



# **FARMING FOR PROFIT WITH MINIMAL WATER**

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**CHALLENGING THE STATUS  
QUO TAKES COMMITMENT,  
COURAGE, IMAGINATION,  
AND, ABOVE ALL,  
DEDICATION TO LEARNING.**

-Marshall Ganz



CHALLENGE YOUR  
OWN STATUS QUO –  
BEFORE SOMEONE  
ELSE DOES.

Ron Kaufman

# Mental Challenges

## Personal

What if's?

Pressure to maintain or expand the operation

Are these changes possible

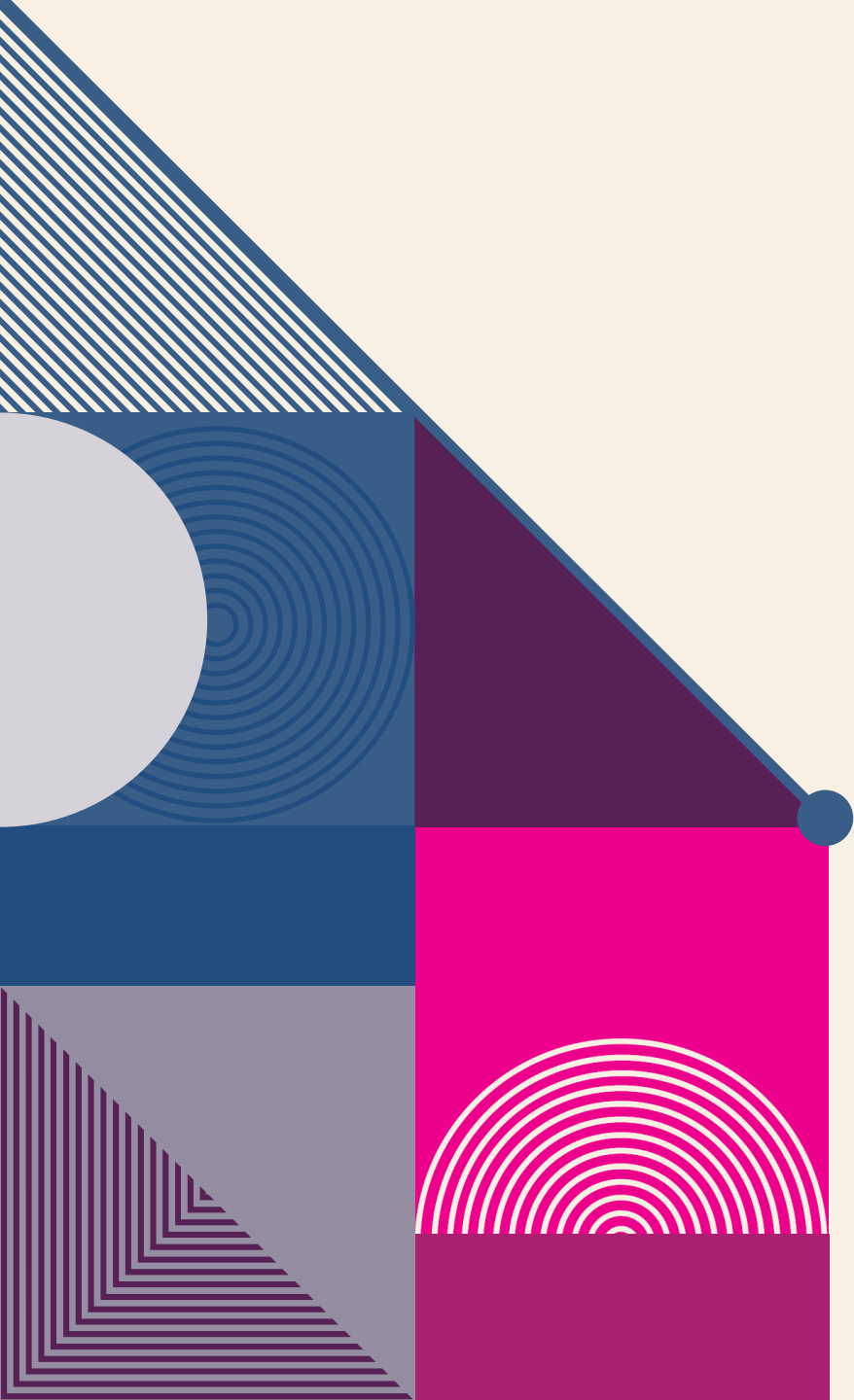
## Community & Family

That's not how we do it

That won't work

That's not suited for our climate





# AGENDA

Introduction

Soil Health

High Plains Challenges

Cropping Options

# MY PARENTS FARM



## COMMON PRACTICES

- **Wheat, Row Crop, Fallow (Tillage or Chem)**
- **Wheat, Fallow (Tillage or Chem)**

