Regenerative Agriculture Data Pilot

Final Project Report and Partner Briefing

The Rockefeller Foundation

Smallholder Data Services

Terra Genesis

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Foreword

Smallholder Data Services (SDS), supported by a grant from The Rockefeller Foundation, is working to ensure that smallholders who are directly involved in defining, implementing, verifying and scaling regenerative agriculture have a stakeholder voice as each of these aspects are being shaped at a global level.

In support of this goal, SDS and one of its founding partners, Terra Genesis, are generating a series of reports, recommendations, best practices and guidelines that draw from early-stage regenerative farming by smallholders in various parts of the world.

In this final report and project summary, we summarize the project deliverables and findings. The report goes on to challenge current scenarios for how regenerative agriculture can be scaled, by proposing an alternative model that is based on how scaling happens in natural ecosystems. The report identifies a few key intervention points in the global agricultural and food supply system where decisive action is most needed, and most appropriately placed to achieve the most significant impact.

In the course of undertaking this Rockefeller Foundation-supported initiative, SDS has also been drawing on an additional partner, the Smallholder Farmers Alliance in Haiti.

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Smallholder Data Services

Smallholder Data Services (SDS) is a consulting and research firm exploring how big data and technology innovations are enabling a revolution in both sustainable supply chains and regenerative agriculture. We reimagine data as a new sustainability product that financially rewards farmers and others involved in sustainable production, including small-holders in the global south. We focus on how the combination of data products and emerging technology unlock solutions for those concerned with the environmental and social impact of the products and services they market and purchase.

More at
smallholderdataservices.com

Terra Genesis

Terra Genesis is an international regenerative design firm that convenes brands, farmers, developers, communities, investors, and NGOs to work at the intersection of agriculture, ecology and economy. Our work is to evolve the role of agriculture and business as drivers of social and ecological health. We work from the ground up to evolve stakeholder capacity and capability and to identify solutions, create processes and curate interventions for systemic regeneration.

More at
terra-genesis.com

smallholder farmers alliance

The Smallholder Farmers Alliance (SFA) is social business non-profit working to feed and reforest a renewed Haiti using a new agroforestry model in which smallholders plant trees to earn credits they exchange for seed, tools, training and other agricultural and community services. The SFA's 6,000 farmer members use organic methodologies, and are now in the process of transitioning to become regenerative.

More at
http://www.haitifarmers.org/

Final Project Summary

This series of reports has sought to identify investment and development strategies for regenerative agriculture adoption and scaling specifically focused on smallholder farmers in four geographical regions: the Caribbean, Latin America, Southeast Asia, and Sub-Saharan Africa.

In particular, the reports have explored the role of secondary crops that can be produced in and procured from high-biodiversity Regenerative Agriculture systems to increase smallholder farm viability and farm community vitality. The project idea emerged from an identified gap in understanding: current focus of regenerative agriculture pilot projects has been on addressing needs for the export commodity marketplace, while very little research has been undertaken on secondary crops' market mechanisms to support farmers to efficiently develop or access these markets.

The deeper change we are invested in fostering is the decolonization and decommodification of global food, fiber, and medicine systems. Smallholder, Indigenous and peasant farmers are consistently identified as being foundational in preserving and improving biodiversity, protecting critical ecosystems, and producing food and materials that feed and clothe the world; however, they have been historically exploited, are presently under-resourced, and are still subject to systemic injustices that have been programmed into the way business and government operate.

Our project has sought to contribute to a broader conversation around how best to center smallholder, indigenous and peasant farmers, and how to identify the strategies and enabling environments necessary to support the adoption and scaling of regenerative agriculture among them. The project has specifically focused on assessing feasible and recurring financing mechanisms like secondary crop markets and farm data markets that bolster farm resiliency and farmer agency, and level the playing field between farmers and their buyers.

Report 1: Regeneration and Regenerative Agriculture: Definitions, Principles and Practices

The first report covers the **principles** that underlay the paradigmatic shift from extractive modes of production and exchange, towards a regenerative mode. The term 'regenerative agriculture' has been adopted rapidly across a highly diffuse and loose movement of organizations and actors, resulting in a lack of a shared understanding and rigor around the term, which renders the movement vulnerable to greenwashing. This report seeks to ground the discussion of regenerative agriculture in a way that retains the meaning and integrity of the term by situating regenerative agriculture within a broader, holistic paradigm of regeneration characterized by specific principles rather than practices. Through three case studies of regenerative agriculture projects, we illustrate how these principles can be applied in practice.

Report 2: Methods for Measurement of Regenerative Agriculture in Practice

The second report briefly outlines the **requirements for monitoring and adaptively learning** from implemented regenerative agriculture projects. Because regenerative agriculture is variably defined, designed, and practiced, the use of monitoring, reporting, and verification (MRV) can contextualize the way the agricultural system in question is evolving, pointing to the active presence (or absence) of regeneration in a place. This report discusses the use of MRV systems in the context of regenerative agriculture, specifying that data collection in and of itself is not the desired outcome. Rather, data collection is a tool to support the intended goal, which is deep regeneration within a place. The report discusses practice-based vs. outcome-based monitoring, forms of measurement, different paradigms of data collection, and what MRV systems can enable.

Report 3: Scaling Strategy for Smallholder Regenerative Agriculture

Scaling Strategy for Smallholder Regenerative Agriculture 2023-24 outlines the **strategy,** region-by-region, to support scaling activities to go beyond replication to genuine place-making. It provides a high-level assessment of possible pathways for growing and scaling regenerative agriculture pilot programs across four geographic regions: Sub-Saharan Africa, the Caribbean, South America, and Southeast Asia. For each region, we examine the agricultural context, the potential for regenerative agriculture systems in the region, challenges, and pathways for scaling.

Report 4: Secondary Crops for Agricultural Diversification: Crop Suitability and Market Opportunities

Report 4 delves into the specific **market tactics** that can support scaling. It explores the market viability and agroecological suitability of secondary crops and specifically their ability to function as a catalyst for regenerative agriculture among smallholder farmers, focusing again on the same four broadly defined geographic regions as in Report 3. The core question of this report is: how can bringing secondary crops to market serve as a catalyst for the revitalization of land, communities, and local and national economies in these regions? Crops were assessed in terms of their suitability for 4 different markets: Commodity export markets, Markets for experimental crops, Domestic/local markets, and Subsistence crops. After region-specific analyses of the business and market access challenges of smallholder farmers, and most suitable crops for the 4 markets, we present market pathways and enabling environments diagrams for the scaling of secondary-crops fueled regenerative agriculture among smallholders. The report includes a Crop Compendium of all of the identified crops for the 4 regions.

Report 5: Evolving New Market Opportunities with Regenerative Agriculture Systems: Market opportunities for secondary crops, data products, payments for ecosystem services, and value-added goods

Report 5, along with Report 7, discusses the **requirements for implementing and scaling** regenerative agriculture technically. It specifically assesses the market opportunities that could support smallholder-centered regenerative agriculture, including but not limited to the secondary crops discussed in the preceding report. Additional income-generating pathways include payments for data products, payments for ecosystem services and carbon, and value-added goods, all of which are evaluated critically for their readiness for adoption especially for smallholders, practicality, and potential to generate true ecosystem and social benefits that outweigh the risks.

Report 6: Decolonizing Community Health, Nutrition, and Culture through Secondary Crops

Decolonizing community health, nutrition, and culture through secondary crops addresses **crucial social outcomes and impacts** associated with the incorporation of secondary crops via agricultural regeneration. The report focuses on the social and health value of secondary crops in smallholder agricultural systems. This includes, but is not limited to, the benefits associated with increased food sovereignty, food security, and nutrition. We discuss how the addition of secondary crops supports the revitalization of culture, strengthens economic and ecological resilience, and builds additional opportunities for social cohesion amongst community members. Importantly, these outcomes support the process of decolonization by contributing to the undermining of present colonial power dynamics within

the global food system, which place inequitable impacts upon smallholder producer communities.

