

AI in Agriculture Present and Future

Enhancing Efficiency, Productivity, and Sustainability



College of Agricultural,
Consumer &
Environmental Sciences

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN



farmdoc
Illinois Extension

Artificial Intelligence

Artificial intelligence (AI) is a way for machines, like computers or robots, to mimic human intelligence. This means they can learn from data, make decisions, solve problems, and even carry out tasks like recognizing speech, analyzing images, or driving a car—all without needing constant human instructions.

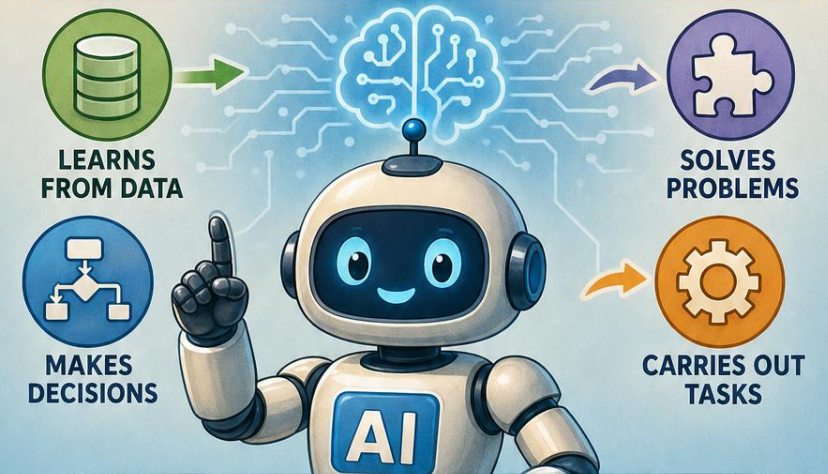
It's like teaching a machine to think and act smartly based on what it has been taught or observed.

GPT-Image-2

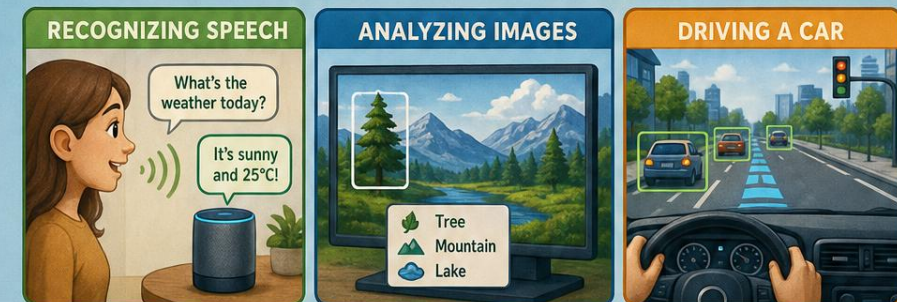
ARTIFICIAL INTELLIGENCE (AI)

AI is a way for machines, like computers or robots, to mimic human intelligence.

This means they can learn from data, make decisions, solve problems, and even carry out tasks like recognizing speech, analyzing images, or driving a car—all without needing constant human instructions.



It's like teaching a machine to think and act smartly based on what it has been taught or observed.



AI doesn't replace people—it helps make life easier, smarter, and more efficient.

- 1. Precision Agriculture:** AI sensors, drones, and satellites collect crop, soil, and weather data to provide insights on planting, irrigation, and crop management, optimizing resources and reducing environmental impact.
- 2. Crop Monitoring:** AI analyzes drone or satellite imagery to assess crop health, detect pests, and identify nutrient or irrigation needs for timely interventions.
- 3. Predictive Analytics:** AI models forecast crop yields, market trends, and pest outbreaks by analyzing weather and historical data, aiding informed decision-making.
- 4. Robotic Farming:** AI-powered robots handle planting, fertilizing, and harvesting with precision, cutting labor costs and boosting efficiency.



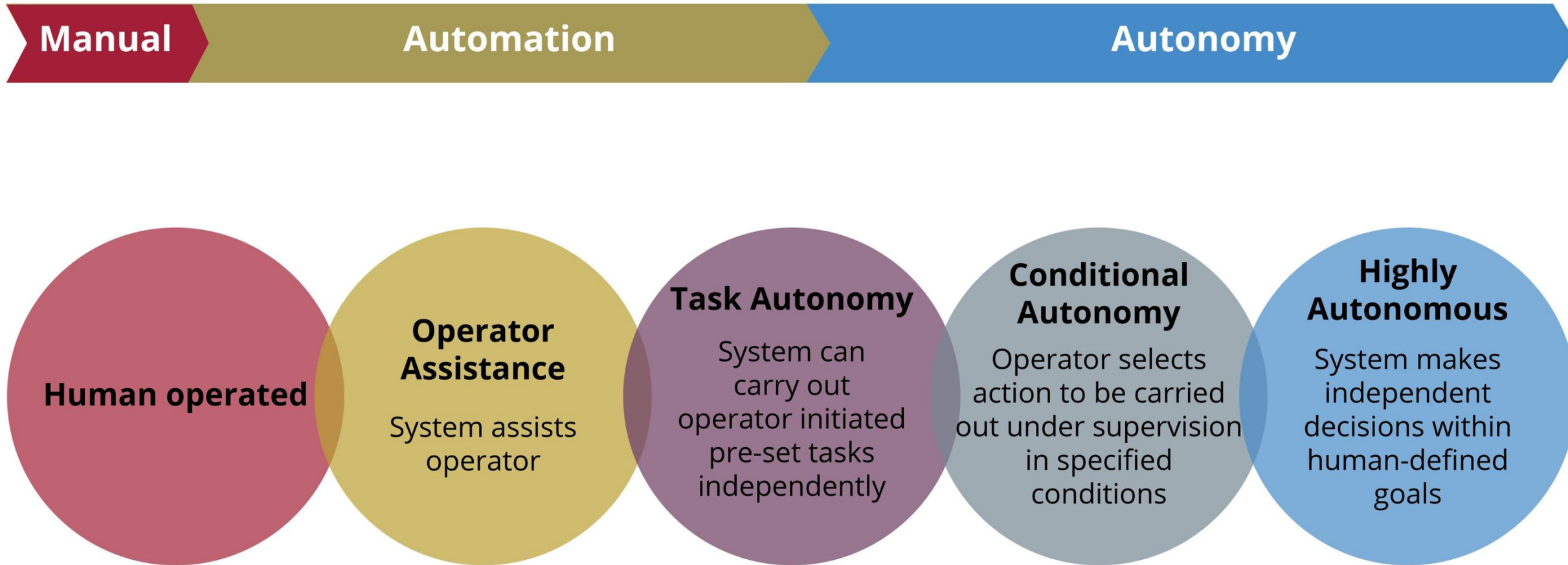
5. Supply Chain Optimization: AI streamlines logistics by predicting demand, optimizing transport, and minimizing waste, ensuring fresher produce at reduced costs.

6. Livestock Monitoring: AI sensors track livestock health and behavior, enabling early illness detection, better care, and optimized feeding.

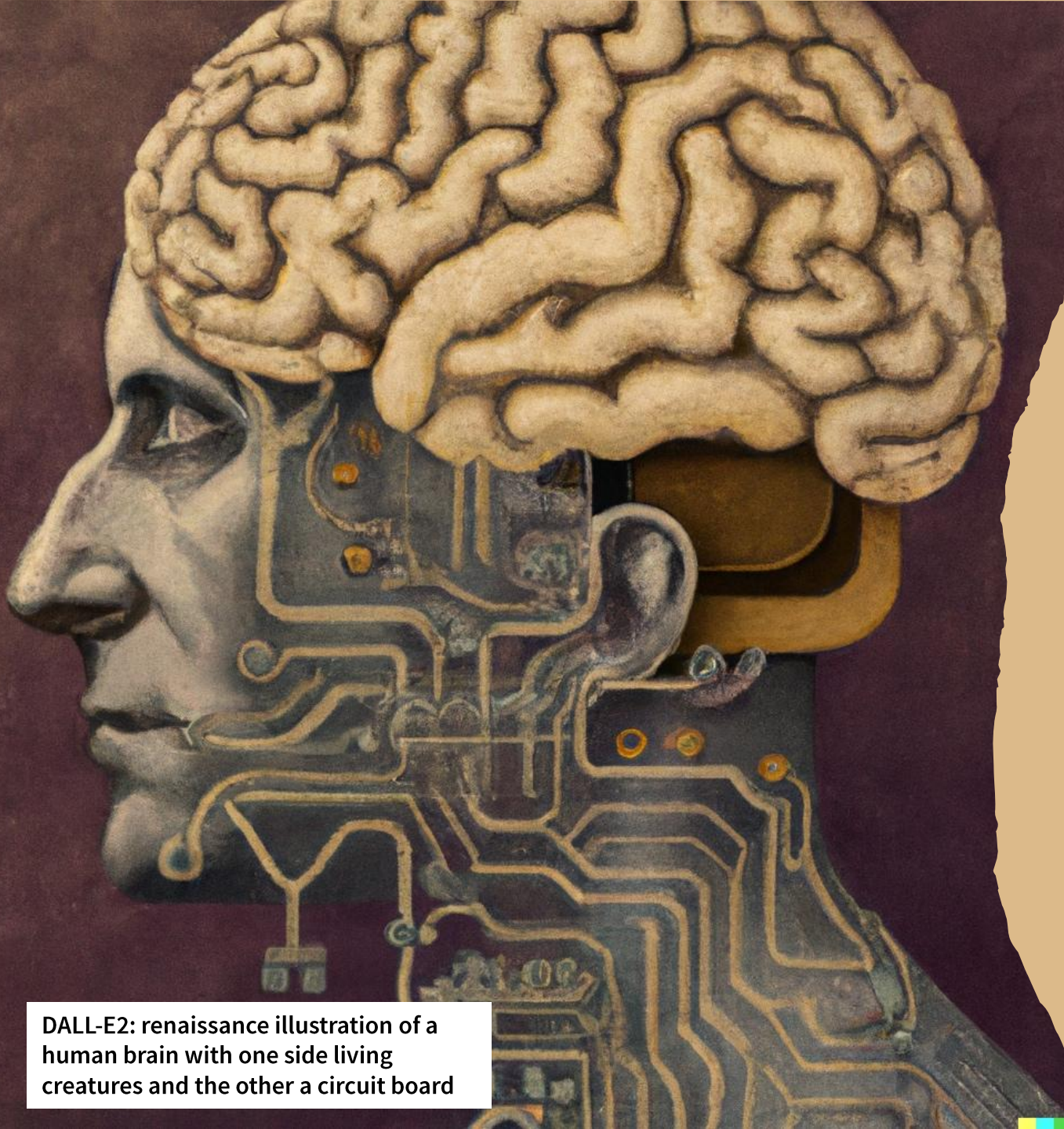
7. Food Safety: AI enhances food safety by detecting contaminants or spoilage in real-time, automating quality control for high-quality products.