## INNOVATIONS

- **Sunflowers added in 1975**
- **First No-Till Planting in 1984**
- **Soil Testing from 1984**
- **Computerized Records starting in 1985**
- **100% Continuous No-Till in 1999**
- **Air Seeder in 1999**
- **GPS w/ autosteer in 2005**
- **Stripper Head in 2016**

# THE FARM NOW

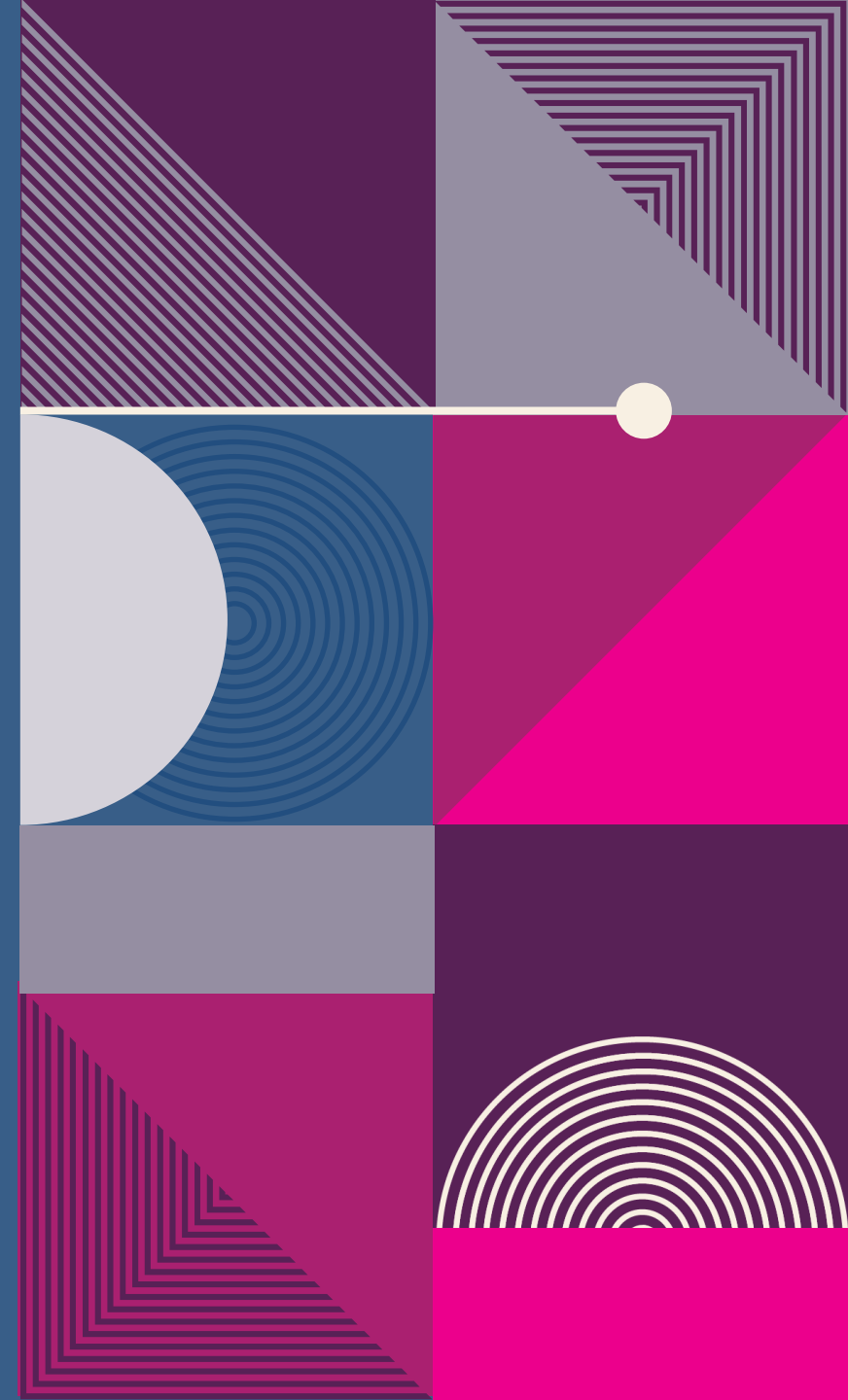


## Continuing Innovation

- Continuous Cropping in 2017
- Diversity Index on Fields 2017
- Soil Health Testing 2017
- Haney 2022
- Narrow Row Spacing 2017
- Gluten Free Production 2018
- Intercropping 2018
- Bee Keeping 2018 - 2024?
- Direct Sales 2018
