
HARVESTING
ROI FROM AI
LEARNING HOW TO LEVERAGE GEN-AI
TO SOLVE FARMING PROBLEMS
DAN MAYCOCK

# TODAY, THERE IS AN INFORMATION OVERLOAD IN AGRICULTURE

- Agriculture is drowning in data but starving for insight.
- Critical market signals are lost in the noise.
- As a result, decisions are often reactive rather than proactive.
- On top of that, Agriculture remains under-digitized making it harder to filter and make sense of the deluge of data without AI-based tools to help.

SEPARATING OUT THE SIGNALS FROM THE NOISE

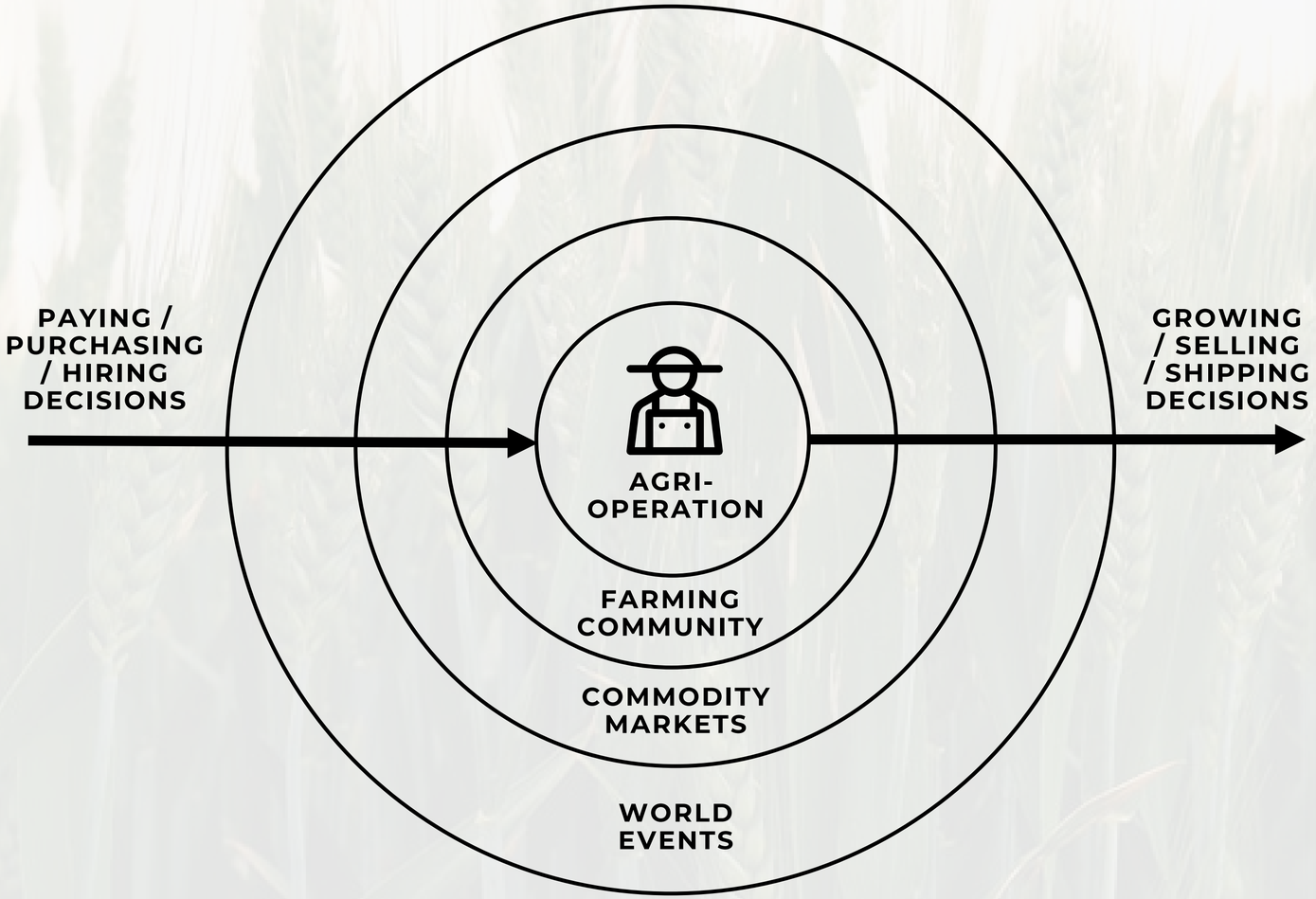
# THE BUTTERFLY EFFECT ON GLOBAL FARM VALUE CHAINS

The world is changing faster than anyone can keep up with, and the impacts on a given farm can be numerous and hard to sort out and measure.