Report 7: Cyborg Agriculture: Transforming Our Relationship with Technology in a Way That Evolves Agricultural Systems

Report 7 explores the role that technology has to play in the process of scaling regenerative agriculture. It opens with a reflection on the central essence, purpose, and value of technology, making the case that a fundamental misunderstanding about the nature of technology and even fear of it can cloud our ability to accurately apply technology. It also clarifies the three distinct imaginaries that are shaping the discourse around regenerative agriculture and technology: those of international governance, corporate sustainability, and agroecological communities. The report then goes on to clarify the common language – themes, terms, and technologies – relevant to the discussion of how technology might be engaged in the scaling of regenerative agriculture. Lastly, it lays out the critical technical, business, and legal analysis frameworks necessary for ensuring feasibility, appropriate incentive structures and business models, regulatory and policy guardrails, and agreements around equitable and fair use of technology.

Report 8: Final Project Summary and Partner Briefing

This final report elaborates on regenerative principles to inform a **conceptual framework** for scaling regenerative agriculture. It takes a closer look, and even seeks to unsettle, current scenarios for how regenerative agriculture can be scaled, by proposing an alternative model that is based on how scaling happens in natural ecosystems. It identifies a few key intervention points in the global agricultural and food supply system where decisive action is most needed, and most appropriately placed to achieve the most significant impact: farmer cooperatives and other local farming organizations; buyer coalitions; quantification of farm data; and a mindset shift that recognizes colonialist patterns of power still impacting the global ag supply system, and seeks to transform it.

Executive Summary

This briefing seeks to unsettle some of the prevailing notions of scaling that underlie current scenarios for the scaling up of regenerative agriculture, reflected in the ambitious commitments made by both private and public sector actors in recent years. It proposes that these dominant scaling models are unlikely to result in achieving the stated goals, and offers instead an alternative model for scaling that builds on living systems thinking, and draws on a pattern language based on the natural evolution of ecosystems — accommodating non-linear, complex systems change.

We make the case that this alternative scaling model demonstrates how regenerative agriculture can scale successfully through collaboration with smallholder farmers. It bridges the gap between the corporate and the grassroots levels of agricultural systems development by identifying the critical intervention points which, if appropriately activated and supported, can accelerate capacity-building within the whole system to allow for regenerative outcomes. It also lays out what the role of business could be in supporting what we call farmer-centric enterprise ecologies.

The critical intervention points are the following:

- Farmer cooperatives or other types of local grower organization, and capacity building and technical support at the level of those organizations
- Quantification of farmag data (MRV systems), when carried out in a way that is accessible to smallholder farmers
- Buyer coalitions, as a crucial way of de-risking farmers and incentivizing polyculture farm systems
- A mindset shift that needs to accompany any efforts towards scaling regenerative agriculture and creating new markets aligned with regenerative production: recognizing and actively seeking to transform colonial patterns of power, and moving from transactionality to relationships based on trust, respect and equity ■

Introduction

Regenerative agriculture has emerged as a resonant alternative to the prevailing resource extractive, inputs-heavy, and ecologically degradative model of farming. It holds the potential for producing many of humanity's needs in a way that supports and replenishes the life-supporting functions of soils, ecosystems, water, and air, which are the basis of our economies and cultures.

At a time when seven out of eight of the safe and just Earth System Boundaries have already been exceeded (Rockström et al. 2023), and we are facing a meta-crisis of compounding climate change, biodiversity loss, topsoil loss and social inequities, the need for a radical shift in global agricultural and food systems is clearer than ever.

Project Drawdown and other research bodies have quantified the potential that a range of regenerative agriculture systems and practices could play in mitigating and adapting to climate change (Hawken et al. 2017). But for that potential to be realized, those regenerative principles need to be adopted on a global scale — and this transition needs to happen at a rate of change without precedent in our agricultural systems. While efforts to promote regenerative agriculture have accelerated globally, they remain fragmented, with disparate approaches and a lack of connection and cohesion between initiatives.

This briefing for the Regenerative Agriculture Data Pilot project highlights and synthesizes the project findings, specifically regarding the key interventions that are necessary for the scaling of regenerative agriculture among smallholder farmers. In doing so, we have to examine and even unsettle some of the dominant assumptions about scaling, and offer a new lens through which to view the question of scaling, drawing on the patterns of natural ecosystems. ■

TROUBLE AHEAD

Recently, relevant industry organizations like Producer's Trust have begun citing the Sustainable Markets Initiative (SMI) Agribusiness Task Force Report, stating:

> **"Currently, only 15% of global farmland is cultivated with regenerative practices, according to the new action plan and report from the Sustainable Markets Initiative (SMI). They calculate that we need to scale up to 40% by 2030 in order to keep global warming to 1.5 degrees Celsius, which is the goal set by the 2015 Paris Climate Agreement."**
> (SUSTAINABLE MARKETS INITIATIVE, 2022).

Unfortunately, this perpetuates some unexamined statistics and attitudes that will harm our ability to chart ambitious and feasible strategies, take meaningful action, and measure what matters along the journey.

On closer inspection, the 15% of farmland figure is based on programs targeting the sequestering of carbon in agricultural soils or the avoidance of emissions based on reduction of farm inputs like synthetic fertilizers. These isolated practices are not equivalent to regenerative agriculture and will not yield the outcomes proposed for regenerative agriculture systems. Below is an aggregated sampling of 10 corporate commitments for regenerative agriculture compared with other industry programs, such as Organic or Fair Trade.

PRIVATE SECTOR COMMITMENTS

	ACRES	% OF TOTAL	TIME TO CHANGE	10-YR CAGR	START DATE
Global Ag Land (2020)	11,861,058,310	100.00%	N/A	-	-
Fair Trade Ag Land (2019)	6,918,940	0.06%	30 years	15.28%	WFTO Founding 1989
Organic Ag Land (2020)	185,081,931	1.56%	30 years	6.43%	USDA NOP 1990
Corporate Commitments (2020)*	71,267,000	0.60%	10 years (proposed)	>500%	-

*A sample of 10 companies who have made specific acreage commitments

Second, studies on the role of agricultural soils in sequestering carbon are hotly contested and there is by no means a scientific consensus on either the appropriate strategies or ultimate ability of soils to recarbonize to or beyond historical levels (Baveye et al. 2020). If the role of soil carbon sequestration is uncertain and the Paris Climate Agreement does not cite the role of agriculture in addressing greenhouse gas emissions, the claim that we need to scale up to 40% does not make sense. Not only is the 15% figure suspect but so too is the 40% figure. This was the result of a proprietary study conducted for the Task Force and must be approached cautiously, given the above facts.

The combination of respected organizations like the Sustainable Markets Initiative's greenwashing efforts to scale regenerative agriculture combined with unprecedented commitments should be cause for concern. In light of recent controversy in the voluntary carbon markets, the wider criticism leveled against corporate climate commitments, and growing regulatory and consumer scrutiny, we are generating conditions that are misaligned with the actual core issues at hand and instead ideally suited to greenwashing behaviors.

We cannot stop at simply highlighting these disconnects and the conditions they will give rise to in the future. We need to identify an alternative theory and approach to scaling regenerative agriculture that draws from empirical precedents and rational theoretical basis for how systems scale. This will provide a pathway forward that does not rely on wishful thinking, disproven methods, and well-trod industry gimmicks. ■

PRECEDENTS: WHAT HAS SCALED WELL, WHAT HASN'T?

When we review the precedents of how more environmentally sustainable forms of agriculture have scaled in the past, the outlook for regenerative is not particularly promising. The leading and best-known global certification programs for farming that are better for the planet and people — Organic, Fair Trade and, more recently, Regenerative Organic Certification — today constitute only a thin sliver of the totality of global agriculture. In spite of their relative visibility, they have not been able to scale to meet the market successfully (See Appendix).

