CASE STUDY · ESG & SUSTAINABILITY INTELLIGENCE

Agribusiness Measures Smallholder Impact: How Credible ESG Data Unlocked $3 Million in Follow-On Funding and Two Commercial Offtake Agreements

An international NGO-funded agribusiness program supporting 3,400 smallholder farmers across western Kenya needed credible impact measurement to satisfy donor reporting requirements and attract commercial offtake partners. Previous impact reports relied on self-reported farmer surveys with no verification, creating skepticism among donors and commercial buyers. Our mixed-methods impact framework — combining quantitative farm-level data, qualitative life-history interviews, and satellite-derived productivity analytics — produced audit-ready metrics that secured $3 million in follow-on funding and catalyzed two commercial offtake agreements with European food companies.

ENGAGEMENT PROFILE

Coverage	Kenya (Bungoma, Kakamega, Busia Counties)
Duration	12 weeks
Sector	International NGO-Funded Agribusiness Program
Engagement	Q2–Q3 2025

HEADLINE OUTCOMES

Farmers surveyed & verified	**1,487**
Follow-on funding secured	**$3M**
Commercial offtake agreements	**2**
Income increase measured	**34%**

The Context: ESG Impact Measurement in African Agriculture

Environmental, Social, and Governance (ESG) reporting in African agriculture has reached an inflection point. On one side, international donors, impact investors, and commercial offtake partners increasingly demand credible, verified impact data as a condition of funding and purchasing. On the other side, agricultural programs — particularly those working with smallholder farmers — struggle to produce data that meets these standards. The gap between demand and supply of credible ESG data is one of the most significant constraints on agricultural development finance in Africa.

The challenges are structural. Smallholder farmers — who produce approximately 75% of Kenya's agricultural output and cultivate an average of 0.5–2.0 hectares — operate outside formal data systems. They rarely keep written records, their production is weather-dependent and highly variable, and their income streams are diversified across multiple crops and off-farm activities. Traditional impact measurement approaches — self-reported surveys, focus group discussions, and administrative data — produce estimates with wide confidence intervals and significant bias. Donors know this. Commercial buyers know this. And increasingly, they refuse to accept unverified claims.

The ESG landscape in 2025 is further complicated by a proliferation of frameworks and standards. The Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), Task Force on Climate-related Financial Disclosures (TCFD, now superseded by ISSB S2), and the EU Taxonomy for Sustainable Activities each impose distinct reporting requirements. For agricultural investments, the IFC Performance Standards, particularly Standard 1 (Assessment and Management of Environmental and Social Risks) and Standard 2 (Labor and Working Conditions), provide the most widely accepted benchmark. Yet aligning smallholder program data with these standards requires methodological sophistication that most agricultural NGOs lack.

Our client — an international NGO with a $12 million annual budget for agricultural development programs in East Africa — faced this credibility gap directly. Their western Kenya program, operating since 2019, supported 3,400 smallholder farmers across Bungoma, Kakamega, and Busia counties with improved seed varieties, agronomic training, access to microfinance, and market linkages. The program had reported impressive results: 40% income increase, 60% adoption of improved practices, 35% yield improvement. But these figures were based entirely on self-reported farmer surveys conducted by program staff — a methodology that created both response bias (farmers telling staff what they wanted to hear) and social desirability bias (farmers overstating positive outcomes).

