

AEA Strengthens Sustainable Agriculture with AI

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The Snapshot

Advancing Eco Agriculture (AEA) is a B2B regenerative agriculture solution consultancy. They sought to refocus conversations between themselves and their clients on cultural management practices¹ by building a tool that would improve the recommendations engine that uses plant health data to inform product and farming practice recommendations. This new software would also serve internal teams, providing everyone from the most proficient agronomists to new hires with the same rich knowledge base that makes AEA the best in the business. With the help of Aries Solutions, what began as an objective to create an AI tool that served both purposes bloomed into an opportunity to educate a much broader public audience of growers with regenerative and sustainable cultural management practices at the forefront of all conversations.



This system that's been built and refined is, in my opinion, the absolute tool to scale our operation, our sales force, and our impact. It makes our core business more robust; we are able to grow our internal teams faster and give them the level of agronomy knowledge required to continue to differentiate AEA in the marketplace. We didn't set out to have one of the most amazing tools in agriculture that could potentially change the world. But we're seeing results from it that will allow our mission of expanding regenerative global agriculture by ten years because of this project.

– Eric Girdler, CEO, Advancing Eco Agriculture

Meet the Client

Advancing Eco Agriculture is a national company headquartered in Middlefield, Ohio, U.S.A. Founded in the early 2000s when trailblazer John Kempf saw a desperate need for a *“scalable, whole-systems approach to revitalizing soil and plant health,”* AEA offers agronomic consulting, plant nutrition analysis, and technology solutions in the form of biological and nutritional products. *“We’re very focused on our customers and bringing solutions to our growers inside of regenerative practices,”* says Eric. *“What makes us different from other similar companies is the fact that we have the world’s best agronomy coupled with product solutions for all growers.”* AEA is consistently expanding and offering new education and chemical-free ways to help those who rely on the environment for their livelihoods at scale.



AEA offers agronomic consulting.



Goals

1. **Emphasize Cultural Management Practices:** A new AI tool, or LLM (Large Language Model), would serve as a means to integrate cultural management practices into the conversations and formal recommendations between AEA's farm services and the growers they support. By analyzing nutrient deficiencies and excesses found in plant sap test results, the tool would help identify and recommend relevant practices to remediate plant health issues.
2. **Scale Internal Teams:** The original goal was to improve the quality of recommendations and reduce the time required by agronomists to compile those recommendations into a report that included cultural management practices. However, the LLM would also be an excellent resource, allowing even the most junior agronomists on the team to learn from and access the depth of knowledge that differentiates AEA in the marketplace for their clients.

Sowing Successful Seeds

AEA offers growers plant sap analysis tests. What is essentially a blood test for plants shows its nutrient levels, allowing the agronomists to prescribe products and new farming practices in the form of a summary and report that outlines the issues and makes recommendations based on regenerative and sustainable farming practices. David Walker, Director of People and HR at AEA, says, *"In the beginning, the process involved us making recommendations audibly. Our reports weren't written down, and questions and details got lost along the way."* When written reports became best practice, the write-up was populated from scratch, including sap test results with nutrient excesses and deficiencies and how and why to address them.

However, there was still room for improvement. The expectation is that every agronomist at AEA is an absolute expert in their field (pun intended). AEA's leadership knew they needed a way to make the sap test and reporting process more efficient and inclusive of cultural management practices while logging all reports for education and reference purposes. Eric says, *"We had this great idea, but we didn't have the right leadership for it. When we finally brought in Aries, they helped give us a better understanding of what this new tool needed to be."*

The Cream of the Crop: AEA + Aries Solutions

Eric continues, saying, *"The partnership with Aries was a big turning point because that was the confidence I think we all needed. Once we had our leadership in place and Aries in place, we could see our team doing the things that they needed to do to build something like this. We would not be where we are today if we had not had those pieces."* David agrees, stating, *"We were spinning our wheels for so long. Working with Aries gave us traction and movement with a roadmap to arrive at our desired outcome. The way Aries does that is masterful."*



Where Crops Meet Code: AI Tooling

AEA had over two decades' worth of blog articles, podcast recordings, sap test results and reports, and other data sets stored in various systems. *"They were very well prepared for this,"* says Chris Rogers, VP of Portfolio at Aries Solutions. *"AEA had already established a solid foundation with their AWS environment and user interface, making it easy for us to build upon,"* explains Drew Esler, Machine Learning SME at Aries. *"They did a great job identifying and cataloging relevant agronomy data, which positioned us well for the next phase. That early effort allowed me to focus on targeted data cleaning and preparation ahead of launch."* Aries worked with AEA to consolidate their treasure trove of information, curating a clean corpus of domain-specific documents. Using Together AI for embedding generation and Pinecone for vector indexing, the team created a retrieval pipeline optimized for question-answering tasks. Within the first few weeks of the project, AEA integrated an AI ChatBot interface to test the first draft.