If we consider why the uptake of Fair Trade and Organic has been so slow, we can identify some clear barriers to certification. It takes a minimum of 3 years to become certified organic. Most commonly, farmers cite heavy transition costs and certification costs as factors that discourage them from certifying, or lead them to decertify:

> **the "requirements not only increase organic farm production costs, but impose additional costs on farm operators who are transitioning from conventional to certified organic production."**
> (GREENE ET AL. 2010)

There are supply chain challenges, such as organic products requiring segregated logistics and processors that can handle the organic requirements, bringing associated risks, costs, and systemic challenges (Jones 2021). Corporate greenwashing has diminished consumer trust in organic, impacting farmers' bottom lines (Torres et al. 2018).

Among farmers, three groups are most likely to decertify: smallholder farmers; non-white farmers — due to systemic barriers — and farmers without outside technical support (Torres et al. 2018). In other words, the kinds of robust support systems that would have been necessary to help diverse kinds of farmers make this transition are often lacking.

The Regenerative Organic Certification (ROC) is, to date, the largest regenerative agricultural program, with the most visibility. However, because it is tied to organic as a prerequisite, it can only scale to the point that organic has scaled.[1] That falls short of the ambitious scale regenerative agriculture would need to meet, to transform the devastating impacts of inputs-intensive conventional agriculture.

In other words, the odds are not in favor of corporations being able to realize their commitments to regenerative if they follow the path of organic agriculture.

What has scaled well, then? In terms of global spread and impact, it turns out that it is the more extractive and inputs-intensive forms of agriculture that have in fact scaled successfully. Industrial agriculture, beginning in the 19th century, and the Green Revolution beginning in the 20th century, are the success stories of how to scale agricultural practices. The chemical-intensive, mechanized and increasingly large-scale, increasingly monoculture-focused agriculture promoted by these two major waves has shaped what farming looks like on all continents. The large multinational agrochemical companies are present in rural villages across the world, from the Amazon rainforest to the foothills of the Himalayas and the wheatfields of Eurasia — their fertilizers and pesticides, seeds, agents who earn commission for every new farmer they recruit as a buyer, and who also provide extension support to farmers, often being the person who tells farmers which crops they should grow and why.

Why were these agricultural trends so successful? Arguably, industrial agriculture's success was not only because of higher-yielding crop varieties, mechanized machinery that improved efficiency and agrochemicals that boosted yields and reduced yield losses, but also because its proponents found ways to form regional organizations and recruit local agents to work for them. Industrial agriculture knowledge has been disseminated through extension services, providing farmers with guidance on improved farming techniques, crop management practices, and the adoption of new technologies. These are factors we will return to later in this briefing. ■

[1] The relationship between organic certification and regenerative agriculture is subject to lively debate. In a 2023 article, Matthias Berninger, Bayer's senior vice president of public affairs, science and sustainability, states "Regenerative agriculture should not make the same mistake that organic did and that is to separate themselves from the mainstream [...] I think regenerative practices should be used at scale, instead of siloed off." (Klein, 2023). A contrasting viewpoint is offered by Tittonell et al. who write, "Removing the term "organic" from the definition of regenerative agriculture ... opened the door to the potential use of the term regenerative agriculture for green-washing agricultural practices that are irreversibly tied to agrochemical inputs."

SCALING REGENERATIVE AGRICULTURE: DOMINANT NARRATIVES AND CONTROVERSIES?

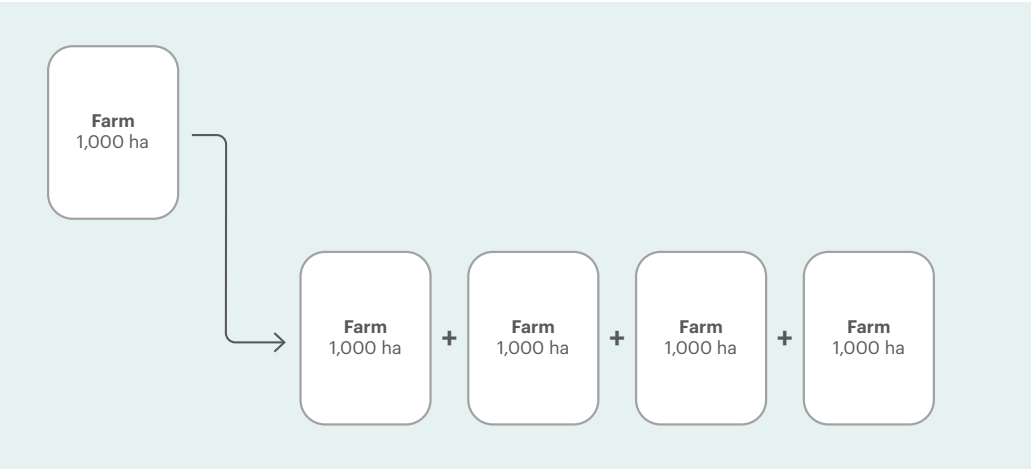
What the term 'scaling' refers to is far from self-evident: there is a vast literature assessing existing scaling models and teasing out the nuances of different types of scaling. 'Scaling' is conventionally used in the sense of replication, such that more value is generated while investing more or less the same amount of energy or capital as before. When applied to regenerative agriculture, it usually refers to growing current production volumes, numbers of hectares under regenerative production, or numbers of farmers participating in regenerative agriculture pilots.

The question of how regenerative agriculture could be scaled globally tends to elicit two kinds of responses, which could be characterized as the "top-down approach" and the "bottom-up approach." These two theories of change reflect a tension that runs through the current discourse about sustainability more generally: namely, that between the global (such as international agreements, targets, and strategies) and the local (place-based, contextual initiatives). (O'Brien et al. 2023)

Regenerative agriculture itself is not a unified, cohesive global movement, but driven by multiple and sometimes conflicting agendas and discourses (Gordon et al. 2023). Approaches to regenerative farming range from "corporate" regenerative agriculture — typically promoted by large multinational agri-food companies — to agroecology, which has typically emerged from peasant movements with an emphasis on food sovereignty, local solutions, justice and commitment to political activism (Tittonell et al. 2022).

The former may initially seem well-positioned to support the scaling of regenerative agriculture on a global scale, as it tends to focus on commercial, large-scale, monoculture farming. Corporate regenerative agriculture initiatives are usually backed by millions of dollars' worth of investment from venture firms and large multinational corporations, as part of high-visibility campaigns.

The high-publicity corporate commitments to regenerative agriculture, discussed earlier, typically operate with the same economy of scale as the corporations themselves, and therefore tend to assume a scaling model of replication: a given set of regenerative farming practices (such as cover crops or no-till) are identified and then applied, like a template, on large acreages of land. The resulting scaling scenarios inevitably focus on large-scale, commercial, mostly monoculture farming.



But the corporate type of regenerative agriculture is compromised by the fact that its impact tends to be shallow rather than deep — "deep" in the sense of restoring ecosystem services, diversifying equitable production systems, and revitalizing communities and farmer livelihoods. Because it tends to work with large-scale monoculture farms, it places emphasis on a few agronomic practices such as conservation tillage and cover crops that have limited ecological benefits. As Tittonell et al. (2018) note, in spite of declarations about diversity, corporations "continue working on large areas of single crop species grown year after year, usually relying heavily on external inputs (pesticides, fertilizers, GMOs), in production systems that may not include animals in their rotation." Because of this low potential for beneficial impact, and the continued use of agrochemicals and other extractive practices, the corporate endorsement of regenerative agriculture has raised concerns about greenwashing (Casey and Lucas 2023).

In other words, the top-down, corporate-driven regenerative agriculture agenda, based on a model of mechanical replication, is unlikely to deliver on the promise of regenerative agriculture.

The bottom-up approach, in contrast, focuses on the grassroots level. The majority of the world's farmers are smallholder farmers in the Global South who live close to the land they manage, observe its condition, are often committed stewards of the land and, because of the smaller scale, may be in a position to implement more complex types of regenerative agriculture such as livestock integration, multi-story agroforestry, and a much greater biodiversity than large-scale monoculture farms.

