Textile Exchange

Regenerative Agriculture Landscape Analysis

January 2022

Foreword

Foreword by Intertribal Agriculture Council

The Intertribal Agriculture Council (IAC) is a national nonprofit that was founded in 1987 to pursue and promote the conservation, development, and use of our agricultural resources for the betterment of our people. IAC is excited to support and engage with Textile Exchange on its Regenerative Agriculture Landscape Analysis. They have taken a full systems approach addressing the complexity of the industry's involvement in regenerative agriculture. IAC fully commends their acknowledgement of the Indigenous roots of regenerative agriculture and the financial risks faced by producers in the transition to regenerative agriculture. This report is coming at an opportune time, and IAC is very appreciative to see Indian Country represented in such a meaningful body of work.

– **Tomie Peterson**
IAC Regenerative Economies Specialist

Cover photo: Ashish Chandra, courtesy of Oshadi

Photo: Alice Aedy. The Chilean Lake District is a region of temperate rainforests, rich biodiversity, and home to the Mapuche indigenous communities.

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Executive summary

As we release our Regenerative Agriculture Landscape Analysis, the apparel, textile, and footwear industry's interest in the potential of regenerative agriculture is gaining momentum, and fast.

With companies risking disruptions to fiber production from climate impacts and biodiversity loss, at Textile Exchange we believe that a transition to regenerative agriculture is fundamental to the long-term health of the sector. Regenerative practices can play a key role in helping farmers develop more resilient systems, bringing immense social and environmental benefits.

What brands lack, however, is a shared framework with which to understand, contextualize, measure, and describe work in this area. That's because the subject is nuanced and cannot be condensed into a single statement or set of practices. Positive steps forward often end up being duplicated, while the sense of the word "regenerative" risks becoming diluted, and its Indigenous and Native roots can be missing from the conversation.

With this in mind, we designed the Regenerative Agriculture Landscape Analysis to offer a deeper understanding of tools, programs, initiatives, and guidance on the subject. We want to highlight just how important it is for brands to clearly define their own use of the term, and to ensure that social justice, equity, and livelihoods are meaningfully embedded in any project deemed regenerative.

Our report is a call to action for companies to start investing in pilot projects that are developed in full financial partnership with farmers, Indigenous communities, and researchers, generating more data on regenerative agriculture as they go. Making this investment now will benefit soil, nature, and communities, as well as maximizing time for learning and adaptation in the eight short years remaining before 2030. A regenerative way of thinking also aligns with a parallel imperative for a fundamentally new economic model for the apparel industry, including more just and non-extractive supply chains and an emerging emphasis on degrowth.

Ultimately, we believe that for the apparel, textile, and footwear industry, regenerative agriculture is an opportunity for investment in a fundamentally different system. Our aim for this body of work is to help accelerate action on the ground.

Key takeaways

- A transition to regenerative agriculture is fundamental for the fashion and textile industry. The long-term health of the sector will depend on how it is able to work with farmers to develop more resilient systems, and regenerative practices offer immense social and environmental benefits too.
- Regenerative agriculture can't be defined in a single statement or set of practices. It is contextual and nuanced, and instead calls for a fundamentally holistic systems approach that puts humans and ecosystems at its core.
- Programs should be rooted in justice, equity, and livelihoods. Indigenous advocates call for an acknowledgement of the Indigenous roots of regenerative agriculture and of past and current racial injustice to underpin future work.
- Regenerative agriculture is about much more than increasing soil carbon levels. While evolving soil science is calling into question exactly how long-term soil carbon sequestration works, holistic regenerative systems have documented interdependent co-benefits related to biodiversity, water availability and quality, climate resilience, and livelihoods.
- We need to move out of silos to speed up the transition. To advance the field of regenerative agriculture overall, apparel, textile, and footwear companies should also increase information-sharing with the food and beverage sector, ensuring that apparel brands influence the latest policy developments, financing models, and research initiatives.

Section overviews

Why regenerative agriculture matters

At Textile Exchange, we're guiding a global community of brands, manufacturers, and growers towards more purposeful production from the very start of the textile supply chain. Together with our global community, we're united with a broad range of governmental and non-governmental actors behind the goal of limiting global warming to 1.5 degrees Celsius above pre-industrial levels.

This imperative drives our Climate+ goal to help the global textile industry achieve a 45% reduction in the emissions that come from producing fibers and raw materials by 2030. Meeting this goal will require a combination of deep emissions cuts, nature-based mitigation options, adaptation strategies, and financial investments to back all these critical shifts. As part of this approach, regenerative agriculture holds immense promise for a range of social and environmental benefits, from overall soil health to community resilience and livelihoods.

Reconnecting with Indigenous roots

While the term and practice of "regenerative agriculture" have gained widespread interest in the last few years, Indigenous people, people of color, and those who work with farmers and land stewards rooted in Indigenous farming traditions strongly dispute the idea that regenerative agriculture is something new. These advocates call for an acknowledgement of the Indigenous roots of regenerative agriculture and of past and current racial injustice to underpin future work.

Recentering the contributions and perspectives of Indigenous communities and communities of color is not only critical from a justice perspective—it is of great economic importance for companies that hope to weather current climate, Covid-related, and economic disruptions. Activists foresee pushback against companies who use the term "regenerative agriculture" without acknowledging the human element and justice considerations.

The science behind soil carbon

The benefits of regenerative agriculture have been documented in hundreds of scientific journal articles and popular publications. Extensive research shows that regenerative approaches can help build soil carbon, and this in turn can have positive effects on soil nutrient availability, water holding capacity, system biodiversity, resilience to extreme weather, disease resistance, and community livelihoods.

Nevertheless, the current interest in regenerative agriculture has largely been driven by hopes that regenerative practices could "sequester" carbon in soils over the long term. However, a shifting scientific consensus on the mechanism of long-term soil carbon storage indicates that the industry must proceed with due diligence around claims related to greenhouse gas impact reduction from soil carbon sequestration as well as around carbon credits and markets. The documented co-benefits of regenerative agriculture also call for a clearer and more holistic shared understanding of what it means to measure and model these benefits.

Regenerative agriculture in the supply chain

Regenerative agriculture does not stop at the farm gate—the values and concepts behind this approach must be carried through the supply system for textile and apparel goods. Building relationships and establishing long-term purchasing contracts are vital, as is working with on-the-ground project developers and technical service providers with trust-based local relationships.

Supply Shed approaches appear to be an important short-term tool, with an understanding that the industry trajectory, and the goals of regenerative agriculture, are driving towards farm-level traceability. Pilot projects are a key strategy for building new supply chains and developing a better understanding of regenerative outcomes in different crops and geographies, and apparel brands are currently adopting this approach as an emerging best practice to speed implementation and shared learning.

Navigating the landscape

The heart of the report is a set of tools that brands can use to navigate the landscape of regenerative agriculture tools and programs. We hope that this report will equip brands to ask the right questions to identify and support initiatives that align with their values. To do so, we created the Matrix of Regenerative Programs to place a robust sample of known regenerative agriculture projects against a common framework, while our Engagement Pathway organizes them into manageable chunks that companies can consider in turn.

To realize the full potential of regenerative agriculture, apparel, textile and footwear companies should integrate innovative financial support models from the start. Our report outlines multiple concrete examples of creative financing approaches to consider.

Engagement Pathway (Summary)

Step 1

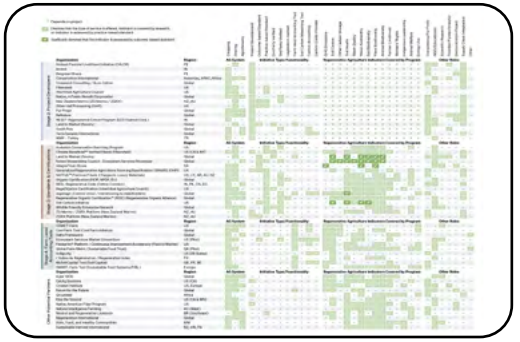
- A.) Brand goals/targets
- B.) Which Ag system?
- C.) Which country/region?

Step 2

Identify possible project developers using Matrix and Map:

Step 3

Assess desired standards/certifications and other potential partners using Matrix:



Step 4

Understand which farm-level accounting tools will be used and the underlying methodology

- Understand the difference between direct soil sampling, remote sensing, and modeling and how they are combined in these tools.
- Determine how soil health, biodiversity, water, and justice outcomes will be measured in your project.

Step 5

Develop a specific financial model to support the project

If carbon credits are sought:

- Identify credible Carbon Credit Protocol using recent reviews

Step 6

Identify credible Carbon Credit Protocol:

- 14 Protocols Reviewed by Carbon Plan
- 12 Protocols Reviewed by EDF

Next steps for brands

Approach regenerative agriculture as an investment in a fundamentally different system. Centuries of Indigenous knowledge and extensive scientific evidence show that regenerative practices are critical for community and ecosystem health. Rather than continuing in the current extractive system, brands must see regenerative agriculture as part of a fundamentally different approach.

Ensure that those who are the direct stewards of the land have an active decision-making role. To be deemed regenerative, programs must include a human element that prioritizes justice and equity. They must involve Indigenous people, communities of color, and farmers, or their chosen representative, from the start.

Look into existing supply networks and identify areas of opportunity with interested producers. Regenerative agriculture pilots are an opportunity to fundamentally rebuild sourcing models and align with an industry-wide push for direct connections and transparency down to the farm level.

Invest in capacity-building for farmers and growers on the ground. Companies should examine their staffing structures to expand their capacity to engage in meaningful regenerative agriculture projects grounded in fast-evolving soil science. They should consider investing in the role of technical service providers for regenerative practices.

Build on the rigor of existing certifications and standards when assessing the benefits of regenerative systems. Interviews and research revealed an emerging consensus against the development of additional new standards or certifications for regenerative agriculture. Instead, the industry could assess the development of "add-on modules" that respect the rigor of existing standards while assessing outcomes for soil health, water systems, biodiversity, and social justice.

Develop long-term contracts and creative financing mechanisms. Investing alongside farmers and growers means sharing the risk of transitioning to regenerative practices. In addition to long-term purchasing contracts, brands can seek a combination of funding sources across the organization to ensure that the success of the project is a shared financial goal.

Increase information-sharing with the food and beverage sector. Going beyond a siloed approach would ensure that apparel brands influence the latest policy developments, financing models, and research initiatives. Regenerative agriculture conversations should be framed around "food and fiber."

Introduction

Goal and scope of this report

Textile Exchange's Regenerative Agriculture Landscape Analysis is intended to provide the apparel, textile, and footwear industry with a clearer understanding of tools, programs, initiatives, guidance, and best practices within the regenerative agriculture landscape—and to offer concrete pathways for brands to deepen their engagement.

Companies across the sector are currently investigating regenerative agriculture opportunities, leading to a significant duplication of effort. This report is designed to reduce the amount of work brands need to do to support regenerative programs and to offer a common framework with which the industry can credibly implement and describe the benefits of regenerative programs. The report team hopes that mapping this ecosystem and providing guidance on this topic will enable brands to understand the stages of engagement in regenerative agriculture projects, identify and appropriately support regenerative programs and partners, and gain clarity on how their efforts will support their overall climate, biodiversity, social justice, and other sustainability targets.

This project is intended to complement the technical guidance on target-setting currently being developed by the Greenhouse Gas Protocol Carbon Removals and Land Sector Initiative, the Science-Based Targets initiative Forest, Land and Agriculture project and Net Zero workstreams, the Science-Based Targets for Nature, and the Convention on Biological Diversity (summarized in Appendix B).

The report also aims to redress two key gaps often seen in the discussion of regenerative agriculture to date:

- The need to acknowledge the Indigenous roots of regenerative agriculture and to include racial and social justice as critical components of any system termed "regenerative;"
- The need to specifically address the financial and other risks faced by farmers in the transition to regenerative agriculture.

This landscape analysis covers regenerative agriculture programs relevant for three major categories of textile material production: cropping, grazing, and agroforestry. Regenerative agriculture practices are relevant to all major apparel and textile crops, including cotton, hemp, and flax from cropping systems; leather, wool, alpaca, mohair, and cashmere from grazing systems; and natural rubber and man-made cellulosic fibers from forestry/agroforestry.[1] Crop residues from regenerative systems may also be a feedstock for the development of biosynthetic fibers.

Overall, this Regenerative Landscape Analysis aims to bring out the nuances and questions involved in the concept of regenerative agriculture, and to propose a more proactive, holistic, and investment-minded approach to brands.

This report does not aim to rank programs, make value judgements, or recommend specific partners to brands. This report's Matrix of Regenerative Programs does not aim to be an exhaustive mapping of every current regenerative agriculture-related program; rather, it focuses on establishing major categories and a robust listing of global initiatives that are current or potential partners for apparel and textile companies. The report also does not seek to collect impact data on any of the programs or practices discussed.

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Top-line conclusions

- Interviews and research overwhelmingly emphasize that regenerative agriculture is, and must be, a fundamentally holistic systems approach that puts humans and ecosystems at the center and acknowledges its roots in Indigenous practices.
- Regenerative agriculture is an opportunity for investment in a fundamentally different system that moves beyond the current extractive model.

Section I

Introduction to Regenerative Agriculture and Why it Matters

Background and the big picture

The goal of this report is to provide an overview of the "landscape" of opportunities for textile, apparel, and footwear brands to engage in the growing field of regenerative agriculture. As with a literal landscape, the best view usually comes from on high—in this case, from the big picture context of climate change, soil science, nature-based solutions, and holistic systems change.

Regenerative agriculture holds immense promise for a range of co-benefits, including overall soil health, biodiversity, water availability and quality, animal welfare, and community resilience and livelihoods. That is both because regenerative agriculture works in alignment with nature **and because it represents a fundamental rethinking of the current "growth logic" economic model**.

Currently, Textile Exchange, its members from the apparel, textile, and footwear industries, and a broad range of governmental and non-governmental actors are united behind the goal of limiting global warming to 1.5 degrees Celsius above pre-industrial levels.[2] The imperative to meet the 1.5°C scenario, in turn, drives the Intergovernmental Panel on Climate Change's call for emissions reductions of 45% by 2030—a mere eight years from now.

In the context of the apparel, textile, and footwear industry, Textile Exchange has used the 45% emissions reductions goal, and three interconnected issues—soil health, water, and biodiversity—as the foundation for its "Climate+" strategy. Textile Exchange's analysis identified an "innovation gap" between the reductions achievable through the use of preferred materials and the total emissions reductions needed. The figure opposite emphasizes how emissions reduction and investment in the innovation gap must happen simultaneously.

Within this innovation gap, regenerative agriculture has a key role to play in helping textile companies generate multiple co-benefits, and, critically, move away from business as usual. Beyond the focus on atmospheric greenhouse gas levels, the fight against global climate change is increasingly being recognized as an intersectional issue, inextricably linked with other environmental and human systems. In particular, as economic anthropologist and author Jason Hickel has written, "When it comes to global warming, we know that the real problem is not just fossil fuels—it is the logic of endless growth that is built into our economic system."[3]

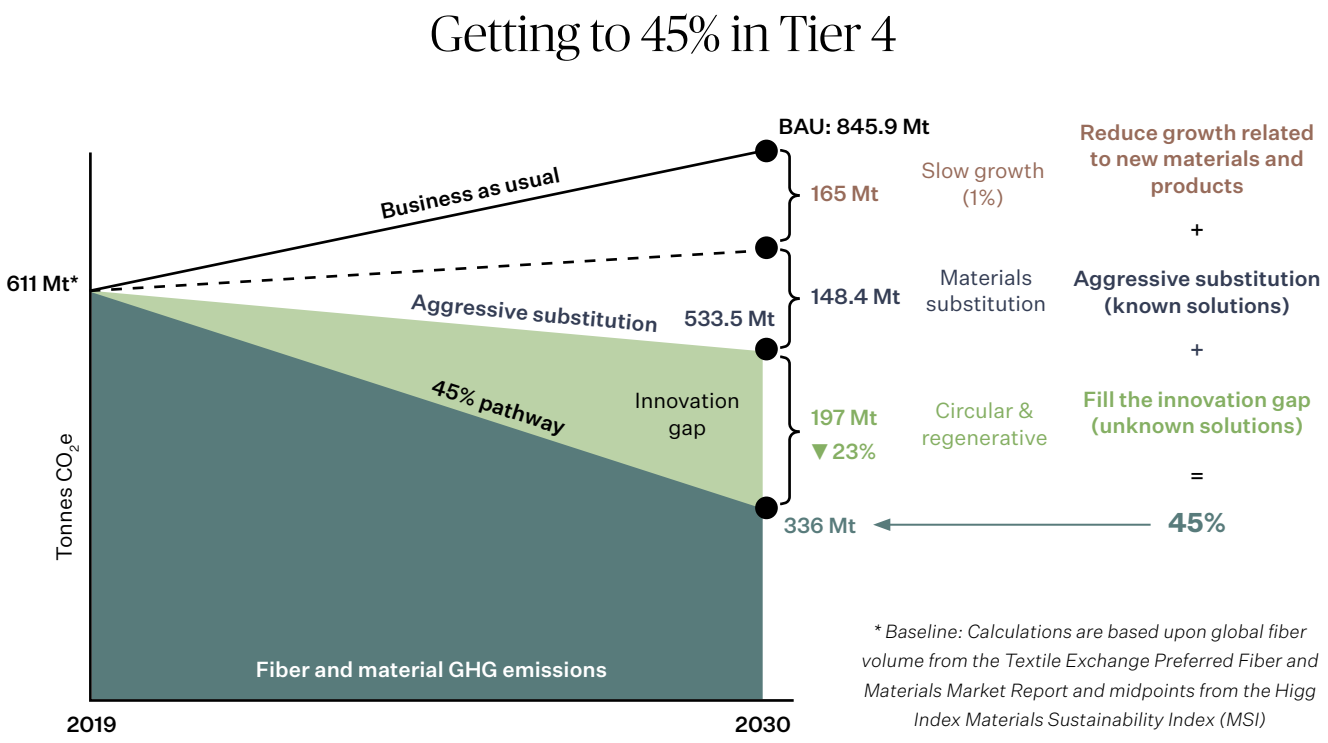

Figure 1: Modeling of interventions needed in the apparel and footwear raw materials extraction phase in order to achieve 45% GHG impact reduction by 2030, as measured against a 2019 baseline. Image credit: Textile Exchange

Reframing the magic bullet

The Intergovernmental Panel on Climate Change stresses that all pathways limiting global warming to 1.5°C "imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options."[4] Regenerative agriculture is not a singular solution to the climate crisis—as a strategy for carbon removals, it must go hand in hand with overall GHG reductions as well as with efforts to drive positive biodiversity outcomes. The Science-Based Targets for Nature collaborators state simply: "This is not an either/or situation . . . We need to halve emissions and reverse nature loss by 2030 to avoid catastrophic consequences."[5]

While emphasizing the need to avoid "carbon tunnel vision,"[6] recent scientific research illustrates the importance of recognizing the range of solutions needed to mitigate emissions. In a widely cited 2019 review, Roe et al. put the potential of regenerative agriculture in the context of all land-related carbon reduction and removal options. These authors found that the land sector "could feasibly and sustainably contribute about 30%, or 15 billion $GtCO_2e$ per year, of the global mitigation needed in 2050 to deliver on the 1.5°C target . . ."[7] As Figure 2 opposite shows, within this potential, these researchers find that carbon sequestration from agriculture represents just under 10% of land sector mitigation potential.

Avoidance of deforestation, in particular, is a critical element that is often overlooked in discussions about regenerative agriculture—it is far easier to keep carbon stored in trees and the soil in the first place than it is to rebuild it through regenerative agriculture practices. As biodiversity expert Dr. Helen Crowley, formerly Head of Sustainable Sourcing and Nature Initiatives at Kering and now a partner at investment advisory firm Pollination, puts it, "For the regenerative agriculture piece to work, you have to have it totally explicit that there can be no conversion of forests." If the land sector represents about 30% of potential mitigation, all such approaches must operate in tandem with the other 70% of mitigation achieved through emissions reductions.

In other words: we need every tool in the toolbox, every wedge of the pie, to meet the climate imperative.

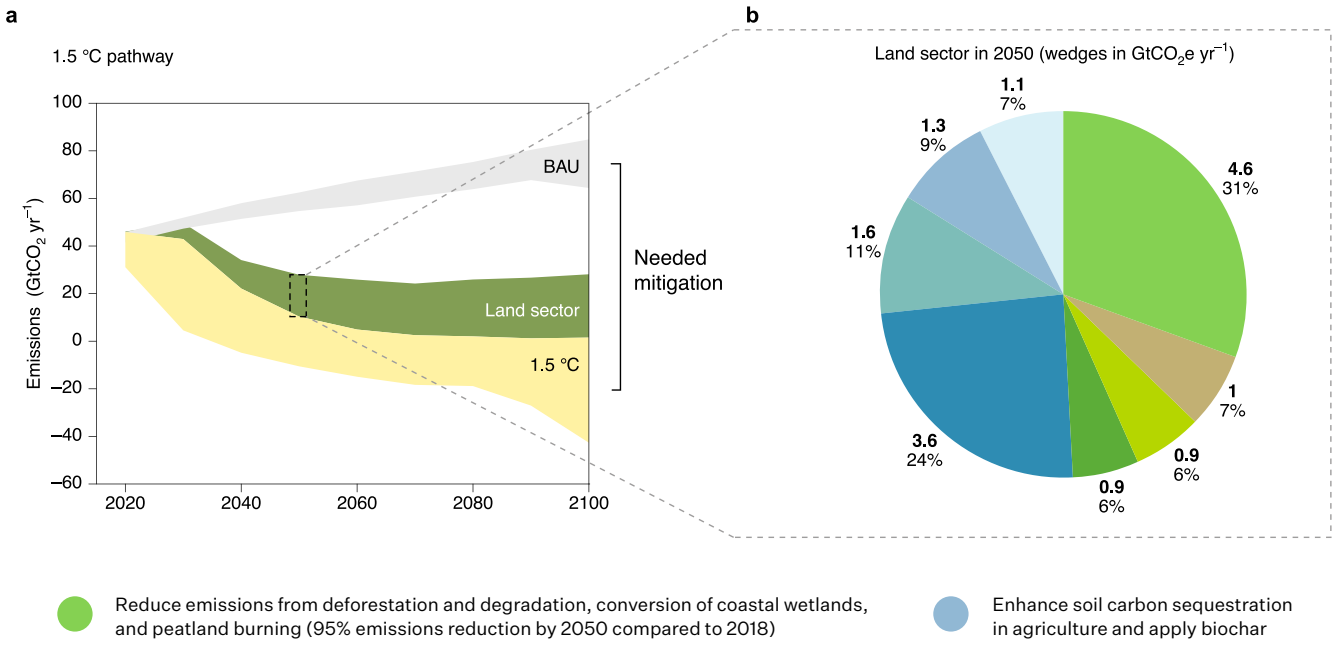

Figure 2: Land-sector roadmap for 2050. Stephanie Roe et al., "Contribution of the land sector to a 1.5°C world." Nature Climate Change, October 2019. See link for full key: https://www.nature.com/articles/s41558-019-0591-9

Why regenerative agriculture matters to the apparel and textile industry

For board members, C-suite executives, sustainability directors, designers, and supply chain companies alike, a transition to regenerative agriculture is fundamental to the long-term health of the apparel and textile industry.

First, regenerative agriculture will support apparel and textile companies' long-term efforts to meet emerging industry guidance, including the Greenhouse Gas Protocol, the Science-Based Targets Initiative and its recently released Net Zero Standard, the Convention on Biological Diversity, and the forthcoming Science-Based Targets for Nature. As described further in Section V, Step 1 and in Appendix B, these guidance frameworks are all in the midst of major updates to integrate considerations relevant to soil carbon and ecosystem co-benefits. Supporting regenerative agriculture through partnerships, sourcing, and investment will allow companies to get out ahead of the new guidance and take a "no-regrets pathway."

Regenerative agriculture also holds the potential to address fundamental risks faced by the industry. Beyond the Covid-19 induced supply chain disruptions that have made headlines in recent months,[8] the industry faces an even greater long-term risk from climate change-induced disruptions to fiber crop production. A recent report finds that "climate change could leave half of the planet's cotton-growing hubs highly vulnerable to temperature increases, changes to rainfall patterns and extreme weather events by 2040."[9] Regenerative agricultural approaches can play a key role in helping farmers in these regions develop more resilient production systems, thus mitigating risk all along the supply chain.

Investors and other key financial stakeholders are closely monitoring these risks and the apparel industry's approach to regenerative agriculture. The Divest/Invest movement, which calls out the fact that fossil fuel companies' externalized climate costs had not been priced into their value on the market, now represents assets of over $11 trillion, including institutions from North America, Europe, Australia, Africa, and South America.[10] As the apparel industry continues to expand its reliance on fossil-fuel derived synthetic fibers, investors are taking note: the Wall Street Journal titled a recent article "The Hidden Cost of Cheap Fashion Could Catch up with Investors."[11] Implementation of holistic regenerative agriculture programs can help the apparel industry develop more resilient supplies of natural fibers that also help decrease overall climate-related financial risks.

Most importantly, regenerative agriculture matters because it aligns with a parallel imperative for a fundamentally new economic paradigm for the apparel industry, including an emerging emphasis on degrowth. Regenerative agriculture is critical for enabling the industry to move beyond business as usual by fundamentally re-envisioning more just and non-extractive supply chains. The Science-Based Targets for Nature framework, currently under development, lays out this concept in a series of levels: Avoid, Reduce, Regenerate, Restore, and finally, Transform. The Transform level is defined as actions that are "necessary to tackle the fundamental drivers of nature loss . . . by drivers we mean the dominant belief and value systems of individuals and organizations, which influence everyday and long-term decision-making."[12] Regenerative agriculture's emphasis on a holistic set of outcomes that go far beyond yield and volume can set the stage for such "Transform"-level approaches.

While business model reform is essential to meet the climate imperative, brands are also likely to find that regenerative agriculture systems matter because they produce more resilient, higher-quality supplies of fiber materials. Rancher and farmer Dianne Haggerty, the founder with her husband Ian of Natural Intelligence Farming in Western Australia, reports that after a decade of regenerative approaches on their farm, "The strength of the wool has been phenomenal . . . the wool softness is phenomenal as well. Even with seasonal variations, we've been able to go through drought or very wet seasons and maintain the quality of the fiber." In the end, Haggerty notes, these fiber-specific impacts are not disconnected from the benefits of regenerative agriculture for the overall system:

> "The land is more resilient to drought as well—so the whole system is more resilient to whatever the climate is dishing up."

By offering the opportunity for resilient supply chains, risk mitigation, and a fundamentally new business model, regenerative agriculture offers much more to businesses beyond the common initial focus on carbon. In fact, as the figure on the following page conveys, a singular focus on carbon risks undermining and ultimately undersells the long-term promise of regenerative agriculture for companies, investors, and communities.

Why regenerative agriculture matters to the apparel and textile industry

With this context in mind, apparel, textile, and footwear companies can take a clear-eyed view of the many programs and tools available to help them integrate regenerative agriculture approaches into the full picture of their climate, sustainability, and social justice strategies.

Mapping the pathways for the apparel and textile industry to achieve these holistic benefits is the goal of this report.

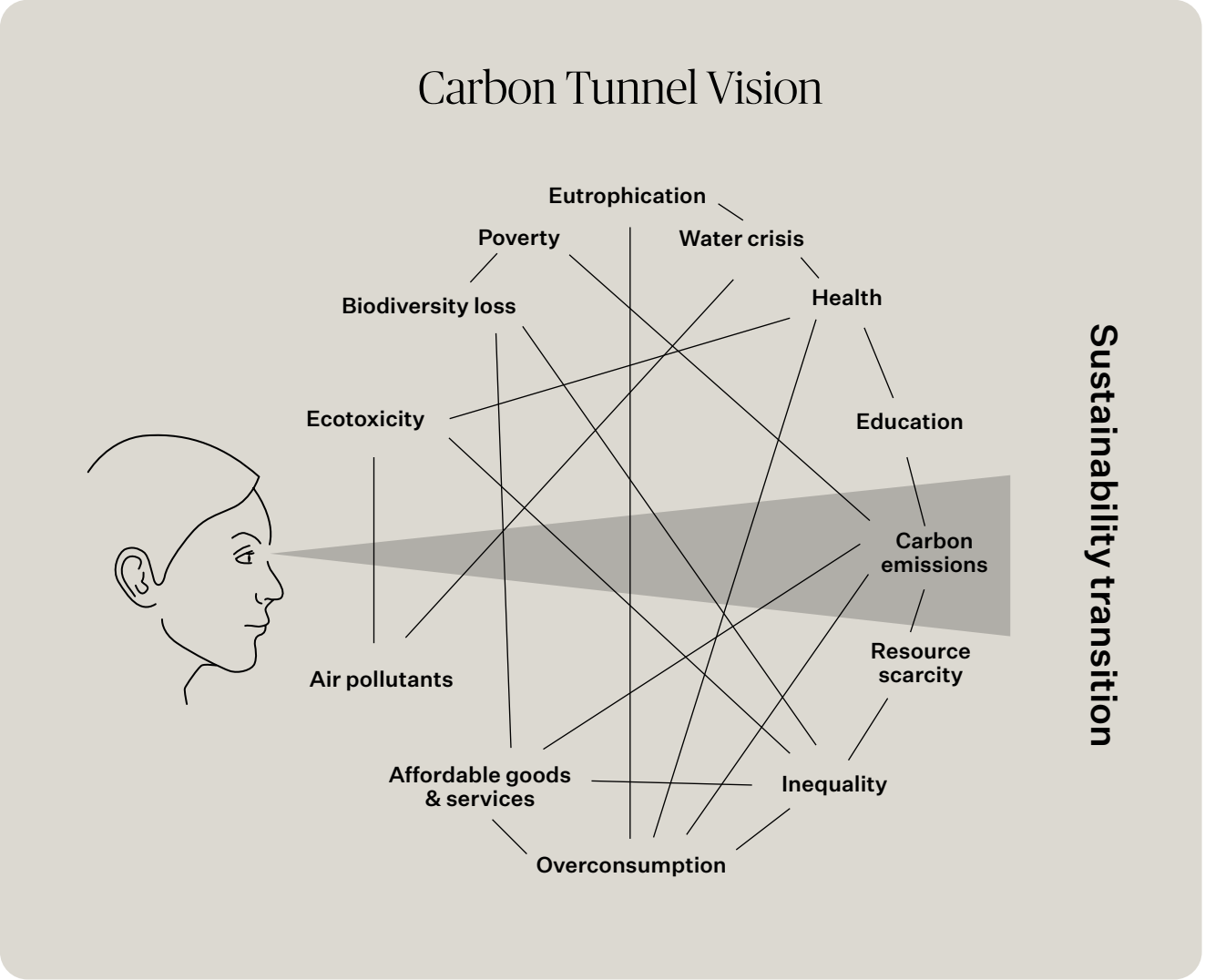

Figure 3: Carbon Tunnel Vision. Based on graphic by Jan Konietzko

Section I: Summary

- Regenerative agriculture holds immense promise for a range of co-benefits, including overall soil health, biodiversity, water availability and quality, animal welfare, and community resilience and livelihoods. That is both because regenerative agriculture works in alignment with nature and because it represents a fundamental rethinking of the current "growth logic" economic model.
- Although regenerative agriculture has important climate benefits, it is not a singular solution to the climate crisis—it must go hand in hand with overall GHG reductions as well as with efforts to drive positive biodiversity outcomes.
- Supporting regenerative agriculture through partnerships, sourcing, and investment will allow companies to get ahead of rapidly evolving industry guidance and take a "no regrets pathway."
- Regenerative agriculture also holds the potential to address fundamental risks faced by the industry, including climate change-induced disruptions to fiber crop production. Investors and other key financial stakeholders are closely monitoring these risks and the apparel industry's response.
- Regenerative agriculture aligns with a parallel imperative for a fundamentally new economic paradigm for the apparel industry, including more just and non-extractive supply chains and an emerging emphasis on degrowth.
- A singular focus on carbon risks undermining and ultimately undersells the long-term promise of regenerative agriculture.