# GEN-AI AS A DIGITAL FARM ADVISOR

Imagine a tool that can help augment your on-the-farm team with subject matter expertise that's increasingly personalized over time

- An agronomist who's seen 10,000 farms
- Market analyst watching prices 24/ 7
- A grant writer who gets 80-90% of the way to a final draft application.
- Equipment specialist for every brand
- A veterinarian available for quick questions



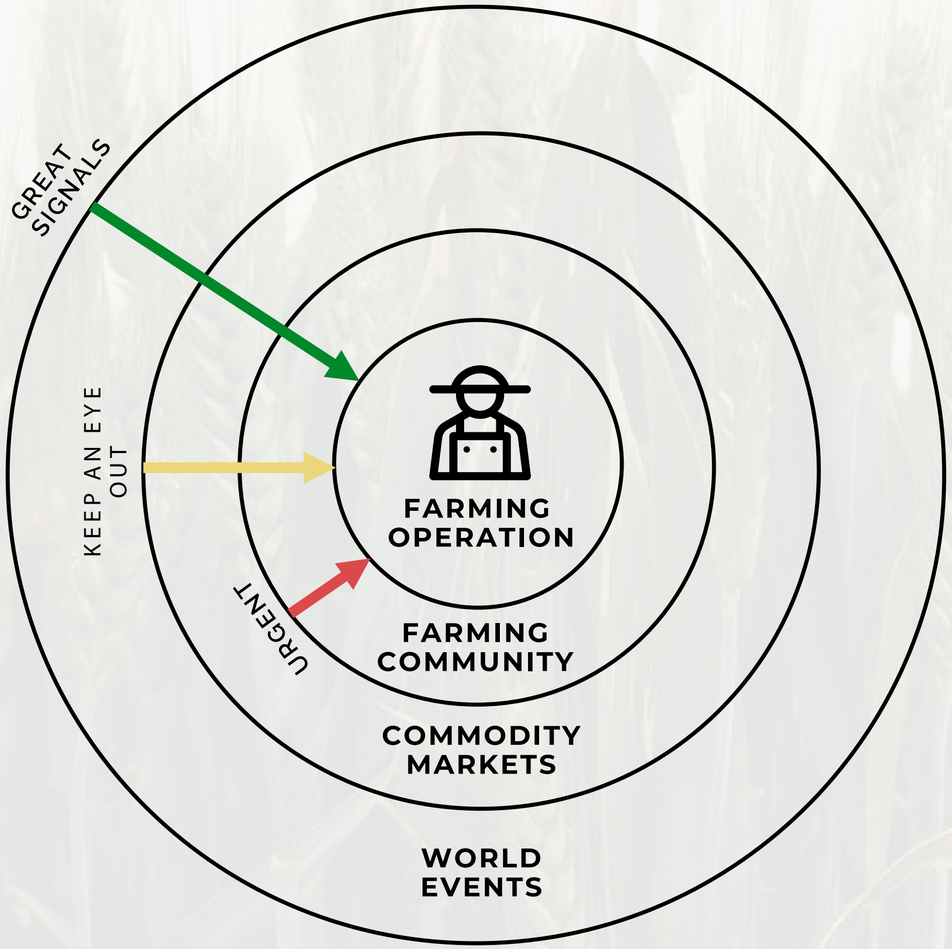

"RIPPLE" EFFECT IMPACTING DECISIONS ABOUT WHAT TO BRING INTO YOUR OPERATION, WHAT AND HOW TO FARM WITHIN YOUR FARM, AND WHAT TO HARVEST AND SELL

# EVERY AGRIBUSINESS EXISTS IN A WORLD OF INCREASINGLY RAPID CHANGES

It's typical for a given farming operation, international agribusiness, or regional ag association to track with local, regional, and global events – but to what extent?

