ADVANCED AGRILYTICS

Transforming Global Food Production One Algorithm at a Time

How Advanced Agrilytics is Scaling Sub-Acre Spatial Agronomy for a More Productive, Efficient, and Resilient Future

White Paper Series | Volume 1
An Ongoing Exploration of Agronomic Innovation from Advanced Agrilytics

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Executive Summary

Global hunger is rising, with more than 282 million people facing acute food insecurity in 2023 alone. As the world population moves toward 10 billion by 2050, agriculture must meet growing food demands using fewer resources and less arable land. Advanced Agrilytics, under the leadership of CEO Kenny Avery, believes that their patented spatial analysis technology will help transform global food production.

This white paper introduces Advanced Agrilytics' transformative solution: a sub-acre level data analysis platform known as TerraFraming™, which examines fields as a collection of microenvironments rather than uniform plots. By layering key agronomic data—including soil composition, cation exchange capacity (CEC) levels, water flow, and nutrient distribution—Advanced Agrilytics delivers custom agronomic prescriptions tailored to each environment within a field. Their methodology improves yield consistency, input efficiency, and most importantly, builds crop resiliency—enabling more consistent yield results in the face of weather extremes or pest and disease pressure.

Key Results of Advanced Agrilytics' Methodology

- Their precision recommendations lead to, on average, a >27% yield increase per acre in corn production and a >15% reduction in nitrogen use per bushel of corn compared to state averages.
- They deliver consistent gains—$46/A in gains by year four and $61/A in gains by year 10 for soybean growers.
- For corn growers, their methodology has proven to achieve $72/A in gains by year four and $100/A by year 10.

This transformative, prescription-based production methodology is built on more than a decade of field data, more than 25 patents, and continuous investment in research and agronomic innovation. The result is a scalable model that not only boosts farmer profitability in the U.S. but also holds promise for addressing global food production by enabling higher yields from limited land in resource-constrained regions.

Taking a Global Approach

Kenny sees global scalability of Advanced Agrilytics' patented analytical technology as the next frontier. Through licensing and managed service business models and their vision of developing a cloud-based agronomic portal, the company aims to deliver their technology to growers worldwide—from Iowa to Indonesia. *"If we can help a grower in Africa raise yields by 20 bushels per acre, that's life-changing for the grower and their community,"* says Avery. By combining their proven agronomic intelligence technology with global datasets, Advanced Agrilytics can deliver hyper-localized recommendations—bringing global data to the individual acre, anywhere in the world.

Conclusion

This white paper underscores a powerful message: technology can transform global food production—not in theory, but in practice. By delivering sustainable, data-driven solutions to growers worldwide, Advanced Agrilytics is taking measurable steps towards enabling more effective, efficient food production—one algorithm at a time.

Transforming Global Food Production One Algorithm at a Time

Global Hunger: A Growing Crisis

In 2023, nearly 282 million people across 59 countries faced acute food insecurity. That's 24 million people more than were reported the previous year, according to the Global Report on Food Crises. Meanwhile, the 2024 Global Hunger Index reports hunger as "serious" or "alarming" in more than 40 countries, including parts of Africa, Asia, and the Middle East. To heighten awareness of this global crisis, the World Food Programme recently launched HungerMap LIVE, which monitors global hunger statistics in real time.

As the global population surges toward 10 billion by 2050, the challenge becomes urgent: How do we produce more food, on less land, with fewer resources and less environmental harm?

Advanced Agrilytics believes they have part of the solution. That solution is their unique, sub-acre spatial analysis technology, which helps agronomists and growers manage every part of every acre in a more proactive, data-driven method that improves nutrient efficiency and yield consistency. It's a technology that has the potential to transform global food production.

Rethinking the Acre: The Power of Spatial Agronomy

Agricultural land is shrinking, input prices are rising, and weather volatility threatens yields. In the face of these challenges, Advanced Agrilytics is redefining the value of precision agronomy through science-backed, sub-acre spatial analysis.