- Milling 2018-2024
- Alternative Harvesting Methods 2018
- Perennial Cover 2019
- Grain Cleaning 2019
- Electro Weeding 2022
- Rice 2022
- Seed Treatments 2023
- Carbon Tracking 2023
- Pollinator Strip Headlands 2024
- Variable Rate Seed and Fertilizer 2024
- Agrivoltaic Shelterbelt 2024
- Community Building 2024
- Sesame 2025
- Sustain Herbicide Retention 2025
- Glyphosate Remediation Research 2025
- Biochar 2025

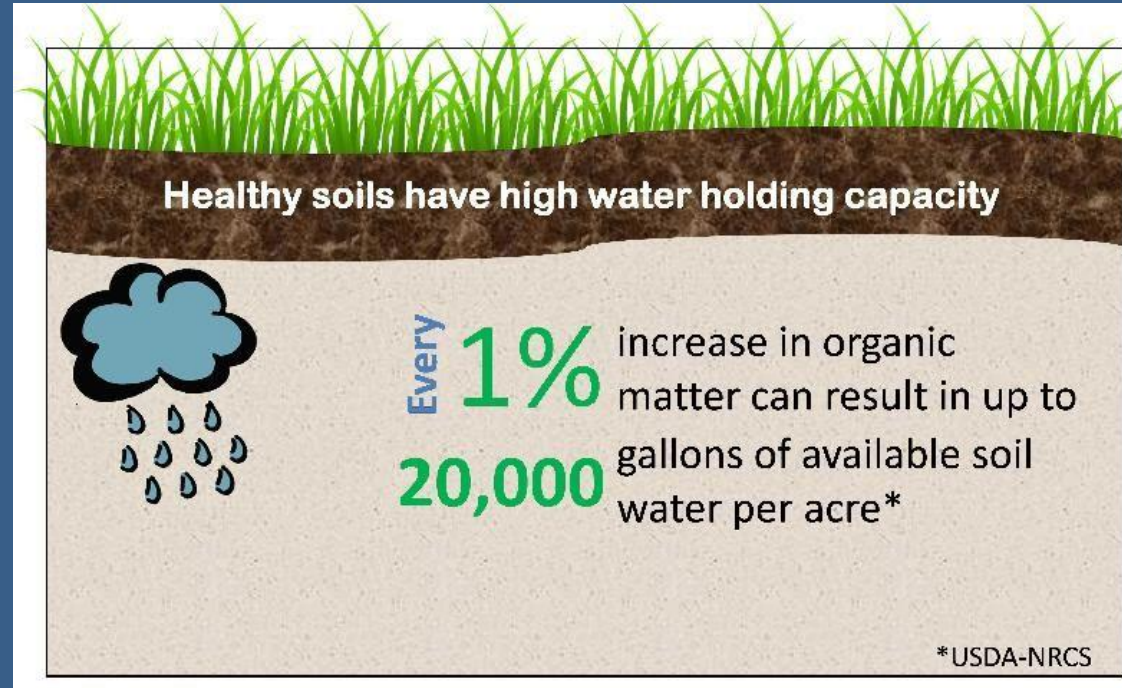
# SOIL HEALTH

- Context
- Soil armor
- Minimal soil disturbance
- Plant diversity
- Continuous living plants/roots
- Livestock integration