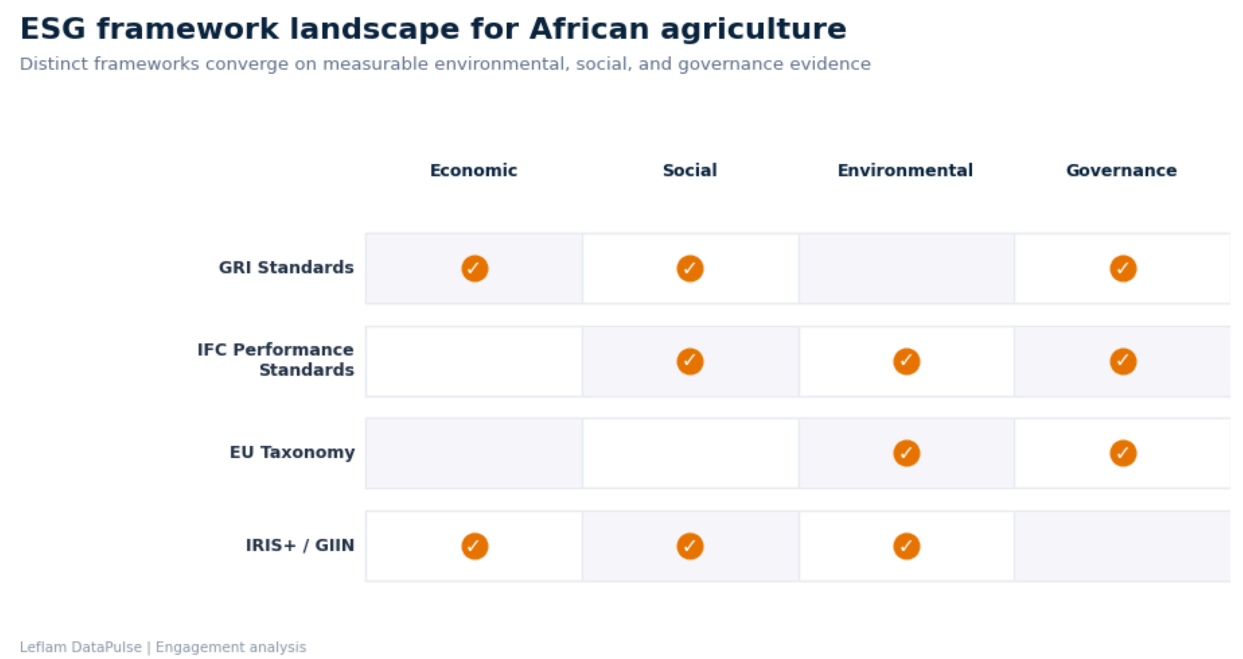

Figure 1. ESG framework landscape for African agriculture — GRI, SASB, IFC, and EU Taxonomy requirements overlap

When the client approached their primary donor for follow-on funding in early 2025, the donor's impact verification team raised serious questions. The donor — a European development finance institution with strict ESG requirements — requested independent verification of all impact claims before releasing the next tranche. Simultaneously, two European food companies (a Dutch vegetable importer and a German organic retailer) that had expressed interest in sourcing from the program's farmer network demanded third-party verified sustainability data as a condition of commercial offtake agreements. The client's existing impact data could satisfy neither requirement.

The Intelligence Challenge: Measuring What Matters, Credibly

The client needed an impact measurement system that was simultaneously: (1) rigorous enough to satisfy donor auditors and commercial buyers; (2) practical enough to implement across 3,400 dispersed smallholders with limited literacy and infrastructure; (3) comprehensive enough to capture environmental, social, and economic dimensions; and (4) cost-effective enough to sustain beyond the initial measurement cycle.

This was not a standard M&E exercise. It was an ESG data architecture problem requiring expertise in agricultural economics, statistical sampling, remote sensing, gender analysis, and international sustainability standards. The client engaged Leflam DataPulse to design and implement a solution.