Levels of AI



Source: Ministry of Defence, Defence Artificial Intelligence Strategy (June 2022), p4



DALL-E2: renaissance illustration of a human brain with one side living creatures and the other a circuit board

Machine Learning

A subset of AI that allows machines to learn from data without being explicitly programmed. It focuses on the development of computer programs that can access data and use it to learn for themselves.

This technology has led to the emergence of large language models like CoPilot, Claude and ChatGPT.

- **Classification**
- **Clustering**
- **Regression/forecasting**

AI vision-based weed management in horseradish production

Sunoj Shajahan, John Reid, Vikram Adve, Elizabeth Wahle, and Dennis Bowman

Goal:

To develop a fully autonomous **mechanical weeding** platform specifically for horseradish production systems.

Future:

To develop a modular system that can be adapted to fit any row of **specialty vegetable crops**.



Collinsville, IL
August 22, 2024

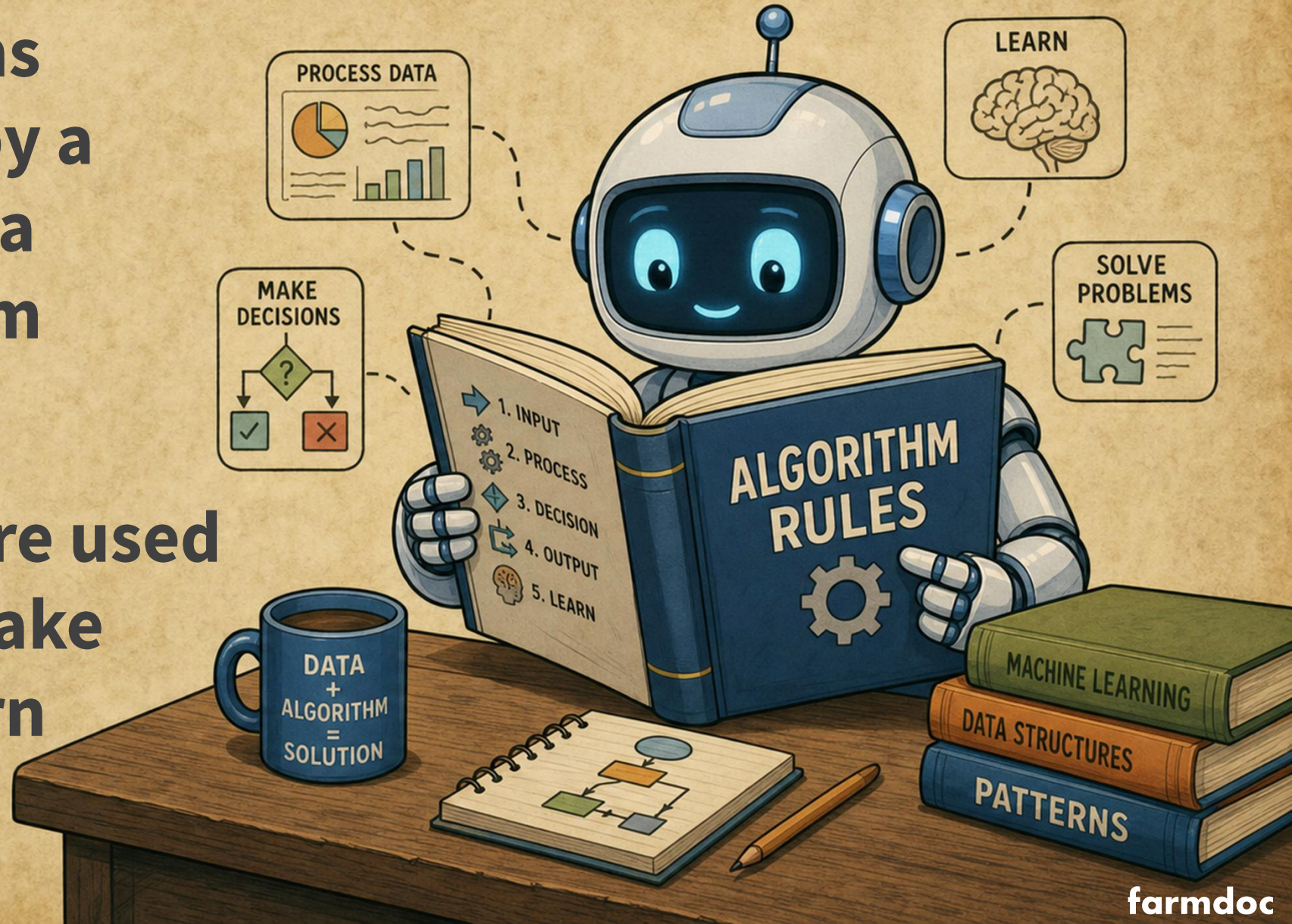


Algorithm

A set of instructions or rules followed by a computer to solve a problem or perform a task.

In AI, algorithms are used to process data, make decisions, and learn from experience.

GPT-Image-2 generated July 2026 using the following prompt: A cartoon of a robot reading a rule book to illustrate the following: A set of instructions or rules followed by a computer to solve problem or perform a task. In AI, algorithms are used to process data, make decisions, and learn from experience. The illustration should be weighted to the right side of the image.



Nitrogen Rate Trial with Variable Rate Sensor

MRTN plus	3.21	264
Base rate only	2.79	154
Control No N	2.09	91
MRTN	3.14	244
Greenseeker	3.23	228
MRTN minus	3.05	208
MRTN	3.07	244
Base rate only	2.81	162
Greenseeker	2.82	189
MRTN minus	3.04	213
Control No N	1.65	97
MRTN plus	2.88	242
Base rate only	2.65	155
MRTN	2.98	239
Control No N	1.77	60
MRTN minus	3.01	197
MRTN plus	3.01	221
Greenseeker	3.2	209
MRTN plus	3	214
Base rate only	2.45	121
MRTN	3.13	197
Greenseeker	3.1	167
Control No N	1.71	42
MRTN minus	3.2	215

2014



Reconstruction

Flight Route



Search

New Visible Light Reconstruction Mis...

Created On: 2024-01-15
Last Update: 2024-01-15

AT 2D



New Visible Light Reconstruction Mis...