"When we first tried it out, we were all taken aback by how well it worked," says Drew. Chris chimes in saying, *"That's when John [Kempf] got excited and started throwing some challenging questions at it. At one point, it answered one of his questions, and someone on the call said, 'This thing is scary accurate,' and I thought, 'Perfect. That's what we want.'"*

"We were immediately thinking about what else it could do," continues Chris. The team started tossing around the idea that this new LLM could have a wider educational application beyond merging cultural management practices into recommendations or scaling internal teams; it could serve as a knowledge center for regenerative agriculture, directly supporting research and development, customer service, marketing, and growers at any capacity. With that in mind, the next few weeks of the project were dedicated to iterating and improving on the first draft. *"Aries does a wonderful job of laying down the tracks and providing the train to move along them,"* David recalls of the process. *"I'd go to meetings and see all the little tweaks and things that could happen in real-time and the outcomes that they would drive, and I'd think 'Wow, we have a true shot here.'"*

Aries and AEA sought to make this AI tool consistently sound like the voice of the AEA brand and experimented with putting more data into the dataset. Chris says, *"Eventually, the model provided an answer that included information that even a senior AEA agronomist had forgotten about but was highly relevant to the question. That's when we knew we were ready to launch."*



Reaping Data-Driven Benefits

AEA agronomists are now able to plug in sap test results and automatically generate a summary and action plan that includes cultural management practices, which are then edited as needed.

"While the tool is highly capable, it's important to AEA that their team is reviewing each report to edit and approve the recommendations, rather than relying entirely on the LLM," says Chris. "Once the full report is up to their standards, it is signed, exported as a PDF, and emailed to the grower."

This process not only ensures that their clients receive the most thorough and accurate recommendations based on their test results, but also makes the reporting process much more efficient while providing new or junior AEA team members with software that reduces the learning curve and allows them to become top-shelf agronomists in an effective way.

"This system that's been built and refined is, in my opinion, the absolute tool to scale our operation, our sales force, and our impact," says Eric. "It makes our core business more robust; we are able to grow our internal teams faster and give them the level of agronomy knowledge required to continue to differentiate AEA in the marketplace. We didn't set out to have one of the most amazing AI tools in agriculture that could potentially change the world. But we're seeing results from it that will allow us to change things in farming. We can accelerate our mission of expanding regenerative global agriculture by ten years because of this project."



AEA has made their new technology available to the public.



Advancing Eco Agriculture Today

Among AEA's next steps is to add the capability for growers to log into a portal and access a full history of their sap test results and personalized reports. *"It'll be similar to MyChart, but for plants,"* says Chris. *"For example, if your blood test shows you have high cholesterol, AEA believes you should be given information explaining why that's harmful and how exercise and a better diet will lower your cholesterol and improve your overall health, rather than only prescribing you medication to fix it. Part of the value here is using this LLM to provide broader education about regenerative agriculture practices."* AEA's reports include this educational component now, but future iterations will make this information accessible to growers within their own accounts.

Additionally, AEA is already working on making this technology available to the public. Eric says, *"I think it will give everybody a chance to be successful in agriculture, whether you're a large-scale commercial operation or a hobby farmer. This software can make your growing practice better and provide knowledge you can't get unless you go read 500 books on the topic."*

Chris adds, *"The hope is that you see these cultural management practices at the forefront of conversations between AEA's farm services and the growers they support. Bringing education and injecting the 'Why We Do This' into those discussions elevates the results for everyone."* Eric agrees, stating, *"And because it's all regenerative farming information, you're reducing billions of chemicals that are being spread on our land and our food, and putting healthier, more nutrient-dense foods into yourself and your family. Food is medicine, and that's a huge part of why we exist as a company."*

¹ Cultural management practices are the techniques used by growers to work with natural approaches to improving soil and plant health, rather than relying on chemical products to fix an issue. For example, using crop ground covers to prevent erosion.

