THE CLIMATE SOURCE

Scope 3 Reductions: Standardization And Supply Chain Collaborations Enable Assurance And Scale

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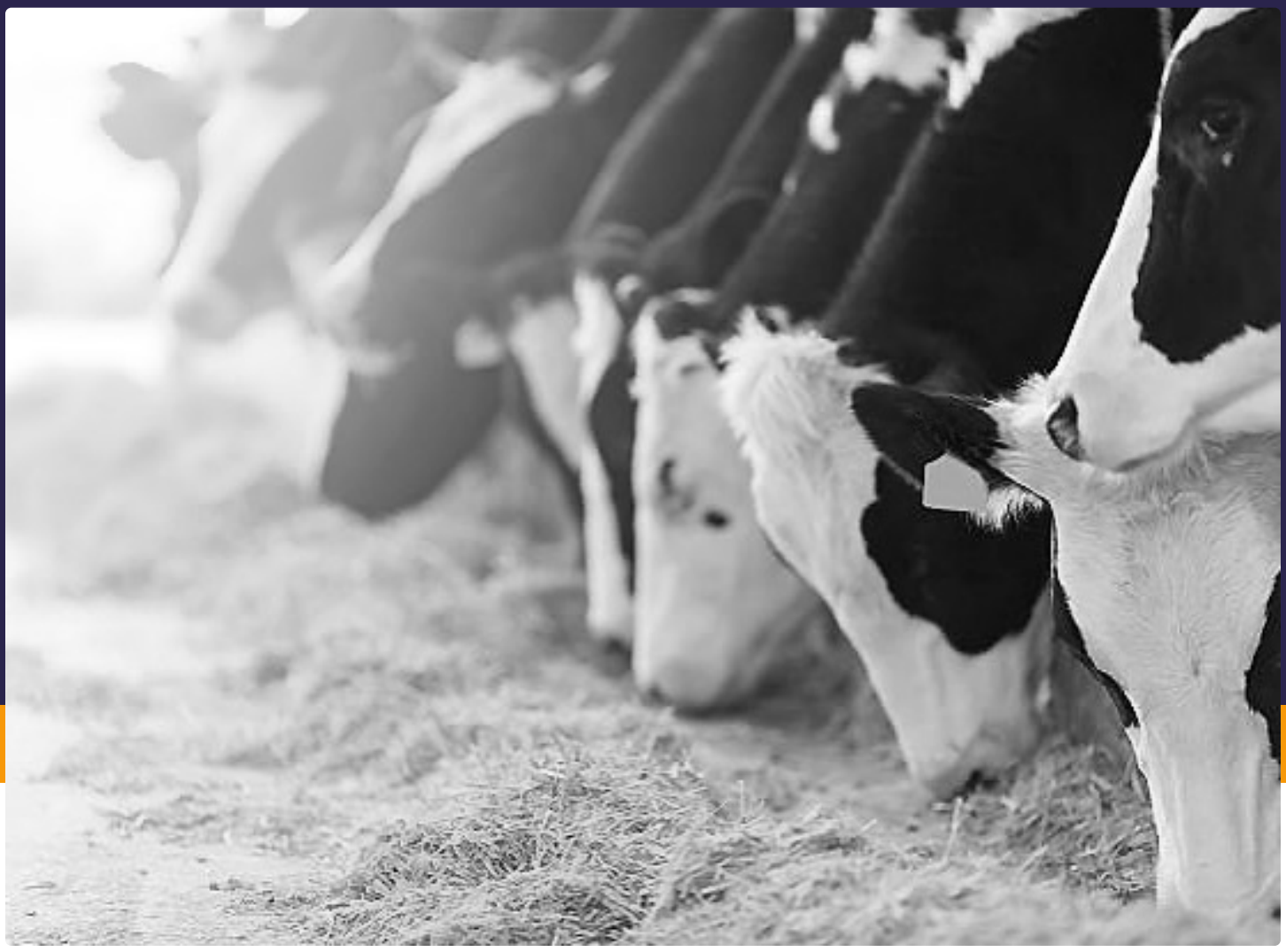

Introduction

As public attention to climate change grows, consumer packaged goods companies (CPGs) in food and beverage have started to lead public-facing climate action campaigns. Following the guidance of the Science Based Targets Initiative (SBTi), an international non-governmental organization that publishes best practices for greenhouse gas (GHG) emissions disclosures, many corporations have established net zero emissions targets by 2050 or earlier. For most CPGs, however, a large portion of emissions footprints are in the supply chain, outside of CPG's direct control. For example, in 2022, PepsiCo reported that 93% of its emissions footprint was in its supply chain.[1]

To tackle supply chain emissions, CPGs are piloting carbon reduction programs that help their suppliers de-risk the adoption of climate-smart technologies and practices. Amongst CPG investments, on-farm interventions are particularly common, given that a variety of practices and technologies that reduce the GHG intensity of agricultural production exist. These supply chain programs (often called inset programs) work similarly to voluntary carbon offsets, with some key differences. And while many carbon projects in agriculture are funded through voluntary carbon offset mechanisms today, over time, regulatory trends will likely favor inset programs over voluntary offset programs.[2]

Today, CPG inset programs are still developing, and even large existing Scope 3 reduction programs will need to grow significantly to achieve CPG targets. To scale inset programs to a level capable of achieving SBTi GHG reduction targets for the food and beverage industry, the inset ecosystem must evolve. Governments will need to clarify regulation around carbon claims and consider incentives to drive more investment into GHG reductions in agriculture. And in the private sector, industry coordination and technological infrastructure can drive economies of scale for supply chain programs. This paper will discuss some of the challenges left to be resolved in scaling agricultural Scope 3 reduction programs as well as their potential solutions.