Created On: 2024-01-12
Last Update: 2024-01-12

AT 2D

Horsey Nov21

Created On: 2023-11-21
Last Update: 2024-01-15

AT 2D

CFAR_CoverCrop_20231113

Created On: 2023-11-13
Last Update: 2023-11-13

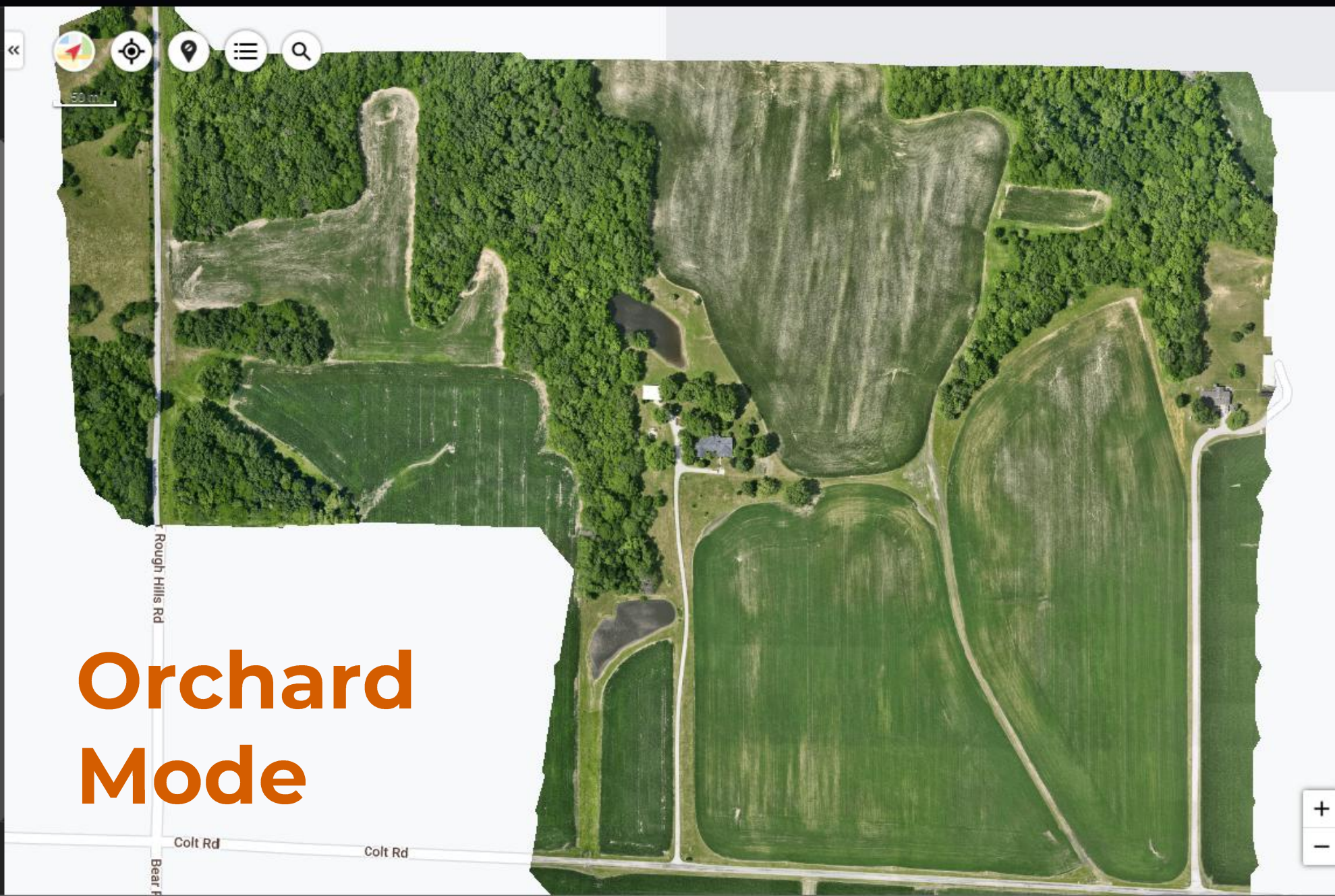
AT 2D 2DM

New Visible Light Reconstruction Mis...

Created On: 2023-10-31
Last Update: 2023-11-21

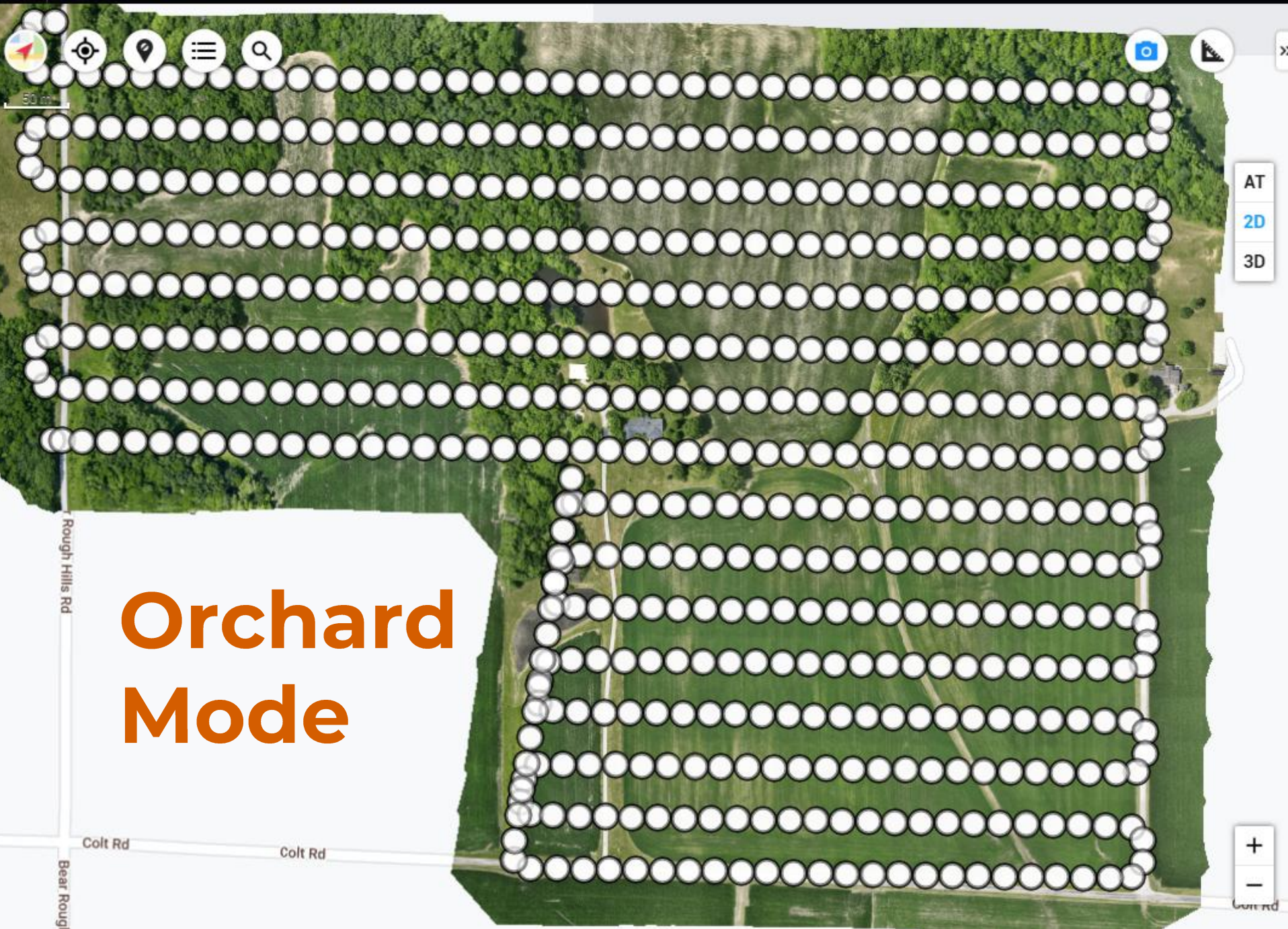
AT 2D

New Mission





Reconstruction



Orchard Mode

New Visible Light Reconstruction...

Photos



2905 Photos >

Image POS Data



Camera Info



Aerotriangulation

Scene

Normal

Computation Method

Standalone Computation

> Advanced

2D Map



Resolution

High

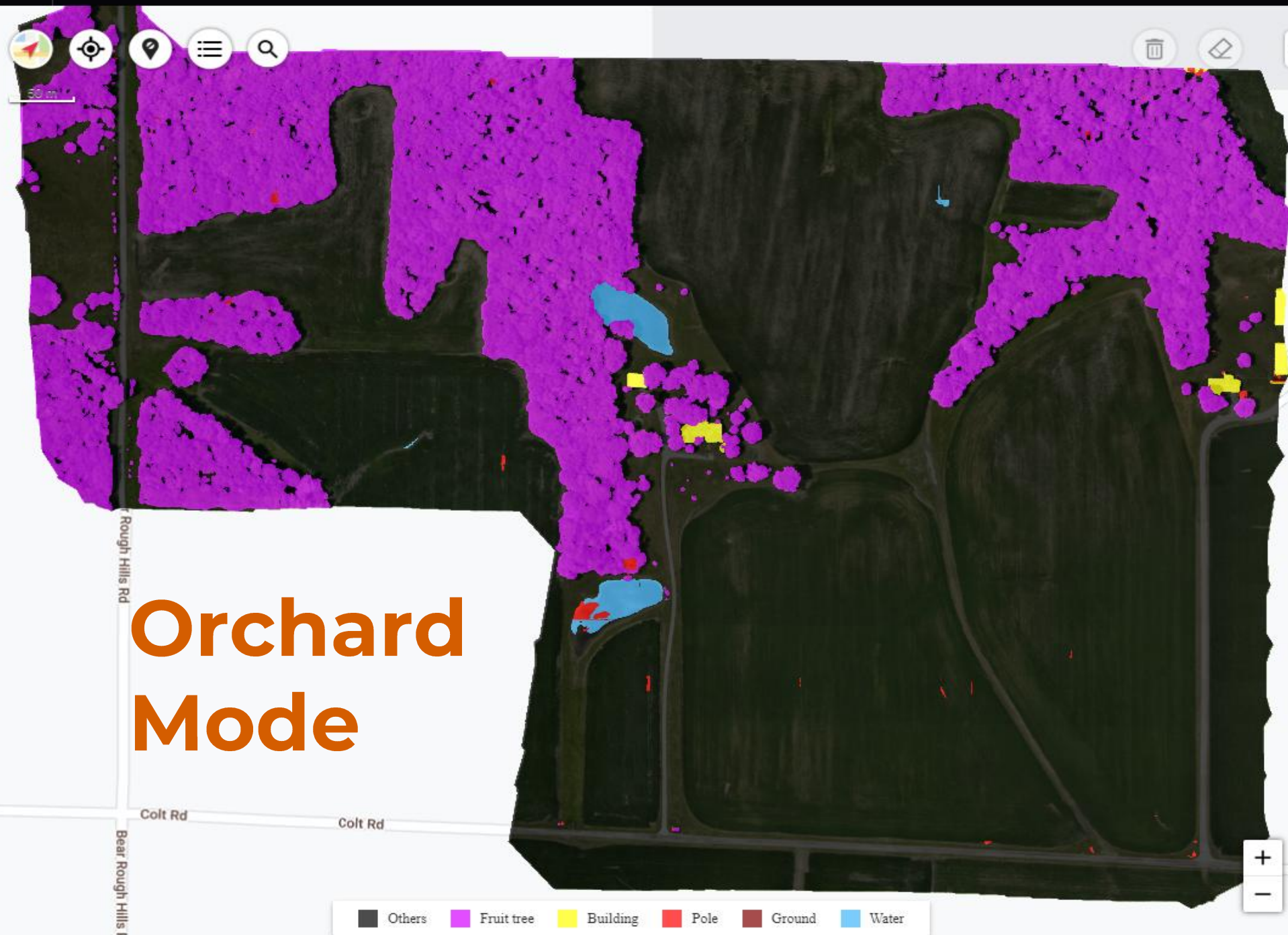
Scene

Fruit Tree

Computation Method

Standalone Computation

Start Reconstruction



< New Visible Light Reconstru...