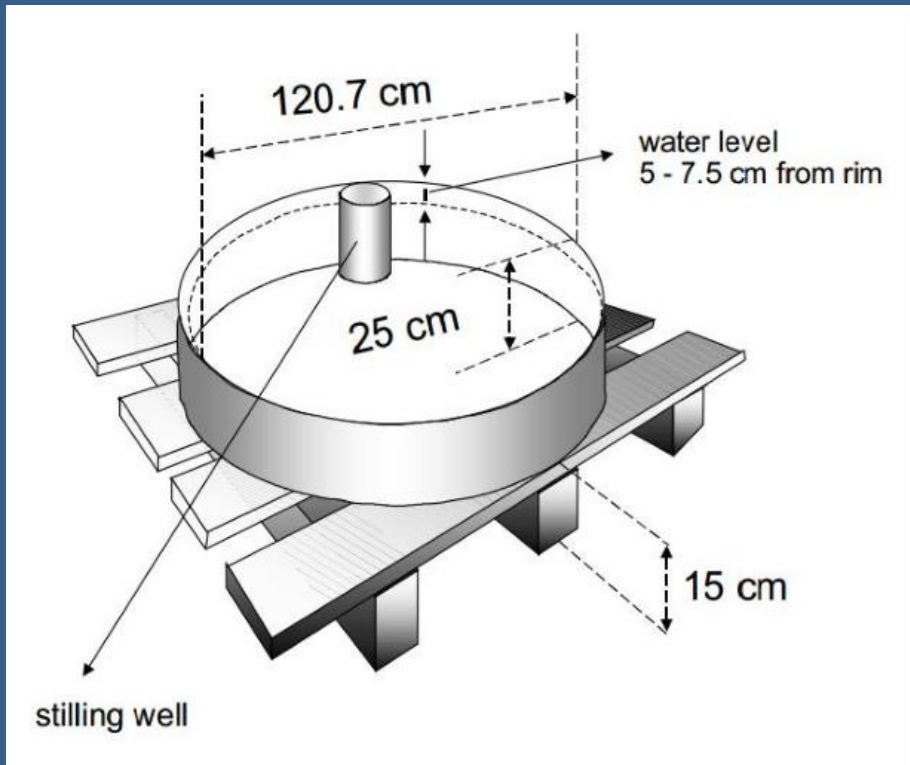


# RELATIONSHIP TO ORGANIC MATTER



Every 1% of organic matter can hold an acre inch of water

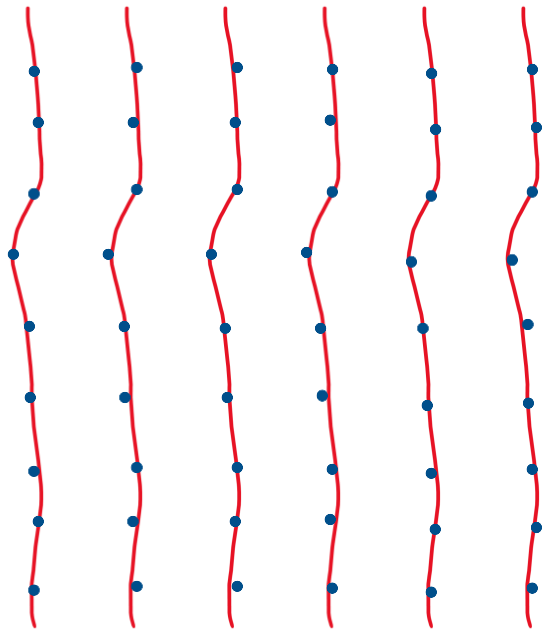
# OUR GREATEST CHALLENGE



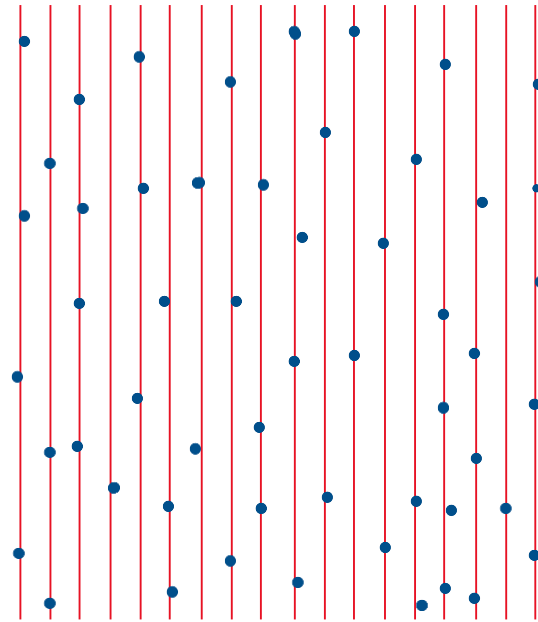
- Annual Pan Evaporation Rate is the average amount that can be evaporated in a year
- It's our limiting factor on the High Plains
- Bismark ND Precip = Akron CO Precip
  - How do the PE Rates Compare?
  - What does that mean for plant growth?
- This is the issue we need to address