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The Structure Of GHG Reduction And Removal Programs

One inherent challenge to designing carbon reduction programs is the diversity of potential project types. Some projects, such as manure digesters, are multi year capital expenditures, where new technology reduces the GHG emission intensity of a process. Other projects, such as fertilizer management programs, are practice changes that may have varying reduction impact year to year. Yet other projects, such as cover cropping, aim to remove carbon from the atmosphere. Moreover, within a project type, the GHG impact of a project may vary depending on a variety of factors, such as previous practices and geographical differences. Given these challenges, it can be difficult for actors seeking to invest in GHG reducing projects to compare the relative impact of projects.

To drive standardization and comparability of carbon projects, the GHG Protocol, a non-governmental organization that publishes best practices on GHG accounting, has developed a set of principles for carbon reduction projects. These principles include no overestimation, additionality, permanence, and no double counting [See Figure 1]. Additionally, the United Nations International Panel on Climate Change (IPCC) vets and approves of GHG calculation methods for different project types.

Historically, GHG project quality principles have been more diligently applied to carbon offset programs than inset programs, since offset programs involve transaction of credits between actors. Yet, because the core needs of carbon offset programs and inset programs are similar, much of the structure of CPG GHG reduction programs are built upon the same foundational infrastructure of offset programs. Thus, understanding the mechanisms and challenges of existing carbon offset programs provides a lens to consider how inset programs may evolve.

Figure 1: Quality Principles for Carbon Reduction Projects [3]

No Overestimation

When quantifying the GHG reduction of a given project, estimation methods should be conservative and prevent overestimation. This includes activities such as setting baselines, estimating actual emissions, and accounting for leakage (knock-on GHG effects of a project).

Additionality

Credits should only be issued for projects where the GHG reductions would not have occurred without offset credit revenues. Additionality criteria are often project and context specific and may include tests such as investment analysis, barrier analysis, and demonstration that a practice is not commonplace.

Permanence

GHG impacts must be permanent, and reserves should be held to account for potential reversals. This principle is most relevant for removal projects that aim to take carbon out of the atmosphere.

No Double Counting

Safeguards should be in place to prevent a variety of forms of double counting. Double issuance occurs when more than one credit is issued for the same intervention. Double use occurs when two parties retire the same credit and accounts for the same reduction on their GHG balance sheets. Double claiming occurs when a credit is generated for a project and another actor also claims the same reduction on their balance sheet (e.g., when both the credit buyer and the credit generating actor claim the reduction on their balance sheet). Some double counting is inherent to Scope 3 emissions – for example when a processor and CPG both count the emissions from transportation of goods between the two entities. For these situations, increasingly, entities are starting to co-invest in GHG reductions with arrangements that allocate reduction claims amongst investing parties.

The Carbon Offset Project Lifecycle

The process of generating an offset credit involves a variety of actors and activities. Broadly, activities fall into three categories: activities that set the rules for credit generation, activities involved in the operations of credit generation and transaction, and supporting services that manage data to support quantification and assurance of credits [See Figure 2]. Additionally, these activities occur across five broad stages: protocol development, program design and registration, program implementation, credit generation, and credit transfer and retirement [See Figure 3].

1 Protocol Development

First registries, such as Verra or Climate Action Reserve, work with the scientific community to develop protocols (also called standards or methodologies). These protocols establish eligibility rules for the design and implementation of credit generating projects as well as procedures for project assurance. Within one industry and production process there may be multiple protocols for different projects–for example, in forestry there are different protocols for deforestation prevention, reforestation, and improved forestry management. Even within the improved forestry management category different activities follow different protocols. For example, Verra lists different protocols for improved forest management through extension of tree rotation age and improved forest management from reduced impact logging practices. This allows registries to make narrower eligibility rules that fit the specific conditions of a project. For example, the conditions to prove a project is additional are different for reforestation projects compared to deforestation prevention projects. Often, project developers will partner with registries to develop new protocols.

2 Program Design And Registration

Next, project developers enroll credit generating actors into a program that qualifies for offset generation through existing protocols. This phase starts with a recruiting and feasibility study period in which the project developer works with program candidates to determine the site-specific economic viability of interventions. A variety of factors impact economic viability, including participant scale, access to measurement data, and fit with protocol requirements. Once a critical mass of project participants are enrolled, the project developer registers the project for approval with the registry.

3 Program Implementation

In the next phase, project developers orchestrate the implementation of the program. In addition to helping project participants operationalize GHG reducing activities, the project developer manages data collection and cash flow for the program. In some cases, the project developer may have all of these capabilities in-house; in other cases, the project developer may bring in third parties to support different components of the program. For example, in agricultural projects, developers may bring in third-party agronomy partners as advisory support for participating growers.

4 Credit Generation

In the next phase, the project developer works to generate offset credits. Utilizing a GHG calculator approved by the International Panel on Climate Change, such as the Cool Farm Tool, the project data manager will quantify the impact of the intervention against a pre-intervention baseline. In some circumstances, the project developer may fulfill the data management role; in other cases, the project developer may partner with a third party data manager. Additionally, in this phase, the project developer will hire a validation/verification body (VVB) to audit the program. VVBs are always third-party auditors and must be accredited with the registry associated with the project. Verification methods range depending on the nature of the project and include on-the-ground methods (such as on-site inspections and random sample interviews), digital methods (such as invoice review and data anomaly analysis), and remote sensing methods (such satellite imagery verification). Once the GHG impact of the project is quantified and the VVB finishes their audit, the project registry will issue offset certificates to the project developer.