Their approach treats every field not as a uniform whole, but as a collection of microenvironments. Their patented software known as TerraFraming™ examines multiple layers of data, including water movement, organic matter content, cation exchange capacity (CEC) levels, nutrient spatial critical levels, and more, for each sub-acre in the field. This unique analysis creates a customized prescription for everything from nutrient management to seeding strategies, delivered in a "ready to implement" format.

"Sometimes a farm is 15 fields, or 40 fields or more," explains Avery. *"Each of those fields, just like a human being, has their own individual characteristics. The soil may be different in some areas; water moves onto and off of various parts of each field in different ways, the organic matter content will vary from area to area, and so on. Our technology analyzes all of these factors so we can help growers get the most yield out of every part of every acre. It's a very proactive, holistic approach – very different than other methods."*

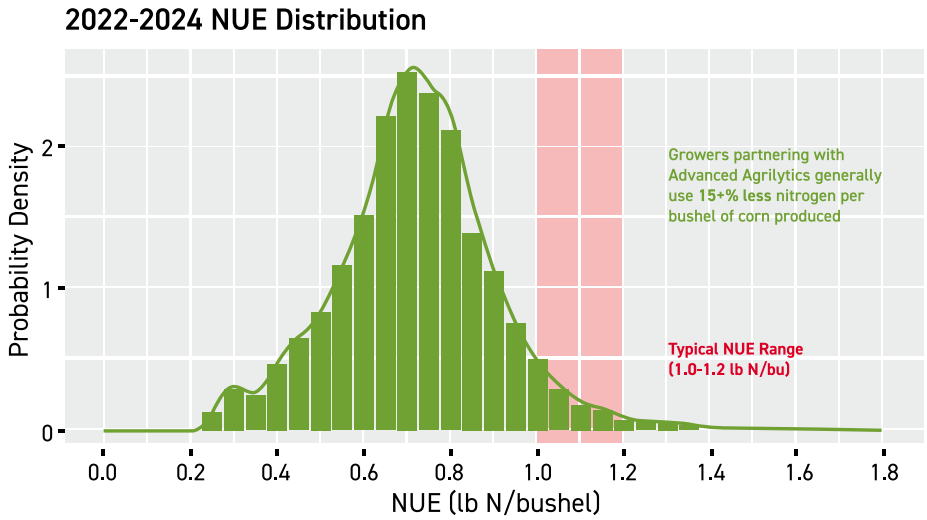
By applying the Advanced Agrilytics methodology, growers can:

- Improve yield consistency and reduce variability.
- Apply fertilizer and other inputs with greater precision, minimizing waste.
- Achieve measurable environmental gains, including improved nitrogen use efficiency, reduced nitrogen runoff, and improved soil health.

Consistent and Impressive Results

- Advanced Agrilytics growers achieve on average 27% more bushels of corn per acre, while using 15% less nitrogen per bushel of corn produced.
- By pinpointing variability and optimizing inputs at the sub-acre level, they deliver consistent gains—$46/A in gains by year four and $61/A in gains by year 10 for soybean growers.
- For corn growers, their methodology has proven to achieve $72/A in gains by year four and $100/A by year 10.
- When their variable rate nitrogen stabilizer prescription is used, there is a 21% reduction in N_2O emissions when compared to standard agronomic practices, in areas prone to high levels of potential nitrogen loss.

Figure 1: Growers Using Advanced Agrilytics Realize More Efficient Nitrogen Utilization



Data analysis shows that growers working with Advanced Agrilytics significantly improve their nitrogen use efficiency. One reason is their patented Nitrogen Loss Layer analysis helps pinpoint areas more prone to nitrogen loss. This allows them to develop variable rate nitrogen stabilizer strategies to help protect nitrogen in those areas and avoid over-applying nitrogen in areas where it is less prone to loss.

Data Drives Better Efficiency

Terms like "disruption" get thrown around a lot in ag tech. Fortunately, Advanced Agrilytics isn't focused on buzzwords but on better outcomes for growers. The company's prescriptions are based on in-depth, spatial analysis of multiple datasets. This analysis, and the crop management strategies they provide, are what growers value most about working with Advanced Agrilytics.