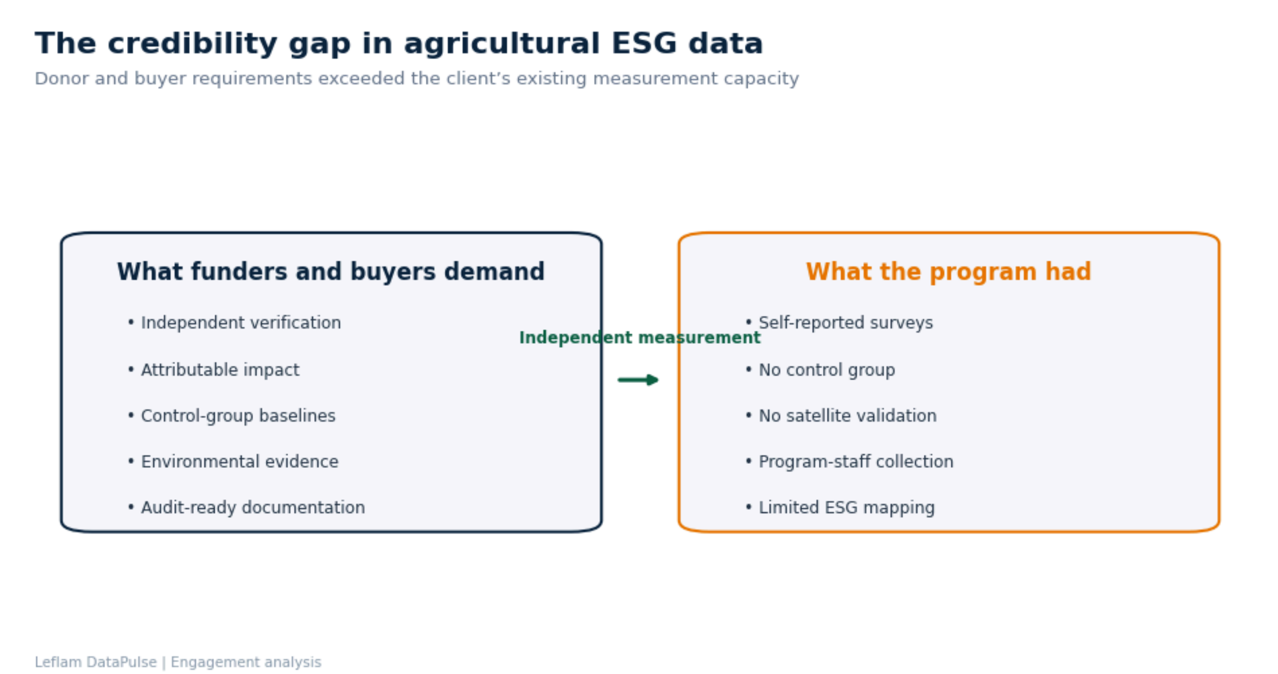

Figure 2. The credibility gap — donor demand for verified impact vs. NGO capacity to produce rigorous data

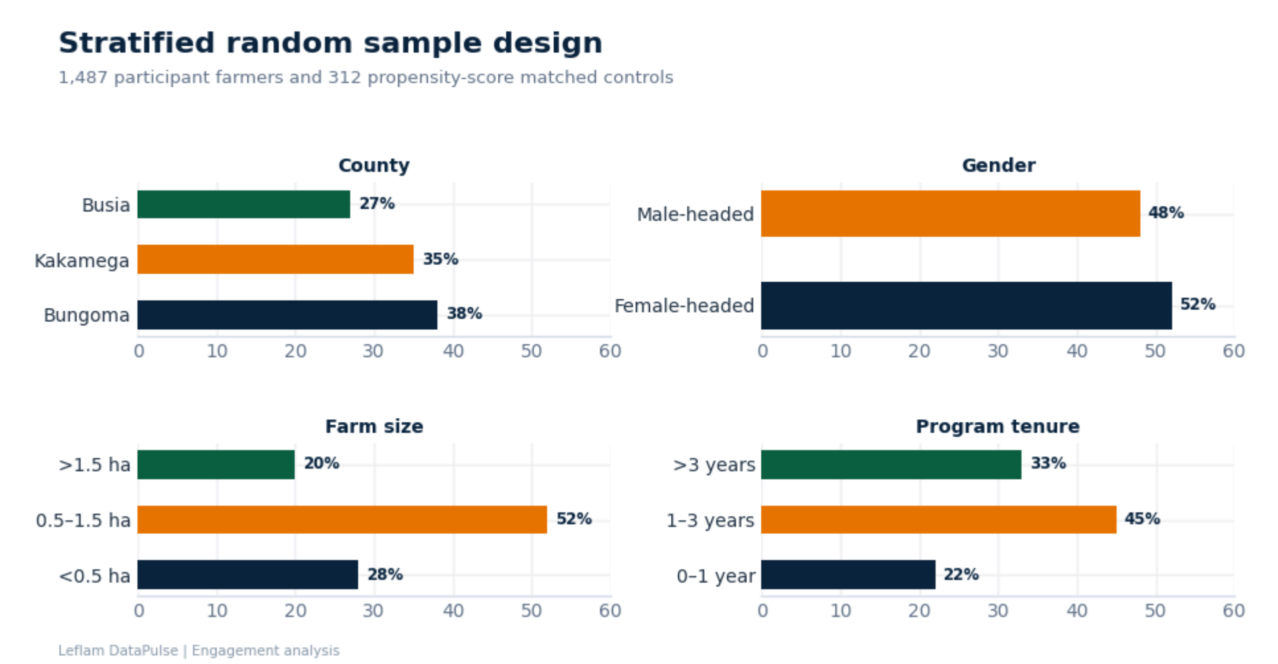

Figure 3. Stratified random sample design — 1,487 farmers across three counties with propensity-score matched controls

Our Approach: A Mixed-Methods Impact Framework

We designed a three-pillar impact measurement framework that combined quantitative rigor with qualitative depth, producing data that was both statistically valid and narratively compelling.

Pillar 1: Quantitative Farm-Level Panel Survey (Weeks 1–8)

- **County:** Bungoma (38% of sample), Kakamega (35%), Busia (27%) — reflecting program distribution.
- **Gender:** 52% female-headed households, 48% male-headed — reflecting the program's gender inclusion objectives and enabling gender-differentiated analysis.
- **Farm size:** Small (<0.5 ha, 28%), Medium (0.5–1.5 ha, 52%), Large (>1.5 ha, 20%) — ensuring representation across the productivity spectrum.
- **Program tenure:** New entrants (0–1 year, 22%), Established (1–3 years, 45%), Long-term (>3 years, 33%) — enabling impact trajectory analysis.

