

The Story of Healing From the Ground Up

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Anya KnechtFarmer, I-Regen Assistant Director, University of Illinois
Owner & Researcher, Knecht Research Consulting & Design LLC



Carl Rosier, PhD *Farmer*, Barking Dog Farms *Researcher in Soil Microbial Ecology*, Basil's Harvest



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Connecting the Dots

- Grew up farming both conventional, regenerative and gardening, canning and food preservation.
- Nutrition & Soil Science & Engineering
- Playing in the dirt. Hauling grain.
- You are what you eat.
- Beckman Institute, CABBI, ARPA-E, iSEE, I-Regen
- Cystic Fibrosis



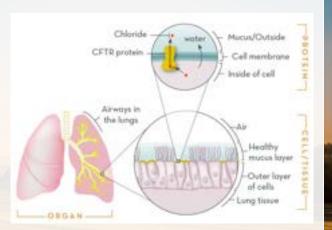
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Cystic Fibrosis (CF)

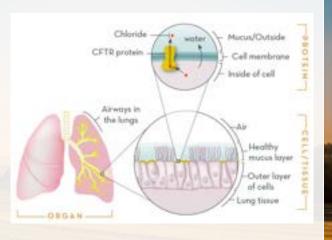
- 70,000 worldwide, 30,000 in US.
- A chronic, progressive, and fatal genetic (inherited) disease, to which there is no cure at present.
- When I was born, the life expectancy for a person born with CF was 14 years old.
- Today it is 37.5 years old for those who were born with CF before 2017.
- The current life expectancy for CF patients born before 2017 is 53 due to new medications and antibiotics. For those of us who were born well before 2017, the damage incurred keeps the life expectancy at 37.5.





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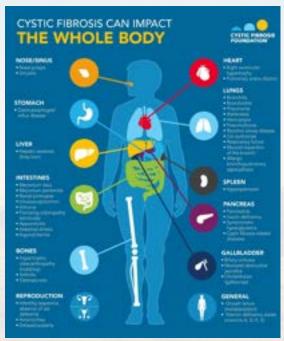
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Graphic Nature of the Disease

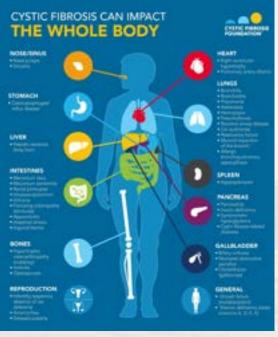
Persistent coughing, wheezing, difficulty breathing, repeated lung infections causing hospitalizations and need for IV meds (acute exacerbations), bronchiectasis, hemoptysis (coughing up blood), pneumothorax, collapsed lung, chronic obstructive pulmonary disease (COPD) as it relates to CF, frequent/daily fevers due to infections, night sweats, lung pain, inflamed nasal passages or sinus infections, foul-smelling and greasy stools, diarrhea, poor weight gain and growth, intestinal rectal blockages/obstruction, prolapse, constipation, nutritional deficiencies/malnutrition, pancreatitis (inflamed pancreas), diabetes, blocked bile duct, reproductive failure, osteoporosis (thinning of bones), and electrolyte imbalances and dehydration. Due to the increased resistance that many bacteria gain, antibiotics prove less useful over time in prolonging survival. Many CF patients experience complications with various organs due to having to use antibiotics to stay alive.





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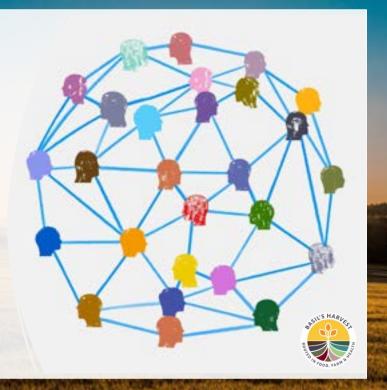
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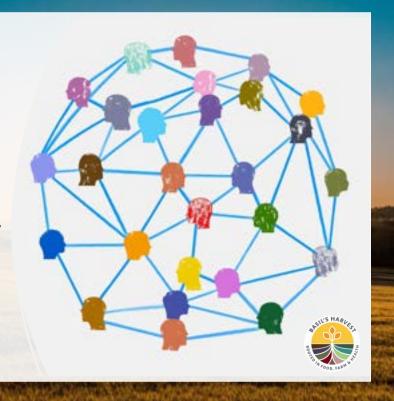


- The search for answers
- Why do you do what you do?
- Generated the Knecht Theory



Engineer the shit out of it...