# IMAGINE AN AI-POWERED SYSTEM THAT CAN HELP

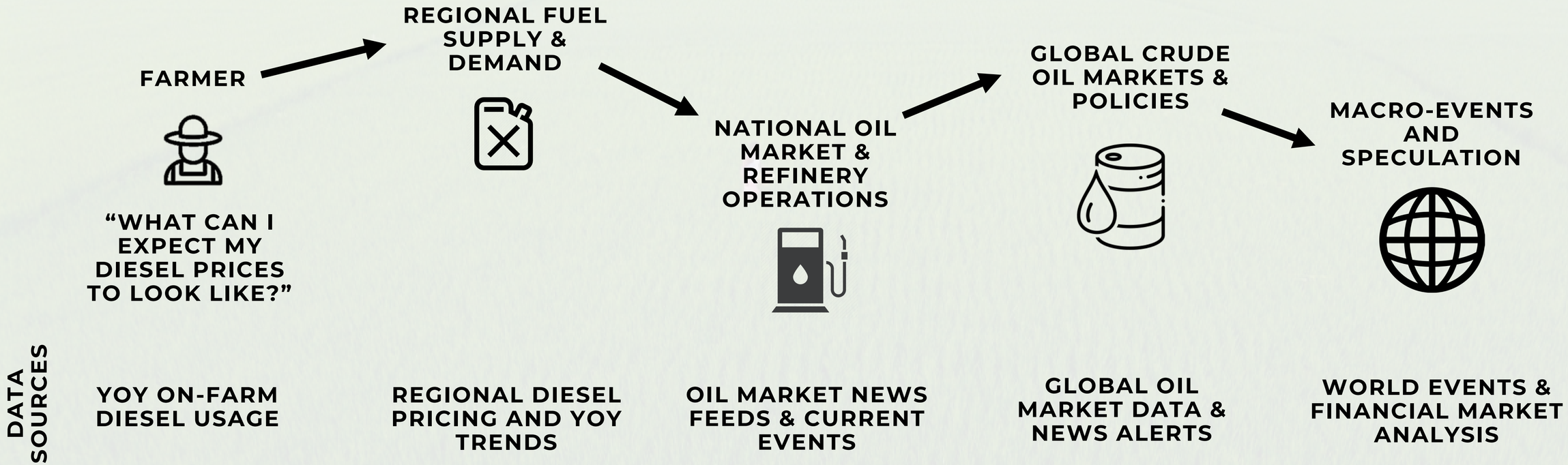
Leveraging AI-based systems can help you ingest data, from analyzing your inbox to keeping track of news headlines, as well as analyzing ongoing shifts in your farming operation from sensors to improved methods for scouting.




**IMAGINE A SYSTEM THAT CAN HELP YOU UNDERSTAND AT EVERY LEVEL OF THE SUPPLY CHAIN, WHAT MATTERS MOST AND WHAT TO DO ABOUT IT, SO YOU CAN MAKE BETTER DECISIONS FASTER**

# DECOMPOSING THE QUESTION TO GET THE ANSWER

When we think of mapping data that matters as the foundation for an effective AI-based system, many agribusiness customers will approach a generative AI application with questions they want to be answered. But how will the questions ultimately get answered?



# HOW GEN-AI WORKS

### STEP #1

**Breaking down your question (Tokens)**

**“WHATS WRONG WITH MY CORN?”**

**“[WHATS] [WRONG] [WITH] [MY] [CORN] [?]”**

- AI breaks your question into pieces it can understand
- Like sorting by size/ variety before packing

### STEP #2

**Understanding context (Transformers)**

- AI connects the pieces to understand relationships
- Recognizes "corn" as a crop, "wrong" as a problem indicator
- Similar to how someone on a farm might assess field conditions by looking at multiple factors together

### STEP #3

**SEARCHING IT’S KNOWLEDGE (PATTERN MATCHING)**

- AI searches through millions of farming scenarios it learned
- Matches your situation to similar corn problems: pests, diseases, nutrient deficiencies
- Like an experienced agronomist recalling past cases

### STEP #4

**Generating Your Answers (Prediction)**

- AI predicts the most likely response based on patterns
- Combines information to create a specific answer for YOUR situation
- Prioritizes most probable causes based on your details

### STEP #5

**DELIVERS ACTIONABLE ADVICE**

- Provides specific recommendations you can use
- "Check for nitrogen deficiency - yellowing starts at leaf tips”
- Suggests next steps: soil testing, visual inspection points

Remember: the more specific your question and the more background / context provided, the better AI can match patterns and provide useful answers!

