

Improving Traceability in Agriculture Supply Chains: can Supply Shed help companies overcome this challenge?

Follow-up Webinar - Deep Dive

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Preface

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Limited traceability and a lack of supplier-specific information present significant challenges for AgFood companies seeking to reduce their Scope 3 emissions. Physical traceability within Supply Chains remains the exception rather than the norm. Additionally, dynamic farming systems—despite their substantial environmental benefits—pose difficulties when accounting for the impact of specific crops, even within a single supply chain.

This is where the concept of the Supply Shed comes in: a group of suppliers within

a specifically defined market that provides similar goods and services and can be shown to fall within a company's supply chain. This approach is designed to help Food & Beverage companies adopt a pragmatic strategy to reduce their Scope 3 emissions, enhance traceability, and enable co-investment and co-claiming, all while preparing for the more complex demands of a fully traceable supply chain approach.

This report, based on a Soil Capital webinar (access the recording via the link above),



Source: Soil Capital

explores the key concepts discussed during the conversation in greater depth, offering additional context and insights. This document aims to guide the reader through a step-by-step understanding of the crucial concepts and their implications for corporates.

This document focuses solely on the AgFood industry. Terms and definitions are contextualized for clarity and specificity within the AgFood industry and may not reflect the global context in which they can be used.

We hope this paper proves to be a valuable resource. If you have any questions arising from your reading or if you wish to build a more resilient AgFood supply chain, please contact us at

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Executive Summary

Limited traceability hinders agri-food companies' efforts to reduce **Scope 3 emissions**. Indeed, agri-food supply chains are complex, involving many different nodes where crops are mixed and exchanged between multiple stakeholders. This reality prevents the vast majority of companies from building a solid physical traceability system and makes it difficult to claim appropriate results from climate actions.

Nevertheless, solutions exist, and the **GHG Protocol Land Sector and Removals Guidance (LSRG)** takes such challenges into account. In its latest update, the **Supply Shed approach** was designed to help food and beverage companies adopt a pragmatic strategy to reduce their Scope 3 emissions, enhance traceability, and enable co-investment and co-claiming—all while preparing for the more complex demands of a fully traceable supply chain approach.

This paper provides a clear understanding of the mechanisms at stake. The first section reminds the reader of the context in which the agri-food supply chain evolves. By **distinguishing between physical and impact traceability**, agri-food companies must follow specific rules when it comes to Scope 3 reductions and GHG accounting.

The second section explains this distinction in more detail and introduces the supply shed approach. By following two concrete and straightforward examples, the reader learns the mechanisms at play and the key definitions step-by-step. Depending on the company's data availability and resources, food and beverage companies can either use the Supply Shed as **Mass Balance approach** or as a **Market-based Mechanisms (MBM)**.

The third section shares Soil Capital's real-life experience in its day-to-day work with agri-food companies supporting farmers from their supply sheds as they transition to regenerative agriculture. The reality is that companies rarely follow only one approach (i.e. Mass Balance or MBM), but rather a mix of both.

Finally, the fourth section delves deeper into the **benefits beyond pure accounting rules**. By taking action now, agri-food companies can move more quickly and cost-effectively to support farmers transitioning to regenerative agriculture in their sourcing region. Moreover, the supply shed approach allows companies to pave the way toward large-scale collaboration between multiple stakeholders and prevents free riding.



Disclaimer

The **GHG Protocol LSRG** is the primary accounting standard indicated by the **SBTi Forest, Land and Agriculture (FLAG)** to measure and report FLAG emissions.

It is important to note that LSRG requirements on this topic are still under development and are expected to evolve. The final requirements are expected to be published in 2025. As such, the following information is not official GHG Protocol guidance but rather updates shared by the GHG Protocol through the **Value Change Initiative (VCI)**.

In the meantime, VCI provides practical solutions informed by close discussions with the GHG Protocol LSRG. This document outlines some of these solutions while situating them within the context of the draft LSRG.