Section II

Definitions of Regenerative Agriculture: Reconnecting with Indigenous Roots

Reconnecting with Indigenous roots

While the term and practice of "regenerative agriculture" have gained widespread interest in the last few years, it should be noted that communities of Indigenous, Native, and other farmers and land stewards of color have used these circular and restorative practices for generations. In today's landscape, NGOs, for-profits, and academics have developed varying definitions, while academic researchers have recently taken up the question in meta-reviews that assess these varying uses.[13]

Before delving into these sources, however, it is important to heed a group of voices that have too often been left out of the conversation: Indigenous people and farmers of color. This perspective is summed up in the powerful reminder about regenerative agriculture from Karen Washington of the U.S.-based Black Farmer Fund, interviewed for and quoted in the 2020 report "Barriers For Farmers & Ranchers to Adopt Regenerative Ag Practices In The US":

> "These are Indigenous practices! These practices have been done for centuries. How do you talk about regenerative farming without lifting up and giving credence to the Indigenous people?"[14]

In interviews for this project, Indigenous people, people of color, and those who work with farmers rooted in Indigenous farming traditions strongly dispute the idea that regenerative agriculture is something new. These advocates call for an acknowledgement of the Indigenous roots of regenerative agriculture and of past and current racial injustice to be central to future work. Interviewed for this report, Kelsey Scott of the Intertribal Agriculture Council and DX Beef, a fourth-generation tribal rancher from the Cheyenne Sioux River Nation in the U.S., added her perspective:

> "What is getting missed in regenerative? The concept of humans being a biological species in the system. We forget that to our detriment . . . If the humans in the system are not getting healthier, we are not truly regenerative. And that's not just the producers, but the community also. For me that *always* means the Indigenous community who owned and managed the land—and 'owned and managed' for us is a kinship term."

Leah Penniman, founder of Soul Fire Farm, notes that this recognition is critical if the field of regenerative agriculture is to avoid perpetuating the extractive practices of many current agricultural systems. As she put it in a 2021 podcast interview: ". . . sometimes I see regenerative ag branded as some new idea—and similar to permaculture, it is an amalgamation of Indigenous ideas that are rebranded, repackaged, and sold. That is a tragedy not just in terms of narrative and credit, but also it perpetuates the legacy of theft upon which this nation [the United States] was founded."[15]

Outside this specific U.S. context, Nishanth Chopra, founder of India-based clothing brand Oshadi, expresses a similar idea: "A lot of people think [regenerative agriculture] is disruptive, but it's not—people have been doing this for generations."[16]

This emphasis on the importance of the perspectives of Indigenous communities and other communities of color is not limited to those who are members of these communities. As Dianne Haggerty of Natural Intelligence Farming in Australia notes, "Integration with our Indigenous First Nations people and appreciating their wisdom is key—really respecting that."

Luke Smith, Partner and CEO of project developer Terra Genesis International, echoes this evolving understanding that regenerative agriculture must include a greater focus on social and racial justice. Terra Genesis was one of the first organizations to grapple with the goal of defining regenerative agriculture, using a 2017 global crowdsourcing process. Asked how their definition has evolved since then, Smith reflects, "The biggest thing we've called out in recent times is far more focus on the social components. Everyone was focused on the agronomics." Now, Smith advocates for a greater focus on inequality, seeking to be "focused on that as a primary way of organizing and working."

Re-centering the contributions and perspective of Indigenous communities and communities of color in regenerative agriculture is not only critical from a justice perspective—it is of greatest economic importance for companies that hope to weather current climate, Covid-related, and economic disruptions. **Indigenous Peoples make up only 6.2% of the global population, but they are the stewards of 80% of the remaining biodiversity.**[17] Companies seeking to set and meet ambitious targets therefore have many reasons to learn from and support Indigenous communities' understanding of how ecosystems can be fully regenerative and resilient.

Definitions of regenerative agriculture in the scientific literature

Recently, academic researchers have also attempted to provide comprehensive treatment of the definition of regenerative agriculture.

In a 2020 review published in the journal *Frontiers in Sustainable Food Systems*, titled "What is Regenerative Agriculture? A Review of Scholar and Practitioner Definitions Based on Processes and Outcomes," Newton et al. reviewed 229 peer-reviewed journal articles and 25 websites that use the term "regenerative agriculture" to assess the types of definitions used. The authors disaggregated all definitions into singular "dimensions" that related to specific "processes" (more commonly referred to as "practices" in most discussions) or "outcomes" and used descriptive statistics to determine the frequency of use of these different processes and outcomes. This approach is in line with the emerging emphasis on outcome-based approaches to evaluating regenerative agriculture systems, as discussed further below in Section V. Notably, only 22 of the 229 articles "provided an approximation of a definition"[18]—meaning that most users of the term employed it without reference to any specific definition.

These researchers' breakdown of the dozens of different elements included in definitions of regenerative agriculture is shown in Table 1, modified to organize these dimensions by descending frequency of use in each category.

Table 1 (opposite): Summary of "processes" (practices) and outcomes included in definitions or descriptions of regenerative agriculture within journal articles and practitioner websites. Adapted from Newton et al. (2020)

Green highlights indicate terms in the top 5 for both Journal Articles and Practitioner Websites

Dimension of regenerative agriculture (Processes) Sorted by frequency in Practitioner Websites	**N**	**%**
Use no or low external inputs; maximize on-farm inputs	32	26.4
Integrate livestock	23	19
Use no synthetic pesticides	15	12.4
Use no synthetic fertilizers	15	12.4
Reduce tillage (or no-, minimal-, conservation-)	14	11.6
Use crop rotations	12	9.9
Use crop plant diversity (including intercropping)	11	9.1
Use compost, mulch, green manure, or crop residues	11	9.1
Use cover crops	10	8.3
Use organic methods	10	8.3
Use ecological or natural principles or systems	9	7.4
Use organic fertilizers	8	6.6
Incorporate perennials and trees	7	5.8
Use natural pest control	7	5.8
Protect/cover the soil	6	5
Focus on localism and/or regionality	6	5
Other	4	3.3
Restore natural habitats	3	2.5
Focus on small scale systems	3	2.5
Rely on farm labor, including for local knowledge	3	2.5

Dimension of regenerative agriculture (Processes) Sorted by frequency in Journal Articles	**N**	**%**
Integrate livestock	9	40.9
Reduce tillage (or no-, minimal-, conservation-)	9	40.9
Use cover crops	8	36.4
Use no or low external inputs; maximize on-farm inputs	7	31.8
Use crop rotations	7	31.8
Use compost, mulch, green manure, or crop residues	6	27.3
Incorporate perennials and trees	6	27.3
Use no synthetic fertilizers	5	22.7
Use no synthetic pesticides	4	18.2
Protect/cover the soil	4	18.2
Use crop plant diversity (including intercropping)	3	13.6
Use organic methods	3	13.6
Use ecological or natural principles or systems	3	13.6
Use organic fertilizers	2	9.1
Use natural pest control	2	9.1
Other	1	4.5
Restore natural habitats	1	4.5
Focus on localism and/or regionality	0	0
Focus on small scale systems	0	0
Rely on farm labor, including for local knowledge	0	0

Dimension of regenerative agriculture (Outcomes) Sorted by frequency in Practitioner Websites	**N**	**%**
To improve soil health (e.g., soil organic matter, fertility)	49	40.5
To increase biodiversity	26	21.5
To improve ecosystem health (incl. ecosystem services)	21	17.4
To increase carbon sequestration	21	17.4
To improve community social and/or economic wellbeing	21	17.4
To increase farm profitability	19	15.7
To improve water health (e.g., hydrology, reduce pollution)	18	14.9
To maintain or improve farm productivity	18	14.9
To create a circular system and/or reduce waste	14	11.6
To improve food nutritional quality and/or human health	13	10.7
To maintain or increase yields	10	8.3
To improve food access and/or food security	10	8.3
To increase crop health and/or resilience	9	7.4
To reduce greenhouse gas emissions	5	4.1
Other	5	4.1
To improve food safety	2	1.7
To improve animal welfare	0	0

Dimension of regenerative agriculture (Outcomes) Sorted by frequency in Journal Articles	**N**	**%**
To improve soil health (e.g., soil organic matter, fertility)	19	86.4
To increase carbon sequestration	14	63.6
To increase biodiversity	10	45.5
To improve water health (e.g., hydrology, reduce pollution)	10	45.5
To improve community social and/or economic wellbeing	9	40.9
To improve ecosystem health (incl. ecosystem services)	7	31.8
To improve food nutritional quality and/or human health	7	31.8
To increase farm profitability	6	27.3
To maintain or improve farm productivity	5	22.7
To maintain or increase yields	5	22.7
To improve food access and/or food security	3	13.6
To increase crop health and/or resilience	3	13.6
To reduce greenhouse gas emissions	3	13.6
Other	3	13.6
To improve animal welfare	3	13.6
To create a circular system and/or reduce waste	1	4.5
To improve food safety	1	4.5

Definitions of regenerative agriculture in scientific literature

As illustrated in the table, Newton et al.'s analysis finds somewhat limited consensus between journal articles in the scientific literature and practitioner websites on the "processes" that define regenerative agriculture, and slightly higher consensus on the outcomes included.

Looking at the top five "processes" mentioned in both journal articles and practitioner websites, only three practices appear in common:

- Use no or low external inputs; maximize on-farm inputs
- Integrate livestock
- Reduce tillage (or no-, minimal-, conservation- [tillage])

Among outcomes, the top five outcomes include four that appear in common between journal articles and practitioner websites:

- To improve soil health (e.g., structure, soil organic matter, fertility)
- To increase biodiversity
- To increase carbon sequestration
- To improve the social and/or economic wellbeing of communities

Based on Newton et al.'s frequency assessment, these elements could thus be viewed as a minimal consensus definition across the scientific literature and practitioner groups.

Newton et al. do not address the current confusion by calling for the adoption of a single definition. Rather, they note, this situation "points to the necessity for individual users of the term to define it clearly and unambiguously for their own purposes and to state that definition in an unequivocal manner."

As one way to bring a more data-driven approach to this question, apparel brands could choose to evaluate regenerative agriculture programs based on whether they include the top five to seven practices and outcomes from these two categories of assessment analyzed by Newton et al. and presented in Table 1 above, with a particular emphasis on driving outcomes that are practice-sensitive and context-specific. Brands could also use these elements to develop their own transparent and documented definition of regenerative agriculture.

This level of clarity is critical because, as Newton et al. caution, "muddiness around the term [regenerative agriculture] may open the door for unscrupulous commercial interests to exploit the term and use it misleadingly in their marketing, potentially diminishing the value of the term to any producer who is more genuinely involved in efforts to enhance the sustainability of food production."[19]

This "muddiness" in the definition has already caused confusion and frustration for farmers and consumers alike. As rancher Jeanne Carver of Shaniko Wool Company in the state of Oregon sees it:

> "For me, this word regenerative is not different to us [from] where we have been since the late '80s. It became known as sustainability and sustainable practices. . . We've seen trends in language, but truly it all comes down to soil and plant health. So, I do not see regenerative as going beyond sustainable. Because if you are being sustainable, you are ensuring the future. You are not just maintaining a certain level of degradation! That's what the regenerative language has implied."

As a result of this frustration, notes Rebecca Burgess of Fibershed, it is more important than ever for brands to both clearly and transparently define their own use of the term regenerative, and to ensure that social equity and justice are meaningfully embedded in their approaches. Without this awareness, she foresees a coming backlash against more reductionist definitions. In her view:

> "What brands should understand—there is a pushback already on calling regenerative just about soil health. Regenerative agriculture has to be about including the human being in it . . . You will get a critique of your sourcing if you are not taking into account the human element. **If you don't acknowledge stolen land, if you don't acknowledge social inequity, if you don't acknowledge systemic racism—then you are missing the whole conversation of regenerative agriculture.**"

Based on the perspectives developed through interviews and research for this project, Textile Exchange has developed the following working definition of regenerative agriculture.

Textile Exchange regenerative agriculture statement

While there is no standardized definition of regenerative agriculture, Textile Exchange takes the view that the concept is inclusive of the following:

- A view of agriculture that works in alignment with natural systems, recognizing the value and resilience of interconnected and mutually beneficial ecosystems vs. extractive agriculture systems.
- An acknowledgement that Indigenous and Native peoples have been employing this approach to growing food and fiber for centuries—it is not a new concept—and that regenerative agriculture must include a focus on social justice.
- A holistic, place-based, outcome-focused systems approach, not a "one-size-fits-all" checklist of practices.

Regenerative agriculture practices are relevant to all natural fibers, whether produced by cropping (cotton, bast fibers, other row crops used as biosynthetic feedstocks); grazing (leather, wool, and other animal fibers); or forestry (man-made cellulosic fibers, rubber plantations). Examples of regenerative practices include but are not limited to: crop rotations, cover cropping, reduction of off-farm inputs alongside maximization of on-farm inputs, diversification of pasture species, managed grazing rotations, silvopasture (combining trees with livestock and forage production), windbreaks, and alley cropping (growing agricultural crops alongside long-term tree crops).[20] It is important to note that best practices will vary based on unique landscapes, ecosystems, communities, and other context.

Textile Exchange also takes the view that over the long term, regenerative agriculture systems should phase out reliance on synthetic pesticides, herbicides, and fertilizers. These synthetic inputs have known negative impacts on soil health, biodiversity, and human health—outcomes antithetical to the values of regenerative. Similarly, regenerative systems should move away from reliance on genetically modified seeds wherever possible, and toward locally controlled and adapted seed stocks. While acknowledging the right of farmers to transition to regenerative practices in a way that works for their individual farm operations, Textile Exchange believes that any project that chooses to allow continued use of pesticides or herbicides during the transition to regenerative practices should only do so in a transparent, place-based, time-limited approach that lays out a clear pathway to transitioning away from synthetic inputs and towards a more holistic regenerative approach.

Examples of desired outcomes for regenerative systems in cropping, grazing, and agroforestry include not only carbon sequestration but also positive outcomes related to biodiversity, soil health, water quality and availability, and other environmental impacts, alongside the equally important outcomes of animal welfare, social justice, Indigenous rights, gender equity, and farmer and community resilience. Over time, regenerative practices can increase productivity, naturally reduce the need for external inputs, and improve economic stability for producers.

In summary, Textile Exchange believes that all regenerative agriculture programs should include the following, in line with the consensus elements identified by recent research and grounded in a context-based respect for local knowledge:

- Minimize and ideally eliminate external inputs; maximize on-farm inputs
- Integrate livestock whenever possible given the cropping system
- Reduce tillage to preserve the life in the soil (by utilizing no-, minimal-, or conservation-tillage)
- Aim for and monitor a broad and holistic set of outcomes including soil health, biodiversity, animal welfare, social justice, and the economic well-being of farmers and communities.

Section II: Summary

- In interviews for this project, Indigenous people, people of color, and those who work with farmers rooted in Indigenous farming traditions strongly dispute the idea that regenerative agriculture is something new. Indigenous advocates call for an acknowledgement of the Indigenous roots of regenerative agriculture and of past and current racial injustice to be central to future work.
- Recentering the contributions and perspective of Indigenous communities and communities of color in regenerative agriculture is not only critical from a justice perspective—it is of greatest economic importance for companies that hope to weather current climate, Covid-related, and economic disruptions.
- Recently, academic researchers have also attempted to provide comprehensive treatment of the definition of regenerative agriculture. A 2020 review by Newton et al. identifies elements of a minimal consensus definition across the scientific literature and practitioner groups.
- Activists foresee pushback against companies who use the term regenerative agriculture without acknowledging the human element and social justice considerations.
- Textile Exchange's Regenerative Agriculture Statement outlines the organization's views and position.

Section III

The Science Behind Regenerative Agriculture and Soil Carbon "Sequestration"

Benefits of regenerative agriculture and building soil carbon

In the context of big-picture apparel industry targets and developments, regenerative agriculture holds immense promise for a range of co-benefits, including overall soil health, biodiversity, water availability and quality, and community resilience and livelihoods, as well as climate benefits.

The benefits of regenerative agriculture have been explored and documented in hundreds of journal articles and popular publications. Extensive field research shows that regenerative agriculture approaches can build soil carbon, which Paustian et al. explain as a combination of "increasing the amount of soil [carbon] added back into the soil and reducing the relative [carbon] loss rates via soil respiration and erosion."[21] As these researchers note, "the field experimental evidence that regenerative agricultural practices can significantly increase soil [carbon] stocks is unequivocal."[22] Bradford et al. provide a concise overview of the benefits of rebuilding soil carbon as an overall strategy for ecosystem health, noting that "the positive effect of soil carbon on erosion resistance, aeration, water availability, and nutrient provision of soils" mean that the "benefits of soil restoration can include improved fertility, reduced fertilizer and irrigation use, and greater resilience to stressors such as drought."[23] Giller et al. cover this issue from what they term "an agronomic perspective," outlining the ways that regenerative agriculture addresses biodiversity as well as soil health.[24] Supporting producers to build carbon in the soil through regenerative agriculture approaches can directly and indirectly support brands' climate goals within and outside of their supply chains, both by generating fewer emissions from their supply chain through reduced use of agricultural fossil fuel inputs and by preventing the release of carbon from the soil through tillage and other disturbance.

A 2021 report by Gilchrist, supported by the E2 program of Natural Resources Defense Council, sets out to "support regenerative agriculture not just as a solution heralded by environmentalists, but as one that would make good business sense even in the absence of environmental benefits."[25] The E2 Report provides a comprehensive and detailed literature review for a range of other benefits of regenerative agriculture, including crop yields, farm profitability, water infiltration and holding capacity, resilience to drought and extreme weather, disease resistance, and improved air and water quality.[26]

Soil scientist Rattan Lal of Ohio State University, perhaps the most widely cited pioneer in work on soil carbon, provides a detailed overview of the mechanisms and interlocking co-benefits of regenerative agriculture in a recent 2020 journal article. In addition to enumerating the ecosystem benefits noted above, Lal's analysis has a particular focus on the business case: "Sustainable productivity in a changing and uncertain climate is an important economic co-benefit because climate-resilient soil can stabilize productivity, reduce uncertainty, and produce an assured yield response even under extreme weather conditions."[27] In this regard, regenerative agriculture is vital for climate adaptation pathways to address warming that is already underway.

As Gilchrist notes, these ecological and economic benefits create a self-reinforcing "virtuous circle":

> "Overall, regenerative practices tend to cause a dual, interrelated shift in farm outcomes. As [regenerative agriculture] is practiced, soil biology is reinvigorated and becomes more capable of sustaining a healthy ecosystem. Soil health improves and crop production can increase. At the same time, as soil rebuilds, the need for chemical inputs such as fertilizers, herbicides, pesticides, fungicides, and nematicides is reduced or eliminated because their functions are sustained by soil biology. In this way, regeneratively managed farms and ranches can see an increase in income coupled with a decrease in input costs, thus improving the financial stability of the operation."[28]

Because of these multiple benefits and the documented ability to build soil carbon through regenerative agriculture, there has been a growing interest in financing mechanisms that issue verified credits for stored soil carbon—as a tool to generate income for producers to incentivize and support the adoption of regenerative practices and to help brands translate their remaining emissions after reduction efforts into offsets or other types of credits. These financing systems focus on regenerative agriculture's ability to build soil carbon and other ecosystem benefits as well as producing the main crop. In regenerative agriculture projects that are equitably designed in partnership with local communities, these credit-based mechanisms have the potential to allow farmers to access up-front financing and brands to access a credit mechanism that is directly tied to their supply sheds or to support regenerative agriculture more broadly.

The shifting soil science paradigm

The co-benefits described above are extensively documented and critically needed. They alone are ample reason for apparel industry companies to support growers in a transition to regenerative approaches.

Nevertheless, the current interest in regenerative agriculture has largely been driven by the potential for regenerative practices to "sequester" carbon in soils—a term that is broadly used to mean "removes CO_2 from the air and stores it somewhere it can't easily escape"[29]—and thus serve as an option for mitigating climate change. Stockmann et al. note more precisely that soil carbon sequestration "implies an increase in soil C for a defined period against a baseline condition where the increased C is sourced from atmospheric CO_2."[30] Here, it is important to note that a new wave of scientific findings about the interaction of soils, carbon, and microbial communities is emerging. Details of the old and new soil science models are provided in the box opposite.

Old and new models of soil carbon storage

Over the past 10 years, there has been a revolution in soil science's understanding of how soil carbon behaves in soils and the actual mechanism of "sequestering" carbon. As journalist Gabriel Popkin puts it, this shift is ". . . akin to what would happen if, in physics, relativity or quantum mechanics were overthrown. Except in this case, almost nobody has heard about it—including many who hope soils can rescue the climate." One soil scientist told Popkin: "There are a lot of people who are interested in sequestration who haven't caught up yet."[31]

The old paradigm proposed that as plant tissue decayed in the soil, the carbon from that tissue became locked into larger, long-chain "humic substances" that were chemically resistant to decomposition by the billions of microbes that are present in each teaspoon of soil. Carbon in the soil was thought to exist in distinct "pools," with the carbon that was supposedly locked in humic substances representing a long-term stable or "recalcitrant" pool of carbon.

However, with advances in soil imaging technology, this long-held theory has come up against an inconvenient fact. As Lehmann and Kleber state, "these 'humic substances' have not been observed by modern analytic techniques," including spectroscopic methods.[32]

Instead, soil scientists are now developing a new paradigm to explain what is actually being seen in the soil at a microscopic level. This new paradigm proposes that soil microbes can digest any size and type of soil organic carbon molecule—they just have to be able to get at it. In this view, protection of soil carbon occurs when these molecules adhere to soil minerals or soil aggregates—clumps of soil that physically, not chemically, shield soil carbon from digestion by microbes. This new model increases the focus on the critical role of soil microbes, aiming to predict carbon's behavior in soils by focusing on the "ability of decomposer organisms to access soil organic matter and on the protection of organic matter from decomposition provided by soil minerals."[33] [34]

At the same time, evidence from modern analytic techniques has led to a second major finding: the dominant component of longer-lasting soil organic carbon is dead microbial biomass, rather than decayed plant material. As Liang et al. note, "this evidence is shifting the research from focusing on 'humic' matter to the microbial contribution."[35]

These seemingly academic developments in fact reflect a fundamental change in the underlying assumptions, and thus the resulting mathematical approaches, used to develop current climate and soil modelling systems.

The shifting soil science paradigm

This new understanding **does not** undermine the importance of restoring soil carbon as a critical tool for building more resilient agricultural systems, and it **does not** detract from the critical need to implement holistic, transformational regenerative agriculture systems for the many co-benefits described above. Longstanding research still indicates that carbon can be stored in soils over long periods, and the co-benefits discussed above mean that regenerative agriculture is also vital to climate adaptation pathways needed to address the warming that is already underway.

As Lehmann et al. illustrate, this new paradigm continues to support many of the major practices usually lumped under the term "regenerative agriculture," but with a more nuanced understanding of how they are impacting the soil environment—one that must be tailored for specific geographic locations and soil types. In a 2020 journal article, they use the concept of "functional complexity," which integrates current knowledge about the way soil carbon interacts with soil microbes, soil minerals, soil water, and other variables.[36] See Figure 4 opposite.

If anything, the new soil science understanding makes a holistic approach, one that is informed by Indigenous and local knowledge, all the more important. As Lehmann et al. put it, this new paradigm suggests that:

> "Soil management should be based on constant care rather than one-time action to lock away carbon in soils."[37]

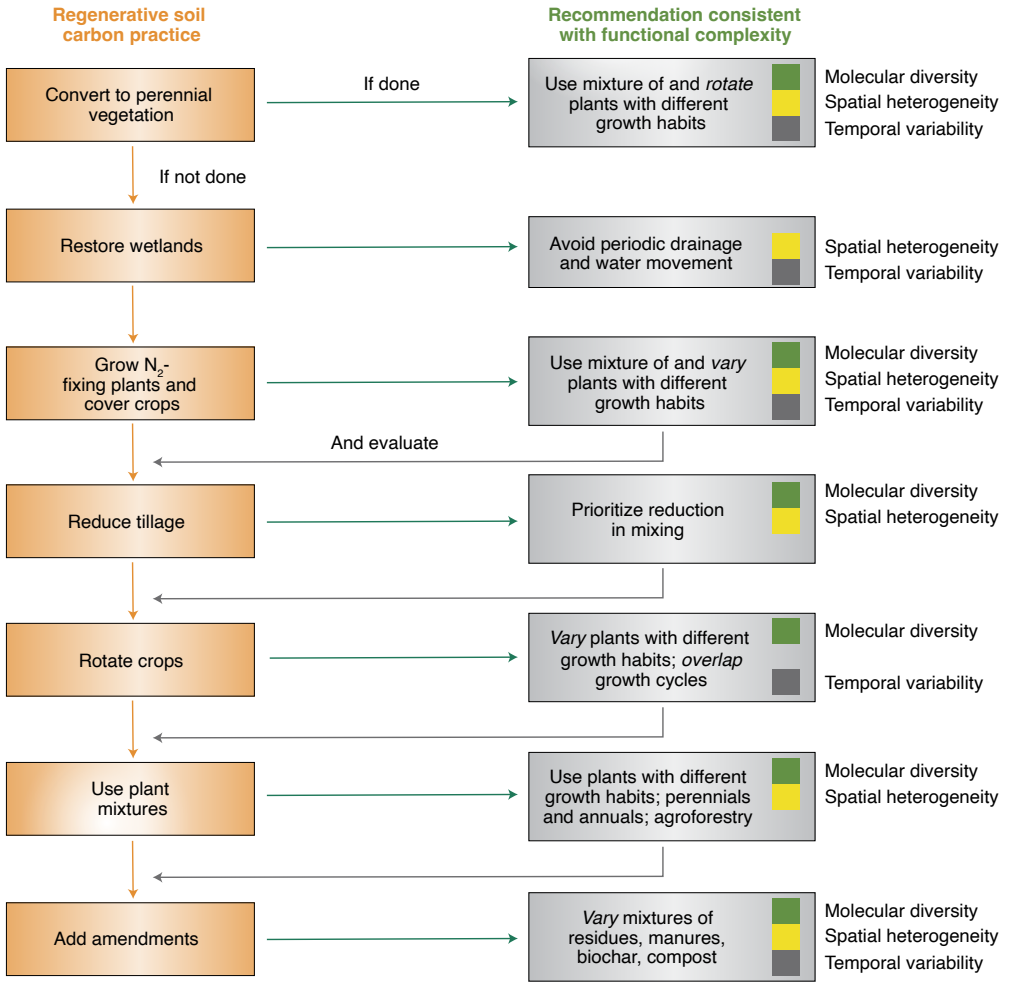

Figure 4: Regenerative soil carbon practice consistent with promotion of functional diversity to increase soil carbon persistence.[38] The figure shows that most commonly accepted regenerative agriculture practices still apply under the new soil science understanding, but with slightly different rationales and approaches. Lehmann, J. et al. "Persistence of Soil Organic Carbon Caused by Functional Complexity." Nature Geoscience 13: 1–6 (2020). https://doi.org/10.1038/s41561-020-0612-3

Considerations for carbon crediting protocols

However, the new soil science understanding **does** have potentially significant implications for current soil carbon computer models, on-farm carbon accounting models, and soil carbon crediting and offsetting schemes. Protecting and restoring soil carbon remains a critical goal, and regenerative agriculture is a proven pathway for brands to do this. What is in question is the mechanism of this carbon storage—and with that, the mathematical assumptions underpinning computer models that predict how much carbon could be stored and for how long based on different practices. These developments particularly impact the concept of "permanence" of soil carbon, since the new understanding of soil microbes' ability to digest carbon with slight ecosystem changes implies that soil carbon could be released under similarly slight management or climatic changes.

As Popkin puts it: "Major climate models such as those produced by the Intergovernmental Panel on Climate Change are based on this outdated understanding of soil. Several recent studies[39] indicate that those models are underestimating the total amount of carbon that will be released from soil in a warming climate. In addition, computer models that predict the greenhouse gas impacts of farming practices—predictions that are being used in carbon markets—are probably overly optimistic about soil's ability to trap and hold on to carbon."[40]

While these computer models continue to be updated and modified, even the recent generation of models still assume that soil carbon exists in long-term and short-term pools and still generally do not factor in the role of microbes. As Campbell and Paustian note in a 2015 review of nearly 100 named Soil Organic Matter (SOM) models, "Considering the potential economic and policy implications of these model applications (carbon credits, for example, or payments for changing land management practices), there is an immediate need to better connect advances in SOM understanding with SOM model development."

