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# Regeneration and Regenerative Agriculture: Definitions, principles and practices



Terra Genesis



Smallholder  
Data Services

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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 will be generating, over the course of the next year, a series of reports, recommendations, best practices and guidelines that draw from early-stage regenerative farming by smallholders in various parts of the world.

For this first set of reports, SDS has turned to one of its founding partners, Terra Genesis International, to take the lead in addressing the definition, measurement and strategies for scaling regenerative agriculture as implemented by smallholders.

In the course of undertaking this Rockefeller Foundation-supported initiative, SDS will be drawing on an additional founding member: the Smallholder Farmers Alliance in Haiti.

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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 smallholders 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](http://smallholderdataservices.com)



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](http://terra-genesis.com)



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/>

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# Defining Regenerative Agriculture



In a time of converging ecological and human crises, regenerative agriculture holds great promise. Yet, because the term has been adopted so rapidly across a highly diffuse and loose “movement” of organizations and actors, there isn’t a single, widely accepted definition for what ‘regenerative agriculture’ exactly means. This lack of a shared understanding and rigor around the term has caused confusion and led to cases where the integrity of the term has been compromised, making the regenerative agriculture movement vulnerable to skepticism as well as greenwashing.

Regenerative agriculture is revolutionary yet also rooted in traditional approaches to farming: farming in ways that replenish soil nutrients, help to clean waterways and air, capture carbon, and create multi-functional, multi-layered, biodiverse farming systems that function holistically and support the well-being of all forms of life within its fold and beyond.

It is therefore critical to ground the discussion of regenerative agriculture in a way that retains the meaning and integrity of the term. This report does that by situating regenerative agriculture within a broader paradigm of regeneration that is characterized by an emphasis on principles rather than practices. We view regenerative agriculture systems holistically: as wholes unto themselves while functioning as a part of a larger whole.

This approach differs from three common approaches to defining regenerative agriculture:

- **Regenerative agriculture as a set of farming techniques or practices:** Rather, it is a process of engaging with the land in a way that is alive and ongoing, not a linear task list of checking boxes or implementing practices that can one day be considered “complete.” Regeneration is also context-specific, inherently dependent on the unique qualities of place, ecological context, cultural context, climate, and so on, so that no list or set of practices can ever provide a comprehensive picture of what it means to farm regeneratively.
- **Regenerative agriculture as soil health:** Soil health is an important consideration in regenerative agriculture, but it takes more than soil health promoting practices for an agricultural approach to be regenerative.
- **Regenerative agriculture primarily framed around carbon:** Carbon sequestration in soil and biomass is an important outcome of regenerative agriculture and land management. But regenerative agriculture cannot be reduced to carbon capture optimization alone.

## WHAT IS REGENERATION?

To understand what makes agriculture *regenerative*, it is necessary to understand what is meant by *regeneration*.

Regeneration is broader than farming. It describes a **process** and a **paradigm** that can be applied to all areas of life and living systems: ecological, economic, social, cultural and psychological.

*It is a process, in the sense that regeneration is a living, ongoing, open-ended journey rather than linear progress heading towards a defined end-point or result.*

*It is a paradigm — a mindset, worldview, or a lens through which we view the world — in the sense that it constitutes a fundamental framework for thinking that is shaped by a certain set of values and perceptions about what is important.*

**To ‘regenerate’ means to bring into renewed existence, to breathe vigorous new life to something, to restore something to a better state than it was in before.** ‘Regenerative’ describes processes that restore, renew or revitalize their own sources of energy and materials, creating sustainable systems that integrate human needs with the needs of other living systems.