Their data and prescriptions are also from a proven, trusted, and unbiased source. They don't sell any products such as fertilizer, chemicals, or seeds. However, their prescriptions do help growers get better ROI and use efficiency from these types of inputs. This isn't hypothetical. It's backed by:

- More than $25 million in proprietary research.
- More than 70 agronomic field staff supporting in-season decision-making for their growers.
- A library of more than 260 tested corn and soybean varieties.

The Importance of Crop Resilience

Another key benefit of incorporating the Advanced Agrilytics methodology into crop production is that it optimizes nutrient efficiency and helps produce healthier crop plants with more biomass—the total mass of above-ground plant material, including stems, leaves, and reproductive structures. More biomass means more vigorous plants with greater leaf area for photosynthesis, more robust root systems, and thicker stalks. These attributes make them more resilient to stress and adverse weather conditions than smaller, weaker plants.

"Creating more resilient crops becomes even more key to addressing global hunger when you examine where most of the world's hungriest people live," says Avery. *"Globally, a disproportionate number of food-insecure people live in regions where crop production is inherently more difficult, due to adverse weather, poor soil quality, limited access to irrigation, and climate variability.*

These areas include large parts of Sub-Saharan Africa, South Asia, Central America, and parts of the Middle East. Imagine if we could give them a technology that could help them produce crops better able to survive and thrive in these conditions."

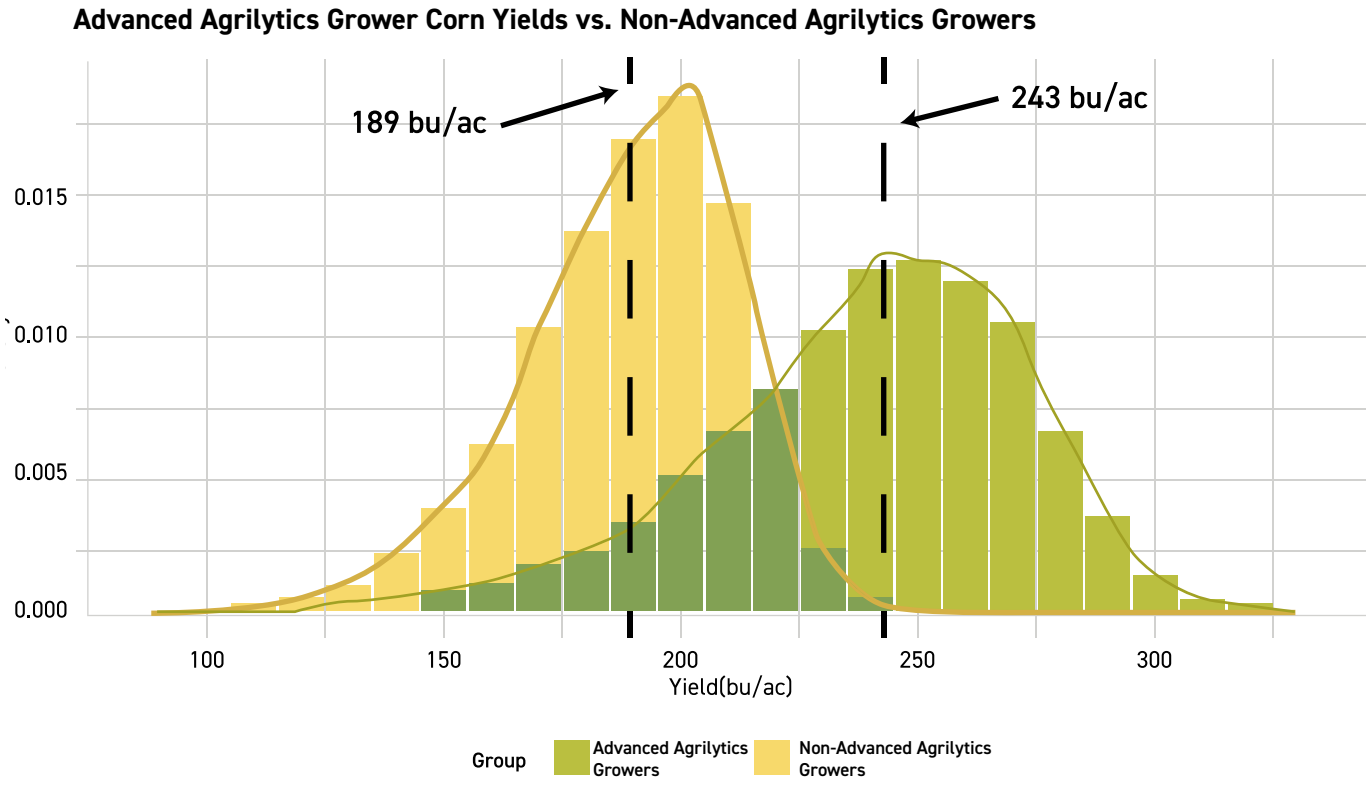
Healthier plants aren't just higher-yielding—they're more efficient. They utilize nitrogen, phosphorus, potassium, and sulfur more effectively. They build biomass faster, reach canopy earlier, and have more efficient photosynthesis "engines." That early-season vigor is a foundational advantage that helps crops manage temperature, conserve moisture, and outcompete weeds and disease pressures.