In addition, brands should keep in mind that, as one expert points out, the mathematical imperative of emissions cuts is a potential challenge in developing carbon credit systems: "If we want the general theory of Science Based Targets initiative to work—that companies need to work in their [own] value chain—it doesn't leave much room for credits to be sold off to other companies within working lands. So the math of selling credits just does not work. YOU need those reductions in your supply chain." Alternatively, or in parallel, brands can support a more general shift to regenerative agriculture beyond their supply chains and these financing mechanisms can unlock the support that global producers so urgently need to do so.

For Australian farmer and rancher Dianne Haggerty of Natural Intelligence Farming, carbon credit systems must be part of, not a replacement for, the deeper conversation about reforming financing systems. In her view, "The concept is fair, I can understand that. But it needs to be not on its own, it has to have to do with biodiversity as well. It [carbon] should not be singled out. The biggest problem I see is the way they are being managed—there are a lot of people trying to measure carbon with satellite imagery and rah rah rah. But is the money going to the right places again, is it really going to the ground?"

Finally, companies should be aware that Indigenous-led organizations have long critiqued the concepts of carbon credits and carbon markets.[41] While individual credit programs may provide financial benefits to local communities, provided that issues like direct representation of Indigenous communities and secure land tenure are addressed, a 2017 report by Indigenous Environmental Network and Climate Justice Alliance concludes with these organizations' view that in the big picture, "Carbon pricing, including carbon trading, carbon taxes, and carbon offsets, are false solutions to climate change that do not keep fossil fuels in the ground."[42] These organizations call out such approaches as problematic because they can perpetuate growth logic assumptions and can result in potential ongoing injustices to communities.

Overall, regenerative agriculture is viewed by companies as a key potential Scope 3 intervention, and regenerative agriculture is well suited to projects that reduce and/or remove emissions from within companies' own supply chains. This is notably different from the concept of offsets that can translate unavoidable remaining emissions in Scope 3 into reductions elsewhere, as these types of projects are designed to reduce GHG emissions within a company's own supply chain (for instance, by investing in farm-level projects that support raw material producers that will supply the brand).[43]

The area of Scope 3 emissions reductions, removals, and carbon credits from regenerative agriculture represents a developing opportunity for the apparel and textile industry. Nevertheless, given the recent findings in soil science and the concerns raised by Indigenous stakeholders mentioned above, brands should proceed with due diligence at this time around claims related to GHG impact reduction from soil carbon sequestration as well as around carbon credits

Considerations for carbon crediting protocols

and markets, choosing partners with rigorous third-party verifications.[44] Many organizations listed in this report's Matrix of Regenerative Programs are actively working to address these questions, including project developers and other organizations that are engaged in understanding the emerging science and developing robust, verified, and equitable programs to identify carbon credit opportunities. Two independent research institutes have recently developed detailed comparisons of over two dozen existing carbon credit protocols, as outlined in the Engagement Pathway in Section V.

Supporting regenerative agriculture on the ground will require many pathways to move away from extractive agricultural practices. The field of regenerative agriculture carbon credits is an evolving space that, like any new sector, will require further research and development as new models and methodologies are refined.

Given the short window for urgent climate action, however, interviews and research for project emphasized that brands also need to act now to invest in regenerative agriculture projects for their multiple co-benefits. These interlocking considerations lead to this report's top line conclusion:

> Regenerative agriculture is an opportunity for investment in a fundamentally different system that moves beyond the current extractive model.

See Recommendation 1.

Photo: Courtesy of Shaniko Wool Company

Impact beyond carbon: Other regenerative indicators

The extensively documented co-benefits of regenerative agriculture also call for a clearer and more holistic shared understanding of what it means to measure and model these benefits. A more granular examination of measurement and impact assessment approaches is also essential for understanding the crowded landscape of programs and tools and choosing the partners that will be best suited for a company's goals.

Detailed information on measurement approaches for soil carbon, soil health, biodiversity, water impacts, social justice, and animal welfare, and the ways these indicators are represented in the Matrix of Regenerative Programs, is provided in Appendix C.

These approaches also tie closely to the discussion of outcome-based and practice-based standards in Section V, Step 3.

Key considerations in measuring and modeling regenerative impacts

Farmers and their data

First, any discussion of impact measurements in regenerative agriculture must acknowledge that these measurement expectations currently fall primarily on farmers, are conducted on land that farmers steward, and generate data over which farmers should have rights and control. A 2019 Australian research paper titled "Farmers and their Data" found that "At the heart of the concerns is the lack of trust between the farmers as data contributors, and those third parties who collect, aggregate and share their data."[45]

The intersection of impact measurement and racial justice

This area of work must also be informed by the equity and racial justice considerations discussed above, particularly as they relate to the history of land theft and discriminatory financing faced by Indigenous and Black farmers, especially in the U.S. The U.S.-based Urban Indian Health Institute calls for progress towards "decolonizing data," meaning that "Indigenous communities determine the information they want to gather, think through why they are gathering it, and know who is interpreting the data and if the interpretation is being done in a way that serves the community."[46]

Baselines: A critical but often overlooked impact measurement step

For any type of impact measurement, the critical first step is the development of a detailed baseline that takes into account the specific characteristics of a farm's particular soil, climate, water, biodiversity, and social justice/livelihood characteristics. Baseline development requires assessing both the current state of the target area (the degree to which soils are already degraded, water quality, etc.) and the potential for health as it stands in that particular region. Without this baseline to start from, "impact" measurements will not be meaningful. Development of these baselines and evaluation criteria requires significant training, skill, and local knowledge.

Combining these indicators into a holistic approach

Combining all these indicators into one system—a system that both respects the current science behind regenerative agriculture's co-benefits and is accessible for farmers—is currently a major challenge for the field of regenerative agriculture as a whole.

As one industry expert sees it, measurement tools and verification practices for regenerative agriculture will be an ongoing challenge for the field, especially in light of two key barriers: First, "Regenerative practices are holistic. Very few certifications look at a system. They look at individual measurements . . . methodologies for holistic systems have not been developed well yet." In addition, "The substrate of soil is so complex that it is hard to have a common methodology that can be applied to a lot of circumstances."

Fred Briones of the Native American Fiber Program, trained as a chemist, calls for a transparent shared methodology as an element of advancing equity in the field of regenerative agriculture, as it would allow Native producers and advocates to compete on a level playing field: "It needs to be one methodology, so we can be on the same page. Because it is all policy driven now. . . there is a lot of opportunity now to sell tax credits, to sell offsets. So it needs to be very specific on that methodology [to ensure fairness]."

In the development of a regenerative agriculture program, brands themselves may not be the ones to engage with the specific measurement and impact assessment tools described in Appendix C and reflected in the Matrix. However, it is critical that companies understand the specific measurement and assessment components involved in the tool or tools used by their project developer or other supply chain partners. Otherwise, brands will be at high risk of making inaccurate claims about the actual meaning of results from these tools. Furthermore, companies must begin to align on measurement tools and verification practices, as a failure to do so will place unrealistic burdens on farmers to meet multiple sets of criteria.

This report's Matrix of Regenerative Programs provides a snapshot of the indicators covered in the many programs and tools included.

Recommendation 1:

Companies should approach regenerative agriculture as an investment in a fundamentally different system that has multiple co-benefits, not a variation on the current extractive model. Centuries of Indigenous knowledge and the weight of scientific evidence show that regenerative practices can make critical contributions to improving soil health, biodiversity, water availability and quality, and to a fundamentally different business approach that prioritizes community and ecosystem health. In contrast, soil science understanding of how carbon is stored in soil over the long term is in a state of flux. As the science continues to evolve, the industry should ***proceed with due diligence*** around claims related to GHG impact reduction from soil carbon sequestration as well as around carbon credits and markets.[47] Regenerative agriculture projects should be part of a comprehensive climate strategy that prioritizes GHG reductions and takes a holistic approach to climate resilience. Further guidance on this concept is discussed in *Appendix B* and available from the GHG Protocols and the Science Based Targets initiative.

Section III: Summary

- Regenerative agriculture's co-benefits for overall soil health, biodiversity, water availability and quality, and community resilience and livelihoods are documented in hundreds of peer-reviewed journal articles and popular publications.
- These interlocking benefits also support the business case for regenerative agriculture, helping to ensure sustainable production under uncertain conditions and making regenerative agriculture vital for climate adaptation pathways.
- Nevertheless, the current interest in regenerative agriculture has largely been driven by the potential for regenerative practices to "sequester" carbon in soils over the long term. Here, it is important to note that a new wave of scientific findings about the interaction of soils, carbon, and microbial communities is emerging that question the model of "humic substances" and focus on the primary role of soil microbes in soil carbon dynamics.
- This paradigm shift **does not** undermine the importance of soil carbon storage as a critical tool for building more resilient agricultural systems, and it **does not** detract from the critical need to implement holistic regenerative agriculture systems for their co-benefits, informed by Indigenous and local knowledge and based **on an approach of "constant care."**
- The new soil science understanding **does** have potentially significant implications for the mathematical assumptions underpinning computer models that predict how much carbon could be stored and for how long under different practices.
- Due to these considerations, the area of carbon credits from regenerative agriculture represents a developing opportunity for the apparel and textile industry. Brands should proceed with due diligence at this time around claims related to GHG impact reduction from soil carbon sequestration as well as around carbon credits and markets. While this is an evolving space, given the short window for urgent climate action brands also need to act now to invest in regenerative agriculture projects.
- The extensively documented co-benefits of regenerative agriculture also call for a clearer and more holistic shared understanding of what it means to measure and model these benefits.

Section IV

Regenerative Agriculture in the Supply Chain: Key Considerations and Best Practices

Partnerships and equity in the supply chain

Research and interviews for this report have made it clear that the implementation of regenerative agriculture does not stop at the farm gate—the values and concepts behind this approach must be carried through the supply system for textile and apparel goods. A few key considerations and best practices have emerged.

As these new regenerative supply networks are built, **brands must ensure that those who are the direct stewards of the land—including Indigenous people, communities of color, and farmers, as appropriate for the project context—have an active decision-making role in any regenerative agriculture project from the start.**

Asked how she would like to see brands approach a conversation with Native producers on a regenerative agriculture project, Kelsey Scott of Intertribal Agriculture Council and DX Beef replies, "Sitting down with them [the producer] and asking—what are your top five goals? The producer is helping the [corporate] entity get closer to its goals—it would be great to see that reciprocated to the producers."

In her own experience, she recounts, "We've had conversations with larger restaurants about sourcing DX beef. Only one has been inclined to say, 'What are DX Beef's goals?' And that is the only one I took call number two on. That right there should speak volumes. It should not be a part of their marketing ploy! It should be an intimate conversation."

On a broader level, from her perspective managing IAC's work with U.S. Native American producers, Scott observes:

> "One thing I still see with the Native American Agriculture Fund[48]—it's all these non-Indian organizations coming into the space. . . The elephant in that room is that not every entity has the wherewithal to navigate those conversations with [Native] producers. It will require investment into a technical service provider. The Intertribal Agricultural Council reaches 9,000 new American Indian farmers and ranchers each year. There are [Native-led] organizations out there that are scrambling to make their budget!"

Instead of funding new intermediaries that lack these authentic relationships with producers, Scott suggests, "Subcontracting work to bring these [Indigenous-led] nonprofits into the space probably accelerates the impact that the textile companies want to have."

In the view of Rebecca Burgess, founder of Fibershed, "My gold standard is relationships. My gold standard is that the brand knows the name of the farmer. It starts with lifting up those who have never steered too far from the land. [Apparel companies'] role in centering them in the conversation **is the work**."

See Recommendation 2.

Photo: Alice Aedy

Supply Shed approaches

For companies mapping out a pathway for regenerative agriculture initiatives, one common question is how to approach regenerative programs in situations where the company does not have full traceability to all its farm-level suppliers (known as "Tier 4" in the apparel industry). Workarounds for this issue are often known as data proxies or Supply Shed approaches, in lieu of site-specific impact assessment. As defined by Gold Standard, "A Supply Shed is a group of suppliers in a specifically defined geography and/or market (e.g., at a national or sub-national level) providing similar goods and services that can be demonstrated to be associated with the company's supply chain."[49]

Cost is a major driver for this approach, as the cost of site-specific impact assessment for carbon and other regenerative benefits, described in Appendix C, can quickly become prohibitive for companies. While many companies currently use standards and certifications to manage their chain of custody, this often means they do not have a direct relationship with their Tier 4 suppliers. This situation makes the effort to work with farmers to implement regenerative practices and assess outcomes all the more challenging.

Project developer Andrew Nobrega of Pur Projet agrees that tracing to an individual farmer through a company's supply chain should be "the goal of every company, and is industry-leading where found," but, he notes, "The reality is, very few companies can do that."

In his view, however, the next level is still a viable option that respects the reality of sourcing agricultural products, such as crop failures or weather impacts: "Is there a trader or cooperative sourcing from, say, 100 farms? That is still good information, and that lets supply chain dynamics be a bit flexible. You can make an investment there and value the whole investment there."

On balance, Supply Shed approaches appear to be an important short-term tool as companies work to launch regenerative agriculture pilot projects, with an understanding that the industry trajectory, and the goals of regenerative agriculture, are driving towards direct traceability. If companies choose to utilize Supply Shed approaches, first and foremost, these should be grounded in inclusive practices that do as much as possible to represent the perspectives and needs of the actual individual farmers involved.

The major guidance processes outlined in Appendix B are actively engaged with the Supply Shed question as they develop their updates.

Overall, Nobrega emphasizes:

> "You need to, if you're taking regenerative approaches, develop robust, long-term, sustainable relationships with the communities you're working in."

Pilots as best practice for building regenerative supply chains

Based on these industry considerations and on the current fluidity of soil carbon science and related sector guidance, interviewees and research for this project emphasized the critical role of pilot regenerative agriculture projects for shared learning and relationship-building among producers, researchers, and companies.

As the New Economics Foundation and Croatan Institute, research institutes that focus on the intersection of ecology and finance, put it in a recent report, "While the agroecological transition needs to be writ large across the landscape, much of the early impetus and further proof of concept is likely to come from smaller, starter farms, which provide crucial support, mentoring and a promising route for new entrants."[50] Pilot projects are also well-suited to developing the location- and context-specific knowledge that are an essential part of regenerative approaches.

Apparel brands are currently adopting this approach as an emerging best practice to speed implementation and shared learning.

At J.Crew/Madewell, SVP and Head of Sustainability Liz Hershfield says, "We wanted to spend this year testing and deliberately not put all our eggs in one basket." Of J.Crew/Madewell's pilot project in Texas with Brent Crossland of 5Loc Cotton, profiled in Case Study 1, Hershfield adds, "That's where we want to be—working with farmers and incentivizing them to make the transition." Gonzalo Pertile, J.Crew/Madewell's Director of Corporate Social Responsibility, adds that J.Crew/Madewell has chosen not to claim any carbon-related credits yet against any of their regenerative projects, instead viewing the pilots as an investment in learning and building new relationships.

Similarly, Kering and its partner Conservation International recently funded seven regenerative agriculture projects in key sourcing landscapes around the world, with a focus on leather, cotton, cashmere, and wool. The decision to fund these particular projects was based in part on the location of Kering's Supply Sheds, combined with consideration of geographic areas with the potential to bring about positive outcomes in biodiversity, livelihoods, soil health, and animal welfare. Kering and Conservation International are not only providing financial support to producers to facilitate the transition to regenerative agricultural practices on the ground, but also working with the producers to co-create a learning exchange and community of practice to share best practices.

Géraldine Vallejo, Sustainability Programme Director, Kering said: "Regenerative agriculture can provide multi-benefits for nature and communities, and it is direly needed to help reverse the trend of climate and biodiversity loss. At Kering, we are working with partners and farmers on the ground to scale projects through the Regenerative Fund for Nature in partnership with Conservation International. This is not the time to wait for others to take the lead – we must all invest in supporting regenerative practices as a matter of urgency."

As the brief examples above indicate, implementation of pilot projects must be closely tied with financial support through multiple channels: increased payments for regeneratively-produced products, long-term contract commitments, and an expanded variety of financing options that go beyond just payments for goods. These financial elements of supply chain best practices are discussed further in Section V (Step 5).

These supply chain best practices offer a pathway for companies to navigate the landscape of regenerative agriculture programs, outlined in the next section on Navigating the Landscape.

Recommendation 2:

To be fully "regenerative," projects must include a human element that prioritizes justice and equity and acknowledges the Indigenous roots of regenerative practices. Brands must ensure that those who are the direct stewards of the land—including Indigenous people, communities of color, and farmers, or their chosen representatives, as appropriate for the project context—have an active decision-making role in any regenerative agriculture project from the start. As Kelsey Scott of Intertribal Agriculture Council put it: "If the humans in the system are not getting healthier, we are not truly regenerative. And that is not just the producers, but the community also."

Recommendation 3:

Regenerative agriculture projects can help brands fundamentally rebuild sourcing models to align with an industry-wide push for direct connections and transparency down to the Tier 4 level. This approach requires a commitment to relationship-building, including working with growers, their direct representatives (such as co-ops), and project developers to develop new supply chains and acknowledge the timelines needed to integrate regenerative practices. This report's Engagement Pathway and Matrix of Regenerative Programs offer a way for companies to assess the landscape of potential partners and implement just and equitable pilot approaches across a range of crops and geographies.

Section V

Navigating the Landscape: Engagement Pathway and Matrix of Regenerative Programs

A pathway for brand engagement with regenerative agriculture

The holistic benefits of regenerative agriculture and the recent shifts in soil science understanding lead to our recommendation that companies engage with regenerative agriculture through a pathway that prioritizes investment in on-the-ground pilot projects that support the multiple co-benefits of truly regenerative systems.

How to use the interlocking Engagement Pathway, Matrix of Regenerative Programs, and Map:

- **The Engagement Pathway** is a tool that can be used by brands interested in engaging in regenerative agriculture projects. It reflects the scientific background, implications, and supply system best practices discussed in the sections above. It organizes the landscape of regenerative tools and programs into manageable chunks that companies can consider in turn. This reduces the number of potential partners that a company would need to consider at any step along the pathway. As can be seen, the pathway also places a strong emphasis on developing pilot regenerative agriculture projects with a focus on ecosystem co-benefits and with an up-front commitment to developing a financial model that shares the risk of the regenerative transition with growers.
- **The Matrix of Regenerative Programs** addresses this project's goals to place a robust sample of known regenerative agriculture programs against a **common framework**. Details on the Matrix of Regenerative Programs are provided on page 47.
- **The Map of Project Developers and Regenerative Agriculture Pilot Projects** below provides a snapshot of the geographic distribution of a sample of current Project Developers and known regenerative agriculture pilot projects.
- The color-coded boxes in the Engagement Pathway then correspond with the colored tabs in the Matrix of Regenerative Programs. The color key is also used throughout this section to highlight additional background for each stage of the Pathway.

Key Questions for companies to consider:

As companies embark on the process of partnership evaluation, some key questions should be considered:

1. Have we addressed all available options for emissions reductions before/in addition to work on regenerative agriculture?
2. How is the "regenerative" program acknowledging and centering Indigenous wisdom, social and racial justice, worker livelihoods, and local community respect and resilience?
3. What co-benefits will be realized from the practices implemented? How will these impacts be measured?
4. Does this program include the needed crop-specific and geographic competencies?
5. Does our company currently have the internal or contracted scientific and technical expertise needed to support this pilot?
6. How is risk (financial, climate, demand-related) shared in the project development? How are farmers paid (for up-front implementation costs and for taking on additional risk)? What is the business model, and where is the money going?
7. What is the long-term plan for sustaining this project and continuing to realize the co-benefits? Ensuring that regenerative practices are sustainably adopted in the long run will require creating an enabling environment through support services such as ongoing technical assistance, equipment and seed suppliers, and ongoing access to credit and financial support.

Engagement pathway

Step 1

A.) Brand goals/targets:
- Desired outcomes: soil health, biodiversity, water, social justice, other
- Targets: GHG Protocol, SBTs, SBTN, CBD, other

B.) Which Ag system?
- Cropping
- Grazing
- Agroforestry

C.) Which country/region?

Step 2

Identify possible project developers using Matrix and Map:
- Andean Pastoral Livelihood Initiative
- Arvind
- Conservation International
- Crossland Consulting / 5Loc Cotton
- Ecotton-Bergman/Rivera
- Fibershed
- Intertribal Agriculture Council
- Native, A Public Benefit Corporation
- New Zealand Merino (ZQ Merino / ZQRX)
- Other Half Processing (OHP)
- Pur Projet
- ReNature
- RESET Regenerative Cotton Program
- Savory (Land to Market)
- South Pole
- Terra Genesis International PBC
- WWF - Turkey

Step 3

Assess desired standards/certifications and other potential partners using Matrix:
- Audubon Conservation Ranching Program
- Climate Beneficial™ Verified Fibers (Fibershed)
- Generalized Regenerative Ag Sourcing Specification (GRASS) (OHP)
- Forest Stewardship Council - Ecosystem Services Proc.
- IntegraTrust iScore
- Land to Market (Savory)
- NATIVA™ Precious Fibers (Chargeurs Luxury Materials)
- Organic Certification (NOP, NPOP, EU)
- REEL Regenerative Code (CottonConnect)
- Rege[N]ation Certification (Intertribal Ag Council)
- regenagri (Control Union/transitioning to stakeholders)
- Regenerative Organic Certification™ (ROA)
- Responsible Animal Fiber Standards (Textile Exchange)
- Soil Carbon Initiative
- Wildlife Friendly Enterprise Network
- ZQ Merino / ZQRX Platform (New Zealand Merino)

Step 4

Understand which farm-level accounting tools will be used and the underlying methodology:
- COMET-Farm
- Cool Farm Tool (Cool Farm Alliance)
- CropIn / SmartFarm® Platform
- Delta Framework
- Ecosystem Services Market Consortium
- Fieldprint® Platform (Field to Market)
- Global Farm Metric from Sustainable Food Trust
- Indigo Ag
- L'Indice de Regeneration / Regeneration Index
- MySoilCapital Tool (Soil Capital)
- SMART-Farm Tool (Sustainable Food Systems/FiBL)

Understand the difference between direct soil sampling, remote sensing, and modeling and how they are combined in these tools.

Determine how soil health, biodiversity, water, and justice outcomes will be measured in your project.

Step 5

Develop a specific financial model to support the project:
- Within that model, how will farmers be paid and supported during the transition period?
- Use financing options / case studies as models.
- Recommendation: Brands should view these projects as an investment in building a new system that moves beyond the current extractive model.

If carbon credits are sought:
- Identify credible carbon credit protocol using recent reviews

Step 6

Identify credible carbon credit protocol:
- 14 Protocols Reviewed by Carbon Plan
- 12 Protocols Reviewed by EDF

See full list on page 68.

Matrix of regenerative programs

* Depends on project

✓ Denotes that the type of service is offered, indicator is covered by research, or indicator is assessed by practice-based standard

✓ Speficially denotes that the indicator is assessed by outcome-based standard

	Organization	Region	Ag System			Initiative Type/Functionality									Regenerative Agriculture Indicators Covered by Program													Other Roles						
			Cropping	Grazing	Agroforestry	Project Development	Outcome-based Standard	Practice-based Standard	2nd Party Verified	3rd Party Verified	Legislation-backed	Farm-level Accounting Tool	Soil Carbon Measuring Tool	Carbon Accounting	Carbon Credit Provider	GHG Emissions	Soil Carbon	Other Carbon Storage	Soil Health	Water Quality	Water Availability	Soil Biodiversity	Plant Biodiversity	Animal Biodiversity	Farmer Livelihood	Workers' Rights	Indigenous Leadership	Animal Welfare	Energy Use	Consultancy/For Profit	NGO/Educational	Scientific Research	Founder/Funder/Investor	Demonstration Project	Supply Chain Integration	Other
Step 2: Project Developers	Andean Pastoral Livelihood Initiative (CALOR)	PE	-	✓	-	✓	-	-	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	✓	-	✓	-	✓	-
	Arvind	IN	✓	-	-	✓	-	-	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	-	-	✓	-
	Conservation International	Americas, APAC, Africa	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	✓	✓	✓	-	✓	-
	Crossland Consulting / 5Loc Cotton	Global	✓	-	-	✓	-	-	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	-	-	✓	-
	Ecotton-Bergman/Rivera	PE	✓	-	-	✓	-	-	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	-	✓	✓	-
	Fibershed	US	✓	✓	-	✓	-	✓	-	-	-	✓	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	✓	-	-	-	✓	-
	Intertribal Agriculture Council	US	✓	✓	-	✓	-	✓	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	✓	-	-	-	-	-
	Native, A Public Benefit Corporation	Global	✓	✓	✓	✓	-	-	-	✓	-	-	-	✓	✓	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	-	-	✓	-
	New Zealand Merino	NZ, AU	-	✓	-	✓	✓	✓	-	✓	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	-	-	✓	-
	Other Half Processing (OHP)	US	-	✓	-	✓	✓	✓	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	-	-	✓	-
	Pur Projet	Global	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	-	-	✓	-
	ReNature	Global	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	✓	✓	✓	-
	RESET Regenerative Cotton Program (ECO Fashion Corp.)	IN	✓	-	-	✓	-	-	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	✓	-	-	✓	✓	-
	Savory (Land to Market)	Global	-	✓	-	✓	✓	-	✓	-	-	✓	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	✓	-	-	-	✓	-
	South Pole	Global	✓	-	✓	✓	-	-	-	✓	-	-	-	✓	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	✓	-	-	-
	Terra Genesis International PBC	Global	✓	-	✓	✓	-	-	-	-	-	-	-	✓	✓	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	-	-	-	-	✓	-
	WWF - Turkey	TR	✓	-	-	✓	-	-	-	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	✓	-	-	-	-	-
	Organization	**Region**	**Ag System**			**Initiative Type/Functionality**										**Regenerative Agriculture Indicators Covered by Program**														**Other Roles**						
Step 3: Standards & Certifications	Audubon Conservation Ranching Program	US	-	✓	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	-	-	✓	-	-	✓	-	-	-	-	-
	Climate Beneficial™ Verified Fibers (Fibershed)	US (CA & NY)	✓	✓	-	✓	-	✓	✓	-	-	✓	-	-	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	✓	-	-	-	✓	-
	Forest Stewardship Council - Ecosystem Services Procedure	Global	-	-	✓	-	✓	✓	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-	-	-
	Generalized Regenerative Agriculture Sourcing Specification (GRASS) (OHP)	US	-	✓	-	✓	✓	✓	-	-	-	-	-	-	-	-	✓	-	✓	-	-	✓	✓	-	✓	-	-	✓	-	✓	-	-	-	-	✓	-
	IntegraTrust iScore	SA	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	✓	✓	-	✓	-	-
	Land to Market (Savory)	Global	-	✓	-	-	✓	-	✓	-	-	✓	-	-	-	-	✓	-	✓	-	✓	✓	✓	✓	-	-	-	-	-	✓	✓	✓	✓	-	✓	-
	NATIVA™ Precious Fibers (Chargeurs Luxury Materials)	US, UY, AR, AU, NZ	-	✓	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓	-	✓	✓	-	✓	-	✓	-	✓	-	-	-	-	✓	-
	Organic Certification (NOP, NPOP, EU) *(see note)*	Global	✓	✓	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	-	✓	-	-	-	-	-
	REEL Regenerative Code (CottonConnect)	Global	✓	✓	✓	✓	-	✓	✓	✓	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	-	-	✓	✓	-
	Rege[N]ation Certification (Intertribal Agriculture Council)	US	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	-	-	-	-	-
	regenagri (Control Union / transitioning to stakeholders)	Global	✓	✓	✓	-	-	✓	-	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	✓	-	-	-	-	✓	-
	Regenerative Organic Certification™ (ROC) (Regenerative Organic Alliance)	Global	✓	✓	✓	-	-	✓	-	✓	✓	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	✓	-	-	-	✓	-
	Responsible Animal Fibers Standards (RWS, RMS, RAS) (Textile Exchange)	Global	-	✓	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓	-	✓	✓	✓	✓	-	✓	-	-	✓	-	-	-	✓	-
	Soil Carbon Initiative	US	✓	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-	-	-
	Wildlife Friendly Enterprise Network	Global	✓	✓	✓	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	-	-	✓	✓	-	-	-	-
	ZQ Merino (New Zealand Merino)	NZ, AU	-	✓	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	-	-	-	-	✓	-
	ZQRX Platform (New Zealand Merino)	NZ, AU	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	-	-	-	-	✓	-

Matrix of regenerative programs

* Depends on project

✓ Denotes that the type of service is offered, indicator is covered by research, or indicator is assessed by practice-based standard