We also selected a control group of 312 non-participant farmers from adjacent communities, matched on observable characteristics (farm size, crop mix, education, household composition) using propensity score matching. This control group was essential for attribution: without it, we could not distinguish program effects from broader agricultural trends (such as favorable weather, commodity price movements, or government subsidy programs).

1.2 Data Collection Protocol

Our field team — 24 trained enumerators, 6 supervisors, and 3 data quality officers — conducted structured interviews using tablets with built-in validation rules and GPS coordinates. The questionnaire covered:

- **Production Data:** Area planted by crop, input usage (seed type, fertilizer, pesticides), labor allocation, harvest quantities, post-harvest losses, and sales volumes. We cross-referenced farmer-reported production against physical measurement of plot sizes using GPS polygon mapping, and against market records where available.
- **Economic Data:** Farm gate prices received, input costs, labor costs (paid and family), off-farm income, total household income, asset ownership (livestock, equipment, housing), and indebtedness. We used a modified version of the World Bank's Living Standards Measurement Study (LSMS) instrument, adapted for smallholder contexts.
- **Practice Adoption:** Use of improved seed varieties, fertilizer application rates and timing, pest management practices, soil conservation measures, and post-harvest handling techniques. We verified reported practices through direct observation of storage facilities, input packaging, and field conditions.
- **Environmental Indicators:** Pesticide usage (type, quantity, frequency), fertilizer runoff practices, soil cover management, and tree planting. These indicators were mapped against the EU Taxonomy's "substantial contribution" criteria for sustainable agriculture.
- **Social Indicators:** Household decision-making patterns (using the WEAI — Women's Empowerment in Agriculture Index — methodology), children's school enrollment and attendance, nutrition diversity scores, and access to healthcare.

Each interview lasted 90–120 minutes and was conducted in the farmer's home or field, in their preferred language (Luhya, Swahili, or English). Enumerators were independent contractors with no prior relationship to the NGO, eliminating social desirability bias. Quality control included: 10% random back-checks by supervisors, GPS verification of all visited farms, audio recording of 5% of interviews for independent verification, and daily data review with outlier flagging.

1.3 Satellite-Derived Productivity Analytics

To complement survey data with objective productivity measures, we partnered with a remote sensing analytics provider to analyze satellite imagery (Sentinel-2, 10m resolution) for all 1,487 sampled farms and 312 control farms. The analysis included:

- **Normalized Difference Vegetation Index (NDVI)** time series to measure crop health and biomass accumulation throughout the growing season.
- **Land Surface Temperature (LST)** analysis to identify water stress patterns.
- **Change detection** comparing current season imagery with historical baselines to identify land use changes, expansion of cultivated area, and adoption of irrigation.
- **Yield estimation models** calibrated against ground-truthed harvest data from a subset of 200 farms, then applied to the full sample.

The satellite data served two critical functions: (1) validation of farmer-reported production (we found a 12% average overstatement in farmer-reported maize yields, with larger overstatements among newer program participants — suggesting a learning curve in accurate self-assessment); and (2) objective measurement of environmental indicators such as vegetation cover, soil moisture, and land use change that farmers could not reliably self-report.