- The search for answers
- Why do you do what you do?
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The Knecht Theory

- Enzymes
- You are what you eat.
- Fries or Spinach?
- Why local?

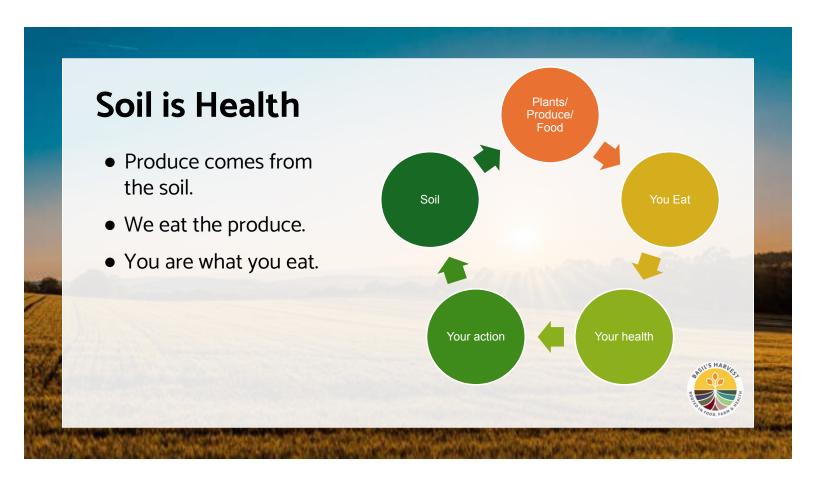


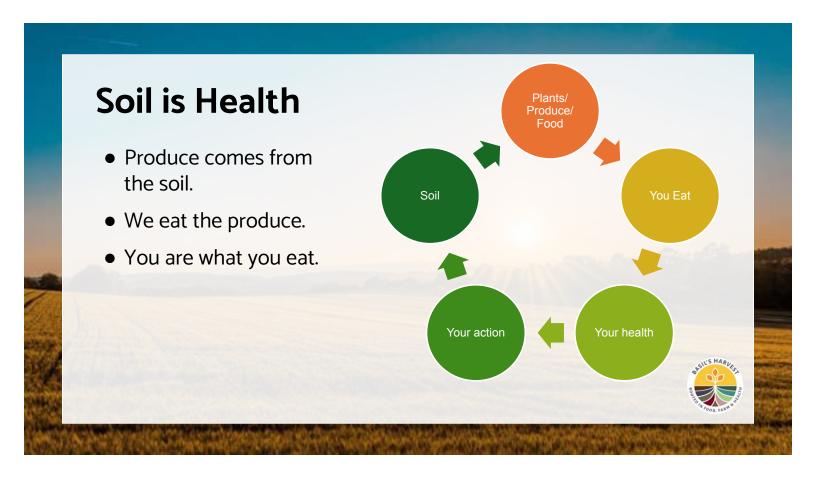


The Knecht Theory

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Damn Nature, you scary!



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If...

- For every action, there is an equal and opposite reaction
- And neither matter can be created nor destroyed
- Then to me it makes sense to figure out how and where things are connected to understand the system and make decisions from there.



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Everyone has challenges!

Whether you have a child with diabetes, you administer healthcare, or you are a farm who provides our food – you are a link in this chain of connections.



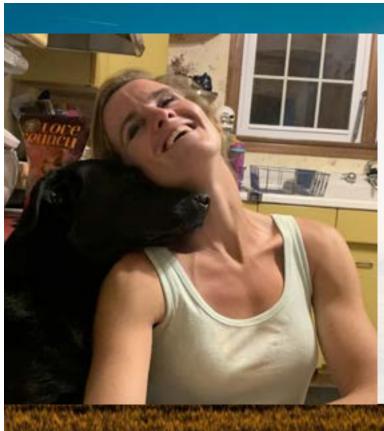


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Thrive and Survive!

- Follow my journey on anyaknecht.com
- Thank you for your time and attention!





