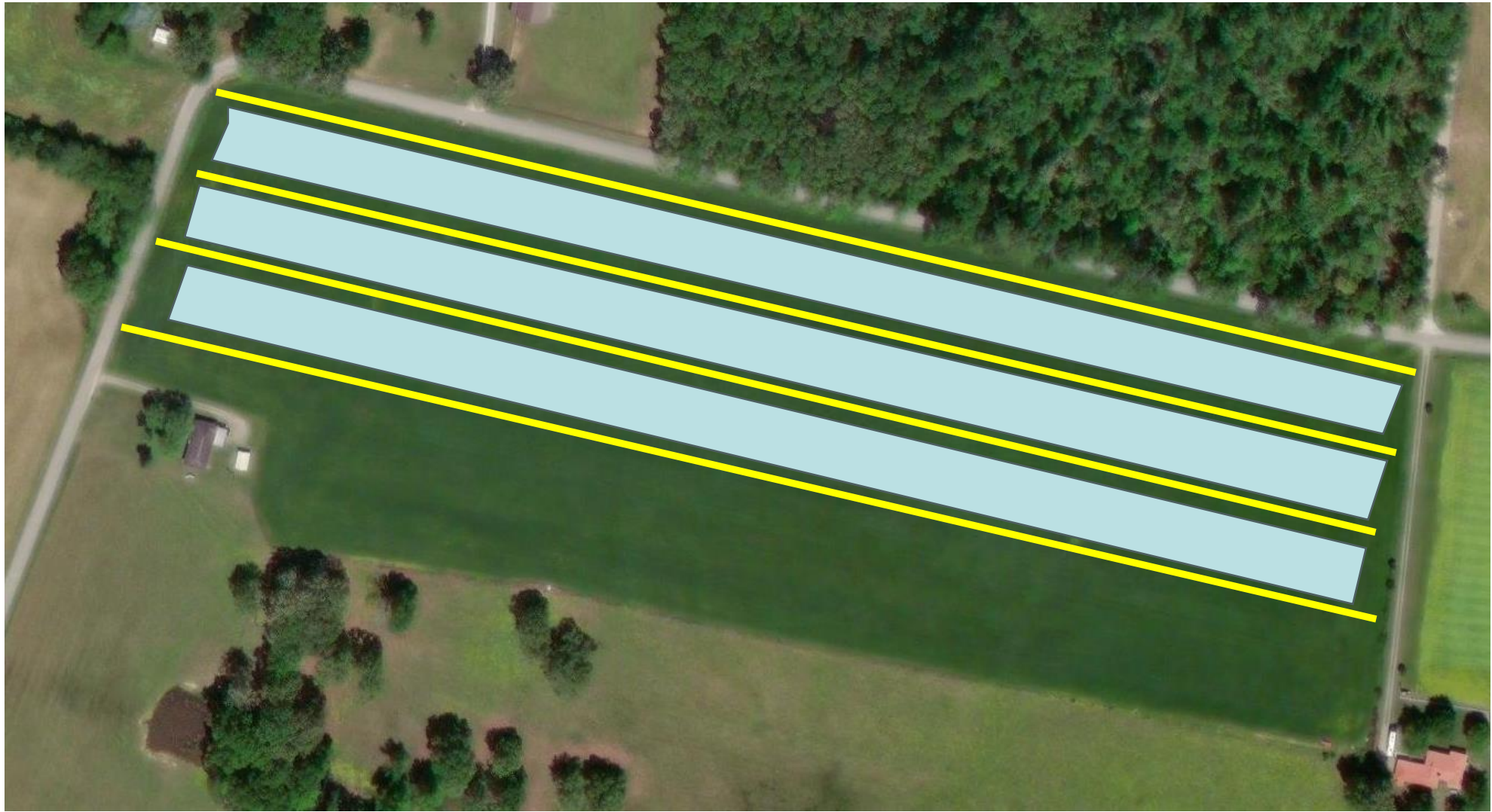
What Does the Soil Desire?





