



CORVIAN

PRECISION AGRICULTURE & SCOPE 3

Part 2: Precision Agriculture

Turning Farm Data Into Verified
Scope 3 Reductions



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2.1 Introduction: From Insight to Action

In Part 1, we made the case that upstream agricultural emissions, often 60–75% of a CPG's carbon footprint, can't be reduced without farm-level visibility.

The Question Now Is...

How do you turn farm data into real, verified Scope 3 progress?

The answer lies in precision agriculture, a suite of digital and data-driven tools, including machinery telemetry, field sensors, and agronomic analytics, that help farmers make smarter, more efficient decisions about what they grow, how they grow it, and what they use.

An aerial photograph of a farm. In the center-left, there is a small white house with a blue roof. The surrounding fields are divided into irregular shapes by green lines, likely representing field boundaries or irrigation canals. The fields show varying colors: some are dark brown, some are light brown, and some are green. The overall scene is a top-down view of agricultural land.

2.2 What Precision Agriculture Actually Looks Like

Precision agriculture is not a single technology. It's a system that combines tools like:

- **Variable-rate nutrient application:** Automatically adjusts fertilizer levels across a field based on soil needs.
- **Satellite and drone imagery:** Detects crop health and moisture stress before they impact yields.
- **Soil and weather sensors:** Monitor field conditions in real time for more accurate decisions.
- **Digital field records:** Keep track of what was applied, when, and where.

Together, these tools help farmers do more with less, reducing fertilizer, fuel, and water use while maintaining or improving yields.

These aren't theoretical savings. In real-world programs:

- **Fertilizer use has dropped by 10–20%**, reducing nitrous oxide emissions (a potent GHG).
- **Water savings of 15–25%** have been achieved through targeted irrigation.
- Yield **gains of 3–8%** are common due to better timing and risk management.



2.3 How Farm Data Becomes Verifiable Scope 3 Reduction

Farmers using precision ag generate an enormous amount of valuable data, on soil nutrients, crop inputs, yields, and land management.

When integrated properly, this data can be used to quantify emissions reductions with high accuracy.

Here's how the process works:

- **Capture:** On-field devices (like sensors, machinery logs, and satellite imagery) collect data on how the field is managed.
- **Analyze:** Platforms like Corvian or Field to Market analyze this data to identify efficiency gains and calculate GHG impacts.
- **Verify:** The data is formatted into audit-ready reports aligned with standards like SBTi FLAG, GHG Protocol Land Sector Guidance, and ISO 14064-2.
- **Report:** CPG companies use this verified data to claim Scope 3 reductions with confidence—backed by evidence.

Importantly, this allows CPGs to trace reductions back to specific farms, fields, and practices, giving them the ability to report and attribute reductions credibly.

2.4 Precision Agriculture Adoption Barriers and Solutions

Despite the benefits, precision ag adoption isn't yet mainstream

Barrier to Adoption	How CPGs Can Help
<i>High upfront costs for tech and software</i>	Co-fund equipment, soil testing, and digital platform access for supplier farms
<i>Limited rural connectivity</i>	Support infrastructure development or choose tools that work offline/low bandwidth
<i>Data ownership and privacy concerns</i>	Establish clear data-sharing agreements and farmer-first data governance frameworks
<i>Low adoption among small/diverse farms</i>	Tailor tools to fit various farm types; fund training through cooperatives or NGOs
<i>Technical complexity and trust gaps</i>	Partner with ag-tech providers to offer user-friendly tools and hands-on farmer support
<i>Unclear farmer incentives</i>	Offer price premiums or sustainability bonuses for verified low-carbon practices

Bottom line:

Farmers shouldn't be asked to carry the transition cost alone. Shared investment creates shared impact.

2.5 What's in It for Farmers

Aligning Incentives at the Ground Level

Precision agriculture won't scale unless farmers benefit first.
The good news is: they do.

Farmers adopting precision practices often see:

- **Lower input costs** from reduced fertilizer, pesticide, and fuel use
- **Stronger margins** thanks to higher input efficiency and fewer crop losses
- **Improved soil health** leading to long-term productivity gains
- **Access to new income streams** from sustainability-linked premiums, insetting deals, and emerging carbon markets

For example, using variable-rate fertilizer can reduce nitrogen use by 15% without reducing yield, saving ~\$20–\$40 per acre on input costs. Over a 1,000-acre farm, that's \$20,000–\$40,000 in annual savings—before accounting for sustainability bonuses or credits.

For farmers, precision ag becomes less about climate goals and more about profitability, risk reduction, and future-readiness.

2.6 Farmer Value Proposition

Precision agriculture isn't just about emissions, it's about enabling better farming.