This adaptability is key when farming in water-limited or high-stress environments. In a dry year, Advanced Agrilytics' data-driven prescriptions direct more nutrients to the parts of the field that need support most. In saturated conditions, their prescriptions fine-tune rates to avoid runoff and nutrient loss. That's not just agronomic stewardship—it's environmental sustainability at the micro level.

Now imagine these same principles applied globally.

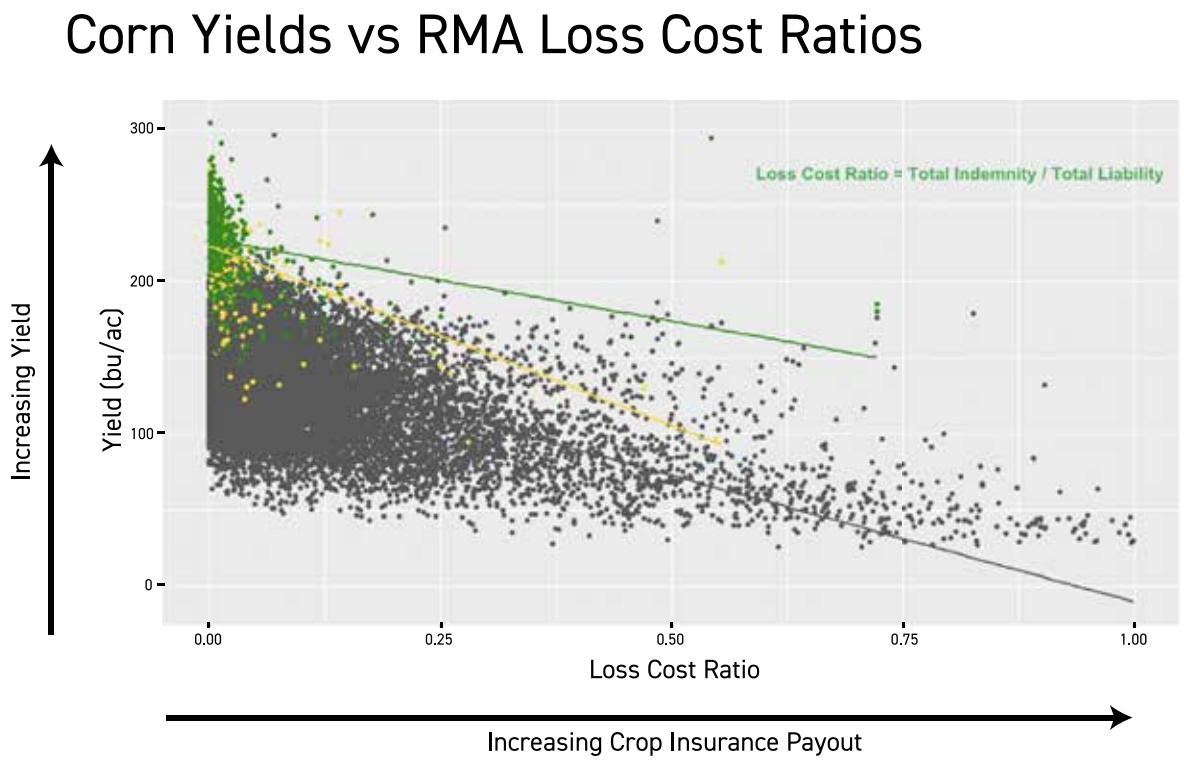
In regions of the world where crop failure means famine, the ability to grow crops that make the most of available moisture, that can push through stress and build a strong canopy quickly, could be life-changing. These systems don't just build bushels—they build buffers. They give growers more control, more predictability, and more hope.