At the same time, there are challenges to scaling at the grassroots level, too — particularly when farmers are acting in isolation. While researching the enabling environments that would facilitate the adoption of regenerative agriculture among smallholders, we have seen time and time again that farmers are often held back by concrete, practical challenges. For example:

- Many farmers suffer from poor health (due to factors such as inadequate sanitation infrastructure, contaminated water, or inadequate nutrition)
- Farmers are time-poor (in many parts of the world having to spend hours collecting water or firewood for basic survival)
- Due to inequitable resource distribution, rural regions often lack the necessary infrastructure such as transport logistics, refrigeration and storage, and processing that would facilitate market access.
- Smallholder farmers around the world are already vulnerable to the effects of climate change. Growing crops under mounting economic pressure, they are unlikely to transition out of dependence on chemical agriculture on their own.
- Farmers typically lack access to financing and to business education. Even in wealthy Global North countries such as the United States, farmers are unlikely to adopt regenerative agriculture practices on their own because they struggle to access funding and reliable information (Forum for the Future 2020).
- Proper implementation and management of diversified agroforestry systems can be complex and daunting. Without (technical) support, farmers may struggle to complexify in a way that is economically and financially viable.

Due to resource constraints and inequitable pressures such as these among smallholder farmers, regenerative agriculture is unlikely to scale from the bottom up either without significant support and coordination from other actors.

The most promising recent proposals for scaling regenerative agriculture recognize the chasm between the corporate and the farmers-centered approaches, and highlight the need for cross-sector collaboration and systemic change.

Forum for the Future's *Growing Our Future* initiative has produced excellent country-specific assessments on scaling regenerative agriculture in the US (2020) and in the UK (2023). The Agribusiness Task Force, part of the Sustainable Markets Initiative (SMI), has taken a more global approach, focusing specifically on the question of what role the private sector can play in accelerating the regenerative transition.

Its recent action plan importantly recognizes companies' role and responsibility to create the kinds of markets that enable and encourage regenerative farming, and makes the following five high-level recommendations:

1. **Agree on common metrics for environmental outcomes**
2. **Build farmers' income from environmental outcomes such as carbon reduction and removal**
3. **Create mechanisms to share the cost of transition with farmers**
4. **Ensure government policy enables and rewards farmers for transition**
5. **Develop new sourcing models to spread the cost of transition (Source)**

These insights are in alignment with the "enabling environments" that our project team has also identified as critical for expanding regenerative agriculture production and facilitating markets that support more diverse, multi-crop farming systems (see the report "Secondary Crops for Agricultural Diversification," March 2023).

However, due to these proposals' focus on the Global North, and predominantly on larger-scale farmers, the applicability of their insights to smallholder farmers in the Global South may be limited.

This briefing makes the case for an approach to scaling regenerative agriculture that is decidedly centered on smallholder farmers, proposing an alternative scaling framework that draws on the patterns of natural systems. It seeks to bridge the gap between the corporate and the grassroots levels by identifying the critical intervention points which, if appropriately activated and supported, can accelerate capacity-building within the whole system to allow for regenerative outcomes.

These intervention points are the following:

- Farmer cooperatives or other types of local grower organization, and capacity building and technical support at the level of those organizations
- Quantification of farm data (MRV systems), when carried out in a way that is accessible to smallholder farmers
- Buyer coalitions, as a crucial way of de-risking farmers and incentivizing polyculture farm systems
- A necessary mindset shift that needs to accompany any efforts towards scaling regenerative agriculture and creating new markets aligned with regenerative production: a relational way of working that recognizes and actively seeks to transform colonial patterns of power, and to move from transactionality to relationships based on trust, respect and equity ■

CAN SMALLHOLDER FARMERS DRIVE THE SCALING OF REGENERATIVE AGRICULTURE?

After extensive research into food systems, markets, and agriculture on three continents for this project, our team remains convinced that scaling deep regeneration requires engaging smallholder farmers.

- There are an estimated 600 million smallholder farming families in the world that together grow an estimated one third of the global food supply.

- Regenerative agriculture itself is rooted in agroecological traditions that have been practiced by smallholder and indigenous farmer communities for centuries. It is therefore crucial that smallholder and indigenous farmers are center stage and play a leading role in developing a twenty-first century vision of regenerative agriculture.

- Smallholder and Indigenous farmers have also historically been exploited and not compensated equitably for their work, as colonialist and capitalist processes have shaped and dictated the terms of global trade and markets. For regenerative agriculture to live up to its promise, it must take a stance on shifting these dynamics by re-centering social justice and the contributions and perspectives of smallholder farmers, Indigenous farmers, and farmers of color.

It is with smallholder farmers that there is a true opportunity for regenerative agriculture to go deeper and — if they are engaged and supported appropriately — widely.

As the excellent report, *Politics of Knowledge,* commissioned by the Global Alliance for the Future of Food points out, the reason why the scalability of smallholder, Indigenous and agroecological approaches has not been taken seriously is "a narrow view of what counts as evidence, coupled with an entrenched willingness to maintain the status quo." (Global Alliance for the Future of Food, 2021) Some funders, researchers, and policymakers remain skeptical about the viability, profitability, and scalability of agroecology, Indigenous foodways, and what we are here calling smallholder-centered regenerative agriculture, presuming that "agroecology, regenerative approaches, and Indigenous foodways are marginal, effective only at small scale, and incapable of producing food at greater levels." The authors go on to note,

> **Replicating success is about more than just the size of farms. Scaling is a process of amplifying a new paradigm that builds sustainable food systems rooted in equity, justice, and reciprocity.**
>
> **In its truest sense, scaling refers to processes that create the conditions for more and more farmers to practice agroecology, encompassing more territories and engaging people in the processing, distribution, and consumption of agroecological and regenerative foods."**
> (GLOBAL ALLIANCE, 2021)

It is the food systems and the agricultural value chain that needs to change in order for smallholders' capacities to change. As Solidaridad's *Small Farmer Atlas* states, "working in a lengthy, export-oriented commodity chain is too much of a straitjacket for farmers." It identifies two key drivers to transform the food system: first, "profit-sharing across the agricultural value chain that directly benefits farmers, improves their business case so they can invest in their farms, and enables them to access finance; secondly, the need for systemic changes that cater to the requirements of small-scale farmers and the need for building wealth in the broader community."

Making such systemic changes and thereby scaling regenerative agriculture with smallholder farmers happens not through a replication scaling model, but through a different model of scaling altogether — one that accommodates non-linear, complex systems change. ■

THE FRACTAL METAPHOR FOR SCALING

To understand how scaling can happen in complex systems, let's look in a perhaps unlikely place: natural ecosystems. Nature knows how to scale effectively, adaptively, and resiliently. What can we learn from its scaling strategies?

Scaling up in natural ecosystems occurs through various ecological processes and interactions. Organisms disperse to new areas. Species follow each other in succession, gradually forming increasingly complex and diverse communities. Nutrients — carbon, nitrogen, phosphorus — cycle through the system, facilitating more resilient ecosystems. There are intricate networks of interactions among organisms, including symbiotic relationships such as those between trees and mycelia, or plants and pollinators, or seeds and birds who eat the seeds, helping them to be dispersed. These networks facilitate the flow of resources, energy, and information through the system.

Scaling in natural ecosystems is not linear. Rather, it is the result of the convergence of a number of factors whose interactions result in unpredictable results. It's marked by the pulse of successional phases, the circularity of nutrient cycles, and continued mutualistic interactions through complex networks.

As natural selection guides a process of adaptation and evolution over time, inevitably some organisms and species die and disappear. The organisms and species that stay adapt to changing conditions, evolve, and become a part of the complexity. As Geoffrey West describes,

> **"Scaling up in natural ecosystems is a dynamic and complex process driven by ecological interactions, adaptation, and the succession of communities over time. It results in increased biodiversity, ecosystem complexity, and the provision of a wide range of ecological services."**
> (WEST, 2017)

How do energy flows and resources move within such complex systems? How do they grow and become transformed over time? Biological systems, including the human body, have a brilliant system for carrying out information exchange and resource distribution: fractal systems.