✓ Speficially denotes that the indicator is assessed by outcome-based standard

	Organization	Region	Ag System			Initiative Type/Functionality										Regenerative Agriculture Indicators Covered by Program												Other Roles						
			Cropping	Grazing	Agroforestry	Project Development	Outcome-based Standard	Practice-based Standard	2nd Party Verified	3rd Party Verified	Legislation-backed	Farm-level Accounting Tool	Soil Carbon Measuring Tool	Carbon Accounting	Carbon Credit Provider	GHG Emissions	Soil Carbon	Other Carbon Storage	Soil Health	Water Quality	Water Availability	Soil Biodiversity	Plant Biodiversity	Animal Biodiversity	Farmer Livelihood	Workers' Rights	Indigenous Leadership	Animal Welfare	Energy Use	Consultancy/For Profit	NGO/Educational	Scientific Research	Founder/Funder/Investor	Demonstration Project	Supply Chain Integration	Other
Step 4: Farm-Level Accounting Tools	COMET-Farm	US	✓	✓	✓	-	-	-	-	-	-	✓	-	✓	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-
	Cool Farm Tool (Cool Farm Alliance)	Global	✓	✓	-	-	-	-	-	-	-	✓	-	✓	-	✓	✓	✓	-	-	✓	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-
	CropIn / SmartFarm® Platform	Global	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-
	Delta Framework	Global	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	-	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	✓
	Ecosystem Services Market Consortium	US (Pilot)	✓	✓	-	-	✓	-	-	✓	-	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	-	✓	✓	-	-	-	-	✓	✓	-	-	-	-
	Fieldprint® Platform / Continuous Improvement Accelerator (Field to Market)	US	✓	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	✓	-	✓	✓	-	-	✓	✓	-	-	-	-	✓	-	✓	-	-	-	-	-
	Global Farm Metric (Sustainable Food Trust)	GB (Pilot)	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	-	-	-	-	✓
	Indigo Ag	US (28 States)	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
	L'Indice de Régénération / Regeneration Index	FR, BE	✓	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	✓	✓	✓	-	-	-	-	-	-	✓	-	-	✓	-	-
	MySoilCapital Tool (Soil Capital)	GB, FR, BE	✓	-	-	-	-	-	-	-	-	✓	-	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-
	SMART-Farm Tool (Sustainable Food Systems/FiBL)	Europe	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-	-	-	-	-
	Organization	**Region**	**Ag System**			**Initiative Type/Functionality**										**Regenerative Agriculture Indicators Covered by Program**													**Other Roles**						
Soil Tools	Cloud Agronomics	Global	✓	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-
	DeepC System (Soil Health Institute)	US	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
	Organization	**Region**	**Ag System**			**Initiative Type/Functionality**										**Regenerative Agriculture Indicators Covered by Program**													**Other Roles**						
Other Potential Partners	4 per 1000	Global	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	-	✓	✓	-	-	-	-
	Cal Ag Soutions	US (CA)	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-
	Croatan Institute	US, Europe	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-	-	✓	✓	✓	✓	-	✓	-	-	✓	✓	-	✓	-	-	-
	Forum for the Future	Global	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	✓	-	-
	Grounded	Africa	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	✓	✓	✓	✓	-	✓	✓	-	-	-	-	✓	-
	Kiss the Ground	US (CA & MN)	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-	-	-
	Native American Fiber Program	US	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	-	-	✓	-	-
	Natural Intelligence Farming	AU (West)	✓	✓	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	-	-	-	✓	-	-
	Neutral and Regenerative Livestock	BR (Southeast)	-	✓	✓	-	-	✓	-	-	-	-	-	-	-	✓	✓	-	✓	-	✓	-	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-
	Organic Cotton Accelerator	Global	✓	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	✓	-	-
	Regeneration International	Global	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-
	Soils, Food, and Healthy Communities	MW	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	-
	Sustainable Harvest International	BZ, HN, PA	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	-	-	-	-	-
	Organization	**Region**	**Ag System**			**Initiative Type/Functionality**										**Regenerative Agriculture Indicators Covered by Program**													**Other Roles**						
Research Institutes	Global Soil Laboratory Network (GLOSOLAN) (Global Soil Partnership, FAO)	Global	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-
	Research Institute of Organic Agriculture (FiBL)	Europe	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	-	-	-	✓	-	-	-	-
	Rodale Institute	US (CA, GA, IA, PA)	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓	-	-	-	-
	Soil Foodweb Institute	Global	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	✓	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-
	Soil Health Institute	North America	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	✓	✓	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	-

Matrix of regenerative programs: Connected tools and partnerships

	Organization	Region	Connections with other Tools/Programs in Matrix & Pathway	Apparel Brands working with Program/Tool
Step 2: Project Developers	Andean Pastoral Livelihood Initiative (CALOR)	PE	Utilizes Soil Foodweb tools	-
	Conservation International	Americas, APAC, Africa	-	Kering - Partner on Regenerative Fund for Nature
	Crossland Consulting / 5Loc Cotton	Global	-	J.Crew/Madewell
	Ecotton-Bergman/Rivera	PE	USDA Organic, GOTS, and Regenerative Organic Certification	-
	Fibershed	US	Partners with Carbon Cycle Institue to develop Carbon Farm Plans	Coyuchi, Mara Hoffman, The North Face, Outerknown, Italia A Collection
	Native, A Public Benefit Corporation	Global	Gold Standard, Climate Action Reserve	Allbirds, Eileen Fisher, Everlane, Reformation, Parade, Gucci, Kering, J.Crew/ Madewell, Designtex
	New Zealand Merino (ZQ Merino / ZQRX)	NZ, AU	ZQ Merino / ZQRX Platform	Smartwool, Icebreaker, Allbirds, many others
	Other Half Processing (OHP)	US	Developing Generalized Regenerative Agriculture Sourcing Specification (GRASS)	Timberland, The North Face, Range Revolution, Medike Landes
	Pur Projet	Global	-	Burberry - Pilot project with wool growers in Australia
	RESET Regenerative Cotton Program (ECO Fashion Corp.)	IN	-	ECO Fashion Corp / MetaWear
	Savory (Land to Market)	Global	Ecological Outcome Verification (EOV)	Timberland, EILEEN FISHER, Kering, other
	South Pole	Global	Science-Based Targets, Verified Carbon Standard, Gold Standard	-
	Terra Genesis International	Global	Regen Network / REGEN Currency	Vans, The North Face, Timberland
	WWF - Turkey	TR	-	Organic Basics

	Organization	Region	Connections with other Tools/Programs in Matrix & Pathway	Apparel Brands working with Program/Tool
Step 3: Standards & Certifications	Climate Beneficial™ Verified Fibers (Fibershed)	US (CA & NY)	-	Coyuchi, Mara Hoffman, The North Face, Outerknown, Italia A Collection
	Forest Stewardship Council - Ecosystem Services Procedure	Global	FSC Certification	-
	Generalized Regenerative Agriculture Sourcing Specification (GRASS) (OHP)	US	Being developed by Other Half Processing, Timberland, and Pure Strategies; ISEAL guidance	Timberland
	IntegraTrust iScore	SA	Restore Africa Fund - financing vehicle	-
	Land to Market (Savory)	Global	Ecological Outcome Verification developed with Ovis 21, Michigan State University, The Nature Conservancy, other global research institutions.	Timberland, EILEEN FISHER, Kering, other
	Organic Certification (NOP, NPOP, EU)	Global	-	Many - See Textile Exchange Organic Content Standard listings
	regenagri (Control Union / transitioning to stakeholders)	Global	Integration with Cool Farm Tool	Candiani, Arvind, others: see https://regenagri.org/certified-companies/
	Regenerative Organic Certification™ (ROC) (Regenerative Organic Alliance)	Global	Organic Certification Required; Equivalencies with many other certifications	Patagonia, Timberland
	Wildlife Friendly Enterprise Network	Global	-	MAYDI, Cubreme, The Fashion Pact, others
	ZQ Merino / ZQRX Platform (New Zealand Merino)	NZ, AU	ZQ has combined audit with Responsible Wool Standard (RWS)	Working with 100+ brands globally
	ZQRX Platform (New Zealand Merino)	NZ, AU	ZQRX Platform builds off ZQ Merino with Regenerative Index (RX)	Working with 23 brands globally

Matrix of regenerative programs: Connected tools and partnerships

	Organization	Region	Connections with other Tools/Programs in Matrix & Pathway	Apparel Brands working with Program/Tool
Step 4: Farm-Level Accounting Tools	COMET-Farm	US	-	Shaniko Wool
	Cool Farm Tool (Cool Farm Alliance)	Global	Partnership with RegenAgri	-
	CropIn / SmartFarm® Platform	Global	Partnership with Organic Cotton Accelerator	-
	Delta Framework	Global	Joint effort of Better Cotton Initiative, Global Coffee Platform, Int'l Cotton Advisory Committee, & Int'l Coffee Association; supported by ISEAL	-
	Fieldprint® Platform / Continuous Improvement Accelerator (Field to Market)	US	Integration with COMET-Planner; new partnership with Ecosystem Services Market Consortium	-
	Indigo Ag	US (28 States)	Protocols approved by Climate Action Reserve and Verra/VCS	The North Face
	SMART-Farm Tool (Sustainable Food Systems/FiBL)	Europe	Spin-off company of research institute FiBL	-

	Organization	Region	Connections with other Tools/Programs in Matrix & Pathway	Apparel Brands working with Program/Tool
Soil	DeepC System (Soil Health Institute)	US	Developed by Soil Health Institute	-

	Organization	Region	Connections with other Tools/Programs in Matrix & Pathway	Apparel Brands working with Program/Tool
Other Partners	4 per 1000	Global	Multiple organizations in Matrix are partners/members of 4p1000	-
	Croatan Institute	US, Europe	Specific work on financing for regenerative agriculture	Solid State/TS Designs
	Forum for the Future	Global	Supporting Delta Framework through Cotton 2040; using Ecosystem Services Market Consortium for pilot	-
	Natural Intelligence Farming	AU (West)		
	Organic Cotton Accelerator	Global	Partnership with CropIn SmartFarm®	Recipient of Regenerative Fund for Nature (Kering/CI) grant

	Organization	Region	Connections with other Tools/Programs in Matrix & Pathway	Apparel Brands working with Program/Tool
Research	Research Institute of Organic Agriculture (FiBL)	Europe	Created SMART tool and founded Sustainable Food Systems to manage tool	-
	Rodale Institute	US (CA, GA, IA, PA)	Partner in Regenerative Organic Alliance / Regenerative Organic Certified	Everlane, Taylor Stitch, TerraThread, Yes And
	Soil Health Institute	North America	Administrative leadership for Ecosystem Services Market Consortium	Patagonia, Ralph Lauren, VF, Wrangler

Matrix of regenerative programs: Additional notes

Considerations for reviewing the Matrix of Regenerative Programs:

- A specific goal of this project was to place a robust sample of known regenerative agriculture programs against a common framework, which was developed for this report's Matrix. With so many different tools and programs, this necessarily required columns in the matrix to apply to a number of different types of programs
- Program selection for the Matrix was focused on programs and tools that are potential partners for interested apparel brands, including programs that were proactively brought to the report team's attention by Textile Exchange staff and members. A Call for Input was circulated in Textile Exchange's newsletter in Summer 2021, and special attention was given to ensuring geographic representation of programs. This report's Matrix of Regenerative Programs does not aim to be an exhaustive mapping of every current regenerative agriculture-related program
- Matrix listings were developed using only publicly available, documented information developed by the organization in question, such as websites, published protocols and standards, and guidance documents
- All organizations listed in the matrix were given an opportunity for an accuracy review of their listing. Organizations were asked to provide publicly available documentation to support any requests for changes, and these sources were taken into consideration and applied as consistently as possible under the framework above
- A light green check broadly means than a function or an indicator is "covered" by a given program. This could mean that an organization carries out a given function, that a standard or certification specifically examines and documents an indicator, or that organization conducts detailed research on that specific indicator
- A specific dark-green check is used to denote indicators that are assessed by outcome-based standards
- While a number of farm-level accounting and measurement tools could be considered to measure "outcomes," such as soil carbon, the dark green check was applied only to the standards and certifications section
- The 3rd party verification column takes a broad definition of 3rd party verification. It includes standards ranging from those owned by companies in the supply chain that are audited by a certification body that is contracted by the standard owner, to independent standards developed through multi-stakeholder processes by NGOs that are audited by third party certification bodies with accreditation body oversight
- The "Indigenous Leadership" column has been defined to mean that a certification includes a specific criterion for ownership/stewardship by Indigenous or Native people or people of color, or that a program is fully led by such individuals

Step 2: Project Developers

Andean Pastoral Livelihood Initiative (CALOR)

- Initiative of CALOR (Colectivos de Acción Local para la Regeneración)

Conservation International

- *Foundation / Funder / Investor:* Partner with Kering on Regenerative Fund for Nature

Fibershed

- *Practice-Based Standard:* See Climate Beneficial™ Verified Fibers

Intertribal Agriculture Council

- *Practice-Based Standard:* See Rege[N]ation Certification

Native, A Public Benefit Corporation

- *Carbon Accounting Methodology:* Native's Help Build approach conservatively estimates carbon credits that will be generated; companies can purchase these credits upfront to provide transition support to producers

New Zealand Merino

- *Outcome-Based Standard:* Working towards with ZQRX - 15 KPIs

Other Half Processing (OHP)

- *Outcome-Based Standard:* See GRASS unified certification system
- *Practice-Based Standard:* See GRASS unified certification system

ReNature

- *Foundation / Funder / Investor:* Has funding arms: ReNature Investments BV and ReNature Foundation

Savory (Land to Market)

- *Outcome-Based Standard:* Savory hubs complete training in Ecological Outcome Verification (EOV)
- *2nd Party Verified:* Savory hubs complete training in Ecological Outcome Verification (EOV)
- *Supply Chain Integration:* Will vary depending on hub
- *Connected Tools & Partnerships:* Other brand partners include New Balance, Ugg/Deckers, Reformation, J.Crew/Madewell, Burberry, Tapestry, HD Wool, Range Revolution, Lagom Leather, Erem, Kamen Road, Fairleather

South Pole

- *Foundation / Funder / Investor:* Strong emphasis on climate finance and carbon finance

Terra Genesis International PBC

- *Carbon Accounting Methodology:* Through affiliated Regen Network
- *Carbon Credit Provider / Exchange System:* Through affiliated Regen Network

Generalized Regenerative Agriculture Sourcing Specification (GRASS) (OHP)

- *Outcome-Based Standard:* GRASS utilizes and leverages both outcome-based and practice-based standards
- *Practice-Based Standard:* GRASS utilizes and leverages both outcome-based and practice-based standards

Step 3: Standards & Certifications

Forest Stewardship Council - Ecosystem Services Procedure

- *Practice-Based Standard:* Other FSC standards apart from the Ecosystem Services Procedure are practice-based

Land to Market (Savory)

- *Connected Tools & Partnerships:* Other brand partners include New Balance, Ugg/Deckers, Reformation, J.Crew/Madewell, Burberry, Tapestry, HD Wool, Range Revolution, Lagom Leather, Erem, Kamen Road, Fairleather

Organic Certification (NOP, NPOP, EU)

- Private Organic Standard Setting Organizations, such as Soil Association, Naturland, BioSuisse, EcoCert, KRAV, and others, may include additional requirements for indicators such as climate, biodiversity, animal welfare, fair trade practices and/or offer additional services such as consultancy, supply chain integration, demonstration projects, etc. The Global Organic Textile Standard

Matrix of regenerative programs: Additional notes

(GOTS) includes additional social and environmental requirements at textile processing stages

regenagri (Control Union / transitioning to stakeholders)

- *Farm-Level Accounting Tool:* Via integration with Cool Farm Tool
- *Carbon Accounting Methodology:* Via integration with Cool Farm Tool
- *Carbon Credit Provider / Exchange System:* Members of regenagri can have their carbon emissions data verified to confirm the amount of carbon reduced and or sequestered. The verification is done under ISO 14064/5 accreditation allowing members to generate carbon credits, which provides them with an additional income stream. https://regenagri.org/why-regenagri/
- *GHG Emissions - including Field Emissions:* Via integration with Cool Farm Tool

Regenerative Organic Certification™ (ROC) (Regenerative Organic Alliance)

- *Backed by Legislation:* Organic Certification Component only - Animal Welfare and Social Fairness components not backed by legislation

Soil Carbon Initiative

- *Outcome-Based Standard:* Includes both outcomes-based and practice-based elements
- *Practice-Based Standard:* Includes both outcomes-based and practice-based elements
- *3rd Party Verified:* Also includes self-reported track option

ZQRX Platform (New Zealand Merino)

Outcome-Based Standard: Working towards with ZQRX - 15 KPIs

Step 4: Farm-Level Accounting Tools

COMET-Farm

- *Carbon Accounting Methodology:* Implements USDA's Quantification Methodologies as described in the document titled Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory

Delta Framework

- *Farm-Level Accounting Tool:* Harmonized indicator framework

Ecosystem Services Market Consortium

- *Outcome-Based Standard:* Ecosystem service credits will be based on modeled outcomes of management pratices
- *Carbon Credit Provider / Exchange System:* Fully launching market program in 2022 with credits that capture increases in soil organic carbon, reductions in greenhouse gases, reductions in soil and nutrient losses that impact water quality (including nitrogen, phosphorus, and sediment), improved water conservation, and biodiversity (biodiversity in research phase)

Global Farm Metric (Sustainable Food Trust)

- *Farm-Level Accounting Tool:* Harmonized indicator framework; farm self-assessment tool
- *Other:* Harmonized indicator framework; farm self-assessment tool

MySoilCapital Tool (Soil Capital)

- *Carbon Credit Provider / Exchange System:* Issues Carbon certificates, not Carbon credits

Step 4 subcategory: Soil Carbon Measurement Tools

Cloud Agronomics

- *Soil Carbon Measurement Tool:* Uses remote sensing data to measure soil carbon over large areas

DeepC System (Soil Health Institute)

- *Soil Carbon Measurement Tool:* System will include in-field measurement tools, spatial sampling algorithm, and machine learning that leverages national soil spectroscopy libraries

Other Potential Partners

4 per 1000

- *Connected Tools and Brand Partnerships:* See: https://www.4p1000.org/sites/default/files/francais/original_partenaires_membres.pdf

Cal Ag Soutions

- *Project Developer/Supply Chain Partner:* Technical Service Provider for growers seeking to implement regenerative practices

Croatan Institute

- *Foundation / Funder / Investor:* Coordinates with many investor networks

Forum for the Future

- *Demonstration Project:* Regenerative cotton pilot through the Growing Our Future iniitiative

Natural Intelligence Farming

- *3rd Party Verified:* RWS certified

Soils, Food, and Healthy Communities

- *Scientific research Institute or Network:* Farmer-led research initiative

Research Institutes and Labs

Rodale Institute

- *Practice-Based Standard:* Partner in Regenerative Organic Alliance / Regenerative Organic Certified

Soil Health Institute

- *Soil Health - General:* Developing a widely-applicable soil health evaluation program by assessing 31 soil health measurements at 124 long-term agricultural research sites across the U.S., Canada, and Mexico

Step 1: Identify brand goals/targets

To determine their best pathway for regenerative projects, brands can begin by identifying the raw materials or products in their supply chain that hold the greatest promise for conversion to regenerative practices. This may be determined by the volume of use, the emergence of promising partnerships, supply chain disruptions that call for new approaches, or other factors.

Concurrently, brands should examine their sustainability targets in the context of global industry guidance frameworks. A major driver of brands' interest in regenerative agriculture has been the hope that regenerative agriculture can help meet existing targets under the climate-focused Science-Based Targets, which are underpinned by the Greenhouse Gas Protocol. Both the Greenhouse Gas Protocol and the Science-Based Targets initiative are currently engaged in developing additional specific guidance that is relevant to regenerative agriculture, while the SBTi has also just released Net Zero standards that indicate strictly limited use of "removals" to meet company targets. Meanwhile, the Convention on Biological Diversity has released a new framework with multiple targets that align with regenerative agriculture, while the Science-Based Targets for Nature guidance is due to be released in 2022.

Appendix B summarizes the major existing and developing sector guidance on carbon and greenhouse gas accounting and reporting, as well as emerging guidance focused on broader targets for reducing impacts on natural systems.

At the time of writing, this guidance is undergoing rapid evolution. Nearly all the major guidance programs have updated elements that have been or will be released between July 2021 and the end of 2022.

While this rapidly evolving guidance introduces uncertainties for companies considering regenerative agriculture as part of their climate strategy, the overall push for a holistic view of regenerative agriculture that emphasizes co-benefits seems clear, particularly as the specifics around accounting for "removals" are still under development.

Despite these limitations, regenerative agriculture remains a key pathway for companies' sustainability goals given its documented co-benefits, and it can still support companies' GHG reduction goals through the minimization of synthetic inputs and of field-level emissions from excessive tillage and soil disturbance.

In particular, the emerging guidance within Science-Based Targets for Nature (SBTN) appears to be very well aligned with the holistic approach to regenerative agriculture discussed here. SBTN is currently engaged in a process to develop "integrated SBTs for all aspects of nature: biodiversity, climate, freshwater, land, and ocean."[51] SBTN will fill a key gap of developing targets for the other connected areas of natural systems beyond GHG emissions—which coincides with the impact areas for holistic regenerative agriculture systems. Critically, SBTN will include in its framework targets that are designed to "Transform" current business activities. As SBTN explains this approach, "Transform" actions tackle "the dominant belief and value systems of individuals and organizations, which influence everyday and long-term decision-making (e.g., in the processes of cost-benefit analysis), investment and business models, economic partnerships, and approaches to societal and environmental responsibility."[52]

Helen Crowley puts it more simply: "None of this will matter if we don't take a systems-level approach to 'Transform.'"

In summary, industry guidance on best practices for tracking impacts is rapidly evolving, requiring companies to closely monitor the emerging guidance in the coming months. Regardless of the specific guidance developments, **brands have a critical opportunity to get ahead of this emerging guidance by starting now to implement regenerative agriculture projects that generate multiple ecosystem co-benefits—maximizing time for learning and adaptation in the eight short years remaining before 2030.** Textile Exchange will continue to provide guidance and resources in this area via its Round Tables and other information channels.

Step 2: Identify project developer using Matrix and Map

Key role of Project Developers

The perspectives and voices we heard throughout this research process highlighted the role of on-the-ground project developers in scaling meaningful regenerative agriculture approaches. This category of partners emerged as a key group on the landscape of regenerative agriculture over the course of this project, and they are potential partners in the second step in the Engagement Pathway.

In the context of this report, project developer is defined to mean any organization or company that could work with an apparel brand to establish a new regenerative agriculture farming project on the ground or establish a partnership with an existing regenerative agriculture project, and then work with the growers and the brand to integrate the agricultural products (cotton, wool, alpaca, leather, etc.) into the brand's supply chain. A few project developers also offer/certify carbon credits, although most do not.

The project developer role includes a key element of data collection and management to ensure that valid and verifiable claims are made across the project. As Luke Smith of Terra Genesis put it, "Our clients are increasingly calling for ability to substantiate the claims they are making about ag systems and supply systems in a quantitative way."

Andrew Nobrega of project developer Pur Projet describes their role as having a "bespoke" quality that always includes "an element of consulting," since their experience gives them "a unique perspective on what can stall or accelerate" with a regenerative agriculture project in any given region. Brent Crossland of 5Loc Cotton characterizes his role similarly in a recent published interview: "There are companies that do pieces and parts, but there never was an entity, a group or person that tried to go in, from field to fabric, and manage every piece of it and be a consultant for it . . . It has to be done. Times are changing. The era of transparency and traceability especially, it is going to get there—it has to get there."[53]

Because each crop, geography, and supply chain will require a customized approach, all project developers are listed in the Matrix of Regenerative Programs with the note that specific regenerative indicators measured would depend on the project (as opposed to the standards and certification section).

The Map and key on the following pages show a sample of known current regenerative pilots and the brand/project developer partnerships involved.

Map: Sample of project developers and regenerative agriculture pilot projects

Project developer headquarters

Known regenerative agriculture fiber and materials pilots

Regenerative Fund for Nature projects (Kering/Conservation International)

Sample of project developers and regenerative agriculture pilot projects

1 **Headquarters:** Shaniko Wool Company *(U.S.)*

2 **Pilot:** Shaniko Wool Company (Network of ranches in Western U.S.) *(Wool)*

3 **Headquarters:** Fibershed *(U.S.)*

4 **Pilot:** Fibershed / Climate Beneficial Wool Pool *(Wool)*

5 **Headquarters:** Crossland Consulting / 5 Loc Cotton *(U.S.)*

6 **Pilot:** Crossland Consulting / J.Crew/Madewell *(Cotton)*

7 **Pilot:** Native / Northern Great Plains Regenerative Grazing Project (Wool)

8 **Headquarters:** Intertribal Agriculture Council *(U.S.)*

9 **Headquarters:** Savory (Land to Market) *(U.S.)*

10 **Pilot:** Other Half Processing/Timberland - U.S. Midwest *(Leather)*

11 **Headquarters:** Other Half Processing (OHP) *(U.S.)*

12 **Headquarters:** Ecotton-Bergman Rivera *(Peru)*

13 **Headquarters:** Andean Pastoral Livelihoods Initiative *(Peru)*

14 **Regenerative Fund for Nature (Kering/CI):** Solidaridad *(Leather)*

15 **Regenerative Fund for Nature (Kering/CI):** Wildlife Conservation Society / Wildlife-Friendly Enterprise Network *(Wool / Mohair)*

16 **Headquarters:** Native, a Public Benefit Corporation *(U.S.)*

17 **Headquarters:** Terra Genesis International *(U.S.)*

18 **Headquarters:** Conservation International (CI) *(U.S.)*

19 **Headquarters:** CottonConnect *(U.K.)*

20 **Headquarters:** Pur Projet *(France)*

21 **Headquarters:** South Pole *(Switzerland)*

22 **Regenerative Fund for Nature (Kering/CI):** Epiterre *(Wool & Leather)*

23 **Regenerative Fund for Nature (Kering/CI):** Fundación Global Nature *(Leather)*

24 **Regenerative Fund for Nature (Kering/CI):** Conservation South Africa *(Wool)*

25 **Headquarters:** WWF *(Turkey)*

26 **Pilot:** WWF Turkey / Organic Basics *(Cotton)*

27 **Pilot:** Patagonia - Regenerative Organic Certification Pilot *(Cotton)*

28 **Regenerative Fund for Nature (Kering/CI):** Organic Cotton Accelerator *(Cotton)*

29 **Pilot:** RESET Regenerative Cotton Program (ECO Fashion Corp.) *(Cotton)*

30 **Pilot:** Oshadi *(Cotton)*

31 **Regenerative Fund for Nature (Kering/CI):** Good Growth *(Cashmere)*

32 **Pilot:** Terra Genesis / VF Corporation *(Rubber)*

33 **Pilot:** Pur Projet / Burberry *(Wool)*

34 **Headquarters:** New Zealand Merino (ZQ / ZQRX) *(New Zealand)*

35 **Pilot:** ZQRX Merino / Smartwool, Icebreaker, Allbirds *(Wool)*

List as of January 2022

Step 2: Identify project developer using Matrix and Map

Related Critical Role: Technical Service Provider

A related critical role mentioned by several interviewees is the job of "Technical Service Provider" (TSP). Such organizations focus on providing direct, geographically specific agricultural technical assistance to growers who are implementing regenerative systems. Interviewees offered a range of examples of TSPs from the non-profit, for-profit, and government sectors, with a special emphasis on the role of Indigenous and Native-led TSPs.

In addition to the detailed agronomic support they provide, Kelsey Scott of Intertribal Agriculture Council also pointed to the important role of TSPs in building the peer-to-peer education that is critical for convincing farmers to shift practices, especially among communities that have experienced a lack of trusting relationships with brands in the past. As she put it, "It's the neighbor-to-neighbor outreach that is most effective. So, the quicker you can get into creating that conversation, the faster it will grow and the quicker the program will be successful." Locally based TSPs and farm service providers who work with multiple growers in one region can be a key pathway for supporting this farmer-to-farmer knowledge transfer.

In a U.S. context, Rebecca Burgess also highlights the key role of government agency TSPs, such as Natural Resources Conservation Service (NRCS) agents, in collecting the kinds of on-farm direct measurement data needed to document regenerative impact: "Ultimately, it is so great when a farmer knows that that a NRCS agent is with them all the time. The benefit is that if a grower does not get to sell to a brand for more than five years . . . the NRCS agent is baked in, and they are your friend for 40 years. So, brands could help inspire more of those public service agents, and the data would go to the grower, and the grower could share it with the brand."

Because TSPs can come from the private sector, NGO sector, or local, state, or federal-level governments, and because of the large number of these organizations operating in every geography, this report's Matrix of Regenerative Programs does not attempt to map TSPs. A few representative organizations are included in a subsection under the Project Developer Category, and some project developers may have this capacity in-house as well. Apparel industry companies may also have opportunities to support the development of fiber crop knowledge in local TSPs that have previously focused more on regenerative food crop production. In general, strong connections with local TSPs should be an important criterion for companies when selecting a project developer—the lack of such trusted, on the ground partners to help farmers implement regenerative approaches has emerged as a key barrier.[54]

Related Critical Role: In-house Technical Capacity

In interviews for this project, an additional theme that emerged strongly is the need for in-house technical capacity—whether full-time employees, or contractors working closely with full-time team members—to enable apparel companies to fully understand and navigate the landscape of regenerative agriculture programs and the rapidly shifting science of soil carbon and soil microbiology. Rebecca Burgess points out that this trend is already underway in the food and beverage sector, and notes: "Brands have so many people on marketing and production—so maybe have more people working on the early part of the supply chain with farms. And maybe brands can share that pre-competitively."

Ideally, this role could serve as a "go-between" to connect project developers and technical service providers with a company's supply chain and marketing teams, helping to provide a full understanding of the factors involved in implementing regenerative agriculture projects and ensuring the collection and interpretation of data to support credible claims on regenerative impacts. Without this technical capacity, harmful unintended consequences may emerge from the misinterpretation or misapplication of data. Overall, Burgess believes:

> "The entire DNA of the company needs to understand science."

Recommendation 4:

Companies should examine their staffing and partnership structures to expand their scientific and technical capacity to understand and engage in meaningful regenerative agriculture projects grounded in fast-evolving soil science. This also involves understanding the shortcomings and limitations of currently available data in the context of broader impacts. As part of this overall approach, brands should consider investing in the role of Technical Service Providers for regenerative practices—the lack of such trusted, on the ground partners to help farmers implement regenerative approaches has emerged as a key barrier.

Step 3: Assess desired standards/certifications and other partners using Matrix

As the Matrix of Regenerative Programs shows, a long and proliferating list of potential partner organizations is available for brands to assess. There is no one perfect or completely comprehensive standard or tool for any given brand or project—each is applicable to different agricultural systems and different regions, and the selection of the crop, geographic region, and project developer will drive these decisions. A few key considerations relevant for Step 3 are discussed below.

Outcome-based and practice-based standards

Overall, interviewees and research for this project generally concurred that outcome-based standards are more suited for regenerative agriculture systems than practice-based systems, and that there is a need to continue to refine and move towards more transparent outcome-based standards that strike a balance between rigor and practicality for farmers.