5 Credit Transfer And Retirement

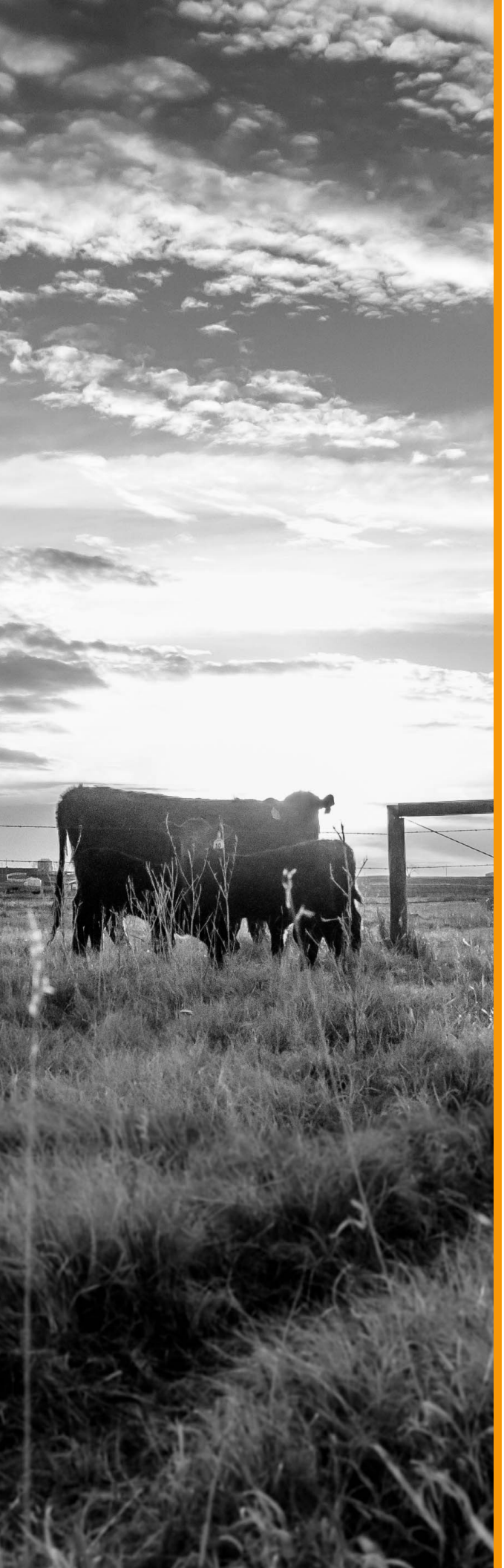
Finally, there are a variety of activities that occur post-credit generation. After offset certificates are issued, they can be exchanged between parties. Often project developers will already have pre-sold credits to buyers, especially high quality credits and/or credits that carry other co-benefits (e.g., social, water, and biodiversity impacts). Project developers will also hold credits as a buffer to protect against risks of systematic calculation errors or reversals. The period during which a project developer, registry, or buyer holds the risk of imperfect credits is typically stipulated in purchase agreements. Finally, the lifecycle of an offset credit ends when it is retired and taken out of circulation, which effectively lets the retiring party include the credit on their carbon balance sheet to counterbalance a metric ton of CO_2 equivalent in emissions.

Figure 2: Activities in the Carbon Offset Generation Process

Set Rules For Credit Generation	**Standard Setting Bodies (e.g. Verra)**	• Develop protocols in conjunction with project developers, NGO, and scientific community • Vet programs & involved parties (program registration; certification of verification bodies) • Maintain credit ledger
	GHG Quantification Calculators (e.g. Cool Farm Tool)	• Determine data elements and methodology to quantify impact of interventions
Operations for Credit Generation & Transaction	**Credit Generators (e.g. Farmers, Agronomists)**	• Implement GHG reducing interventions
	Project Developers & Marketplaces (e.g. Soil &Water Outcomes Fund)	• Set up program (recruit & enroll growers, conduct feasibility studies, register programs) • Orchestrate parties for program implementation (operations, data management) • Manage program finances (cash flow, risk) • Attract credit buyers and facilitate credit transactions
	Credit Buyers (e.g. Pepsico)	• Purchase & retire credits
Supporting Services	**Data Collection & Measurement (e.g. Yardstick)**	• Deploy surveys and technology (digital, sensors, etc.) for data collection
	Data Management & Accounting (e.g. Patch)	• Aggregate data into format for GHG quantification
	Monitoring, Reporting, & Verification (e.g Hummingbird Technologies)	• Verify implementation of interventions via variety of methods (digital, remote sensing, on the ground)

Figure 3: Stages in Carbon Offset Lifecycle

		1. Protocol Development	2. Program Design & Registration	3. Program Implementation	4. Credit Generation	5. Credit Transfer & Retirement
Set Rules For Credit Generation	Standard Setting Bodies	• Develop project rules • Vet GHG quantification calculators	• Ensure registered projects comply with protocol rules			
	GHG Quantification Calculators	• Develop data models for GHG quantification			• Ingest on-farm data to quantify GHG impact	
Operations for Credit Generation & Transaction	Credit Generators		• Assess project feasibility	• Implement interventions		
	Project Developers & Marketplaces	• Propose and support new standard development	• Screen and enroll credit generators • Register projects	• Coordinate advisors, data collection, verifiers • Manage program finances	• Coordinate data processes across parties	• Manage credit sales and ongoing credit risk
	Credit Buyers					• Purchase and retire credits
Supporting Services	Data Collection & Measurement			• Collect on-farm data for GHG quantification		
	Data Management & Accounting				• Organize data from multiple sources into format for GHG calculator	
	Monitoring, Reporting, & Verification			• Conduct tests to verify the implementation of interventions		



Key Differences Between Carbon Offset Programs And Inset Programs

While CPG inset programs mirror many of the processes of carbon offset credit generation, they differ in a few key ways. Some of these differences stem from the inherent nature of insets, which focus on a corporation's product carbon footprint and supply chain, therefore directly impacting the corporation's Scope 3 emissions. Meanwhile, other differences stem from differences in the regulatory requirements around carbon disclosures and assurance levels.