Fractals are self-similar patterns that repeat across progressively smaller or larger scales, so that if one zooms in on a small part, it appears similar as the larger whole. While mathematical fractals can theoretically be infinite, fractals found in nature are finite and not always perfectly symmetrical.

Good examples of the self-similarity are a Romanesco cauliflower, the spiral of a shell, tree branches in winter, a river delta, or the human circulatory system. A fern leaf repeats its pattern at various scales, from the large leaf to the individual crenelated edges that make up that larger leaf. All of these organisms and phenomena repeatedly apply a certain principle of further division or expansion, successively, which results in a pattern.

Fractal systems are characterized by

- Effective distribution of energy and materials between the macroscopic and the microscopic, due to hierarchical branching networks
- Self-organization, "an emergent behavior in which the constituents themselves agglomerate to form the emergent whole."
- The ability to adapt and evolve as they respond to changing conditions, due to rich internal diversity. They have many adaptable, interchangeable, components, and can therefore stand many shocks and strains better than a simple, rigid system. (West 2017, 143-44)

While fractal patterns are best known in mathematics and nature, human social groups can be similarly self-organized and therefore similarly adaptable and resilient. O'Brien et al. (2023) propose that the fractal metaphor presents a useful way to consider social change, and to reconcile local and global scales — potentially resolving the tension, noted earlier, between top-down and bottom-up approaches. Like mathematical or natural fractals, they find, social fractals are also "self-similar patterns that repeat themselves across a range of structures at different scales, extending from small social interactions to large national and international institutions."

To return to the example of industrial agriculture discussed at the beginning of this briefing: its tendency to spread through local dissemination and recruitment of local agents can be seen as a kind of branching or fractal network. Similarly, if we look at organizations and movements — beyond the domain of agriculture — that have scaled well, historically, we see similar patterns. Consider the example of two humanitarian organizations: The International Red Cross and the Salvation Army. Both operate worldwide and are well-known and well-respected for offering aid and support on a global scale. What are some of the factors that enabled them to successfully scale worldwide? Both organizations established national societies and local branches wherever they operated. Both rely heavily on dedicated volunteer networks. They have formed strategic partnerships and collaborations with governments, other humanitarian organizations, and local communities.

These alliances have allowed them to leverage resources, expertise, and local knowledge to expand their reach and impact. Lastly, they have proven to be adaptable and innovative in their approaches, evolving to meet the changing needs of communities and therefore remaining relevant and effective in different cultural contexts.

If we were to sum up what a) scaling in natural ecosystems, b) scaling of industrial agriculture, and c) scaling of these global aid organizations have in common, these key factors emerge:

- Localized dissemination (of knowledge; of energy) through branching patterns and localized networks
- Cross-sector collaborations & partnerships
- Intricate networks of interactions between entities, including mutualistic relationships
- Leaving room for (localized uniqueness and) diversity – not rigid unification
- Adaptability and innovation

Branching and localized networks, then, are one characteristic of effective "fractally" scaling systems, whether natural or human systems. ■

THE FARMER ORGANIZATION AS THE INTERVENTION NODE

The fractal is a metaphor, but it can be a powerful tool for seeing past the limitations of linear frameworks of change, and for reconciling the top-down and bottom-up approaches. In what follows, we would like to explore what scaling of regenerative agriculture according to a fractal pattern would look like.

The starting point for such a scaling proposal is the understanding that any farm is part of a larger system. A farm is never an isolated entity: it is typically a part of a wider collective group, such as a village, a farmer cooperative, an aggregation group or a farmer-producer organization. Geographically, it belongs within a watershed and, zooming out further still, a bioregion.

The entanglement and interrelationship of farmers nested within farmer groups, farmer groups nested within watersheds, watersheds nested within bioregions, is a fractal-like pattern. While each "node" — individual, group, or region — within it is unique, there is self-similarity in the sense that the micro level and the macro level determine each others' "horizons of possibilities." If regeneration is not occurring at the micro level, it is very hard to activate it at the macro level. For example, if farmers are predominantly struggling to meet their most basic needs such as health, sanitation and food security, i.e. they themselves cannot live in a way that is regenerative for them, regeneration of the region's agriculture is very hard to achieve. Conversely, if the broader region is characterized by agricultural policy that does not support smallholders, address rural poverty, or if exploitative trading relationships are the norm, it is hard if not impossible for an individual farmer to gather the resources necessary to transition to more diversified, less chemical-reliant farming practices.

When the nodes — individual farmer, farmer collective, watershed, bioregion — are appropriately aligned, resources, activating energies and knowledge can rapidly be transferred from one level to another. Not only that, but the whole system can self-organize, with each of its constituents contributing to the "filling out" of the pattern at a macro level. If we know the appropriate node or scale at which to intervene in this system, we can tap into the powerful scaling potential of a fractally organized system.

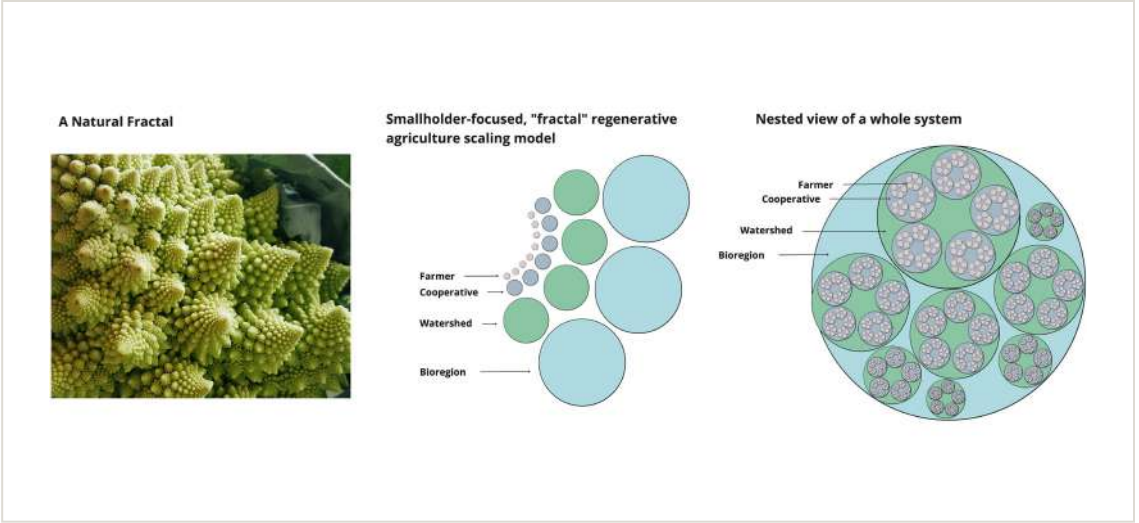
We propose that the appropriate node for intervention is the farmer group, such as a farmer cooperative, other local organization or a rural resource hub. On the one hand, trying to scale regenerative agriculture by working with a single farmer at a time, convincing them of the benefits of adopting regenerative practices and building their individual capabilities to do so, would be too slow and resource-intensive. On the other hand, trying to transition vast tracts of land or an entire region to regenerative agriculture all at once would likely not result in deep regeneration, because such a scale doesn't allow for building strong relationships and implementing more intensive and

impactful practices.

Self-organized farmer collectives or cooperatives, in contrast, are often identified as one of the most important factors of regenerative or even sustainable food systems. Firstly, farmers who are organized amongst themselves acquire stronger market positions through aggregating produce and being able to improve quality control. A certain volume is necessary for commercial viability; volume requires aggregation; and aggregation, in turn, requires organization, infrastructure, and facilities. Furthermore, collectively farmers can more effectively gain access to education, skill development, as well as social, financial, and technical support. Importantly, organized farmers have governance structures in place, which facilitates internal functioning and unlocks their ability to collaborate with other third-party organizations.