This is in line with overall trends in both the apparel industry and in standards more generally, as noted in a 2017 report by New Foresight, commissioned by ISEAL: "While the implementation of certain production or management practices and technologies was once an accepted proxy for sustainability gains, stakeholders now look for demonstrable results closer to the desired impact."[55] The same report defines "outcome-based standards" to mean "those standard systems which, to credit an entity with a certificate, require that entity to achieve an outcome or performance level rather than successful implementation of practices."[56]

The shifting soil science paradigm discussed above gives additional support to outcome-based standards that work with producers to develop localized baselines and an approach of continuous improvement. Outcome-based approaches are in line with the scientific literature, especially Lehmann et al.'s conclusion that protecting soil carbon under the new paradigm of protecting carbon from microbial decomposition will require "constant care" to maintain healthy soil structures and biodiversity over the long term.[57] Outcome-based approaches are also more suited for taking into account the interrelated co-benefits of regenerative agriculture and the specific characteristics of each soil type and ecosystem.

However, current outcome-based programs evaluate impacts over a highly variable set of indicators, as outlined in Appendix C. As one interviewee described it, the idea of outcome-based standards is "the golden goose" that the field is chasing, but "it's not quite there yet. There are a lot of organizations that have it 80% correct. All of them have it 20% incorrect—but it's a different 20% for each actor." The shift to outcome-based standards will pose many challenges, but as with regenerative agriculture overall, the promise lies in part with the fact that, as the New Foresight report states, "the transition represents a fundamental change in the way a standard organization works towards its mission."[58]

Remaining mindful of contextual differences in outcomes and the hierarchy involved in deciding which outcomes to measure can support an outcome-based approach that remains nuanced and holistic. Similarly, incorporating practices can remain useful where outcome measurements may not be in place to support all areas of value in the system. Siena Shepard of the Textile Exchange Climate+ team, who is working to bring more environmental justice literacy into work at Textile Exchange, notes: "Indigenous wisdom teaches us that the means are just as important as the ends. How we interact with the land and our relationship with all species in the system are paramount and should be considered as inseparable from the outcomes."

Practice-based standards that can work with producers to assess and document place-based adaptations, and can use data to link practices to outcomes, can also be useful within this emerging understanding of regenerative agriculture. As discussed in the sidebar on the relationship between Organic and Regenerative on pg. 56, practice-based standards should be seen as a floor, not a ceiling. Given that it can take time—often years—to observe desired outcomes in biodiversity, soil health, and justice and livelihoods in regenerative systems, brands may also want to consider a staged approach that combines practice-based standards in early years and expands to use of outcome-based standards or add-on modules as a project progresses.

Step 3: Assess desired standards/certifications and other partners using Matrix

Implications for standards overall:

Across interviews and research for this project, there was a consensus view that there is not a need for a new regenerative agriculture standard or certification. As the Matrix of Regenerative Programs shows, at least 15 standards and certifications are already available that cover some elements of regenerative approaches, along with three harmonized indicator framework efforts.

This crowded landscape is causing confusion for many stakeholders, not least the farmers and ranchers responsible for meeting these standards' criteria. As "Barriers" report author Jenny O'Connor put it in a 2020 article, "I don't know if a set of standards is going to get us there. I think producers are pretty weary of certifications."[59]

Others have concerns that the push for development of new standards may take a selective approach to the range of issues under the umbrella of regenerative, while simultaneously distracting from current standards and approaches that deliver known regenerative outcomes, such as organic. As Sarah Compson of the Soil Association in the U.K., also a Textile Exchange staff member and a member of IFOAM-Organics International World Board, sees it, "It's important to avoid regenerative schemes that do little more than endorse business as usual, for example by mistaking measurement for impact. Driving best practice, innovation, and continuous improvement must be central to truly regenerative initiatives. The organic movement has grappled with this for many years, and the surge in interest around regenerative offers a great opportunity for the shared aims of the organic movement to become realized as well. New standards are not the route for driving impact here—instead, we need to celebrate and build on what is already there."

There is an emerging consensus to explore the development of "add-on modules" that can allow existing rigorous standards to give growers the opportunity to be recognized for additional regenerative practices and outcomes. See Recommendation 5.

As discussed in the sidebar, the Forest Stewardship Council Ecosystem Services protocol could be one model for this outcome-based, add-on module approach to regenerative agriculture certification.

Recommendation 5:

Regenerative agriculture's documented co-benefits suggest that outcome-based standards may be best suited for this evolving field, potentially linked to or in conjunction with practices. Interviews and research for this project also revealed an emerging consensus against the development of new standards or certifications for regenerative agriculture. Instead, brands could assess the development of add-on modules that respect the rigor of existing standards and the inherent place-based nature of regenerative agriculture, while developing outcome-based methods for assessing regenerative impacts on soil health, water systems, biodiversity, social justice, and livelihoods.

Relationship between regenerative and organic

In research and interviews for this report, the relationship between regenerative agriculture, organic agriculture, and certified organic agriculture has been a frequent question. A number of brands expressed confusion over whether agricultural systems could be labelled as regenerative if they were not already certified organic, or which of these certifications might need to come first.

Organic agriculture is a production system that sustains the health of soils, ecosystems, and people. It relies on ecological processes, biodiversity, and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation, and science to benefit the shared environment and promote fair relationships and good quality of life for all involved.[60] As Textile Exchange points out in its 2021 Organic Cotton Marketing Report, "Organic farmers have used regenerative practices, such as crop rotation, green manures, and cover cropping for generations, as part of their holistic approach to managing the land without synthetic inputs."[61] Organic standards, as outlined by IFOAM Organics International, the umbrella organization for organic worldwide, require that growers meet a set of practices designed to enhance ecosystem health and avoid the use of genetically modified seeds and synthetic inputs from a defined list.[62] Over the last 30 years, in most regions of the world the term "organic" has also been codified into legislation.

According to Sarah Compson of the Soil Association and Textile Exchange, "The fact that organic is legislated offers vital legal protections that guard against greenwashing and ensure that minimum standards are being practiced." In her view, this means that organic certification is part of meaningful change in both farming and brand practice, helping to ensure that regenerative outcomes are actually reached, with legislation providing an important backstop.

The effectiveness of organic and agroecology in driving positive outcomes is well recognized, with the IPCC, the Food and Agriculture Organization (FAO), the International Panel of Experts on Sustainable Food Systems (IPES Food), and the International Union for Conservation of Nature (IUCN), to name a few, having all documented agroecology and organic farming as a tool for carbon sequestration, reducing emissions, improving soil fertility, and as an adaptation strategy for the more intensive dry and wet periods resulting from climate change.[63]

However, Compson also notes that "Legislation is always a floor, not a ceiling. It is not possible to reflect the full breadth of organic principles and practice in regulation alone. Many farmers already go well beyond legal baselines, and it is vital that they are supported and encouraged to do so." This is particularly relevant where subsidy support is poor or where organic legal safeguards are weak or poorly implemented. For example, in the U.S., the United States Department of Agriculture (USDA) National Organic Program has come under fire for diverging from organic principles in the implementation of its organic legislation.

A key point emphasized by Compson is that "There are far more similarities than differences between the regenerative and organic agricultural movements. Fundamentally they are united in setting the path for the agricultural transition needed to ensure that farming systems can adequately answer the crises of our times, and there are great opportunities ahead to work synergistically. Where organic has struggled, it is because the underlying market and policy environment has not always adequately recognized or supported the ecological and social benefits it delivers—for regenerative to flourish, this facet will also need to be addressed."

While organic agriculture shares key elements with regenerative, organic standards and certification were primarily developed as an assurance scheme, and the system was not designed to include the outcome-focused approaches and monitoring that are now gaining interest. To address this fact, many in the regenerative agriculture field advocate for maintaining organic certification and best-practice implementation, while adding on additional elements to assess outcome-based changes in ecosystems and in social justice and livelihoods. This is the approach taken by the Regenerative Organic Certification, as shown in its three pillars of requirements in the graphic in Appendix C.

Other advocates and farmers, however, point to the imperative of quickly transitioning as many acres as possible away from the extractive system of industrial agriculture as a reason to begin adopting regenerative approaches without requiring organic certification. In an example from the food sector, rancher Will Harris of White Oak Pastures in the U.S. relies on grazing livestock to help regenerate degraded pastures. But since the pastures are degraded in part from recent chemical use, meat from these animals could not be certified as organic until after a three-year transition period, even though Harris himself does not apply chemicals. So, Harris forgoes USDA Organic certification on these animals in favor of transparent communication with customers about his practices.[64]

Relationship between regenerative and organic

In other cases, some argue that the goal of a rapid transition means that growers may need to gradually adopt regenerative practices while continuing to use some synthetic herbicides or pesticides that are banned by organic agriculture. The Soil Carbon Initiative (SCI), a recently released outcome-based standard developed by Green America in partnership with corporate partners including Danone, General Mills, and Ben & Jerry's, follows this approach. The SCI standard can be adopted by conventional or organic farmers, and it does not require a decrease in the use of pesticides in order for a farming operation to qualify as "regenerative" under the SCI standard.[65] According to the group's founder, "Farmers may need to continue using fertilizers or herbicides, and the decision should be theirs to make."[66] However, the opportunity for growers who are still using substantial amounts of herbicides and pesticides to become "certified" under the SCI standard raises significant concerns, as these inputs can have negative impacts on people and ecosystems irrespective of the other benefits being delivered by regenerative practices. As one public reviewer of the standard put it, "This will . . . be an easy opportunity for farmers and organizations to get an easy certification without any real investment toward sequestering carbon or building soil health."[67]

On balance, companies should apply a place-based approach to the question of the relationship between regenerative agriculture and certified organic agriculture. In countries where organic is already well established, such as India, requiring this certification as a prerequisite for additional shifts towards regenerative represents the most robust approach. Where organic is less prevalent or where organic standards are less well implemented, companies may wish to dedicate their focus and financial support to enabling a transition to regenerative approaches and the implementation of rigorous outcome-based certification.

Any project that chooses to allow continued use of pesticides or herbicides during the transition to regenerative practices should only do so in a transparent, place-based, time-limited approach that lays out a clear pathway to transitioning away from the extractive agricultural system and towards a more holistic regenerative approach—not as a workaround for the rigor of existing standards. And in either case, apparel and footwear companies must dedicate meaningful financial resources to helping growers move through the transition period.

Globally, only 1.5% of farmland is currently certified organic,[68] and land managed with certified regenerative agriculture approaches an even smaller fraction. Industrial, extractive agriculture systems remain the status quo. Companies can best advance their goals by avoiding polarization and keeping in mind the big-picture imperative for a rapid transition away from extractive agricultural systems through transparent and documented partnerships with farmers and the fundamental transformation of current models.

Ultimately, organic and regenerative should not be considered as competing concepts—there is much that unites them, and both movements can build on and learn from one another along their shared path to achieving equitable and restorative agricultural systems.

Key model for the add-on module concept: FSC Ecosystem Services Procedure

The Forest Stewardship Council (FSC) Ecosystem Services Procedure (ESP) provides a specific example of an add-on module that allows regenerative outcomes assessment to be added on top of an existing practice-based certification.[69]

The development of the Ecosystem Services Procedure mirrors the evolving understanding of ecosystem co-benefits that has taken place in the field of regenerative agriculture. As Jorge Matallana of FSC explains it, "Twenty years ago, the global conversation on forest management was focused on timber—managing the obtaining of timber. As time passes, we have realized that forests are much more than simply trees! There are ecosystems, ecosystem services. So, these forests are more than trees, so we should generate a value—and bring value to the forest managers."

The FSC Ecosystem Services procedure is available to forest managers who are already FSC certified. These forest managers could be traditional forest product companies, or they could be Indigenous communities or other local entities who are managing forest systems. Matallana notes that "We are moving strongly toward creating a model for Indigenous communities. It can be smallholders or low intensity orgs—it's a whole different approach for them. Their revenue is much lower, so they could not simply implement everything all at once."

To apply for the ESP, these forest managers first establish a "theory of change" of how they will restore or protect the forest's ecosystem services, using an outcome-based approach. Once they begin implementing those approaches, FSC provides a process of verification of those impacts.

Then, once the verification process is completed by a certification body, the project can look for what FSC calls a "sponsor."

As Matallana emphasizes, "This is important—we are NOT selling an offset in this case. Once the impacts are verified, we generate a claim, and these claims can be sponsored or partnered with a company. They [the company] become part of a story, but they cannot claim that they are "offsetting" or compensating for some damage they did or some emission they created."

Making the connection to regenerative agriculture, Matallana continues, "Just to come again to regenerative agriculture–the way that most organizations are trying to approach climate action is through carbon. That's the buzzword, net zero—but it is kind of a black box. So, what we are trying to do with the [Ecosystem Services] Procedure is to reward best practices."

The financial model of the sponsorship is not set by FSC but is determined by direct agreement between the sponsoring company and the forest manager. As Matallana puts it, "We put them in contact, but we don't broker.

Money is part of it—we need to provide tools that empower forest managers—but there is not a standardized price. That is up to the agreement between companies and forest managers."

Overall, the FSC Ecosystem Services Procedure represents an important model for an approach that apparel sector companies could look to for providing direct support to regenerative producers, becoming closely associated with a given project and its story, but without seeking to claim "offsets."

Matallana concludes: "What we would like to highlight is that first, this is simply a way to bring the value of forests and the value of nature to the conversation and to the marketplace—actually seeing companies put the value of nature into their numbers." The way we like to frame this is that this is a way to contribute, to build value chains and practices that are contributing to actual conservation. Before natural capital turns into an actual number, there is a bridge you need to build—and that is what we offer."

Step 4: Understand farm-level accounting and measuring tools

In the development of a regenerative agriculture program, brands themselves may not be the ones to engage with the specific measurement and impact assessment tools described in this section. However, it is critical that companies understand the specific measurement and assessment components involved in the tool or tools used by their project developer or other supply chain partners. Otherwise, brands will be at high risk of making inaccurate claims about the actual meaning of the results from these tools.

Current approaches to measuring the impacts of regenerative agriculture, and especially to measuring soil organic carbon, rely on a curious combination of the old and new. On the one hand, sampling soil and measuring the carbon in the soil are still most often done with basic, low-tech field and laboratory techniques. The depth of the soil sample has a major impact on the results of analysis, but deeper sampling means more work and more expense. As a result, the most common recommended depth for sampling is 15 centimeters, or 6 inches. However, recent research shows that many apparent impacts to soil carbon, especially related to reduced-tillage practices, are not seen at lower depths when samples are taken to depths of 30 cm (approximately 12 inches) or more.[70]

Meanwhile, another branch of soil science has worked intensively over recent decades to develop dozens of sophisticated computer modelling systems that predict the dynamics of carbon in the soil.[71] These models rely on various combinations of direct sampling and measurements to test and verify their predictions, but there is a fundamental mismatch between the amount of data needed to continually adjust and calibrate these models and the slow and laborious process of soil field sampling. To address this need, many researchers and start-up companies have recently targeted another measurement approach: the use of spectroscopy and remote sensing to measure soil carbon. These methods measure soil carbon using the reflectance of soils in the visible and infrared spectra. While offering the promise of more efficient measurement—and importantly, the ability to measure change across wide geographic scales—these approaches introduce a new set of assumptions and extrapolations into the measurement and modeling process.

In the areas of overall soil health, biodiversity, and water impacts, current standards and tools also use a wide range of methods to measure impacts from regenerative systems. For example, some systems measure biodiversity outcomes by counting and measuring the types of species present in a given area using a transect method, some specify the implementation of biodiversity-focused practices such as removing invasive species, and some focus on documenting the implementation of cover crops and/or rotational grazing practices. In the area of water impacts, some assessment systems focus on water availability, using tests like water infiltration tests or assessment of relative water use in a system, while others focus on water quality or the reduction of water pollution. Social justice and livelihood assessment tools present an even more widely varying set of criteria. Animal welfare criteria tend to be somewhat more consistent but still must be examined in detail to ensure that companies understand which elements are actually covered by various tools and programs.

Detailed information on measurement approaches for soil carbon, soil health, biodiversity, water impacts, social justice and farmer livelihoods, and animal welfare, and the ways these indicators are represented in the Matrix of Regenerative Programs, is provided in Appendix C.

This Report's Matrix of Regenerative Programs provides a snapshot of the assessment areas covered in each of the many programs and tools included.

Step 5: Develop a specific financial model to support the project

Why finance is a critical part of regenerative agriculture

To realize the full potential of regenerative agriculture, there is a critical need for apparel and textile sector companies to integrate innovative financial support models from the beginning of their engagement with various partners across the value chain.

This imperative starts with the farmers who are being asked to make the up-front capital investment and perform the physical, daily labor of implementing, maintaining, and monitoring regenerative systems, in the face of an entrenched extractive agricultural system that has previously asked them to focus on yields above all else.

In many cases, growers identify this financial risk as the single biggest barrier to transitioning. In rancher Dianne Haggerty's experience, "The farming practices themselves have not been that much of a challenge. The biggest challenge is getting the message to the marketplace." In her view, "if everything is appropriately recognized from a natural capital and a human and community perspective," the farm practices are straightforward to implement. But, she notes, "We are still in a marketplace that rewards volume."

Luke Smith of Terra Genesis summarizes it plainly: "If the transition financing and the TA [technical assistance] are not in place—it won't happen."

More broadly, this financial support must be part of a transformative approach to regenerative agriculture overall. Conventional, extractive agriculture and conventional finance are inextricably interwoven, so it is folly to believe we can reform one without addressing the other. As the New Economy Foundation and Croatan Institute state in a 2021 report on financing needs for reforming agriculture in a U.K. context:

> "Without reimagining finance, both structurally and in terms of its purpose, transition will be impossible at the scale and pace necessary to prevent climate and biodiversity collapse."[72]

Current landscape of farm finance

The current system of farm financing rewards practices that are often antithetical to regenerative agriculture's goals: growing the same crop year after year, consolidating farmland, and focusing on the yield of the cash crop only.

This system not only incentivizes environmentally damaging practices, but it tends to exclude smaller growers and historically disenfranchised communities. As New Economics Foundation and Croatan Institute note, "The vast majority of [bank] lending goes to a percentage of farmers who own land (or other collateral), have an established relationship with a bank, and a track record of farming under the industrial paradigm."[73] This system then traps larger farmers in a cycle of debt that is not only accepted but rewarded—bank lenders rely on the knowledge that growers will be able to repay their loans through the next year's government subsidies. This dynamic makes it extremely difficult for these larger farmers to innovate, since doing so might disqualify them from subsidies and thus leave them unable to repay their loans.

Meanwhile, innovative small farms are generally considered too small, too new, too undercollateralized, or just too unfamiliar for mainstream financial institutions to take a risk on. Since conventional lenders typically assess both land value and creditworthiness by the metric of yield, a vicious cycle can be created for smaller farms using regenerative approaches: "As these considerations impact land value, the main contributor to net worth, land tenure of agroecological farms is jeopardized."[74]

These misaligned incentives set up what the report's authors call "an ecological paradox." Larger farms that have the capacity to scale regenerative agriculture on more acres are trapped in a cycle that discourages the shift to regenerative, while smaller farms, often the most likely to be interested in regenerative approaches, cannot access capital to help support this transition.

This paradox argues that apparel and footwear companies must play an active role in supporting these smaller-scale farms with early-stage financial support in order to create the systemic change needed.

Carbon markets as a financing strategy: promise and problems

To date, many in both the agriculture and apparel sectors are looking to carbon credit marketplaces to provide the financing needed to reduce risk for farmers and help scale regenerative agriculture. Early findings indicate that certain credits can be considered "lower-risk"[75] and credible for offsetting GHG emissions. Additionally, recent research has shown that brands should do due diligence in selecting partners to avoid financial risk and ensure social justice.

Step 5: Develop a specific financial model to support the project

Pragmatically speaking, these marketplaces currently rest on the same shifting soil science foundation discussed above in Section III. Financially speaking, many researchers, investors, and farmers themselves have concluded that these marketplaces are not living up to the promise of returning value to farmers. One farmer advocate interviewed is dubious about the claims of carbon marketplaces, with an emphasis on the additional risks they are asking farmers to bear:

> "If you look at any carbon market that's ever been developed, they have ended in failure. It is because of their reliance on modelling. The models don't work. If they don't sample and verify and only work on models, there will be cheating. You see in Australia, they have about the only one that's been successful—but it was funded by the government. It is expensive because they require verification. And most of the money ended up in the middleman, in the aggregator. The risk is still on the farmer or rancher delivering [the C credits]."

For investors, a recent report from investor consortium CREO Syndicate advises its audience that, "According to several investors managing multimillion-dollar farmland real asset funds, overcoming the cost of verification, which includes sampling and auditing, requires the price of soil carbon exceed $20 per ton. This value surpasses the current mid-teens benchmark in the regulatory carbon market in Australia and in voluntary soil carbon agreements in the U.S. and Brazil." While some voluntary markets in Europe are seeing higher prices, CREO notes, "Climate-friendly governance and regulated carbon trading might yield a higher price but do not ensure market engagement or verifiable soil science."[76]

As New Economics Foundation and Croatan Institute state, "There is a world of difference between public payments for ecological improvements and better agriculture and the establishment of markets to price those improvements and trade their benefits."[77]

One industry expert interviewed is concerned about the risks of the latter: "We will see more schemes around ecosystem credits. If a couple years go by and we find out this is not true," they fear, it will undermine financial support for the field of regenerative agriculture as a whole:

> "It's just so risky to be using model data. And we will have the investment community say, 'never mind.'"

As discussed further below, impact trading systems that provide credits directly to growers, as opposed to trading them through a speculative marketplace, provide one short-term option to get funding directly to farmers in situations where companies do not have the Tier 4 visibility to support these farmers directly. The Impact Incentives program is discussed below in Appendix D.

Even in the best of circumstances, however, credit trading mechanisms often require growers to have implemented and verified a practice before the credit is issued—essentially expecting them to front the cost of implementing the practice. While awareness of this issue is growing, and some pioneering programs, such as Native's Help Build™, are developing methods for up-front payments, there is a critical need to expand the landscape of financing methods that provide both up-front cost-sharing and patient long-term investment for the field of regenerative agriculture.

How brands can get engaged in financing regenerative agriculture

Given these considerations on carbon credit trading strategies, creative financing approaches will be needed to provide up-front support to growers in the transition to regenerative agriculture. In this regard, recent reports have identified the apparel industry as a missing link. In its "Financing the Transformation in the Fashion Industry" report, Fashion for Good finds that: "Typical R&D investment for the fashion industry is less than 1% of sales, compared with about 10% to 15% of sales for consumer electronics companies and about 20% to 30% of sales for pharmaceutical and biotech companies."[78]

Structural reasons contribute to this situation: since most brands do not own their own supply chains, their investments tend to focus on the product design and marketing elements at the end of the supply chain. As a result, according to Fashion for Good, ". . . players in the supply chain are often asked to bear the risk, costs, and effort of innovating, with little guarantee that they will be in a position to capitalize on their investment."[79] This situation is particularly ironic and unsustainable because, as the organization points out: "The ultimate beneficiaries of innovation are the brands. . . ." Fashion for Good calls on brands and companies later in the supply chain to be "willing to pay more than a marginal surcharge for innovative products."[80]

Step 5: Develop a specific financial model to support the project

From his perspective working on the ground with farmers in communities across the globe, Andrew Nobrega of Pur Projet reinforces the call for upfront support for implementation of regenerative agriculture, whether that involves hard costs for equipment and inputs or soft costs for technical assistance:

> "None of our projects have been operated on the basis of the community doing the work and only getting paid on delivery of the assets of carbon. It's not materially feasible. **We need to capitalize the program from an inputs perspective in most cases; from a TA [technical assistance] perspective in ALL cases.**"

In taking this leadership role, brands need not act alone. Fashion for Good outlines the potential multiplier effect of greater brand engagement in financing any innovation and the way that brand commitments de-risk and unlock investor participation."[81]

To shift this system and create this catalytic effect, interviewees for this report repeatedly emphasized that brands should consider regenerative agriculture projects as "an investment" in a fundamentally new model.

Asked about the financing element of J.Crew/Madewell's case study with Crossland Consulting, Liz Hershfield stated:

> "It is definitely an investment—you have to think of it that way."

Since the "returns" from regenerative agriculture systems increase over time—with lower input costs, increased co-benefits, greater system resilience, and reduction of risk–regenerative agriculture pilots also share this characteristic with other investments that pay back over time.[82]

Another brand representative noted that regenerative agriculture projects would benefit from "creative financing" and are "an investment in product, supply chain, marketing and ESG performance overall."

Looking specifically at the mechanics of this investment, brand representatives outlined a number of ways that financial support could be directed to regenerative projects. Ideally, regenerative agriculture project should be supported through a combination of these funding buckets, to ensure that there is a shared commitment to the project's success across the company.

- **CSR or sustainability budget:** A company's CSR budget is frequently seen as an option for initial funds to help develop regenerative pilots. One interviewee described a potential approach where the sustainability team could support membership funds for a regenerative initiative, while the supply chain team could absorb the premium needed to make regenerative projects cost-competitive at first. However, interviewees noted that this funding approach can be limiting for overall company buy-in.
- **Marketing budget:** Some industry experts advocated for funding regenerative agriculture projects from the marketing budget, "because you know you're going to do storytelling about it—you want to get your ROI from talking to your customer and being a leader—and they have the most flexible budget." Marketing budgets have been used to pay project developers, consultants, and other costs associated with developing regenerative agriculture pilots. However, other experts noted that "Some of the brands would put the startup cost into a marketing budget. But those startup costs for a new supply chain—those don't necessarily fit neatly in the costing model."
- **Operations budget:** Another frequent strategy has been to fund regenerative programs by asking the operational division of the company to determine and price in a premium on the product. However, this approach runs the risk of being seen as burdensome by both operations teams and C-suite management, as opposed to being treated as an investment in developing future supply chains. Nonetheless, the straightforward funding mechanisms of paying more for regeneratively-produced fiber crops and committing to secure long-term contracts with producers were emphasized repeatedly in interviews for this project. Documentation for such long-term commitments, such as a Letter of Intent or Memorandum of Understanding, can help function as "collateral" to help producers access loans. While these approaches are key tools, it is also important to note that other financing approaches are needed that fundamentally shift regenerative agriculture systems away from the growth-oriented business model that ties payments to production of goods.
- **Charitable Arm/Foundation budget:** Brands' charitable arms provide a key option for creative financing. While brand foundations or charitable arms must respect tax regulations and conflict-of-interest firewalls that specify that projects can't result in direct financial

Step 5: Develop a specific financial model to support the project

benefit to the company, that still leaves ample scope to support research, technical assistance, and educational elements of regenerative agriculture systems.

- **Corporate climate finance/Internal price on carbon:** Beyond these funding mechanisms, some companies are following emerging guidance to develop climate finance commitments that earmark additional funds for climate security projects. Based on guidance from Gold Standard, a company would first determine the "social cost of carbon" or "internal carbon price"—estimates for this number vary, but "credible estimates to do not fall below $40 USD" per ton of carbon.[83] To determine a climate finance commitment, a company would then calculate its remaining tons of unabated GHG emissions from the given year, and multiply that number by the social cost of carbon per ton. That amount of funding could then be directly channeled to regenerative agriculture projects, or used to contribute to the development of a fund or any of the integrated capital strategies outlines below. Recent research finds that 35% of the apparel companies surveyed are already employing or planning to employ an internal carbon pricing approach.[84]

More information about alternative funding and business models for climate change impact is available in the Climate Board and Textile Exchange's recently released Friction Points Report.[85]

While brands have begun to experiment with some of these approaches, Luke Smith of Terra Genesis echoes the findings of Croatan Institute and others in calling for a much larger scale of investment, and one that involves precompetitive and shared approaches. In his view, "The kinds of investments that are being made are one to two orders of magnitude lower than needed to bring about the change. We are going to need to pool resources to see this change come about."

To outline concrete possibilities for ways that brands could make investments in regenerative agriculture as part of a full financial ecosystem, rather than as one-offs, the Integrated Capital framework, developed by the pioneering U.S. based impact investing firm RSF Social Capital, offers a useful approach. RSF defines Integrated Capital as "the coordinated use of diverse forms of financial and human capital to support enterprises and strategies that address complex social and environmental problems."[86]

The 2020 Croatan Institute report "Soil Wealth: Investing in Regenerative Agriculture Across Asset Classes" uses a related framework of "asset classes" that is readily transferable to assessing options in the apparel, footwear, and textile sector.[87] A second 2020 report, "The Fibers Roadmap: Integrated Capital Opportunities to Support Revitalization of U.S.-Grown Fiber, Textiles, and Leather," utilizes this framework with an emphasis on mid-scale fiber production and processing in the U.S.[88]

Current and emerging models of creative financing for regenerative agriculture

A brief overview of current and emerging models in these five Integrated Capital Categories follows, including examples from the apparel and textile sector with a few models from other sectors. In many cases, these models represent blended approaches among the categories of capital and between private and public financing.

Brief details and links to sources for models are provided in Appendix D.

The financing models outlined above will be vital for allowing farmers to make the transition to regenerative agriculture, but they are just as important for building a supply chain for regenerative agriculture products that maintains transparency and traceability.

CREO Syndicate finds that "Despite the midstream supply chain representing a significant set of costs (up to 40% in some markets), it is the space where CREO has anecdotally seen the least investment activity."[89] This key gap connects the financing models above with the supply system best practices outlined in Section IV.