Context

Traceability challenges in agri-food supply chain



Source: Soil Capital

In today's complex global supply chains, physical traceability is unrealistic and impractical. Such traceability level in the agri-food supply chain remains the exception rather than the norm. Indeed, most food and beverage companies **lack physical traceability** in their agricultural supply chains. The conventional understanding of a supply chain as a linear progression of suppliers is far from reality; the agri-food sector supply chain is more accurately described as a complex network. This complexity arises from the mixing of grains at various stages, from cooperatives to cereal dealers – making it nearly impossible to track back to individual farms or fields. In the grain sector, for example, mills source from hundreds or even thousands of farms, blend the supply, and distribute it extensively.

As a result, companies are unable to trace sourcing to specific upstream suppliers and face significant challenges in tracking intervention impacts, hindering decarbonization efforts. In that regard, the GHG Protocol has been facing a lot of pushback from market participants due to the impracticability of requirements based on physical traceability (i.e. volume control at every node of the supply chain up to the farmer).

Context

Traceability according to the GHG Protocol



Source: Soil Capital

In its upcoming Land Sector and Removals Guidance (LSRG), the GHG Protocol mentions traceability as a requirement to accounting and reporting for CO₂ removals: “Traceability refers to the ability of a company to identify, track, and collect information on activities in its value chain, across its upstream and downstream processes and products”¹

The GHG Protocol distinguishes between two ways of tracking:

Physical traceability

This means being able to track the movement of materials and products and their associated emissions throughout the supply chain.

¹ Please note that these definitions, from the GHG Protocol LSRG draft, are still under development and may be subject to change before its official publication anticipated in 2025.

Impact traceability

This means being able to track and gather information about the emissions and removal impacts of projects and actions. This distinction between physical and impact traceability has great consequences on Scope 3 reductions strategies and their associated claims. To better understand the nuance, let's take two typical examples: a company relying on physical traceability and another one relying on impact traceability.

Examples in the agri-food industry

Example 1: Physical Traceability



Source: Soil Capital

This section illustrates two typical examples of agri-food companies relying on two different types of traceability: physical and impact. Each case aims to guide the reader through a step-by-step understanding of the crucial concepts and their implications.

Let's take the example of an agri-food company that produces beers. It operates in the United Kingdom and sources different crops, like barley, for its products. The majority of its emissions in its value chain come from **field-level activities**, i.e., farming practices.

Therefore, the company decides to engage in reducing its Scope 3 emissions and enters into a partnership with a project developer. The project aims to support the farmers in the company's supply chain in their transition toward more sustainable practices, i.e., regenerative agriculture.

Luckily, the company has already implemented a **physical traceability** model and is able to control volumes across its supply chain, up to the farmer. This tracking method is referred to as a **Chain of Custody (CoC) model**.

A Chain of Custody (CoC) is the custodial sequence that occurs as ownership or control of the material supply is transferred from one custodian to another in the supply chain. It is essentially a way to trace regenerative products as they move throughout the supply chain¹. It ensures transparency and accountability by maintaining a clear record of each transfer, from the point of origin (e.g., farm) to the final destination (e.g., retailer or consumer).

¹ From ISEAL Guidance: Chain of custody models and definitions

Examples in the agri-food industry

Example 1: Physical Traceability



Different types of CoC (qualifying as physical traceability):

Identity Preserved

This model provides full traceability of certified products throughout the entire supply chain, from origin to end-user. For example, regenerative products can be traced back to the specific farm where they were grown, ensuring that they meet all certification standards at every stage of production and processing.

Segregation

Certified products are kept physically separate from non-certified ones throughout the supply chain. For example, regenerative wheat is stored, transported, and processed separately to maintain their certified status, requiring dedicated facilities and logistics.

Mass Balance

This model allows for physical traceability when products with specified characteristics are mixed with those without (regenerative wheat with non-regenerative wheat) as long as the initial input equals the final output — i.e., as long as mass is balanced throughout the system.