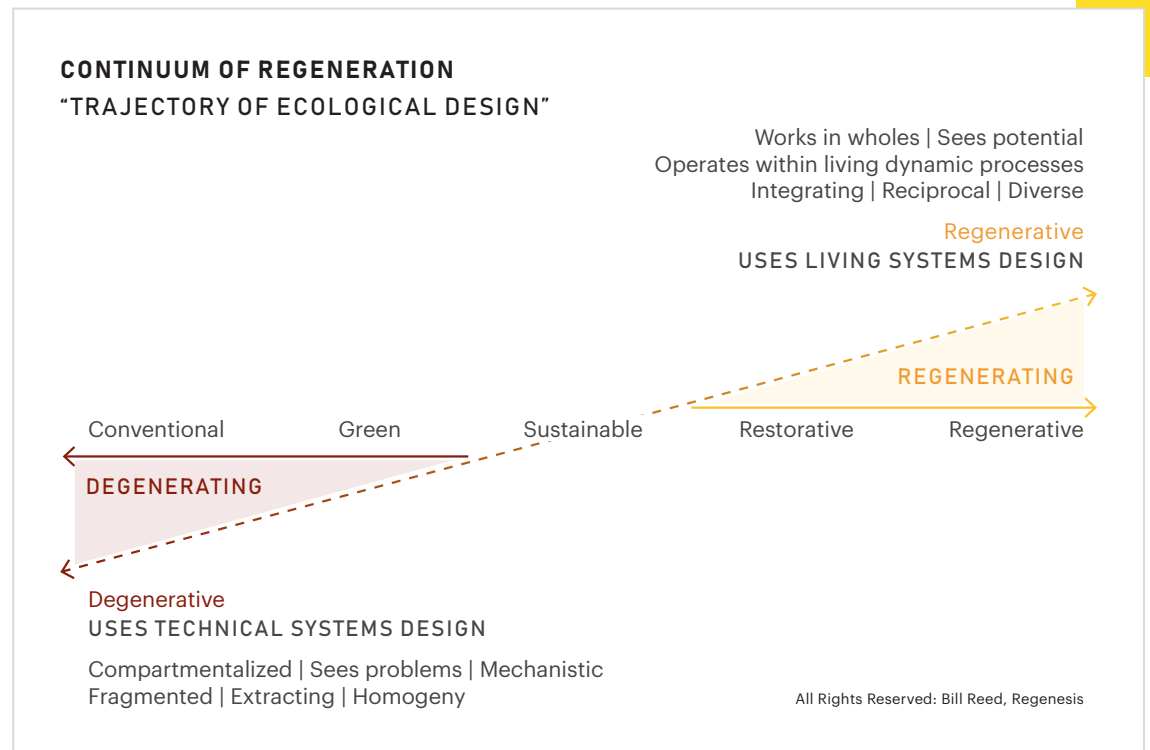
Regeneration can be contrasted with other paradigms, as illustrated in the graphic to the right. The processes and paradigms that have come to characterize industrial and post-industrial agriculture and economy can be called degenerative, in the sense that they have degenerated, degraded and depleted natural resources, soil nutrients, ecosystems, and human well-being in their quest to maximize efficiency and profitability. Even efforts towards so-called “green” technologies and “green” business have operated from a similar mindset and led to similar results.

What makes these processes degenerative is the underlying paradigm, or way of thinking that they apply to the world: one that is predominantly mechanistic, compartmentalized and fragmentary, and focused on “solving problems.” Because it fails to view phenomena holistically, it ends up functioning in extractive ways.

Efforts towards sustainability are movement in the right direction: seeking to conserve resources, reduce harm, and move towards more life-sustaining processes. But where they get us, at best, is stabilizing and sustaining the status quo. Much more is needed to start to restore and regenerate the degrading impacts of the prevailing degenerative business-as-usual.

Regeneration operates from a living systems design mindset of working in wholes, which means understanding the interrelationships and reciprocities that characterize a living system. It means viewing any system, such as a farm or an ecosystem, as a dynamic and living process. It values diversity over homogeneity, and focuses on the potential inherent in a system rather than problem-solving and fixing discrete issues in a system.

As a broader framework, regeneration is moving beyond extractive, linear, one-way relationships to circular and reciprocal systems and processes that restore, renew or revitalize their own sources of energy and materials.



This broader paradigm, then, can be applied to a number of areas of life. We may speak of a *regenerative supply chain* when a company sources the raw materials for its products from sources where they are grown in ways that build soil and ecosystem health. This is the case, for example, when a chocolate company or a coffee importing cooperative supports its cacao or coffee farmers in developing agroforestry systems that build healthy soil. A *regenerative business or organization* goes far beyond corporate sustainability; it provides services and goods in ways that regenerate, instead of destroy, environmental and social resilience. It seeks to grow the capacity of everyone involved, to elevate the whole.