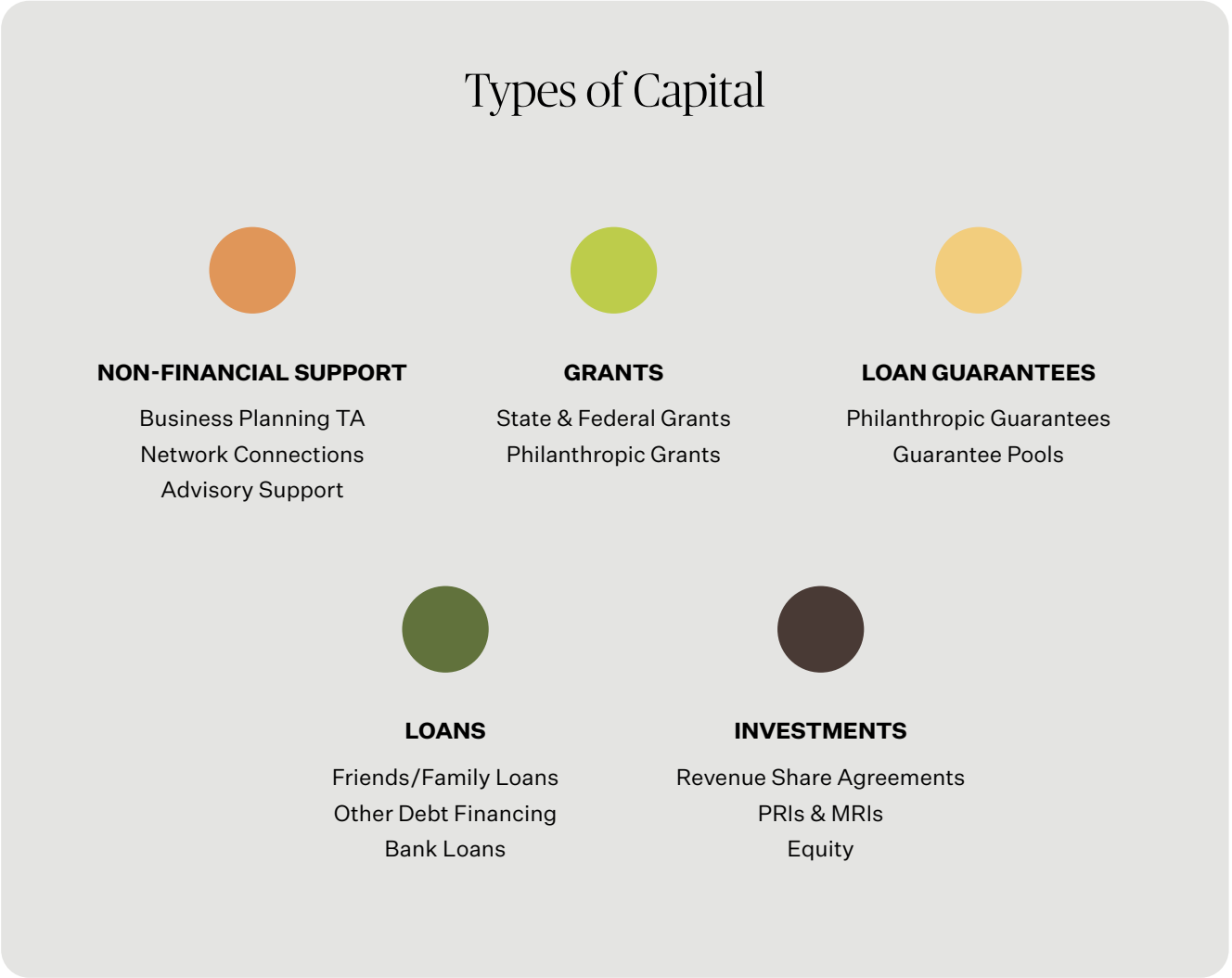

Figure 5: Types of Capital. Adapted from and used by permission of RSF Social Finance

Asset Class	Notes	Models (See Appendix D for more details)
Grants / philanthropic funding / brands' charitable arms:	The charitable arms of apparel and footwear brands offer untapped potential for supporting regenerative agriculture projects. In the U.S., such entities are regulated under the U.S. tax code, which requires them to fulfil a charitable or educational purpose, and brands must abide by self-dealing regulations that prevent profiting off of grants. However, this leaves very broad scope for funding research, technical assistance, education, policy work, and supporting the purchase of equipment and even of land.	• The Regenerative Fund for Nature (Kering and Conservation International) (Global) • Marciano Family Foundation / Fibershed field study (U.S.) • Ralph Lauren / Soil Health Institute U.S. Regenerative Cotton Fund (U.S.)
Loan Guarantees	Loan guarantees are a key but underutilized financing tool that have gained traction in other sectors. In this model, funds do not leave the balance sheet of the guaranteeing entity, but they can be used as collateral for loans to other entities. Fashion for Good finds that "Corporate guarantees . . . [are] an especially effective way to help innovators secure funding for large-scale projects in commercialization such as building a demonstration plant."[90]	• PurFi/Concordia Textiles (U.S./Belgium) • CPIC Blueprint: Guarantee-Backed Lending for clean textile production (Turkey)
Loans	A wide variety of creative loan options have been developed in recent years to support the transition to regenerative agriculture in the food sector. Apparel and footwear companies could initiate conversations and partnerships with these entities on behalf of fiber farmers and ranchers in their supply chain, as these growers are often overlooked in the food-focused sector.	• The Perennial Fund (U.S.) • Loans for Enlightened Agriculture Programme (LEAP) (U.K.) • Community Development Finance Institutions (CDFIs)(Global) Ex: Caja Cusco (Peru)
Integrated Capital Financing Vehicles	As Luke Smith of Terra Genesis sees it, the field of regenerative agriculture needs "to have investors who appreciate an expanded opportunity of what ROI means—especially now that we are in the position to do outcome-based verification and see transparency and traceability." A number of emerging funds are beginning to provide this flexible investment capital, often using integrated capital models that combine different financing categories, and they offer many models and potential partners for apparel and footwear companies.	• Fashion For Good / Good Fashion Fund (Netherlands) • Specialized investment Funds in Textile and Food Sectors: (Canada, U.S.): Alante Capital, Renewal Funds, others • The Livelihoods Funds (Global) • Christy Dawn "CSA" Model (U.S./India) • Emerging Fund: Apparel Impact Institute (Aii) Donor Pooled Fund • Emerging Fund: Sustainable Agriculture & Food Systems Funders (SAFSF)/Fibershed Integrated Capital Fibers Fund: (U.S.)
Indigenous and people of color-led financing efforts	The critical need to address the Indigenous roots of regenerative agriculture and issues of social and racial justice extends to the area of financing. A comprehensive treatment of issues in racial equity investing can be found in the recently released report from the Croatan Institute Racial Equity, Economics, Finance, and Sustainability (REEFS) Initiative, "Capital at a Crossroads: Accelerating Racial Equity Investment Across Asset Classes."[91] A number of financing vehicles have emerged that prioritize Indigenous leadership and projects.	• Akiptan (Native Community Development Finance Institution (CDFI) (U.S.) • Indigenia Capital (Canada/U.S.) • Black Farmer Fund (U.S.)
Public / Public-Private Financing	As Fashion for Good notes, "The public sector can offer larger ticket sizes for ventures and de-risk larger investment rounds from other investors."[92] Public financing can also be a component of blended financing vehicles such as those listed above.	• Development Impact Bonds (DIBs) • U.S. Agency for International Development (USAID) / Root Capital / Keurig Dr Pepper Partnership for Sustainable Supply Chains (PSSC) • Proposed Model: U.K. Agroecology Development Bank
Financing models that involve payments for ecosystem services	The Impact Incentives system, developed by Textile Exchange and partners including Proterra, Global Roundtable for Sustainable Beef and Global Food Partners, separates the trading of physical goods from the trading of incentives for sustainability performance. This system eliminates the cost and complexity of traceability, while still allowing transparency, and it bypasses problematic marketplace structures that can allow for speculation and other profit-taking activities that result in growers losing out on revenue.	• Impact Incentives (Global) • Ecosystem Services Market Consortium (ESMC) (U.S.)

Table 2: Overview of current and emerging Integrated Capital models for financing regenerative agriculture

On the horizon: emerging issues in regenerative agriculture financing

Need for better metrics in financing systems as well as in impact assessment

The same needs for shared data and common metrics discussed in Step 4 above also apply to the area of financing tools for regenerative agriculture. The Soil Wealth authors recommend that an "ecosystem of accountability" needs to be developed to monitor financing products for their claims about social and environmental impact, "particularly when weak or misleading indicators about soil health or other regenerative outcomes are being used."[93] New models of "regenerative finance," "non-extractive finance," and "community-governed investment" are emerging to provide a framework for this work.[94]

On the horizon, in a recent article former Timberland COO Kenneth Pucker points to the emergence of SBTs for asset managers as a key development: "In addition, there is a need for more rigorous benchmarking of ESG funds against appropriate benchmarks. To that end, a consortium of NGOs is working to extend the Science-Based Targets measurement standard from companies to asset managers. If adopted, Science-Based Finance Targets would be a great way for asset managers to verify their credentials while allocating capital to companies committed to addressing climate change."[95] Along similar lines, the Task Force on Nature-Related Financial Disclosures is developing a risk management and disclosure framework as part of the push for companies to report and act on nature-related risks.[96]

In these future research areas, both regenerative agriculture and regenerative finance must hold true to their labels by ensuring that farmers, Indigenous communities, and traditionally disenfranchised communities are fully included in the development of these financial measurement systems.

Investor and shareholder pressure on boards and company leadership to meaningfully support regenerative agriculture

As the Soil Wealth report points out, consumer goods companies are "investees" as well as potential investors. Given that "several publicly traded companies have started to claim the mantle of 'regenerative agriculture' in their own sourcing practices," Croatan Institute suggests that "listed equity investors in those kinds of companies are well placed to hold them true to their words by seeking data on their deeds." The report highlights Danone, General Mills, Unilever, and VF Group as four publicly traded companies that have launched programs on regenerative farming, noting that investors can pressure the Boards and C-suite leadership of such companies "to use their purchasing power to source from regenerative farms and support the value chains associated with them."[97]

Questioning the business model/connection to degrowth

The financing considerations above make plain the need for a more radical look at the apparel industry's overall business model. While acknowledging some progress, the 2017 World Resources Institute report "Elephant in the Boardroom" puts this issue in stark terms: "Underneath this welcome progress lies an uncomfortable truth: Most businesses' growth is still predicated on more people buying more goods . . . If not addressed, business dependency on increasing consumption will be the Achilles' heel of the business model."[98]

Degrowth is a planned reduction of energy and resource use designed to bring the economy back into balance with the living world in a way that reduces inequality and improves human well-being.[99] For the apparel, textile, and footwear industry, this means shifting to a system in which business growth is ultimately decoupled from the extraction of new materials to make new products, using other models to create business value. According to GHG modeling conducted by Textile Exchange for the raw fiber and material production phase of the apparel value chain, reduction of traditional growth rates is one of the most significant potential levers to reducing climate impacts. Emissions are set to increase by 38% from 2019 to 2030 under "business as usual" growth of 3%; reducing year over year growth to 1% could reduce emissions growth from 2019 to 2030 by 26% and would address around one-third of the emissions reductions needed to meet a 45% reduction pathway compared to a business as usual scenario.[100] (See Figure 1, Textile Exchange: Getting to 45% in Tier 4).

Addressing this issue requires questioning what authors Kate Fletcher and Matilda Tham call the "economic growth logic which currently drives the fashion sector"—and this in turn connects back to the truly radical potential of regenerative agriculture: "Rethinking fashion outside the economic growth logic shifts power from multinational companies to organizations, communities, and citizens."[101]

This degrowth thinking brings us full circle to the Indigenous roots of regenerative agriculture discussed at the beginning. Fully honoring these roots, Fletcher and Tham note, requires understanding the intersectionality of the colonial mindset on land, humans, communities, and the current economic model.[102] The movement for degrowth, as explored by scholars like Jason Hickel,[103] also emphasizes the need for brands to move towards an investment mindset in considering non-extractive approaches to funding and financing regenerative agriculture pilots and ongoing programs.

As Luke Smith of Terra Genesis sees it, the need to link regenerative agriculture with a fundamentally different business model is currently a barrier to scaling regenerative agriculture. For executives accustomed to focusing on quarterly reports, he notes, this approach requires much more than a change in farming techniques: "It is a paradigm shift—we are changing the way people function. That is not a conversation that many are willing to have in the business realm."

In summary, as Elizabeth Whitlow of ROC put it in a 2020 published interview, the transition to regenerative agriculture is:

> "a vulnerable time for farmers. If fashion wants to effect change, understanding that ground-level need for investment and support during that transition is the key to the kingdom."[104]

Recommendation 6:

To deliver on the recommendations above, any regenerative agriculture project must include the development of creative financing mechanisms that share the risk of transitioning to regenerative practices with farmers. In addition to long-term purchasing contracts, brands can seek a combination of funding sources across the organization to ensure that the success of the project is a shared financial goal across the company. Brands should also expand their thinking about creative financing approaches to understand how their capital could unlock other financing, drawing on a growing number of models including grants, loans, investments, public financing, and programs like the Impact Incentives that pay growers directly for ecosystem benefits. Investments in land ownership or secure land tenure are a critical part of this approach overall—both to incentivize long-term practice shifts and to address a history of land theft from Indigenous and Black farmers.

Step 6: If carbon credits are sought, identify credible carbon credit protocol

As discussed above, recent shifts in soil science mean that brands must conduct due diligence if seeking carbon credits. This means working hand-in-hand with developers that follow the best available carbon protocols, ensuring that brands can leverage the opportunities and outcomes that the carbon market presents. Two recent reviews from independent research entities, Carbon Plan[105] and Environmental Defense Fund (EDF),[106] provide a detailed analysis of existing programs that aim to generate credible carbon credits designed to help companies meet SBTs. The lists at right and images below indicate the scope of these recent reviews of soil carbon credit protocols: 14 programs analyzed by Carbon Plan, and 12 protocols analyzed by EDF, with 12 of the protocols evaluated by both reports.

For companies that may have identified specific options for carbon credits as a component of a larger reductions-focused strategy, these recently released reports offer an opportunity to compare two different assessments for each of the 12 major carbon crediting protocols currently available.

14 Protocols Reviewed by Carbon Plan:

- American Carbon Registry Compost Additions to Grazed Grasslands v 1.0
- American Carbon Registry Grazing Land and Livestock Management v 1.0
- BCarbon
- Climate Action Reserve Soil Enrichment Protocol
- FAO GSOL MRV Protocol
- Gold Standard Improved Tillage Module
- Nori Pilot Croplands Methodology v 1.2
- Plan Vivo
- Regen Network Methodology for GHG and Co-benefits in Grazing Systems
- Verra VM0042 - Methodology for Improved Agricultural Land Management v 1.0
- Verra VM0021 - Soil Carbon Quantification Methodology v 1.0 (2012)
- Verra VM0017 - Adoption of Sustainable Agricultural Land Management v 1.0
- Verra VM0026 - Methodology for Sustainable Grassland Management v 1.0
- Verra VM0032 - Methodology for the Adoption of Sustainable Grasslands through Adjustment of Fire and Grazing v 1.0

12 Protocols Reviewed by EDF:

- Alberta Quantification Protocol for Conservation Cropping v 1.0
- Australian Carbon Credits (Carbon Farming Initiative—Measurement of Soil Carbon Sequestration in Agricultural Systems)
- Aust. Carbon Credits (Estimating Sequestration of Carbon in Soil Using Default Values)
- BCarbon Soil Carbon Credit Systems
- Climate Action Reserve Soil Enrichment Protocol v 1.0
- FAO GSOC MRV Protocol
- Gold Standard Soil Organic Carbon Framework Methodology v 1.0
- Nori Croplands Methodology v 1.2
- Regen Network Methodology for GHG and Co-Benefits in Grazing Systems
- Verra VM0042 - Methodology for Improved Agricultural Land Management v 1.0
- Verra VM0021 - Soil Carbon Quantification Methodology v 1.0
- Verra VM0017 - Adoption of Sustainable Land Management v 1.0

Step 6: If carbon credits are sought, identify credible carbon credit protocol

In the chart below, we summarize our results by showing scores for rigor, additionality, durability, and safeguards, alongside our overall rating across the full set of protocols.

	Rigor	Additionality	Durability	Safeguards	Rating
ACR C	1	1	2	1	1
ACR G	1	1	2	1	1
BCarbon	3	1	2	1	3
CAR Soil	2	1	2	1	2
FAO	3	1	1	1	2
Gold Std	1	1	2	3	2
Nori	1	1	1	1	1
Plan Vivo	1	1	1	3	1
Regen	1	1	2	1	1
Verra FG	2	1	2	1	2
Verra IA	1	2	2	1	2
Verra Soil	3	1	2	1	3
Verra SA	1	1	2	1	1
Verra SG	1	1	2	1	1

Summary table of our results. Each protocol is a row. The first four columns show scores along four individual metrics (each on a scale from 1 to 3) and the final column shows the overall rating (on a scale from 1 to 5). For more details, check out the interactive version of this table. Abbreviations: Grazing (G), Compost (C) Improved Agriculture (IA), Sustainable Agriculture (SA), Fire + Grazing (FG)

Figure 6: Zelikova, J., Chay, F., Freeman, J., and Cullenward, D., "A buyer's guide to soil carbon offsets." CarbonPlan, 2021. https://carbonplan.org/research/soil-protocols-explainer

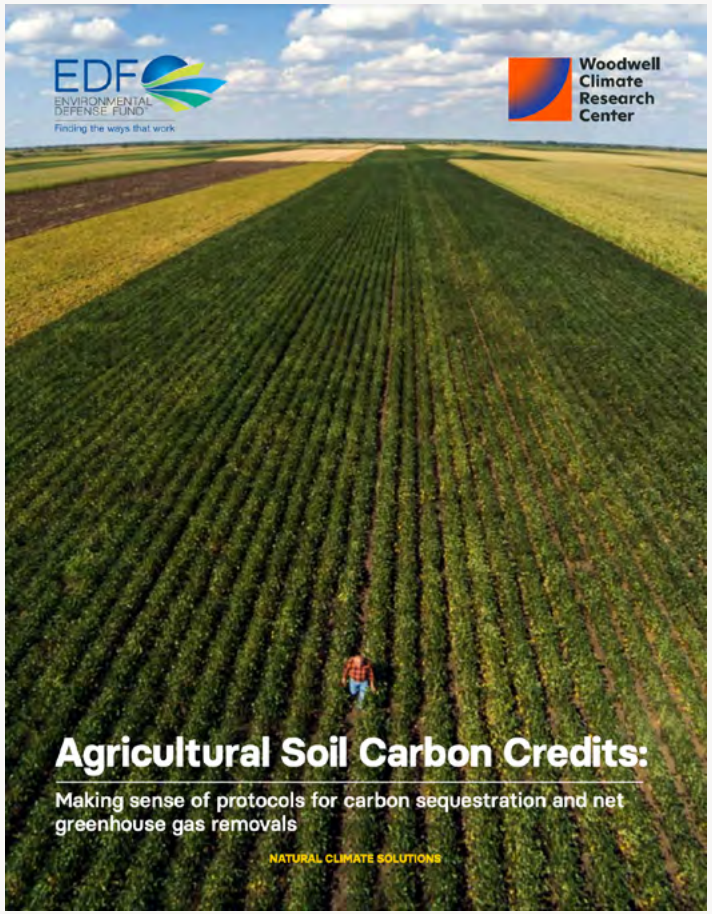

Figure 7: Oldfield, E.E., Eagle, A.J., Rubin, R.L., Rudek, J., Sanderman, J., and Gordon, D.R., "Agricultural soil carbon credits: Making sense of protocols for carbon sequestration and net greenhouse gas removals." Environmental Defense Fund, 2021. https://www.edf.org/sites/default/files/content/agricultural-soil-carbon-credits-protocol-synthesis.pdf

The no-regrets pathway

In the final analysis, brands' claims, and claims about regenerative agriculture overall, must be balanced against the reality that individual farmers are the ones responsible for carrying out the dirty, difficult, day-to-day work of implementing regenerative practices.

As two soil scientists from the University of California Berkeley note in a journal article on soil carbon sequestration potential, ". . . no coherent economic strategy has been offered that will induce millions of individual farmers to adopt and maintain prescribed practices on multidecadal time scales." These authors call for the focus to shift to "realistic experimental field research that is seldom part of technical soil C sequestration analyses."[107]

This report calls on brands to be part of this "realistic experimental field research" by investing their resources in the creation of regenerative agriculture pilot projects—developed in full financial partnership with farmers, researchers, Indigenous communities, and others most impacted by climate change—that can help rebuild supply chains and generate new data and understanding about the multiple benefits of regenerative agriculture.

Put more simply, biodiversity expert Helen Crowley advocates for brands to adopt what she calls a "**no-regrets pathway for companies**," investing in regenerative agriculture programs for their broad range of co-benefits for soils, nature, and communities and getting out ahead of emerging industry guidance like the Science-Based Targets for Nature.

As she puts it:

> "Investing in these processes now will give you an opportunity for a pipeline of credits eventually. And you will be able to account for this under the SBTN [Science-Based Targets for Nature]."

The Pathway for Engagement can be followed repeatedly, or concurrently, to established new projects for various crops and geographies.

Section V: Summary

- The holistic benefits of regenerative agriculture and the recent shifts in soil science understanding lead to our recommendation that companies engage with regenerative agriculture through a pathway that prioritizes investment in on-the-ground pilot projects that support the multiple co-benefits of truly regenerative systems.
- Industry guidance on best practices for tracking impacts is rapidly evolving. Brands have a critical opportunity to get ahead of this emerging guidance by starting now to implement regenerative agriculture projects.
- On the ground project developers, locally rooted Technical Service Providers (TSPs), and in-house or contracted scientific expertise within apparel companies will all play critical roles in successful regenerative agriculture programs.
- Interviewees generally concurred that outcome-based standards are better suited for regenerative agriculture systems than practice-based systems, and there was emerging consensus against the development of new standards or certifications for regenerative agriculture—instead, "add-on modules" could incorporate outcome-based approaches.
- Brands themselves may not engage directly with specific farm-level accounting tools for regenerative agriculture, but companies must understand the specific measurement and assessment components involved in these tools.
- To realize the full potential of regenerative agriculture, there is a critical need for apparel and textile sector companies to integrate innovative financial support models from the start.
- Interviewees emphasized that brands should consider regenerative agriculture projects as "an investment" in a fundamentally new model. Section V (Step 5) outlines multiple concrete examples of creative financing approaches to allow this.
- For companies that have identified specific options for carbon credits as a component of a larger reductions-focused strategy, two recently released reports offer an opportunity to compare existing carbon crediting protocols.
- Investing in regenerative agriculture programs for their broad range of co-benefits for soils, nature, and communities represents the "no regrets pathway" for apparel and textile industry companies.

Section VI

Policy Drivers and Considerations for Regenerative Agriculture

Policy drivers and considerations for regenerative agriculture

Interviewees for this project were quick to point to the role of policy as an additional driver for growing involvement in regenerative agriculture by corporate entities. In the case of regenerative agriculture, this policy landscape quickly expands from traditional industry engagement areas like trade policy to include agriculture and climate legislation in several countries.

Globally, single use plastic bans were identified as a key development by several interviewees. As Fred Briones of the Native American Fiber Program sees it, apparel and footwear manufacturers must recognize that they may soon become liable for fossil fuel-based materials that they rely on today. As he points out, "You can look in parallel with bags, polyethylene, single use plastics—these are banned in several countries . . . So is nylon going to be banned? Those are the policies that are coming." Briones' forecast also echoes emerging policy bans on glyphosate in Germany, Austria, and several U.S. states[108] and a global trend towards mandatory climate-related disclosure policies.[109]

In the U.K., the New Economics Foundation and Croatan Institute offer detailed recommendations relating to the new, post-Common Agricultural Policy (CAP) legislation in their report "Credit Where Due: Financing a Just Transition to Agroecology in the Aftermath of Brexit." Separately, it is expected that the next iteration of the EU's CAP (due in 2023) will support environmental outcomes such as soil health, water quality, and biodiversity that are delivered by regenerative agriculture. These developments will be important to monitor as other countries look to ecosystem-based agricultural payment systems as well.

In the U.S., reform efforts related to regenerative agriculture have focused primarily on the U.S. Farm Bill, due for reauthorization in 2023. Industry, NGO, and funder groups are actively working to shift the crop subsidy system, which currently serves as a disincentive for crop diversification, crop rotations, cover cropping, and other key regenerative practices.

On the horizon, Textile Exchange will continue to advocate for the Preferential Tariff Project it presented at COP26 to include regenerative producers.

These rapid policy developments present an opportunity for the apparel, textile, and footwear sector to be more involved in in advancing regenerative agriculture within the agriculture sector overall and in policy development in particular. A closer connection to these rapidly evolving efforts will help ensure that apparel brands can help shape the latest policy developments, financing models, and research initiatives. Textile Exchange is expanding its efforts to play a leadership, convening, and networking role in this context.

Recommendation 7:

To advance the field of regenerative agriculture overall, apparel, textiles, and footwear sector companies should increase information sharing with the field of regenerative agriculture in the food and beverage sector. Crop rotations involving food and fiber crops in regenerative systems mean that unified marketing support will be increasingly important, while a closer connection to these rapidly evolving efforts will help ensure that apparel brands influence the latest policy developments, financing models, and research initiatives. While apparel brands will need to make judgments on the initiatives they engage in, closer connections will continue to help Textile Exchange's members take a leadership role in this growing field and ensure that regenerative agriculture conversations are framed around "food and fiber."

Section VII

Recommendations, Opportunities, and Next Steps

Recommendations, opportunities, and next steps

Recommendation 1:

Companies should approach regenerative agriculture as an investment in a fundamentally different system that has multiple co-benefits, not a variation on the predominant extractive model. Centuries of Indigenous knowledge and the weight of scientific evidence show that regenerative practices can make critical contributions to improving soil health, biodiversity, water availability and quality, and to a fundamentally different business approach that prioritizes community and ecosystem health. In contrast, soil science understanding of how carbon is stored in soil is in a state of flux. As the science continues to evolve, the industry should proceed with due diligence around claims related to GHG impact reduction from soil carbon sequestration as well as around carbon credits and markets.[110] Regenerative agriculture projects should be part of a comprehensive climate strategy that prioritizes GHG reductions and takes a holistic approach to climate resilience. Further guidance on this concept is discussed in Appendix B and available from the GHG Protocols and the Science Based Targets initiative.

Recommendation 2:

To be fully "regenerative," projects must include a human element that prioritizes justice and equity and acknowledges the Indigenous roots of regenerative practices. Brands must ensure that those who are the direct stewards of the land—including Indigenous people, communities of color, and farmers, or their chosen representatives, as appropriate for the project context—have an active decision-making role in any regenerative agriculture project from the start. As Kelsey Scott of Intertribal Agriculture Council put it: "If the humans in the system are not getting healthier, we are not truly regenerative. And that's not just the producers, but the community also."

Recommendation 3:

Regenerative agriculture projects can help brands fundamentally rebuild sourcing models to align with an industry-wide push for direct connections and transparency down to the Tier 4 level. This approach requires a commitment to relationship building, including working with growers, their direct representatives (such as co-ops), and project developers to develop new supply chains and acknowledge the timelines needed to integrate regenerative practices. This report's Engagement Pathway and Matrix of Regenerative Programs offer a way for companies to assess the landscape of potential partners and implement just and equitable pilot approaches across a range of crops and geographies.

Recommendation 4:

Companies should examine their staffing and partnership structures to expand their scientific and technical capacity to understand and engage in meaningful regenerative agriculture projects grounded in fast-evolving soil science. This also involves understanding the shortcomings and limitations of currently available data in the context of broader impacts. As part of this overall approach, brands should consider investing in the role of Technical Service Providers for regenerative practices—the lack of such trusted, on the ground partners to help farmers implement regenerative approaches has emerged as a key barrier.

Recommendation 5:

Regenerative agriculture's documented co-benefits suggest that outcome-based standards may be best suited for this evolving field, potentially linked to or in conjunction with practices. Interviews and research for this project also revealed an emerging consensus against the development of new standards or certifications for regenerative agriculture. Instead, brands could assess the development of add-on modules that respect the rigor of existing standards and the inherent place-based nature of regenerative agriculture, while developing outcome-based methods for assessing regenerative impacts on soil health, water systems, biodiversity, and social justice and livelihoods.

Recommendation 6:

To deliver on the recommendations above, any regenerative agriculture project must include the development of creative financing mechanisms that share the risk of transitioning to regenerative practices with farmers. In addition to long-term purchasing contracts, brands can seek a combination of funding sources across the organization to ensure that the success of the project is a shared financial goal across the company. Brands should also expand their thinking about creative financing approaches to understand how their capital could unlock other financing, drawing on a growing number of models including grants, loans, investments, public financing, and programs like the Impact Incentives that pay growers directly for ecosystem benefits. Investments in land ownership or secure land tenure are a critical part of this approach overall—both to incentivize long-term

Recommendations, opportunities, and next steps

practice shifts and to address a history of land theft from Indigenous and Black farmers.

Recommendation 7:

To advance the field of regenerative agriculture overall, apparel, textiles, and footwear sector companies should increase information-sharing with the field of regenerative agriculture in the food and beverage sector. Crop rotations involving food and fiber crops in regenerative systems mean that unified marketing support will be increasingly important, while a closer connection to these rapidly evolving efforts will help ensure that apparel brands influence the latest policy developments, financing models, and research initiatives. While apparel brands will need to make judgments on the initiatives they engage in, closer connections will continue to help Textile Exchange's members take a leadership role in this growing field and ensure that regenerative agriculture conversations are framed around "food and fiber."

Opportunities: Where the gaps in knowledge lie

- As Bradford et al note: ". . . the more than 40-year history of soil biogeochemical modelling in agricultural systems is based primarily on the long-held paradigm of biochemical resistance."[111] New modelling efforts to represent the emerging understanding of soil carbon persistence, along with high-resolution field measurement technologies, will be critical for filling current gaps in knowledge.
- Impact assessments for other criteria, including biodiversity, water, and livelihoods and social justice, also still rely on a widely varying set of approaches that have not fully coalesced into holistic measurement approaches for regenerative agriculture systems. Improving these holistic measurement systems is key for understanding the full co-benefits of regenerative agriculture.
- Mobilizing regenerative finance will require additional work: "Multiple parties have recognized the importance of finance, but not offered any specific details for how to mobilize it in any detail—this is a fundamental barrier to the urgent and necessary change in the sector."[112] Fully exploring these details is a key phase II research need.
- Key knowledge gaps and recommendations are just as closely connected to the areas of financing and fundamental business model shifts as they are to soil science or ecosystem co-benefits.
- Textile Exchange will provide opportunities for members to directly address these key barriers to the implementation of regenerative agriculture through a Regenerative Community of Practice, which will include engagement opportunities related to additional research and collaborative action. More information will be available on textileexchange.org later in 2022.