In our case, the company implemented a **Mass Balance model**. This means that the company secures volume control at every node of its supply chain up to the farm and is able to identify the first **Point of Aggregation**

(PoA) — e.g. a cooperative, a mill, etc. It has a direct relationship with its suppliers and they are able to provide the necessary volume control data between the first PoA and the farmers.

Examples in the agri-food industry

Example 1: Physical Traceability



Source: Soil Capital

In its partnership with the project developer, one of the first steps consists in identifying the first PoA from which the company sources its barley — i.e., its sourcing region. This is where a crucial concept comes into play : **the Supply Shed**.

The Supply Shed can be leveraged as a sourcing region (following the rules of a CoC model) complying with the GHG Protocol draft LSRG according to **three criteria**:

1 Spatial Boundaries

Referring to the size of the Supply Shed, we expect the LSRG will allow regional supply sheds while restricting country-level supply sheds, except for small countries. However, the draft LSRG has not provided a clear definition of "size" for regions, leaving room for interpretation. For instance, a region in the US could be larger than a country in the EU like Belgium.

2 Traceability Requirements

This refers to the draft LSRG requirements stating that there must be a minimum level of physical traceability, up to a Mass Balance Chain of Custody.

3 Emission Factors Used¹

This refers to the emission factors used in accounting for the Supply Shed. Emission factors resulting from a specific intervention must be precisely accounted for to avoid double counting.

¹ An emission factor is the carbon footprint of an individual crop in a given year, generated under an inventory accounting framework.

"A Supply Shed is a group of suppliers providing functionally equivalent goods or services within a fixed and spatially defined area that is demonstrably part of a company's supply chain. The Supply Shed includes all suppliers within designated boundaries, regardless of their practices or segmentation."

Value Change Initiative in Food
& Agriculture Glossary

Examples in the agri-food industry

Example 1: Physical Traceability



Source: Soil Capital

The Supply Shed approach was developed several years ago by the **Value Change Initiative** (VCI) and has come through iterations along the way and is used in different ways. As described above, this approach avoids waiting for full physical traceability — Identity Preserved or Segregation — by allowing Mass Balance models to qualify as well under the **GHG protocol LSRG**.

In our example, the beer company can identify its Supply Shed, which meets the three criteria to comply with the GHG Protocol LSRG. As mentioned previously, the traceability requirements are fulfilled thanks to its already-implemented Mass Balance model. Consequently, the spatial boundaries are easily defined. Finally, the emission factors are provided by its collaboration with the project developer.

Now that we know the company complies with the GHG Protocol LSRG, let's look at the claims it can make under its **inventory accounting**¹.

Thanks to its new project, the company can invest at the farm level to help farmers grow low-carbon crops through regenerative practices. This investment resulted in a harvest of 10,000 tons of low-carbon crops.

¹ According to GHG Protocol, inventory accounting is the only pathway that allows companies to count mitigation outcomes towards their Science Based targets (i.e., to account for emissions reductions or removals under GHG inventory).

However, as per the Mass Balance definition, these crops are mixed with 40,000 tons of conventional crops. There is no way to clearly identify which crop is which, unlike with more precise CoC models like Identity Preserved or Segregation.

Nevertheless, the company has **volume control** and therefore knows the proportion. Its Mass Balance model allows it to claim 10,000 tons of low-carbon crops. The volume of impacted products remains balanced, and the company can **claim the regenerative characteristics for its products**.

In conclusion, the beer company, by implementing a Mass Balance model, can effectively track and manage its GHG emissions. This model enables the company to invest in regenerative agriculture practices and to account for claims under its GHG inventory to show progress towards its Scope 3 emissions over time. Despite the mixing of low-carbon and conventional crops, the Mass Balance approach allows the company to maintain volume control and claim the regenerative characteristics of its products. This compliance with GHG Protocol LSRG showcases how the company can leverage the Supply Shed concept as sourcing region to meet sustainability goals and make credible claims about its carbon footprint.