Notably, when designing carbon reduction programs, CPGs currently do not need to follow third party protocols or GHG calculators. In some cases, the CPG will pay growers directly for adoption of regenerative practices, without necessarily requiring data measurement activities on par with offset programs. These programs often compensate growers on a per-acre basis as opposed to a per metric ton of CO_2 equivalent reduction basis. These "pay-for-practices" programs may not have as stringent eligibility requirements as carbon offset protocols. Finally, many CPG programs target other co-benefits such as water use, biodiversity impacts, and social welfare goals; in these cases, GHG impact is one of an array of desired sustainability outcomes.

Given that the actors implementing GHG reducing interventions must be within the CPG's supply chain, the net impact of carbon programs inherently already sits on the CPG's carbon balance sheet. Therefore, when completing inset projects, CPGs do not necessarily need to generate credits that can be traded between parties. This means that risks of non-compliant implementation, calculation errors, and reversals are by default held by the CPG. Thus, the project assurance and third party verification requirements for inset programs depend on the assurance and risk tolerance policies of the implementing CPG. Given this dynamic, today, most CPGs do not include carbon removal projects, which are more difficult to quantify and lack scientific rigor, on their balance sheets.

Compared to offset programs, which generate exclusive reduction claims, supply chain inset programs present opportunities for multiple parties to share in the investment claims to Scope 3 reduction. For example, in 2023, Pepsico and Walmart announced a joint collaboration to invest $120M in transitioning North American farms to regenerative agriculture.[4] Given concerns about double counting, the accounting systems of collaborative programs are under scrutiny, and programs tend to tend towards caution to avoid greenwashing risks. Thus, co-investment and co-claiming requires significant transparency that can only be enabled by sophisticated data management, contract agreements, and partner management. While these structures involve higher complexity, the pooled investment of multiple parties may be necessary to fund incentives for particularly high-cost interventions.

Finally, one last feature of CPG inset programs is the potential that these programs support CPG marketing goals in addition to progress towards SBTi commitments. For example, in March 2023, Tyson launched its Brazen Beef brand, the first beef product to receive the USDA's approval for a "climate friendly" claim.[5] Beef sold under the brand has a documented 10% reduction in GHG emissions from pasture to production compared to conventional methods. Notably, assurance requirements for on-pack marketing claims and climate related financial disclosures fall into different regulatory spaces, with the US Department of Agriculture and Federal Trade Commission regulating the former and the Securities Exchange Commission regulating the latter.

Overall, inset programs today are less standardized and less regulated than carbon offset markets. CPGs broadly define their own program protocols and eligibility requirements. Moreover, project assurance and GHG quantification methods for inset programs are subject to the CPG risk tolerances. Today, CPGs are still in the early days of developing inset programs; however, over time, market dynamics and changing regulation will force these programs to evolve.

Why Scrutiny On GHG Claims Will Increase

With corporations starting to make public claims on their climate ambitions, non-governmental organizations, the media, and governments are starting to scrutinize the validity of corporate claims and actions. Many of these actors are concerned about potential greenwashing, the act of making false or misleading statements about the environmental benefits of one's actions or products. Thus, governments are starting to codify regulations to prevent greenwashing. These regulations broadly fall into two categories: regulations on marketing claims and financial disclosures.

Scrutiny of Marketing Claims

Recent media investigations have called attention to issues with corporate "net-zero" claims and the integrity of carbon offset credits that underlie them. For example, in 2022, Bloomberg released a report finding nearly 40% of carbon offset credits traded in the prior year came from renewable energy projects that did not avoid or reduce emissions.[6] One large buyer of offset credits, Delta, had made advertising claims to be carbon neutral based on these offset credits. Since the report, Delta has faced a class-action lawsuit and updated its sustainability strategy.[7] Similarly, a 2023 Guardian investigation found that over 90% of rainforest carbon offsets issued by Verra, the world's largest registry, did not represent genuine carbon reductions.[8] The CEO of Verra later stepped down in June 2023.

Critics of "junk" carbon credit programs argue that more regulation and oversight mechanisms need to be implemented to ensure the integrity of carbon offset credits on the market. In theory, registries and project developers should follow the GHG Protocol's project quality guidelines. In practice, however, today no single actor is penalized for poorly designed protocols and projects nor incentivized to uncover the systemic risks in the ecosystem. The result is that developers and buyers who are least concerned about credit quality have transacted and retired credits that don't represent true GHG reductions at rock bottom prices of $5-10. Furthermore, some critics argue that offsets should not be permitted for net zero claims, arguing that offset schemes enable actors to benefit from green marketing claims without making any investments to reduce GHG emissions within their own operations and value chains.

In response to these criticisms, governments are starting to focus their attention on environmental marketing claims. In May 2023, the European Parliament passed legislation giving it the authority to ban the use of general environmental claims, including terms such as "environmentally friendly" and "climate neutral." The EU legislation also aims to ban claims that are based solely on offsetting schemes.[9] Meanwhile, in the United States, the Federal Trade Commission is in the process of updating its Green Guides, which regulate how marketers should qualify environmental marketing claims. For the upcoming version of the Green Guides, the FTC is explicitly considering revising its guidance on carbon offsets as well as how it regulates terms such as "Net Zero" and "Low Carbon."[10]

Scrutiny of Financial Disclosures

In addition to tackling greenwashing in marketing claims, regulators in the EU and US are starting to propose regulation to formalize carbon reporting in financial disclosures. The proposals seek to standardize the scope and assurance requirements of corporate emissions, including requiring Scope 3 emissions for a large number of corporations [See Figure 4]. By moving such reporting from voluntary to regulatory frameworks, the regulations will force corporations to develop more rigorous, consistent, and auditable processes for quantifying emissions. Moreover, standardizing disclosures will enable more comparability and scrutiny of corporate progress against climate goals.