The farmer group or cooperative is composed of individuals, so facilitating the understanding of regenerative principles, practices and processes at that level will reach individual farmers, who can then go on to apply their enhanced capabilities to their own contexts — their farms and families. Because of peer support and peer learning at the farmer cooperative level, farmers will not be left to make the transition alone.

The farmer group or cooperative is also at the appropriate scale to engage in negotiations with buyers of crops. It is at that point that equitable and fair negotiations, including incentives and support in the form of premiums, forward contracting, or financial



A sample schematic of fractal scaling

support for implementation or processing facilities, need to be facilitated in order for the farming to be "regenerative."

In the context of African countries, Roger Leakey sees Rural Resource Centres (RRCs) or grassroots farmer-centered hubs as a critical component of smallholder farmer centered regeneration. Such resource centers or hubs could provide extension services and trainings; facilitate the capacity-building of local farmer leaders and train-the-trainers; disseminate regenerative farming practices through farmer-to-farmer interactions; and nurture local livelihood needs through supporting the development of value-added products. In the long term, such a participatory center can grow into "a diffusion hub that fosters many satellite tree nurseries in neighbouring villages, so maturing and becoming self-supporting and sustainable." (Leakey 2018) The idea of a

diffusion hub with satellite activity in neighboring communities is, again, a fractal-like pattern.

At the watershed and bioregion level, the amplification of the regenerative paradigm needs to support the creation of a supportive policy environment and adequate infrastructure — see, for example, Charles Jones' analysis that industry-specific efforts without larger institutional and infrastructural development will fail in the long term (Jones 2015).

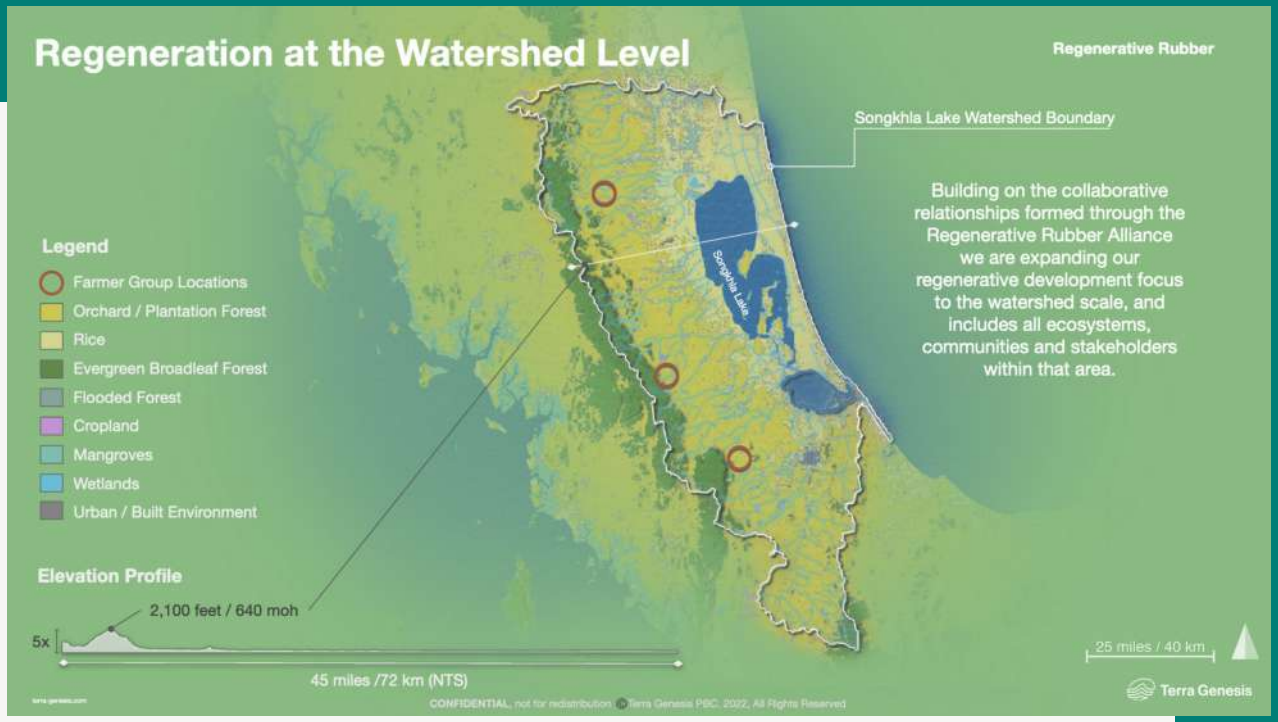
What results is not mechanical replication of a template that looks the same everywhere, and is likely characterized by low-impact, "regenerative lite" practices (or worse, greenwashing). Rather, regenerative principles and processes are engaged at the farmer cooperative level; but the specific practices in which they result are determined in a context-specific manner, depending on the place, the crop, and the style of farming, drawing on the innate intelligence of the farmer group and their intimate understanding of the land they cultivate.

One of the most critical questions for scaling regenerative agriculture, then, is: How do we strengthen local farmer organizations? How do we build capacity among farmers to self-organize if there isn't an existing organization? Lastly, how can these organizations be made more inclusive when they are not? For example, in some cultures there are particular challenges to women's involvement in farmer groups, and "increasing women's participation requires intentional sensitization to overcome cultural restrictions." (Feed the Future, 2018) ■

CASE STUDY: THAILAND REGENERATIVE RUBBER AGROFORESTRY AT A WATERSHED LEVEL

For several years, Terra Genesis has been supporting a Thai agroforestry rubber project in Southern Thailand. Together with market partners VF Corporation brands Timberland, Vans, and The North Face – the project has developed the world's first regenerative rubber supply system for the apparel industry.

The project exemplifies the idea of fractal scaling, from the cooperative to a watershed level. It began with a single small group of rubber farmers that had organized around the concept of Wanakaset, or 'self-reliance.' The Wanakaset movement emerged organically from the local farmers' relationship with their land, resulting in a unique philosophy and set of farming practices. It was this group that Terra Genesis initially engaged and worked with to identify what regeneration would mean for this particular place and for this particular crop, developing the group's capacity and supporting it in negotiating purchase agreements with VF that were favorable for the farmers.



After building capacity in this way with a single farmer cooperative, the project has now scaled to a total of five cooperatives, encompassing a wider region. Working now with a network of agroforestry rubber cooperatives in southern Thailand, Terra Genesis has facilitated direct trade relationships, a monitoring and verification system enabling quantification of regenerative social and ecological outcomes, and a pathway towards achieving VF's corporate goal of 100% of its rubber supplied from regenerative farms by 2030.

The program is now moving towards a watershed-scale coordinated strategy across 3 neighboring provinces, with engagement from government representatives. In this way, engaging farmers at the level of a single cooperative has allowed the effects of regeneration to ripple across both individual farmers' communities and families, and outward across an entire watershed and province.

FARM DATA QUANTIFICATION AS A WAY OF UNLOCKING SMALLHOLDER FARMER POTENTIAL

Building farmers' income from environmental outcome measurement, such as carbon reduction and removal or insetting, is often proposed as a component for a scaling strategy (Sustainable Markets Initiative 2022).

However, farmers – and specifically farmers on small farms — are often not incentivized to participate in the valorization or monetization of ecological outcomes. A recent report by McKinsey found that

> **"many farmers today are focused on near-term financial performance and may not have adequate incentives to adopt sustainable practices and technologies [...] 50 percent of farmers cite low ROI as a top reason for not participating in carbon programs."**
> (MCKINSEY 2023, 28)

Enrolling in a carbon or ecosystem services program typically involves considerable paperwork, audits, and other logistics. Carbon farm payments are so small per acre or hectare that it is simply not worth it for a smallholder farmer to even go through the process of qualifying, and of measuring impacts. Farm-based carbon offsets, insetting, and other ecosystem services payments systems therefore tend to primarily serve the needs of companies who need to offset their impact, and large-scale farmers.