## WHAT IS REGENERATIVE AGRICULTURE?

Regenerative agriculture is a system of farming principles and practices that applies the regenerative process and paradigm to agriculture.

Regenerative agriculture is rooted in indigenous and ancestral agroecological traditions. At the same time, it draws from decades of scientific and applied research by the global communities of organic farming, agroecology, holistic grazing, and agroforestry.

Regenerative agricultural systems include ecological, social and cultural systems, and as such they encompass the well-being of the farmers, their communities, and those they impact, as well as the landscapes they are a part of, the ecosystems in which they are nested, and the ecosystems they impact.

# Principles of Regeneration at Work in Regenerative Agriculture

Based on the work of Carol Sanford



From these foundational ideas about what regeneration is and how it can inform agriculture, a set of principles can be distilled that do not dictate the specifics of regenerative agricultural systems, but point toward characteristics that define them. These principles are key to ensuring integrity and success on the journey of developing regenerative agricultural systems.

## **1. Works with whole agroecosystems**

A regenerative approach to agriculture considers whole agricultural systems including: soil, water, biodiversity, ecosystem health, farmers, farm workers and their surrounding communities.

## **2. Sources from place and unique context**

A regenerative approach to agriculture applies a place-sourced, context-specific approach that is informed by and draws on each agricultural system's unique ecology, history and culture, rather than applying a generic or one-size-fits-all template to it.

## **3. Develops capacity of all stakeholders**

Regenerative agriculture develops capacity in all stakeholders in the agricultural system, including farmers, ecosystems, communities, co-creators, investors and end customers. This is not development dictated by or imposed from the outside, but rather creating the optimal conditions for each of the stakeholders to flourish and develop their own potential.

## **4. Works through systemic interventions**

A regenerative approach to agriculture seeks to work through the points of highest and most systemic return in interventions within the agricultural system. For example, increasing species diversity in a farm system is a nodal intervention because it results in a number of cascading benefits including disease and pest resistance, wildlife habitat, support for pollinators, food and income security, aesthetics, and resilience in the face of stresses and shocks to the system.



## 5. Recognizes nested systems

In regenerative agriculture, we consider the larger systems a farm is nested within (regional ecosystems, bioregion, watershed) as well as the systems that are nested within the farm (water cycle, soil cycle, earthworm communities).

## 6. Develops reciprocal relationships

Regenerative agriculture engages all stakeholders to connect with the living and dynamic processes of the larger system or whole they are a part of, such that their own work and growth makes appropriate contributions to that larger whole.

## 7. Works from potential

A regenerative approach to agriculture recognizes and works towards supporting and developing the potential of an agricultural system. It focuses energy on supporting a system in actualizing its potential rather than focusing on problems. It's the difference between "How can we solve the problems in the system" (narrow focus) and "What potential is this system trying to realize" (seeing potential).



Image: Shawn Linehan

While regenerative agriculture cannot be defined by solely a list of farming practices, or specific desired outcomes such as carbon sequestration, there are certain practices and outcomes that are known to be conducive to regeneration.

## EFFECTS COMMONLY OBSERVED

### IN REGENERATIVE AGRICULTURE

- Increased health and vitality for farming communities
- Equitable, safe and fulfilling working conditions for farmers and farm workers
- Increased farm resilience to climate change and extreme dramatic weather events
- Enhanced ecosystem health

## OUTCOMES COMMONLY OBSERVED

### IN REGENERATIVE AGRICULTURE

- Enriched soils with improved nutrient cycling
- Increased biodiversity
- Maintained or improved per-acre yields
- Improved on-farm and down stream water quality and watershed health

## PRACTICES COMMONLY USED

### IN REGENERATIVE AGRICULTURE

- Agroforestry
- Silvopasture
- Crop diversification
- Crop rotation
- Cover cropping
- Reduced till or no-till
- Mulching
- Integrated pest management
- No or reduced use of synthetic pesticides and fertilizers
- Use of biofertilizers and traditional fertility-building methods
- Managed rotational grazing
- Multi-species, multi-system integration (plants, animals, aquaculture etc.)