Figure 2: Improved Yield Consistency = Better Operational Resiliency



This graph compares corn yields from Advanced Agrilytics growers to county—level yield distributions in the regions where the company operates. This shows that Advanced Agrilytics growers consistently outperform state yield averages. While most growers in the region fall within a more centralized yield range, their growers are pushing the right side of the distribution, achieving higher yields more frequently and reliably. This demonstrable improvement in yield consistency allows growers to improve operational resilience, meaning they can endure weather volatility or other ups and downs more successfully.

Figure 3: Increased Resilience During Adverse Conditions



This scatter plot illustrates the relationship between yield performance and crop insurance loss cost ratios—the higher the ratio, the greater the insurance payouts due to yield losses. The trendline for Advanced Agrilytics customers (represented by the green dots and the green trend line) shows a much flatter decline compared to the average reported by the USDA Risk Management Agency (RMA). This means that as weather variability or other risk factors increase, yields of Advanced Agrilytics growers remain more stable.

Each dot and trend line tells a story:

- Green dots represent current Advanced Agrilytics customers with acres under active management. The green trend line shows that the rate of yield decreases is not as steep for Advanced Agrilytics customers.
- Yellow dots show the same growers before partnering with Advanced Agrilytics.
- Gray dots reflect the broader population of all farmers as reported by the USDA National Agricultural Statistics Service (NASS), serving as a national benchmark.

In practical terms: while many farmers experience steep yield declines when risk increases, Advanced Agrilytics customers maintain a more resilient yield curve. They company's data-driven farm management not only boosts productivity in good years—it helps growers better withstand tough seasons, reducing both agronomic and financial volatility.

Bringing Midwest Technology to the Global Stage

Avery has worked in global roles at various leading agribusinesses such as the former Monsanto Company (now Bayer Crop Science), where his world travels helped him to develop a more informed world view of critical issues such as hunger.

"The United Nations projects our global population will be 9.8 billion people by 2050," explains Avery. *"The bulk of that population growth will occur in Asia and Africa – coincidentally, areas of the world where the majority of people are already suffering from starvation. Every year, more arable acres are taken out of production. That means that on a global basis, we are going to have to be much more efficient in producing more food on a global scale.*

"And that's where I get excited about the tools and technology that Advanced Agrilytics brings to the equation. For example, suppose our technology could help a grower in Africa whose acres are yielding 60 bushels an acre increase their yield by an additional 20 bushels of yield over the next three to four years. In that case, that's a life-changing number - not just for that grower, but for their entire community."

Avery and his team at Advanced Agrilytics are laying the groundwork for allowing them to bring their technology, first conceived 15 years ago by a group of three visionaries in Indiana, to the global stage. His vision is to make the company's technology available to any grower, anywhere. Here's how:

1. Cloud-Based Agronomic Portal

In the future, Avery envisions a cloud-based portal that crop producers could access and use to upload specific data sets. Then they could potentially:

- Receive tailored planting and nutrient strategies.
- Adjust plans in real-time based on weather and crop development.
- Remove the dependency on physical proximity to an agronomist, enabling scalable, high-ROI agronomy across continents.