Examples in the agri-food industry

Example 2: Impact Traceability



Source: FreePix

Now, let's take the example of another agri-food company that produces cereal bars. It operates in France and sources different crops, like wheat, for its products. The majority of its emissions in its value chain come from **field-level activities**, i.e., farming practices. Therefore, the company decides to engage in reducing its Scope 3 emissions and enters into a partnership with the project developer. The project aims to support the farmers in the company's supply chain in their transition toward more sustainable practices, i.e., regenerative agriculture.

Unfortunately, the company does not have a Chain of Custody model in place. It lacks sufficient volume control across the value chain. However, the company does utilize a **data-driven tracking system**, its **MRV (Monitoring, Reporting, and Verification)**. This MRV provides the company with robust **impact data**. In other words, the cereal bar company lacks physical traceability but maintains impact traceability¹.

¹ An MRV does not necessarily provide physical traceability. It provides you with a collection of the data of interest. You need to shape the data as evidence for your reporting according to your own Chain of Custody model.

As mentioned previously, the GHG Protocol LSRG recognizes the Supply Shed approach if three criteria are met. In this case, the cereal bar company does not fulfill the traceability requirements because of its lack of CoC model. Therefore, the company cannot define its supply shed to be leveraged as a sourcing region. Nevertheless, the story doesn't end here! Indeed, the company can still leverage its supply shed as a **Market-Based Mechanism (MBM)**.

"Market-based mechanisms (MBM) are approaches that use carbon pricing and market dynamics to provide incentives to accelerate decarbonization of activities. GHG market-based accounting methods enable the calculation of GHG inventory emissions using certificates of GHG attributes that can be de-bundled from physical goods procured by the company."

Value Change Initiative in Food
& Agriculture Glossary

Examples in the agri-food industry

Example 2: Impact Traceability



Source: Soil Capital

To make the Supply Shed approach function practically as an MBM, the company needs to provide specific data that links its sourcing activities to a defined geographic area (i.e., the supply shed). To achieve this, it must identify its first **Point of Aggregation (PoA)** (this could be a cooperative, mill, or other entity where the volumes from different farmers are aggregated). Once the company finds this first PoA, the project developer can help get information on the geographic area that this PoA covers (that could be national, sub-national, or local).

In this example, the company maps the supply chain to the PoA, with the project developer's support. It appears that the PoA is a cooperative that operates in the Occitanie region of France and sources wheat exclusively from farmers within that region. Therefore, the company can define its supply shed as the Occitanie region. This means it can financially support any farmer producing wheat in Occitanie and **claim the associated impact**.

As mentioned previously, impact traceability doesn't currently provide physical traceability (according to LSRG latest updates). Therefore,

such traceability would be declared separately from the inventory accounting, as a **Market-Based Mechanism in an intervention accounting**¹.

In conclusion, despite lacking a Chain of Custody model, the cereal bar company can still leverage the Supply Shed approach as a Market-Based Mechanism. This approach focuses on sourcing from a defined geographic area, with evidence that the company sources from the supply shed. The company does not comply with the GHG Protocol LSRG and must declare its project results in a separate intervention accounting. Nevertheless, the company can still credibly claim that its wheat is sourced from regenerative agriculture within its defined supply shed².

¹ This is still under discussion, with CoC requirements evolving and the role of MBMs in achieving Science-Based Targets yet to be determined.

² The Value Change Initiative (VCI), which is driving practical solutions for Scope 3 GHG emissions accounting, such as the Supply Shed MBM. By delivering credible and scalable approaches, the VCI empowers companies to take meaningful action now. The good news is that the VCI is actively engaging with the GHG Protocol LSRG to align these solutions with future standards.

Examples in the agri-food industry

Key Takeways

Traceability

- Two different types of traceability: **physical** and **impact**.
- If a company can achieve **physical traceability** of product, including volume control throughout the supply chain using the conforming CoC model, associated reductions and removals can be reported in its inventory according to LSRG last draft.
- If not, and the company still has **impact traceability**, it can report under a **Market-Based Mechanism**, but this would need to be done separately from the GHG inventory, though details still under discussion, with MBM roles in achieving SBTi undecided.