# Applying Principles and Practices to Place

This section describes the lessons learned from applying appropriate principles and practices in three representative pilot project countries and farming contexts where Terra Genesis International has engaged with local farmer communities in regenerative agriculture projects.



## THAILAND | RUBBER

The history of this project dates back 90-100 years when rubber was first introduced to Thailand (particularly southern Thailand). Rubber trees were integrated alongside other crops in a diverse, traditional forest-like system. In the 1960s and 70s, the Green Revolution began promoting rubber monocultures as the way rubber should be grown and penalized farmers for growing other trees and species. The move to monocultures had detrimental consequences: the soil degraded, wildlife and biodiversity was lost, and rubber tree growth wasn't optimal. Members of the community who were strongly attuned to the importance of a symbiotic relationship with the forest saw that the rubber forests, the ecosystem and the community needed to be restored. It was essential to "bring the forest back to the rubber."

The Wanakaset farming system (meaning 'agroforestry and self-reliance' in Thai) integrates rubber trees with a great variety of other beneficial species, including fruit trees, perennial vegetables, medicinal herbs, timber, and more. No two Wanakaset agroforestry farms are alike; they are each a reflection of the specific needs and creativity of the farmer who created and manages the system. These are extremely biodiverse systems, both in terms of agrobiodiversity (up to 100 crop varieties in some cases) and the great diversity of native plants, animals, and fungi. Farmer application of ecological management practices has been a key driver of regeneration of the local landscape. The rubber farmers are part of a larger Wanakaset movement in Thailand, which focuses on restoring ecosystem health, social and communal wellbeing, and restoring cultural values.

To realize the market potential of the regenerative rubber being produced, it was necessary to identify market partners who saw the value and depth of regeneration in this place. Terra Genesis International connected with the rubber project through Michael Commons, the Southeast Asia Regional Coordinator for the company, who had had long-standing relationships with the Wanakaset rubber farmers. Terra Genesis and Michael established negotiations with the VF Corporation, which became a committed market partner for the rubber project.

By establishing a long-term mutually beneficial partnership with VF, farmers are now able to receive a premium for their differentiated product, as well as access to resources and support needed to incentivize other farmers in their network to transition from conventional to regenerative forms of production. Other key stakeholders currently include the farmer cooperative, farmer leaders, rubber processors and Terra Genesis.

Already in its origins, the Thai agroforestry rubber project was applying a number of the principles of regenerative agriculture. First of all, it applies a place-sourced, context-specific approach based on an agricultural system's unique ecology, history and culture: the Wanakaset movement emerged organically from the local farmers' relationship with their land, resulting in a unique philosophy and set of farming practices.

The Thai rubber project also exemplifies the principles of reciprocity and nestedness. The project has been a success because the sourcing relationship was co-created by many different stakeholders, all of whom have their own unique role to play, and has developed mutual trust. The other partners were invited in by the farmers rather than entering from a position of power or control. Learning to trust and respect each respective role (e.g. farmers' knowledge of the forest; the processors' knowledge of producing rubber sheets) has been crucial to moving the project forward. This principle of reciprocity also relates to the principle of nestedness, in that each stakeholder is nested in this ecosystem and enterprise ecology.

One more ingredient of success in this project is involving a diversity of people, including different ages, genders and religions. The project has placed importance on a symbiotic relationship with nature that the elders in the community have modeled; creating safer conditions for women to work; and providing the younger generation with lucrative opportunities to make a living through farming. Regenerative principles at work here include the development of capacity and fostering reciprocal relationships in the whole agricultural system.





## HAITI | COTTON

The Haiti cotton project has been stewarded since its inception by the Smallholder Farmers' Alliance (SFA), an on-the-ground organization supporting Haitian farmers. SFA had worked for several years in partnership with the footwear company Timberland, which sponsored an agroforestry program that supported tree nurseries and agricultural services for farmers. A few years later, the idea of re-introducing cotton to Haiti emerged. (Cotton used to be one of Haiti's top agricultural exports until the 1980s, when it petered out for a number of reasons.) SFA's farmers started by growing organic cotton, and in 2022 began transitioning to regenerative cotton growing practices. The program is now in the process of scaling from 160 farmers to thousands.