An important innovation lies in making farm data programs and measurement and monitoring tools (M&E, MRV, etc) **easily accessible, open-source, and small-scale farmer friendly.**

If this is done well, the quantification of ag data can unlock access to another revenue stream for smallholder farmers. This is then another factor that helps to bridge the "grassroots" and the "corporate" levels of scale: the grassroots is close to the land and is in a position to closely monitor the farm ecosystem, providing valuable data for the corporations that need it to meet regulations and communicate their impact, while the corporate level has global market access, access to financing, and streamlined infrastructure which make them an attractive partner for the farmers.

Presently,

> **"The spread of mobile technology, remote-sensing data, and distributed computing and storage capabilities are opening new opportunities to integrate smallholder farmers into the broader agri-food system."**
> (FEED THE FUTURE 2018).

While there are some limitations such as uneven access to internet connectivity and varying rates of literacy, farmers' engagement in farm data programs has rapidly increased. Moreover, the aggregation of farmer data, remote-sensing data, satellite data, and weather data allows for more robust data sets while requiring less of the farmer.

The Ethos™ Regenerative Outcome Verification™, launched by Terra Genesis in 2023, is an example of a farm data program that is built with smallholders in mind. The data is collected and aggregated through a peer verification network akin to a participatory guarantee system, which engages the farmers themselves as data collectors. Farmers are involved in determining what regeneration looks like in their particular context. Lastly, an important innovative component of the EthosTM platform is data sovereignty: farmers own the data and can sell it, which yields an additional farm-based revenue stream.

In this way, farmers are rewarded for the impacts of their stewardship; companies can report on procurement impacts, and consumers can see the impact of their purchasing decisions. EthosTM facilitates precisely the kind of "profit-sharing across the agricultural value chain that directly benefits farmers" that Solidaridad's *Small Farmer Atlas* calls for as a crucial intervention: it eliminates the compounding of premiums by creating Direct Economic Relationships between producers and buyers, allowing farmers to retain more of the profit. ■

Image: Kamolpatara Kasikam (Pookie) training Chorthip Prabpree on using the application for Ethos™ data collection in Tamot, Phatthalung. Photo by Michael Commons.

DE-RISKING DIVERSE FARM SYSTEMS THROUGH BUYER COALITIONS

The previous reports in this project have explored the market pathways that would support and incentivize more diverse polyculture-based agricultural systems.

A key challenge for polyculture systems is that present-day markets tend to operate on the assumption of a single farm product or single enterprise. The purchasing of ancillary crops is often not coordinated; at best, a farmer may sell them at local markets or use them as subsistence crops.

Just as aggregation of farmers is needed to achieve volumes that make trade viable, so is the aggregation of buyers also sometimes necessary, so that a farmer group growing diverse crops would have a guarantee, prior to planting day, that there will be buyers at harvest time.

Convening buyer coalitions, such as precompetitive partnerships, that represent different companies, potentially even different industries, is a way of accelerating market pathways and de-risking farmers. It requires coordination and a willingness to commit to a collaborative, landscape approach to procurement that may be more complex than if each party were to pursue purchasing on their own. An exciting new avenue is exploring cross-industry partnerships, such as those representing the food and apparel industries, committing to support and source from the same farmers or the same landscape. For example, legumes can be grown as a rotational crop for cotton, such that the same field yields two kinds of crop in a year. A buyer coalition of a food company and an apparel company could commit to supporting regenerative agriculture practices on this farm and to purchasing the product at harvest time. Another example is a coffee trader partnering with a rubber trader to purchase coffee and rubber grown in a diverse polyculture, such as the Thailand rubber agroforestry system mentioned in this report. ■

WORKING RELATIONALLY: FROM SCALING TECHNOLOGIES TO ACTIVATING CAPACITY

A fractal approach transcends the tension between local and global-scale solutions because the focus shifts

> **"from scaling technologies, behaviors, and projects to building and activating the agency and capacities of individuals and collectives to transform systems and cultures at scale."**
> (O'BRIEN ET AL. 2023)

But to activate agency and capacity, it is crucial not only to identify the appropriate node for intervention — the local farmer organization or group — but also the appropriate manner in which that group should be engaged.

This is where the paradigm, or mindset, that the actors operate with comes into play. Paradigms and mindsets are one of the most effective levers of change, or points to intervene in a system (Meadows 1999). As Lorraine Daston has demonstrated, paradigms, or models, are "thick" rules — broad paradigms to emulate or as general guides to practice — that often go unseen and unspoken, but they shape assumptions and give rise to more detailed rules that govern our lives (Daston 2022).

An intention to make a change in the agricultural system should be grounded in values of care, dignity and respect for the farmers. In order for a farming project to be regenerative, it cannot be experienced by the farmers in question as yet another extractive transaction in a long history of inequitable colonial and capitalist trade. As Gordon et al. (2023) point out, power, equity and how humans relate to one another has been largely absent from the dominant discourses of regenerative agriculture. That is now slowly beginning to change as we witness an amplified demand for collective recognition that the social and the economic are part and parcel of regenerative agriculture — and that therefore conversations about power and equity should be as well.

What is required of companies is shifting the paradigm of the roles they play — from offtaker to caretaker or steward of the landscapes from which they source their raw materials or ingredients. This mindset shift also changes companies' perception of their responsibility: if a company can be responsible for the destruction of a landscape, it is also (financially) responsible for its regeneration.

This work is admittedly hard. It takes energy and personal investment to engage people, cultivate relationships, and to re-align profit sharing and power dynamics. But there can be no "regenerative agriculture" without a willingness to do this work.

An anecdote from Scott Poynton, founder of the Forest Trust and the Pond Foundation, about a regenerative Bambara nut project in Ghana illustrates what engaging with farmers as partners, with respect and care, could look like. Poynton visited Northern Ghana to explore the possibilities of sourcing Bambara nut, a groundnut-type crop, from the region, and went around meeting with local farmer groups to ask if they would become growers for the project. However, the farmers voiced skepticism, saying that other traders and businesses had come to the region before, proposing similar projects. The farmers had gotten excited, cleared land, and invested work — only to be disappointed when the traders never came back.

Poynton and his partners at WhatIf Foodshad to prove that they were different.

> **"We decided that I would go back to Ghana… and start working with the local partners there and build up a local team to deliver this project of a regenerative Bambara groundnut value chain.**
>
> **What do we mean by this concept of 'regenerative'? We didn't want to go there and just buy the beans. We didn't want to just be traders – coming in, buying the beans and screwing the farmers down on price. We wanted to partner with farmers and we wanted to support them to explore different ways of agricultural practices.**
>
> (POYNTON 2023)

The local farmers, who were predominantly women, shared that they love to farm, but are time-poor because they need to collect firewood, fetch water, there isn't a school so they have to look after the children, they are often either sick due to contaminated water or pregnant.

> **So many companies think about those aspects of their community engagement as being sort of little projects they have to do on the side. They come in, they buy the crop, they screw the farmers down on price, they get out. And if they want to put a nice picture on the front of their annual report, they might build a school. There are so many beautiful school buildings in these parts that have never seen a teacher and have never seen a student.**
>
> **So we realized that we had to go further. We had to work in a different way. And that different way was where we came in and we saw the farmers as partners. And they were prepared to give us their labor on their land to grow this crop. And in return, we had to bring them seed so they could grow the crop. But we'd also have to support their overall community to help make time for these time-poor women to go and farm. So it wasn't just about doing a nice project. If we wanted to buy the Bambara bean, we had to bring in water infrastructure. We had to bring in health infrastructure. We had to bring in education infrastructure. We had to bring in sanitation infrastructure.**

That is what WhatIf Foods went on to do. But the specifics of their on-the-ground support are less important than the values that motivated them to do so. Treating the farmers as equals, as partners; cultivating relationships through hours spent talking under the village meeting tree; being good to their word with the farmers and coming back, again and again, to bring the seeds, to buy the crop, to build infrastructure.