Here's how it translates into real-world value for growers:

Benefit Area	What It Looks Like on the Ground	Typical Outcome
<i>Input Savings</i>	Variable-rate fertilizer and irrigation only where needed	10–25% less fertilizer and water used
<i>Yield Optimization</i>	Early detection of crop stress via satellite and sensors	3–8% higher yield stability
<i>Soil Health Improvement</i>	Reduced tillage, better nutrient placement, more organic matter	Long-term productivity gains
<i>Risk Management</i>	Field-level weather data, soil moisture monitoring, and in-season alerts to anticipate stress events	Reduced yield variability, fewer weather-driven losses, and improved risk predictability
<i>New Revenue Streams</i>	Payments for verified carbon reductions, regenerative bonuses from buyers	\$15–\$50/acre via carbon or premiums
<i>Decision Confidence</i>	Field-level data and analytics, real-time alerts, and visibility into every acre on the farm	Data-supported insights, confident decisions, and measurable ROI

Precision Ag = Profitability + Resilience + Climate Impact

Over 60% of CPG emissions come from farms, yet more than 85% of Scope 3 data is still modeled, despite precision ag delivering up to 30% N₂O cuts, **25% input savings**, and **\$50/acre** in verified farmer value.

“You can’t reduce what you can’t measure, precision agriculture gives us both the visibility and the verification to turn climate ambition into action.”

— VP, Sustainability Strategy, Global CPG Company



2.6 Why This Is a Strategic Advantage for CPGs

For CPG companies, verified Scope 3 reductions are more than compliance, they're a differentiator.

Brands that can trace sustainability outcomes back to the farm unlock:

- **Audit-ready ESG reporting** aligned with global frameworks
- **Customer trust** through transparent sourcing
- **Stronger retailer relationships** via certified low-carbon ingredients
- **Investor confidence** with finance-grade emissions data
- **Risk mitigation** against regulatory, reputational, and supply disruptions

Why It Matters: Strategic Value for CPGs

Precision agriculture enables auditable ESG reporting aligned with FLAG, CSRD, and the GHG Protocol by linking real farm data to corporate disclosures.

Verified Scope 3 reductions can be traced back to specific sourcing regions, giving brands the ability to make credible, science-based claims.

This not only supports premium product positioning but also reduces supply chain risk and drives smarter, impact-aligned procurement.

2.7 Launch Blueprint

Scalable Precision Ag Pilot for Verified Scope 3 Reduction

Start small, prove impact, and scale with confidence.

A focused pilot allows CPGs to validate farm-level data, model ROI, and build the foundation for credible Scope 3 reporting.

Component	Details
Region & Crop	Midwest corn, Canadian wheat, Argentina soy, etc.
Participants	10–20 farmers or co-op members
Field Setup	Baseline + optimized plots for direct impact comparison
Data Collected	Soil carbon, telemetry, NDVI, farm records
Duration	3–6 months, from planting through harvest
Key Metrics	N use, CO ₂ e/ha, water savings, yield, farmer ROI
Partners	Ag-tech platform, agronomist, validator
Output	Verified, audit-ready Scope 3 dataset + MRV reporting format

Goal:

Build a repeatable model that connects field performance to corporate carbon goals, enabling traceable, science-based emissions reduction at scale.

2.8 From Pilot to Platform

Scaling Verified Scope 3 Reduction Across Supply Chains

Precision agriculture pilots are the launchpad, platform integration is the path to impact at scale.

To move from isolated examples to enterprise-wide climate outcomes, CPGs must embed verified farm data into procurement, traceability, and ESG systems.

Scalable Precision Ag Program Framework

Phase	Focus	Value Created
Pilot Launch (3–6 mo)	Select crop + region, test MRV, capture baseline data	Validates impact, builds trust, proves ROI
Data Integration	Connect farm data to MRV platforms, APIs, and dashboards	Enables traceable, audit-ready Scope 3 accounting
Procurement Alignment	Tie incentives and premiums to verified reductions	Drives adoption and impact-linked sourcing
Supplier Enablement	Provide agronomy support, training, and co-investment	Lowers adoption barriers, boosts farmer participation
Platform Scale-Up	Expand regionally; standardize data and verification	Institutionalizes verified Scope 3 across global sourcing
Traceability Tools	Use dashboards, QR codes, digital certificates	Builds brand trust, consumer credibility, and retail alignment

Outcome:

A repeatable, finance-grade system that turns digital farm data into credible carbon claims, integrated with how companies source, report, and grow.

2.9 Final Call to Action

- **Focus on High-Impact Commodities:** Identify the crops and regions that drive the bulk of your upstream emissions and are ready for data-driven solutions.
- **Launch a Targeted Precision Ag Pilot:** Start with a 3–6 month program that captures field-level data, tests MRV workflows, and builds internal alignment.
- **Measure and Verify Emissions Reductions:** Translate farm activity into CO₂e savings using trusted models and generate audit-ready reports aligned with ESG standards.
- **Scale Through Strategic Procurement:** Integrate verified outcomes into sourcing contracts, supplier incentives, and ESG reporting systems to drive measurable impact.





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