Brady Daugherty Age 9 2015





We Spend A Lot of Money and Labor Creating Imbalances and Blocking Energy Capture

Potential

- Adjective
 - Having or showing the capacity to become or develop into something in the future
- Noun
 - Latent qualities or abilities to that may be developed and lead to future success or usefulness
- Latent
 - Quality or state existing but not yet developed or manifest, hidden or concealed



Recognizing Potential

Soil Degradation



Tillage System

Soil Conservation



No-Till System
Soil Loss "T"

Soil Rejuvenation



Soil Health System

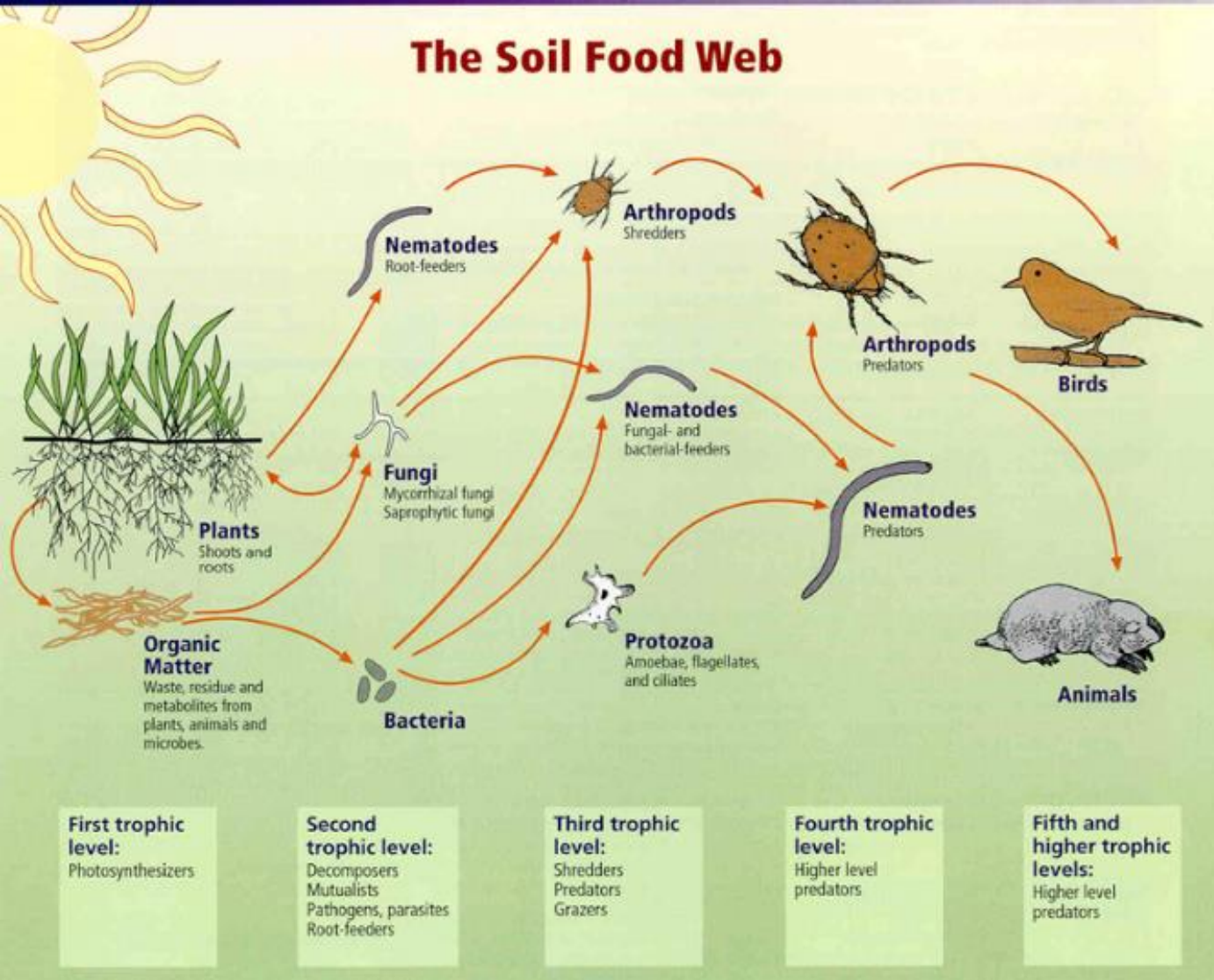




Daugherty's Sophisticated 365 Model, Evaluation Metrics, Carbon Measuring Evaluation Tool, etc.....