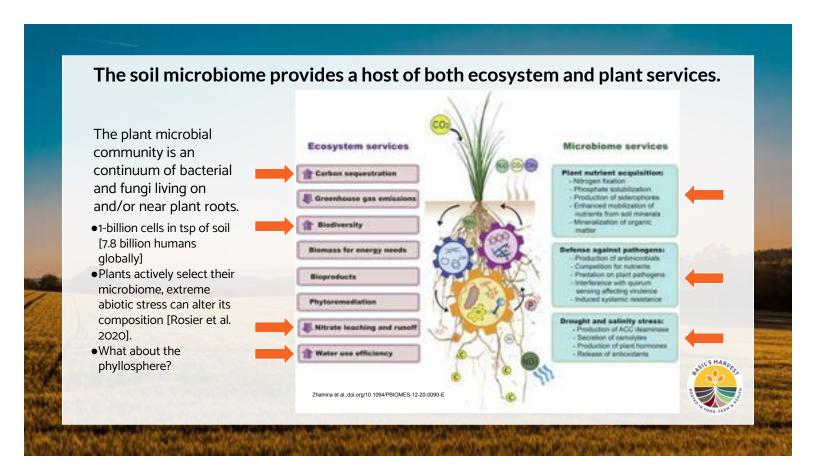
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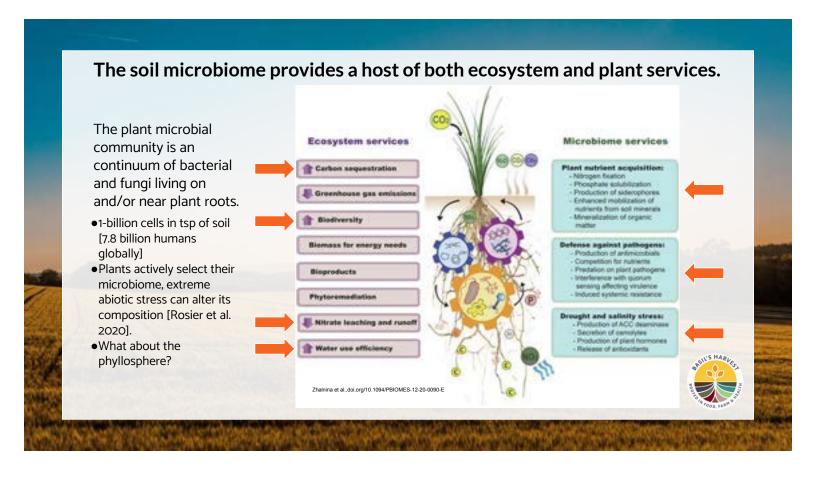
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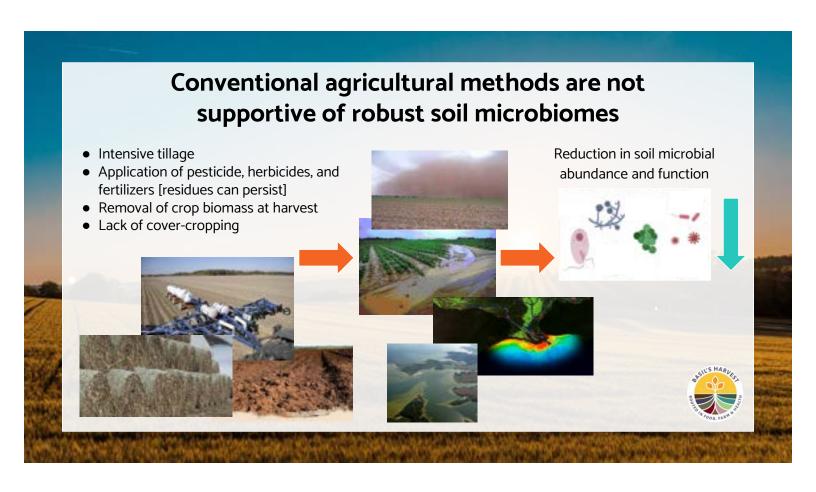


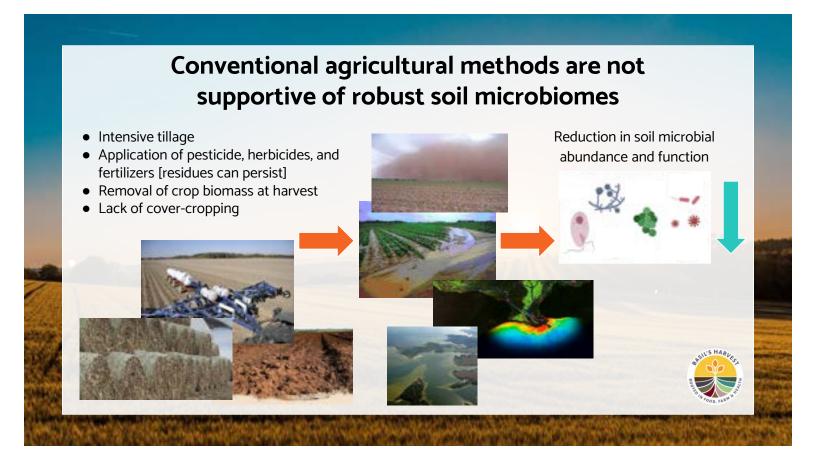












Organic/Regenerative agricultural approaches focus on creating stable soil environment increasing microbial abundance.