Supply Shed

- The Supply Shed allows companies to **avoid waiting for full physical traceability** — i.e., Identity Preserved or Segregation - by using Mass Balance.
- If meeting a set of **3 criteria**, the Supply Shed can be referred as the **sourcing region** and be used for **inventory accounting**:
 - 1 Spatial Boundaries
 - 2 Traceability Requirements
 - 3 Emission Factors Used
- If the Supply Shed doesn't meet one of the three criteria, it can still be leveraged as a **Market-Based Mechanism** and accounted separately (Note: this is still evolving, with MBM roles in achieving SBTi undecided.)

How Soil Capital helps agri-food corporates achieve credible traceability

Implementing both approaches according to the company's resources



Source: Soil Capital

When put into practice, the reality of the agri-food system shows that one company is rarely involved in only one approach of the Supply Shed.

From our on-the-ground experience, at Soil Capital we support companies in navigating both approaches, based on their data availability and resources, helping them decide which approach best fits their specific context:

For volumes where the corporate has physical traceability

Throughout all the nodes in the supply chain up until the farmers — so for instance where they have direct relationship with their suppliers, where those suppliers are already willing and able to provide the necessary volume control data — we would follow a Supply Shed as sourcing region approach by helping them engage their suppliers.

For volumes lacking detailed physical traceability data

Where companies are not able to track volume information at every node, from the farm to first PoA and beyond — which is generally the case in commodity markets, companies can

use the Market-Based Mechanism version of the supply shed approach. This approach doesn't require a Chain of Custody model, but instead focuses on sourcing from a defined geographic area with evidence the company is sourcing from the supply shed.

Several of our clients are implementing both methods in parallel

Doing so can help lay the foundation for scaling the physical traceability approach across all volumes over time. As more farmers within the supply shed transition to regenerative agriculture practices, meaning volumes impacted, it becomes easier to engage each node to provide volume control information to qualify as mass balance.

How Soil Capital helps agri-food corporates achieve credible traceability

Defining a supply shed size that fits the company's needs



Source: Soil Capital

Ultimately, the best approach depends on the available information and the resources companies are willing to invest.

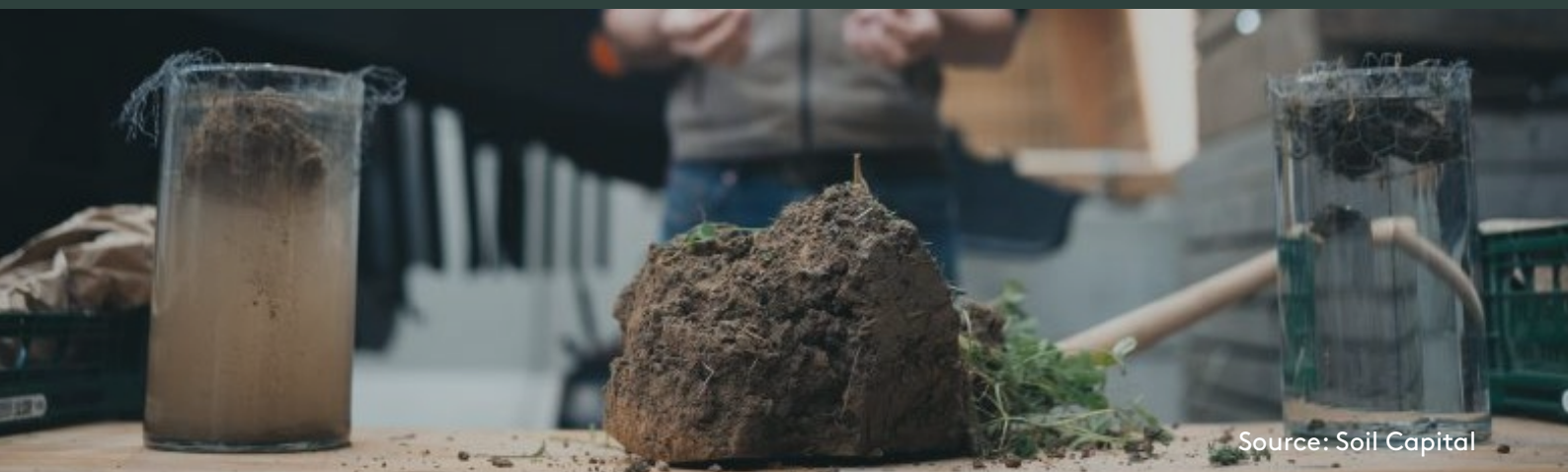
For context, as explained above, we expect the LSRG will allow local and regional supply sheds but restrict country-level supply sheds, unless the country is small enough to cover just one sourcing region. The draft LSRG does not specify a size threshold, leaving **room for interpretation**. For example, a region in the U.S. could be larger than an entire country in the EU, such as Belgium.