The Soil Food Web



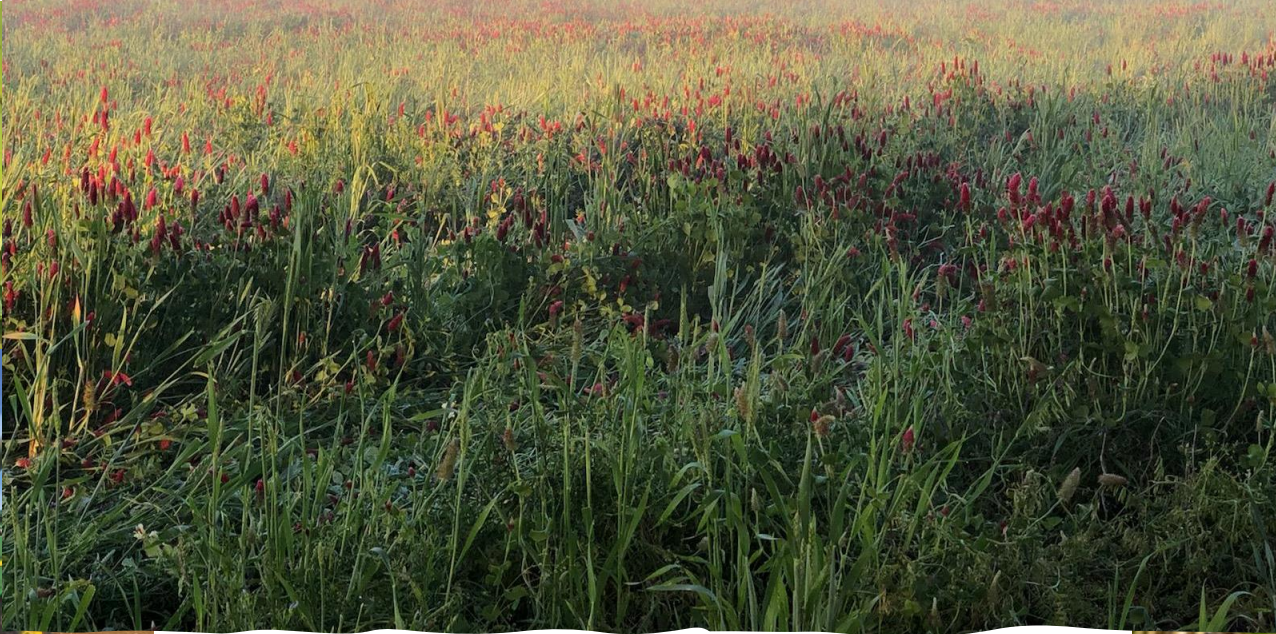
Food source in absence of plant

Photosynthesis

Soil Aggregates

More Complex Carbon Food





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Principles to Reach Resource's Potential

- Keep the Soil Covered - the house (factory) must be protected
 - Living Plant(s) – capturing sunlight drives (provides food) the functions
 - Pump Diversity – Embrace nature's synergistic collaborations
 - Understand what Tillage Does and what Restores its effects
-
- Integrate Livestock/Mimic Livestock Integration



Battle is
WON
or
LOST



Learn and Understand everything You Can about Carbon to Nitrogen Ratios

Table 1. Carbon to nitrogen ratios of crop residues and other organic materials

Material	C:N Ratio
rye straw	82:1
wheat straw	80:1
oat straw	70:1
corn stover	57:1
rye cover crop (anthesis)	37:1
pea straw	29:1
rye cover crop (vegetative)	26:1
mature alfalfa hay	25:1
Ideal Microbial Diet	24:1
rotted barnyard manure	20:1
legume hay	17:1
beef manure	17:1
young alfalfa hay	13:1
hairy vetch cover crop	11:1
soil microbes (average)	8:1