Spraying Type

Continuous Spraying

Flight Route Plan Type

Distance Interval (Auto)

Display Result

Force Set Calibration Point

Modify Result

Mission Area Planning



Tip:

1. Left-click to add boundary points for spraying area planning. Add at least one setpoint to complete planning.
2. Right-click to exit and continue making new field plans or flight routes

Generate 3D Flight Route



Orchard Mode

< New Visible Light Reconstru...



Spraying Type

Spot Spraying

Flight Route Plan Type

Tree Crown Center (Auto)

Display Result

Force Set Calibration Point

Modify Result

Mission Area Planning



Tip:

1. Left-click to add boundary points for spraying area planning. Add at least one setpoint to complete planning.
2. Right-click to exit and continue making new field plans or flight routes

+

-

Others Fruit tree Building Pole Ground Water

Generate 3D Flight Route



Orchard Mode

< New Visible Light Reconstru...



Spraying Type

Spot Spraying

Flight Route Plan Type

Tree Crown Center (Auto)

Display Result

Force Set Calibration Point

Modify Result

Mission Area Planning



Farmland

1

Boundary Point

14

Area

200381.42 ft²

Tree Count

55

Tip:

1. Left-click to add boundary points for spraying area planning. Add at least one setpoint to complete planning.
2. Right-click to exit and continue making new field plans or flight routes



Generate 3D Flight Route

Others Fruit tree Building Pole Ground Water

Orchard Mode

Others Fruit tree Building Pole Ground Water

< New Visible Light Reconstru... >

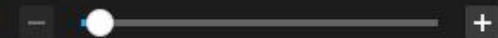


Display Result ☐

Display Routes ☒

Enable Obstacle Sensing ☒

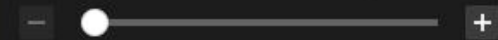
Route Altitude 6.56 ft



Flight Route Width 16.4 ft



Route Angle 0 °



Terrain Follow Accuracy 0.5



Tip:

1. Setting a lower value means higher terrain following accuracy, but less stability due to obstacle avoidance. A higher value means less accuracy, but more stable flight

Back to Edit



Large Language Model

Large language models (LLMs), based on neural networks, use machine learning to process and mimic human language communication, performing tasks such as translation, chatbot interactions, summarization, and content generation. While lacking consciousness and emotions, they can sound human-like, often fine-tuned through Reinforcement Learning from Human Feedback (RLHF) to improve their conversational capabilities.

Natural Language Processing (NLP)

The branch of AI concerned with the interaction between computers and humans through natural language. It enables computers to understand, interpret, and generate human language.



DALL-E2: postmodernism, books falling into a funnel and letters going into a computer

Generative AI Has Strong Potential in Ag ... **... Because of essential features of modern agriculture**

Technical advisory services are crucial for improving Ag outcomes

Low-income and smallholder farmers have
limited access to advisors

Crop advisors, industry techs must keep up with **vast literature**

Data-driven farm management
is crucial to productivity, sustainability

Challenge: Data sets are abundant, but **ground truth is expensive**



Cropwizard 1.5

Cropwizard Chatbot by
AIFARMS



No data.



 Export history

 OpenAI API Key



Welcome to the CropWizard Project
in the AIFARMS AI Institute for
Agriculture! Ask any crop-related
questions below, drawing on the
power of Extension knowledge bases
from around the US.

You can also ask questions about
images! To upload an image, click on
the image icon at the left of the chat
bar, below.

CropWizard's document corpus is subject to
licenses. Usage is subject to terms, a privacy
policy, and generative AI policy. Sorry, the legal
team made us say that.

Start a conversation below or try these examples

- What are the best pest control options
for aphids in my soybean crop?
- What are the best crop insurance
options available to a corn and soybean
farmer in Champaign County, IL?
- What is the best time for pruning apple
trees in Washington State?



Message Illinois Chat

Claude Sonnet 4.6 >

Agent Mode



CropWizard

Interactive advice & decision support for Ag professionals

<https://uiuc.chat/cropwizard-1.5>



Built on **GPT4 variants** from OpenAI
(and open-source LLMs)

Consults **400,000+ docs** from Extension
and open access research

Soils, crops, pests, weeds, disease management,
crop finance, ...

Computational tools for Ag image processing
and quantitative decisions

API access allows other apps to add rich
conversational interaction



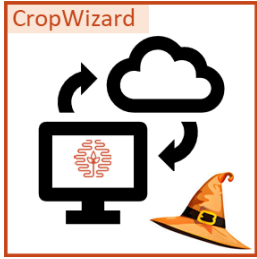
What is wrong with my soybean field?

Image description: The soybean plants in the image appear to have some issues that could be related to environmental stress:

1. **Yellowing Leaves:** The leaves show signs of chlorosis, which could indicate nutrient deficiencies, such as nitrogen or iron.
2. **Dry, Cracked Soil:** The soil appears dry and cracked, suggesting drought stress or insufficient watering.
3. **Possible Pest Damage:** Check for signs of pests, as they can cause leaf discoloration and damage.

Keywords: Soybean, chlorosis, nutrient deficiency, drought stress, dry soil, yellowing leaves, pest damage.





What is wrong with my soybean field?

Based on the image and description, your soybeans may be experiencing several issues. Possible Causes:

Yellowing Leaves (Chlorosis)

Nutrient Deficiency

This could be due to a lack of nitrogen or iron. Iron deficiency chlorosis often appears as yellowing between the veins of young leaves, while nitrogen deficiency typically affects older leaves first⁹.

Solution

Conduct a soil test to confirm nutrient levels and consider applying appropriate fertilizers.





What is wrong with my soybean field?

Based on the image and description, your soybeans may be experiencing several issues. Possible Causes:

Dry, Cracked Soil

Drought Stress

The dry soil indicates insufficient moisture, which can lead to reduced nutrient uptake and stress on the plants⁵⁹.

Solution

Ensure adequate irrigation and consider mulching to retain soil moisture.





What is wrong with my soybean field?

Based on the image and description, your soybeans may be experiencing several issues. Possible Causes:

Possible Pest Damage

Pests

Check for signs of pests like soybean cyst nematodes or insects that can cause leaf damage and discoloration ¹⁷.

Solution

Inspect plants for pests and consider integrated pest management strategies if pests are present.





What is wrong with my soybean field?

Recommendations

Soil Testing: This will help identify specific nutrient deficiencies and guide fertilization.

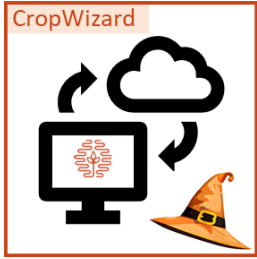
Irrigation Management: Adjust watering schedules to maintain consistent soil moisture.

Pest Monitoring: Regularly check for pests and apply control measures as needed.

If symptoms persist, consulting with a local agricultural extension service can provide more tailored advice.

If you have further questions or need additional assistance, feel free to ask!





What is this plant growing in my neighbor's field

The plant in your neighbor's field is Crimson Clover (*Trifolium incarnatum*). It features bright red, cone-shaped flower heads and trifoliate leaves. Crimson clover is commonly used as a cover crop to enhance soil health, prevent erosion, and fix nitrogen. It also attracts pollinators like bees, making it beneficial for the ecosystem.

Establishment Challenges: Obtaining a good stand can be difficult, requiring well-prepared seedbeds and proper seeding techniques⁵⁴.

Overall, crimson clover is a beneficial cover crop for Illinois, especially when managed properly to mitigate its limitations.





Follow-up: What are the optimum seeding dates and rates for crimson clover in Illinois?

Seeding Date: Fall Planting: Crimson clover should be seeded six to eight weeks before the average first frost date. In Illinois, this typically means planting from mid-August to early September to ensure good establishment before winter³.

Seeding Rate:

Drilled: 15 to 18 pounds per acre.

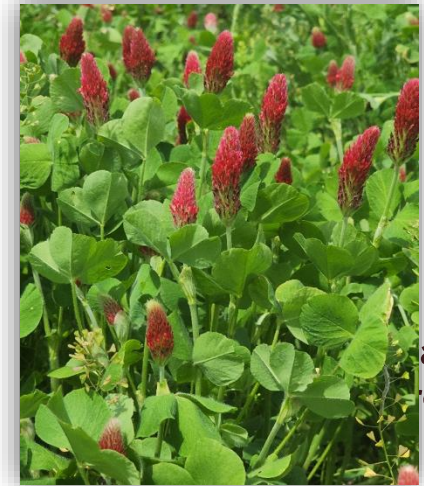
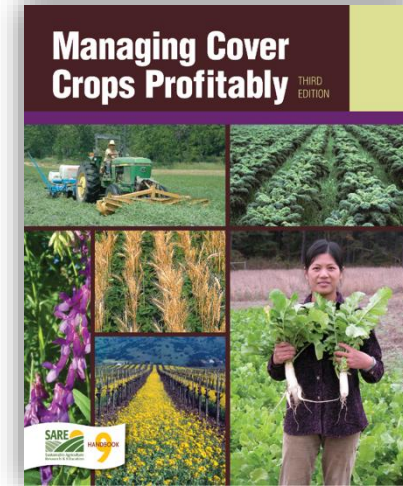
Broadcast: 22 to 30 pounds per acre³.