- Reduction in tillage/limited deep tillage events
- Application of compost
- Retention crop biomass after harvest
- Use of cover-cropping/legumes



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State of knowledge soil microbial influence on crop quality?

Several studies suggest that crop nutrient content continues to decline [Mayer, A., 1997, Davis et al., 2004]

Variability in crop antioxidant and protein content linked to variety selection and management influences on soil environment [Rosier et al., 2024]

Several reports show negative effects on beneficial soil microbes, including arbuscular mycorrhizal fungi and nitrogen-fixing Rhizobium spp. as a result of glyphosate application (*Van Bruggen et al, 2018*).



Montgomery et al., suggested that organically managed crops maintain greater mineral and phytochemical content then conventional crops.

Huber et al. proposed that diets composed of organic foods might provide greater organism resilience

Our knowledge is constantly evolving and more research is needed.



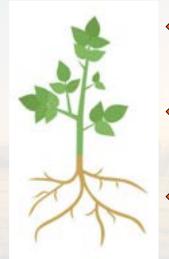
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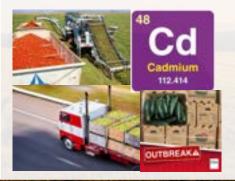
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Challenges continue!

Conventionally produced

- Cultivar variety- engineered for early harvest ["elite varieties"]
- Treated with preserving agents
- Stored/Transported long distance
- Contains pesticide/herbicide residue
- Possible heavy metal residue
- Possible contamination



Local/organically produced

- Increase use of heirloom varieties
- Harvested < 7 days of market
- No pesticide/herbicide residue
- No heavy metal residue

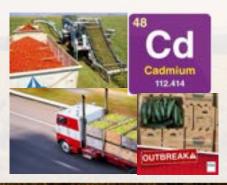




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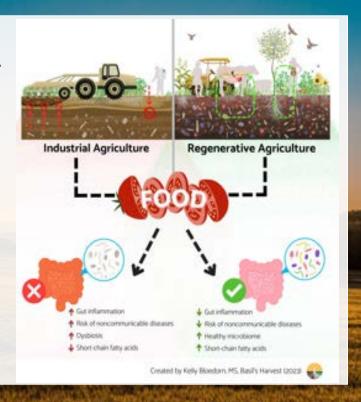




The microbiome and quality of the crop directly influences gut microbial community

The gut and soil microbiome share similar bacteria

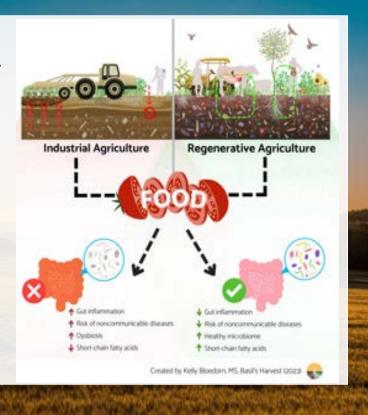
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- Microbes from fruits, salads and vegetables inculcate the human gut microbiome.
- The plant microbiome can significantly influence gut microbiome and thereby human health (Hirt, 2020)
- A recent study suggests that the brain gut microbiome (BGM) plays a significant role in mental health (An et al., 2024: doi.org/10.1038/s44220-024-00266-6)



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As a farmer....

- **Consumer**: increased participation in their regional foodshed
- Market manager: greater inclusion of beginning farm operations
- State and local agencies: increased support for food insecure communities. Colorado sugar tax is a great example.
- Farmer-to-farmer: increased knowledge sharing and collaborations.