# Examining Row Spacing

One plant per every 13.5" of row



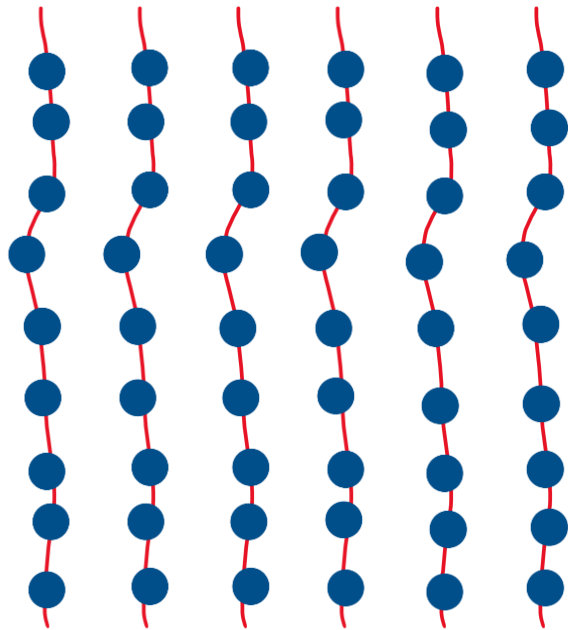
One plant per every 39.9" of row



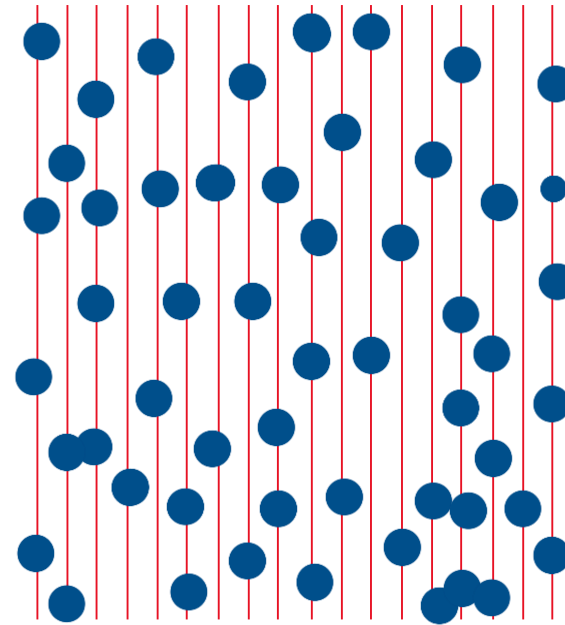
Every plant has 3.11 square feet of space on average in both