Leveraging AI:

# PROMPT ENGINEERING

**Learning how to start using GenAI using plain English interaction**

## WHAT IS PROMPT ENGINEERING?

- The skill of asking AI tools the right questions to get useful answers
- Like giving clear instructions to a farm hand - specificity matters
- Example: "cover crops for Iowa soybeans" vs just "crops"

## WHY IS THIS IMPORTANT TO KNOW?

- AI tools are going to grow in relevance, and the power to leverage these tools early on will become a competitive advantage
- Good prompts =actionable farm insights
- Poor prompts =wasted time and generic answers (“vending machine answers”
- Can help with: market analysis, pest ID, equipment troubleshooting

## HOW TO START

- **Be specific:** Include location, crop type, problem details
- **Use plain language** - describe like talking to a neighbor
- **Start simple**, then add details
- **Save prompts that work well**
- **Practice** with familiar topics first

**Dan Maycock | 6/26/25**

# INTERACTIVE EXERCISE

## Let's Practice Writing Prompts with AI

**SAMPLE PROBLEM:** Build an irrigation forecast for the coming week based on the estimated weather patterns & average evapotranspiration rate per acre, using standard average acre/ feet by zone for an apple orchard in area code 98947

PROBLEM # 1: Palmer Amaranth Control in Illinois Corn-Soybean Rotation

PROBLEM # 2: Beef Cow Feed Management During Texas Drought

PROBLEM # 3: Prairie Pothole Wetland Management for Breeding Ducks

- **Two Teams of 4 Per Table**
- **Two Handouts at a Table, One Per Team**
- **Pick one of the problems to use AI to help "Solve"**

# INTERACTIVE EXERCISE

Writing Prompts to Solve Farming Problems

**SAMPLE PROMPT FOR THE PROBLEM: WHAT A GOOD PROMPT CAN LOOK LIKE**

"I need to build an irrigation forecast for an apple orchard in zip code 98947.

1. First determine the typical acre-feet per hour per zone irrigation rates for apple orchards in this region (considering climate zone and standard system configurations)

2. Look up the weather forecast for the next week via several trusted web sources, then settle on averages based on differentiated weather estimations

3. Calculate the daily and weekly evapotranspiration (ET) rates for apples based on temperature, humidity, and typical crop coefficients, showing variations of the formula by name for calculating ET rates I should choose in the future to use a different method

4. Using the typical flow rates from step 1, create a specific irrigation schedule (days, hours to run, and acre-feet amounts) for the next seven days

5. Include adjustments for system efficiency, soil type, and heat stress considerations

6. Note any extreme temperature days that might require special attention

Format the output with clear headers showing:

- Typical irrigation rates for the area
- Weather summary with citations for weather sources
- ET calculations
- Recommended schedule with specific days/ hours
- Key adjustments and considerations"

BONUS: Have AI write this all in legible Spanish for a field worker originating from Chiapas region in Mexico, then, when done, ask them to write this in posh British English

# INTERACTIVE EXERCISE

Writing Prompts to Solve Farming Problems

<ON-COMPUTER EXAMPLE OF GEN-AI OUTPUT>

# INTERACTIVE EXERCISE

Writing Prompts to Solve Farming Problems

**SAMPLE PROBLEM:** Build an irrigation forecast for the coming week based on the estimated weather patterns & average evapotranspiration rate per acre, using standard average acre/ feet by zone for an apple orchard in area code 98947

**EXERCISE:**

- 45 Min to write your prompts with a break half way to check on how everyone is doing and a final check in at the end (volunteers welcome to share!)
- "Roamers" are circulating to answer questions or help you out (including me), so raise your hand if you need help
- Each table has two "power users" so consider two groups of 4 at each table with one "power user" (please raise hands) so you can all solve this together
- Have fun, keeping in mind there's many ways to write a prompt, but the more detailed you can be the better responses you'll often get (think technical writing vs high-level questions). AI tool suggestions below.