In the words of one participant in the Forum for the Future "Growing our Future" initiative:

> "...If we are serious about regenerative agriculture we will not start with what happens on the land, but with what causes how the land is treated, which starts with who owns, governs, and controls the systems. And today's ownership, governance, and control is the main reason we have the global crisis we collectively confront."[113]

Section VIII

Case Studies

Case study 1: J.Crew and Madewell / 5Loc Cotton

Crop: Cotton

Geography: High Plains of Texas

Regenerative practices involved:

- Cover cropping
- Crop rotations
- No-till
- Compost

Supply chain structure: Growers; Calcot; J.Crew/ Madewell mills and factories

Certification or standard(s) used: regenagri

Financing mechanism for the transition: Long-term contracts

Spotlight on:

- The Key Role of Aggregators
- Long term contracts as a financing tool
- Implementing flexible approaches based on geography

The recent partnership between J.Crew/Madewell, 5Loc Cotton, Calcot, and Texas cotton growers illustrates many of the best practices and partnership approaches outlined in this report.

The project idea began with a vision to create a larger impact on the environment by supporting producers to transition to more sustainable practices. J.Crew/ Madewell's interest was to experiment with regenerative production, develop a fully traceable supply chain, and learn from the project as the company assessed the potential for regenerative approaches across its main crops. Both partners hoped "to incentivize farmers to make the move—to organic and onward to regenerative," as Brent Crossland of 5Loc Cotton puts it.

In its first year, the 2021 harvest, the project worked with growers who are a mix of transitional to certified organic as well as transitional to regenerative approaches. The cotton will be identified as being in transition to regenerative for the first year, with a goal of 1000 bales. Once this pathway is established, the partners will consider expanding to work with conventional farmers who want to move to organic and then regenerative but need support.

A key partner in this project is the California-based cotton cooperative Calcot. Calcot is a marketing cooperative that handles cotton produced by its members in the U.S. states of California, Arizona, New Mexico, Texas, Oklahoma, and Kansas. In the project, Calcot functions as an aggregator. Crossland is working with Calcot to bring potential farmers for this project into one inventory, which can then be traced directly from the individual farms to the cotton gin.

As Crossland puts it, "The farmers are really interested in doing more than a contractual thing. And typically the whole game has been to buy it as cheap as you can from the farm and sell it as high as you can to the spinner. That's why I like working with Calcot. The fact that they are the growers and they are a co-op—they are a true partner to both parties."

From J.Crew/Madewell's perspective, says Director of Corporate Social Responsibility Gonzalo Pertile, the role of Calcot as an aggregator "was also critical—mills are used to working with cotton aggregators, and connecting them with farmers and co-ops directly is a different approach." The aggregator helps smooth the transition from mills' traditional practice of buying cotton on the open market, which reduces traceability, to buying the cotton from a known supplier in order to maintain traceability along the full supply chain.

As Senior VP and Head of Sustainability Liz Hershfield summarizes it:

> "So the traceability is key, key, key."

Crossland also has praise for another key resource in this project, No-Till Texas and its Soil Health Symposium. This farmer-led association, backed by researchers and scientists, provides practical demonstrations and grower support for no-till and other regenerative practices. Crossland describes attending their last conference pre-Covid: "Farmers were telling farmers how great this [regenerative approach] is. I believe that is really going to drive the regenerative practices that we need in that area."

Case study 1: J.Crew and Madewell / 5Loc Cotton

From the grower side, he says:

> "This is a groundswell because it works."

For the pilot project, Crossland will work with growers and Technical Service Providers to implement three major practice categories:

- **Cover cropping:** This will include planting into cover crops, especially winter annuals like winter wheat. Crossland notes that the arid Texas high plains climate poses challenges for some cover crops: "We're still trying to understand which winter annuals are best for the region—cereals, triticale, leguminous crops—but on those, without the rainfall it's tough."
- **Crop rotations:** The project aims to support growers to move to a three- to four-year rotations of grain sorghum, sunflowers, and peanuts. Many have already integrated peanuts into their rotations with irrigation. Some will also be integrating grazing options into their cover crop.
- **Conversion to no-till:** An especially important approach given the high wind erosion in this region.

Other practices involved include compost and manure applications to build soil organic matter and the use of buffer strips and restoration of playa lakes to provide habitat for waterfowl.

The project will generally follow regenagri certification, although as Crossland notes, "regenerative certifications are still in their infancy, and that creates challenges from geographic standpoint—we probably will modify in that geography." Use of GMOs will be prohibited for in-transition and certified organic crops, but they can still be utilized in the regenagri programs. In other words, growers have the ability to choose practices that work for them—for example, using cattle to graze down a cover crop that is growing too lush for no-till approaches.

Financing mechanism:

As part of the project, J.Crew/Madewell committed to a long-term contract with the growers. The contract length will be three years, which is also the length of time it will take some participating growers to obtain organic or regenagri certification—a key approach to providing growers the stability to make the transition to regenerative practices.

Crossland emphasizes that "having the long-term commitment is important. J.Crew/Madewell is committing to the partnership, and for the farmers, that's a good thing, knowing that there is a secure demand—I call it the 'sleep well' element."

In the first year, Pertile notes, J.Crew/Madewell is not messaging the project from a marketing perspective. They are also running other pilots with different crops and partners. As he puts it, "We are learning and using this to get a clear sense of the regen space. Our hope is that next year we will learn a lot more about this from all the pilots. Then after that, the idea is to be able to message these programs in a much larger way."

Crossland has one final recommendation for brands: invite growers in to visit them at their offices, as well as taking the time for field visits. As he puts it, "Farmers LOVE to showcase what they're doing to a brand, because most of the time they don't know where their cotton goes. And I would encourage the opposite—bringing growers into the brand. It's not the bricks and mortar, it's your day to day. They get just as much excitement from learning what you do as you would from going to the farm or their gin."

Case study 2: VF Corporation / Terra Genesis International

Crop: Rubber

Geography: Thailand

Timeline/lead time to product used: Pilot launched in 2019, Preliminary Sourcing Initiated in 2021, Product Launch in 2023

Regenerative practices involved:

- *Ecological:* Native plant and food plant intercropping, multi-strata agroforestry, bird/pollinator habitat, natural nutrient cycling, soil revitalization through soil cover, erosion prevention, and increased quantity and diversity of organic matter
- *Social:* Premium pricing structures, producer agency in project development, forest gardens provide a diversity of yields for family use and nutritional security, reducing costs and diversifying income, continual communal learning and exchange process

Supply chain structure: Farmers tap and collect latex; delivery of latex to farmer-cooperatives or local processors, which process the latex into rubber sheets that are exported for use in making shoe soles; purchasing by VF Corporation

Certification or standard(s) used: Terra Genesis ROV™ (Regenerative Outcome Verification)

Financing mechanism for the transition: Premium purchase price

Spotlight on:

- On-the-ground relationships
- Ensuring a "drop-in" substitution of regenerative products

Photo: Sigmund (Sigkyrre). Rubber trees, Thailand.

The partnership between VF Corporation, including its Timberland, Vans, and The North Face brands, and rubber producers in Thailand—as facilitated by and co-developed with project developer Terra Genesis International, PBC—has established a regenerative rubber pilot that illustrates the critical need for trust-based relationships with local farmer communities.

As Luke Smith, Partner and CEO of Terra Genesis, recounts, their design firm already had a relationship with a network of rubber growers in Thailand. This connection was a direct result of relationships developed over the long term by Terra Genesis's Michael Commons, who has lived in Thailand for 20 years and practices forest gardening with his family. As Commons got to know these Thai rubber

Case study 2: VF Corporation / Terra Genesis International

farmers, he observed that, "They were already practicing a very regenerative form of rubber production—biodiverse, higher yields, and studies were already showing that they outperformed monoculture systems."

However, Smith adds, "What these farmers didn't have was an ability to differentiate their product and receive a premium and therefore be able to expand that to a wider network of producers. So really what they needed was long-term committed partnerships with buyers who recognized and wanted to support what they were doing."

Smith put together materials on the project and sought to build a relationship with a values-aligned buyer. When he met with Timberland, they expressed interest in partnering. From the Timberland side, as Zachary Angelini, Senior Manager of Environmental Stewardship, describes it, "We had begun digging into the traceability of our natural rubber supply system and were searching for solutions that could reduce our risk of deforestation. What excited us most about this project was the opportunity go beyond risk mitigation, and actually co-create environmental and social benefits within our supply system."

Project developer Terra Genesis has played a role in developing a monitoring system for the project, which, Smith emphasizes, "The community has been closely involved in developing because it is a monitoring tool for them, too." All parties in the project will benefit from this monitoring system, he adds: "Brands want to say this is the story. And investors want to know that they are getting the impacts."

The trust-based, direct partnership with the farming community, including consultations with local community elders, is a key feature of this case study. As Textile Exchange's Beth Jensen, formerly of VF Corporation, sees it, "The reality is that you don't often have that level of connection with the on-the-ground farmers and growers—which is especially important as you are trying to de-risk it for them and build the necessary trust."

This project is working to supply regenerative rubber that can drop into an existing set of specifications, including grading and formulation needs. While this will still involve VF Corporation building a new supply chain at the Tier 4 level, it will not require the company to re-tool all aspects of its production specs for the rubber involved.

Financing mechanism:

VF and its Timberland, Vans, and The North Face brands have invested in this project by supporting Terra Genesis' project development process and by paying a healthy premium that will incentivize more farmers to transition to agroforestry production and strengthen the farmer cooperatives that represent them.

As Smith puts it, "It's great when a brand wants to pay a premium for a product, but even better when they are willing to invest in the project."

Overall, Smith notes that he is seeing more projects where infrastructure is needed to support regenerative practices and/or traceable post-harvest supply links, "so those buyers have to become investors as well as buyers. More and more brands appear to be willing to become investors in regenerative supply development, either through insetting or some other internal funds."

In the end, Smith says, "We truly believe that a regenerative supply system requires deep trust and co-creative relationships between stakeholders. Our preferred way of working is to have people on the ground who can develop those relationships and trust that enables the project to move forward in the best way. We've seen too many instances of projects not having that trust and things going awry."

Case study 3: Oshadi

Crop: Cotton

Geography: Tamil Nadu, India

Regenerative practices involved: Agroforestry, compost, non-synthetic pest control, free grazing, crop rotation, green manure plantation, water saving and rainwater harvesting

Supply chain structure: Hybrid (in-house + outsource), all processes based within 100km from the farm

Certification or standard(s) used: Intentionally relies on direct communication with growers rather than certification.

Financing mechanism for the transition: Funding from brand partners

Spotlight on:

- Supporting and promoting Indigenous practices with respect for local communities
- Regionally appropriate "package approach"
- Integration along the supply chain

Photo: Ashish Chandra, courtesy of Oshadi. Oshadi's regenerative farm in Tamil Nadu, India.

India-based apparel brand Oshadi has often been called a regenerative pioneer. As founder Nishanth Chopra sees it, they are just at the beginning of the journey: "Brands tell us—you are pioneers, using regenerative. We are maybe 20% regenerative. Only when you reach 80%, then you are what you stand for."

Nonetheless, their efforts to date offer a model and many lessons learned for other brands and companies.

To begin with, Oshadi's approach is rooted in Chopra's own connections to the brand's sourcing region in the Tamil Nadu state of India, and to the communities there who are still using Indigenous farming practices. As he

Case study 3: Oshadi

puts it: "I am from South India, where there is still a mix of Indigenous practices and chemical farming—compost, horn manure, urea, Roundup. So, we took good bits and pieces."

Oshadi supports growers to implement what Chopra calls a "package" of practices and corresponding implementation support, including:

- A traditional compost tea and pest repellent made using green chili, ginger, local plant leaves extract and five "gold products" that come from cows: dung, urine, milk, curd, and ghee
- Live fence techniques that create a home for other species
- Land preparation and residue composting support
- Support for compost production or compost supplies
- Water resource and rainwater management
- A requirement for implementing tree planting and agroforestry.

To provide a demonstration site for these interrelated regenerative practices, Oshadi has established its own farm in the district. The farm has now become central to Oshadi's model, both as proof of concept and as a support center for the network of growers that the brand supports.

In some cases, Chopra acknowledges, growers were resistant to most of the regenerative practices involved, since they seemed to be a threat to the yield-driven conventional system. Growers were reluctant to share water rights, so Oshadi provided support to the grower collective to set up a drip irrigation and watershed management system. With agroforestry, initially farmers were resistant to giving up any land area for tree planting. But Oshadi integrated this into the support package, and growers are now finding that the trees play a valuable role, including shedding flowers and leaves that can go into compost.

Overall, Chopra reminds us, "Sustainability is a privilege. We think about it because it we have a privilege to think about it. They [the farmers] do want to switch. But they are taught to burn the residue; they don't have a way out." To address these dynamics, Chopra says, the package also comes with a message: "We will be with you throughout."

Financing mechanism:

Oshadi's unique financing model extends the concept of a regenerative system to the economic model for all involved. Oshadi supports the cost of the package up front, helping farmers be able to afford to implement regenerative practices as an alternative to the extractive cotton production model. Cotton prices are established based on that year's weather and crop conditions, and Oshadi and its brand partners commit to a minimum price in advance. As a result, Chopra says, "Before working with us, farmers were making about $400 per acre yearly. A really good yearly income was $700 per acre. Now they earn over $1400 per acre."

Oshadi is also currently working on providing healthcare (health insurance already in-progress) and education for all their employees' children and building community housing (a project they will be facilitating next year). Notably, Oshadi's holistic approach to regenerative continues along the supply chain, with the inclusion of a requirement for 100% renewable energy use by their spinners and mills, as well as required wage thresholds. As Chopra sees it, "It has to start at the roots. There is a supply chain that is full of chemicals and toxicity, and people and resources are exploited. But once you start, you start thinking, 'what's next?' Once someone decides to change, it travels along the chain."

Asked what guidance he would have for other brands on how to approach relationships with local and Indigenous farming communities, Chopra has clear advice: "It is not coming in with saviorism language. Be on the ground and see things. Have a connection with the people, a connection with the soil."

Chopra emphasizes that brands' claims must respect the Indigenous roots of regenerative agriculture and the ongoing need for greater justice and equity in the global apparel supply chain. As he put it, "Some brands say, 'We want to take care of your farmers.' But our farmers can take care of themselves. They don't need your charity. That kind of mentality has been driving this work for such a long time. It is not blame, but it is an extremely different mindset. There are two ways to start: 'We are going to impose a certification,' or 'We are going to work together to make it happen.'"

Advocating for the latter, Chopra says: "We have Indigenous wisdom, you have funds. That is a better USP to sell in the market. I would not say that is a fair relationship, because it is still only 200 dollars a month per acre for farmers. But at least it is a good root to start from."

Case study 4: Shaniko Wool Company

Crop: Merino and Merino/Rambouillet Wool

Geography: U.S., Western states - CA, NV, OR, UT, CO

Timeline/lead time to product used: 12 months

Regenerative practices involved: No-till / reduced tillage, cover cropping, nitrogen management, rotational, mob and multi-species grazing, grazing of post-harvest agricultural residues, interseeding and nutrient management

Supply chain structure: Wool Top is sold to U.S. spinning mills and manufacturers

Certification or Standard(s) used: Responsible Wool Standard (RWS)

Financing mechanism for the transition: Initial data collection being self-funded by rancher/founder of Shaniko Wool Company.

Spotlight on:

- Building on existing RWS certification
- Need for rigorous data collection to document regenerative benefits
- Need for brand partnerships to support the up-front costs of data collection

Jeanne Carver's work to document regenerative outcomes on her network of ranches is a continuation of the pioneering work in sustainability over the past 30-plus years in their own ranching operation. Jeanne and her late husband Dan began their mission to connect their wool and the practices that produced it to U.S. manufacturing and American designers and brands back in 1999. In 2015, they became involved with Textile Exchange's Responsible Wool Standard (RWS) as a Pilot Audit site, and then became the first ranch in the world certified to RWS. By 2018, they established Shaniko Wool Company to bring other ranches under certification and scale the supply of RWS-certified American wool available to brands.

Carver recalls, "After years of successful relationships with agency partners in the management of natural resources, I had the opportunity to become knowledgeable about Textile Exchange." Carver had witnessed the increasing disconnect from fiber to product, just as in the food system, and believed in the importance of reconnecting this process. "I could see that Textile Exchange was becoming an important partner with a critical role," she says. "Textile Exchange's work is interfacing between growers, supply chains, brands, and the consumer. It is really convening and building a community that is working to re-join a broken circle. That is a community I want to be part of."

In recent years, Carver observed that brands were asking her questions about impacts that went beyond the RWS Certification. As she recounts, "When you become audited by a third party, it adds to your credibility and increases confidence for your customers. Even so, some still questioned our practices: 'You are meeting the standards, but what are your real impacts to the climate situation?' I said, 'Gosh, I think we're doing pretty good, but we don't have any data to support our work.' Why do I feel it is important to do something more [than RWS]? We want to know our ecosystem impact, use that information to help influence future management decisions, and better inform our brand partners and customers about the most important aspect of fiber production.'"

In Carver's view, "This is not just for credibility. The greater good is how this will influence our management from now on, and how it will help our textile partners and consumers in their fiber choices." Carver is quick to emphasize that, "For the most part, we did not have to change our practices to be [RWS] certified, but we changed our monitoring and documentation. And now we are taking the next step with climate-related impacts—more comprehensive data and measurement."

To obtain the data and proof of regenerative impacts she felt she needed, Carver reached out to Dr. John Talbott at Oregon State University, who led the development of their Carbon Initiative model. The model includes a rigorous soil and biomass sampling protocol across all seven ranches in the Shaniko network. This involves:

- 250 separate monitoring stations across 1.5 million acres
- Measuring soil to a depth of 20 cm at every site, and at every fifth site to 60 cm
- Measuring biomass at every site
- Samples are taken in the early growing season and post growing season and analyzed at state-of-the-art laboratories.

Case study 4: Shaniko Wool Company

As Carver puts it, "We wanted a sampling protocol that would stand up against all challenges."

Sampling began on her own ranch in the spring of 2020, for which they now have two years of data. They moved sampling across all acreage (seven ranches) in 2021.

At the time sampling began, the team also worked to input historic data from Carver's ranching operation into the COMET-Farm tool, in order to ultimately determine their net carbon budget, and use their sampling data to actually quantify soil organic carbon.

They will continue sampling on all ranches in 2022 and beyond, with the goal of getting all seven ranches into COMET-Farm in 2022. This will allow Shaniko Wool Company to know the net carbon budgets and soil organic carbon levels for all seven ranches individually, and as an aggregate Farm Group.

Long awaited preliminary results for Carver's ranch, based on two years of measurement, were presented at the Textile Sustainability Conference in Dublin in November 2021.

Soil Organic Carbon levels on this first Shaniko Wool Company ranch are indeed increasing, showing a combined **annual increase of 3.98 tons/acre** across 32,000 acres, for a total of 127,360 tons sequestered.

Combined with emissions results from COMET-Farm, this data and research is solid evidence that their ranching operation is banking carbon on an annual basis in their soils and grazing lands.

Carver is excited about the next year, as she believes they will see similar results for all seven ranches. She has earned more support from Oregon State University's Agricultural Research Division, and they have assigned a post-doctoral student in Range Science to the Shaniko Wool Company research project for 2022.

Carver shares one of the greatest challenges to their project, "The COMET-Farm tool has been built largely with data and mathematical assumptions based on cropping systems, not grazing systems." Carver says her OSU team is currently working with the COMET-Farm team to share data collected in order to adapt COMET-Farm to work better for grazing systems." As she puts it, "They know that their model is heavily geared to cropping. We've been told by their people that there is not enough grazing data for the model to work effectively. We are a 1.5 million-acre laboratory."

Financing mechanism:

Carver is self-funding this program. She believes it has great value for the future for both agriculture and the textile industry. She estimates that her costs will run $60,000 to $100,000/year initially, for all the mapping, soil and biomass sampling, analysis and organization of data. Asked how brands could support this work, Carver says:

> "If they are a brand who is going to use and tell this story, or that has a foundation, maybe they want to contribute to the carbon work—the costs of measuring and analyzing this important data and documentation of the climate impact of preferred fibers."

As a strong supporter of the RWS program, Carver envisions that the kind of data on soil health and climate benefits that she is collecting could someday be part of the RWS program, perhaps along the lines of the "add-on module" approach discussed above. [Editor's note: Textile Exchange is currently piloting a geospatial data collection program with a group of existing RWS certified sites.]

As she envisions it, "Wouldn't it be great, if the same brands that source our RWS wool supported the measurement and documentation of the positive ecosystem impacts of the wool production?"

For now, Carver says:

> "We need this data and I'm going to press on with getting it so we can learn from it. The greatest contributions we make are our positive ecosystem benefits—our greatest deliverable is one we don't get credit for and we don't sell."

Glossary

Glossary

For this glossary, this report relies on definitions from a range of published sources as cited.

Carbon-related terms:

Accounting/Carbon accounting/Carbon counting:

"Carbon accounting is the process by which organizations quantify their GHG emissions, so that they may understand their climate impact and set goals to limit their emissions. In some organizations, this is also known as a carbon or greenhouse gas inventory."[114]

In discussions of this topic, **it is important to differentiate between counting carbon and accounting for carbon**. "Carbon counting deals with the science: how you measure the amount of carbon captured in forests, farms, and prairies, as well as the changes in that amount (the carbon flux). Carbon accounting deals with the politics: how to take those measurements and the factors impacting them and create a global set of rules for translating the changes in carbon stocks and the factors impacting them into ledger entries on which people can make decisions."[115]

Additional/Additionality:

"For an emissions reduction project generating carbon credits, being additional means that the project activity would not have existed in the absence of carbon market incentives and that the project reduces emissions and/or physically removes carbon from the atmosphere beyond the business-as-usual scenario. Additionality is a core requirement of all projects that produce high quality carbon credits."[116]

Carbon credit:

"A "carbon credit" (also known as a "carbon offset") is an electronic and serialized unit that represents one ton of CO_2 equivalent that is reduced, avoided, or sequestered from projects applying an approved carbon credit methodology."[117]

Carbon crediting program:

"A program under which emissions reduction projects are certified and issued carbon credits. Examples include programs typically used for emissions compliance obligations, such as the Clean Development Mechanism (CDM), and programs typically or exclusively used for voluntary carbon credit purchases, such as the Gold Standard, Verified Carbon Standard, Climate Action Reserve, American Carbon Registry, and Plan Vivo."[118]

Carbon credit methodology:

"A set of criteria, procedures and technical specifications applicable to one or more project activities which sets out the requirements by which a project developer must demonstrate additionality and monitor and quantify a project's emission reductions under a carbon crediting program."[119]

Carbon market:

"A market in which units—allowances or credits—are traded between entities. When units are used for voluntary purposes or where carbon credits are certified solely by voluntary programs or standards, the market is often referred to as a "voluntary" carbon market. Where units are used to satisfy legal compliance obligations, this is often referred to as a "compliance" market."[120]

Insetting:

"Insetting is a relatively recent concept for which there is no universal definition or standard. Likewise, there is ambiguity in how emission reductions from insetting should be reported, and whether such reductions can be used to meet a company's science-based targets. Early definitions originate in part from a 2009 technical paper from Ecometrica, which defines the 'new paradigm' of insetting as an investment within the company's sphere of influence or interest, but outside of a company's Scope 1 and 2 emissions.[121] Some have proposed a narrower definition that describes a company's investment in a verified carbon project within its supply chain, and the subsequent claiming of those—or a portion of those—carbon credits. These definitions will continue to evolve."[122]

Offseting:

Generally, carbon offsets (See definition of "carbon credit" or "carbon offset" above) are developed as tradeable commodities for the "carbon market." The offset provider and the purchaser are separate entities, and the source of the offsets may be far removed from a company's supply chain. "Carbon offsets are widely used by individuals, corporations, and governments to mitigate their greenhouse gas emissions on the assumption that offsets reflect equivalent climate benefits achieved elsewhere."[123]

Permanence:

"A requirement that the issued carbon credits represent long-term reductions or removals and that measures are in place to mitigate the risk that the reduction or

Glossary

removal is reversed. For SOC projects, the permanence time frame generally requires that projects maintain activities that have led to SOC accrual in order to prevent reversals."[124]

Scope 1 emissions:

A company's direct emissions from owned or controlled sources.

Scope 2 emissions:

A company's indirect emissions associated with purchase of power, heat, steam or cooling.

Scope 3 emissions:

A company's indirect emissions that occur in their value chain, including both upstream and downstream emissions.[125]

Soil Carbon Sequestration:

"Soil Carbon Sequestration implies an increase in soil C for a defined period against a baseline condition where the increased C is sourced from atmospheric CO_2."[126]

Soil organic carbon:

The carbon contained within soil organic matter. Often abbreviated as SOC.

Soil organic matter:

"The fraction of soil that consists of decomposed plant, animal and microbial material."[127] Often abbreviated as SOM.

General terms:

Agroecology:

"The Food and Agricultural Organization (FAO) of the United Nations describes 10 interlinked and interdependent elements of agroecology . . . It follows a 'whole systems' approach to sustainability, social justice, and a secure global food system—but fundamentally requires a shift in power and ownership structures. . . Agroecology can address multiple interlinked crises and brings together three components: science, practice, and social movements. It has a clear political dimension and aims to change social relations, empower farmers, add value locally, and create short value chains."[128]

In this regard, agroecology can be seen as having many components that apply to the emerging definition of regenerative agriculture outlined here, especially as regards the need for a shift in power and ownership structures.

Biodiversity:

"Biodiversity, or biological diversity, is the diversity of life existing at three levels: genetic, species, and ecosystem. Biodiversity includes variety in all forms of life, from bacteria and fungi to grasses, ferns, trees, insects, and mammals. It encompasses the diversity found at all levels of organization, from genetic differences between individuals and populations (groups of related individuals) to the types of natural communities (groups of interacting species) found in a particular area. Biodiversity also includes the full range of natural processes upon which life depends, such as nutrient cycling, carbon and nitrogen fixation, predation, symbiosis and natural succession."[129]

Indigenous Peoples:

"Indigenous Peoples are distinct social and cultural groups that share collective ancestral ties to the lands and natural resources where they live, occupy or from which they have been displaced. The land and natural resources on which they depend are inextricably linked to their identities, cultures, livelihoods, as well as their physical and spiritual well-being."[130]

Impacts/Outcomes:

In discussing outcome-based and practice-based standards, in the general use of the terms "impacts" and "outcomes," and in the development of the Matrix of Regenerative Programs, this report has attempted to follow the five-step framework presented by New Foresight in its report to ISEAL, which in turn draws on the "Glossary of Key Terms In Evaluation And Results Based Management" developed by OECD:

"Inputs:

The financial, human, and material resources used for the development intervention.

Activities:

Actions taken or work performed through which inputs, such as funds, technical assistance and other types of resources, are mobilised to produce specific outputs

Outputs:

The products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.

Glossary

Outcomes:

The likely or achieved short-term and medium-term effects of an intervention's outputs.

Impact:

Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended."[131]

Indicator:

"Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor."[132]

Outcome-based standards:

"Outcome based standards are those standards which, to credit an entity with a certificate, require that entity to achieve an outcome or performance level rather than successful implementation of practices."[133]

Practice-based standard:

"Sustainability standards . . . based on an assessment of practices and processes that are expected to deliver positive outcomes for people and the environment, rather than on the actual outcomes achieved."[134]

Protocol:

"In research, protocol refers to the written procedures or guidelines that provide the blueprint for the research study, as well as good and ethical practices that should be observed when conducting research, such as good etiquette when dealing with participants, adherence to ethical principles and guidelines to protect participants, compliance with institutional review board requirements, not engaging in academic dishonesty, and so on."[135]

In the specific context of this report, a protocol is: "A guidance document that contains all relevant rules, standards, deductions, calculations and parameters for the calculation/estimation of emission reductions and removals, and for monitoring, verification and reporting of emission reductions and removals from an emissions crediting project."[136]

Appendix A

Report Process

Report Process

Key steps in the development of this report included the following:

- Initial project description and scope of work developed by Textile Exchange staff in Spring 2021, including an initial list of programs and tools to assess.
- Call for Input circulated in Textile Exchange's newsletter in Summer 2021.
- 25 stakeholder interviews in five categories (Brand, Farmer/Grower/Supply Chain, Civil Society/NGO, Professional Services/Project Developer, and Technical Experts/Scientists, with an effort to ensure perspectives from Indigenous people and people of color across categories) conducted between July and September 2021.
- Desk research/literature review of 100+ reports, scientific journal articles, and other sources conducted June-October 2021.
- Matrix of Regenerative Programs listings were developed using only publicly available, documented information developed by the organization in question, such as websites, published protocols and standards, and guidance documents.
- All organizations listed in the matrix were given an opportunity for an accuracy review of their listing in December 2021. Organizations were asked to provide publicly available documentation to support any requests for changes, and these sources were taken into consideration and applied as consistently as possible under the framework above.

Photo: Ashish Chandra, courtesy of Oshadi

Appendix B

Summary of Major Current and Developing Guidance Processes

Summary of major current and developing guidance processes

The table below summarizes the major developing sector guidance processes that are currently in place or emerging*. The first two major guidance processes, the GHG Protocol and Science Based Targets initiative (SBTi) Forest, Land, and Agriculture (FLAG), are focused specifically on GHG emission reductions and carbon dioxide (CO_2) removals. The GHG Protocol standards underlie the SBTi, and setting an SBT begins with the identification of company emissions, considering the three scopes of emissions defined by the GHG Protocol Corporate Standard: Scope 1, 2 and 3. In contrast, the Science-Based Targets for Nature (SBTN) and Convention on Biological Diversity (CBD) frameworks are attempting to help companies set broader targets that take into account the interconnected nature of ecosystems—an approach that is fully aligned with the principles of regenerative agriculture discussed above. Implications of this developing guidance are discussed further in Section V, Step 1 above.