Figure 4: EU and US Climate Related Financial Disclosure Proposals [11] [12] [13]

	EU CSRD Proposal	US SEC Proposal
Coverage	Medium and large public and private companies operating in the EU	Public companies with at least $75M in equity shares
Materiality Principle	Double materiality: requires disclosure of information that is material for investors as well as other societal stakeholders	Single materiality: requires disclosure of information that is material only for investors
Disclosure Scope and Standards	• Independent disclosure guidelines, based on the Global Reporting Initiative • Requires Scope 1, 2, and 3 emissions disclosures • Requires companies to disclose the compatibility of their activities with the Paris Agreement • Includes sector specific metrics	• Independent disclosure guidelines, based heavily on Task Force on Climate related Disclosures • Requires Scope 1 and 2 emissions disclosures; only requires Scope 3 emissions disclosures if the company has a public commitment or emissions are deemed material • If the corporation has public climate-related targets, requires information on how the corporation plans to meet goals and data demonstrating progress
Assurance Requirements	• Requires 3rd party assurance • Grace period for "limited" assurance, with expected phase in of "reasonable assurance" over time	• Requires 3rd party verification of Scope 1 and 2 emissions; does not require 3rd party verification of Scope 3 emissions • Grace period for "limited" assurance; phase in for "reasonable assurance" over time

Challenges To Scaling Agricultural Inset Programs

To achieve SBTi GHG reduction targets, even early developers of inset programs, such as PepsiCo, will need to grow their inset programs [See Figure 5]. Yet, CPGs today face challenges to further scaling programs. Early in developing inset programs, CPGs have concerns around project quality and ensuring ownership of GHG reductions. Meanwhile producers face operational hurdles and high transaction costs when enrolling in GHG reduction programs.

CPG Challenges: Concerns About Project Quality, Traceability, And Free Riding

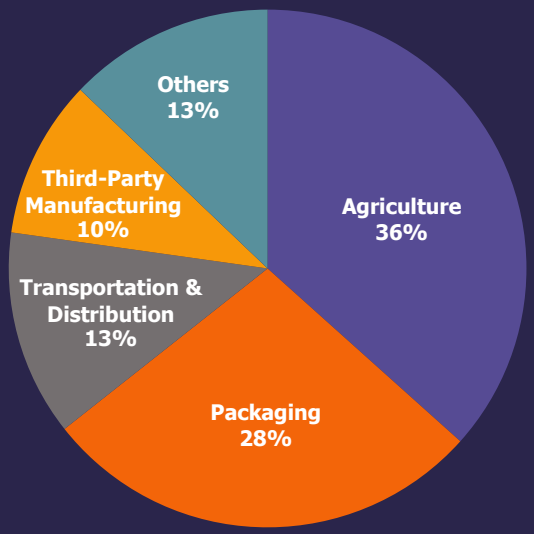
With scrutiny on GHG claims increasing over time, CPG inset programs will need to evolve to increase project quality and assurance. Compared to carbon offset programs, many features of inset programs are less problematic from a quality standpoint. First, the types of projects that inset programs focus on are usually less controversial than the forestry and renewable energy credits criticized in the media. Second, since inset programs focus on a corporation's supply chain emissions, establishing additionality and ensuring no overestimation is less complex, since emissions baselines are inherently already on a corporation's carbon balance sheet.

While certain carbon project quality criteria are less problematic for inset programs, certain nuances of agricultural projects pose unique project quality challenges–particularly for the no double counting principle. Current guidance from the GHG protocol states that organizations should claim ownership of reductions and should acknowledge the material risks of double counting when disclosing emissions. In practice, however, this is hard to achieve in food and beverage supply chains.

Figure 5: Snapshot of PepsiCo's Regenerative Agriculture Program 2023

As of 2023, PepsiCo's regenerative agriculture program will invest $216M in projects across 3M acres by 2030 and aims to deliver 3M metric tons of GHG emission reductions.[14] While the program covers a sizable portion of PepsiCo's 7M acre agricultural footprint, it only represents a 14% reduction against PepsiCo's 20.7M MT agricultural GHG footprint. To achieve its 2030 Scope 3 reduction goal (40% reduction against a 2015 baseline, totaling 21.6M MT), PepsiCo will either need to identify further reductions from agriculture or identify outsized GHG reduction opportunities in other Scope 3 emissions categories.[15]