| www.ChatGPT.com | www.Claude.com | Copilot.Microsoft.com |
|---|---|---|
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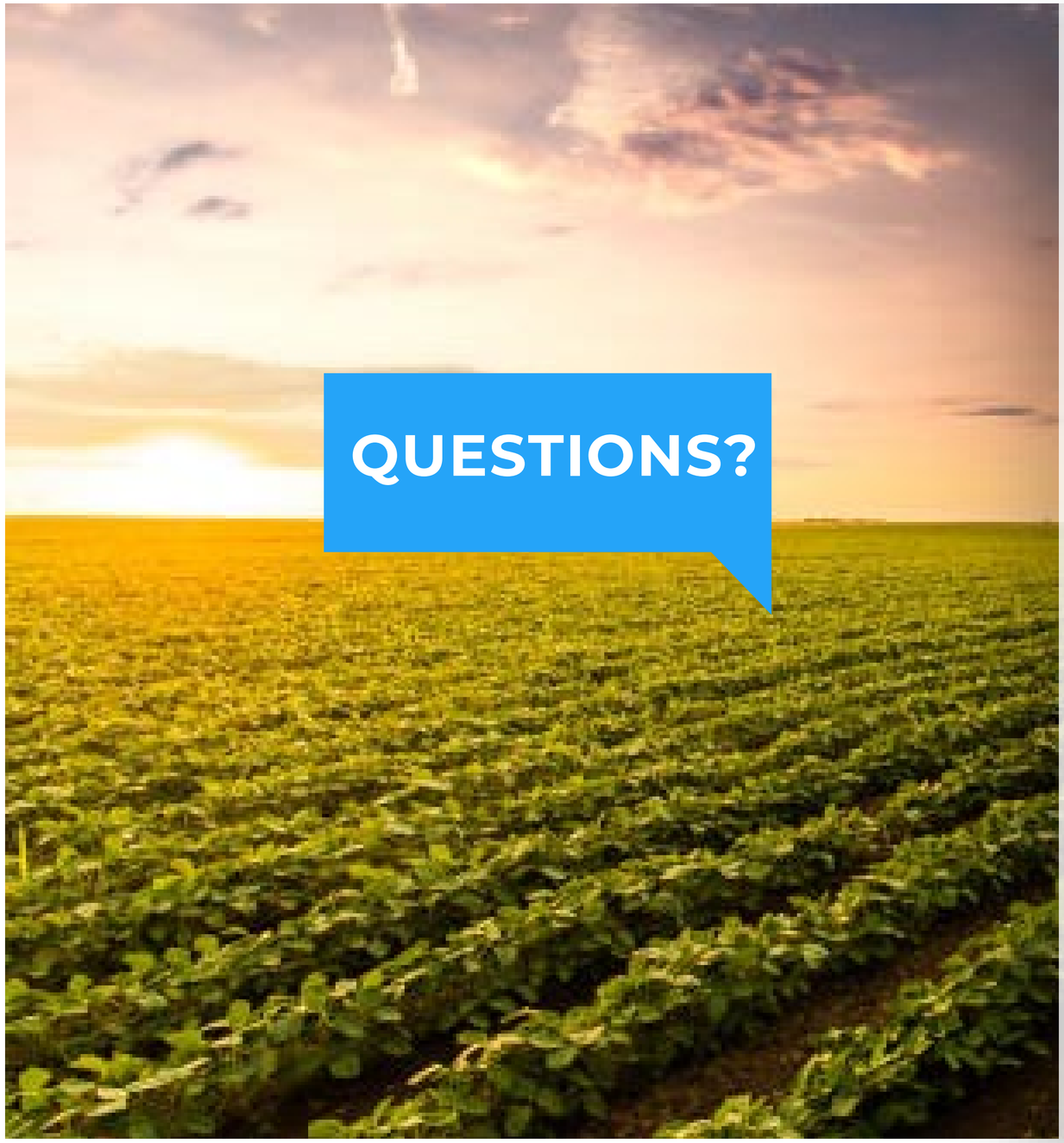
# KEY TAKE-AWAYS

- **Good Data Systems Make for Useful & Impactful AI Systems (i.e., Invest in good data infrastructure to start)**
- **Better questions & background = better answers**
- **Immediate practical benefits for any kind of farming**
- **Getting started is simple**

**The bottom line:** In a world of information overload and rapid change, AI helps you focus on what matters most for your operation, turning overwhelming data into actionable insights that improve yields, reduce costs, and keep you competitive.




# REACH OUT AS QUESTIONS COME UP

As a friend of Farm Foundation, I'm happy to provide any guidance or support as you're diving deeper into data or AI initiatives. Please feel free to reach out if I can be helpful, or if you have questions.

## DAN MAYCOCK

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Schedule a "virtual" coffee chat with me