Additional Considerations:

Inoculation: It's important to inoculate the seed with the appropriate Rhizobium bacteria to ensure effective nitrogen fixation.

Soil Preparation: Ensure a well-prepared seedbed for optimal seed-to-soil contact, which can enhance germination and establishment.

These guidelines help maximize the benefits of crimson clover, such as nitrogen fixation and soil improvement, while minimizing the risk of winterkill.



ant
ces



Precision Ag Tool Portfolio



USDA Plant Hardiness
Zone Map



USA Blight



Tracking Soil
Temperatures in the
North Central United
States



AgroClimate Rainfall
and Temperature
Monitoring

Illinois Climate Network: Station Data: Champaign



Latitude: -----
Longitude: -----
Altitude: -----

Station List

Latest Conditions:
As of 10/1/2024 10:00 AM

Air Temperature: 67.1° F
Dew Point: 61.0° F
Relative Humidity: 80.9%
Barometric Press. (sea level): 1017 mbar
Wind Speed: 5.1 mph
Wind Direction: NNW
Precipitation: 0.0 in
Soil Temp 2" (Bare Soil): 67.3° F
Soil Temp 4" (Bare Soil): 66.3° F
Soil Temp 4" (Sod): 68.0° F
Soil Temp 8" (Sod): 69.4° F

Weekly Graphs:

Soil Temp 4" Sod



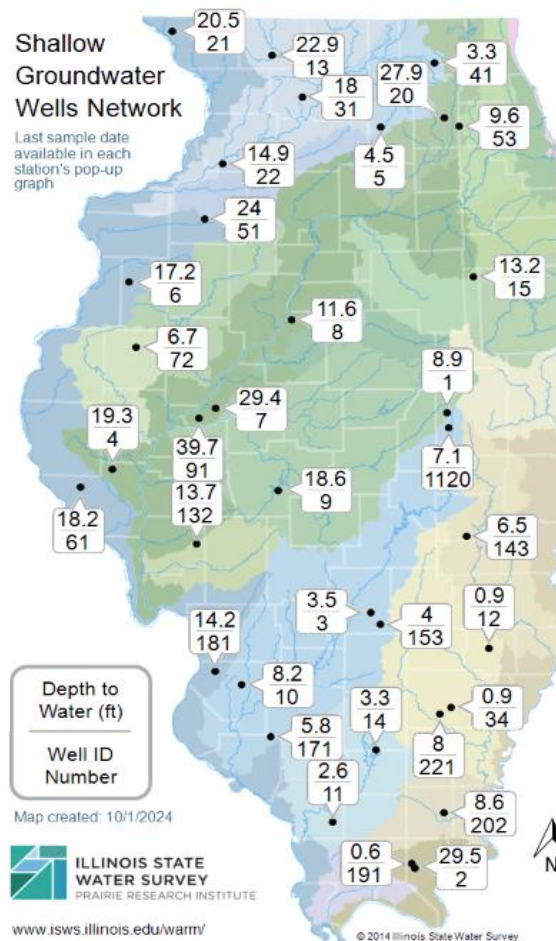
Soil Temp 8" Sod



Shallow Groundwater Wells Network

Shallow Groundwater Wells Network

Last sample date
available in each
station's pop-up
graph



Map created: 10/1/2024

ILLINOIS STATE
WATER SURVEY
PRAIRIE RESEARCH INSTITUTE

www.isws.illinois.edu/warm/

© 2014 Illinois State Water Survey

Illinois Climate Network: Crop Degree-Day Calculator

Choose a base temperature corresponding to a particular crop, 50° F for corn and 40° F for colder crops. Next, select a station nearest your point of interest, and input a planting date. Click "CALCULATE" to see the relevant degree-day accumulation for your area.

Choose a Base Temperature (Crop)

50° (Corn)
40° (Cold Weather Crops)

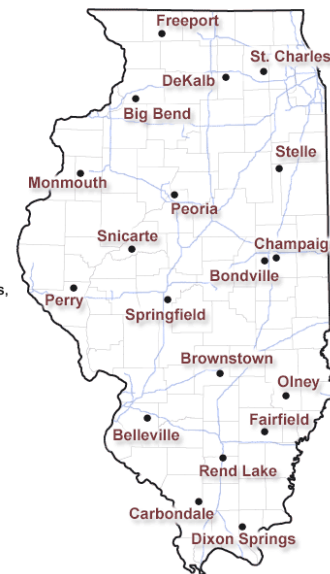
Input a planting date (mm/dd):

01/01

CALCULATE Clear

For regional growing degree day maps,
visit the [Midwest Climate Watch](#).

Click the nearest station (dot).



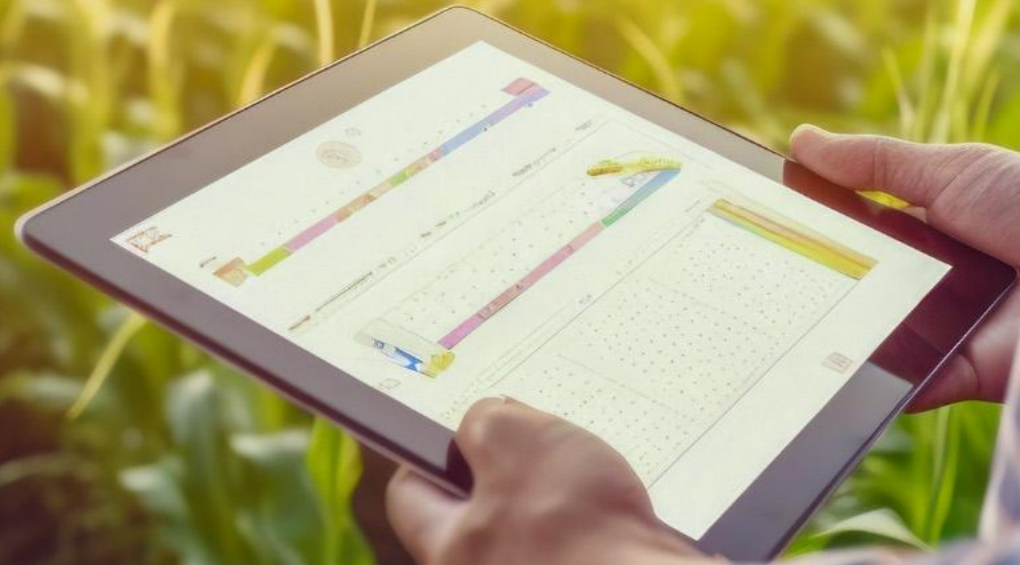
Illinois State Water Survey

PRAIRIE RESEARCH INSTITUTE



AI AgriBench

Building trust and confidence in question-answering systems for digital crop production



INTERPRETING THE LEADERBOARD

This table ranks general-purpose Large Language Models and agriculture-specific advisory services (called “Subject Model”) in terms of **4 metrics**:

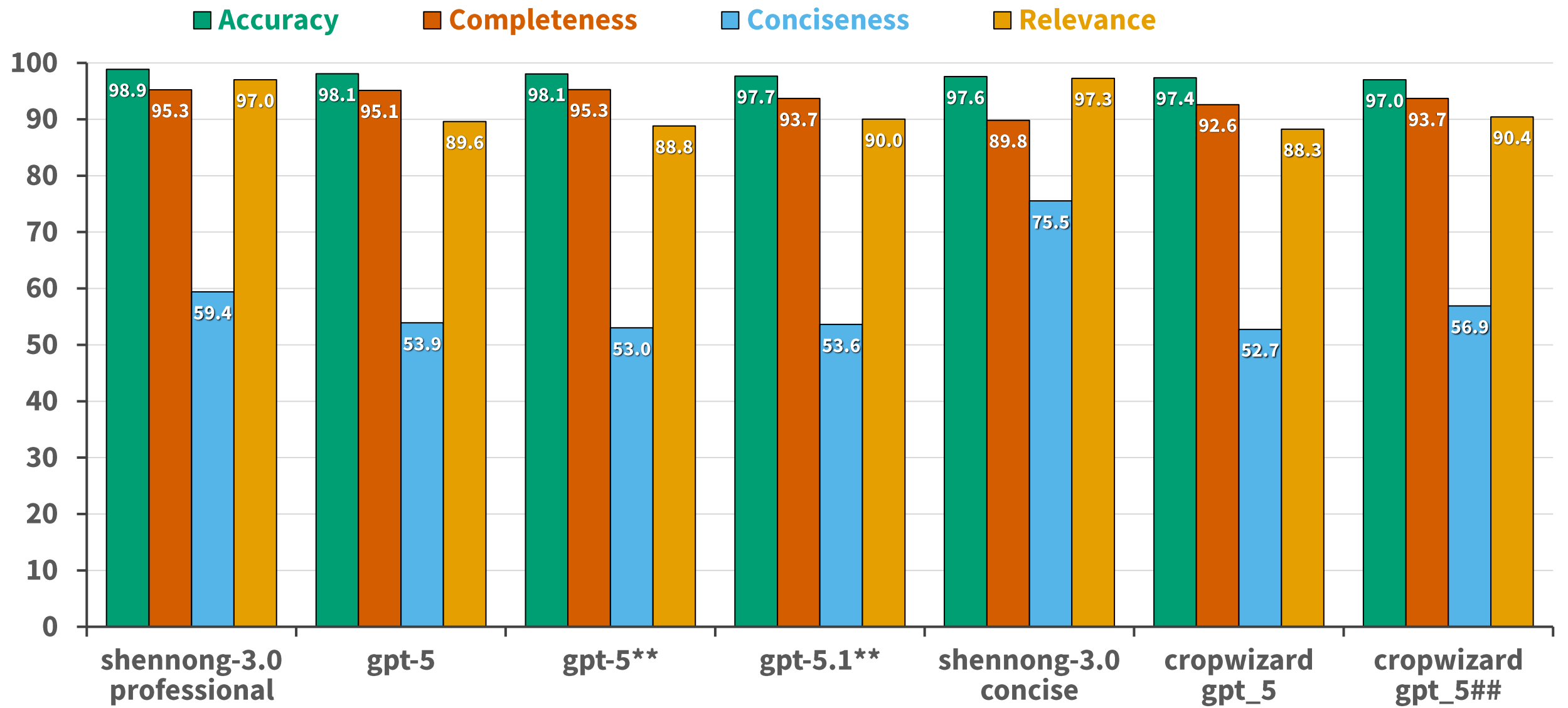
METRIC	WHAT IT MEASURES	GOOD SCORE (HIGH)	LOW SCORE (LOW)
 ACCURACY Alignment with expert consensus and the gold answer.	Includes correct terminology (disease/pest names, nutrient forms), factual correctness of diagnostic conclusions, and appropriateness of management recommendations.	 Completely correct, expert-aligned answers score 100.	 Severely incorrect or misleading answers score near 0.
 RELEVANCE How well the answer stays on topic and addresses the user's agricultural question.	Answers that drift into unrelated agronomy, ignore the main decision, or miss critical points are penalized.	 Stays focused on the user's question and addresses the core decision.	 Off-topic, ignores the main question, or misses what matters.
 COMPLETENESS Whether the answer covers the key steps, caveats, and conditions needed to act safely and effectively.	Rewards answers that include essential steps, caveats, risks, timing, and context.	 Covers all key elements a farmer or advisor needs to act with confidence.	 Partial, missing key steps or caveats, or leaves important gaps.
 CONCISENESS Whether the answer is focused, avoids unnecessary digressions, and communicates information efficiently.	Values clear, complete answers that get to the point without extra fluff.	 Focused, easy to read, delivers what's needed—no wasted words.	 Wordy, repetitive, or includes unnecessary information.

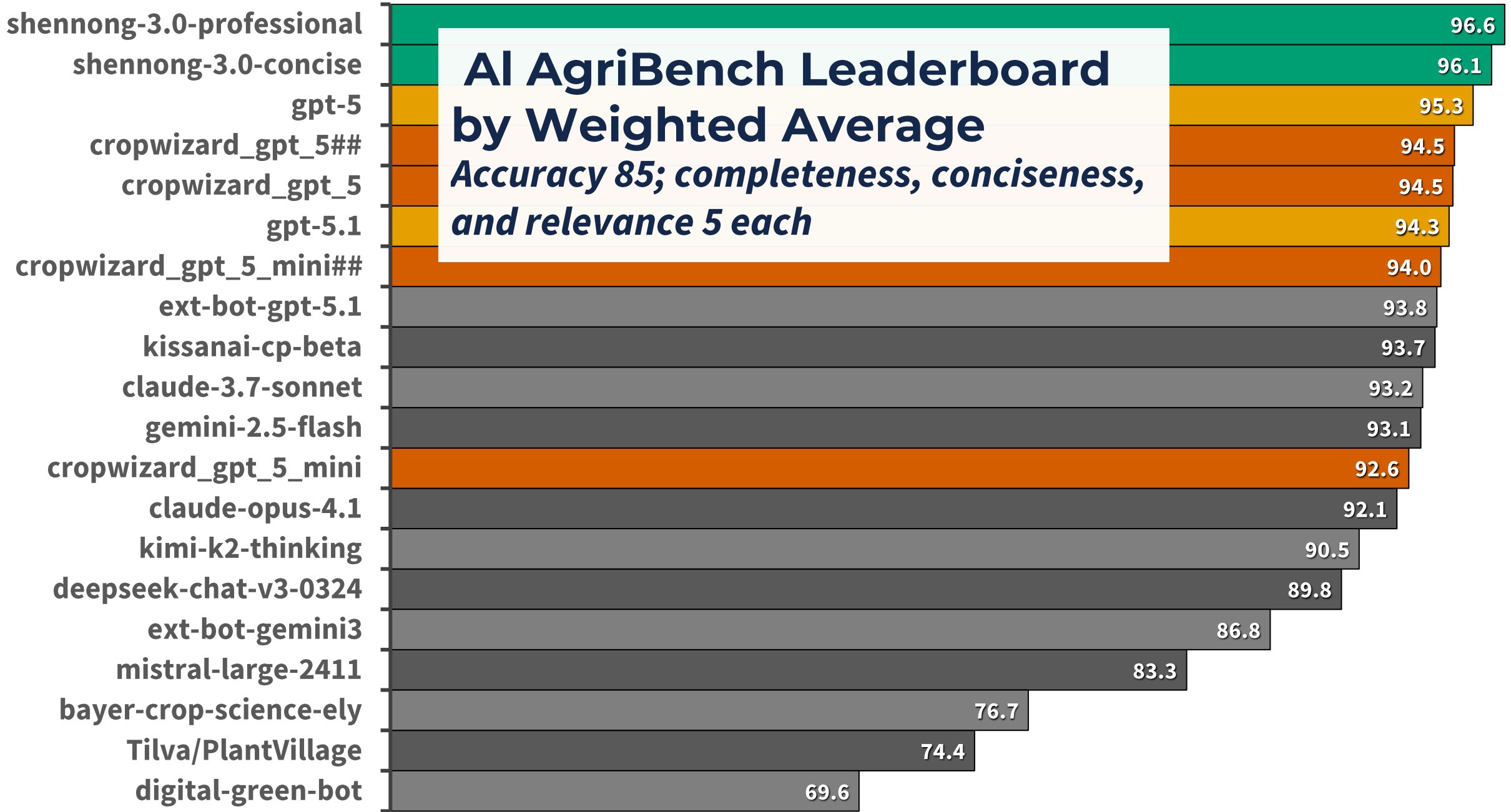
AT A GLANCE	
	Accuracy = Correct & expert-aligned
	Relevance = On topic & decision-focused
	Completeness = All key steps & caveats
	Conciseness = Clear & to the point



☒ Pests ☒ Diseases ☒ Weeds ☒ Nutrition ☒ Soils ☒ Seed Hybrids ☒ Horticulture ☒ Water ☒ Weather				
Subject Model	Accuracy	Completeness	Conciseness	Relevance
gpt-5	98.08	95.12	53.91	89.61
gpt-5**	98.06	95.26	53.03	88.81
gpt-5.1**	97.67	93.69	53.62	90.02
cropwizard_gpt_5	97.38	92.60	52.74	88.25
cropwizard_gpt_5##	97.02	93.69	56.92	90.43
gpt-5.1	96.90	93.16	54.52	90.90
ext-bot-gpt-5.1	96.63	92.75	51.17	89.04
cropwizard_gpt_5_mini##	96.59	94.13	52.69	90.16
kissanai-cp-beta	96.54	89.37	52.88	90.70
gpt-5-mini	96.31	92.95	55.93	88.69
gemini-2.5-flash	96.13	92.24	48.47	87.30
gpt-5-mini**	95.91	91.77	55.59	88.40
cropwizard_gpt_5_mini	95.65	91.82	48.76	85.55

AI AgriBench Leaderboard





C:\> ???????

A prompt is an input, expressed in language, images, or code, that instructs the AI on the task to perform. Users interacting with AI systems need to meticulously craft prompts (Microsoft describes it as akin to ordering a sandwich at a deli counter, where specifying bread, condiments, vegetables, cheese, and meat ensures a desired and satisfying outcome.)

Better Prompts Get Better Results

—— Line up all the pieces to build ——
a great result.



Each car is
an essential part
of a strong prompt.

- Role – Who the AI should be
- Audience – Who it's for
- Constraints – Boundaries or requirements
- Output – How the result should look
- Actions – What the AI should do

Role

Audience

Constraints

Output

Actions

Prompt Engineering in Action

Example: Improving the Same Request

Version 1: Basic Prompt

"Tell me about AI in agriculture."

Result: Generic overview

Version 2: Better Prompt

"Explain how AI is currently being used in agriculture, including crop scouting, autonomous machinery, and decision support tools."

Result: More detailed and relevant

Version 3: Expert Prompt

"You are an agricultural technology specialist. Create a 30-minute presentation for Illinois farmers describing current and future applications of AI in agriculture. Include examples of drones, robotics, and generative AI. Use plain language and end with three key takeaways."

Result: Audience-focused, actionable, presentation-ready content

Checklist for better Prompts

- ☐ **Role:** “You are an X (extension educator / agronomist).”
- ☐ **Audience:** “for Y (small-acre, organic, conventional, urban, etc.).”
- ☐ **Constraints:** season, geography, scale, budget, regulatory limits.
- ☐ **Output:** format, length, and readability level.
- ☐ **Actions:** provide examples, stepwise list, next steps.
- ☐ **Sources:** request citations or flag needs for local advice.



Hallucinations

Generative AI systems can produce creative content like stories and poems but may struggle with accuracy, leading to what developers call "hallucinations" or more precisely, "fabrications."