# Revisiting Row Spacing

One plant per every 13.5" of row

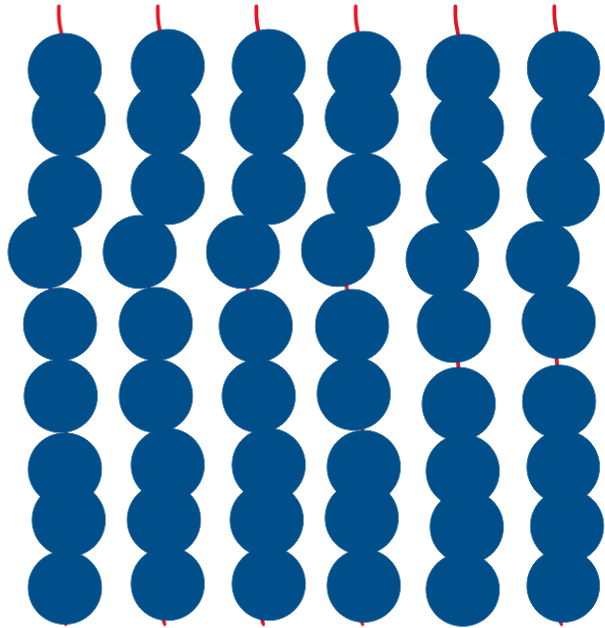


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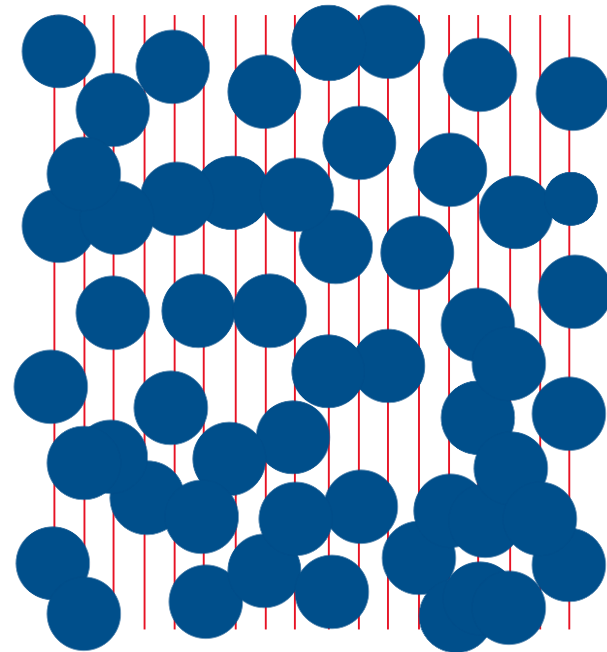


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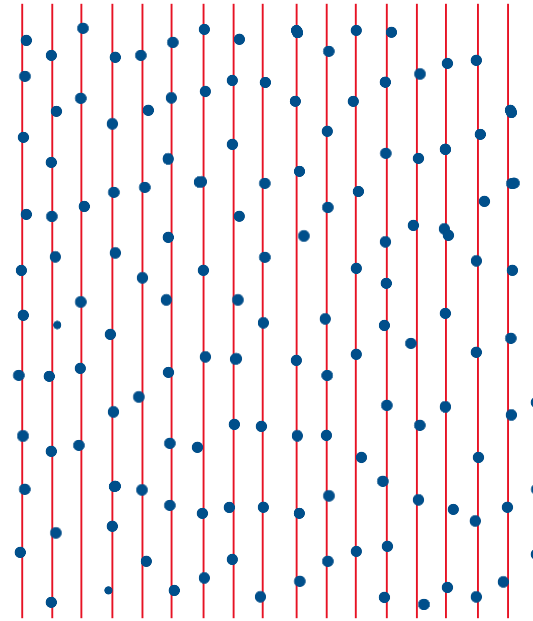


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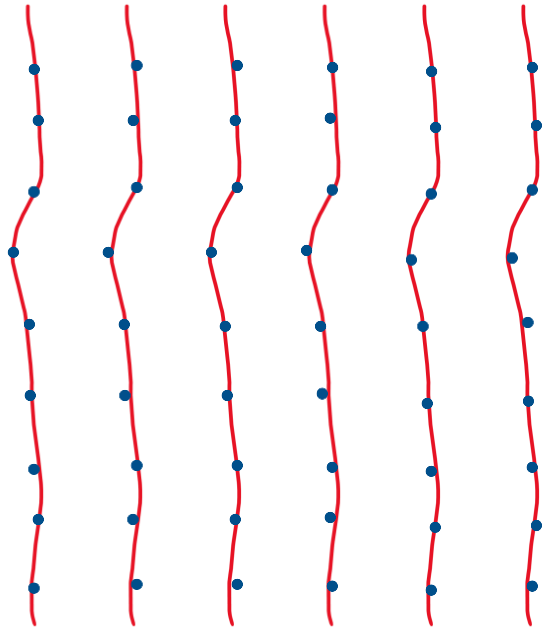
# Revisiting Row Spacing

- But what if we wanted uniform spacing in plants?
- One plant per every 13.5" of furrow
  - 37564 plants per acre
- We have found 2.5 times the standard population gives us uniform spacing
- The closest competing plant is almost the same distance as planted