Pepsico Scope 3 Emissions by Category

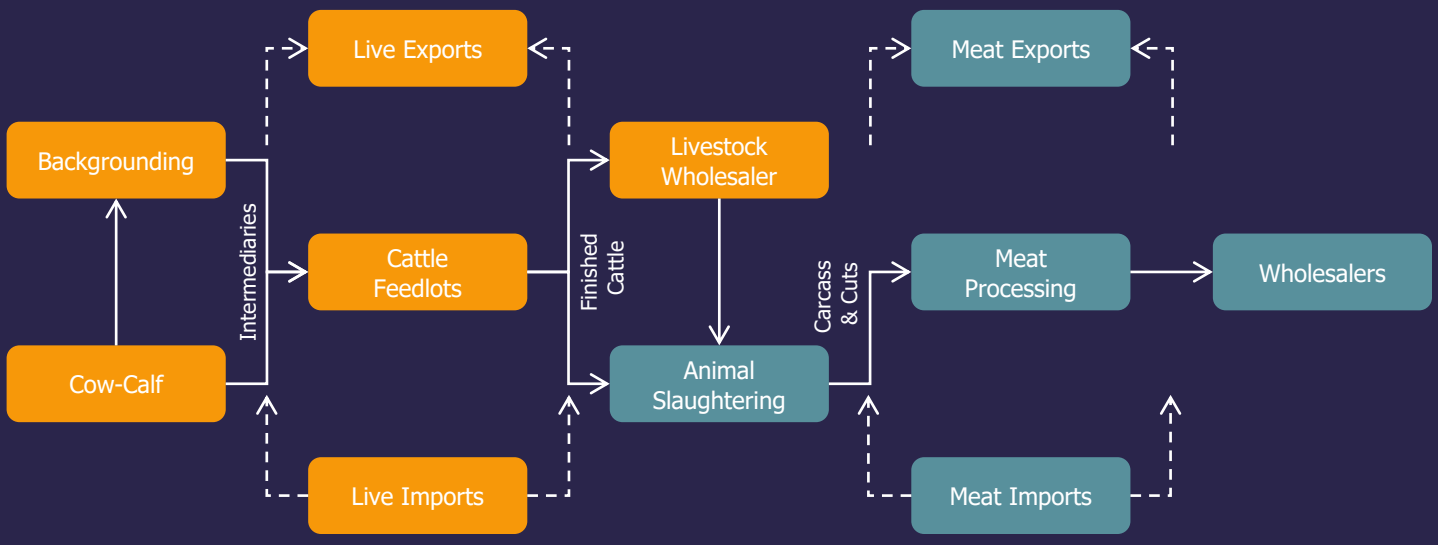


In many agricultural supply chains, agricultural goods are processed into multiple byproducts, making it difficult to determine the GHG footprint attributable to a given end buyer. For example, raw milk can be processed into cheese, whey, butter, cream, fluid milk, sour milk, and powdered milk products. Since different end-buyers purchase different ratios of different raw milk byproducts from different farms, it is difficult to determine how to attribute GHG emissions to any given end-buyer. For some products, there are scientific studies to attribute GHG emissions by byproduct. In milk, emissions can be attributed by a metric termed fat protein corrected milk (FPCM). In other products such as cattle, however, such attribution does not yet exist.

Additionally, agricultural supply chains tend to be long, complex, and opaque, making it difficult for CPGs to identify the specific farms they source from and the associated GHG emissions at each stage of production. For example, in the beef supply chain, an animal will go through cow-calf operations, stocker / backgrounding operations, and feedlots before reaching a processor [See Figure 6]. At multiple stages of the beef lifecycle, cattle may be imported into or exported out of the country. Moreover, some cattle may enter the supply chain through other paths, such as retired dairy cows. Thus, for any given end-buyer, who typically only has a direct relationship with a processor or wholesaler, it is difficult to track the GHG footprint of their product at each upstream stage of production.

Both byproduct and complex supply chain dynamics pose traceability challenges for Scope 3 reduction programs. Fundamentally, inset programs target interventions at the farm level; however, farmers rarely have direct relationships with end-buyers. In the vast majority of cases, farms sell their product to aggregators who then pass on the supply to a complex system of system processors, ingredients companies, and wholesalers. Thus, when a CPG invests in an intervention on a farm, they cannot be certain that the product from that given farm reaches their end product or the end product of another CPG that sources from the same processor. Moreover, supply chains are not static over time. The milk from one farm may go to one CPG in one week and another CPG in the next, but no single actor across the supply chain tracks these movements.