↑
slower

Relative
~~Decomposition~~
Rate

↓
faster



**Consumption
and Cycling**



Heck with OM%

Re-Think Carbon

When You are not catching sunshine, the soil (factory) is eating reserves

Focus on a continuous flow of energy (food)



2 Thir

The L

Carbo

sequester :

Overview

Similar and opposite words

Usage examples

Pronunciation

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)

 se·ques·ter
/sə'kwester/

verb

- 1. **isolate** or hide away.
"Tiberius was sequestered on an island"

Similar: isolate oneself hide oneself away shut oneself away seclude oneself ▼

- 2. take legal possession of (assets) until a debt has been paid or other claims have been met.
"the power of courts to sequester the assets of unions"

noun **US**

a general cut in government spending.
"if the budget deal hadn't gone through, there would have been a sequester of at least \$100 billion"

[Feedback](#)

More definitions ▼

People also ask :

What does sequester mean?

to keep apart from others; segregate or isolate: The jury was sequestered until a verdict was reached.

See translations in 100+ languages

Translate to

Choose language ▼

rip



Human Integrity = Ecological Integrity

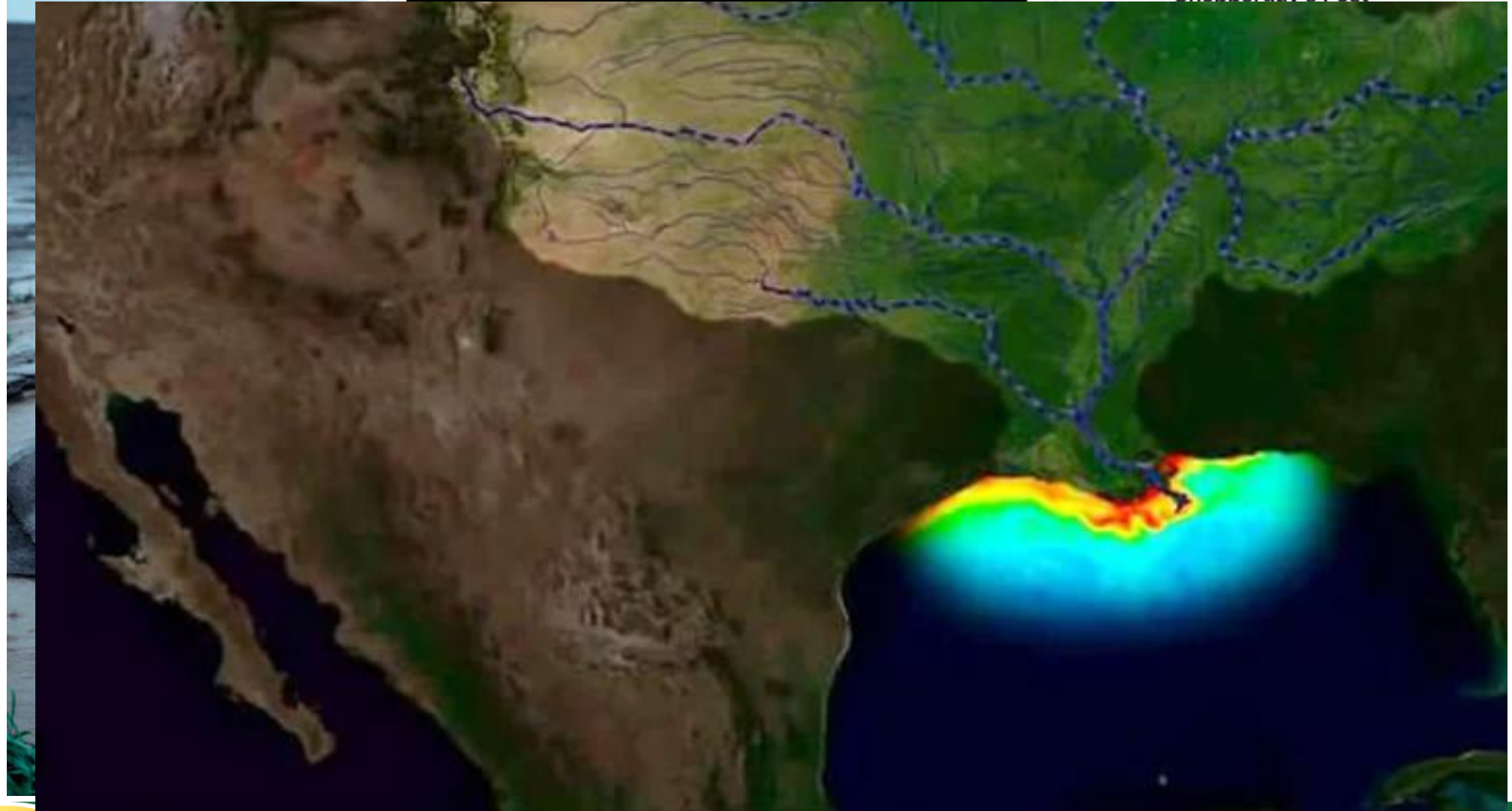


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**Don't Start Planting Cover
Crops Until.....**



No-Till + Cover Crops = ?



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Lets Talk About Tillage

Tillage + Nothing = Degradation

Tillage + Establishment of Highly Diverse Energy Capturing Device >
0 Disturbance with 7 months of starving



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As Minimal as You Can to Get Stand



I can tolerate this on October 4 to have this on Dec 12



2 Things To Never Do on this Journey

Never Plant 100% Legume or Legume Mix

Never Plant 100% Brassica(s)



Lets Talk About Diversity

Don't be Skeered of it and it don't cost more

Geographically Adaptive

Topographically Adaptive

Allelopathy?



4 Seasons of
Covers in my
neck of the
woods

Cuss em in the Fall

Cuss em in the Winter

Cuss em in the Spring

Praise em in the Summer



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ENVIRONMENTAL TILLAGE SYSTEMS



You Can Bust Your Tail in the Fall, Only to Not Reach Big Potential in the Spring