Guidance Entity	Description of developing guidance	Relevance for Regenerative Agriculture	Timeline
GHG Protocol / Land Sector and Removals Guidance	New standards and guidance on how companies account for and report the following activities in their GHG inventories: • CO_2 removals and storage • Land use change emissions • Land management emissions and/or removals • Biogenic CO_2 emissions from products • Related topics.[137]	GHG Protocol's upcoming guidance will include key areas relevant for regenerative agriculture, including: • Accounting for carbon removals and their ongoing storage. • Methods for estimating carbon removals across different land uses (e.g. forest land, grassland, croplands) and carbon pools (e.g. biomass and soil carbon). • Traceability and attribution of lands generating removals in a company's value chain (i.e. scope 3 removals). • Distinguishing between removals accounted for using inventory methods reported in scope 1 or scope 3 vs. credited removals reported separately.[138]	Pilot testing in Q2 2022; released later in 2022.
SBTi FLAG Project	The SBTi's build on the GHG Protocols. The FLAG project focuses on "Methods and guidance to enable businesses in food, agriculture and forest sectors to set science-based targets (SBTs) that fully incorporate deforestation and land-related emissions."[139]	Focus is mainly on deforestation-related emissions. While the FLAG project will include a focus on carbon removals, they are not a major part of strategies to achieve climate targets in the short and medium term (5-15 years).[140]	Currently projected to be complete by Q1 of 2022.
SBTi Net Zero Standard	Covers a company's entire value chain emissions, Scopes 1, 2, and 3. Requires rapid, deep cuts to value-chain emissions; most companies will require cuts of 90-95%.[141]	Standard does not allow any net-zero claims until long-term SBTs are met. At that point, "a company must use carbon removals to neutralize any limited emissions that cannot yet be eliminated."[142] Allowable removals will be determined by the GHG Protocol / Land Sector and Removals Guidance above.	Piloted July -August 2021; launched October 28, 2021.
SBTN	The SBTN expands on the SBTs by developing targets for impacts beyond climate, including "integrated SBTs for all aspects of nature: biodiversity, climate, freshwater, land, and ocean."[143]	Critically, the SBTN will include targets that are designed to "Transform" current business activities.[144] This systems-level approach appears set to be in close alignment with the holistic goals of regenerative agriculture discussed above.	Released in 2022; aims for widespread adoption by 2025.
Convention on Biological Diversity	New global biodiversity framework, designed "to guide actions worldwide through 2030, to preserve and protect nature and its essential services to people. . . ." Includes 21 targets and 10 'milestones' for 2030.[145]	Multiple targets relevant to regenerative agriculture, including: "Ensure that at least 30 per cent globally of land areas . . . are conserved through effectively and equitably managed. . . conservation measures."[146]	Released June 1, 2021.

** As of January 2022*

Appendix C

What it Means to “Measure” and “Model” Soil Carbon and Other Regenerative Indicators

What it means to "measure" and "model" soil carbon and other indicators

To fully understand the crowded landscape of programs and tools in the field of regenerative agriculture, it is essential to examine what we mean when we say that these tools "measure" or "model" the impacts of systems that employ regenerative agriculture practices, and the way these are combined in tools and programs in the Matrix. As discussed in Section III above, key consideration of data privacy for farmers, he intersection of impact measurement and racial justice, and the development of locally relevant baselines must underlie this topic.

Impact assessment: soil carbon

Current approaches to measuring the impacts of regenerative agriculture, and especially to measuring soil organic carbon, rely on a curious combination of the old and new. On the one hand, sampling soil and measuring the carbon in the soil are still most often done with basic, low-tech field and laboratory techniques. Farmers, ranchers, extension agents, or other support personnel walk the fields with a sharp-pointed shovel, dig small holes and pull out a shovelful of soil, mix samples from across the field in a bucket, put a sample of the soil in a zip-top plastic bag, and mail it to a soil lab.[147] The locations for digging are determined by a basic process of laying transects, such as a grid or other method to divide the farm into relatively representative areas.

The process can be sped up with a tubular metal soil corer, but even with this, as Clemson University's extension service put it, "Any farmer will tell you that traditional soil sampling is a time consuming, labor-intensive process if done correctly."[148] Clemson's "sweatless" soil corer design may cut down on the sweat, but not on the time, high potential for variability, and relative expense of this soil sampling method.[149]

The depth of the soil sample has a major impact on the results of analysis, but deeper sampling means more work and more expense. As a result, the most common recommended depth for sampling is 15 centimeters, or 6 inches. However, recent research shows that many apparent impacts to soil carbon, especially related to reduced-tillage practices, are cancelled out when samples are taken to depths of 30 centimeters.[150] [151]

Back at the lab, the preferred method for measuring soil organic carbon involves placing weighed samples of soil in a ceramic cup, heating this to 900 degrees Celsius, and measuring the carbon dioxide gas that is released as a product of combustion. To account for different types of soil and measurement goals, other tests involving acids, other chemicals, and the measurement of soil bulk density can also be applied.[152]

While these methods have remained largely unchanged for farmers and field scientists, another branch of soil science has worked intensively over recent decades to develop sophisticated computer modelling systems that predict the dynamics of carbon in the soil. Dozens of new and updated computer models have appeared in recent years, each one relying on different underlying mathematical assumptions, as Campbell and Paustian outline in detail in a 2015 review.[153]

These models rely on various combinations of direct sampling and measurements to test and verify their predictions, but there is a fundamental mismatch between the amount of data needed to continually adjust and calibrate these models and the slow and laborious process of soil field sampling.

To address this need, many researchers and start-up companies have recently targeted another measurement approach: the use of spectrometry and remote sensing to measure soil carbon. Some methods measure soil carbon using the reflectance of soils in the visible and infrared spectra, on the principle that, "As carbon content increases, a soil's color darkens, giving it a slightly different spectral signature than soil with lower carbon content."[154] Other approaches use gamma rays to measure soil properties, based on the degree of reflectance of radiation.[155] Developing approaches include remote sensing with satellites, field-level use of pocket-sized reflectometers, and integrated systems that use AI to supplement modelling. These methods are early in development, and all still require a combination of scanning technologies calibrated with physical soil sampling to provide reliable results. A few programs using these approaches are included in the Matrix of Regenerative Programs.

The U.S. data analytics NGO Pecan Street notes that low-cost measurement technologies for soil carbon lag well behind other fields: "Due to underinvestment in the soil sciences and the agricultural sector for decades, application of the data and low-cost sensor revolution that has transformed almost every other economic sector is only beginning to take shape in agriculture. . . ."[156] This will be an important frontier for ongoing research efforts that will benefit the apparel and textile field overall.

What it means to "measure" and "model" soil carbon and other indicators

The soil carbon "floor" (or lack thereof)

Discussion of impact assessments has occasionally raised claims that some systems are already at a state of maximum impact.

As Bradford et al. note, it is true that "There may be instances where calls to build soil carbon may be incompatible with other goals, such as in some native rangelands used for cattle grazing where naturally low soil carbon and hence fertility is important for considering high levels of endemic plant diversity."[157] In simpler terms, there are native ecosystems that are partially defined by having lower carbon soils.

However, these authors emphasize, "All soils—from the most marginal to the most fertile—are vulnerable to soil carbon losses and fertility decline."[158] This fact argues that the principle of continuous improvement through regenerative practices can still apply to any soil type, even if the major goal of those regenerative practices may go beyond increasing soil carbon to focus primarily on soil microbial diversity, aboveground biodiversity, water holding capacity, or other impact areas.

The new soil science paradigm and Lehmann et al.'s idea of "continuous care" to keep soil carbon protected from microbes also argues that there will always be an ongoing need for these practices.

Impact beyond carbon: assessing soil health, biodiversity, water impact, social justice, and animal welfare

While soil carbon has received the lion's share of attention, measurement of several other categories of impact is also needed to fully assess whether agricultural systems are "regenerative"—keeping in mind the varying definitions of this term described above.

Impact assessment: soil health overall

The North American Project to Evaluate Soil Health Measurements, run by the U.S.-based Soil Health Institute, was developed to help identify a consistent set of indicators that could be considered to indicate soil "health." As the project's press release notes, "There is no standardized measurement for soil health in the United States; instead, different sets of measurements and methods can conflict and confuse farmers and field conservationists."[159] The project is supporting collaborative research to help the industry adopt standardized measurements to evaluate and improve soil health. Results of this project will be posted beginning January 2022 at the following link: https://soilhealthinstitute.org/north-american-project-to-evaluate-soil-health-measurements/

In the U.K., the Agriculture and Horticulture Development Board GREATsoils program is supporting a five-year research and knowledge exchange that seeks to increase understanding of soil biology and develop a toolkit to measure and manage soil health.[160] Further results can be found at: https://ahdb.org.uk/soil-biology-and-soil-health-partnership

Impact assessment: biodiversity

Current standards and tools use a wide range of methods to measure biodiversity impacts from regenerative systems. In discussion with project advisors, we opted to examine biodiversity indicators in three categories: soil biodiversity, plant biodiversity, and animal biodiversity. This approach mirrors the three-level framework found in the definition of biodiversity (see Glossary), while being simpler to grasp and assesses in agricultural systems. A few examples:

- In the Land to Market program, biodiversity of aboveground species in the paddock is assessed by counting and measuring coverage of the types of plant species present using a transect method, then applying biodiversity assessment tools from the scientific literature such as the Species Richness and Shannon-Wienner index.[161]
- The South African organization Integra Trust's iScore uses more basic indicators to document an outcome they call "Biodiversity promotion." These include:
  - For grazing systems: "The degree to which rotational/planned grazing is applied."
  - For cropping systems: "The diversity and integration between the number and type of crops, cover crops and livestock."[162]
- Under the Regenerative Organic Certification (ROC) practice-based certification, biodiversity assessment focuses on the absence of practices and conditions that would harm biodiversity. For example, the ROC standard includes:
  "4. BIODIVERSITY Practice Description / 4.1 Invasive Species: Farmers monitor and manage the infestation

What it means to "measure" and "model" soil carbon and other indicators

of unwanted exotic or invasive plants and animals, including insects, that may spread to natural areas on and off the farm. For example, managed grazing is an acceptable management practice for exotic weed control."[163] ROC's rigorous on-site assessment also monitors the use of organically approved pesticides that may harm pollinators, asks farmers and auditors to monitor native flora and fauna, and collects data on diversity of plantings.

As Helen Crowley points out, these wide-ranging approaches cause concern about a "lack of granularity" about the potential of regenerative agriculture. As she puts it, regenerative agriculture "is called a biodiversity solution—but it's only a biodiversity solution if you do certain things. . . [Planting] Eucalyptus [trees] will give you carbon but not biodiversity. We should be promoting planting a diversity of crops, and more co-existence of crops and animals."

"And with soil it's the same thing," Crowley adds. "The diversity of nematodes, fungi—you can measure that now. That is an outcome, that is what drives soil functionality. That is what you want to measure—the life in the soil. And soil carbon is just a proxy for that."

In the Matrix of Regenerative Programs, the three-level framework of soil, plant, and animal biodiversity is used to capture the ways that programs and standards attempt to assess biodiversity-related practices and outcomes in regenerative systems.

Impact assessment: water

As with biodiversity, the concept of "water impacts" includes a vastly complex set of natural cycles that function at the soil, landscape, and global level. The ecology of a given region, or a brand's particular goals, might lead to a primary focus on water availability, water quality, the presence of ponds and wetlands for wildlife, reducing runoff and erosion, or other dimensions. These areas are assessed in varying ways by the standards and programs reviewed for this report. A few examples:

- The Land to Market water assessment consists of a water infiltration test, designed to measure the rate at which water from rainfall or irrigation sinks into the soil. This low-tech and common approach is based on a method developed by the U.S. Natural Resources Conservation Service.[164] Reduced water infiltration rates are an indication of poor soil structure and soil capping which leads to erosion by surface water runoff.
- The Integra Trust iScore focuses on an outcome of "Water Use efficiency," defined for grazing systems as "The blue and green water use relative to the production value expressed as a ratio to a district and industry-specific norm."[165] This measure accounts for how efficiently water is used per unit of farm production but does not generate information about the water holding capacity of the specific soils or impacts on water quality.
- ROC's practice-based standard requires operations to integrate "Water Conservation and/or Wetland Restoration," and ROC also includes a requirement to preserve natural waterways: "Operations conserve and restore natural bodies of water, wetland, riparian areas, and associated habitats."[166] ROC's on-site assessment requires operators to describe farm water conservation measures, and specific steps taken to restore natural bodies of water and wetlands. The ROC standard also has stringent requirements for wastewater, including a prohibition on discharging untreated wastewater into natural waterways or soil.

As can be quickly seen, these various systems are interpreting the idea of impact measurements for "water" in widely different ways. Brands and companies will need to exercise care in determining which element of water use and quality is most important to them *before* attempting to evaluating tools, programs, or impact measurement systems.

In the Matrix of Regenerative Programs, a two-level framework of water availability and water quality is used to capture the different ways that programs and standards attempt to assess water-related practices and outcomes in regenerative systems.

What it means to "measure" and "model" soil carbon and other indicators

Impact assessment: social justice and livelihoods

In light of the perspective on Indigenous rights and racial justice in regenerative agriculture discussed in the Definitions section above, there is a growing consensus that it is critical to integrate measurements that track social, racial, and economic justice into the monitoring of regenerative projects. Apparel sector companies have the opportunity to take the lead on embedding justice into any system for evaluating regenerative projects.

The Regenerative Organic Certification currently offers nine options for underlying certifications that can meet its social fairness criteria, each of which defines "impact" on social fairness slightly differently (see figure 8 opposite). As one example, the Agricultural Justice Project Food Justice Certified standards "are an attempt to codify in concrete terms what making a legitimate claim of 'social justice' in organic and sustainable agriculture means." FJC Standards address:

- Workers' rights to freedom of association and collective bargaining
- Fair wages and benefits for workers
- Fair and equitable contracts for farmers and buyers
- Fair pricing for farmers
- Clear conflict resolution policies for farmers or food business owners/managers and workers
- Workplace health and safety
- Farmworker housing
- Interns and apprentices
- Children on farms"[167]

To date, the only regenerative agriculture program identified in this project that includes Indigenous leadership as a direct criterion to receive certification is the U.S-based Intertribal Agriculture Council Rege[N]ation certification. Many other programs are actively working to strengthen their engagement with and requirements for meaningful participation by Indigenous communities and communities of color.

In the Matrix of Regenerative Programs, social justice efforts are indicated with three categories: farmer livelihood and fair financing, workers' rights and fair labor, and Indigenous and BIPOC leadership and land stewardship.

Impact assessment: animal welfare

Compared to the other areas above, animal welfare impact assessments tend to have a more consistent set of criteria across the programs and standards reviewed for this report. These criteria are increasingly based on the framework of the Five Domains of Animal Welfare (a more recent iteration of the widespread Five Freedoms model): Nutrition, Environment, Health, Behavior, and Mental State. The Textile Exchange Animal Welfare Framework looks at key topics for animal management, sets a desired outcome for each, and maps the Five Domains to these, with the next level down in the framework setting the animal welfare aims. This model has been used for the development of the latest iterations of the Responsible Animal Fiber standards and could be used as the basis of requirements for any species.

In the Matrix of Regenerative Programs, animal welfare efforts are indicated with one column. However, brands should carefully investigate the underlying criteria for programs and standards based on the type of animal, geography, and other considerations.

Figure 8: ROC™ Required Baseline Certifications & Equivalency Assessment. https://regenorganic.org/wp-content/uploads/2021/03/ROC_QMS_REF_AEA_v2.pdf

Appendix D

Specific Models of Creative Financing for Regenerative Agriculture

Specific models of creative financing for regenerative agriculture

Grants/philanthropic funding/brands' charitable arms

The charitable arms of apparel and footwear brands offer untapped potential for supporting regenerative agriculture projects. In the U.S., such entities are regulated under the U.S. tax code, which requires them to fulfil a charitable or educational purpose, and brands must abide by self-dealing regulations that prevent profiting off grants. However, this leaves very broad scope for funding research, technical assistance, education, policy work, and supporting the purchase of equipment and even of land.

- **Model: Regenerative Fund for Nature (Kering and Conservation International):** The Regenerative Fund for Nature "supports promising and innovative regenerative agriculture projects around the world to drive a transition from current farming methods to regenerative practices for 1,000,000 hectares of crop and rangelands."[168] Eligible projects focused on leather, cotton, wool, or cashmere. The fund was initially supported at five million Euros (US $5.8 million). Seven projects were selected for funding in 2021.[169]
- **Model: Marciano Family Foundation/Fibershed:** This three-year study, funded by the Marciano Family Foundation of the GUESS? founders, will track the impacts of regenerative agriculture practices including multispecies winter cover crops, minimal tillage, microbial seed inoculation and compost application in the setting of a large-scale commercial cotton farming operation in California.[170]
- **Model: Ralph Lauren/Soil Health Institute:** In October 2021, the Ralph Lauren Corporate Foundation provided a U.S. $5 million gift to establish the Soil Health Institute's U.S. Regenerative Cotton Fund (USRCF). The Fund will work with cotton growers to help them implement systems to help them "measure and monitor the environmental, societal, and economic benefits of soil health management systems on their operations."[171]

Loan guarantees

Loan guarantees are a key but underutilized financing tool that have gained traction in other sectors. In this model, funds do not leave the balance sheet of the guaranteeing entity, but they can be used as collateral for loans to other entities. Fashion for Good finds that "Corporate guarantees . . . [are] an especially effective way to help innovators secure funding for large-scale projects in commercialization such as building a demonstration plant."[172] In other cases, purchasing contracts from brands can serve as collateral for loans.

- **Model: PurFi/Concordia Textiles:** Recycling startup PurFi built a plant for industrial textile applications in a partnership with Concordia Textiles, "which helped it secure the funding needed for capital expenditures, on top of a €5 million equity investment."[173]
- **Model: Coalition for Private Investment in Conservation (CPIC) Blueprint:** Guarantee-based lending for clean textile production: This model, piloted in Turkey, uses purchase guarantees as collateral to allow garment factories to access commercial loans. Loans considered in this model range from $90,000-$200,000. The blueprint specifically notes that "complementary grants can be provided by apparel brands or NGOs to conduct feasibility studies," making this model well suited for use as an integrated capital approach to supporting regenerative agriculture improvements by farms.[174]

Loans

A wide variety of creative loan options have been developed in recent years to support the transition to regenerative agriculture in the food sector. Apparel and footwear companies could initiate conversations and partnerships with these entities on behalf of fiber farmers and ranchers in their supply chain, as these growers are often overlooked in the food-focused sector.

- **Model: The Perennial Fund (U.S.):** "The Perennial Fund is a blended finance investment vehicle focused on providing loans of $50-$1,000 per acre for growers to bridge the 36-month transition period toward regenerative production."[175]
- **Model: Loans for Enlightened Agriculture Programme (LEAP) (U.K.):** Several efforts are underway to develop financing for agroecology in the U.K. under the new CAP program, including the Real Farming Trust's Loans for Enlightened Agriculture Programme (LEAP). As of 2021 LEAP was approximately halfway through its lending program, "having lent just under half its capital with £210,000 in the pipeline."[176]
- **Model: Community Development Finance Institutions (CDFIs)(Global) Ex: Caja Cusco (Peru):** Community Development Finance Institutions (CDFIs) are private, community-based financial institutions that are dedicated to providing affordable lending to help low-wealth and low-income community members. There are currently over 1000 CDFIs in the U.S. and a growing number globally. As just one example, Caja Cusco in Peru was formed in 1988 with a mission to "support socioeconomic segments that have limited access to traditional banking, promoting the development of

Specific models of creative financing for regenerative agriculture

small and microenterprises, promoting savings in the population and granting credits to SMEs, contributing to financial decentralization and democratization of credit."[177] Companies such as Google are developing partnerships with CDFIs to offer flexible grants funds that can be used for operations, loan capital, loan loss reserves, capacity building, or other purposes.[178] Apparel brands could seek similar partnerships in communities across the globe to support the transition to regenerative agriculture and/or new supply chain infrastructure.

Investment/ Blended Financing Vehicles

As Luke Smith of Terra Genesis sees it, the field of regenerative agriculture needs "to have investors who appreciate an expanded opportunity of what ROI means—especially now that we are in the position to do outcome-based verification and see transparency and traceability." A number of emerging funds are beginning to provide this flexible investment capital, and they offer many models and potential partners for apparel and footwear companies.

- **Model: Fashion For Good / Good Fashion Fund:** ". . . the Good Fashion Fund is one of the first private blended financing vehicles in the fashion sector that catalyzes private financing through a layer of philanthropic capital—provided, in this case, by the C&A foundation [now the Laudes Foundation]."[179]
- **Model: Specialized investment Funds:** A few examples of textile-focused funds include Textile Innovation Fund, Bombyx Capital, and Alante Capital, which have supported innovations like 3D printing, sustainable dyeing methods, and alternative raw materials.[180] Additional funds from the food system that are investing in regenerative agriculture approaches include Renewal Funds in Canada and Closed Loop Capital and S2G Ventures in the U.S., among others.[181] Further research will be needed to understand these funds' specific interest in regenerative agriculture in the apparel industry.
- **Model: Livelihoods Funds:** The Livelihoods Funds originated in 2008 as the Danone Fund for Nature. By 2011 Danone opened the fund to other investors, and the entity evolved into a family of funds, including The Livelihoods Fund for Family Farming (L3F) and The Livelihoods Carbon Funds. The L3F "provides upfront financing to project implementers (often grassroots NGOs) that deploy large-scale sustainable agriculture projects featuring a landscape approach with rural farming communities"[182] and uses a public-private financing model to generate returns through fees for ecosystem services. The Livelihoods Carbon Funds do reply on carbon credits for a portion of their financing model, but also require long-term financial commitments from investors and provide up-front financing. Current investors in L3F include Danone, Mars, Firmenich, and Veolia, while LCF investors include Hermès, among others.
- **Model: Christy Dawn "CSA" Model:** Christy Dawn's "Land Stewardship" program, which it describes as "a CSA (community supported agriculture) model for dresses," lets customers pay $200 to cover the costs of a farmer in India transitioning a plot of land from conventional to regenerative practices. At the end of the season, customers receive store credit equal to the value of the cotton that was harvested—but they share the risk with growers if the cotton is worth less than $200. "It's not a donation. It's an investment in process," says the company's CEO.[183]
- **Model: Emerging Fund: Apparel Impact Institute (Aii):** Aii's November 2021 report, "Unlocking the Trillion Dollar Fashion Decarbonisation Opportunity," outlines just over U.S. $1 trillion in financing needed to achieve key categories of decarbonization solutions including coal phaseout, energy efficiency, renewable electricity, next generation materials, and more.[184] Based on the report's findings, Aii is now working to develop a donor-pooled fund to raise $100 million of philanthropic/ grant dollars, which will work with capital providers to unlock $1.4 billion of financial capital alongside the philanthropic portion.
- **Model: Emerging Fund: Sustainable Agriculture & Food Systems Funders (SAFSF)/Fibershed Integrated Capital Fibers Fund:** The 2020 SAFSF Fibers Roadmap analysis identified $50M in U.S. soil-based fiber system investment needs, which must also be backed by a systems-change approach that includes integrated reforms in business technical assistance, policy, and research. The report has led to the development of the Integrated Capital Fibers Fund, being designed as a $10M flexible financing vehicle tailored to the needs of mid-sized U.S. fiber producers and processors, with a specific focus on equity and justice.[185]

Indigenous and people of color-led financing efforts

The critical need to address the Indigenous roots of regenerative agriculture and issues of social and racial justice extends to the area of financing. A comprehensive treatment of issues in racial equity investing can be found

Specific models of creative financing for regenerative agriculture

in the recently released report from the Croatan Institute Racial Equity, Economics, Finance, and Sustainability (REEFS) Initiative, "Capital at a Crossroads: Accelerating Racial Equity Investment Across Asset Classes."[186] A number of financing vehicles have emerged that prioritize Indigenous leadership and projects.

- **Model: Akiptan:** "Akiptan is a Native American Community Development Financial Institution (CDFI) that provides loans and technical assistance to those in Indian Agriculture."[187] Akiptan's mission is to "provide fair financing to Native American Agriculture Operations throughout Indian Country."
- **Model: Indigena Capital:** "The principals of Indigena have specialized in partnering exclusively with Tribal Nations in the United States and First Nations, Inuit and Métis peoples in Canada for over three decades. . . ."[188] Fred Briones of NAFP has praise for the work of Indigena—as he puts it, "they are right alongside us."
- **Model: Black Farmer Fund (U.S.):** The Black Farmer Fund describes itself as "an emerging community investment fund." Currently focused on Black-owned farm and food businesses in the state of New York, the fund provides grants and low-interest loans and serves as a model for a community governance model and the integration of technical assistance for farmers with all financial support. The fund has received support from Patagonia along with a number of private foundations and donors.[189]

Public / Public-Private financing:

As Fashion for Good notes, "the public sector can offer larger ticket sizes for ventures and de-risk larger investment rounds from other investors."[190]

- **Model: development impact bonds:** "Development Impact Bonds (DIBs) finance development programs with money from private investors who earn a return if the program is successful, paid by a third-party donor. The outcomes to be measured are agreed upon at the outset and independently verified. With greater focus on outcomes instead of inputs, DIBs create space for more innovation, local problem-solving, and adaptation."[191] According to Luke Smith of Terra Genesis, "We are also seeing these [DIBs] as new tools focused on outcomes."
- **Model: Proposed U.K. Agroecology Development Bank:** In the U.K., "The proposed ADB [Agroecology Development Bank] . . . could have a powerful role in incentivizing farmers to form much more ambitious management plans by providing advisory and consultancy services that enable them to assess and successfully access appropriate finance. With the ability to draw down government-guaranteed finance, it could also offer loans at huge concessions and help de-risk agroecology by scaling up the sector at much lower costs than could be provided by private banks or even by impact investors or philanthropic finance."[192]
- **U.S. Agency for International Development (USAID) / Root Capital / Keurig Dr Pepper:** In this model from the food and beverage sector, a public-private partnership came together to form the Feed the Future Partnership for Sustainable Supply Chains. The U.S. International Development Finance Corporation (DFC) added another tool to the partnership with a $35 million loan guarantee, allowing the PSSC to provide both grants and debt relief and restructuring.[193]

Financing models that involve payments for ecosystem services

As explained by the CREO Syndicate, "Regenerative agriculture generates products (e.g., crops and livestock) and beneficial ecosystem services, as opposed to the industrial agriculture that provides just products. It therefore offers two markets for revenue. . . Buyers can directly purchase ecosystem services . . . from sellers or they can indirectly purchase ecosystem services through a marketplace that aggregates credits from sellers."[194]

- **Model: Impact Incentives:** The Impact Incentives system,[195] developed by Textile Exchange and partners including ProTerra Foundation, Global Food Partners, and the Global Roundtable for Sustainable Beef (GRSB) (collectively, the Impact Alliance), bypasses the cost and time needed to trace materials back to their origin, allowing companies to take efficient and effective action to address the impacts of their raw materials. As Textile Exchange's Anne Gillespie describes it:

1. Impact Incentives refer to the certificates that are traded in support of a sustainability claim. The certificates are issued when a set of criteria have been met, and the physical goods and the Impact Incentives are traded separately from each other. The Impact Incentive certificates represent a specified quantity of verified material that has been produced but has not been physically traded as verified goods.
2. Impact Incentives are decoupled from the physical product itself, and they work independently of any traceability system. This makes them ideal for long, complex, or opaque supply chains that would otherwise present a barrier to action.

Specific models of creative financing for regenerative agriculture

3. Impact Incentive scopes apply across multiple commodities (e.g., soy, eggs, beef, leather). By using Impact Incentives, sellers or buyers of multiple commodities can each work with a single trusted tool that gives them consistency and efficiency.
4. Data collection and verification are valuable aspects of the Incentives.
5. Brands can adopt different strategies: they can invest in their own Supply Sheds, if known, or choose to invest in the areas of highest impact (e.g., to stop deforestation in the Amazon biome).
6. The Impact Alliance governs the use of Impact Incentives, setting policies and procedures to ensure that they are used consistently, and their integrity is protected.

- **Model: Impact Partnership Incentives:** An important development of the Impact Alliance is the Impact Partnership model. This approach allows brands to directly support producers in their transition towards best practices. In a typical certification model, the producer must first make the investment to meet the standard before putting their certified goods on the market in the expectation of receiving a premium. Under an Impact Partnership, a brand will share in the risks and costs of meeting the required best practices and support producers through a local Program Partner.

1. Program Partners are on-the-ground organizations that work directly with producers to help them improve their practices and work towards meeting the scopes set by the Impact Incentives.
2. Brands buy Impact Partnership Incentives from the Program Partners who may in turn use the money to provide training and education and technical support, coordinate data collection, verify and register Incentives, fund equipment purchases or infrastructure investments, and also financially incentivize the individual producers.
3. An Impact Partnership can last for up to three years—after that, it is expected that producers should be able to meet the standards of best practice, and they can either sell Impact Incentives directly to brands or sell certified physical goods at a premium.

Although Impact Incentives and Impact Partnership Incentives do not have to be in a company's direct supply chain, they offer an excellent opportunity to develop long-term relationships that will benefit both sides. Impact Incentives and Impact Partnership Incentives do not act as "offsets," but they do offer brands verified impact data, a rich set of stories to tell, and the opportunity to invest in a more sustainable supply network. They offer the benefit of full transparency about the farms being supported and the impacts being made.

- **Model: Ecosystem Services Market Consortium (ESMC):** The ESMC is attempting to address some of these concerns by spreading the credits across several different markets for different ecosystem benefits. As described by ESMC, "Rather than focusing on just one type of environmental improvement, we 'stack' multiple ecosystem services to go beyond simply improving soil carbon and reducing greenhouse gases. The same land stewardship practices that impact soil carbon and greenhouse gas emissions, for instance, oftentimes have additional benefits, such as improved water quality and water conservation, as well as biodiversity benefits such as habitat for pollinators, insects, and birds. ESMC's market program will reward producers for all these benefits, not just carbon credits.[196]

Endnotes

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