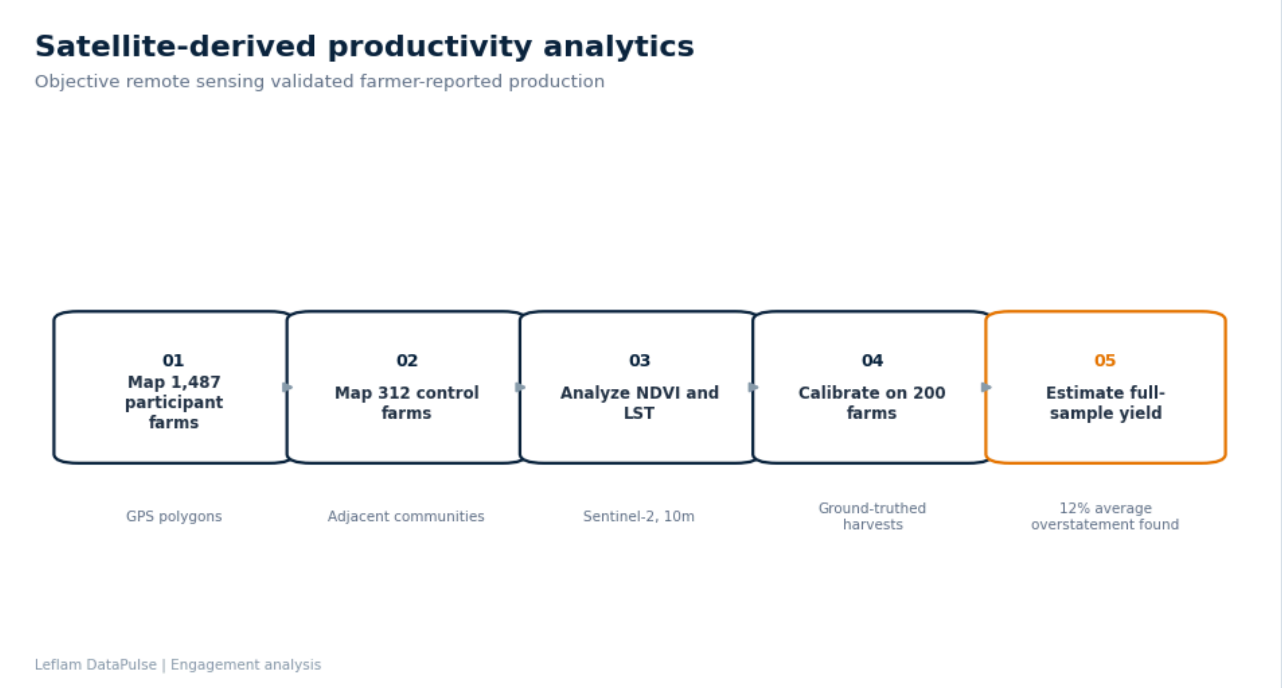

Figure 4. Satellite-derived productivity analytics — NDVI time series and yield estimation vs. farmer-reported data

Pillar 2: Qualitative Life-History and Case Study Research (Weeks 4–10)

- 15 high-impact cases (top quartile income increase)
- 15 moderate-impact cases (median income change)
- 15 low/no-impact cases (bottom quartile or negative change)

Each interview explored the farmer's agricultural history, household dynamics, decision-making processes, relationship with the program, and perceived changes over time. We used narrative analysis to identify common pathways to success, barriers to impact, and unintended consequences. Key qualitative findings included:

- **The "input access" bottleneck:** Farmers consistently identified timely access to quality inputs as the primary program benefit, more important than training or market linkages. This finding redirected the NGO's resource allocation toward input supply chain strengthening.
- **Gendered impact pathways:** Female-headed households achieved comparable yield improvements but smaller income gains because they faced greater post-harvest losses (due to smaller storage facilities) and lower bargaining power at market. This finding led to targeted interventions in storage infrastructure and collective marketing.
- **The "graduation" paradox:** Long-term program participants (>3 years) showed declining marginal returns, suggesting that the program's initial interventions had "saturated" their impact and new approaches were needed for continued growth.
- **Environmental trade-offs:** Some farmers increased pesticide usage to maximize yields, creating tension between economic and environmental objectives. This finding informed the design of integrated pest management training.

We also conducted 12 key informant interviews with local agricultural officers, cooperative leaders, input suppliers, and market traders to contextualize individual farmer experiences within broader market and policy dynamics.