These inaccuracies can arise because the systems cannot distinguish between real and fake information.

Developers address this by "grounding" the AI with reliable data from trusted sources to enhance accuracy, but sometimes errors occur when the model lacks up-to-date information after training.

DALL-2: digital art image of a psychedelic mushroom

Hallucinations



ChatGPT 4.o: Create a limerick about agricultural autonomous technology and safety

**In the fields where the crops grow high,
Autonomous tech roams the sky.
With sensors and gears,
It reduces our fears,
Keeping farmers and yields safely nigh.**







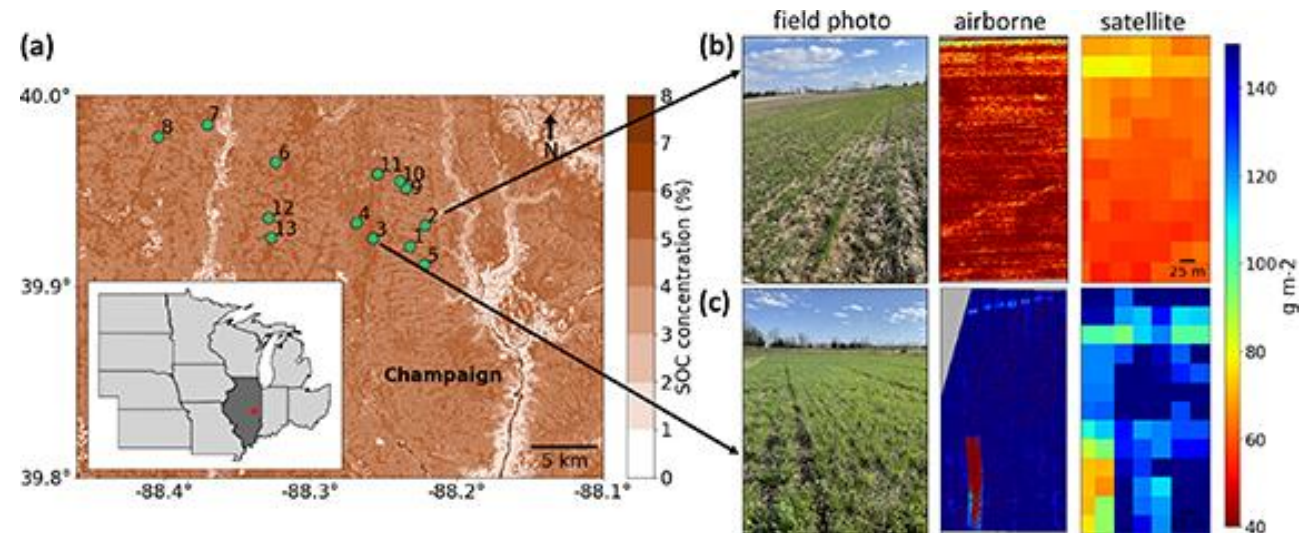
Improving Agricultural Outcomes

Growing AI foundations for AG

Improving AG outcomes

Expanding opportunities

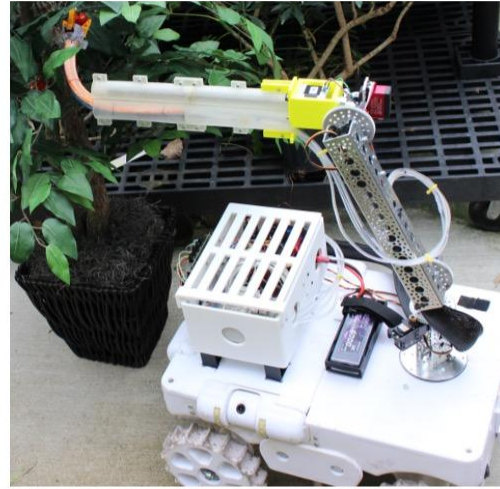
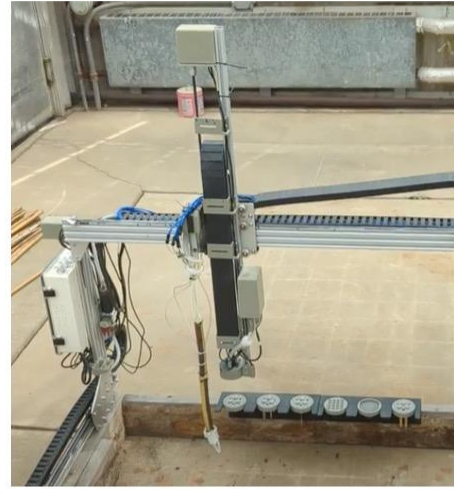
- ✓ Greater adoption of robotics for cover crops
- ✓ Labor-efficient management of livestock through computer vision
- ✓ New and scalable techniques for soil carbon predictions
- ✓ New analysis of soil microbiome
- ✓ Field-level carbon estimates and assessment of sustainable farming practices using process-guided ML



Autonomous Cover Crop Planting



Meet our Team of Agbots



Components of the AI system

Mobility

Tractor or Field robot



Sensing

- Collect image dataset – Horseradish + Weeds
- At **various growth stages**
- What are the most troublesome weeds? – Waterhemp and Palmer Amaranth



Task



Train an AI classifier model



Spraying or tillage

Exploring the Diverse Commercial Applications of Artificial Intelligence in Agriculture



See & Spray

This innovative technology utilizes AI-driven analytics to optimize herbicide application by identifying weeds and targeting them precisely, reducing chemical use and promoting sustainable farming practices.



A comprehensive data management platform that leverages AI to analyze vast amounts of agricultural data, enabling farmers to make informed decisions about planting, fertilization, and yield predictions for crop management.



An AI-powered mobile app designed for farmers, providing real-time diagnostics of crop diseases and pest infestations through image recognition, helping to enhance crop health and productivity.



This cutting-edge soil sensing technology employs AI algorithms to analyze soil moisture levels and nutrient availability, allowing farmers to optimize irrigation and fertilization schedules for improved crop yield.



A unique AI solution that uses computer vision to monitor livestock behavior and health, providing farmers with actionable insights to enhance animal welfare and farm productivity.

Land O'Lakes



A data-driven platform that combines AI and agronomic expertise to help farmers implement sustainable practices, improve soil health, and increase profitability while minimizing environmental impacts.

AI isn't one technology: It's a collection of technologies

In ag, we most commonly experience AI in four ways

AI Category	What it Does	Agriculture Examples
Predictive AI (Machine Learning)	Predicts or classifies outcomes from data	Yield prediction, disease forecasting, nitrogen recommendations, grain grading, crop insurance risk
Machine-Embedded AI	Controls equipment in real time	See & Spray, autonomous tractors, combine automation, robotic harvesters
Generative AI	Creates text, images, code, and reports	ChatGPT, Extension assistants, writing spray records, creating nutrient plans
Agentic AI	Completes workflows by using multiple tools	Farm office automation, scheduling, compliance, inventory management

AGENTIC AI: YOUR FARMING WINGMAN

Get everything ready for **planting** next week.

The AI might

Check the
weather
forecast



Review soil
conditions



Confirm fertilizer
deliveries



Schedule
equipment
maintenance



Assign
employees



Verify seed
inventory

Notify the
agronomist



Update the farm
management software



Generate
work orders



Alert the farmer if
something needs
attention

Summary

We are in the **FIRST BALL** of the **FIRST INNING** of Generative AI

- ✓ It's not just for chatbots:
all data-driven interactive services can benefit !
- ✓ The technology holds promise in low-resource domains like Agriculture
- ✓ Much fewer risks than other arenas (politics, defense, justice, finance, ...)
- ✓ Much can be done now but deep research needed to fulfill the promise

Summary

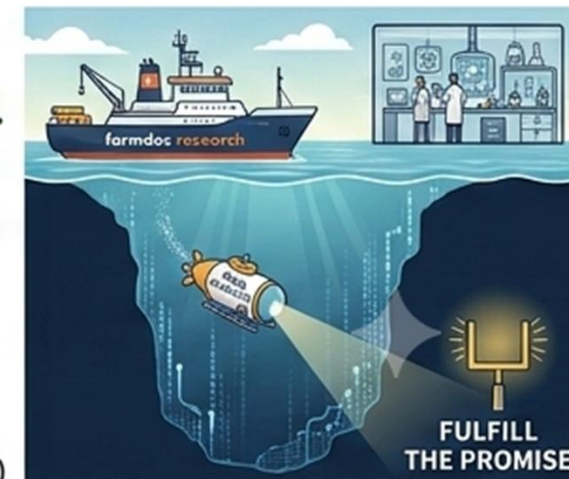
We are in the **FIRST BALL** of the **FIRST INNING** of Generative AI

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Low-Risk
Agriculture

High-Risk
Arenas
(stormy, caution)



What does AI think the 3 takeaway points are?