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Consume(rs)

- ★ You are what you eat 28-36 trillion cells-> 330 billion cells replaced daily
- ★ You vote for a food system with every bite and sip
- ★ Your vote ripples







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Ultra-processed food

67% of calories by ages 2-18 yrs 57% of calories by adults 73% of US food supply is ultra-processed foods

Engineered food (industrial prep)

- Hyperpalatable, inexpensive, long shelf life
- Energy dense, chemically enhanced

Possibly addictive (dopamine effect) Adverse health outcomes-mental disorders, obesity, cancer, respiratory, GI, metabolic, cardiovascular





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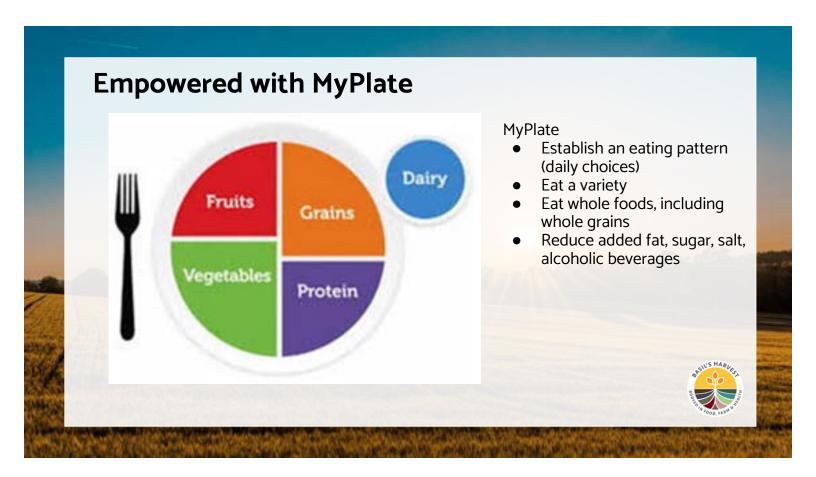
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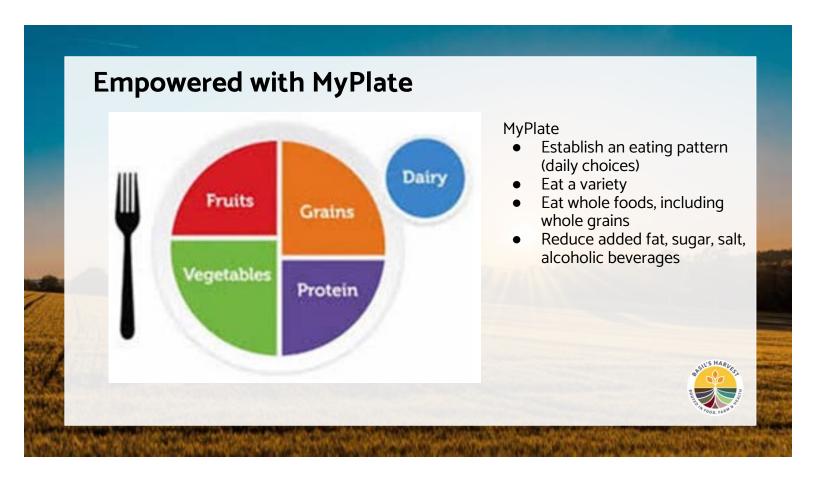
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Planetary Health Plate

Environmental Nutrition

- Eating patterns that support healthy microbiome
- Eating patterns that support a sustainable food system & planet
- Eating patterns that build resilience
- Envision/build food system for the future (responsive, adaptable, locally relevant)



Eating patterns that

Safeguard soil microbiome (local ecosystem) → gut microbiome (human ecology)



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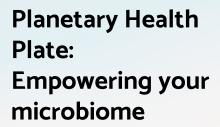
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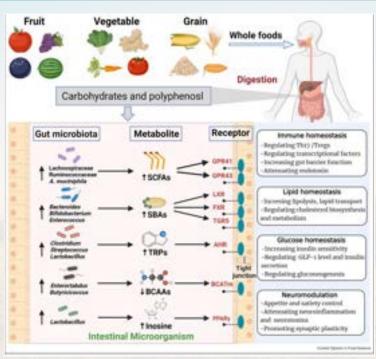
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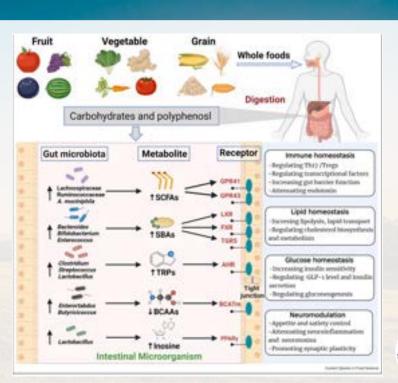