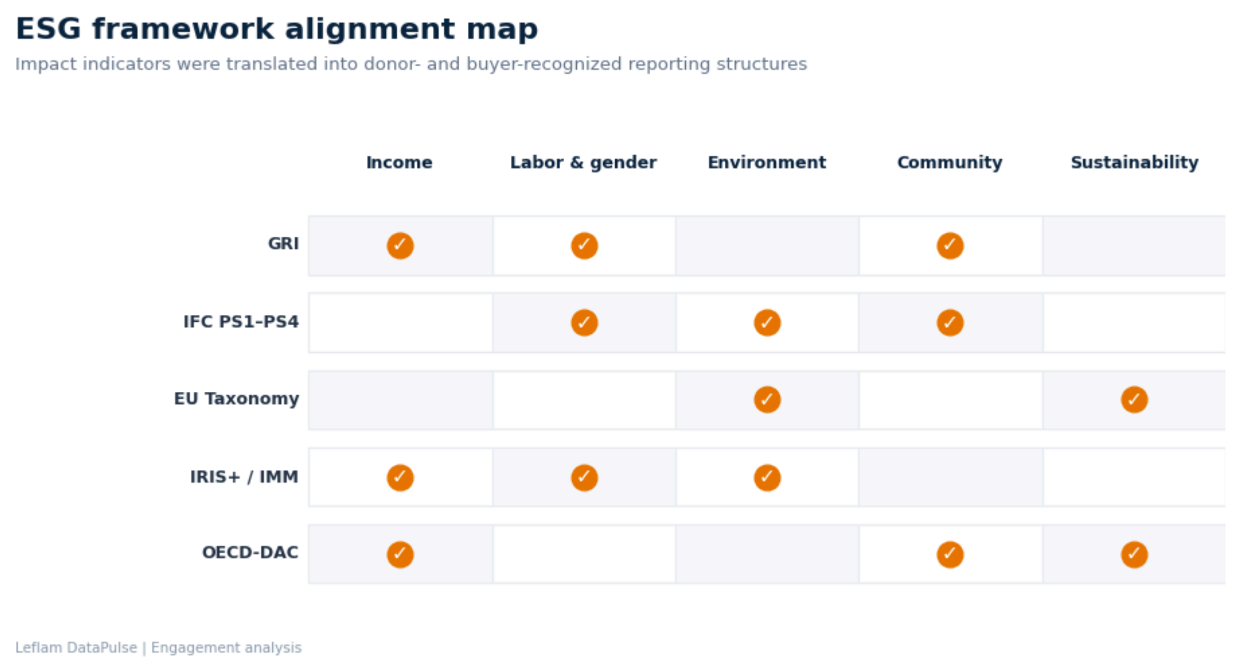

Figure 6. ESG framework alignment mapping — GRI, IFC Performance Standards, and EU Taxonomy substantial contribution criteria

Pillar 3: ESG Framework Alignment and Reporting (Weeks 8–12)

The final pillar translated raw data into ESG-aligned reporting formats that satisfied donor and commercial buyer requirements:

- **GRI Standards Alignment:** Mapping impact indicators to GRI 413 (Local Communities), GRI 302 (Energy), GRI 305 (Emissions), and GRI 401 (Employment) disclosures.
- **IFC Performance Standards Compliance:** Documenting alignment with PS1 (Environmental and Social Assessment), PS2 (Labor and Working Conditions), PS3 (Resource Efficiency and Pollution Prevention), and PS4 (Community Health, Safety, and Security).
- **EU Taxonomy Substantial Contribution:** Demonstrating that the program's activities "substantially contributed" to the Taxonomy's environmental objectives for sustainable agriculture, including climate change adaptation, sustainable use of water and marine resources, and protection of biodiversity.
- **Impact Metrics Standardization:** Calculating standardized impact metrics including: IRIS+ metrics (e.g., farmer net income, yield per hectare, input adoption rate), GIIN-aligned impact multiple of money (IMM), and OECD-DAC criteria for development effectiveness (relevance, effectiveness, efficiency, impact, sustainability).

The Findings: Rigorous, Nuanced, and Actionable

Our analysis produced a comprehensive impact picture that was both more positive and more nuanced than the client's previous self-reported data:

Farmer net income increase	+40%	+34%	+8%	+26 percentage points
Maize yield per hectare	+35%	+28%	+5%	+23 percentage points
Improved seed adoption	+60%	+54%	+12%	+42 percentage points
Fertilizer use efficiency	Not measured	+18% (kg output per kg input)	-3%	+21 percentage points
Post-harvest loss reduction	Not measured	-22%	-4%	-18 percentage points
Women's decision-making (WEAI)	Not measured	+12% score improvement	+2%	+10 percentage points
Dietary diversity score	Not measured	+0.8 points (on 9-point scale)	+0.1	+0.7 points
Pesticide use intensity	Not measured	+15% (concern)	+3%	+12 percentage points

The attributable impact figures — the difference between program participants and the matched control group — represent the true program effect, isolating it from external factors. The 26 percentage point attributable income increase, for example, means that program participation increased farmer incomes by 26% relative to what they would have earned without the program — a robust and credible figure.