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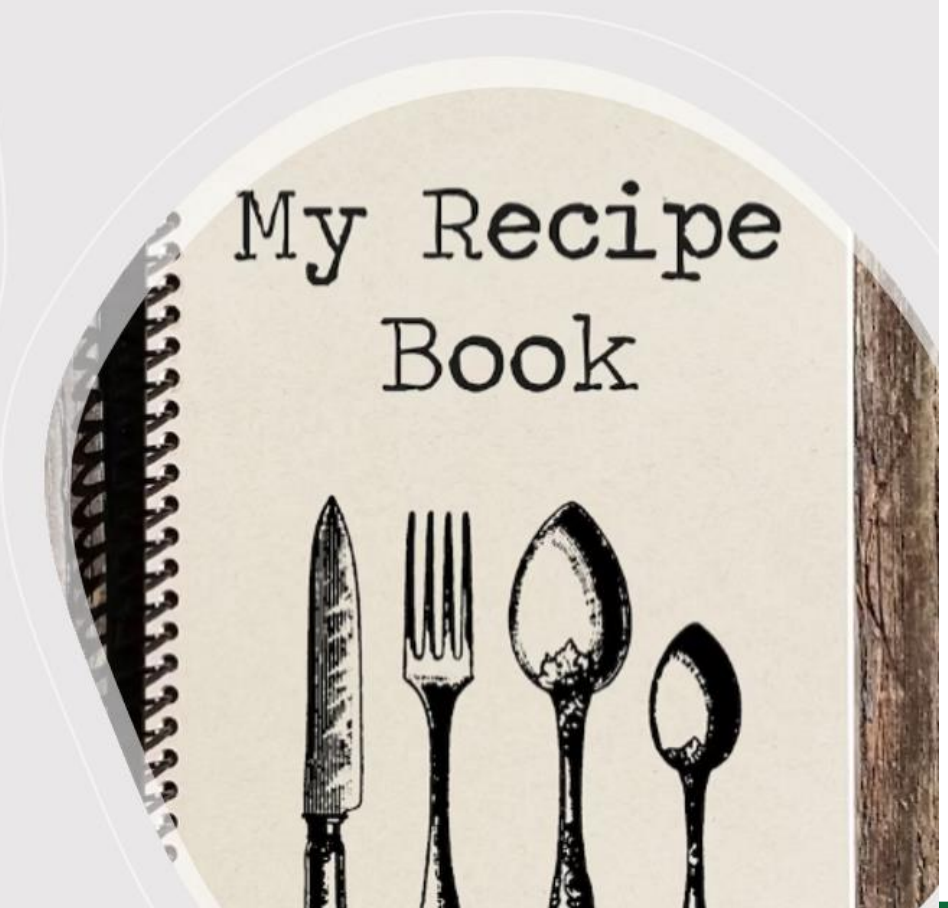
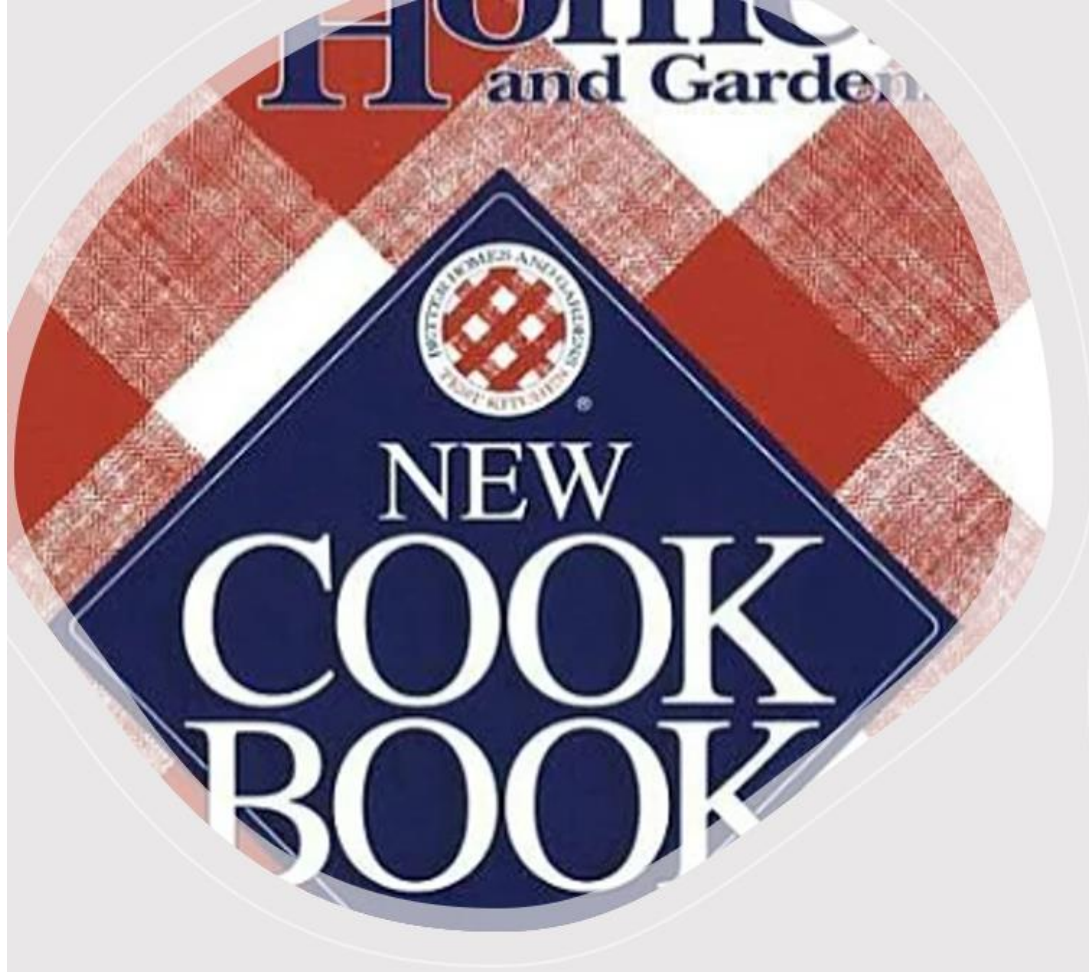


Lets Talk about Biomass



Results Begin with the Commitment to Restoration, But Understanding and Acceptance of the Dynamics is a Must





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I Humbly Thank You for
Your Time and Wish You all
the Best in this Journey

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