Whole Foods →
Prebiotic (feed
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Probiotic
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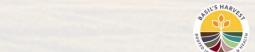
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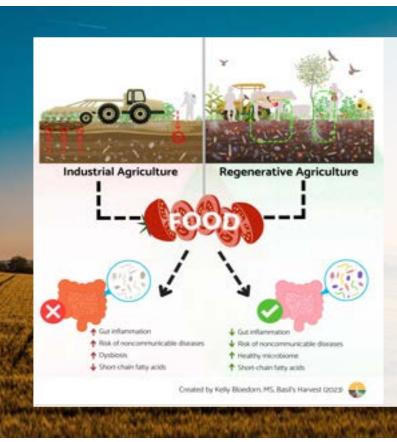




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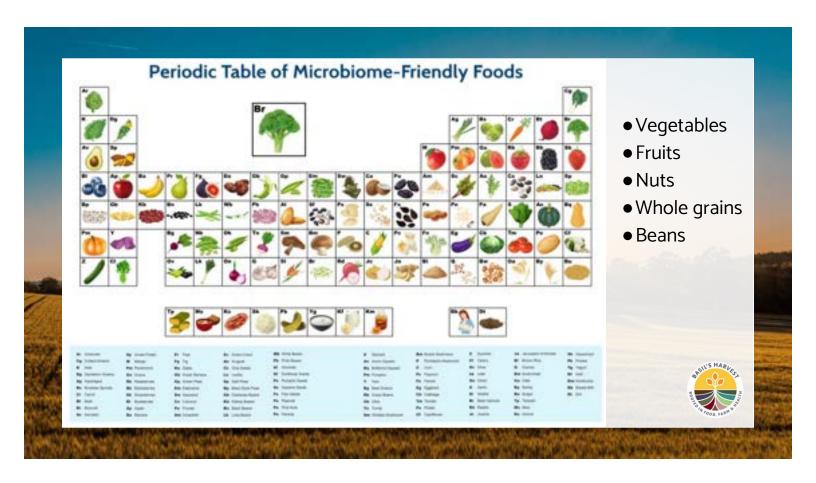


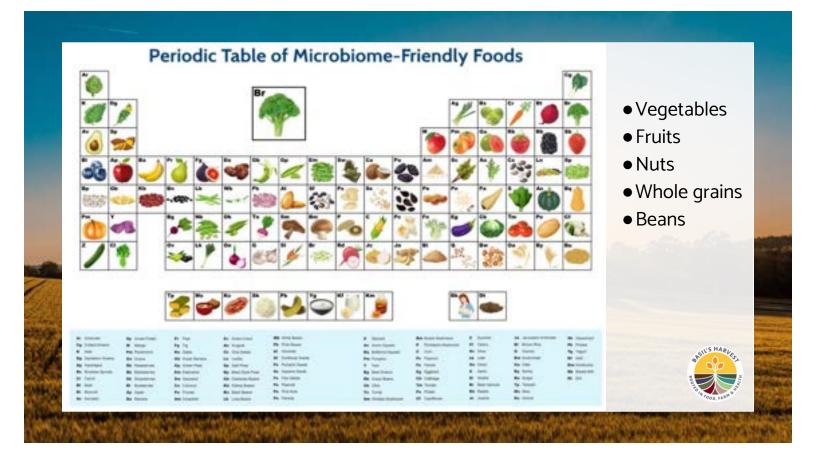


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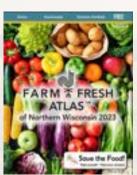
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Eat Local Regional Food

Microbiome friendly

- Close to harvest=highest nutrients and phytochemicals
- More variety of cultivars
 - Heritage varieties
 - Local control of seeds
 - Support local ecosystems
- Talk with the expert grower
 - Production practices
 - Cultivar differences
 - Preparation tips









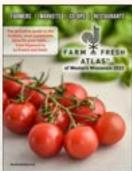


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Action: Support regenerative organic farmers

Farms, land in farms, and average acres per farm, 1850–2023

Million farms, billion acres, or 100 acres per farm

Farms (million)

Average farm size (100 acres per farm)

Land in farms (billion acres)

879

Land in farms (billion acres)

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, Census of Agriculture (through 2022) and Farms and Land in Farms; 2023 Summary (February 2024). USDA 2023 Farm Census

In 5 years:

We lost 150,000 farms & farmers. And 21 million acres of farmland.

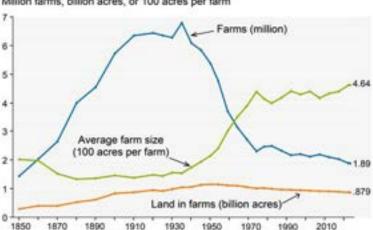
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