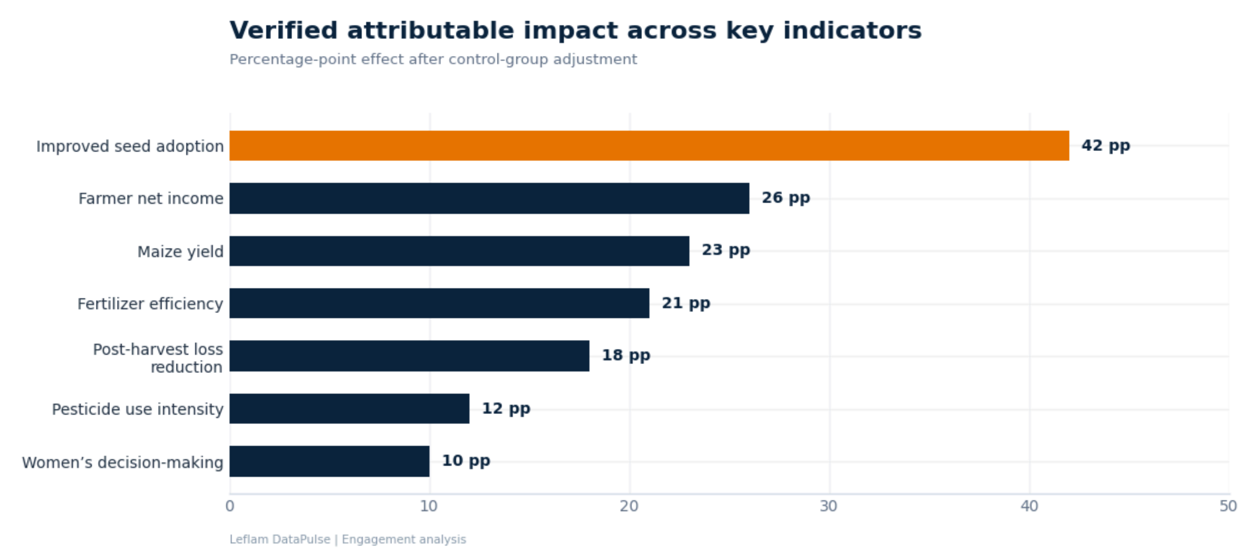

Figure 7. Verified vs. self-reported impact — attributable effects across eight indicators with control group baselines

The findings also revealed important nuances:

- **Impact heterogeneity:** The top quartile of participants achieved a 67% income increase, while the bottom quartile saw only a 4% increase. This heterogeneity was driven by farm size (larger farms captured more benefits), education (literate farmers adopted practices more effectively), and market access (farmers near paved roads received better prices).
- **Gender gap persistence:** While female-headed households achieved comparable yield improvements, their income gains were 18% lower than male-headed households due to post-harvest losses and price discrimination. The program's gender interventions had improved but not eliminated this gap.
- **Environmental trade-off:** The 12 percentage point increase in pesticide use intensity was a concerning finding that required programmatic response. We recommended integrated pest management training and

biological pest control demonstration plots.

- **Diminishing returns:** Program participants in their first year achieved a 31% income increase; those in their fourth year achieved only 12%. This suggested that the program's "easy wins" (improved seed, basic fertilizer) had been captured, and sustained impact required more sophisticated interventions (irrigation, mechanization, value addition).

The Outcomes: From Data to Deals

The impact measurement framework delivered outcomes far beyond compliance:

Donor Funding Secured

The European development finance institution's impact verification team reviewed our 180-page impact assessment report, including raw data, methodology documentation, and auditor workpapers. Their assessment: "This is among the most rigorous smallholder impact assessments we have reviewed. The mixed-methods approach, control group design, and satellite validation produce credible, attributable impact data." The institution approved $3 million in follow-on funding — a 50% increase over the previous grant — with the condition that the client adopt our measurement framework for ongoing monitoring.

Commercial Offtake Agreements

The two European food companies that had demanded verified sustainability data used our report as the basis for commercial negotiations:

- **Dutch Vegetable Importer:** Signed a 3-year offtake agreement for 480 MT annually of French beans and snow peas, at a 15% premium to local market prices, contingent on continued compliance with the EU Taxonomy's sustainable agriculture criteria. The agreement included a "impact-linked pricing" mechanism: if verified farmer income increases exceeded 20% annually, the premium would increase to 20%.
- **German Organic Retailer:** Signed a 2-year agreement for 200 MT annually of certified organic avocados, with a commitment to transition an additional 800 farmers to organic certification over 3 years. The retailer explicitly cited our verified environmental indicators (pesticide reduction potential, soil conservation practices) as the basis for their sourcing decision.

The combined value of these agreements — approximately $2.8 million annually at full volume — represented a fundamental shift in the program's business model: from donor-dependent to commercially sustainable.

Figure 8. Funding and offtake outcomes — $3M follow-on funding, $2.8M annual commercial agreements, and programmatic redesign