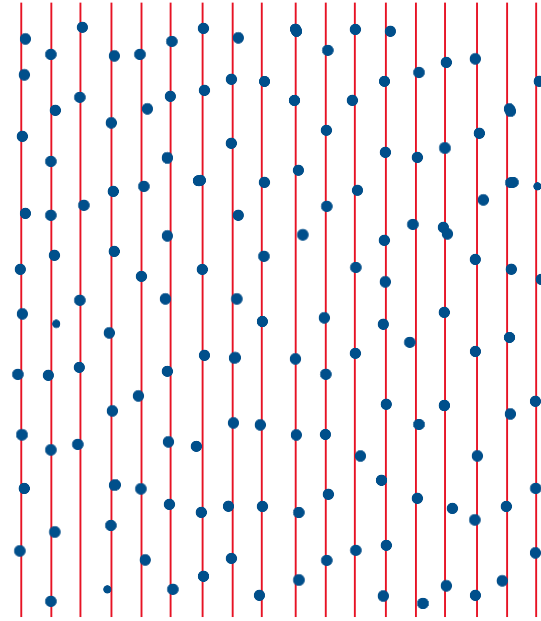


# Now Why!!!

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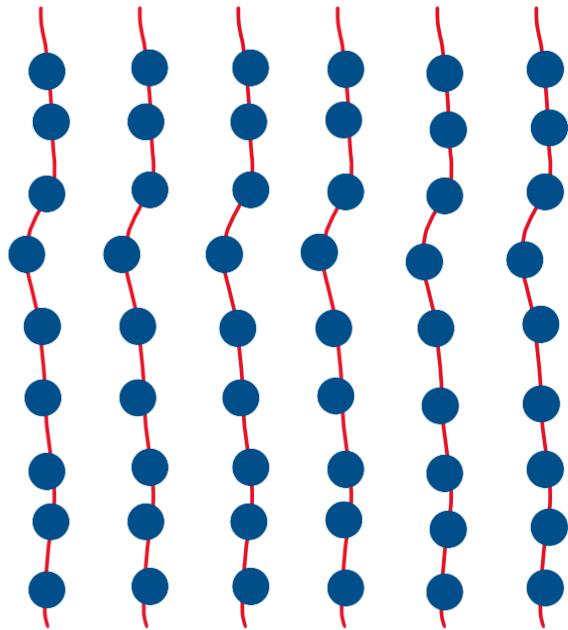


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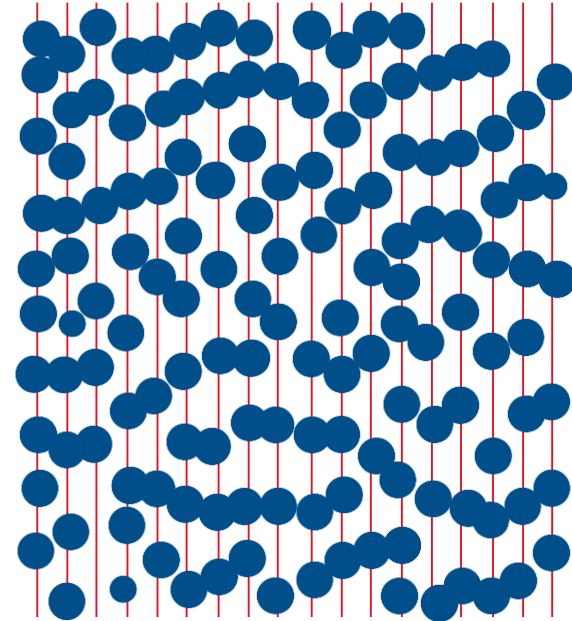


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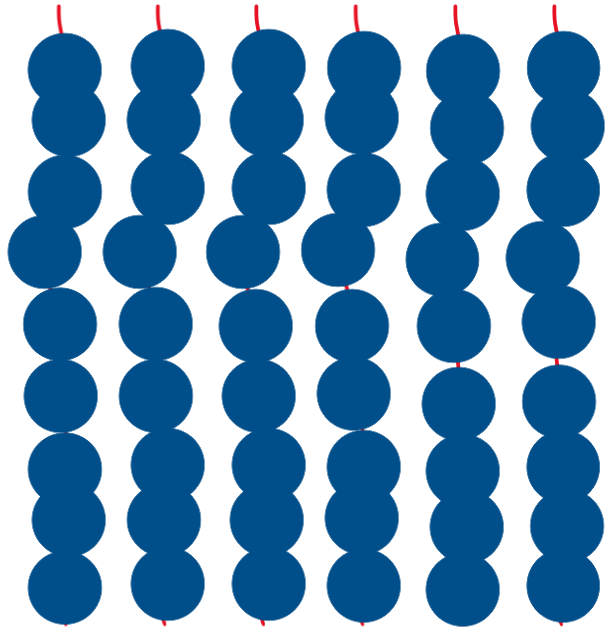
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# Now Why!!!