Figure 6: Stages of the Beef Value Chain

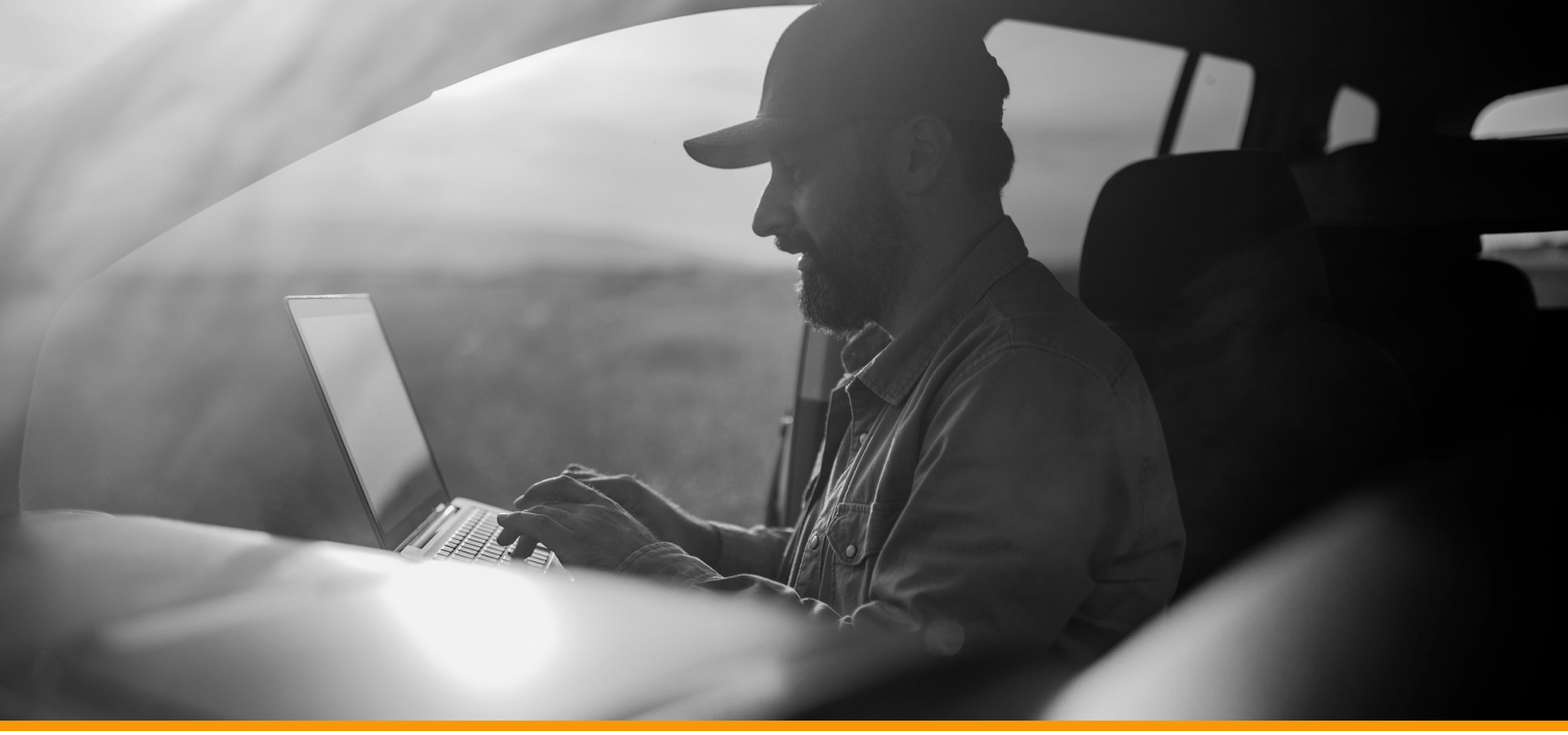


The net effect of these challenges is the potential for double counting of GHG reductions and free riding from other actors sourcing from the same geography. Even actors with the best intentions have a hard time knowing whether their ingredients are sourced from a high GHG intensity or low intensity farm. And in the case that their ingredients are sourced from a lower intensity farm, they will not know who funded the intervention. These attribution challenges lead to a situation where actors may free ride on the interventions funded by other actors, recording GHG reductions on their balance sheet without investing in GHG reductions themselves.

Overall, issues with supply chain traceability lead to underinvestment in GHG reduction programs. As one individual at multinational CPG described it: "One of the issues in dairy is managing the carbon rights at the farm level. When we put money into a farm, we don't want to lose those carbon rights to someone else." With stronger mechanisms to ensure that those funding interventions are able to secure GHG reduction claims, CPGs may be more willing to invest money into inset programs. Moreover, CPGs who may be free riding on the investments of other actors will need to start their own programs to achieve their reduction targets. And finally, supply chain traceability solutions will strengthen co-investment and co-claim structures, enabling multiple supply chain actors to manage traceability and allocation of claims in collaborative projects and bringing more investment into the ecosystem.

Producer Challenges: Operational Hurdles And Contractual Concerns

For producers, the economics of participating in GHG reduction programs is a meaningful hurdle. Often, the pure cost and risk involved in GHG reducing practice changes is not fully compensated by programs today. Some interventions, such as manure separators, are multi year investments. Other interventions, such as cover crops, have high annual costs. With a current market price of $20-40 per metric ton of CO_2 equivalent abated, programs do not always cover the full operational cost of interventions. Some CPG inset programs seek to solve this problem by partnering with other mission aligned organizations, bolstering programs through grant funding non-profits, and state and local governments. These partnerships, however, often only exist at a hyperlocal level and require high operational lift to scale nationwide.



The operational and risk management complexity of participating in programs is also a barrier for producers. Operating procedures for regenerative agriculture vary depending on geographic needs and cultural practices, meaning that programs often need to provide locally adapted technical support. Data measurement, data management, and verification processes in GHG reduction programs often add operational complexity and carry high time costs. And some interventions, such as crop rotations, carry yield risks and impact insurance qualification and are not associated with alternative risk mitigation tools.

Even when programs have sufficient financial, operational, and risk management support, producers may be hesitant to commit to programs. Today, CPG programs vary significantly across contract terms (time periods, stipulations, etc.) Different program arrangements will be optimal for producers with different circumstances, such as scale of operations and existing practices. Producers want a menu of program options that work for their operations and want the qualifications of their operations to be fungible across multiple programs. Given the many competing programs on the market, however, it is often difficult for producers to assess what programs make most sense for them.

Producers are also concerned with the contractual implications of participation in programs. Some producers worry that the data shared with CPGs may be used against them by enabling CPGs to try to cherry-pick their suppliers. Other producers worry that participation in programs will lock them into specific sourcing programs, reducing their optionality and ability to negotiate with buyers. These concerns further add to the transactional complexity of enrolling producers.

Overall, the inset process currently carries high transaction costs. As one individual at a multinational CPG described it: "when considering carbon contracts, you have to think about how that affects the rest of your sourcing business. The transaction costs are high. You have to ask the burden of the contract, when who is getting paid, and more. Today, we're scrambling just to get very simple financing contracts done." Some of these transaction costs result from the heterogeneity in the space and could be mitigated through more standardization. Other transaction costs result from measurement and verification processes, which would benefit from improved technology and digital scale. Given that current carbon prices fall short from fully compensating the costs of some interventions, reducing transaction costs in inset programs is a critical imperative.

Conclusion: Needs For Scaling Inset Markets In Food And Agriculture

In the face of consumer, investor, and regulatory pressure, CPGs are increasingly making GHG reduction commitments. Building off the infrastructure and processes developed for carbon offset programs, CPGs are developing GHG reduction programs within their supply chains. These programs are still far from fulfilling CPG claims, and regulatory scrutiny of GHG claims and reduction programs will increase.

Both CPGs and producers have concerns with existing Scope 3 reduction processes. CPGs are concerned about being able to claim the interventions they fund while avoiding greenwashing as well as preventing free riders in the ecosystem. Meanwhile, producers are concerned about the financial, operational, risk, and contractual implications of inset programs. To bridge the concerns of these two stakeholder groups, the carbon claims ecosystem needs more supporting services, infrastructure, and technology.

Data management and accounting solutions can resolve traceability challenges that lead to double counting and free riding. The Value Chain Initiative, a multistakeholder forum that includes public, private, and non-governmental organizations, has proposed the concept of supply sheds as a market-level attribution framework for GHG reduction claims [See Figure 7]. This concept allows for CPGs to claim interventions made within a geographic sourcing area while still maintaining a dynamic sourcing approach. Under the supply shed framework, producers would also not be locked in to delivering supply to the CPG that funds their on-farm interventions, alleviating some of their contractual concerns.