"I envision a day when a grower could input their data into a secure online portal connected to our technology," he explains. *"From there the data would be analyzed to provide that grower with customized agronomic prescriptions that will allow them to take their farm's production and efficiency to a much higher level – no matter where in the world they are. That's the goal, and we're not that far away from it. We've got the tools, and we've got the data, but right now we don't have access to the global market. That day is coming."*

2. Licensing and Technology Partnerships

In 2024, Advanced Agrilytics launched managed service and licensing business models, allowing them to develop contractual partnerships with agricultural retailers, agronomists, and other agribusinesses. Through these relationships, partners can offer Advanced Agrilytics technology to growers in any location—potentially, anywhere in the world. For more details on Advanced Agrilytics Managed Service and Licensing offerings, click here.

"Our Managed Service and Licensing offerings will allow us to partner with agronomists, agricultural retailers, and others in agribusiness to help growers produce crops more efficiently wherever they are, not just based on where we are, physically," says Avery. *"We could potentially license our technology in France, Africa, or Asia—getting the technology to as many people as possible."*

Managed Service: Turnkey Agronomic Intelligence for Retail Partner

In the Managed Service model, Advanced Agrilytics acts as the agronomic engine behind the scenes, equipping agricultural retailers with customized, data-driven agronomic prescriptions for their customers. These prescriptions are built using Advanced Agrilytics' patented tools and include:

- Nitrogen, phosphorus, and potassium strategies
- Seeding rates
- In-season adjustments based on weather and field data

Key benefits for retail partners:

- Retain and deepen customer relationships through differentiated, high-value services
- Offer proven, research-backed recommendations without adding internal workload
- Receive ongoing support from Advanced Agrilytics agronomic experts
- Access co-branded marketing and educational materials to promote the offering

What growers gain:

- Customized, field-by-field prescriptions designed to improve nutrient efficiency and yield consistency
- A proactive agronomic plan for long-term efficiency and whole-farm performance
- Insights grounded in unbiased, third-party spatial data

Licensing: Integrate Spatial Technology Into Your Own Platform

The Licensing model is ideal for organizations that want to embed Advanced Agrilytics' patented spatial agronomy tools into their own systems and services. This model enables partners to maintain their customer relationships and brand identity, while leveraging the same algorithms and insights used internally by Advanced Agrilytics.

Key benefits for retail partners:

- Direct access to Advanced Agrilytics' analytics engine and spatial agronomic technology
- Comprehensive onboarding and training for your team
- Ongoing technical support and data interpretation assistance
- A high-tech edge that enhances your reputation and agronomic impact

What growers gain:

- Local support from a trusted advisor who's equipped with cutting-edge data and analytical tools
- A consistent, customized plan that adapts to each field, each growing season
- A path toward greater resilience, efficiency, and profitability

3. Utilizing Global Data for Local Benefit

When Advanced Agrilytics technology becomes available outside of the United States, new regional data sets will enhance their model's adaptability and utility, especially when combined with the rich multi-year data the company already has accumulated. A grower in Kenya, Indonesia, or Argentina will benefit not only from local insights, but from more than a decade of intelligence sourced from millions of corn and soybean acres.

What's Next?

Advanced Agrilytics evaluates new agricultural technology on a continuous basis. The goal is to look for technologies that could potentially be incorporated into the existing methodology and provide more value for crop producers.

"If we sort emerging technologies into 'buckets' we would have observation technology, such as drones and aerial imaging, and then soil sensing technology and finally, application technology," says Avery. *"All three of those are very viable technological areas that we continue to evaluate and explore. I think Advanced Agrilytics will be concentrating most on the observation and soil sensing technology opportunities, and how those might be incorporated into our existing tech platform to help us create an even more valuable prescription product for crop producers."*

The Bottom Line

Making global food production more efficient requires action, technology, and transformation. Advanced Agrilytics is proving that high yields, environmental stewardship, and global food security are not mutually exclusive. In fact, their technology allows growers to achieve more efficient production in a more sustainable way.

Each additional bushel produced sustainably is a step toward more efficient global food production. Each optimized acre is a reason to believe that agriculture can meet the moment. Avery and his team are leading the way—one algorithm at a time.

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