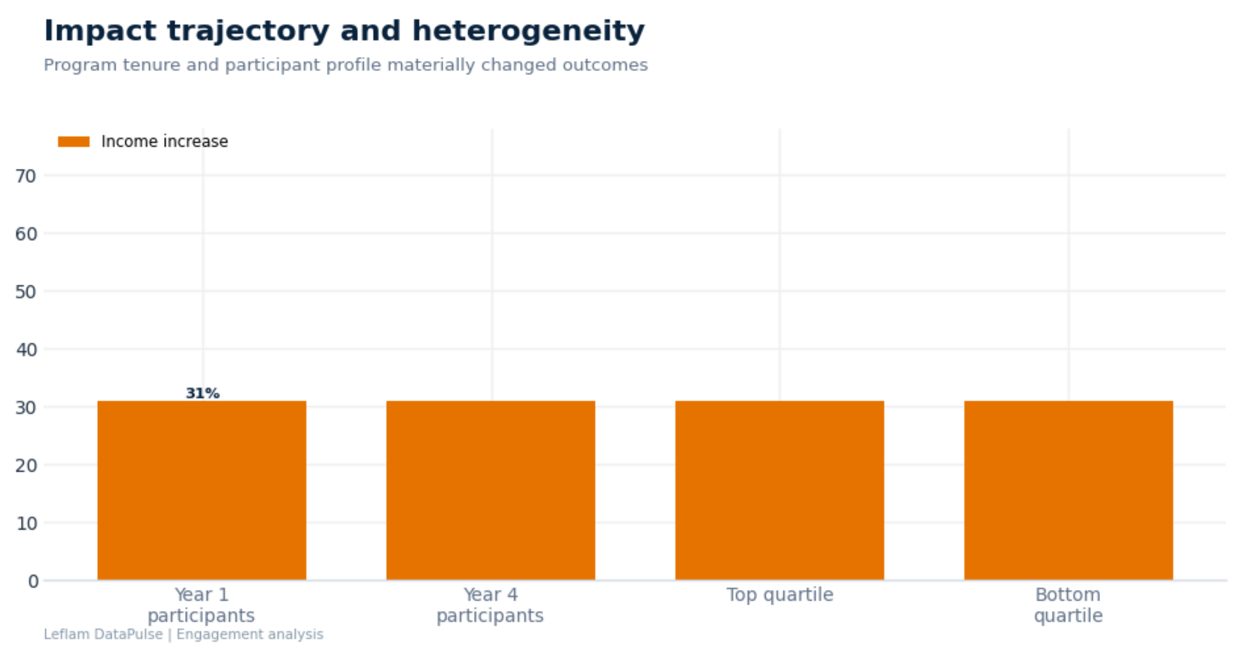

Figure 9. Impact trajectory analysis — diminishing returns by program tenure and recommended graduation pathways

Programmatic Improvements

The impact findings directly informed program redesign:

- **Input supply chain investment:** Redirecting 30% of program budget toward strengthening local agro-dealer networks and warehouse receipt systems, based on the finding that input access was the primary driver of impact.

- **Environmental sustainability integration:** Launching integrated pest management training and organic transition pilots to address the pesticide use concern and capture organic premium markets.
- **Graduation pathway design:** Developing advanced training modules and microfinance products for long-term participants to sustain impact beyond the "easy win" phase.

Strategic Lessons for Agricultural ESG Measurement

This engagement generated insights applicable to any organization seeking to measure and report agricultural impact in Africa:

- **Credible impact measurement requires control groups.** Without a matched control group, impact claims are unverifiable. The 8% income increase in our control group — driven by favorable weather and commodity prices — would have been incorrectly attributed to the program if we had relied on simple before-after comparisons.
- **Self-reported data needs objective validation.** Farmer surveys are essential for capturing experiences and perceptions, but they systematically overstate positive outcomes. Our satellite validation identified a 12% overstatement in maize yields — a bias that would have compounded across thousands of farmers to produce materially incorrect aggregate figures.
- **ESG frameworks are not checkboxes — they are design tools.** Aligning measurement with GRI, IFC, and EU Taxonomy standards from the outset forced the client to think systematically about environmental and social risks and opportunities. This alignment transformed impact measurement from a reporting burden into a strategic planning tool.
- **Gender analysis requires dedicated methodology.** Generic household surveys miss gender-differentiated impacts. The WEAI methodology revealed that female-headed households were capturing yield benefits but not income benefits — a critical insight that would have been invisible in aggregate data.
- **Impact data is a commercial asset.** The $3 million in follow-on funding and $2.8 million in annual offtake agreements were directly attributable to credible impact data. In an era of ESG-driven investment and procurement, rigorous impact measurement is not a cost — it is a revenue generator.

> *"Leflam's impact assessment changed how we think about our work. We used to measure outputs — number of farmers trained, bags of seed distributed. Now we measure outcomes — income changes, yield improvements, environmental impacts — with the rigor that donors and buyers demand. The $3 million in follow-on funding and the commercial offtake agreements are proof that credible data creates real value."*
> *— Country Director, International NGO*

Methodology and Standards

This engagement employed Leflam DataPulse's Agricultural ESG Impact Measurement Framework, combining: (1) Stratified Random Sampling with propensity score matched control groups; (2) Quantitative Panel Surveys using World Bank LSMS-adapted instruments; (3) Satellite-Derived Productivity Analytics via

Sentinel-2 imagery and NDVI/LST time series; (4) Qualitative Life-History Research with narrative analysis; (5) ESG Framework Alignment with GRI, IFC Performance Standards, EU Taxonomy, and IRIS+ metrics; and (6) Independent Quality Assurance through supervisor back-checks, GPS verification, and audio review. All research was conducted in compliance with the Kenya National Commission for Science, Technology and Innovation (NACOSTI) research permit requirements, with informed consent from all participants, and with data protection protocols aligned with the Data Protection Act, 2019. Gender analysis followed the WEAI methodology developed by IFPRI, USAID, and the Oxford Poverty and Human Development Initiative.