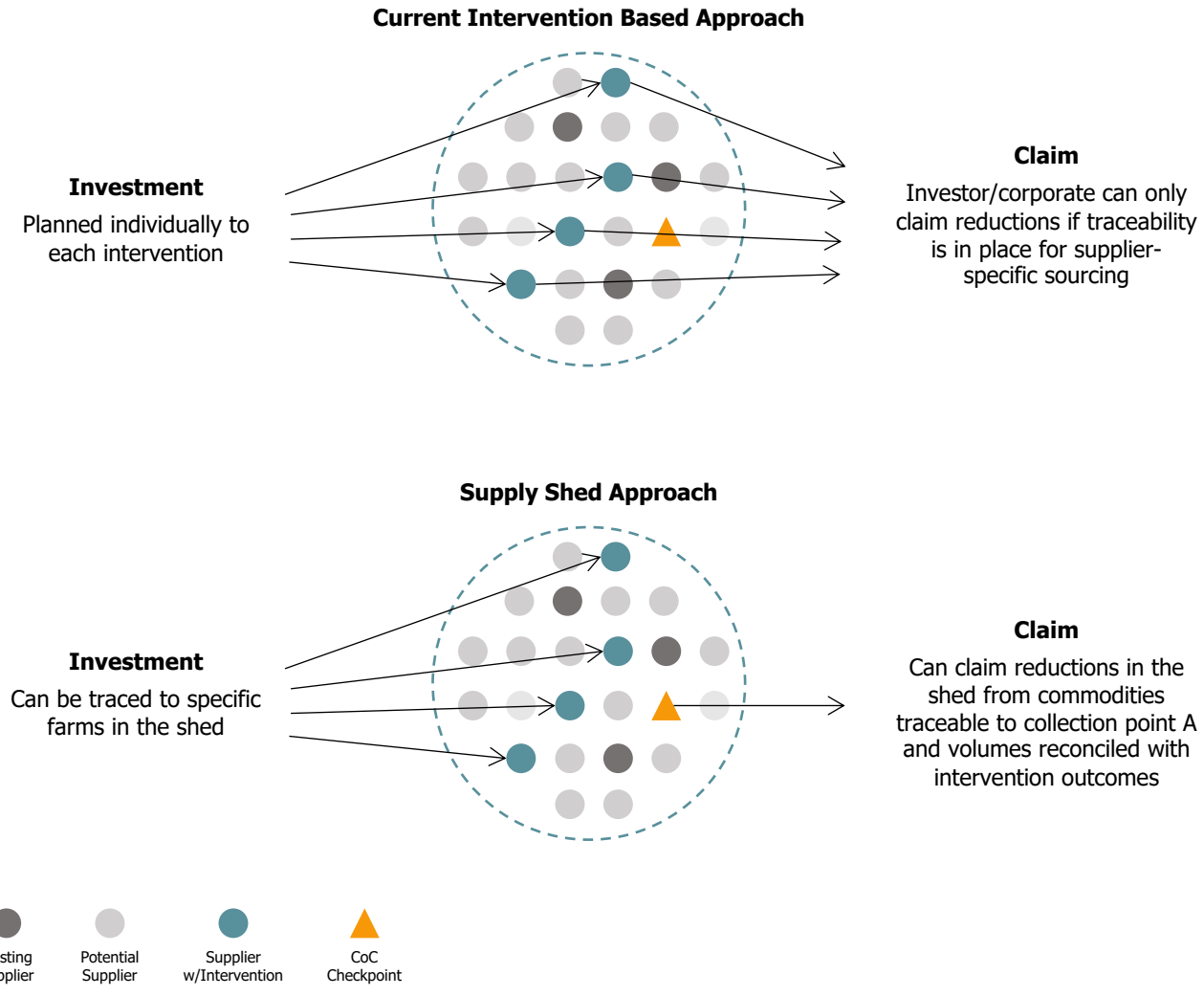
A number of players are exploring solutions to reduce project costs by targeting the data measurement process. Innovators in sensor technologies are exploring options to reduce costs, improve deployment, and use remote sensing methods such as satellites. Additionally, some players are exploring digital solutions to streamline record collection and record keeping. Still, measurement needs vary by project type, meaning that few solutions will be a silver bullet. For example, under GHG Protocol guidance some project types, such soil sequestration removals, require primary source data as opposed to modeled data, leading to meaningful measurement costs.

Second, standardization of project protocols can drive cost efficiencies for all parties, reducing transaction costs and driving more investment into inset ecosystems. A streamlined set of consistent program options would reduce the operational complexity producers face when choosing programs. It would also simplify the producer-program matching process for project developers, lowering enrollment costs. Meanwhile, standardization of measurement and verification processes can bring down servicing costs and enable data scale that supports improved GHG modeling–potentially reducing the need for primary data and thus further reducing data measurement costs.

Overall, adjustments to the Scope 3 reduction frameworks will be critical to enabling mass scaling of GHG reduction programs. The concerns that CPGs and producers have about existing inset programs surface inherent tensions: traceability versus data privacy, transparency versus opacity, and mass balance versus segregated supply. While it is unclear how some of these tensions will be resolved, it is clear that more supporting services, infrastructure, and technology will be critical to unleashing the power of inset programs.

Figure 7: An Introduction To The Supply Shed Concept [16]

A supply shed refers to a group of suppliers within a geographic boundary that provides similar goods into a supply chain. By allocating and attributing GHG claims at a market level as opposed to the farm level, a corporation is better able to claim the mitigation of outcomes. Moreover, the supply shed approach enables the theoretical co-investment and co-claiming of GHG reduction projects. One present issue with the implementation of supply sheds, however, are lack of consistent standards and requirements for defining supply sheds.



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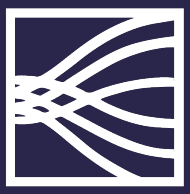

THE CLIMATE SOURCE

The Climate Source. Developing value chains for climate resiliency.
With decades of experience in the nuance and complexities of modern agriculture, we design innovative strategies and execute scalable programs for decarbonized supply chains, regenerative agriculture, market access, and co-financing. From field to warehouse, and everywhere in between, we are committed to providing clear and effective change that leads to value for all stakeholders.

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