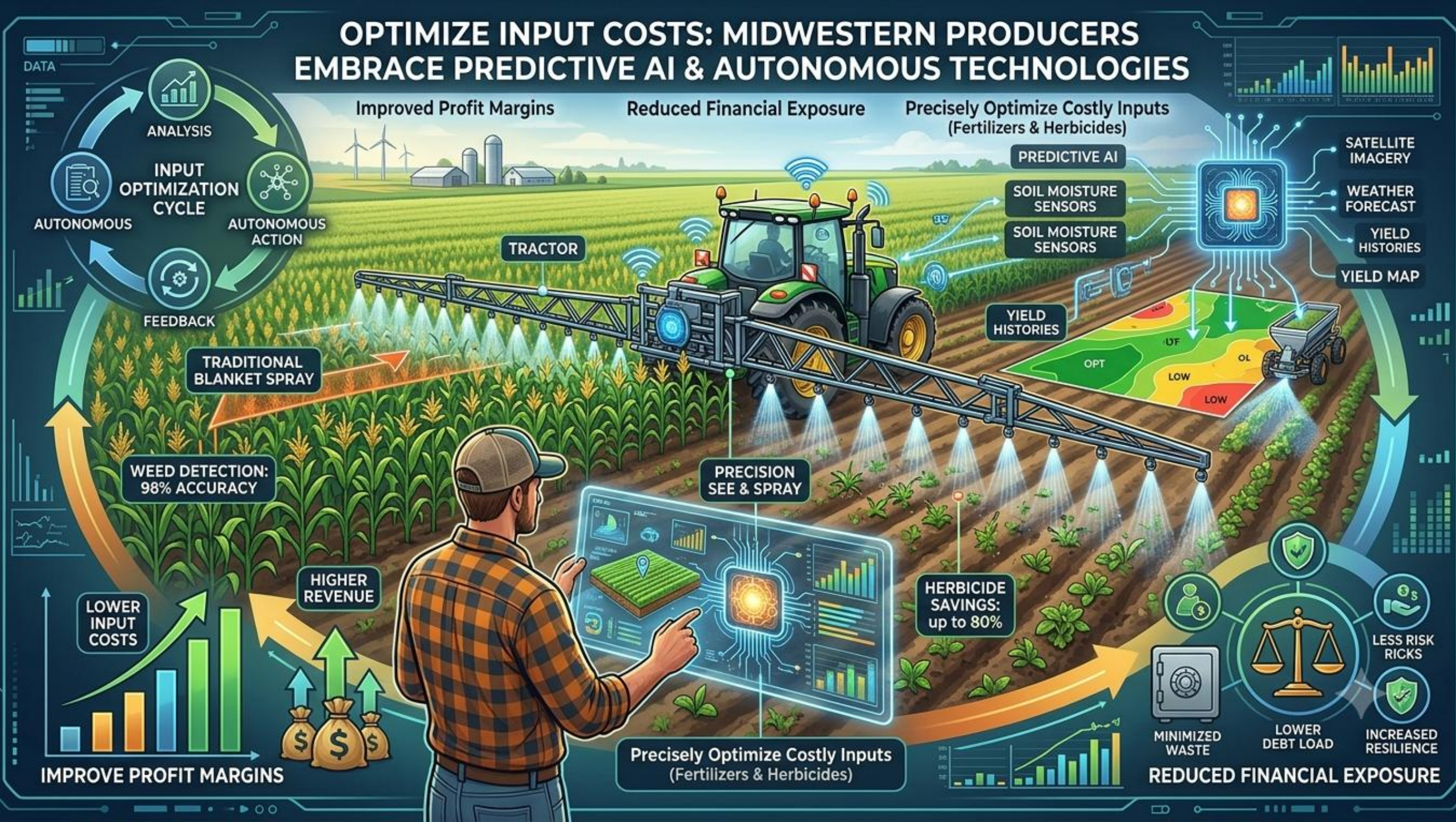
The prompt used with Gemini-3.1-Pro with a PDF of the presentation

Act as an agricultural economics expert. Please review the attached presentation from a University of Illinois farmdoc webinar and provide 3 concise key takeaway messages. Tailor these takeaways for Midwestern row-crop producers and ag lenders, focusing specifically on actionable risk-management strategies or economic implications. Format the output as three bullet points, keeping each point to a maximum of one sentence.

1: Optimize Input Costs

Midwestern producers can improve profit margins and reduce financial exposure by adopting predictive AI and autonomous technologies (like See & Spray) to precisely optimize costly inputs such as fertilizers and herbicides.

Figure 1 consists of two bar charts. The left chart displays the number of publications per year from 1980 to 2009. The y-axis represents the number of publications, ranging from 0 to 1000. The x-axis represents the years. The number of publications starts low (around 50) in 1980, increases to about 100 in 1985, then to about 200 in 1990. There is a significant increase starting around 2000, reaching a peak of approximately 700 in 2008, and ending at about 650 in 2009. The right chart displays the number of publications per year from 2010 to 2019. The y-axis represents the number of publications, ranging from 0 to 1000. The x-axis represents the years. The number of publications starts high (around 900) in 2010, decreases to about 700 in 2011, then to about 600 in 2012. It then increases to about 750 in 2013, 800 in 2014, 600 in 2015, 700 in 2016, 800 in 2017, 900 in 2018, and peaks at about 950 in 2019.



2: Enhance Decision Support

Ag lenders and farmers should utilize specialized generative AI tools, such as CropWizard, as data-driven assistants to rapidly synthesize complex agronomic data for better-informed risk management and crop insurance decisions.

ENHANCE DECISION SUPPORT: AG LENDERS & FARMERS AND CROPWIZARD AI

DATA INGESTION & RAPID SYNTHESIS



**CROPWIZARD AI:
GENERATIVE ASSISTANT**

Synthesizing Complex
Agronomic & Financial Data

BETTER-INFORMED DECISIONS & OUTCOMES



RISK MANAGEMENT

Risk Profiles



- Weather Risk
- Market Risk
- Production Risk

Risk Score: **Optimized**

Mitigation Strategies

Recommended mitigation, recommended strategies, and recommendations to find confidant and risks.

CROP INSURANCE decisions



Coverage Type: **Parametric**

Coverage Level: **Optimized**

Premium vs Payout Estimates

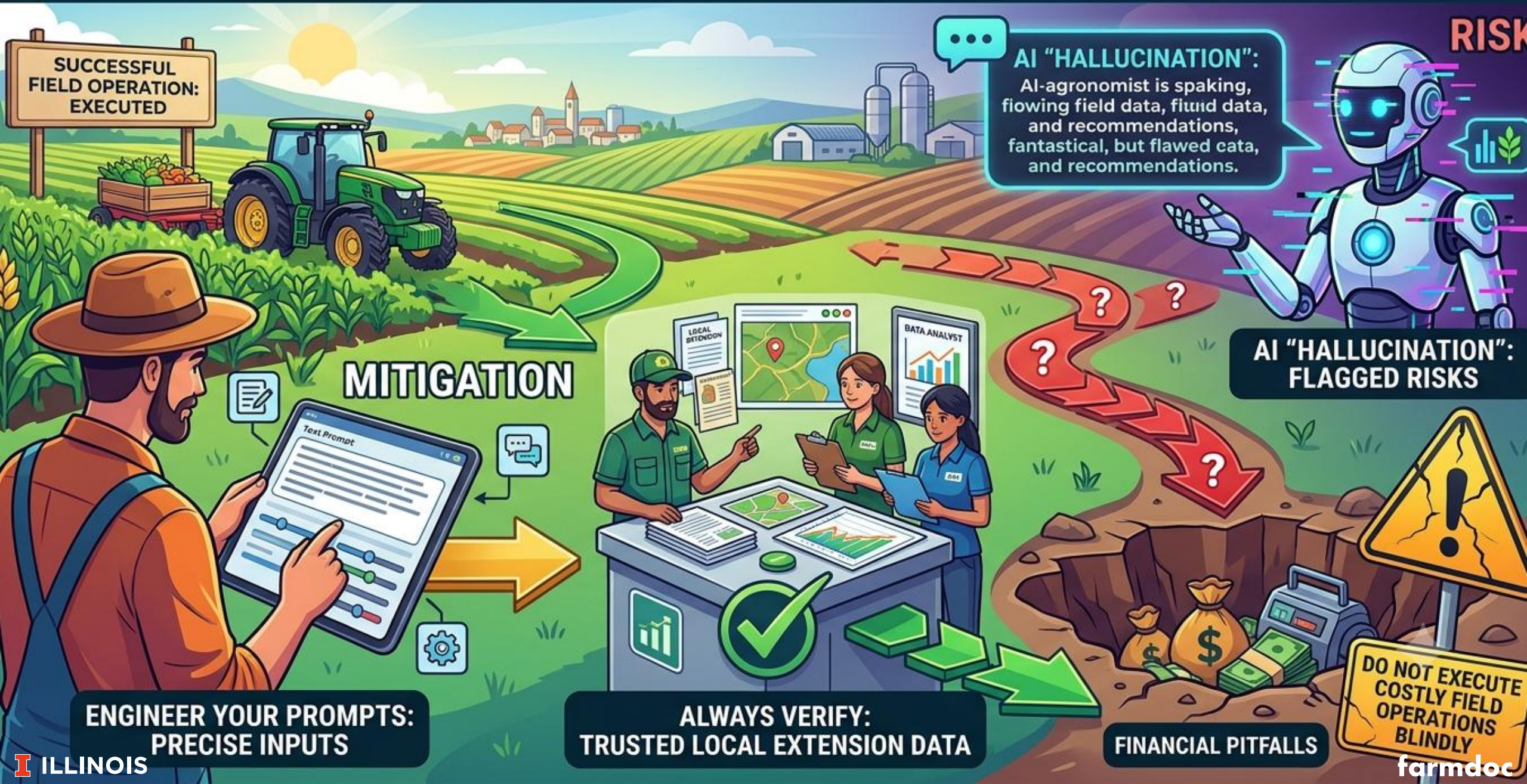


**Optimized Policy
& Protection**

3: Mitigate Information Risk

To avoid the financial pitfalls of AI "hallucinations," users must carefully engineer their prompts and always verify AI-generated agronomic advice against trusted local extension data before executing costly field operations.

MITIGATE INFORMATION RISK: AG AI & CROP ADVICE





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