At Soil Capital, we tailor supply shed definitions to meet our clients' specific needs and operational constraints, particularly the level of data granularity they can obtain from suppliers. As a result, we offer both national and regional supply sheds. This flexibility acknowledges that some European countries are comparable in size to regions and that achieving regional traceability is not always feasible for corporations.

In practice, we work closely with clients to trace their supply chains back to the first point of aggregation. While some clients can trace sourcing to specific regions, others can only do so at the country level due to limitations in data infrastructure or information provided by their suppliers.

Therefore, we remain flexible in our approach to supply shed definition and more specifically we remain open to country level supply shed in our operating context in Europe.

Benefits from the Supply Shed approach beyond accounting rules



Source: Soil Capital

There are many benefits with the Supply Shed approach (whether it is the Mass Balance approach or the MBM approach).

The supply shed approach allows you to **move quicker** and in a **more cost-effective** way to support farmers transitioning to regen ag in your sourcing region. It allows you to **act with farmers** who are ready to move now, without needing further levels of physical traceability beyond mass balance to be in place.

In addition, by creating a **coalition of corporate off-takers**, the supply shed concept creates an environment for **large-scale collaboration**, where companies collectively share the financial burden of supporting farmers through the transition to regenerative agriculture. In other words, the supply shed allows you to identify companies that are all sourcing in the same region - whereas in a supply chain, you would not be able to collaborate in that way. It also helps address the problem of **free riders** by ensuring that no single company bears the full cost of funding the transition alone.

Finally, investing in your supply shed, supporting the farmers and landscapes your business depends on, isn't just about accounting for Scope 3 reductions. It's a strategy for **long-term resilience**. Beyond reducing GHG emissions, investing in regenerative agriculture within your supply shed unlocks a range of broader benefits - one of the most critical being the improvement of supply chains' resilience. According to a [BCG study](#), investing in soil health can **reduce yield variability** from extreme weather by up to 50%. That's a powerful reminder that beyond emissions metrics, regional investments in regeneration are essential to protecting **supply security** and **economic stability**.

In summary, the supply shed approach is a practical and scalable solution for companies that want to take action **now**. It enables companies to collaborate to support farmers in their transition and enhance supply chain resilience—all without being constrained by the current limitations of traceability systems.

CONTACT

About Soil Capital

Soil Capital is a certified B Corp company whose mission is to support farmers in their transition to regenerative and sustainable agriculture. Soil Capital's programme benefits over 1,800 farmers in France, Belgium and the UK, covering 350,000 hectares. It is based on a reliable methodology, certified by a tangible carbon indicator, aligned with corporate objectives to reduce scope 3 carbon emissions. Soil Capital's Units comply with the FLAG requirements of the SBT initiative, and are measurable and verified by third parties.

Soil Capital was founded over 10 years ago with the belief that farmers must be recognised, supported, and compensated for their essential contribution to solving environmental problems and producing healthy, nutritious food. In 2019, the company launched a programme to reward farms transitioning to regenerative agricultural practices across Europe.

Contact us

If you're interested in discovering how Soil Capital's regenerative programme can help you build a more resilient AgFood supply chain, please contact us at hello@soilcapital.com.