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One plant per every 13.5" of row





# NOW WHAT TO SEED

- Need to look at areas of the world with similar growing conditions for cropping options
  - Sub-Saharan Africa, India
- Millets, Sorghums, Sesame, Beans, Sunflowers, Camelina, Buckwheat, Amaranth
- Weeds and Grasses is a good focus
- Other crop timing and double cropping
- Markets
- What are your goals? Long Term vs Short Term
- Lenders and Insurance



# CLOSER LOOK

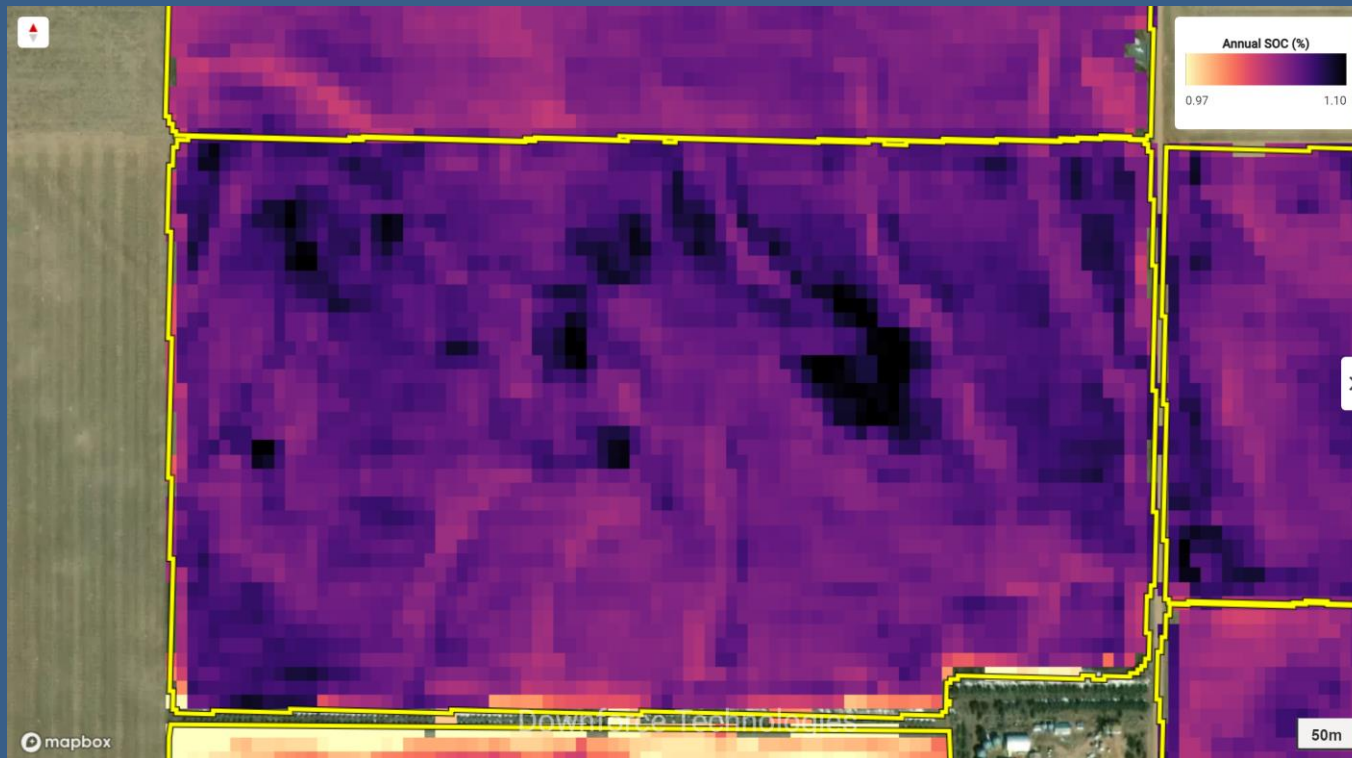
- Millets
  - Proso is most common, but others exist
- Sorghums
  - Contracts for food grade white are opening up
- Beans
  - Black eyes have the least water usage
- Sunflowers
  - Oils have much lower inputs
- Oats
- Camelina
- Buckwheat
- Amaranth
- Sesame



# WHAT TO CONSIDER

- Water Savings
- Increased Soil Health
- Mining Old Inputs
- Changing Workload and Timing
- Reduced Risks
- Return on Investment

# EVALUATING RESULTS



- Soil Health
- Carbon Sequestration
- Disease & Insect Pressures
- Mental Health
- Continuing Operations

# THANK YOU



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If you focus on the hurt, you'll keep suffering.  
If you focus on the lesson, you'll keep growing.