Terra Genesis has supported SFA in developing the regenerative cotton program. Another key stakeholder, Smallholder Data Services, is developing the data technology needed for monitoring and verification of the eco-social outcomes.

It has to be stated that the program has truly succeeded against all odds: the environmental and social conditions in Haiti are dire. Low levels of literacy present a problem for soliciting information from farmers or engaging them in participatory monitoring. The landscape is highly degraded and eroded, farmers are economically disadvantaged, and the program has faced challenges due to ongoing social and political unrest in Haiti.

SFA's relative success can perhaps be explained by exploring some of the regenerative principles at work. One of them is nestedness: at the inception of the program, SFA and Terra Genesis developed an extensive stakeholder map that included farmers, researchers, brand partners, project developers and so on in its fold. SFA is an extremely well-organized and well-networked organization, which is why it was able to secure a major buyer such as Timberland for the cotton from the start.

At the same time, nestedness could be further developed: while each participating farm may be regenerating, the broader landscape in which it is situated remains eroded and degraded. Integrating the patchwork of regenerative cotton farms into a web that supports the entire community and the entire watershed is where this program could still further evolve.

Another principle that is actively applied here is that of developing capacity. SFA has done this by identifying key farmer leaders and representatives and working with them. Involving leaders in the community early on and onboarding them to the effort has been key to the cotton program's success. SFA has also used trial sites with the idea that "seeing is believing," hoping to encourage more farmers to join the program. Throughout the development of the program, they have sought to consult the farmers and collect and incorporate feedback from them. The farmers are hands-on and practical, and have helped to shape the program. Incentives and good communication are key to maintaining farmer buy-in. This participatory approach is one of the keys to the program's success.

The SFA Haiti cotton program holds some valuable lessons about what will allow a pilot program such as this to succeed. One factor is the strong governance that's in place through SFA. Having a buyer in place for the cotton was crucial, as well, to convince farmers to grow it. Lastly, for a project like this to be scalable, tree nurseries or seed breeding programs need to be established as early as possible for the keystone crop (in this case cotton) as well as for secondary crops and support species. A robust quantity of plant stock is needed to implement agroforestry practices on hundreds of farms at a time.



## ECUADOR | CACAO

Terra Genesis' work with cacao in Ecuador is located in a truly unique eco-region: the Choco rainforest in Ecuador, one of the world's biodiversity hotspots. Alongside with this natural richness, however, the pressures of the global market and industry are constant here: there is a high degree of deforestation, pressure from palm oil companies, and shrimp farms destroying mangroves.

The local partner organization, UOPROCAE, is an umbrella organization that supports 5 individual cacao cooperatives. A group of these cacao farmers have been practicing a "regenerative" form of cacao production for the last 15 years or so, combining their traditional agroecological practices with more explicitly modern regenerative practices. Initially, Terra Genesis was involved in supporting farmers with regenerative farming practices, water management, erosion control, and pest management for cacao production.

Terra Genesis developed an initial monitoring system (survey) around 2017 on top of Organic and Fair Trade, called Cacao ROV 1.0. In the process, many lessons have been learned, such as what kind of training is needed for the farmers. It is clear that an established and stable entity with good governance is needed on the ground to facilitate the onboarding to the regenerative practices. UOPROCAE as an organization has experienced some setbacks that have impeded its efficacy and ability to pay farmers on time. Because of this lack of stable governance on-the-ground, the Cacao ROV 2.0 development was paused in Fall 2022 to focus more on building organizational capacity.

A regenerative principle at work at this origin is the idea of sourcing from place. Ecuador appears to be one of the earliest places where cacao was grown. It is a culturally, ecologically and economically significant plant, a "keystone crop." Similarly, some of the practices that make up the Regenerative Cacao growing practices are sourced from place, from the traditional practices of the original group of cacao farmers.

Another principle visible at the Ecuador cacao origin is the idea of a nodal intervention. The local point person supporting this project, George Fletcher, might be called a nodal person in this project. He has made it possible to develop networks around regenerative cacao in the region. George saw the potential for cacao, and brought lots of connections and social capital to the project. He is head of UOPROCAE, with connections both locally and internationally, negotiating with other stakeholders, and managing certifications. 🌐