Solidaridad's *Small Farmer Atlas* highlights the importance of respectful, mutualistic relationships as the cornerstone of smallholder-centered regeneration: "the private sector and farmers have key roles to play in building relationships based on mutual respect rather than dependent beneficiaries reliant on support projects. This entails recognizing and prioritizing the interests and agenda of local communities, rather than imposing top-down solutions."

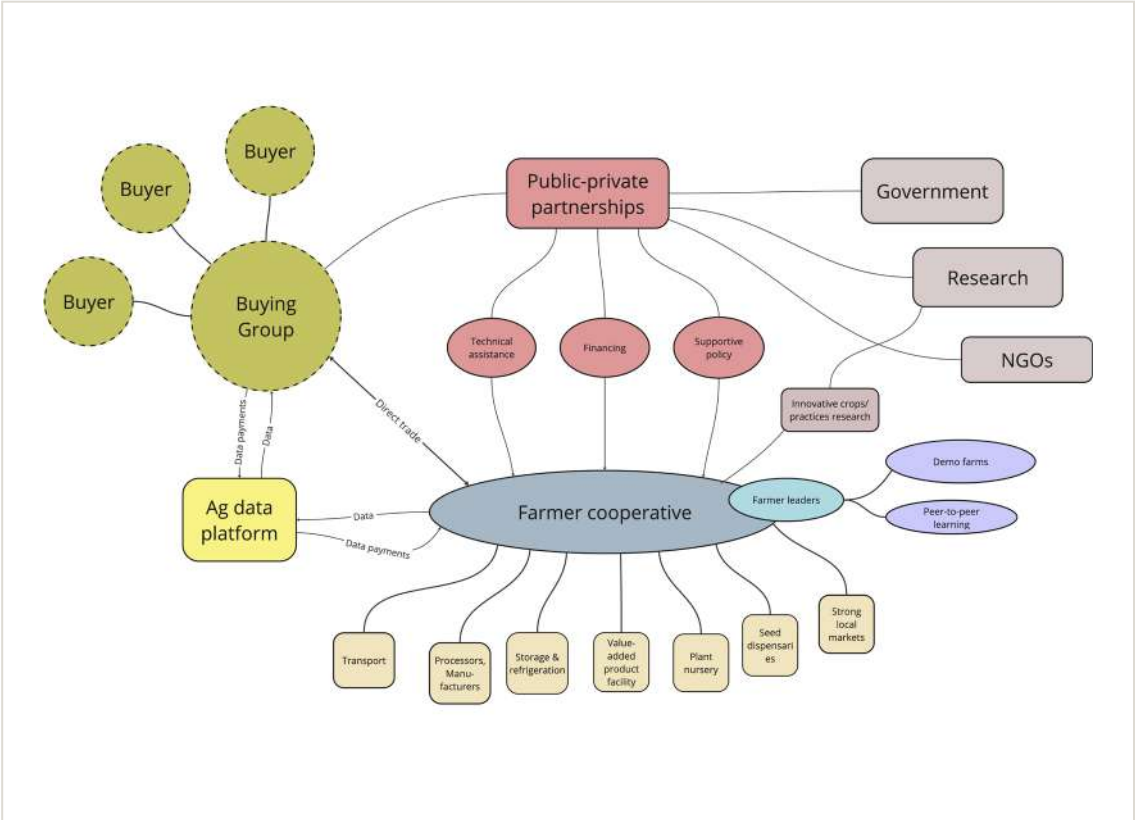
There is emergent thinking about what development work, philanthropy, and even business could look like if conducted while cultivating a relational way of being, accommodating diverse worldviews and notions of the good life such as *buen vivir* and *ubuntu* rather than only Global North -centric visions, and putting the commons before commodification (Escobar 2018; Kothari et al. 2019). ■

"The grassroots" isn't just a nice idea; it is required to scale. Through engaging with clusters of smallholder farmers, rather than each farmer individually and one by one, it is possible to not only reach more farmers at once; one can also tap into the collective agency brought about by relationships within a community and rapidly scale to the watershed and bioregion level.

What would happen if we shifted focus away from "replicating regenerative practices on more and more acres" and instead to the strengthening of farmer networks and deepening of connections?

In doing so, we would help build capacity at a local organizational level and, over time, support the emergence of farmer-centered enterprise ecologies. Taking its model from the concept of ecosystems, an enterprise ecology is the network of organizations that are involved in the delivery of a product or service, involved in mutualistic relationships with one another. Rather than supply chain models, which are focused on the business and see the farmer merely as the supplier of a raw product, a farmer-centered enterprise ecology places the farmer (or the farmer cooperative) at the center and considers what are the other organizations, sectors and resources that enable it to function optimally.

Here is a schematic diagram of what a farmer-centered enterprise ecology could look like:



While this enterprise map centers farmers, as opposed to private sector entities, it does not mean that the latter don't have a role to play. On the contrary, the companies that source from agriculture are critical to the functioning of a healthy farmer enterprise ecosystem.

The two key drivers to transform the food system, laid out by the Small Farmer Atlas, sum up the work that is businesses' and corporations' to do:

1. **ensure profit-sharing across the agricultural value chain that directly benefits farmers, and**

2. **work towards systemic changes that build wealth in the broader community**

The work for companies is to evolve their business models to ensure profit-sharing across the agricultural value chain. **Here are some pathways:**

- → direct trade to ensure more of the profit stays with the farmer
- → forward contracting or other payment terms that provide upfront support
- → support access to other different funding mechanisms
- → farm data platforms that are accessible and economically viable for smallholders
- → buyer coalitions or pre-competitive agreements that focus around supporting multi-crop enterprises and farming regions

Here are some pathways to foster systemic changes that build wealth in the broader community, especially through cross-sector partnerships:

- → identify mechanisms to support local farmer organizations such as cooperatives, and to form them where they do not yet exist
- → supportive rural and agricultural policy technical assistance and education
- → public-private partnerships and investment of private sector in financing solutions for smallholders
- → foster the development of farmer-centered local infrastructure: processing facilities, storage and refrigeration, value-added product manufacturing, plant nurseries, seed dispensaries, and tool libraries

Perhaps the most important and difficult work, though, is boldly engaging the complexity of living systems, and committing to evolving our own capabilities as agents within them, as nodes in the fractal, collectively forming an ambitious and critical new pattern on the planet. This requires naming, and consciously shifting away from, the legacy systems such as extractive capitalism and colonialism that we have inherited, and finding new ways to relate to the landscape and to each other. ■

Organic	$ 59,100,000,000	$ 62,900,000,000	$ 70,800,000,000	$ 68,500,000,000	$ 80,000,000,000	$ 81,600,000,000	$ 90,000,000,000	$ 97,000,000,000	$ 95,000,000,000	$ 106,000,000,000	$ 120,650,000,000
Fair Trade [1]	$ 4,320,000,000	$ 4,980,000,000	$ 4,790,000,000	$ 5,500,000,000	$ 5,900,000,000	$ 7,300,000,000	$ 7,880,000,000	$ 8,490,000,000	$ 9,800,000,000	$ 10,927,000,000	$ 12,183,605,000

Global Agricultural Land Area (Hectares in MM) [2]											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
	4,820.00	4,800.00	4,800.00	4,790.00	4,790.00	4,770.00	4,770.00	4,810.00	4,800.00	4,800.00	4,800.00
Global Organic Agricultural Land Area (Hectares in MM) [3]											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
	37.20	37.20	37.50	43.09	43.70	50.90	57.82	69.84	71.50	72.30	74.90
Global Fair Trade Agricultural Land Area (Hectares in MM) [4]											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
	1.10	1.30	1.80	1.90	2.09	2.20	2.30	2.63	2.65	2.80	3.00

[1] From Annual Reports, purple values imputed based on CAGR
[2] FAO Statistics
[3] FAO Statistics
[4] Source from annual reports

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